PLANT MANUAL

EQUIPMENT TECHNICIAN'S HANDBOOK

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MODEL 15 TELETYPE

ADJUSTMENTS

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1. PRINTING ADJUSTMENTS

1.1 Plunger Guide Roller Bracket

1.1.1 There should be not more than .010" clearance between either the right or left end of the pull bar bail and stripper plate when the bail is moved to its extreme forward position. TO ADJUST the position of the pull bar bail with relation to the stripper plate, loosen the plunger guide roller bracket mounting screws and move the bracket to the right or left.

1.2 Flanged Guide Roller

1.2.1 The flanged guide roller should be parallel, or within .002" of being parallel, to the surface of the plunger, and both guide rollers should rotate freely. TO ADJUST the flanged roller with relation to the plunger, move the roller end of the bracket up or down with the mounting screws friction tight. Tighten the mounting screws.

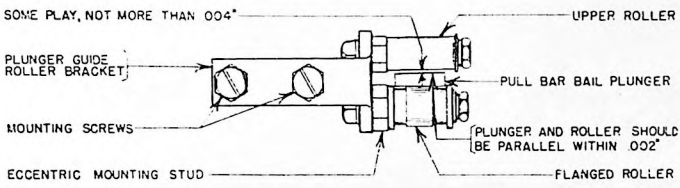


Figure 1

1.3 Plunger Guide Roller Bracket Final

1.3.1 Operate the pull bar bail slowly and see that all pull bars start to move away from the code bars simultaneously, within .020". If necessary, re-locate the plunger guide roller bracket to the left or right to meet this requirement. Check to see that the flange roller is parallel to the surface of the plunger within .002" and that both guide rollers rotate freely.

1.4 Plunger Roller Eccentric Mounting Stud

1.4.1 There should be some play, not more than .004", between the pull bar bail plunger and the rollers. Check for this play throughout the entire travel of the plunger. ADJUST the position of the eccentric mounting stud to obtain this requirement.

1.5 Pull Bar Spring Tension

1.5.1 It should require 2-1/2 to 3-1/2 ozs. to pull the spring to its position length.

1.6 Left and Right Pull Bar Spring Bracket

1.6.1 With the pull bar bail in its extreme rear position, the end pull bar and the fourth pull bar from the end should have some play, not more than .004". TO ADJUST, loosen the mounting screw of the pull bar spring bracket and position the bracket so that all four pull bars are free and that the end pull bar and at least one of the other three pull bars have some play, not more than .004".

1.7 Carriage Support and Pull Bar Bail Plunger Rollers

1.7.1 The three carriage support rollers and the pull bar bail plunger roller should turn freely with a barely perceptible amount of end play. TO ADJUST, loosen the lock nuts and position the cone nuts.

1.8 Type Bar Backstop

1.8.1 With the pull bar bail in its extreme rear position, there should be not less than .010" clearance between the type bar backstop and the pull bars when the type bars are held in the type bar guide. Make this check on the two end pull bars and the middle pull bar. TO ADJUST, set the up and down position of the type bar backstop by means of its elongated mounting holes to meet this requirement.

1.9 Selector Vanes

1.9.1 The forked arms of the vanes should line up with their respective T-levers. When the printing bail is in its extreme rear position, each vane should have some end play, not more than .004". TO ADJUST, loosen the vane clamping screws and position the vanes by means of their pilot screws. Tighten the clamping screws.

1.10 Pull Bar Guide (Code Bar Mounting Plate)

1.10.1 With the pull bar bail in its extreme rear position, move the code bars to the right. Then move the pull bar bail opposite the pull bar humps. There should be .008" to .020" clearance between the humps on all pull bars (except the blank pull bar) and the pull bar bail. With the code bars moved to the left position, there should be a like clearance between the blank pull bar hump and the pull bar bail. TO ADJUST, position the code bar mounting plate by means of its elongated mounting holes.

1.11 Code Bar Bell Cranks

1.11.1 The code bars should be carried firmly against their stops in both the MARKING and SPACING positions when the LETTERS and BLANK combinations are alternately selected. ADJUST by means of the bell crank eccentric bushings.

1.12 Printing Bail Shaft Right Bearings

1.12.1 With the printing bail held toward the right, there should be some, not more than .015", clearance between the end of the printing bail casting

1.12.1 and the left bearing of the printing bail shaft. TO ADJUST, remove the printing bail spring and position the right bearing by utilizing its elongated mounting holes. Replace the printing bail spring.

1.13 Printing Bail

1.13.1 The pull bars should clear the code bars .010" to .050" when the main shaft is rotated until the printing bail is in its extreme rear position, with the type bar carriage in both its extreme right and left positions. TO ADJUST, position the printing bail by means of its adjusting screw and lock nut, located on the printing bail operating arm. If the clearance at one side is unobtainable, it will be necessary to refine the PULL BAR GUIDE in such a way that the clearance between the pull bar bail and the pull bar humps, at the side that had the least clearance, is reduced to a minimum and, at the side that had the most clearance, is increased to a maximum for the PRINTING BAIL.

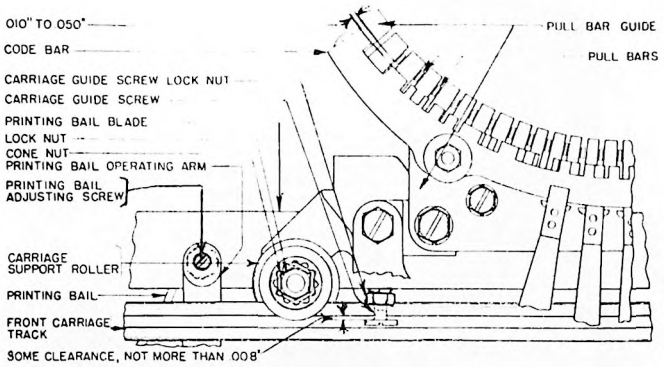


Figure 2

1.14 Printing Bail Spring Tension

1.14.1 With the printing bail in its extreme rear position, it should require 6-1/2 to 8-1/2 lbs. for 60 or 75 wpm operation (4 to 6 lbs. for 100 wpm operation), to start the lever moving. TO ADJUST, position the spring adjusting lever screw.

2. FUNCTION ADJUSTMENTS

2.1 Function Lever Bail

2.1.1 There should be .040" to .060" clearance between the rear edge of the No. 1 vane and the front edges of the function levers, except the universal function lever, when the printing bail is in its rearmost position and the No. 1 vane is held midway between its marking and spacing positions. TO ADJUST, position the function lever bail by means of its elongated mounting holes.

2.2 Blocking Plate

2.2.1 The position of the blocking plate should be as follows:

(a) With the CARRIAGE RETURN combination selected, and the main shaft rotated until the travel of the function lever bail is blocked by the selected function lever and the front edge of the right projection of the function lever bail should be flush (within .005") with the top front edge of the rear prong of the carriage return function lever.

(b) With the LINE FEED combination selected and the main shaft rotated until the travel of the function lever bail is blocked by the selected function lever, and the front edge of the left projection of the function lever bail should be flush (within .005") with the top front edge of the rear prong of the line feed function lever.

TO ADJUST, position the blocking plate by means of its slotted holes.

2.3 Function Bail Spring Tension

2.3.1 With the function bail in its extreme rear, it should require 2 to 3 lbs. to extend the spring to its position length.

2.4 Function Bail Blade

2.4.1 With the FIGURES, LINE FEED, and LETTERS function levers alternately selected and the main shaft rotated until the travel of the function lever bail is blocked by the selected function lever, there should be .004" to .015" clearance between the rear edge of No. 1 vane and the rear edge of a notch in the selected function lever. TO ADJUST, select the FIGURES function lever and adjust the right end of the function bail blade by raising or lowering it by means of its elongated mounting holes to

2.4.1 secure the specified clearance between the rear edge of the No. 1 vane and the bottom of a notch in the SHIFT junction lever. Then select the LINE FEED function lever and adjust the left end of the function bail blade by raising or lowering it to secure the specified clearance between the rear edge of the No. 1 vane and the bottom of a notch in the LINE FEED function lever.

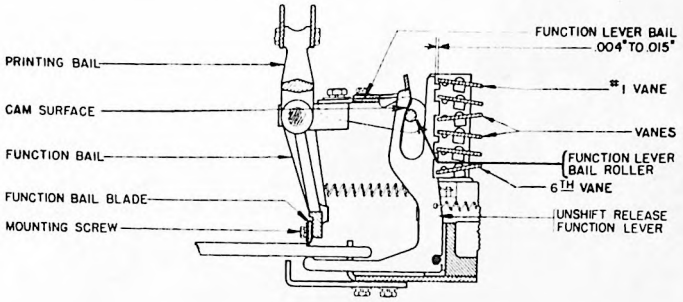


Figure 3

2.5 Platen Unit Pilot Screws

2.5.1 The platen unit should be midway between the side frames and should be free on its bearings without end play. TO ADJUST, position the platen unit by means of its pilot screws. (Care should be taken not to tighten the pilot screws to the extent that they cause a strain on the side frames.)

2.6 Platen Shift - Unshift Stop Post

2.6.1 The top and bottom surfaces of the platen shift-unshift stop post should be parallel to a line through the centre of the platen detent roller screw and the platen pilot screw. TO ADJUST, loosen the platen shift-unshift stop post nut and rotate the post.

2.7 Unshift on Space Cutout Lever

2.7.1 If it is desired that the platen should not return to the UNSHIFT position when the SPACE combination is received, the UNSHIFT on space cutout

2.7.1 lever should be rotated so that the hooked end of the cutout lever is to the rear of the SPACE function lever extension and the cutout lever touches the side of the SPACE function lever extension. There should be some clearance, not more than .006" between the rear surface of the SPACE function lever extension and the cutout lever.

2.8 Shift (FIGURES) and Unshift (LETTERS)

2.8.1 With the SHIFT-UNSHIFT detent and platen balance springs removedand LETTERS and FIGURES alternately selected, the SHIFT-UNSHIFT stop post should move to within .010" to .025" of the UNSHIFT stop screw and the SHIFT stop screw respectively, whenthe main shaft is rotated and the selected push bar is moved to its rearmost position when operated by the function bail blade. TO ADJUST, place the typing unit on its right side and rotate the main shaft until the function bail is in its extreme forward position. Adjust the turnbuckle on the shift-unshift link so as to equalize (within .010") the clearance between the function bail blade and the shoulder on the UNSHIFT push bar when the platen is in the FIGURES position. Select the LETTERS and FIGURES alternately and check for the specifed clearances between the shift-unshift stop post and the UNSHIFT and SHIFT stop screws. If either of these clearances is greater than .025", move the shift-unshift link bracket toward the front of the unit; if less than .010", move it toward the rear. Adjust the shift-unshift link turnbuckle to equalize both clearances within .010" the specified limits. Replace the shift-unshift detent spring and platen balance spring.

2.9 Platen Balance Spring Tension

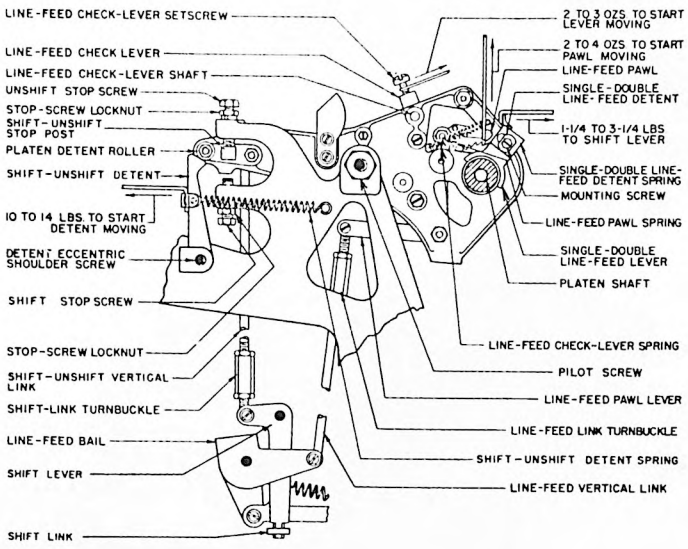
2.9.1 With the platen in the LETTERS position, it should require 3-1/2 to 5 lbs. to pull the spring to position length on units equipped with cast iron platen brackets, and 1-1/4 to 2 lbs. on units equipped with alumi - mum platen brackets.

2.10 Shift - Unshift Detent

2.10.1 When the platen is shifted to the SHIFT and UNSHIFT positions, the platen detent roller should ride equally on either side of the detent. TO ADJUST, position the shift-unshift detent by means of its eccentric shoulder screw.

2.11 Shift - Unshift Detent Spring Tension

2.11.1 It should require from 10 to 14 lbs. to start the detent moving.



2.12 LETTERS Stop Screw

2.12.1 With the platen in the UNSHIFT position, insert a sheet of paper with a carbon in the printer and press the letter N firmly against the platen. The impression made on the paper should be of uniform shade. TO ADJUST, raise the UNSHIFT stop screw if the shading is lighter at the bottom of the character and lower it if the shading is lighter at the top.

2.13 FIGURES Stop Screw

2.13.1 With the platen in the LETTERS position (down), print the letter W on the platen. Then, with the platen in the FIGURES position (up), the Figure 2 should be in direct alignment with the letter W when the Figure 2 is printed directly on the platen. ADJUST by means of the SHIFT stop screw.

2.14 FIGURES and LETTERS, Function Lever Spring Tensions

2.14.1 It should require 15 to 19 ozs. to start each of these function levers

2.14.1 moving. When checking these tensions, the push bars should be held away from the function levers.

2.15 Space Function Lever Spring Tension

2.15.1 With the printing bail in the forward position, it should require 12 to 16 ounces to start the space function lever moving. When checking this tension, the push bar should be held away from the function lever.

2.16 LETTERS and FIGURES Push Bars Spring Tensions

2.16.1 It should require 3 to 5 ozs. to start the LETTERS and FIGURES push bars moving.

2.17 Platen Shaft

2.17.1 The platen shaft should have some end play, not more than .004". TO ADJUST, position the friction assembly on the platen shaft by means of its set screws.

3. LINE FEED ADJUSTMENTS

3.1 Single - Double Line Feed Detent and Spring Pressure

3.1.1 The single-double line feed lever should travel equally on either side of its detent and it should require 1-1/4 to 4 lbs. to move the lever to the opposite position.

3.2 Line Feed Detent Lever

(a) With the single-double line feed lever in the SINGLE line feed position (up), and the line feed bail operated by hand, the line feed pawl, when sliding off the rear edge of the single-double line feed lever, should just miss the edge of a tooth on the ratchet.

(b) With the line feed detent lever positioned away from the ratchet and line feed selected, the detent roller should drop into a notch on the ratchet without moving the ratchet either up or down. TO ADUST, loosen the detent lever eccentric screw nut and turn the eccentric screw and recheck the requirement. Tighten the detent lever eccentric screw.

3.3 Line Feed Link Turnbuckle (Figure 4)

3.3.1 With the single-double line feed lever in the SINGLE line feed position, select the LINE FEED combination and rotate the main shaft until the line feed push bar just touches the function bail blade, there should be a .005" to .020" clearance between the function bail blade and the notch in the upper surface of the line feed push bar. TO ADJUST, loosen the lock nuts and rotate the turnbuckle. Tighten the lock nuts.

3.4 Line Feed Function Lever Spring Tension

3.4.1 It should require 15 to 19 ozs. to start the function lever moving. (The push bar should be held away from the function lever.)

3.5 Line Feed Push Bar Spring Tension

3.5.1 It should require 1-1/2 to 2-1/2 ozs. to start the push bar moving.

3.6 Line Feed Detent Lever Spring Tension

3.6.1 It should require 5 to 6 lbs. to start the detent lever moving.

3.7 Line Feed Pawl Spring Tension

3.7.1 It should require 2 to 4 ozs. to start the pawl moving.

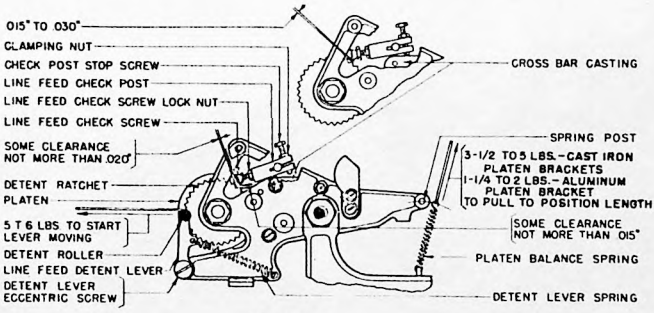


Figure 5

3.8 Line Feed Check Screw

3.8.1 The line feed check screw should drop in the twelfth notch above the detent roller. There should be some clearance, not more than .020", between the front face of the screw and the face of the tooth at the point of minimum clearance, when the check screw is held in the bottom of a notch on the ratchet. TO ADJUST, loosen the line feed check screw lock nut and position the check screw. If necessary, loosen the clamping nut of the line feed check post stop screw and back off the stop screw before making this adjustment.

3.9 Line Feed Check Post Stop Screw

3.9.1 With the line feed check post stop screw held down against the casting, there should be .015" to .030" clearance between the line feed check screw and each tooth on the detent ratchet, when the platen is rotated. TO ADJUST, loosen the check post clamping nut and position the stop screw.

3.10 Line Feed Check Lever

3.10.1 With the LINE FEED combination selected and the main shaft rotated until the line feed pawl has reached its farthest travel in rotating the platen, the line feed pawl lever should be in contact with the check lever. There should be some clearance, not more than .015", between the lower edge of the line feed check screw and the bottom of any notch in the detent ratchet. TO ADJUST, loosen the check lever set screw and position the check lever. Before tightening the set screw see that the shaft has some end play, not more than .008".

3.11 Line Feed Check Lever Spring Tension

3.11.1 It should require 2 to 3 ozs. to start the lever moving.

4. FRICTION FEED ADJUSTMENTS

4.1 Pressure Roller Release Shaft Collars

4.1.1 The pressure roller release shaft should have some end play, not more than .004" and the pressure roller release arm should be approximately 5/32" to 7/32" from the extreme right hand side of the platen casting. ADJUST the clearance of the release shaft arm by means of the right locating collar and the end play of the left locating collar.

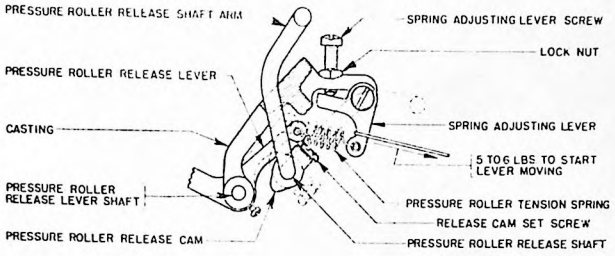


Figure 6

4.2 Pressure Roller Release Cams

4.2.1 On units equipped with six pressure rollers, the following applies: With the pressure roller release shaft arm in its rear position, the camming surfaces should line up with the release levers. With all the travel of the front pressure rollers taken up manually in a downward direction (so that the rear pressure rollers are resting against the platen), there should be a least .060" between the front pressure rollers and the platen. With all the travel of the rear pressure rollers taken up manually in a downward direction (so that the front pressure rollers are resting against the platen), there should be at least .060" between the rear pressure rollers and the platen.

On units equipped with one pressure roller, the following applies: With the pressure roller release shaft arm in its rear position, the pressure roller should be from .015" to .050" away from the platen. TO ADJUST, position the cams on the release shaft by means of their set screws.

4.3 Pressure Roller Spring Tension

4.3.1 It should require 4 to 6 lbs. to start the adjusting lever moving. ADJUST the spring adjusting lever screw so that all tensions are equal.

4.4 Pressure Roller Release Lever Shafts

4.4.1 With the two paper chute mounting extensions touching the outer edges of the two release lever shafts, the left end of the left release lever shaft (viewed from the rear of the printer) should project through the

4.4.1 left paper chute mounting extension and touch the platen bracket. The outer end of the right release lever shaft should project beyond the outer surface of the right paper chute extension by not more than 3/64" to 3/32". TO ADJUST, position the release shafts by means of their set screws.

4.5 Paper Chute Spring Tension

4.5.1 It should require 2 to 7 ozs. to start the paper chute moving.

4.6 Paper Chute

4.6.1 The paper chute should have some end play, not more than .004", and there should be some clearance, not more than .020", between the front edge of the paper chute and the surface of the platen. TO ADJUST, bend the chute manually to meet the above requirements. (Rotate the platen shaft to see that the paper chute does not bind the platen.)

4.7 Paper Fingers

4.7.1 The paper finger shaft stop arm should clear its stop post .004" to .020" with both paper fingers resting against the platen. The outer edge of the lower portion of each finger should be within 3/32" of the end of the rubber portion of the platen and should not extend beyond the end of the rubber portion. TO ADJUST, first set the position of the right paper finger and secure it to the shaft by means of its set screw with the specified clearance between the stop arm and the stop post. Then set the left paper finger to correspond to the width of the paper.

4.8 Paper Fingers Shaft Spring Tension

4.8.1 It should require 16 to 22 ozs. to start the stop arm moving.

4.9 Paper Straightener Rod stops

4.9.1 When the paper straightener rod is in its extreme upward position, there should be a clearance of .030" to .050" between the straightener rod and the blocking edge of the stops. TO ADJUST, position the stops by means of their elongated holes.

4.10 Paper Straightener Rod Spring Tension

4.10.1 It should require 8 to 12 ozs. to start the levers moving.

4.11 Paper Guides

4.11.1 The outer sides of both paper guides should be .040" to .050 from the shoulder on their respective ends of the straightener rod. TO ADJUST, position the guides on the shaft by means of their set screws.

4.12 Paper Spindle Drag Spring

4.12.1 Apply the push end of a scale to the left end of the spindle shaft and push toward the right side of the typing unit. It should require 5 to 8 lbs. to start the spindle moving. This pressure may be adjusted by bending the spindle drag spring.

4.13 Platen Friction Assembly

4.13.1 Move the pressure roller release shaft arm to its extreme rear position. Unhook the line feed detent lever spring and place the platen crank vertically upward. Hook scale to the end of the crank handle and pull horizontally toward the front of the typing unit. It should require 5 to 9 ounces to start the platen rotating. Replace the detent lever spring. This tension may be regulated by means of the adjusting nuts on the friction assembly.

5. MARGIN BELL ADJUSTMENTS

5.1 Margin Signal Bell

5.1.1 The bell should ring on the sixty-sixth printed character for lines of seventy-two character length, on the seventieth for lines of seventy-six character length, and on the thirty-ninth for lines of forty-four character length. TO ADJUST, return the carriage to the left end of the line. Then space the carriage sixty-six, seventy or thirty-nine spaces to the right, depending on the length of line being printed. Loosen the margin bell cam thumb screw and adjust the cam so that its right side is in contact with the margin bell pawl and tighten the thumb screw.

5.2 Margin Bell Pawl Spring Tension

5.2.1 It should require 1/2 to 1-1/2 ozs. to start the pawl moving.

5.3 Margin Bell Hammer

5.3.1 With the bell hammer arm resting against the stop post, there should

5.3.1 be .002" to .060" clearance between the bell and the bell hammer. TO ADJUST, loosen the margin bell hammer bracket mounting screws and shift the bracket; if this does not give the required clearance, then bend the bell hammer arm along its entire length, avoiding a sharp bend at any point.

5.4 Margin Bell Hammer Spring Tension

5.4.1 It should require 10-1/2 to 13-1/2 ozs. to start the arm moving.

6. SIGNAL BELL ADJUSTMENTS

6.1 Signal Bell Hammer Spring Tension

6.1.1 It should require 3 to 5 ozs. to start the bell hammer moving.

6.2 Signal Bell Latch Bar Latch Shims

6.2.1 Set the typing unit on its right side. With the platen in the LETTERS position, the BELL combination selected and the main shaft rotated until the printing bail is in its extreme forward position, there should be .004" to .010" clearance between the bell latch bar and the lobe on the rear extension of the bell function lever. TO ADJUST, add or remove shims between the latch and the function lever comb.

6.3 Signal Bell Latch Bar Latch

6.3.1 With the main shaft rotated until the function bail is in its extreme rear position, there should be a clearance of .010" to .020" between the front shoulder of the bell latch bar and its latch. TO ADJUST, position the bell latch bar latch toward the front or rear by means of its elongated mounting holes.

6.4 Signal Bell Hammer Backstop

6.4.1 With the bell latch bar in its latched position, there should be .020" to .040" clearance between the bell hammer arm extension and the bell operating lever. TO ADJUST, position the bell hammer backstop by means of its elongated mounting holes.

6.5 Signal Bell Operating Lever Spring Tension

6.5.1 It should require 1-1/4 to 2-1/4 lbs. to start the lever moving.

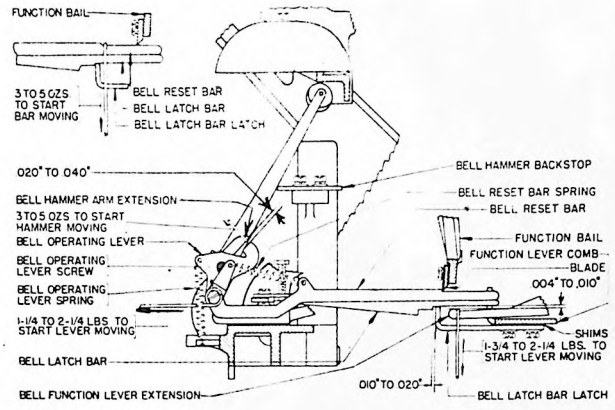


Figure 7

6.6 Signal Bell Reset Bar Spring Tension

6.6.1 It should require 3 to 5 ozs. to start the reset bar moving.

6.7 Bell Function Lever Spring Tension

6.7.1 It should require 1-3/4 to 2-1/4 lbs. to start the lever moving.

7. CARRIAGE RETURN ADJUSTMENTS

7.1 Carriage Return Latch Bar Latch Shims

7.1.1 With the letter O combination selected and the main shaft rotated until the printing bail is in its extreme forward position, there should be .004" to .010" clearance between the carriage return latch bar and the lobe on the rear extension of the carriage return function lever. TO ADJUST, add or remove shims between the carriage return latch bar latch and the function lever comb.

7.2 Carriage Return Latch Bar Latch

7.2.1 With the main shaft rotated until the function bail is in its extreme rear position, there should be .010" to .020" clearance between the shoulder on the carriage return latch bar and the latch. TO ADJUST, position the latch to the front or rear by means of its elongated mounting holes.

7.3 Carriage Return Lock Bar Latch Eccentric Screw

7.3.1 With the front end of the dashpot lever held in its extreme left position, there should be .006" to .020" clearance between the lower edge of the lock bar latch and the upper edge of the lock bar. TO ADJUST, reposition the lock bar latch with its lock nut loosened.

7.4 Carriage Return Function Lever Spring Tension

7.4.1 It should require 1-3/4 to 2-1/4 lbs. to start the lever moving.

7.5 Carriage Return Lock Bar Latch Spring Tension

7.5.1 It should require 7 to 10 ozs. to start the latch moving.

7.6 Carriage Return Lock Bar

7.6.1 With the carriage return lock bar in its latched position and the shoulder of the lock bar held against the edge of the latch, there should be a clearance of .010" to .020" between the teeth of the carriage return clutch members. ADJUST the length of the lock bar by means of its sliding joint to obtain this clearance.

7.7 Carriage Return Spring Drum

7.7.1 It should require 3-3/4 to 4-1/4 lbs. to start the carriage moving away from the extreme left position. When measuring this tension, the carriage return lock bar should be operated. TO ADJUST, wind up the carriage return spring by rotating the centre shaft of the drum to increase the tension, and operated the carriage return drum escapement lever to decrease the tension.

7.8 Carriage Return Operating Lever Stop Screw

7.8.1 Select CARRIAGE RETURN and rotate the main shaft until the carriage return function lever just trips the carriage return latch bar off its

7.8.1 latch. There should be from .002" to .020" clearance between the lock bar shoulder and the inner edge of the lock bar latch when the play in the mechanism is taken up in a direction to make the clearance a minimum. TO ADJUST, set the height of the carriage return operating lever stop screw.

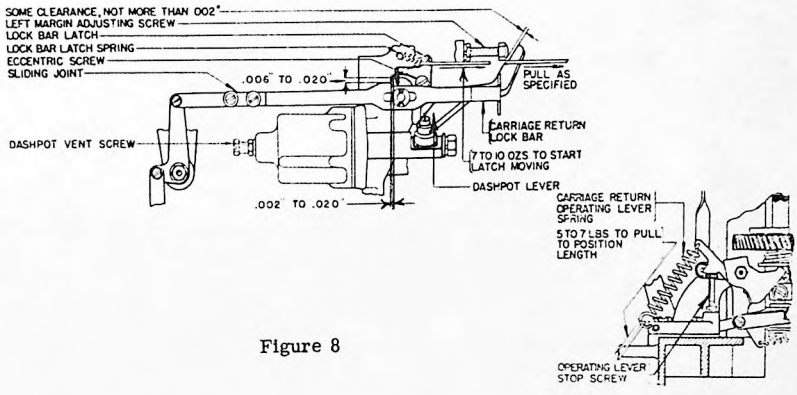


Figure 8

7.9 Carriage Return Reset Bar Spring Tension

7.9.1 It should require 3 to 5 ounces to start the reset bar moving.

7.10 Carriage Return Operating Lever Spring Tension

7.10.1 It should require 5 to 7 lbs. to extend the spring to position length.

7.11 Carriage Return Clutch Spring Compression

7.11.1 It should require 1-1/2 to 2-1/2 lbs. to start the driving clutch member moving away from the driven member.

7.12 Carriage Guide Screws (Figure 2)

7.12.1 With the printing bail in its extreme rear position, there should be some clearance, not more than .008", between the upper surface of the

7.12.1 guide screw heads and the upper surface of the groove in the front carriage track. Check for this clearance over the entire travel of the carriage. ADJUST by means of the guide screws and lock nuts.

7.13 Dashpot Vent Screw

7.13.1 The carriage should return from its right stop to its left stop without bouncing and with minimum shock when the carriage return lock bar is held in its latched position. ADJUST by means of the dashpot vent screw and lock nut.

7.14 Dashpot Lever Spring Tension

7.14.1 It should require 16 to 22 ozs. to extend the spring to its position length.

7.15 Margin Adjusting Screw Arm Spring Pressure

7.15.1 It should require 2 to 7 lbs. to disengage the arm from the detent spring.

7.16 Left Margin Adjusting Screw

7.16.1 The left edge of the letter M should print 7/8" (plus or minus 1/16") from the left edge of the platen. Also, with the type bar carriage fully returned and the dashpot lever manually positioned to the extreme left, there should be some clearance, not more than .002" between the dashpot lever and the left margin adjusting screw. TO ADJUST, reposition the left hand margin adjusting screw.

7.17 Right Margin Adjusting Screw

7.17.1 The printer should normally print seventy-two characters on a line before spacing is blocked by the spacing stop pawl. TO ADJUST, return the carriage to the left end of the line and back off the right margin adjusting screw. Then, with the right margin adjusting screw arm in engagement with its detent, space the carriage seventy-one spaces. ADJUST the stop screw so that the spacing stop lever is moved within .015" to .030" from a projection on the spacing stop sleeve.

8. SPACING ADJUSTMENTS

8.1 Spacing Escapement Pawl Operating Arm

8.1.1 With the LINE FEED combination selected and the main shaft rotated

8.1.1 until the function lever bail rests on the line feed function lever, there should be .020" to .040" clearance between the rear spacing escapement pawl and the low part of the spacing escapement ratchet. TO ADJUST, loosen the spacing escapement pawl operating arm mounting screws and position the arm. Tighten the mounting screws.

8.2 Spacing Escapement Pawl Spring Tension

8.2.1 It should require 10 to 14 ozs. to start the pawl moving.

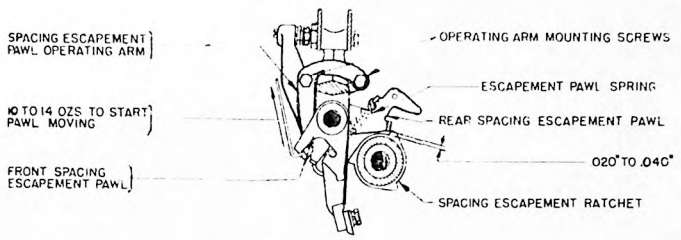


Figure 9

8.3 Spacing Shaft Lower Bearing Bracket

8.3.1 There should be a minimum amount of play without binding at any point of engagement between the spacing shaft gear and the main shaft spacing gear during one complete revolution of the spacing shaft gear. TO ADJUST, position the bracket by means of its elongated mounting holes, and reposition the eccentric against the bearing bracket.

8.4 Spacing Rack

8.4.1 There should be some backlash, not more than .006" between the spacing rack along the entire travel of the rack. TO ADJUST, remove the type bar carriage draw strap, loosen the spacing rack mounting screws and position the rack toward the front or rear. ADJUST for this backlash with the carriage in its extreme left and right hand positions and also in its centre position. Tighten the mounting screws and replace the draw strap.

8.5 Spacing Stop Lever Bracket

8.5.1 The lower end of the spacing stop lever should clear the driving disc of the main shaft .060" to .080". With the spacing stop lever held against the stop on the bracket by means of its spring, there should be a clearance of .040" to .080" between the lower left edge of the stop lever and the right side of a tooth on the spacing stop sleeve when the tooth is opposite the lever. ADJUST the spacing stop lever bracket vertically by means of its enlarged mounting holes to meet the first requirement and adjust it horizontally to meet the latter requirement.

8.6 Spacing Stop Lever Spring Tension

8.6.1 It should require 8 to 12 ozs. to start the lever moving.

9. RIBBON ADJUSTMENTS

9.1 Ribbon Feed Shaft Bearing Plates

9.1.1 The end of the ribbon feed shaft should be flush with or extend not more than .015" over the inner end of the vertical feed shaft bevel gear teeth, when the ribbon feed shaft is in its right and then in its left position and their vertical feed shaft bevel gear is held in engagement with the ribbon shaft gear. TO ADJUST, loosen the mounting screws of both right and left ribbon spool brackets and position the bearing plate by means of its clamping nuts.

9.2 Ribbon Feed Shaft Detent Spring

9.2.1 The ribbon feed shaft detent should travel equally on either side of the detent roller when the shaft is moved from its extreme left to its extreme right position or vice versa. TO ADJUST, loosen the mounting screws of the ribbon feed shaft detent spring, and position the spring.

9.3 Ribbon Feed Shaft Detent Spring Pressure

9.3.1 It should require 18 to 26 ozs. to start the roller moving away from the detent. Check the tension of the detent in the left and right positions, the tensions should be approximately equal. To increase or decrease the spring pressure, remove the spring and bend it. To equalize the pressure, position the spring to right or left.

9.4 Vertical Ribbon Feedshafts

9.4.1 The lower ends of the right and left vertical ribbon feed shafts should

9.4.1 be flush with the outside edges of their respective bevel gears. ADJUST by means of the bevel gear set screws, being sure that when the set screws are tightened they bear against the flat faces on the shafts.

9.5 Ribbon Spool Brackets

9.5.1 With the ribbon feed shaft in its left position, the left vertical ribbon feed shafts should have some end play, not more than .015", during one revolution of the vertical ribbon feed shaft bevel gear. The right vertical ribbon feed shaft should have a like amount of end play, when the ribbon feed shaft is in the right position. ADJUST both right and left ribbon spool brackets by means of their elongated mounting holes to meet this requirement, being sure that the brackets are vertical.

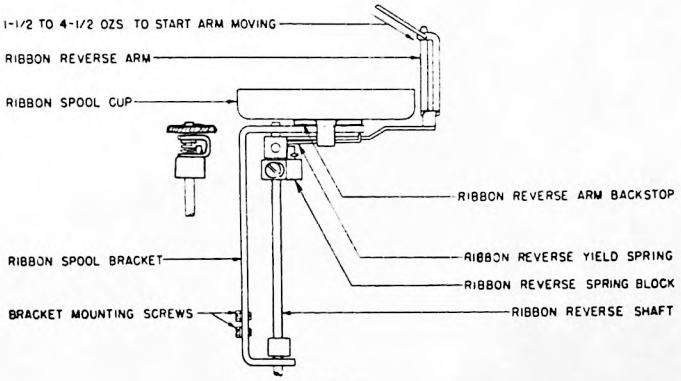


Figure 10

9.6 Ribbon Spool Shaft Spur Gears

9.6.1 The ribbon spool shafts should have some end play.not more than .006". TO ADJUST, position the ribbon spool shaft spur gears by means of their set screws.

9.7 Vertical Ribbon Feed Shaft Spur Gears

9.7.1 Both right and left vertical ribbon feed shaft spur gears should line up

9.7.1 with their respective ribbon spool shaft spur gears. TO ADJUST, position the vertical ribbon feed shaft spur gears by means of their set screws.

9.8 Ribbon Spool Cups

9.8.1 The centres of the ribbon rollers should be 3/4" to 7/8" in front of a line through the centres of the ribbon spool shafts. There should be no bind between the ribbon spool shaft spur gears and the vertical ribbon feed shaft spur gears at any point in their engagement. TO ADUST, position each ribbon spool cup by means of the nut on its ribbon spool cup bushing.

9.9 Vertical Ribbon Feed Shaft Spring Tension

9.9.1 It should require 2-1/2 to 3-1/2 ozs. (1-1/2 to 2-1/2 ozs. for 100 wpm) to start the shaft turning. TO ADJUST, position the collars on the vertical feed shafts by means of their set screws to obtain the proper tension.

9.10 Ribbon Reverse Arms Ribbon Guide Slot

9.10.1 The ribbon guide slot should be .025" to .035" wide and the straight upright piece should clear the angled arm by .010" to .020". TO ADJUST, bend the upright ends of the ribbon reverse arms.

9.11 Ribbon Reverse Shafts

9.11.1 There should be .040" to .060" clearance between the bottoms of the ribbon spool cups and the upper ends of the ribbon reverse shafts when the ribbon reverse arms are held up against the ribbon spool brackets. TO ADJUST, loosen the set screw, position the shaft while holding the ribbon reverse arm up against the ribbon spool bracket and then tighten the ribbon reverse arm set screw.

9.12 Ribbon Reverse Shafts Collar

9.12.1 The ribbon reverse shafts should have from .002" to .010" end play. TO ADJUST, position the collars by means of their set screws.

9.13 Ribbon Reverse Shafts Links

9.13.1 The ribbon reverse bail should clear both left and right ribbon reverse pawls by .015" to .050" when the pull bar bail is in its extreme rear

9.13.1 position and both the left and right ribbon reverse arms are held forward against their stops. TO ADJUST, position the ribbon reverse shafts links by means of their set screws.

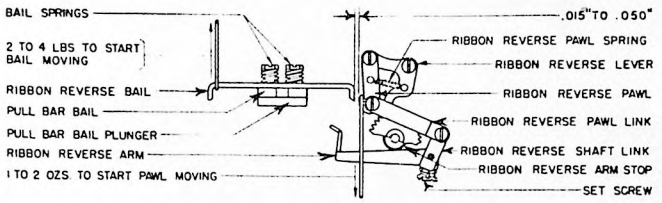


Figure 11

9.14 Ribbon Spool Cups and Ribbon Reverse Arm Backstop

9.14.1 The centres of the ribbon rollers should be 3/4" to 7/8" in front of a line through the centres of the ribbon spool shafts. TO ADJUST, position the ribbon spool cups by means of the nuts on the ribbon spool cup bushings.

9.15 Ribbon Reverse Arm Yield Spring Tension

9.15.1 It should require 1-1/2 to 4-1/2 ozs. to start the ribbon reverse arm moving.

9.16 Ribbon Reverse Pawl Spring Tension

9.16.1 It should require 1 to 2 ozs. to start the ribbon reverse pawl moving.

9.17 Ribbon Reverse Bail Spring Compression

9.17.1 It should require 2 to 4 lbs. to just start the left and the right end of the ribbon reverse bail moving.

9.18 Ribbon Oscillator Lever

9.18.1 With the ribbon lockout bar in its unoperated position (pulled outward

9.18.1 toward the right), the ribbon should fully cover any character as it is being printed and the top edge of the ribbon should not be above the bottom edge of the printed character when the printing has been completed and the main shaft clutch has disengaged. TO ADJUST, shift the platen to the FIGURES position (up) and loosen the ribbon oscillator lever clamping screw and nut. Position the ribbon oscillator lever and tighten the clamping screw and nut. Check this adjustment with the platen in the LETTERS position (down).

9.19 Ribbon Feed Pawl Spring Tension

9.19 With the pull bar bail in its extreme rear position it should require 2-1/4 to 3-1/4 ozs. to pull the spring to its position length.

9.20 Ribbon Shift Lever Bracket

9.20.1 The ribbon oscillator lever should move freely in its slot when its spring is unhooked and the ribbon carrier is approximately centrally located with respect to the type bar guide. TO ADJUST, position the ribbon shift lever bracket by means of its enlarged mounting holes. Replace the ribbon oscillator lever spring.

9.21 Ribbon Oscillator Lever Spring Tension

9.21.1 With the ribbon shift lever spring removed, it should require 2-1/2 to 3-1/2 ozs. to start the oscillator lever moving. Replace the ribbon oscillator lever spring.

9.22 Ribbon Shift Lever Spring Tension

9.22.1 With the ribbon oscillator lever spring unhooked, it should require 1 to 1-3/4 lbs. to start the shift lever moving. Replace the ribbon oscillator lever spring.

9.23 Ribbon Lockout Bar Detent Spring Pressure

9.23.1 It should require 16 to 32 ozs. to pull the lockout bar out to its unoperated position.

10. SEND-RECEIVE-BREAK MECHANISM

10.1 Send-Receive Mechanism Plate

10.1.1 With the left arm of the T lever in contact with the blank function lever

10.1.1 extension, there should be some clearance, not more than .008", between the right arm of the T lever and the universal function lever extension when the BLANK combination is selected and the main shaft rotated until the blank function lever is completely selected, stopping rotation at the point where the function lever bail roller just leaves the cam surface of the blank function lever. TO ADJUST, position the send-receive mechanism plate by means of its elongated mounting holes. When making this adjustment, the intermediate lever should be clear of the blank function lever extension.

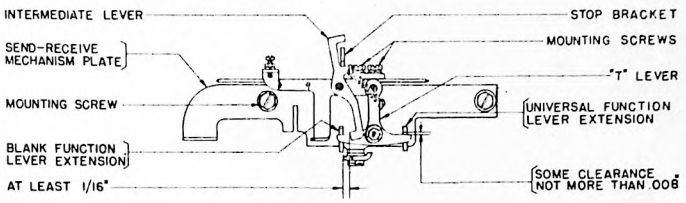


Figure 12

10.2 Intermediate Lever Stop Bracket

10.2.1 First select the BLANK combination and rotate the main shaft until the intermediate lever toe is under the blank function lever extension. Make sure that the intermediate lever is approximately vertical. Then select the T combination and rotate the main shaft until the printing bail is in its extreme forward position. During this latter operation the left end of the intermediate lever toe should move to a point at least 1/16" to the right of the blank function lever extension. TO ADJUST, position the intermediate lever stop bracket by means of its elongated mounting holes.

10.3 Send-Receive Reset Lever Upper Adjusting Screw

10.3.1 With the printing bail in its extreme rear position and the send-receive lever in the SEND position (up), move the toe of the intermediate lever under the blank function lever extension. Then select the T combination and rotate the motor until the intermediate lever is moved to a position where the blank function lever extension overlaps the toe of the intermed-

10.3.1 iate lever by one half the thickness of the blank function lever extension. Under these conditions, there should be .004" to .006" clearance between the upper edge of the intermediate lever toe and the bottom of the blank function lever extension. TO ADJUST, position the reset lever upper adjusting screw.

10.4 Send-Receive T Lever Friction Washer

10.4.1 With the printing bail rearward, it should require 5 to 6-1/2 ozs. to start the T lever moving . TO ADJUST, position the stop nut.

10.5 Intermediate Lever Spring Tension

10.5.1 It should require 3/4 to 1-1/2 ozs. to start the lever moving.

10.6 Locking Function Lever Spring Tension

10.6.1 It should require 40 to 50 ozs. to pull the spring to position length.

10.7 Sixth Vane Detent Spring Tension

10.7.1 It should require 6 to 8 ozs. to start the roller moving away from the sixth vane.

10.8 Sixth Vane Extension Spring Compression

10.8.1 It should require 3/4 to 1-1/4 ozs. to start the extension moving away from the vane.

10.9 Universal Function Lever Spring Tension

10.9.1 It should require 14 to 17 ozs. to start the lever moving.

10.10 Blank Function Lever Spring Tension

10.10.1 It should require 4-1/2 to 6 lbs. to start the lever moving .

10.11 Blank Printing and Spacing Cutout Function Lever Spring Tension

10.11.1 With the printing bail in its extreme rear position, it should require 22 to 30 ozs. to extend the spring to its position length.

11. MAIN SHAFT ADJUSTMENTS

11.1 Main Shaft

11.1.1 When the main shaft is rotated, the selector cams on the selector cam sleeve should line up with their respective selector levers. TO ADJUST, loosen the four screws which hold the main shaft bearing caps and position the main shaft. Then tighten the bearing caps mounting screws.

11.2 Main Shaft Jaw Clutch Throwout Lever

11.2.1 With main shaft clutch fully disengaged, there should be from .010" to .020" clearance between the teeth of the two clutch members. ADJUST the clutch throw-out lever by means of its pilot screws to obtain this clearance. After adjusting, the lever should be free, with not more than .002" end play.

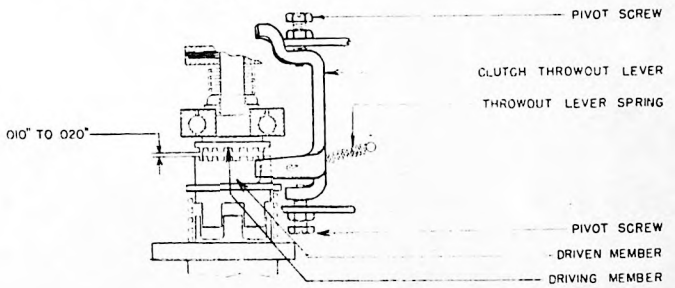


Figure 13

11.3 Main Shaft Jaw Clutch Throwout Lever Spring Tension

11.3.1 It should require 2-1/2 to 4 ozs. to start the lever moving.

11.4 Main Shaft Jaw Clutch Spring Tension

11.4.1 The tension required to separate the clutch teeth is as follows:

22 to 30 ounces for 60 wpm operation

11.4.1 32 to 42 ounces for 75 wpm operation
46 to 58 ounces for 100 wpm operation

11.5 Spacing Clutch Torque

11.5.1 With the main shaft rotating, hold off the rear escapement pawl and pull horizontally toward the rear of the unit. It should require from 18 to 24 ozs. to hold the spacing escapement ratchet stationary.

11.6 Selector Clutch Torque

11.6.1 It should require a pull of 14 to 18 ozs. for 60 or 75 wpm operation and 16 to 22 ozs. for 100 wpm operation to hold the cam sleeve stationary. This clutch torque depends on the condition of the felt washers and the clutch spring.

11.7 Motor Plate

11.7.1 There should be a barely perceptible amount of backlash between the motor pinion and the highest point of the main shaft gear. The lateral alignment of the motor pinion and the main shaft gear should be such that the centre line of the gear coincides with a vertical line through the centre of the hole in the motor pinion. TO ADJUST for the backlash, loosen the rear motor plate mounting screw and the lock nut on the motor plate adjusting screw. Slightly loosen the two front motor plate mounting screws. Place the typing unit on the base and tighten the three thumb screws. Position the motor plate adjusting screw to obtain the specified backlash. Start the motor and carefully reposition the adjusting screw until the gear noise is reduced to a minimum. Tighten the three motor plate mounting screws and the adjusting screw lock nut. Recheck the backlash. (If the gear noise cannot be reduced, it may be necessary to replace the pinion and gear)

12. ADJUSTMENTS FOR PRINTERS EQUIPPED FOR STATION SELECTOR OPERATION (TYPING UNIT ADJUSTMENTS)

12.1 Call - Contacts

(a) With the main shaft rotated so that the call-contact function lever is resting against the selector vanes, but not selected, there should be some clearance, not more than .010" between the insulator on the end of the contact spring and the lobe on the call-contact function lever. TO ADJUST, bend the upper contact spring.

12.1 (b) With the main shaft in the same position as specified in paragraph (a) there should be a contact gap of .015" to .020". TO ADJUST, bend the lower contact spring.

12.2 Call - Contact Function - Lever Spring Tension

12.2.1 It should require a tension of 24 to 32 ozs. to start the function lever moving.

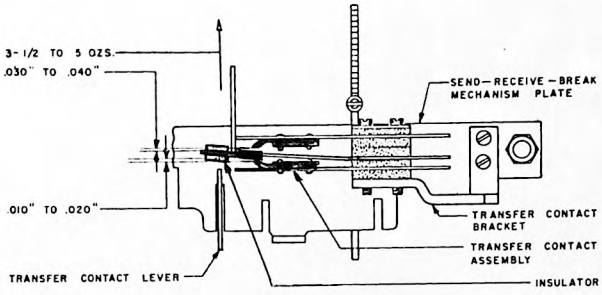


Figure 14

12.3 Transfer Contacts

(a) With the transfer contact lever held away from the insulator on the transfer contact spring, the centre contact should make with the lower contact. There should also be a clearance of .030" to .040" between the centre and upper contacts. TO ADJUST, bend the upper (heavy) contact spring so that it is parallel to and in line with the insulators between which it is mounted. Bend the centre contact spring so that it rests against the lower spring with just a slight amount of tension and then bend the lower contact spring to obtain the required gap.

(b) With the transfer contact lever held away from the contact insulator, hook an 8 oz. scale under the centre contact spring between the insulator and the contact and pull vertically upward. A tension of 3-1/2 ozs. should be required to open the contacts. TO ADJUST, bend the centre contact spring. Recheck (a).

12.3 (c) The position of the transfer contacts in relationship to the transfer contact lever should be such that, when the transfer contact lever is in its lower most position, there is a clearance of .010" to .020" between the end of the transfer contact lever and the insulator on the centre contact spring. TO ADJUST, loosen the screws which secure the transfer contact bracket to the send-receive plate, and position the transfer contact assembly so that the upper and lower contact springs are parallel to the function lever spring plate. Tighten the transfer contact bracket mounting screws. Set up the SPACE and rotate the main shaft until the printing bail is in its extreme forward position. Position the adjusting screw on the transfer-contact function lever to meet the requirement and tighten the lock nut.

12.4 Transfer Contact-Lever Spring Tension

12.4.1 It should require a tension of 12 to 16 ozs. to start the lever moving.

12.5 Transfer Contact Function - Lever Spring Tension

12.5.1 Place the typing unit on the right side. Select SPACE (#3 vane down) and rotate the main shaft until the printing bail is in its extreme forward position. With the transfer contact lever held away from the adjusting screw head, hook a scale to the transfer-contact function lever extension and pull horizontally. It should require a tension of 20 to 28 ozs. to start the lever moving.

12.6 Function Lever Bail (See paragraph 2.1)

12.6.1 NOTE: A minimum clearance of .025" is permissible between the rear edge of the transfer contact function lever when the typing unit is equipped with the station selector mechanism.

12.7 Disconnect Contact

(a) Set up the CARRIAGE-RETURN combination and rotate the main shaft until the printing bail is in its extreme forward position. There should be a clearance of .010" to .020" between the disconnect contacts. TO ADJUST, bend the stiffener to obtain this clearance.

(b) With the main shaft in its STOP position, make certain that there is some clearance between the insulator on the lower disconnect contact spring and the bell crank when the play in the bell crank

12.7 (b) is taken up in the direction to make this clearance a maximum. TO ADJUST, bend the stiffener and the upper contact spring.

(c) With the typing unit resting on the right side and the main shaft in its STOP position, hook an 8 oz. scale to the lower contact spring between the contact and insulator and pull at a right angle to the contact spring. It should require a tension of 3-1/2 to 5 ozs. to just break contact. TO ADJUST, bend the lower contact spring.

12.8 Keylever Link

12.8.1 The keylever link should be positioned on its keylever to provide from .020" to .040" clearance between the vertical edge of the link and the vertical side of the bail. TO ADJUST, loosen the link clamping screw and position the link.

12.9 Bail Spring Tension

12.9.1 It should require a tension of 2 to 3 ozs. to start the spring moving away from the bail. TO ADJUST, bend the spring.

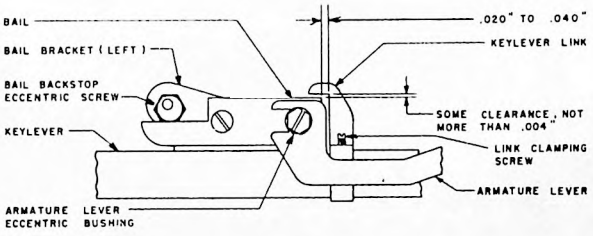


Figure 15

12.10 Bail Backstop

12.10.1 There should be some clearance, not more than .004" between the edge of the bail and the hook on the keylever link. TO ADJUST, loosen the bail backstop eccentric mounting screw. Hold the bail against the eccentric backstop, and turn the eccentric. Tighten the screw.

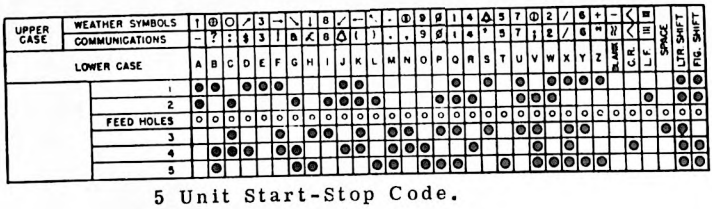
12.11 Answer-Back-Magnet Heel-Piece Air Gap

12.11.1 There should be a clearance of .005" to .015" between the end of the heel piece and the armature when the armature is held in the operated position. TO ADJUST, loosen the armature-yoke mounting screw and place a .008" gauge between the heel piece and the armature. Hold the armature firmly against the gauge and tighten the mounting screw.

12.12 Bail

12.12.1 The eccentric bushing on the bail which is engaged in the forked end of the answer-back-magnet armature lever should be adjusted to provide full travel of the keylever which it operates. TO ADJUST, loosen the eccentric bushing mounting screw, fully depress the answer-back keylever, place the magnet armature in its operated postion and rotate the eccentric bushing until the bail just clears the keylever link. Tighten the eccentric bushing mounting screw.

NOTE: Adjust the eccentrics so that the keyboard clutch is just tripped when the answer-back magnet is energized with a piece of paper placed between the armature and the pole piece. It is important not to increase or decrease this adjustment as intermittent errors may occur.



5 Unit Start-Stop Code.

Figure 16

13. ELECTRICAL MOTOR CONTROL ADJUSTMENTS

13.1 Motor Stop Function Lever Spring

13.1.1 It should require 5 to 6 lbs. to start the function lever moving.

13.2 Motor Stop Contact

13.2.1 With the printing bail to its rear position, there should be some clearance, not more than .006" between the insulator on the contact spring and the motor stop function lever front extension. TO ADJUST, bend the contact. With LETTERS selected and the main shaft rotated until all function levers are against the vanes, there should be a .010" to .015" clearance between the contacts. TO ADJUST, bend the heavy contact spring.

13.3 Start Magnet and Stop Magnet Cores

13.3.1 With either magnet armature held operated, there should be not more than .004" clearance between the magnet armature and either the magnet core or yoke. TO ADJUST, add or remove shims between the magnet core and the yoke.

13.4 Start Magnet Bracket

13.4.1 With the start magnet armature held operated, position the stop magnet armature until its inner edge aligns with the outer shoulder on the start magnet armature; there should be a .004" to .008" clearance between the stop magnet armature and the outer face of the yoke. TO ADJUST, reposition the stop magnet bracket by means of its mounting screws and remove the resistor.

13.5 Stop Magnet Bracket

13.5.1 With the stop magnet armature held in the operated position by its latch there should be .004" to .008" clearance between the stop magnet armature and the outer face of the yoke. TO ADJUST, reposition the stop magnet bracket with its mounting screws loosened and the resistor removed.

13.6 Armature Stop

13.6.1 With the stop magnet armature against the armature stop, there should be a .070" to .080" clearance between the stop magnet armature and the outer face of the yoke. TO ADJUST, reposition the armature stop with its mounting screws loosened.

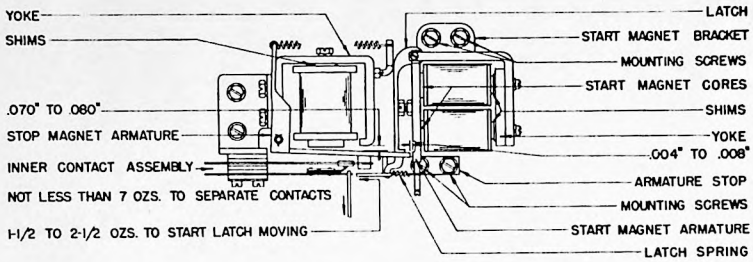


Figure 17

13.7 Latch Backstop Screw

13.7.1 With the stop magnet armature held in the operated position by the notch in the start magnet armature, there should be some clearance, not more than .008" between the high part of the latching surface of the latch and the end of the slot in the stop magnet armature. TO ADUST, reposition the latch backstop screw.

13.8 Stop Magnet Armature Spring Tension

13.8.1 It should require 14 to 16 ozs. to stretch the spring to its position length.

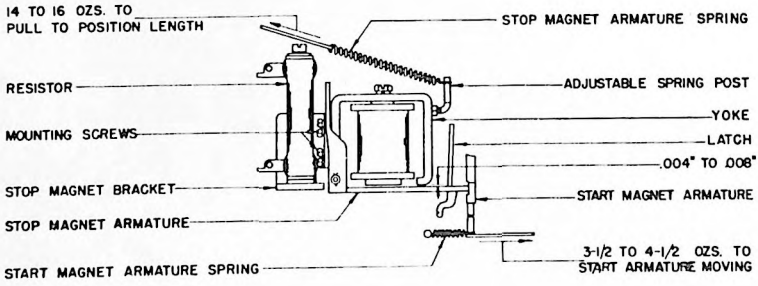


Figure 18

13.9 Start Magnet Armature Spring Tension

13.9.1 It should require 3-1/2 to 4-1/2 ozs. to start the armature moving.

13.10 Latch Spring Tension

13.10.1 It should require 1-1/2 to 2-1/2 ozs. to start the latch moving.

13.11 Inner Contact Assembly

13.11.1 It should require 1-1/2 to 2 ozs. to start the long contact spring moving away from the stop magnet armature. TO ADJUST, bend the long contact spring.
With the stop magnet armature held in the operated position by the notch in the start magnet armature, there should be a .015" to .020" gap between the contact. TO ADJUST, bend the short contact spring.

13.12 Outer Contact Assembly

13.12.1 The stop magnet armature should be held operated by the notch in the start magnet armature during the following adjustments:

(a) The two short contact springs nearest the armature should bear against their stiffeners with slight pressure when the other springs are held off. TO ADJUST, bend the short contact springs.

(b) There should be some clearance,not more than .006" between the insulator on the long contact spring and the stop magnet armature. TO ADJUST, bend the spring stiffener nearestthe armature.

(c) It should require 1 to 1-1/2 ozs. to separate the contacts when the adjacent springs are held away. TO ADJUST, bend the long contact spring.

(d) The long contact spring should be adjusted so that it bears lightly against the long contact spring nearest the stop magnet armature.

(e) It should require 1 to 2 ozs. to start the short contact spring farthest from the stop magnet armature moving. There should be a .015" to .020" gap between the contacts.

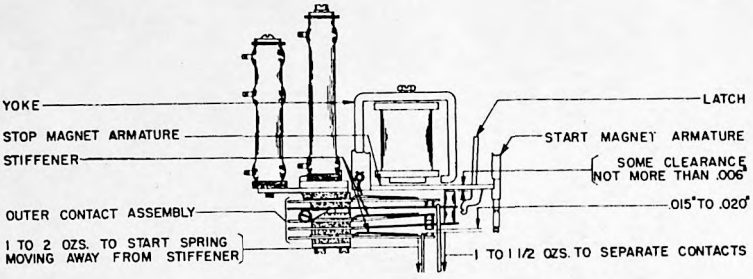


Figure 19

MODEL 15 TELETYPE WIRING

SINGLE CORD OPERATION
Line - 34 & 41
Strap - 32 & 42

TWO CORD OPERATION
Send line - 32 & 34
Rec line - 41 & 42

NON-RELAY OPERATION

G - 61 remove and tape.
W - 65 move to 66.
Y - 62 move to 61.
Disconnect D.C. cord

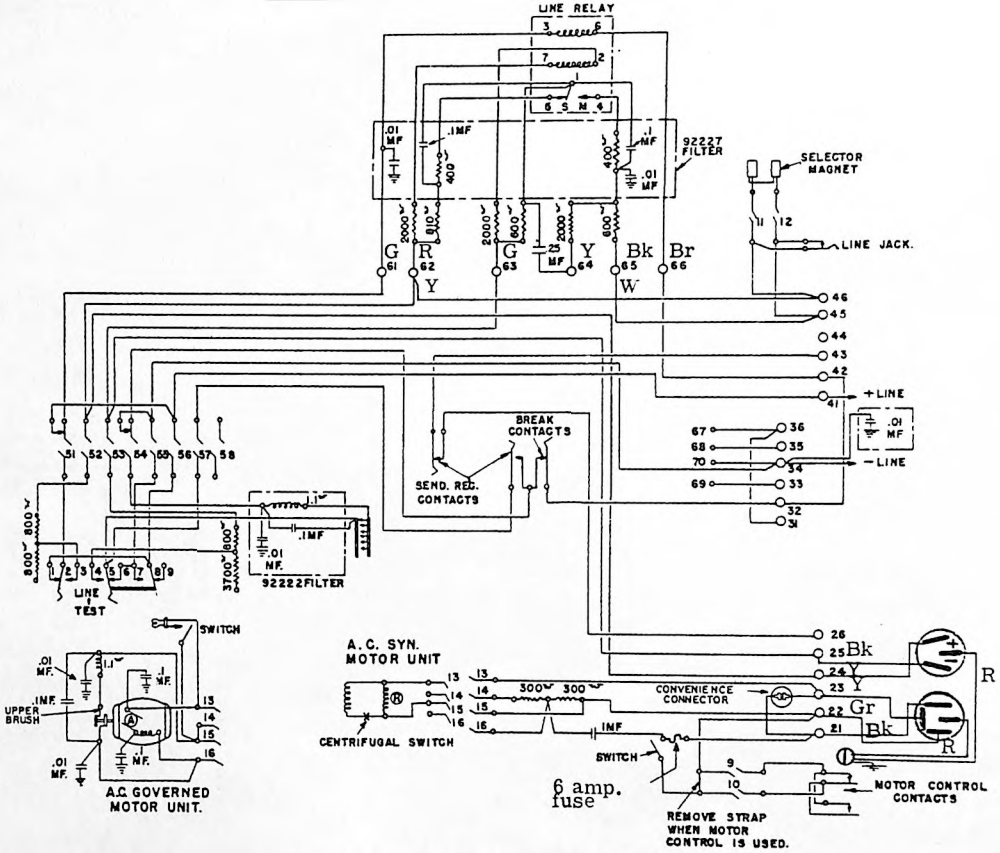


Figure 20. MODEL 15 WIRING DIAGRAM.

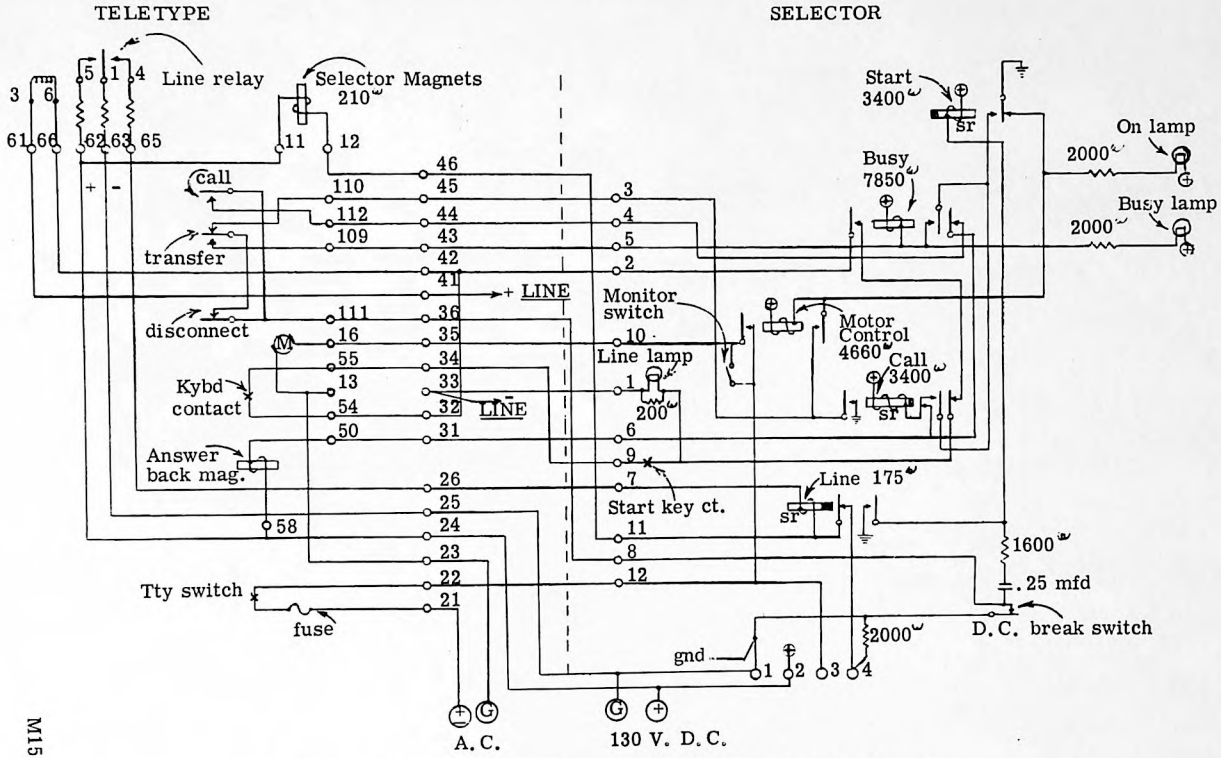


Figure 21. SE-200 STATION SELECTOR (with C-68 Modif.)

M15-39

TO BY-PASS A SE-200 STATION SELECTOR

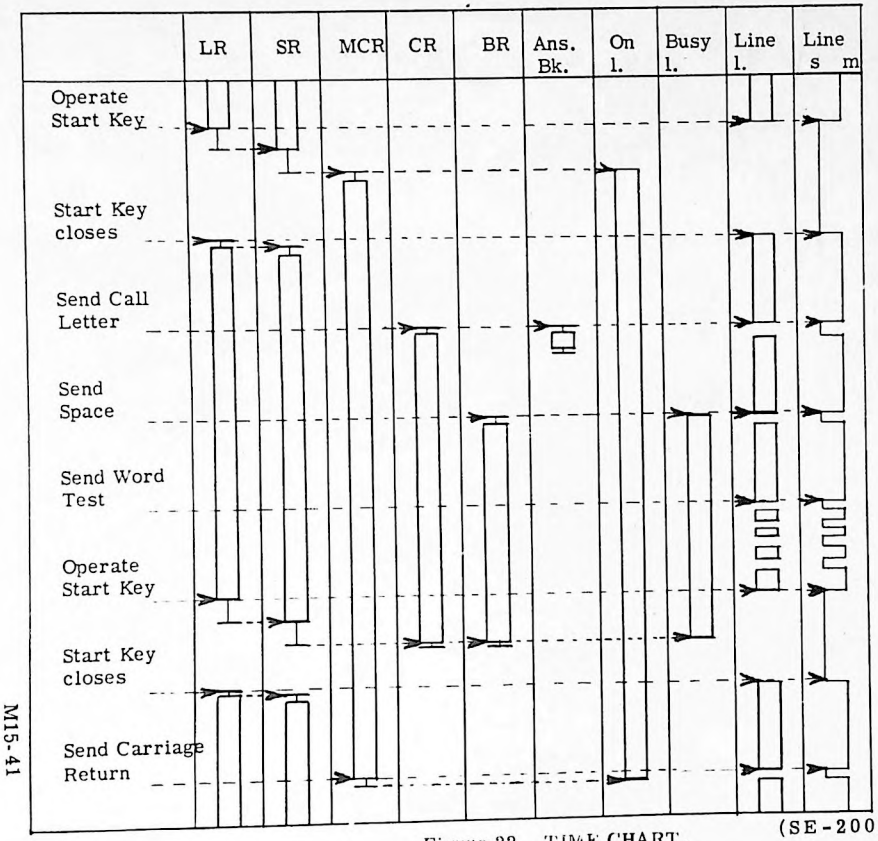
Place the following straps in the female jones plug connector

1 to 9
7 to 11
10 to 12

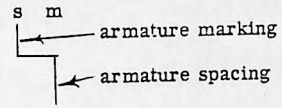
Wrap electric tape around the connector and straps. (use a heavy gauge solid wire for straps)

Disconnect D.C. plug to selector.

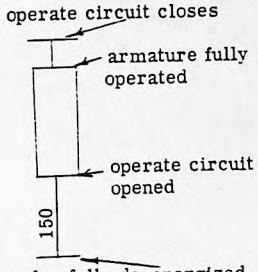
Place female connector on table shelf.



POLAR RELAY



NEUTRAL RELAYS

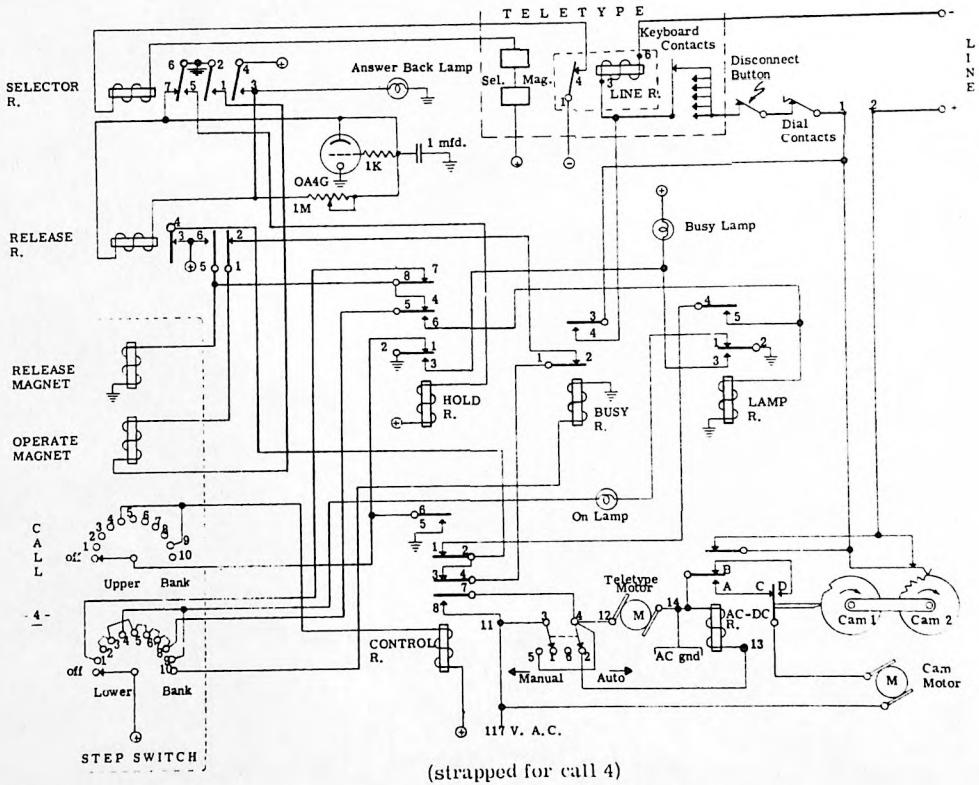


LR - Line relay
SR - Start relay
MCR- Motor control relay
CR - Call relay
BR - Busy relay
LR - Line relay (selector)

(SE-200)

Figure 22. TIME CHART.

M15-41



(strapped for call 4)

Figure 23. CDX-15 DIAL SELECTOR.

(corrected)
M15-42

CN TELECOMMUNICATIONS
ENGINEERING DEPARTMENT

PLANT MANUAL BK2.3.3
ISSUE 1
AUGUST, 1964

MODEL 15 PERFORATOR TRANSMITTER (MODEL 19 KEYBOARD)

ADJUSTMENTS

CONTENTS

CONTENTS PAGE

1. SELECTOR BAR ASSEMBLY SHIM ADJUSTMENT

1.1 When the "Q" key lever is fully depressed, all other key levers should have some play between the leather upstop and the selector bars and there should be some clearance, not over .030", between the high portions of the first selector bar from the front (A-1) and the unoperated key levers in line with the high portions. These conditions should also exist when the "P" or "B" key levers are depressed.

.2 When the "T" key lever is fully depressed, there should be some clearance, not over .020", between the rearmost code selector bar (E-2) and

1.2 the unoperated key lever having the least clearance. TO ADJUST, add (or remove) an equal number of shims to the bracket at each of the rear corners. Tighten the mounting screws. Replace the "Y" lever connecting link extensions and the left and right keyboard slide plates.

2. TRIP-OFF PAWL STOP PLATE ADJUSTMENT

2.1 With the high part of the intermediate pawl eccentric towards the front of the unit, there should be .070" to .080" clearance between the trip-off pawl and the intermediate pawl when the trip-off pawl is resting against the trip-off pawl stop plate and the intermediate pawl is against its eccentric. TO ADJUST, loosen the trip-off pawl stop plate mounting screws and position it. Tighten the screws.

3. REPEAT SPACE ROD CUTOUT ADJUSTMENT

3.1 With the keyboard control operating lever in the lower position and the space bar depressed until it rests lightly on its rubber downstops, there should be a clearance of .010" to .020" between the repeat space rod and the side of the intermediate pawl. TO ADJUST, position the cutout in its slot utilizing the elongated mounting hole.

4. KEYBOARD CONTROL CONTACT ASSEMBLY ADJUSTMENTS

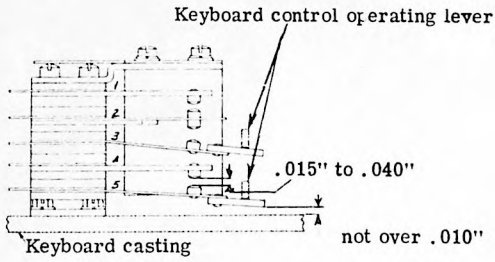


Figure 1

4.1 Place the keyboard control operating lever in the upper position.

4.1.1 Both prongs of the keyboard control operating lever should engage the insulating tips of contact springs No. 3 and No. 5 approximately centrally.

4.1.1 TO ADJUST, loosen the contact assembly bracket mounting screws and position the bracket. Tighten the screws.

.2 There should be not less than .010" clearance between the keyboard casting and the insulating tip on contact spring No. 5. TO ADJUST, bend the lowest contact.

.3 There should be .015" to .040" clearance between the contact points on springs No. 4 and No. 5. TO ADJUST, bend contact spring No. 4.

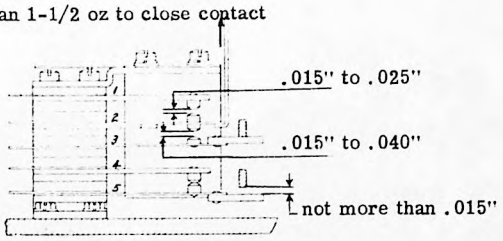


Figure 2

4.2 Place the keyboard control operating lever in the centre position.

4.2.1 There should be not less than .015" clearance between the lower prong on the keyboard control operating lever and the insulating tip on contact spring No. 5. TO ADJUST, bend contact spring No. 4.

.2 With the insulating tip on contact spring No. 3 resting against the upper prong of the keyboard control operating lever, there should be .015" to .040" clearance between the contact points on springs No. 2 and No. 3. TO ADJUST, bend the backstop of contact spring No. 2.

.3 There should be .015" to .025" clearance between the contact points of springs No. 1 and No. 2. TO ADJUST, bend contact spring No. 1.

.4 It should require a pull of not more than 1-1 2 ozs. to raise contact spring No. 2 so that the points of springs No. 1 and No. 2 make contact.

4.2.4 TO ADJUST, bend contact spring No. 2. Recheck the above contact gaps.

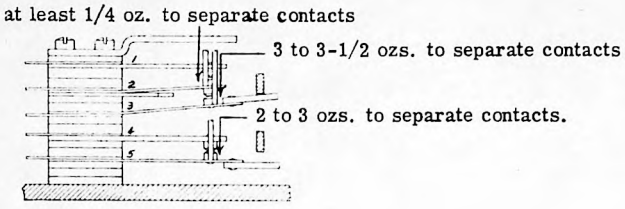


Figure 3

4.3 Place the keyboard control operating lever in the lower position.

4.3.1 It should require a push of 2 to 3 ozs. to separate the contact points of springs No. 4 and No. 5. TO ADJUST, bend contact spring No. 5. Recheck the contact gap.

.2 It should require a push of 3 to 3-1 2 ozs. to separate the contact points of springs No. 2 and No. 3 when spring No. 2 is held to prevent follow. TO ADJUST, bend contact spring No. 3. Recheck the contact gap.

5. KEYBOARD CONTROL OPERATING LEVER DETENT BRACKET ADJUSTMENT

5.1 With the keyboard control operating lever in its upper position, it should require a pull of at least 20 ozs. to move the operating lever from the upper (keyboard) position to the centre (Keyboard and Tape) position. TO ADJUST, loosen the detent bracket mounting screws and position the bracket. Tighten the screws.

6. UNIVERSAL BAR CUTOUT MECHANISM ADJUSTMENTS

6.1 With the keyboard control operating lever in the middle position, and all keylevers in the unoperated position, there should be some clearance, not over 1 16", between the universal bar and the cutout lever. TO ADJUST, bend the universal bar cutout lever return spring.

7. TRIP-OFF PAWL CUTOUT ADJUSTMENT

7.1 When the clutch throwout lever is resting against the low part of its cam and the keyboard control operating lever is moved slowly from the centre position to the lower position, there should be .015" to .030" clearance between the trip-off pawl and the intermediate pawl at the point where the clearance is a minimum. TO ADJUST, bend the trip-off pawl cut-out.

8. CAM PULSING CONTACT ADJUSTMENTS

8.1 Rotate the transmitting cam assembly until the tip on the contact operating spring, which bears on the cam, falls into the cam indent. It will be necessary to remove the filters from their mounting bracket in order to make the measurements.

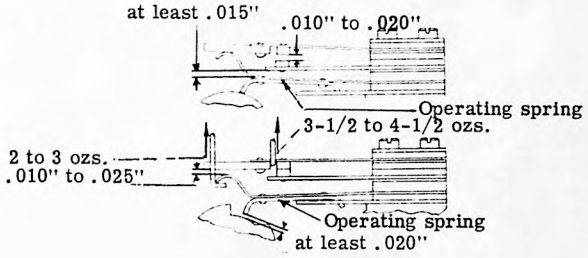


Figure 4

.2 It should require a pull of 3-1 2 to 4-1 2 ozs. to separate the contact points. Also, the contact surfaces should meet squarely. TO ADJUST. bend the contact springs.

.3 There should be .010" to .025" clearance between the curved tip on the contact operating spring and the insulating tip on the upper contact spring. TO ADJUST. bend the backstop for the contact operating spring.

.4 It should require a pull of 2 to 3 ozs. to start the lower spring moving away from the end of the backstop. TO ADJUST. bend the contact operating spring.

8.5 There should be at least .020" clearance between the wearing tip on the contact operating spring and the low part of the cam surface. If necessary to adjust, recheck the previous adjustments.

9. TAPE FEED ROLL ADJUSTMENT

9.1 The tape feed roll should be free and should not have over .003" end play. TO ADJUST, increase or decrease the number of shims installed between the feed roll bracket and the casting. Tighten the screws.

10. TAPE TENSION LEVER STUD ADJUSTMENT

10.1 The feed pins on the feed roll should not touch either side of the slot in the tape tension lever when the play in both the feed roll and tape tension lever is taken up in opposite directions. TO ADJUST, increase or decrease the number of shims installed between the tape tension lever stud and the feed roll bracket.

11. TAPE TENSION LEVER SPRING TENSION ADJUSTMENT

11.1 It should require a pull of 5 to 5-1 2 ozs. to start the slotted extension of the lever moving away from the feed roll. TO ADJUST, loosen the tape tension lever stud lock nut and rotate the stud in either a clockwise or counterclockwise direction. Tighten the lock nut.

12. BACKSPACE MECHANISM SPRING TENSION REQUIREMENTS

12.1 It should require 4 to 6 ozs. to start the backspace lever moving. It should require 1 to 2 ozs. to start the feed pawl moving.

13. FEED ROLL DETENT SPRING TENSION REQUIREMENT

13.1 It should require 15 to 17 ozs. to start the roller moving away from the star wheel. TO ADJUST, hold the adjusting thumb nut and loosen the lock nut. Then turn the thumb nut to obtain the proper tension. Hold the thumb nut when tightening the lock nut.

14. SELECTOR LEVER BRACKET ADJUSTMENT (Figure 5)

14.1 Place an "R" wrench on the R, T and Y keylevers, depress the wrench until the keylevers are stopped by the code bars. The engaging tips of the selector fingers (not including the feed punch selector finger) should be under the punches by not more than half the diameter of the punches (gauge by eye). TO ADJUST, loosen the selector lever bracket mount-

14.1 ing screws and position the bracket. Tighten the mounting screws.

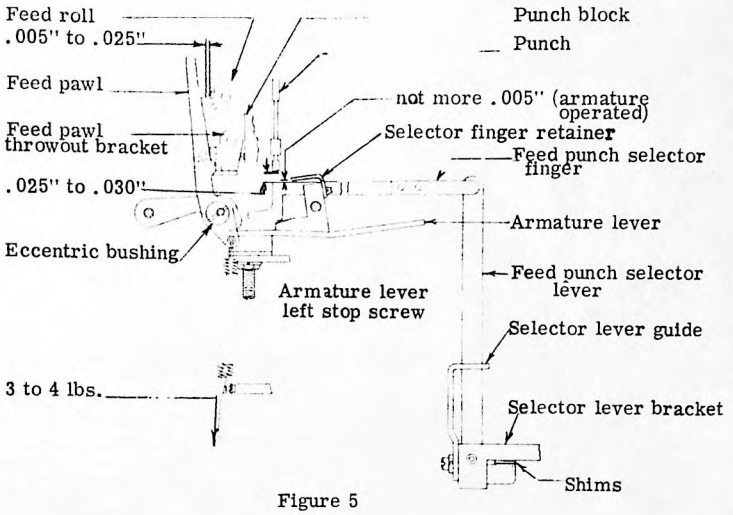


Figure 5

15. FEED PUNCH SELECTOR LEVER ADJUSTMENT (Figure 5)

15.1 The left end of the feed punch selector finger should line up with the left edge of the feed punch pin (gauge by eye). TO ADJUST, position the feed punch selector lever by increasing or decreasing the number of shims between the formed-over ear of the selector lever bracket.

16. ARMATURE LEVER LEFT STOP SCREW ADJUSTMENT (Figure 5)

16.1 With the armature lever held firmly against its left stop and the left end of the uppermost section of the feed punch selector finger in line with the left edge of the feed punch pin, the clearance between the feed punch selector finger and the feed punch should be .025" to .030".

17. ARMATURE LEVER RIGHT STOP SCREW ADJUSTMENT

17.1 In order to check this adjustment it is necessary to remake it. TO ADJUST, proceed as follows: Place all of the punch selector fingers under the punch pins so that the left end of each selector finger lines up with the left end of the feed punch selector finger. Adjust the armature lever right stop screw so that the punches fail to punch through the tape when the punch magnets are energized by closing the punch contacts by hand. Then back off the stop screw until all of the punches just punch through the tape when the punch magnet contacts are operated by hand. All of the punches should also perforate the tape when the selector fingers are positioned as far to the left as possible. Back off the right stop screw farther if necessary. Then back off the stop screw 1/4 turn more for margin. Make certain that there is some clearance between the armature and the magnet core when the armature lever is held firmly against its right stop. Tighten the lock nut.

18. SELECTOR FINGER RETAINER ADJUSTMENT (Figure 5)

18.1 There should be some clearance, not over .005" between the retainer and the top of the feed punch selector lever when the armature lever is held in its operated position by the magnet. Also, the selector finger retainer should be equidistant (within .005") from the No. 1 and No. 5 selector fingers when the ends of all the selector fingers are in line. TO ADJUST, loosen the retainer mounting screws and adjust the retainer. Tighten the screws.

19. TAPE GUIDE SPRING ADJUSTMENT

(a) The edge of the spring should be parallel to the edge of the casting on which it is mounted.

(b) The spring should hold the tape securely against the side of the guide in the die block adjacent to No. 1 punch without buckling the tape.

TO ADJUST, for requirement (a), position the spring. To check the latter requirement, take up the play of the tape in the die block toward the spring and observe whether the spring returns the tape to the far side when the tape is released. TO ADJUST, bend the spring.

20. PUNCH CONTACT BRACKET ADJUSTMENT

20.1 The punch contact bracket should be positioned, so that its mounting

20.1 screws are midway in the elongated holes. TO ADJUST, loosen the mounting screws, reposition the bracket and tighten the mounting screws.

21. PUNCH CONTACT SPRING TENSION (Figure 7)

21.1 With any keylever depressed, it should require 2 to 3 ozs. to separate the contacts. TO ADJUST, bend the right-hand contact spring.

22. KEY PRESSURE ADJUSTING MECHANISM ADJUSTMENT

22.1 The punch contact operating lever backstop screw should be centrally located with the contact operating lever. TO ADJUST, position the key pressure adjusting mechanism by means of its mounting screws.

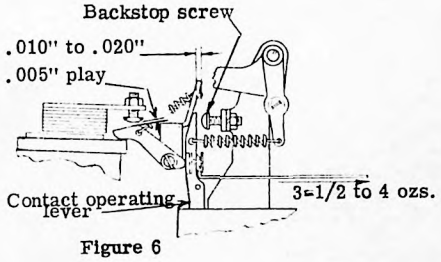


Figure 6

23. ANTI-CHATTER MECHANISM ADJUSTMENTS

23.1 With the armature lever in its unoperated position, the anti-chatter lever should be in contact with the adjusting screw on the armature, and its upper surface should be approximately horizontal. TO ADJUST, position the adjusting screw.

.2 With the armature lever in the energized position, the anti-chatter lever should have at least .005" play between the operating screw and the magnet.

.3 With the armature lever in the unoperated position, the anti-chatter lever should extend at least 1 32" to the left of the centre of the

23.3 operating screw. TO ADJUST, refine the operating screw.

.4 It should require 2 to 3 ozs. to pull the anti-chatter lever spring to its position length.

24. PUNCH CONTACT OPERATING LEVER LINK ADJUSTMENT (Figure 7)

24.1 With the space bar fully depressed, there should be .015" to .030" clearance between the right-hand contact spring and the insulator on the contact operating lever. TO ADJUST, reposition the adjustable link.

NOTE: Depress the LETTERS and BLANK keylevers alternately, the selector fingers should travel the same distance to the right or left after the punch contacts have closed.

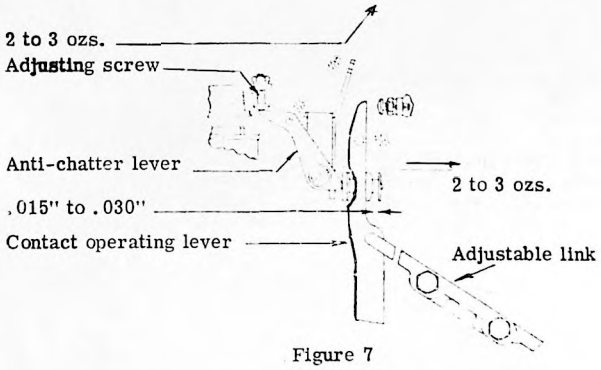


Figure 7

25. PUNCH CONTACT OPERATING LEVER BACKSTOP ADJUSTMENT (Figure 6)

25.1 With DC connected to 52 and 53, operate any keylever and slowly release until the contact operating lever just separates the punch contacts. Under this condition there should be a .010" to .020" clearance between the contact operating lever backstop and the right-hand edge of the contact operating lever. TO ADJUST, loosen the backstop screw lock nut and position the screw, tighten the lock nut.

26. PUNCH CONTACT OPERATING LEVER SPRING TENSION

26.1 It should require 1/2 to 1 oz. to just start the contact operating lever moving away from the backstop screw. TO ADJUST, turn the spring adjusting screw to its highest position. Then position the extension on the adjusting lever by means of the elongated slot in the extension to meet the requirement.

27. PUNCH MAGNET ADJUSTMENT

27.1 With the punch magnet energized and the armature lever resting against its right-hand stop, there should be .004" to .008" clearance between the magnet cores and the armature.

.2 In order to change this adjustment, it will be necessary to remove the counter unit and the counter mounting bracket. Replace the parts after making the adjustment.

.3 TO ADJUST, loosen the two eccentric stop mounting screws and rotate the eccentric away from the core. Loosen the magnet core mounting screws and position the core. Tighten the mounting screws. Rotate the eccentrics so they make contact with the core and tighten the screws which mount the eccentrics.

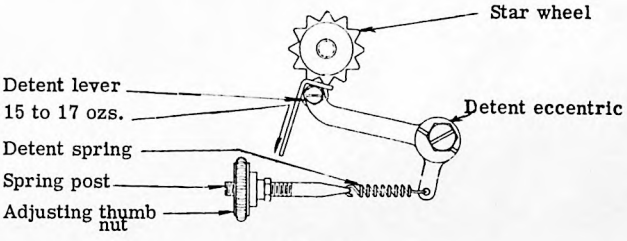


Figure 8

28. FEED ROLL DETENT ADJUSTMENT (Figure 8)

(a) With the detent lever roller resting between two teeth of the star wheel and the armature lever in the operated position.

28. (a) insert the feed roll positioning gauge (No. 73517) in the punch block guide slot so that the projection of the gauge stops against the feed hole punch. Under these conditions, a pin on the feed roll should line up with the centre hole of the gauge. TO ADJUST, loosen the detent eccentric bushing mounting screw and position the bushing keeping the centre of the eccentric bushing below the centre of the mounting screw. Tighten the mounting screw.

(b) The perforations in the tape should conform to the standard spacing of 10 holes to the inch. Check the tape against the tape gauge (#2215). TO ADJUST, loosen the detent lever eccentric bushing mounting screw and position the bushing using the lower semi-circle of its adjusting range. Tighten the mounting screw.

29. FEED PAWL ECCENTRIC ADJUSTMENT

29.1 The feed pawl should just engage a tooth on the feed roll, without over-travel, when the armature lever is raised slowly by hand until the feed punch selector finger just touches the feed punch. TO ADJUST, loosen the feed pawl eccentric bushing mounting screw, and position the bushing. Tighten the bushing mounting screw.

30. FEED PAWL SPRING TENSION

30.1 With the armature lever resting against its left stop, it should require 3 to 4 lbs. to extend the spring to its installed length.

31. FEED PAWL THROWOUT BRACKET ADJUSTMENT (Figure 5)

31.1 With the armature lever resting against its left-hand stop, there should be .005" to .015" clearance between the tip of the tooth on the feed pawl and the tips of the teeth on the feed roll throughout a complete revolution of the feed roll. TO ADJUST, loosen the bracket mounting screw and the adjusting screw lock nut and set them both friction tight. Then, with the adjusting screw in contact with the punch block advance or withdraw the screw until the desired clearance is obtained. Tighten the lock nut and the mounting screw.

32. FEED PAWL GUIDE ADJUSTMENT (Figure 9)

32.1 When the armature lever is held in its operated position by energizing

32.1 the punch magnet, and the feed roll is rotated, there should be some clearance, not more than .005", between the feed pawl and the closest feed roll tooth. TO ADJUST, position the feed pawl guide.

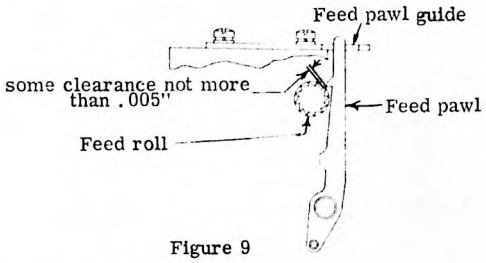


Figure 9

33. TAPE STRIPPER PLATE ADJUSTMENT

33.1 There should be some clearance, not over .010", between the tape stripper plate and the feed roll throughout a complete revolution of the feed roll. TO ADJUST, loosen the mounting screws and position the plate. Tighten the mounting screws.

34. TAPE KNIFE ADJUSTMENT

34.1 The tape knife should be approximately horizontal and there should be at least .015" clearance between the tape knife and the tape stripper at their closest point. TO ADJUST, loosen the tape knife mounting screws and position the knife. Tighten the mounting screws.

35. COUNTER CONTROL CONTACT OPERATING MECHANISM ADJUSTMENTS

35.1 With the "figures" key lever and any two other keys levers depressed until they are stopped by the code selector bars, the relation between the key levers and the cam levers on the contact operating mechanism should be such that the cam levers are just completely displaced. To check this adjustment, depress the "figures" and any two other key levers until they are stopped by the code selector bars. Then, observing the counter control contact operating fibre extension, there should be very little or no further displacement as the "figures" key lever is

35.1 depressed to its full depth of stroke. In a similar manner repeat this check, using the "carriage return" key lever. It is important that the full displacement of the cam lever is not reached until the function key lever just reaches its neutral position. ADJUST, by means of shims located between the contact operating mechanism and the two rear mounting ears of the condenser cover.

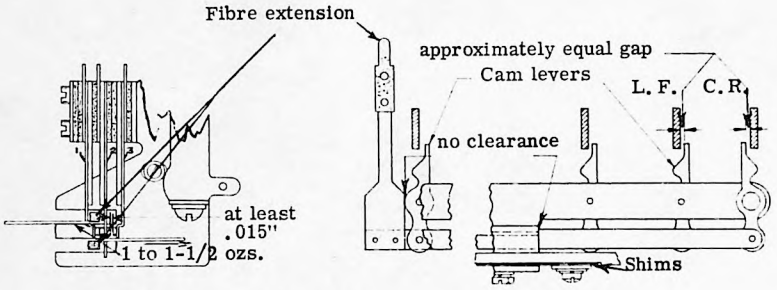


Figure 10

.2 When the cam levers are held away from the key levers against their backstops, there should be approximately equal clearance between the "carriage return" and "line feed" key levers and the tips of their respective cam levers. TO ADJUST, position the counter control contact operating mechanism laterally by means of the elongated holes in the mounting ears.

36. COUNTER CONTROL CONTACT ASSEMBLY ADJUSTMENTS

36.1 Remove the contact cover by loosening its mounting nuts. The contact springs are numbered from left to right, with contact spring No. 3 nearest to the resistor.

.2 Contact springs No. 1 and No. 2 should be approximately at right angles to the insulator pile-up in the assembly, and each contact point should have a follow of .005" to .010" when the other spring is moved away from it. ADJUST by bending the stiffeners for contact springs No. 1 and No. 2.

36.3 It should require a force of 1 to 1-1 2 ozs. to just separate the contact points on contact springs No. 1 and No. 2. TO ADJUST, bend contact spring No. 1 or No. 2 and recheck requirement No. 1.

.4 The contact operating fibre extensions of the counter control contact mechanism should move freely in their guide slots, and there should be not more than .005" clearance between the contact spring No. 2 and the right edge of the fibre tip, when the rear contact operating fibre extension is held to the right against the backstop. TO ADJUST, position the counter control contact assembly by means of the elongated mounting holes in the bracket.

.5 Contact spring No. 3 should be held by its backstop so that when the "carriage return" key lever is depressed slowly, contact spring No. 3 will be moved .005" to .010" by the action of the contact point on contact spring No. 2. TO ADJUST, bend the stiffener for contact spring No. 3.

.6 With the "carriage return" key lever fully depressed, it should require a force of 3 4 to 1 oz., applied to contact spring No. 3, to just separate the contact points on contact springs No. 2 and No. 3. TO ADJUST, bend the contact spring No. 3 and recheck requirement No. 4.

.7 With the contact operating fibre extensions on the counter contact operating mechanism not touching contact springs No. 1 and No. 2, there should be at least .015" clearance between the contact points on contact springs No. 2 and No. 3. If this clearance does not exist, refine the preceding adjustments to obtain proper clearance.

.8 When the "carriage return" key lever is depressed, contact spring No. 2 should move toward the right and should break contact with the contact point on contact spring No. 1 before it makes contact with the contact point on contact spring No. 3. If adjustment is necessary refine the preceding adjustments to meet the break-before-make requirement.

.9 Replace the contact cover. Hold the mounting screws with a screwdriver when tightening the nuts to avoid loosening the contact pile-up mounting screws.

37. FEED PAWL BRACKET ADJUSTMENT

37.1 With the counting magnet armature play taken up in an outward direction, the outer edge of the pawl should not extend more than .035" outside the outer surface of the ratchet. With the play taken up in the opposite direc-

37.1 tion, the outer surface of the pawl should not be more than .015" within the outer surface of the ratchet. TO ADJUST, remove the armature assembly from the unit. Set the screws which hold the bracket to the armature so that the bracket is friction tight, and replace the armature assembly on the unit. Adjust the bracket for the correct position of the pawl, remove the armature assembly and tighten the bracket mounting screw. Replace the armature assembly.

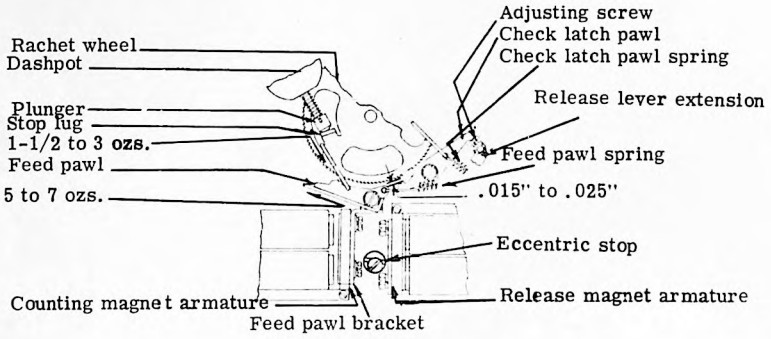


Figure 11

38. RATCHET RETURN SPRING ADJUSTMENT (Figure 11)

38.1 The ratchet should be free throughout a complete revolution in a counterclockwise direction. TO ADJUST, proceed as follows: Remove the dashpot. When removing the dashpot, care should be taken to permit the ratchet spring to unwind slowly so as to avoid breaking the spring. Wind up the ratchet spring by turning the ratchet in a counterclockwise direction until the spring is tight. Then return the ratchet in a clockwise direction not less than one, nor more than two complete revolutions. Position the ratchet so that the stop lug is in the approximate location of 45° in the lower left-hand quadrant as the ratchet is viewed from the rear. Engage the latch pawl to hold the ratchet in place. Replace the dashpot and position it so that the stop lug is in full engagement with the plunger throughout the stroke of the plunger.

39. RATCHET SPRING TENSION (Figure 11)

39.1 Operate the release magnet armature and hold the dashpot plunger

39.1 depressed. Hook a scale over the spoke of the ratchet that carries the stop lug at the point on the spoke nearest the periphery of the ratchet and pull in a counterclockwise direction at a right angle to the radius. It should require 1-1 2 to 3 ozs. to move the stop lug away from the end of the plunger.

40. RELEASE MAGNET ARMATURE ECCENTRIC STOP ADJUSTMENT

40.1 With the feed pawl in full engagement with the teeth on the ratchet. there should be .010" to .020" clearance between the release lever extension and the feed pawl when the release magnet armature is against its stop. TO ADJUST, loosen the eccentric stop mounting screw and position the eccentric. Tighten the mounting screw.

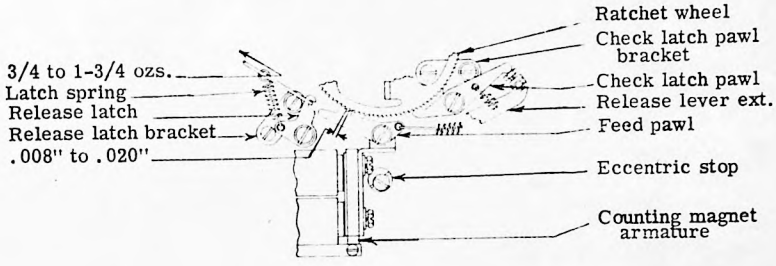


Figure 12

41. CHECK LATCH PAWL BRACKET ADJUSTMENT (Figure 12)

41.1 With the counting magnet armature against the magnet cores. the teeth on the feed pawl should overtravel the ratchet teeth .008" to .020". TO ADJUST, loosen the check latch pawl bracket mounting screws and position the bracket. Tighten the mounting screws.

NOTE: When making this adjustment, back off the release lever extension adjusting screw and hold the check latch pawl in full engagement with a tooth on the ratchet.

42. RELEASE LEVER EXTENSION ADJUSTING SCREW ADJUSTMENT (Figure 11)

42.1 Hold the ratchet so that the teeth on the check latch pawl are not

42.1 opposite the place on the ratchet where the teeth are missing. There should be .015" to .025" clearance between the check latch pawl and the ratchet. TO ADJUST, loosen the release lever extension adjustment screw lock nut and position the screw. Tighten the lock nut.

43. COUNTING MAGNET ARMATURE ECCENTRIC STOP ADJUSTMENT

43.1 When the counting magnet armature is operated, its feed pawl should rotate the ratchet one tooth and the check latch pawl should be in full engagement with a tooth on the ratchet, with slight overtravel not over .010", when the counting magnet armature is against its eccentric stop. Check this overtravel throughout a complete revolution of the ratchet. TO ADJUST, loosen the eccentric stop mounting screw and position the eccentric. Tighten the mounting screw.

44. RELEASE LATCH BRACKET ADJUSTMENT

44.1 With the release magnet armature against the magnet cores, the release lever extension should overtravel the notch in the release latch by .004" to .015". TO ADJUST, loosen the release latch bracket mounting screws and position the bracket. Tighten the screws.

45. CHECK LATCH PAWL SPRING TENSION (Figure 11)

45.1 It should require 1-1 2 to 2-1 2 ounces to start the pawl moving.

46. RELEASE LATCH SPRING TENSION

46.1 With the release latch in its unlatched position, it should require 3 4 to 1-3 4 ozs. to start.

47. DASHPOT POSITION ADJUSTMENT

47.1 With the plunger completely depressed into the dashpot cylinder, the stop on the ratchet resting firmly against the end of the plunger shaft, and the check latch pawl in engagement with the ratchet, there should be some clearance, not over .004", between the engaging faces of the first tooth on the ratchet and the first (outer) tooth on the check pawl. Under the foregoing conditions the indicator should point to zero on the scale. Also, the point of contact of the plunger against the ratchet stop lug should be at least .040" from the edge of the stop lug throughout the stroke of the plunger. TO ADJUST the dashpot, loosen the dashpot mounting screws and position the dashpot. Tighten the mounting screws.

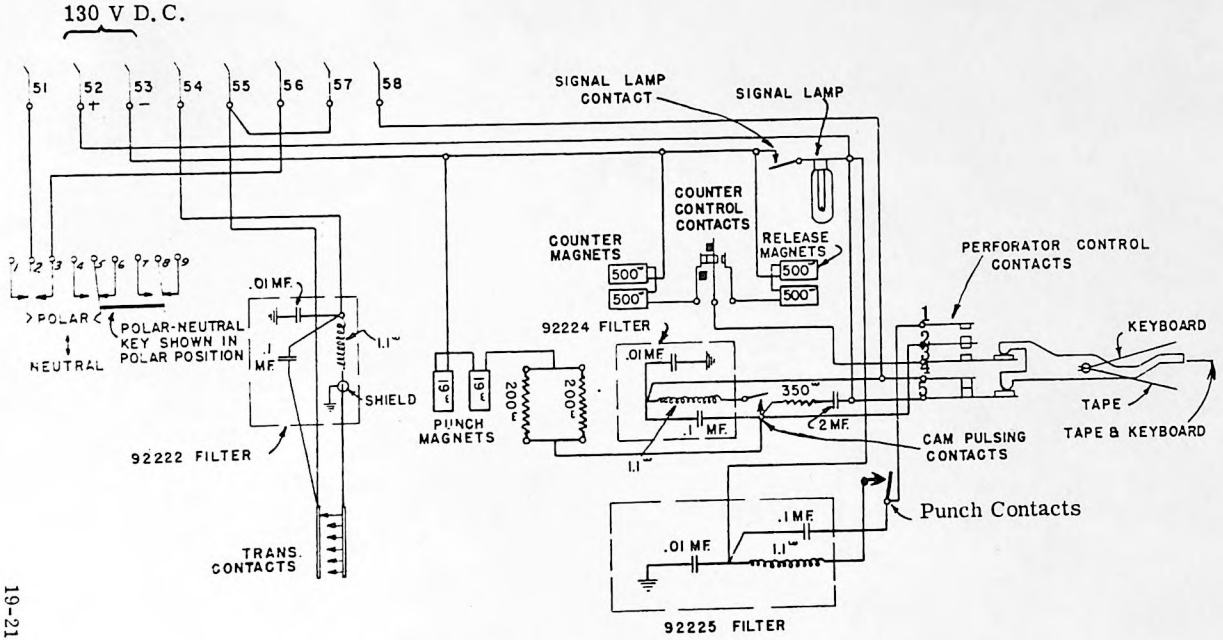
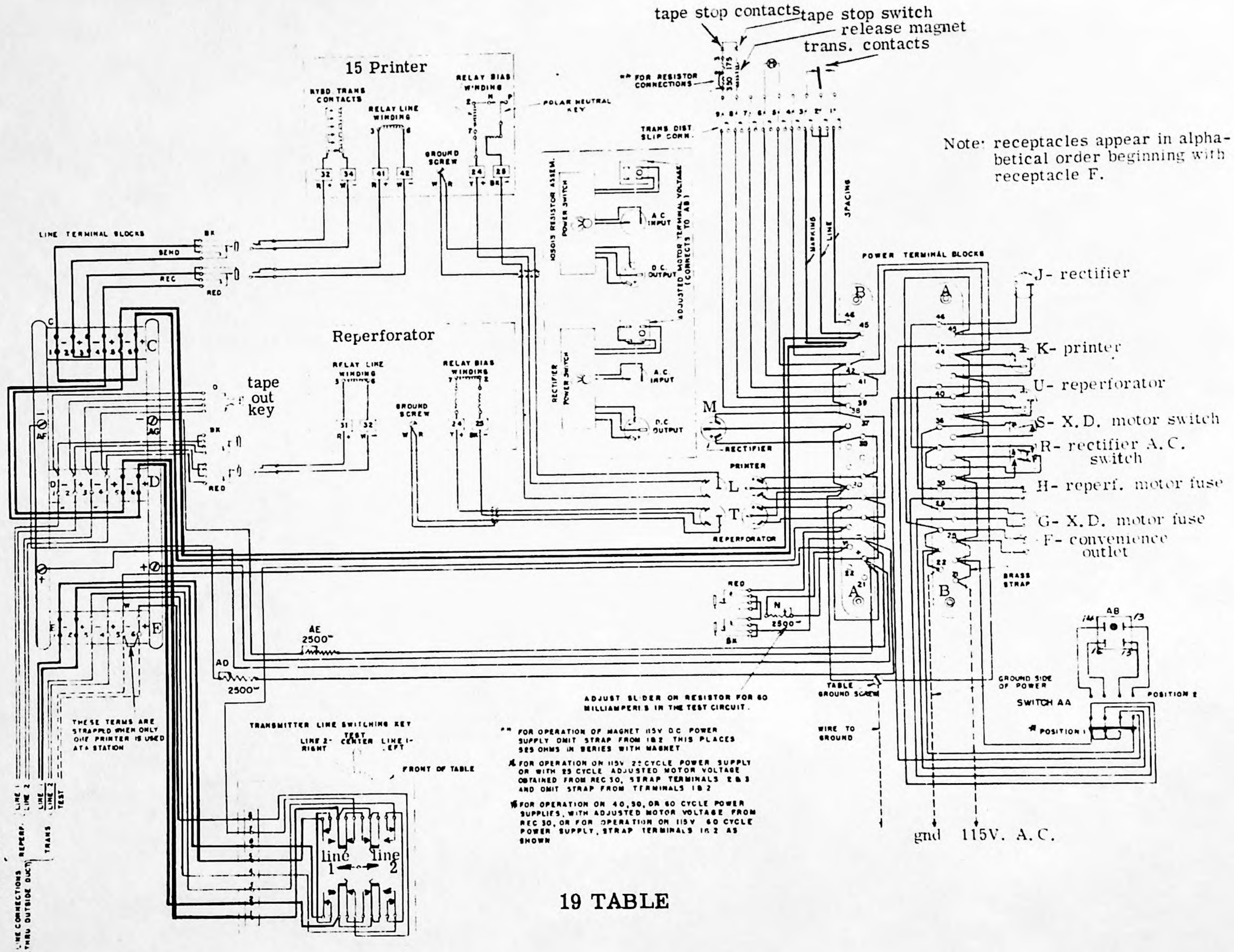


Figure 13. MODEL 15 PERFORATOR TRANSMITTER (19 Kybd).



tape stop contacts
tape stop switch
release magnet
trans. contacts
15 Printer
Note: receptacles appear in alphabetical order beginning with receptacle F.
Reperforator
tape out key
J- rectifier
K- printer
U- reperforator
S- X.D. motor switch
R- rectifier A.C. switch
H- reperf. motor fuse
G- X.D. motor fuse
F- convenience outlet
LINE TERMINAL BLOCKS
POWER TERMINAL BLOCKS
ADJUST SLIDER OR RESISTOR FOR 60 MILLIAMPERES IN THE TEST CIRCUIT.
THESE TERMS ARE STRAPPED WHEN ONLY ONE PRINTER IS USED AT A STATION
TRANSMITTER LINE SWITCHING KEY
FRONT OF TABLE
SWITCH AA
gnd
115V. A.C.
line 1
line 2

19 TABLE

19 TABLE WIRING.

Connect Line 1 - E1 & E2
Connect Line 2 - E3 & E4
Connect A.C. - A21 & A22.

To connect one line without use of Table switching key
remove strap - C1 & C6
add strap - C5 & C6
Connect line - C1 & C6

CN TELECOMMUNICATIONS
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PLANT MANUAL BK2.3.4
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LORENZE MODEL 15 TELETYPE

ADJUSTMENTS

CONTENTS

1. KEYBOARD ADJUSTMENTS

1.1 Selector Bar Assembly Position (Figure 1)

REQUIREMENT: With the selector bars resting against the two outer bearing plates, there should be a .004" to .012" clearance between the keylevers and the teeth of the selector bars and must be equal on both ends.

TO ADJUST: Reposition the two outer bearing plates on the selector bar assembly with its set screws loosened.

1.2 Selector Bar Stop Bracket (Figure 1)

REQUIREMENT: With the selector bars positioned to the extreme left hand position, the keylevers should engage the slanting sides of the selector bars. In a similar manner check with the selector bars in the extreme right hand position.

TO ADJUST: Reposition the right stop bracket if the requirement is not met with the selector bars in the left hand position and reposition the left stop bracket if the right hand requirement is not satisfied.

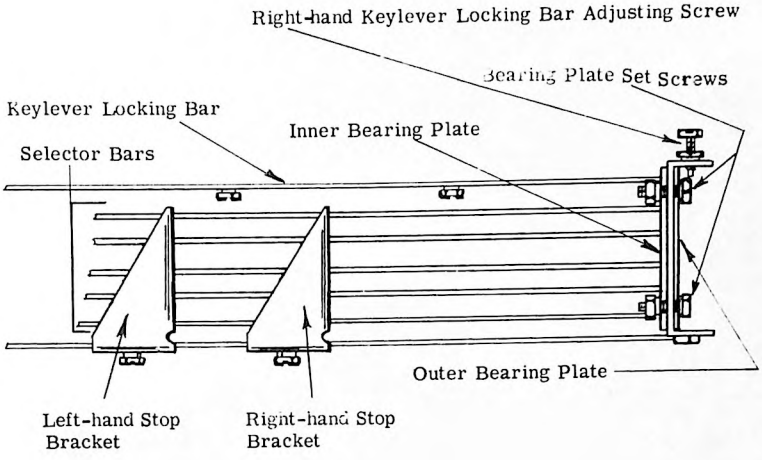


Figure 1

1.3 Keylever Locking Bar (Figure 1)

REQUIREMENT: (1) With the keylever locking bar to its extreme right hand position, the upper case keylevers should engage the middle of the locking bar teeth. In a similar manner check with the locking bar in its left hand position operating the lower case keylevers.

TO ADJUST: Reposition the left or right hand keylever locking bar adjusting screws with its lock nut loosened.

REQUIREMENT: (2) With the keylever locking bar resting against the inner bearing plates, there should be a .008" to .016" clearance between the keylever locking bar and all the keylevers.

1.3 TO ADJUST: Reposition the inner bearing plates on the selector bar assembly with its set screws loosened.

1.4 Universal Bar Pilot Screws

REQUIREMENT: The universal bar should have an end play of .004" to .012".

TO ADJUST: Reposition the universal bar by means of its pilot screws.

1.5 Locking Lever Shaft Bracket (Figure 2)

REQUIREMENT: With the locking levers in the spacing position and the contact levers on the high part of their cam, there should be a .004" to .012" clearance between the contact levers and the locking levers. Also the lock loop should be positioned mid-way between the marking and spacing locking levers when "Y" is selected.

TO ADJUST: Add or remove shims between the locking lever shaft bracket and the keyboard casting to meet the first requirement and before tightening the bracket mounting screws, position the bracket to meet the second requirement.

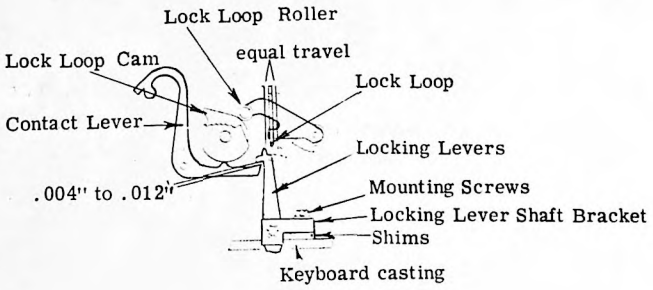


Figure 2

1.6 Transmitting Shaft End Play

REQUIREMENT: The transmitting shaft should be free with no end play.

TO ADJUST: Reposition the bushing in the rear bearing bracket by means of its adjusting nuts.

1.7 Clutch Throwout Lever

REQUIREMENT: There should be a .004" to .008" clearance between the clutch teeth with the clutch fully disengaged.

TO ADJUST: Position the clutch throwout lever by means of shims placed between the throwout lever post and the bracket.

1.8 Trip-Off Pawl (Figure 3)

REQUIREMENT: With any keylever depressed, rotate the transmitting shaft until the lower extension of the clutch throwout lever reaches its highest travel, there should be a .008" to .016" clearance between the clutch throwout lever and the latching surface of the trip-off pawl shoulder.

TO ADJUST: Reposition the trip-off pawl mounting plate with its mounting screws loosened.

1.9 Lock Loop Roller (Figure 2)

REQUIREMENT: With the keyboard clutch fully disengaged, position the locking levers directly below the lock loop blade. there should be a .015" to .060" clearance between the lock loop blade and the locking lever.

TO ADJUST: Readjust the lock loop eccentric screw with its lock nut loosened.

1.10 Transmitting Clutch Pressure Roller

REQUIREMENT: The transmitting clutch pressure roller should travel

1.10 REQUIREMENT: from .020" to .032" to the front of the keyboard when engaged by the driven clutch member.

TO ADJUST: Reposition the pressure roller with its mounting screw loosened.

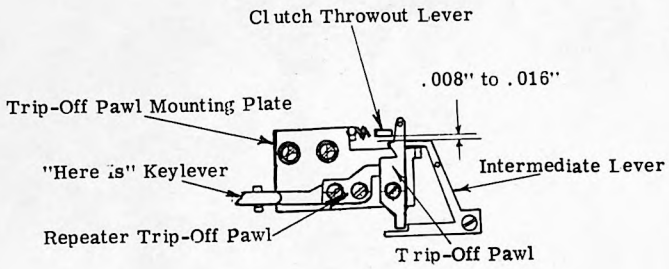


Figure 3

1.11 Intermediate Lever Stop Plate (Figure 3)

REQUIREMENT: With the transmitting clutch fully disengaged, there should be some clearance not more than .006" between the trip-off pawl and the notch in the intermediate lever.

TO ADJUST: Reposition the intermediate lever stop plate.

1.12 Universal Bar Position (Figure 4)

REQUIREMENT: With any keylever fully depressed, there should be a .008" to .020" clearance between the clutch throwout lever and the trip-off pawl.

TO ADJUST: Reposition the universal bar bearing plates with its clamping screws loosened.

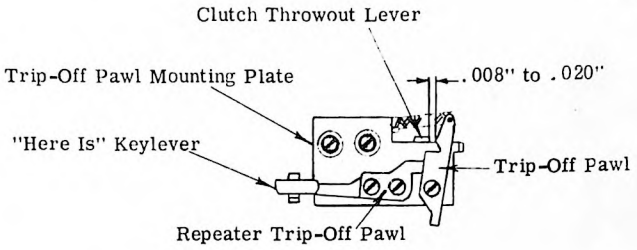
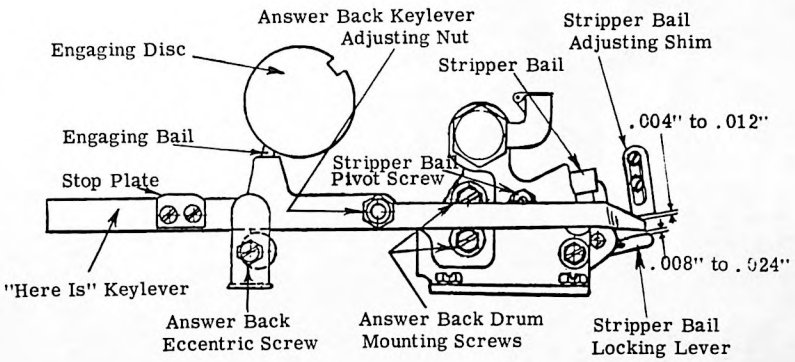


Figure 4



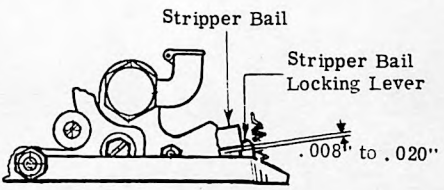


Figure 5

LO15-6

1.13 Transmitting Contacts

REQUIREMENTS: (1) With any contact lever on the high part of its cam, the contact gap should be approximately .020".

TO ADJUST: Reposition the contact adjusting screws with its clamping screws loosened.

REQUIREMENTS: (2) With any contact lever on the low part of its cam, it should require a pressure of 3-1 2 to 6 ozs. to open the contacts, with the scale applied to the contact spring just above the contact point.

TO ADJUST: Bend the longer contact springs. Recheck (1).

1.14 Repeat Keylever Eccentric

REQUIREMENT: The repeat keytop unoperated, it should align with the other keytops and should not be higher or lower than its adjacent keytops.

TO ADJUST: Reposition its eccentric screw with its lock nut loosened.

2. ANSWER BACK ADJUSTMENTS

2.1 Stripper Bail Pivot Screws (Figure 5)

REQUIREMENT: The stripper bail should have a .008" to .025" end play.

TO ADJUST: Readjust the front pivot screw with its lock nuts loosened.

2.2 Stripper Bail Locking Lever (Figure 5)

REQUIREMENT: With the "HERE IS" key fully depressed, there should be a .008" to .020" clearance between the lower edge of the stripper bail and latching surface of the stripper bail locking lever.

2.2 TO ADJUST: Reposition the stripper bail locking lever with its two mounting screws loosened.

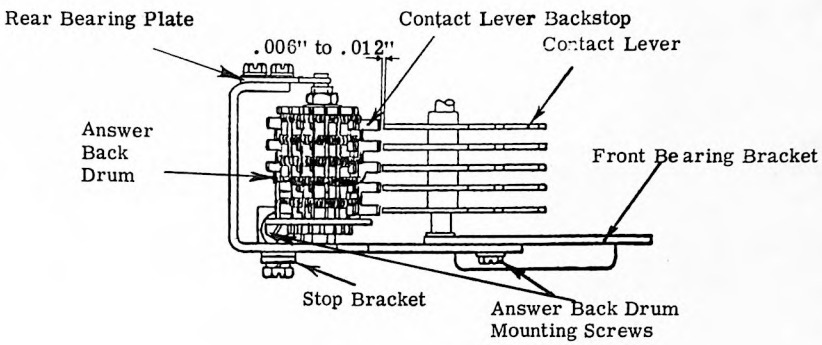


Figure 6

2.3 Answer Back Drum Alignment (Figure 6)

REQUIREMENT: (1) With the lock loop roller on the peak of its cam, depress the "HERE IS" key and rotate answer back drum until 5 contact lever backstops are directly opposite the contact levers. There should be a .006" to .012" clearance between the contact levers and the contact lever backstops.

TO ADJUST: Reposition the answer back drum assembly with its three mounting screws loosened. To equalize the clearance, reposition its rear bearing plate with its two clamp screws loosened.

REQUIREMENT: (2) With the "HERE IS" key depressed, rotate the transmitting shaft, the contact levers should fully engage the contact lever backstops in the first row. Continue rotating the transmitting

2.3 REQUIREMENT: (2) shaft and check each row in a similar manner.

TO ADJUST: Rotate the answer-back drum until the "HERE IS" key lever rises into the notch of the ratchet disc. Loosen the rear lock nut (counterclockwise thread) of the drum, with a tommy inserted in the adjusting holes in the ratchet disc, rotate the disc counterclockwise to keep it stationary. Rotate the answer back drum ratchet wheel until the ratchet locking lever engages a tooth on the ratchet wheel and rotate the drum. See Figure 7 for location of parts.

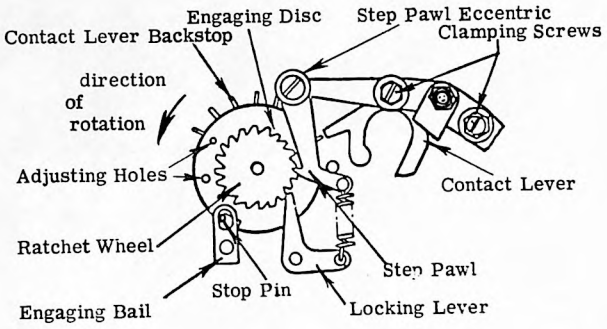


Figure 7

2.4 Answer Back Drum Step Pawl Eccentric Screw (Figure 7)

REQUIREMENT: With the "HERE IS" keylever operated, rotate the transmitting shaft until the lock loop roller is positioned to the right of its cam. Advance the step pawl until a row of contact lever backstop are opposite the contact levers. The answer back drum locking lever should drop between two teeth on the ratchet and there should be a .004" to .008" clearance between the upper surface of the locking lever

2.4 REQUIREMENT: and a tooth on the ratchet.

TO ADJUST: Reposition the step pawl eccentric screw with its lock nut loosened.

2.5 Answer Back Keylever (Figure 5)

REQUIREMENT: With the answer back keylever operated, its right-hand extension should clear the stripper bail locking lever by .008" to .024".

TO ADJUST: Reposition the adjusting nut with its lock nut loosened.

2.6 Stripper Bail Adjusting Shim (Figure 5)

REQUIREMENT: With any keylever held fully depressed, there should be a .004" to .012" clearance between the answer back keylever and the stripper bail shim with play taken up to make this clearance a minimum.

TO ADJUST: Reposition the adjusting shim with clamping screws loosened.

2.7 Repeater Trip-Off Lever (Figure 4)

REQUIREMENT: With the clutch fully disengaged there should be a .005" to .015" clearance between the repeater trip off lever and the trip off pawl.

TO ADJUST: Reposition the repeater trip off lever its mounting screws loosened.

2.8 Answer Back Keylever Eccentric Screw (Figure 5)

REQUIREMENT: With the "HERE IS" keylever held depressed, there should be at least .008" clearance between the stripper bail locking lever and the stripper bail.

TO ADJUST: Reposition the answer back keylever eccentric screw with its lock nut loosen and recheck the answer back keylever adjustment paragraph 2.5.

2.9 Answer Back Drum Step Pawl (Figure 7)

REQUIREMENT: With the "HERE IS" keylever operated, rotate the transmitting shaft until the lock loop roller is on the peak of its cam. There should be a .008" to .024" clearance between the side of a tooth on the ratchet and the step pawl.

TO ADJUST: Reposition the step pawl with clamping screws loosened.

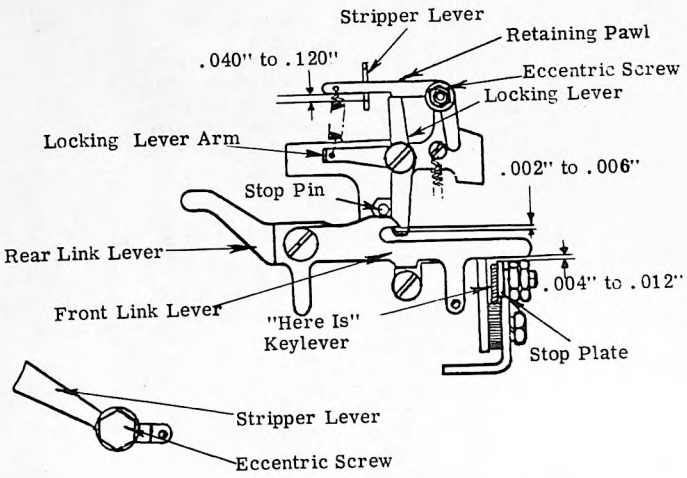


Figure 8

2.10 Answer Back Stripper Lever Eccentric Screw (Figure 8)

REQUIREMENT: With the clutch fully disengaged and the locking lever arm rotated downward, there should be a .040" to .120" clearance between the answer back stripper lever and the answer back retaining pawl.

2.10 TO ADJUST: Reposition the answer back stripper lever eccentric screw with its lock nut loosened.

2.11 Answer Back Locking Lever Stop Pin (Figure 8)

REQUIREMENT: There should be a .002" to .006" clearance between the locking lever and the shoulder on the front link lever and the front link lever should overlap the locking lever by .060" to .120", when the locking lever is not engaged in the shoulder of the retaining pawl.

TO ADJUST: Reposition the stop pin with its lock nut loosened.

2.12 Answer Back Retaining Pawl Eccentric (Figure 8)

REQUIREMENT: With the answer back locking lever fully engaged with the shoulder of its retaining pawl, there should be a .004" to .012" clearance between the lower extension of the locking lever and the front of the shoulder on the front link lever.

TO ADJUST: Reposition the answer back retaining pawl eccentric with its lock nut loosened.

2.13 Answer Back Keylever Stop Plate (Figures 5 and 8)

REQUIREMENT: With the clutch fully disengaged and the front link lever fully engaged with the locking lever, lift the rear link lever, there should be a .004" to .012" clearance between the front link lever and the answer back keylever stop plate.

TO ADJUST: Reposition the stop plate with its clamping screws loosened.

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MODEL 28 TELETYPE

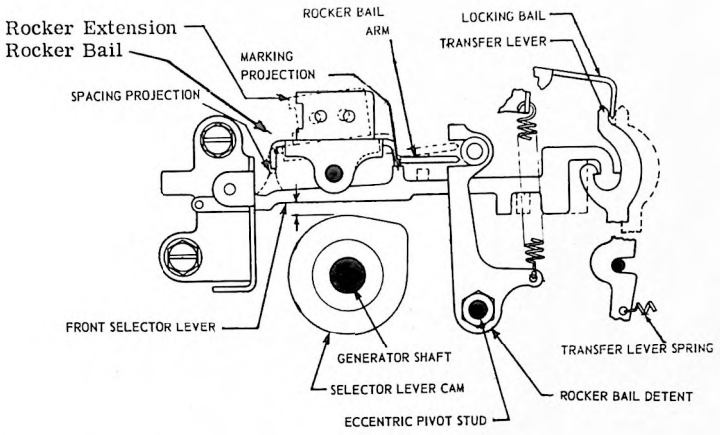
ADJUSTMENTS

CONTENTS

1. LK3 KEYBOARD ADJUSTMENTS

1.1 Spring Tensions

Clutch latch lever	1-1 2 to 2-1 2 ozs.
Clutch stop lever	1-3 4 to 3 ozs.
Clutch trip bar	5 to 9 ozs.
Code bar bail	6 to 8 ozs.
Code bar bail latch	1 2 to 1-1 2 ozs.
Code bar	3 to 4 ozs.
Code bare latch	1 4 to 1-1 4 ozs.
Code lever	3-1 2 to 8 ozs.
Code lever bail	1-3 4 to 3 ozs.
Code lever bail latch lever	3 to 5 ozs.
Contact box	2 to 4 ozs.
Detent Lever	8-1 2 to 11-1 2 ozs.
Eccentric follower	1 to 2 ozs.
Flutter lever	1 to 2-1 4 ozs.
Intermediate lever	2 to 4 ozs.
Lock bar	5 to 9 ozs.
Lock bail	2 to 4 ozs.
Non-repeat	1 2 to 1-1 2 ozs.
Reset lever	2 to 4 ozs.
Selector lever	1 to 2-1 2 ozs.
Transfer lever	5-1 2 to 8 ozs.



1.2 Selector Lever Guide

REQUIREMENT: With signal generator clutch disengaged, the clearance between front selector lever and the low part of its cam should be
Minimum .004" Maximum .010"

TO ADJUST: Position the selector lever guide with its mounting screws loosened.

1.3 Rocker Bail Pivot Screw

REQUIREMENT: Rocker bail free on pivot with some end play maximum .010".

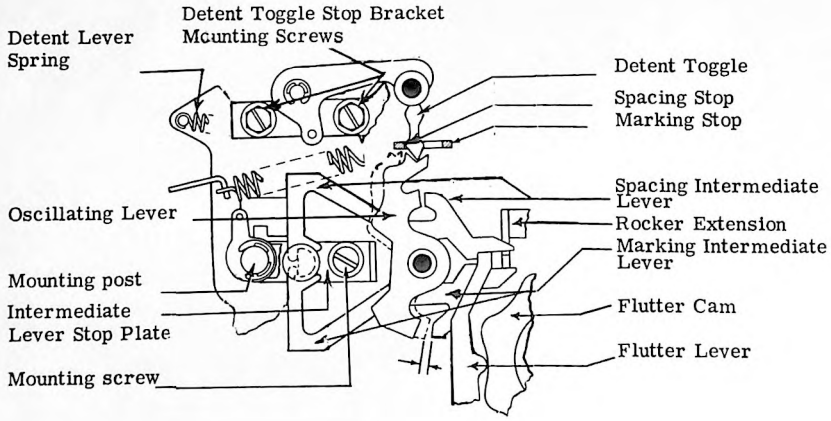
TO ADJUST: Rotate pivot screw.

1.4 Rocker Bail Detent

REQUIREMENT: Clearance between the rocker bail arm and both the marking and the spacing projections of the selector levers should be equal within .005".

1.4 TO CHECK: Rotate the cam sleeve until the front selector lever has come down off the peak of its cam and is opposite the low part of its cam. With the front selector lever in the marking (left) position and the rocker bail arm against the lower stop of its detent, hold the selector lever lightly up against the rocker bail and gauge the clearance between the selector lever and the cam. Shift the rocker bail arm against the upper stop of its detent and hold the front selector lever to the right and up so that the spacing projection touches the rocker bail. Gauge the clearance between the selector lever and the cam. These two clearances should be equal within .005".

TO ADJUST: Equalize clearance by rotating the eccentric pivot stud of the detent with its lock nut loosened. Keep the high part of the eccentric toward the generator shaft.



1.5 Rocker Extension

REQUIREMENT: Equal clearance (within .005") between the rocker extension and both the marking and the spacing intermediate levers when selected individually.

TO CHECK: Rotate the shaft until the marking intermediate lever is selected and the flutter lever is on low part of cam. Gauge clearance. Repeat procedure for spacing intermediate lever. Gauge clearance.

TO ADJUST: Equalize clearances by positioning the rocker extension with its mounting screws loosened.

1.6 Detent Toggle Stop Bracket and Intermediate Lever Stop Plate

REQUIREMENT: Clearance between engaging surfaces of spacing and marking intermediate levers and associated surfaces of oscillating lever should be equal within .004" and have some clearances not more than .006".

TO CHECK: Front selector lever in marking position, generator shaft rotated until front selector lever is on peak of its cam. Move oscillating lever toward marking intermediate lever and gauge the gap. Then with front selector lever in spacing position and on peak of its cam, move oscillating lever toward spacing intermediate lever and check gap.

TO ADJUST:

(a) Equalize the clearances by positioning the stop bracket with its mounting screws loosened.

(b) To get required clearances by positioning the intermediate stop plate with mounting post and mounting screw loosened.

1.7 Flutter Lever

REQUIREMENT: With the flutter lever on each low portion of its cam and the marking and spacing intermediate levers alternately selected, the clearance between

1.7 REQUIREMENT: the flutter lever and latching surface of selected intermediate lever should be : Minimum .008" maximum .018"
With the clutch engaged and the selector levers (Figure 2) to marking (left), rotate the generator shaft to check clearance on marking intermediate levers. Hold selector levers to spacing (right) and rotate shaft to check spacing intermediate levers.

TO ADJUST: Position the flutter lever mounting stud in the elongated mounting hole with the lock nut loosened.

1.8 Clutch Shoe Lever

REQUIREMENT: Gap between clutch shoe lever and its stop lug should be .055" to .075" greater when clutch is engaged than when the clutch is disengaged.

TO ADJUST: With the two clamp screws in the clutch disk loosened, engage a wrench on the lug of the adjusting disk and rotate the disk.

NOTE: After the above adjustment is made, check for drag on the drum as follows: place clutch in stop position, hook 8 oz. scale on top tooth of gear and pull horizontally to the left. If a pull of more than 8 ozs. is required to move drum, refine the adjustment.

1.9 Generator Contact

REQUIREMENT: The marking and spacing contact gaps should be equal.

TO CHECK: Remove the cover from the contact box. First move the detent toggle against its spacing stop (left as viewed from rear) and gauge the marking contact gap. Then move the detent toggle against its marking stop and gauge spacing contact gap.

TO ADJUST: Rotate the adjusting screw with its lock nut loosened and with the contact box mounting screws

1.9 TO ADJUST: friction tight. Replace contact box cover.

1.10 Code Bar Bail Adjusting Screw

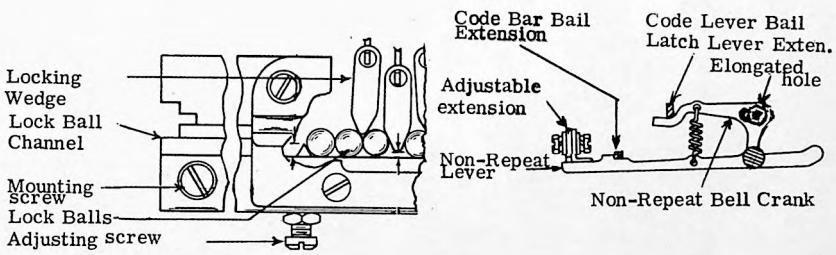
REQUIREMENT: Rotate clutch until code bar bail is in extreme left-hand position. Clearance between the code bar bail latch lever and code bar bail roller.
Minimum .004" Maximum .008"

TO ADJUST: Position the code bar bail adjusting screw with its lock nut loosened.

1.11 Non-Repeat Lever

REQUIREMENT: Any keylever depressed, signal generator shaft rotated until clutch is disengaged, while holding keylever depressed clearance between code lever bail extension and code lever bail latch lever:
Minimum .020" Maximum .030"
Let up on keylever until surfaces to be measured are in line.

TO ADJUST: Position non-repeat bell crank should pivot screw in its elongated hole with lock nut loosened.



1.12 Keylever Lock Ball Channel and Lock Ball End Play

REQUIREMENT: With the generator shaft rotating, the clutch should trip consistently when two keylevers are

1.12 REQUIREMENT: depressed alternately. The clutch should not trip when two keylevers are depressed simultaneously. No keylever locking wedge should reach the bottom of the lock ball channel when depressed. When either the Q and P keylever is fully depressed, it should reach:
Minimum some clearance Maximum .015"
of the bottom of the channel.

TO ADJUST: Position the lock ball channel with its mounting screws loosened. Position the lock ball adjusting screw approximately .060" above the bottom of the ball channel.

1.13 Code Lever Bail Latch Lever Eccentric

REQUIREMENT: Any keylever fully depressed. Clearance between front vertical surface of the code lever bail extension and the step on the rear end of the code lever bail latch lever:
Minimum .025" Maximum .040"

TO ADJUST: Rotate the code lever bail latch lever eccentric. Keep high part of eccentric upward and toward the front. Make certain there is some clearance between the code bar bail latch lever and the code bar bail latch.

1.14 Code Lever Bail Non-Repeat Extension

REQUIREMENT: Generator clutch disengaged. Code lever bail rotated until code lever bail latch lever just trips. With bail latching extension resting against vertical surface of latch lever and shaft rotated until non-repeat lever is fully latched on code bar bail extension:
Minimum some clearance Maximum .015"
between adjustable extension and non-repeat lever.

TO ADJUST: Position adjustable extension with clamp screw loosened.

1.15 Code Bar Guides

REQUIREMENT: Clearance between code bars and code bar guides: Minimum some clearance Maximum .010"

TO ADJUST: Position the two code bar guides with their mounting screws loosened.

NOTE: Check or adjust right hand guide only.

1.16 Code Bar Bail Bumper

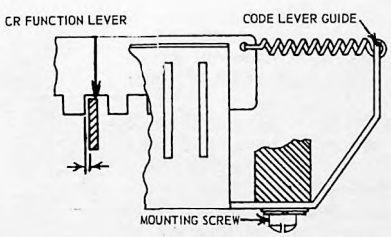
REQUIREMENT: Letters selection applied to code bars clearance between shoulder on the closest code bar and the engaging face of the code bar bail: Minimum .010" Maximum .020"

TO ADJUST: Position the bumper with its mounting screws loosened.

1.17 Code Lever Guide

REQUIREMENT: CR keylever held depressed while disengaging clutch. Clearance between or function lever and stopping edge of number 5 code bar: Minimum .005" Maximum .015"

TO ADJUST: Position the code lever guide with its four mounting screws loosened.



M28-8

1.18 Code Bar Bounce Suppressor Bracket Support Screw

REQUIREMENT: Letters selection applied to code bars, bounce suppressor bail held against reset lever, clearance between bounce suppressor bail and No. 5 code bar latch should be:
Minimum some clearance Maximum .010"

TO ADJUST: Position support screw with its lock nut loosened.

1.19 Code Bar Latch

(1) REQUIREMENT: Letters selection applied to the code bars and the code bars against their stop. Clearance between code bar and latch:
Minimum .010" Maximum .025"

(2) REQUIREMENT: Bounce suppressor bail should ride centrally on reset lever.

TO ADJUST: Position bounce suppressor bracket with mounting screws loosened.

1.20 Code Lever Bail

REQUIREMENT: Alignment of the code lever bail extension and the code lever bail latch lever should bring the edges flush within .010". Code lever bail should have:
Minimum some end play Maximum .010"

TO ADJUST: Position the code lever bail by means of the pilot screws.

1.21 Space Bar Pivot

REQUIREMENT: The space bar should be free on its pivots and have some end play:
Minimum some play Maximum .010".
It should also be free from binds in the slots of the keytop guide plate.

TO ADJUST: Position the space bar bail pilot screws.

1.22 Intermediate Gear Bracket

(1) REQUIREMENT: There should be a barely perceptible amount of backlash between the typing unit driven gear and the typing unit driving gear (On Intermediate Gear Assembly).

TO ADJUST: Position the complete intermediate gear mechanism bracket by utilizing the adjusting slots with the three hexagon head screws loosened. Align the gears at this time.

(2) REQUIREMENT: There should be a barely perceptible amount of backlash between the motor pinion and the intermediate driven gear.

TO ADJUST: Raise or lower the front end of the intermediate gear bracket by means of the filister head adjusting and clamping screws located at the front end of the bracket. Refine requirements if necessary.

2. LK10 KEYBOARD ADJUSTMENTS

2.1 This section contains only the adjustments pertaining to the redesigned mechanisms, which do not appear on the LK3 Keyboard. The remainder of the adjustments may be found in the LK3 (earlier model) section.

LK10 KEYBOARD

Spring Tensions:

Clutch latch lever	2 to 3 oz.
Clutch shoe	3 to 5 oz.
Clutch shoe lever	15 to 20 oz.
Clutch stop lever	2 to 3 oz.
Clutch trip bar	9 to 12 oz.
Code bar	3 to 5 oz.
Code bar bail	9 to 11 oz.
Code bar bail latch	1/2 to 1-1/2 oz.

2.1

Code lever	1 to 2 oz.
Code lever universal bail	1 to 2 oz.
Contact box	2 to 3 oz.
Contact box drive link	11 to 13 oz.
Lock bar	4 to 7 oz.
Margin indicator	7 to 11 oz.
Non-repeat lever	1/2 to 1-1/2 oz.
Plunger	3 to 5 oz.
Transfer bail detent latch	2-3/4 to 4-1/4 oz.
Transfer lever	1-1/2 to 2-1/2 oz.
Transfer lever locking bail	5 to 6 oz.
Universal bail latch	7 to 8 oz.

2.2 Transfer Bail Detent

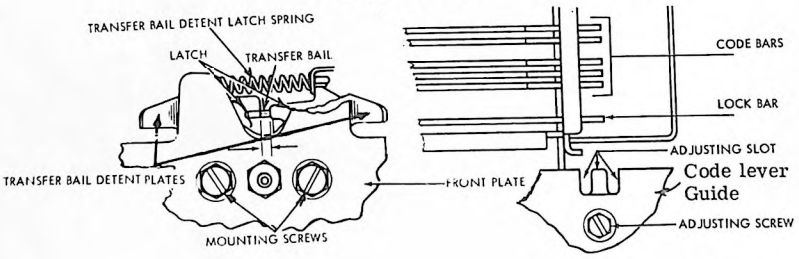
REQUIREMENT: Equal clearance with .002" between the transfer bail and transfer bail detent plates, when transfer bail moved to marking and spacing.

TO ADJUST: Keyboard clutch fully disengaged, manually position the transfer bail to marking and spacing and gauge clearances. Rotate the detent plate right or left by means of the pry point with mounting screws loosened.

2.3 Function Bail and Code Lever Clearance

REQUIREMENT: Minimum .015"

TO ADJUST: Position function bail assembly with mounting screws loosened.



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2.4 Code Bar Bail

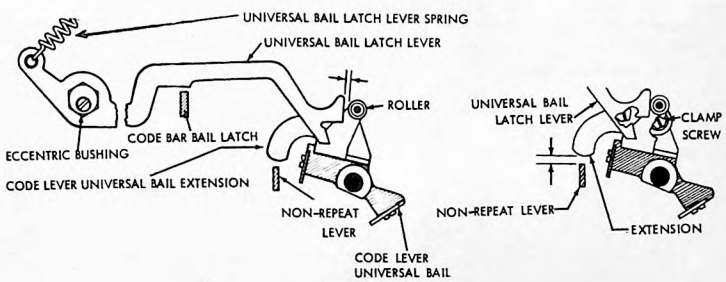
REQUIREMENT: With the code bar bail in the extreme left-hand position:
Minimum .004" Maximum .012"
between code bar bail roller and code bar bail latch.

TO ADJUST: Adjust eccentric stud with lock nut loosened.

2.5 Code Bar Bail and Non-Repeat Lever Clearance

REQUIREMENT: Any keylever fully depressed:
Minimum .010" Maximum .030"
between code bar bail and non-repeat lever shoulder.

TO ADJUST: Loosen lock nut and shoulder screw and move mechanism left or right.



2.6 Universal Bail Latch Lever

REQUIREMENT: G keylever held fully depressed. Clearance between universal bail latch lever and roller on universal bail extension:
Minimum .005" Maximum .015"

TO ADJUST: Rotate eccentric. Keep high part of eccentric up.

2.7 Universal Bail Extension

REQUIREMENT: Universal bail extension roller resting against end of universal bail latch lever:
Minimum .060" Maximum .080"
between extension and non-repeat lever.

TO CHECK: Depress letters keylever and release it. Check clearance.

TO ADJUST: Position the extension with its clamp screw loosened.

3. LP6 TYPING UNIT ADJUSTMENTS

3.1 Spring Tensions:

Anti-deflection plate	1 to 5 lb.
Breaker slide bail	1/2 to 1-3/4 oz.
Carriage return	3 to 3-3/4 lb.
Carriage return latch bail	3 to 4-1/2 oz.
Clutch latch lever	5 to 7-1/4 oz.
Clutch shoe	3 to 5 oz.
Clutch shoe lever	15 to 22 oz.
Clutch trip lever	5 to 16 oz.
Code bar clutch cam follower	20 to 24 oz.
Code bar detent	1-1/2 to 3-1/2 oz.
Code bar yeild	17 to 23 oz.
Common transfer lever	1/2 to 1-1/4 oz.
Dash pot transfer slide	3-1/2 to 4-1/2 oz.
Decelerating slide	1/2 to 1-1/2 oz.
Function bar	2-1/2 to 3-1/2 oz.
Function contact	1 to 2 oz.
Function lever	1-1/2 to 2-3/4 oz.
Function pawl	3 to 10-1/2 oz.
Horizontal positioning drive linkage	6 to 12 oz.
Horizontal positioning lock lever	28 to 43 oz.
Horizontal stop slide	1/2 to 3 oz.
Keyboard lock lever	1/2 to 1-1/2 oz.
Line feed bar bell crank	19 to 24.
Line feed bar release lever	3 to 8 oz.

3.1

Line feed stripper bail	1 2 to 2 oz.
Lower wire rope pulley bail	18 to 22 oz.
Marking lock lever	1-1 2 to 3 oz.
Paper finger	3 to 6 oz.
Paper straightener lever	1-1 2 to 4 oz.
Paper pressure bail	10 to 18 oz.
Paper pressure roller lever	28 to 36 oz.
Platen detent bail	16 to 32 oz.
Printing hammer operating bail	10 to 13 oz.
Printing hammer operating bail latch	3 to 4-1/2 oz.
Printing hammer plunger	3 to 5-3/4 oz.
Printing hammer yield	1 to 2 oz.
Push lever reset bail	4 to 8 oz.
Reversing slide detent	2 to 4-1/2 oz.
Ribbon feed lever	3/4 to 2 oz.
Ribbon lever	1-1/2 to 3 oz.
Ribbon ratchet wheel friction	3 to 7-1/2 oz.
Ribbon reverse detent lever	10 to 18 oz.
Ribbon tension spring	3 to 5-1/2 oz.
Selector armature	3 oz.
Selector clutch latch lever	2 to 3-1/2 oz.
Selector lever	1-1/4 to 2-1/2 oz.
Selector push lever	3/4 to 1-1/2 oz.
Shift linkage	7 to 14 oz.
Spacing feed pawl	2-1/2 to 4 oz.
Spacing feed pawl release link	1/2 to 2-1/2 oz.
Spacing lock lever	3 to 6 oz.
Space suppression bail	1/2 to 1-1/2 oz.
Spacing trip lever	2-1/2 to 5 oz.
Spacing trip lever bail	8 to 12 oz.
Start lever	2-1/2 to 4-1/2 oz.
Transfer lever	1-1/2 to 2-1/2 oz.
Trip shaft lever	1 to 2 oz.
Type box carriage roller arm	28 to 36 oz.
Type pallet	1/4 to 3/4 oz.
Vertical positioning lever	4 to 12 oz.
Vertical positioning lock lever	2 to 4 oz.

3.2 Selector Magnet Bracket

Spacing lock lever on a high part of cam. Armature energized.

3.2 (1) REQUIREMENT: Clearance between the end of the armature extension and shoulder on spacing lock lever: Minimum .020" Maximum .030"

TO ADJUST: Position magnet bracket by means of adjusting link with its two mounting screws loosened. Tighten link clamp screw only.

(2) REQUIREMENT: Some clearance between the upper surface of armature extension and lower surface of the spacing lock lever. When lock lever is held downward: Minimum some clearance Maximum .003"

TO ADJUST: Position upper end of magnet bracket with mounting screws loosened. Recheck requirement (1).

3.3 Selector Armature Spring Tension

(1) REQUIREMENT: Scale applied as nearly vertical as possible at end of armature extension. It should require approximately 3 ozs. to pull armature to marking position.

TO ADJUST: Rotate the adjusting nut.

3.4 Selector Clutch Drum

REQUIREMENT: Clutch disengaged in stop position. Clutch drum against shoulder on main shaft. Cam-clutch assembly should have: Minimum some end play Maximum .010"

TO ADJUST: Utilize clearance in clutch drum mounting hole with mounting screw loosened.

3.5 Selector Clutch Stop Arm

REQUIREMENT: Range scale set at 60. Selector in stop position. Clutch stop arm should engage clutch shoe lever. Minimum 3/4 bite Maximum full bite for shoe lever.

TO ADJUST: Position stop arm on stop arm bail with clamp screw loosened.

3.6 Transfer Adjustments

3.6.1 Transfer Lever Eccentric

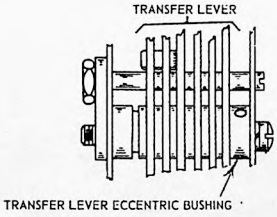
REQUIREMENT: Push levers positioned for letters. Selector clutch disengaged, Code bar shift lever link in uppermost position, clearance between rear code bar shift lever and code bar shift bar farthest from rear code bar shift lever:
Minimum .010" Maximum .025"
when play of shift bar is taken up for maximum clearance.

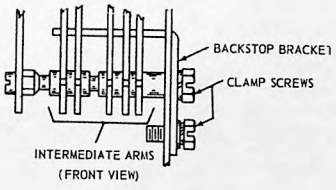
TO ADJUST: Rotate eccentric bushing with clamp screw loosened. Keep both holes in eccentric bushing above horizontal centre.

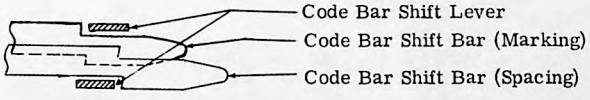
NOTE: One or more code bar shift bars can touch code bar shift levers.

3.6.2 Intermediate Arm Backstop Bracket

REQUIREMENT: Select blank and rotate main shaft until shift lever link reaches highest travel. Take up play to make clearance maximum. Clearance between front code bar shift lever and inner step of farthest code bar shift bar:
Minimum .010" Maximum .025"







3.6.2 TO ADJUST: Position backstop bracket with its two clamp screws loosened.

3.6.3 Shift Lever Drive Arm

REQUIREMENT: Shift lever link in the uppermost position. Clearance between the top of the rollers and the top of the cam slots in the shift levers:
Minimum some clearance Maximum .025"
on closest lever.

TO ADJUST: Loosen the clamp screw. Position the shift lever drive arm on its shaft to meet the requirement and to provide some end play, not more than .006".

3.6.4 Code Bar Detent

REQUIREMENT: Front plate removed. All clutches disengaged. Supression and shift code bars should detent equally (gauge by eye).

TO ADJUST: Equalize the detenting of the code bars by adding or removing shims between the casting and the code bar bracket.

3.6.5 Code Bar Shift Lever Link Bracket

REQUIREMENT: Motion of front and rear code bar shift levers should be equalized with respect to code bar travel.

TO CHECK: Select M combination and rotate main shaft until code bar shift lever link reaches highest travel. Take up play for maximum clearance. Clearance between spacing and marking code bar shift lever and shoulder on nearest code bar shift bar:
Minimum .002" Maximum .025"

TO ADJUST: Position code bare shift lever link bracket with its 3 mounting screws loosened.

NOTE: On later model the above adjustment is made by positioning the front and rear adjusting plates (pry points) with its clamp screws loosened.

3.7 Rocker Shaft Adjustments

3.7.1 Rocker Shaft Left Bracket

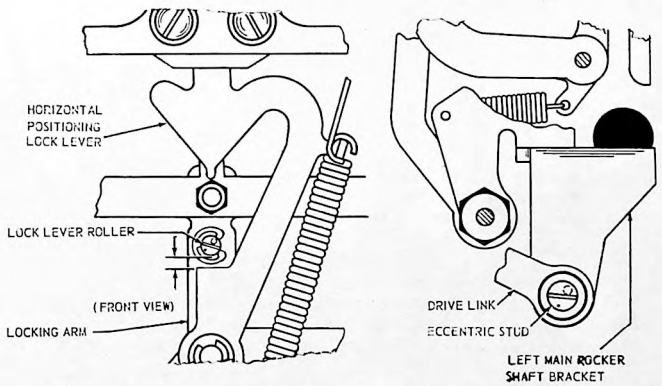
REQUIREMENT: Rocker shaft left bracket firmly seated against inner bearing race.

TO ADJUST: Hold rocker shaft in extreme left position and position the bracket against the inner bearing race with mounting scews loosened.

3.7.2 Rocker Shaft Bracket Eccentric Stud

REQUIREMENT: Type box clutch disengaged. Play in locking arm taken towards front. Gap between lower side of lock lever roller and top edge of shoulder on horizontal positioning lock lever :
Minimum .065" Maximum .080"

TO ADJUST: Position eccentric stud in lower end of rocker shaft left bracket. Keep high part of eccentric (marked with dot) below centre line of drive link.



IMPORTANT: Any change in this adjustment will require a re-checking of the following adjustments: horizontal

3.7.2 IMPORTANT: positioning drive linkage, right vertical positioning lever eccentric stud, left vertical positioning lever eccentric stud, vertical positioning lock lever, ribbon feed lever stop bracket, function stripper blade arms, spacing trip lever bail cam plate, printing track, printing arm, reversing slide brackets.

3.8 Main Shaft Clutch Shoe Lever Adjustments

NOTE: All clutches shall be adjusted so that the clutch trip lever engages the full thickness of the shoe lever.

3.8.1 Code Bar and Function Clutch Trip Lever Adjustment

REQUIREMENT: All clutches in stop positions.
1. Code bar clutch trip lever should engage the clutch shoe lever by the full thickness of the shoe lever.
2. Function clutch trip lever should engage the clutch shoe lever by the full thickness of the shoe lever. Check at lug with least bite.

TO ADJUST: Position the trip lever on its shaft with its clamp screw loosened.
Provide some end play of the trip lever shaft.
Maximum .006"

3.8.2 Spacing Clutch Trip Lever

REQUIREMENT: Spacing clutch trip lever should engage shoe lever by full thickness of shoe lever.
Check at stop lug with least bite.

TO ADJUST: Use adjusting screw to position spacing clutch trip arm.

3.8.3 Clutch Trip Shaft Set Collars

(1) REQUIREMENT: Spacing clutch latch lever should have side play:
Minimum some Maximum .008"

3.8.3 TO ADJUST: Position spacing clutch latch lever set collar.

(2) REQUIREMENT: Approximate alignment of right end of stop extensions on trip lever and shoe lever.

TO ADJUST: Position line feed clutch trip lever set collar.

(3) REQUIREMENT: Line feed clutch latch lever should have side play:
Minimum some Maximum .008"

TO ADJUST: Position line feed clutch latch lever set collar.

3.8.4 Line Feed Clutch Trip Lever Eccentric Post

REQUIREMENT: Line feed clutch in its stop position.
Trip lever should engage the clutch shoe lever by the full thickness of the shoe lever. Check at stop lug.

TO ADJUST: Position the trip lever eccentric post.

3.8.5 Type Box Clutch Trip Lever Eccentric Post

REQUIREMENT: Type box clutch disengaged. Trip lever should engage the clutch shoe lever by the full thickness of the shoe lever.

TO ADJUST: Position the trip lever eccentric post.

3.8.6 Type Box Clutch Trip Lever

(1) REQUIREMENT: Clutch trip shaft cam follower roller on the lowest surface of cam (located on code bar clutch). Clearance between inner face of type box clutch trip lever and the clutch disk stop lug:
Minimum .065" Maximum .080"

TO ADJUST: Loosen clamp screw and position stop.

(2) REQUIREMENT: When positioning the trip arm determine that the latch lever has some side play:
Maximum .008"

3.8.6 TO ADJUST: Position the clutch trip arm on its shaft with the clamp screw loosened.

3.8.7 Clutch Shoe Lever

(1) REQUIREMENT: Gap between clutch shoe lever and its stop lug should be .055" to .075" greater when clutch is engaged than when the clutch is disengaged.

TO ADJUST: With the two clamp screws in the clutch disk loosened, engage a wrench on the lug of the adjusting disk and rotate the disk.

3.9 Vertical Positioning Adjustments

3.9.1 Lock Lever:

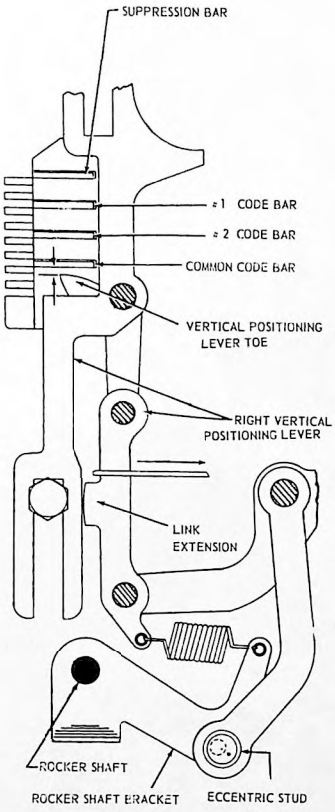
REQUIREMENT: Letters combination set up on code bars. Main side operating levers at the upper end of travel. Upper notch of vertical positioning lock lever fully engaged (manually if necessary) with the vertical slide projection. The upper surface of the follower arm rear extension should be in contact with or not more than .004" away from the inner extension of the main side lever.

TO ADJUST: Position the right and left vertical positioning lock levers with their mounting screws loosened. Take up play.

3.9.2 Right Vertical Positioning Lever Eccentric Stud:

REQUIREMENT: Type box clutch disengaged. Common code bar in spacing position. Play taken up between the code bar and the type box track to make the clearance a minimum:
Minimum .035" Maximum .050"
clearance between the vertical positioning lever toe and the lower surface of the common code bar.

TO ADJUST: Position the eccentric stud in the right rocker shaft bracket. Position high part of eccentric (marked with dot) towards the rear.



3.9.3 Left Vertical Positioning Lever Eccentric Stud

REQUIREMENT: Right and left vertical positioning levers should buckle equally within .006".

TO CHECK: Common code bar in spacing position. Trip type box clutch and rotate main shaft until right vertical positioning lever toe touches common code bar and just starts to buckle its link extension by some clearance not more than .008". The left vertical positioning lever toe, should touch the common code bar and buckle its link extension within .006" of the right link extension clearance.

TO ADJUST: Position eccentric stud on rocker shaft left bracket inner arm. Position high part of cam (marked with dot) towards the rear.

3.10 Horizontal Positioning Adjustments

3.10.1 Reversing Slide Brackets:

REQUIREMENT: Type box clutch, code bar clutch and function clutch disengaged. Reversing slide moved to right and left through its full travel, right motion should buckle left horizontal positioning drive linkage and left motion should buckle right horizontal positioning drive linkage. The amount of buckling in each case should be: Minimum .030" Maximum .045" measured at point of maximum clearance.

3.10.1 TO ADJUST: Position each reversing slide bracket with their clamp screws loosened.

3.10.2 Reversing Slide Adjusting Stud

REQUIREMENT: Type box clutch disengaged.
With No. 3 code bar in spacing position (right), the reversing slide detent rollers should be fully seated in the right-hand notches of the detent lever. With No. 3 code bar in marking position (left), the reversing slide detent rollers should be fully seated in the left-hand notches of the detent lever.

TO ADJUST: Position the reversing slide stud in its elongated hole with its mounting nut loosened.

3.10.3 Horizontal Positioning Drive Linkage

REQUIREMENT: Type box clutch disengaged.
Code bars 4 and 5 to spacing (right).
Clearance between each side of centre horizontal stop slide and decelerating slides, on side where knee link is straight should be equal (within .008")
Minimum .015" Maximum .040"

TO ADJUST: Loosen bearing stud mounting screws and connecting strip mounting screws friction tight. Position one or both bearing studs on the connecting strip to provide .025" to .035" between the centre horizontal slide and the decelerating slide on the side where the linkage is not buckled. Tighten the two inner mounting screws. Change position of reversing slide and check opposite clearance. Equalize by shifting both studs and connecting strip as a unit. Hold the drive linkage hub against the lower vertical link of the drive linkage. Tighten the two outer bearing stud mounting screws. Check the linkage for freeness throughout a complete cycle.

3.11 Stunt Box Adjustments

3.11.1 Function Bar Reset Bail Blade:

(1) REQUIREMENT: Function clutch and type box clutch fully disengaged.

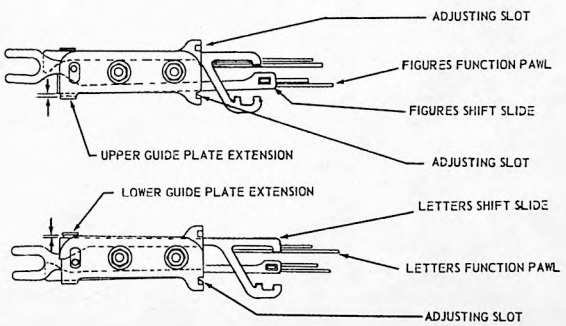
3.11.1 (1) REQUIREMENT: Clearance between function bar and reset bail blade:
Minimum .018" Maximum .035"
when function bar moved manually to rearward position.

TO CHECK: Measure clearance at bars located in stunt box slots 4, 23, and 41. If there is no bar in these slots use nearest bar.

TO ADJUST: Position blade on reset bail with blade mounting screws friction tight.

(2) REQUIREMENT: Type box clutch rotated 1/2 revolution, with a function pawl moved to its extreme rear position, it should overtravel its bar by at least .002".

TO ADJUST: Refine adjustment (1).



3.11.2 Shift Code Bar Operating Mechanism

(1) REQUIREMENT: Select figures, rotate main shaft until function clutch disk stop lug is toward bottom of unit. Clearance between upper guide plate extension and shift slide:
Minimum .005" Maximum .015"

(2) REQUIREMENT: Repeat the procedure for the letters function. Check

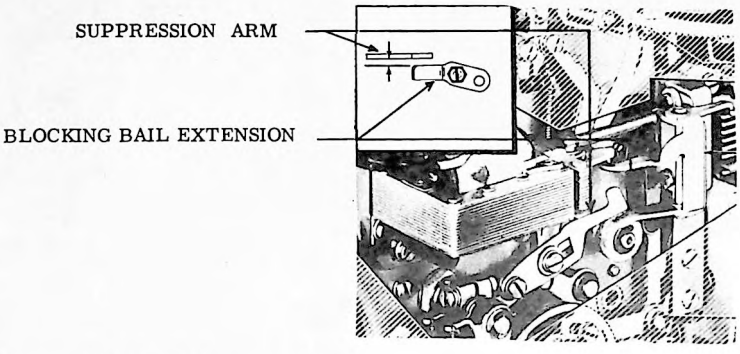
3.11.2 REQUIREMENT: clearance between lower guide plate extension and shift slide.

TO ADJUST: Position upper and/or guide plate by the adjusting slot with the clamp nuts loosened.

3.11.3 Stripper Blade Drive Cam Position

REQUIREMENT: Stripper blade drive cam should move the stripper blade an equal distance above and below centre line of its pivot (gauge by eye):
(a) upward direction (b) downward direction

TO ADJUST: With stripper blade drive arm mounting screws loosened equalize the overtravel of each cam peak.



3.11.4 Blocking Bail

REQUIREMENT: With printer in the print-case, rotate main shaft until lower surface of the suppression arm is aligned (approx) with bottom surface of blocking bail extension. Clearance between suppression arm and blocking bail extension, with play taken up to produce minimum clearance:
Minimum .008" Maximum .035"

3.11.4 TO ADJUST: Position extension with its mounting screw loosened. Refine the adjustment if necessary and recheck each shift mechanism.
Refine the stunt case code bar shift mechanism adjustment of any shift mechanism that does not meet the above requirement.

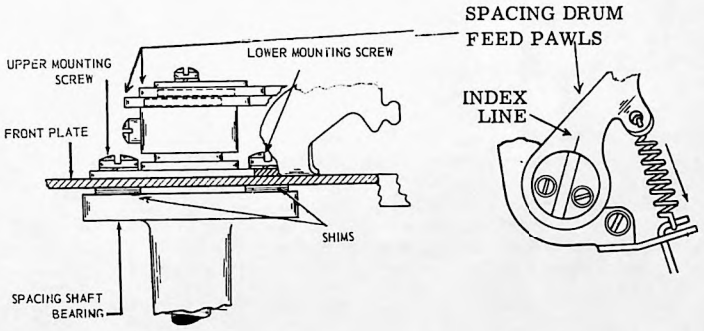
3.11.5 Unshift-On-Space Function Pawl

To prevent unshift-on-space function, loosen the lock nut and turn the disabling screw in, until a clearance between the lower edge of the unshift-on-space function pawl and its function bar.
Minimum .030" Maximum .060"
Tighten lock nut.

3.12 Spacing Adjustments

3.12.1 Spacing Gear Phasing:

REQUIREMENT: Spacing clutch disengaged. Index line on the spacing pawl should be between the two lines on the pawl retaining washer.



TO ADJUST: Loosen the upper and lower mounting screws, disengage the spacing shaft gear from the spacing gear. Rotate the spacing shaft gear until the index

3.12.1 TO ADJUST: line on the spacing pawl is properly positioned. Mesh the spacing shaft gear with the spacing gear. Make sure the spacing clutch is fully disengaged while doing the above adjustment. Retighten the mounting screws.

3.12.2 Spacing Gear Clearance

REQUIREMENT: Carriage fully returned. Minimum backlash of spacing gears without bind.

TO ADJUST: Insert shims between the spacing shaft bearing and front plate at upper mounting screw to increase clearance and at lower mounting screw to decrease backlash.

3.12.3 Spacing Trip Lever Bail Cam Plate

REQUIREMENT: Spacing trip lever arm in upward position. Type box clutch rotated through approximately one-half of its cycle. All function pawls disengaged from function pawls disengaged from function bar. Clearance between top surface of trip lever arm extension and spacing trip lever shoulder:
Minimum .015" Maximum .030"

TO ADJUST: Position cam plate on rocker shaft with mounting screws loosened. Position forward edge of cam plate parallel to shaft.

3.13 Line Feed Adjustments

3.13.1 Line Feed Clutch Phasing:

REQUIREMENT: Line feed clutch in stop position. Both line feed bars should engage the teeth of the line feed spur gear.

TO ADJUST: Remove the line feed clutch mounting screw, slide the entire line feed clutch assembly out of engagement with the line feed eccentric spur gear. Rotate the line feed eccentric spur gear until both line feed bars are fully engaged in the line feed

3.13.1 TO ADJUST: spur gear. Reposition the line feed clutch assembly and replace the clutch mounting screw. Rotate the line feed clutch until the clutch is fully disengaged and recheck requirement.

3.13.2 Line Feed Clutch Trip Lever - Adjusting Screw

REQUIREMENT: All main shaft clutches fully disengaged. Some clearance between the end of the trip lever adjusting screw and the trip arm.
Maximum .006"

TO ADJUST: Position the adjusting screw.

3.13.3 Line Feed Spur Gear Detent Eccentric

REQUIREMENT: Line feed clutch disengaged. Platen rotated until detent stud is seated between two teeth on line feed spur gear. When hand wheel is released, the teeth on the feed bars should mesh with teeth on the line feed spur gear. The detent stud should contact one gear tooth and be not more than .006" from other tooth.

TO ADJUST: Rotate the detent eccentric with its mounting screws loosened. Keep high part of eccentric upward.

3.14 Carriage Return Adjustment

3.14.1 Carriage Return Latch Bail:

REQUIREMENT: Carriage fully returned. Clearance between carriage return latch bail and carriage return lever: Minimum .004" Maximum .025"

TO ADJUST: Position latch bail plate on latch bail with clamp screw loosened.

3.14.2 Carriage Return Lever

REQUIREMENT: Carriage return set up on selector. Main shaft rotated until function clutch stop lug is toward bottom of unit. Carriage return function pawl

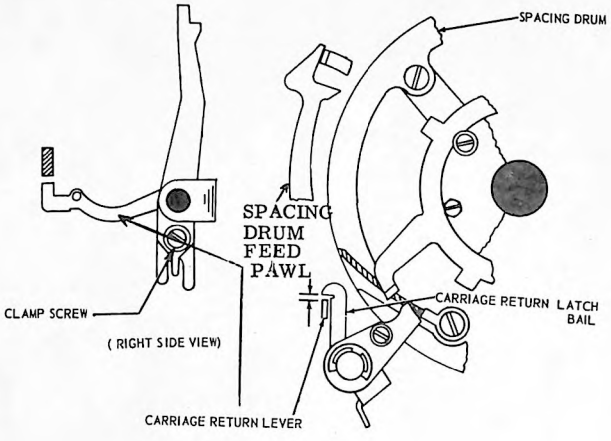
3.14.2 REQUIREMENT: should be fully selected. Printing hammer mechanism held midway on the platen. Clearance between latch bail and carriage return lever. Minimum .006" Maximum .025"

TO ADJUST: Position carriage return lever on carriage return bail with clamp screw loosened.

3.14.3 Carriage Return Spring

REQUIREMENT: Spacing drum in its returned position. Spacing pawls. Transfer slide and carriage return latch held away. Printing track in its lowest position. Minimum: 3 lbs. Maximum: 3-3/4 lbs. to start the spring drum moving.

TO ADJUST: Rotate the spring drum ratchet wheel with the spring drum nut loosened to increase tension. Operate escapement lever to decrease it.



3.14.4 Carriage Wire Rope

REQUIREMENT: Clearance between lower wire rope and carriage return latch bail post should be at least .006". With the horizontal positioning mechanism in its lowest position, clearance between the lower wire rope and shift slide drive linkage should be: Minimum .030"

TO ADJUST: Return the printing carriage to its left hand position. Loosen the rope clamp screw (mounted on outer surface of spring drum) one turn only. Position the pulley bearing studs with their mounting screws loosened to meet the requirement. Make certain that the rope moves around its clamp screw to an equalized position. Tighten the clamp screw and mounting screws.

3.14.5 Dash Pot Vent Screw

REQUIREMENT: Type box carriage should return from any length of line without bouncing. First character of each line should be printed in same location.

TO ADJUST: Turn down vent screw until slight pneumatic bounce is perceptible. Back off screw until effect disappears. For dashpots with one vent hole: Back screw off one full turn. Tighten nut. For dashpots with two vent holes: Back screw off 1/4 turn. Tighten nut.

3.15 PRINTING ADJUSTMENTS

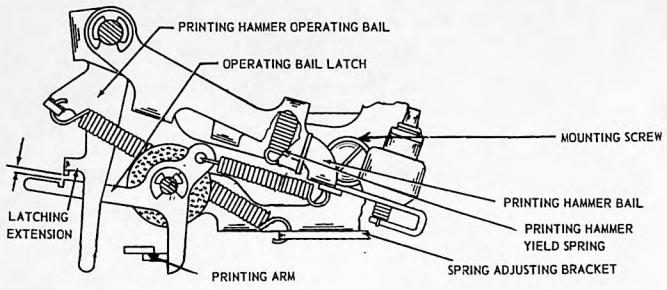
3.15.1 Printing Track

REQUIREMENT: Printing track in its extreme downward position. Printing hammer operating bail latching extension held with left face in line with the latch shoulder. Clearance between latching extension and operating bail latch should be:
Minimum .015" Maximum .040"

TO ADJUST: Position the printing track up or down with its

3.15.1 TO ADJUST: mounting screws loosened.

NOTE: Check the above with printing hammer in left and right hand position.



3.15.2 Printing Arm

(1) REQUIREMENT: Printing track in maximum downward position, printing hammer operating bail against its stop: Some clearance between secondary printing arm and forward extension of hammer operating bail.
Maximum .012"
when printing arm slide is held downward over each printing track mounting screw for maximum clearance.

(2) REQUIREMENT: Printing track in uppermost position. Latching extension of printing hammer operating bail should overtravel latching surface of operating bail latch by:
Minimum .006"
Check right and left position.

TO ADJUST: Position secondary printing arm with clamp screws loosened.

3.15.3 Printing Hammer Stop Bracket

REQUIREMENT: Type box in blank position and near centre of

3.15.3 REQUIREMENT: platen. Printing track in its downward position. Printing hammer held against its stop. Clearance between printing hammer and dummy type pallet: Minimum .008" Maximum .020"

TO ADJUST: Position the stop bracket with its mounting screw and the printing hammer bail pivot stud loosened.

3.15.4 Printing Carriage Position

REQUIREMENT: Type box in letters position. M type pallet selected. Type box in printing position. M type pallet should be approximately in centre of printing hammer when hammer is just touching M type pallet.

TO ADJUST: Position printing carriage on wire rope with clamp screws loosened.

3.15.5 Printing Hammer Bearing Stud

REQUIREMENT: Type box at midpoint of platen and in position to print period. Printing hammer in contact with type pallet and pressed downward at bearing post. Face of hammer should be fully on end of type pallet.

TO ADJUST: Add or remove shims between shoulder on bearing post and stop bracket.

3.15.6 Shift Linkage

REQUIREMENT: Carriage near midpoint of platen. Type box in position to print M. Manually buckle right shift linkage. Shift type box to left. Period type pallet should be approximately in centre of print hammer when hammer is just touching period type pallet.

TO ADJUST: Position left shift linkage on oscillator rail with two clamp screws loosened.

TO RECHECK: Shift alternately from M to period. Take up play in each direction. Refine adjustment if necessary.

3.15.7 Printing Carriage Lower Roller

REQUIREMENT: Carriage wire rope clamp screws loosened. Play of carriage on track: minimum without bind throughout track's full length.

TO ADJUST: (Eccentric Bushing)
Position lower roller with screw nut loosened. Keep high part of eccentric (chamfered corner) toward the right.

TO ADJUST: (Sliding Screw)
Position lower roller with mounting screw loosened.

3.15.8 Type Box Carriage Roller

REQUIREMENT: Minimum vertical play without bind in type box carriage.

TO CHECK: Move carriage to right end of track. Place in upper position. Remove drive link. Check throughout entire travel of carriage.

TO ADJUST: Position lower roller arm with clamp screw loosened.

3.15.9 Type Box Alignment

REQUIREMENT: Printed impression of characters at top and at bottom should be equal (gauge visually).

TO ADJUST: Loosen nut. Operate printer under power. Repeat characters E and Z. Turn adjusting screw in or out (in steps of 1/4 turn) to meet requirement. Tighten nut.

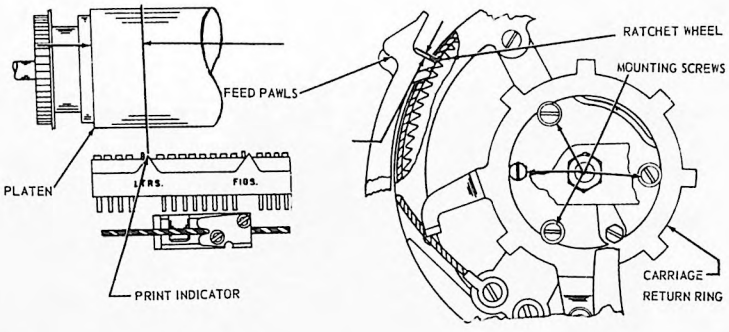
3.16 Friction Feed Adjustment

3.16.1 Oscillating Rail Slide:

REQUIREMENT: Carriage return ring and automatic carriage return-line feed ring free to rotate on spacing drum (five mounting screws loosened). Spacing

3.16.1 REQUIREMENT: clutch disengaged. Feed pawl, which is farthest advanced, engaging tooth immediately above cut-away section of ratchet. Clearance between slide and pulley:
Minimum .025" Maximum .050"

TO ADJUST: Position slide on wire rope with clamp screws loosened.



3.16.2 Left Hand Margin

(1) REQUIREMENT: (for 72 character line)

Type box clutch disengaged. Spacing drum in returned position. Type box shifted to the letters position. The letters print indicator on the type box should be:
Minimum 9/16" Maximum 11/16"
from the left edge of the platen.

(2) REQUIREMENT: Spacing clutch disengaged. Front spacing feed pawl farthest advanced. Spacing drum fully re-turned. Play in spacing shaft gear taken up clockwise. Clearance between pawl and shoulder ratchet wheel tooth immediately ahead:
Minimum .002" Maximum .015"

3.16.2 (3) REQUIREMENT: Rear pawl, when farthest advanced, should rest at bottom of indentation between ratchet wheel teeth.

TO ADJUST: Position carrriage return ring with four mounting screws loosened.

3.16.3 Right Margin

REQUIREMENT: (Operating on base) Type box Carriage in position to print character on which spacing cutout is desired. Front spacing pawl farthest advanced. Clearance between upper edge of spacing cutout lever and cutout transfer bail when spacing cutout transfer bail is held in its extreme upper position:
Minimum .006" Maximum .025"

TO ADJUST: Position the cutout lever with its clamp screw loosened.

3.16.4 Right Margin with Automatic Carriage Return-Line Feed Ring

REQUIREMENT: Type box clutch disengaged. Carriage positioned two spaces before character on which auto CR-LF is to occur. Front feed pawl farthest advanced. Clearance between extension on right and auto CR-LF bell crank:
Minimum .040" Maximum .055"

TO ADJUST: Position ring with four mounting screws (3 round head screws and hexagonal screw on shoulder) loosened.

3.16.5 Paper Finger Adjustment

REQUIREMENT: The pressure end of the paper fingers should overlap the paper from 3/8 inch to 1/2 inch.

TO ADJUST: Position the paper fingers by sliding them on their shaft.

3.16.6 Paper Straightener Rod Collar

REQUIREMENT: Left collar spaced

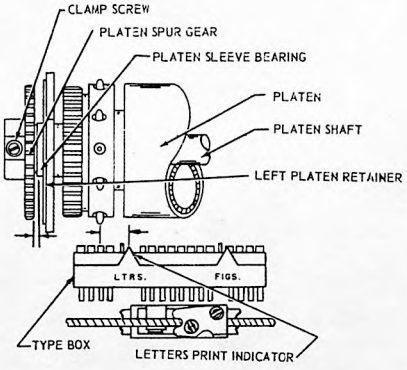
3.16.6 REQUIREMENT: Minimum 9 32" Maximum 21 64" from the left shoulder on the paper straightener shaft.
Right collar spaced :
Minimum 1 16" Maximum 5 64" from the right shoulder.

TO ADJUST: Position collars on shaft with set screws loosened.

3.17 Sprocket Feed Adjustments

3.17.1 Type Box Position

REQUIREMENT: Type box and spacing clutches disengaged. Type box shifted to letters position. Four mounting screws loosened so that space suppression ring, or automatic carriage return line feed ring, is free to rotate on drum (units equipped with standard spacing drum) spacing cutout and automatic carriage return-line feed arms in maximum counterclockwise position. Clearance between letters print indicator and centre line of sprocket pins in right hub:
Minimum 5/16" Maximum 7/16"



3.17.1 TO ADJUST: Loosen two type box clamp screws and two printing carriage clamp screws. Position type box. Tighten type box clamp screws. Do not tighten printing carriage clamp screws until printing carriage position adjustment is made.

3.17.2 Left Margin

(1) REQUIREMENT: Type box clutch disengaged. Spacing drum fully returned. Type box shifted to letters position. Clearance between centre of letters print indicator on type box and centre line of sprocket pins in left hub:
Minimum 5/16" Maximum 7/16"

(2) REQUIREMENT: Spacing clutch disengaged. Front spacing feed pawl farthest advanced. Spacing drum fully returned. Play in spacing shaft gear taken up clockwise. Clearance between pawl and shoulder of ratchet wheel tooth immediately ahead:
Minimum .002" Maximum .015"

(3) REQUIREMENT: Rear pawl, when farthest advanced, should rest at bottom of indentation between ratchet wheel teeth.

TO ADJUST: Position carriage return. Ring with mounting screws loosened.

3.17.3 Printing Line

REQUIREMENT: Bottom of printed line should be:
Maximum 0 Minimum 1/32"

TO ADJUST: Position the left sprocket hub with its cam and gear retaining screws loosened. The spur gear and left platen retainer must be removed to make this adjustment.

3.17.4 Sprocket Pin Separation

(1) REQUIREMENT: With single sheet of sprocket feed paper placed on the platen the sprocket pins should be centrally located in the feed holes of the paper.

(2) REQUIREMENT: Printed line should be parallel to a line drawn

3.17.4 (2) REQUIREMENT: perpendicular to edge of paper within plus or minus 1 32". The characters printed should be parallel to the lines on paper within plus or minus 1 32".

TO ADJUST: Position right sprocket hub with clamp screw loosened.

3.17.5 Platen End Play

REQUIREMENT: Line feed bars disengaged. Platen shaft should have some end play:

Maximum .010"

TO ADJUST: Position platen spur gear with clamp screw loosened.

3.17.6 Printing Hammer Stop Bracket

Same as standard adjustment except clearance between printing hammer and dummy tape pallet should be:
Minimum some Maximum .020"

3.17.7 Paper Guide

REQUIREMENT: The clearance between the platen and the front edge of the paper guide should be:
Minimum .050" Maximum .060"

TO ADJUST: Position the guide with its rear mounting screws loosened.

3.17.8 Right Margin

Refer to Friction Feed Adjustments page 33.

3.17.9 Front Guide Bracket

(1) REQUIREMENT: The sprocket pins should be centrally located in the paper holes.

(2) REQUIREMENT: The gap between the platen and the front guide bracket should be:

3.17.9 (2) REQUIREMENT: Minimum .090" Maximum .105"

TO ADJUST: Latch bracket. Bring bracket against platen and position bracket arms horizontally on shaft with clamp screws loosened to meet requirement No. (1). Rotate arms to meet requirement No. (2).

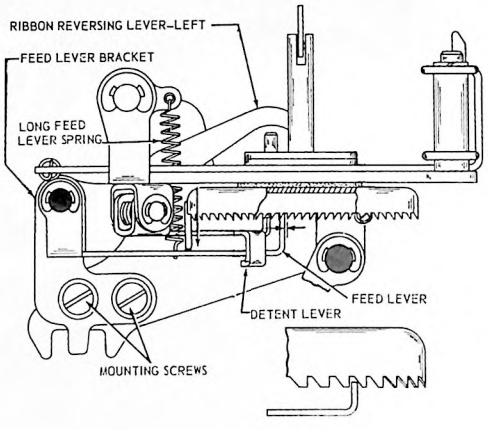
3.18 Ribbon Adjustments

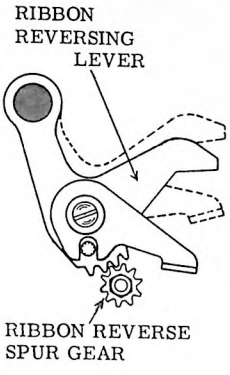
3.18.1 Ribbon Feed Lever Bracket:

REQUIREMENT: (left and right mech.) Reversing lever in upward position. Ribbon mechanism in upper position. The detent lever held against the ratchet wheel. Clearance between the front face of the feed lever and the shoulder of a toothon the ratchet wheel: Minimum .020" Maximum .030"

TO ADJUST: Position the feed lever bracket with its mounting screws loosened.

NOTE: Rotate the main shaft. The ratchet wheel should step one tooth only with each operation.





3.18.2 Ribbon Reverse Spur Gear

REQUIREMENT: When right reversing lever is in maximum downward position, the left reversing lever should be in its maximum upward position.

TO ADJUST: Loosen the set screws in the detent cam. Loosen the left spur gear nut. Securely tighten the right spur gear nut. Move the right reversing lever to its maximum downward position and hold the left reversing lever in its maximum upward position. Then tighten the left spur gear nut.

3.18.3 Ribbon Reverse Detent

REQUIREMENT: Detent should seat equally in each notch of cam. Free end of the detent flush with cam.

TO ADJUST: Position the cam on its shaft with its set screws loosened.

3.19 Manual Selection of Combinations

1. Mount the armature clip on the selector.
2. Rotate main shaft until all clutches are fully disengaged.
3. Move the selector armature down, so as to release the selector clutch, then release the armature.
4. Rotate main shaft until the #5 push lever just moves forward.
5. All push levers should be marking, therefore strip the push levers from the selector levers which are spacing in the code combination that is being selected.
6. Continue rotating main shaft until the selection is completed.
7. In order to repeat the selection, do not touch the armature clip. Operate the code bar clutch trip lever and rotate main shaft until the selection has been repeated.

3.20 Front Plate Removal

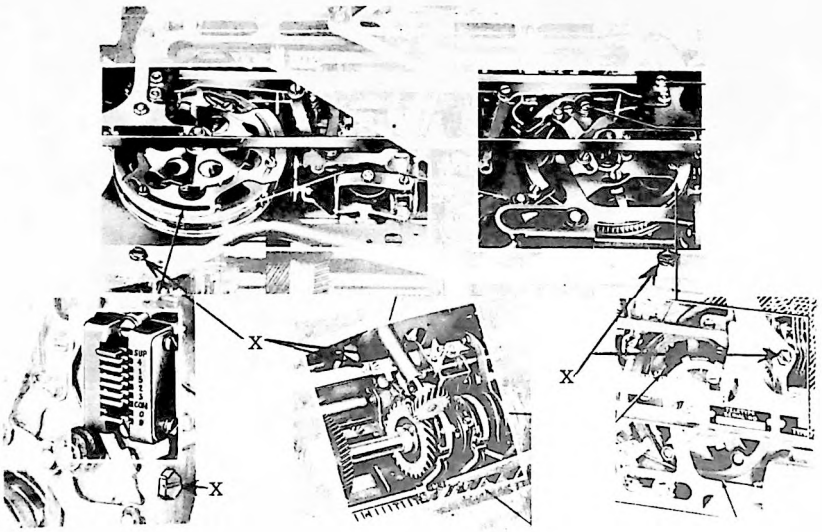
1. Remove the typing unit from the base.
2. Position the printing hammer mechanism to the extreme right, remove the tru-arc from the type box carriage link and disengage the link from the carriage. Note: it may be necessary to loosen the clamping screws on the type box

3.20

2. carriage and position the carriage further to the right in order to make the tru-arc more accessible.
3. Return the printing hammer assembly to the extreme left.
4. Remove the two main bail drive bracket mounting screws on the rocker shaft.
5. Remove the four hexagonal screws which secure the front plate to the side frames.
6. The front plate can now be removed.
7. To reinstall the front plate reverse the above procedure, but care must be exercised so that: the horizontal motion stop slides, the shift code bar extension, #3 code bar extension and the auto C.R.L.F. bell crank are properly repositioned.

NOTE: The spacing gear phasing adjustment must be remade.

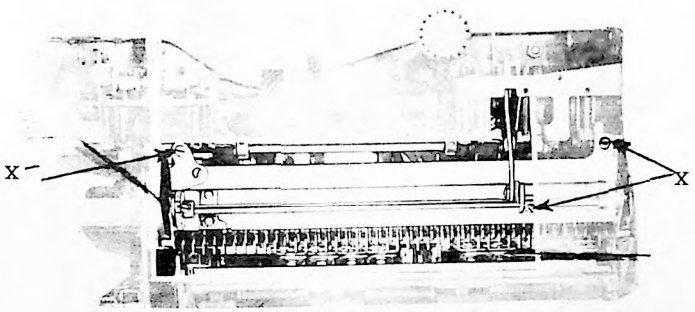
REMOVE SCREWS INDICATED BY AN X



LEFT SIDE BOTTOM VIEW RIGHT SIDE

3.21 Stunt Box Removal

1. Remove the rear tie bar.
2. Disengage the drive arm from the stripper blade driven arm. Disengage the cam shaft drive arm from the stripper blade drive arm by removing the clamping screw and sliding the drive arm out of engagement.
3. Remove the two mounting screws which secure the stunt box at its lower extremity to the typing unit.
4. Pull the stunt box to the rear, it may be necessary to rotate the main shaft in order to move the stripper blade drive arm out of the path of the stunt box.
5. To reinstall the stunt reverse the above procedure. When function bars engage the rear of the code bars strip off all the function pawls from the function bars; all code bar forks should properly engage their posts.



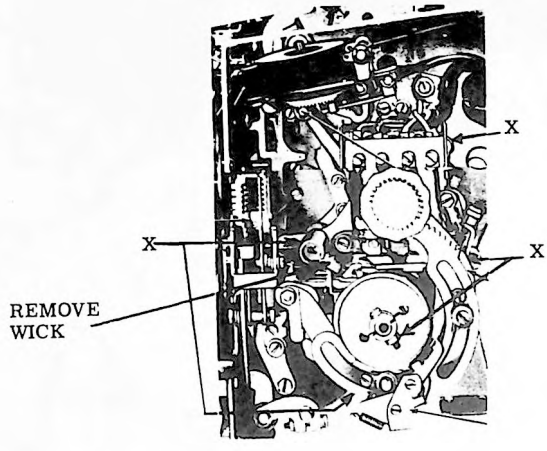
3.22 Selector Cam Clutch Assembly Removal

1. Lift the push lever reset bail onto its shoulder.
2. Remove the mounting screw on the selector clutch drum.
3. With a screw driver position on the marking lock lever to the front.
4. While rotating the selector clutch, gently pull the selector clutch assembly.
5. Before the selector clutch assembly is completely removed it may be necessary to move the clutch stop arm forward as

3.22 5. it may hinder in the removal of the selector clutch assembly.
6. To reinstall, reverse the above procedure.

3.23 Selector Mechanism Removal

1. Remove the selector cam clutch assembly.
2. Remove the felt wick in order to gain access to a mounting screw; remove this screw.
3. Remove the remaining three selector mounting screws.
4. Unhook the common transfer lever spring from the push lever guide.
5. Rotate the selector mounting bracket clockwise and remove the selector mechanism.
6. To reinstall, reverse the above procedure. Do not forget to unlatch the push lever reset bail.

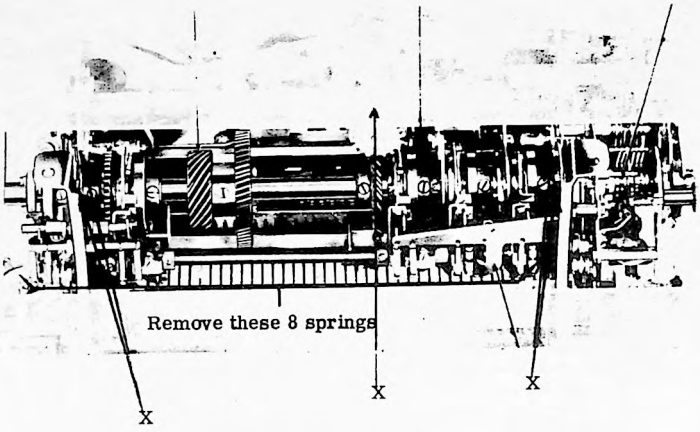


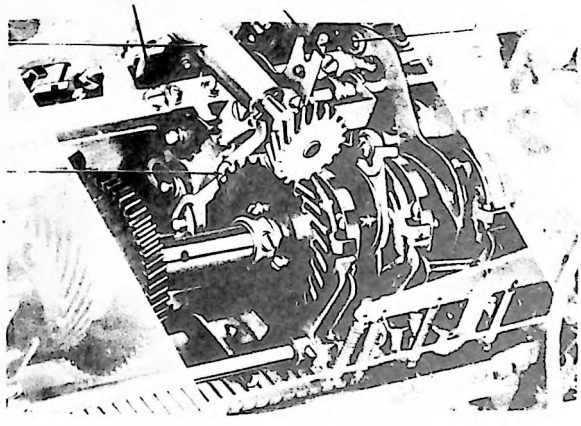
3.24 Main Shaft Removal

1. Remove the selector cam clutch assembly.
2. Return the carriage to the left.

3.24

3. Remove the spacing shaft gear.
4. Remove the stripper blade drive arm.
5. Remove the clutch bearing on the extreme right end of main shaft by removing its mounting screw.
6. Unhook the 8 clutch trip lever and latch lever springs plus the large cam follower spring.
7. Remove the mounting screws from the left and right hand bearing clamps.
8. Hold the function bar reset bail to the front of the unit.
9. Move the main shaft assembly to left, position the main shaft so that left bearing clamp passes by the vertical positioning levers.
10. To reinstall, remove the type box clutch link then reverse the above procedure.
11. The spacing gear and line feed phasing must be checked.


Remove these 8 springs
X
X
X



MODEL 28 TYPE BOX CHART (COMMERCIAL)

LETTERS

LEFT

	4 8 5 MARKING	4 MARKING 5 SPACING	4 SPACING 5 MARKING	4 8 5 SPACING
TOP ROW	M --345	N --34-	H --3-5	SPACE --3--
2ND ROW	X 1-345	F 1-34-	Y 1-3-5	S 1-3--
3RD ROW	V -2345	C -234-	P -23-5	I -23--
BOTTOM ROW	LETTERS 12345	K 1234-	Q 123-5	U 123--
	3 MARKING			
	4TH ROW	3RD ROW	2ND ROW	1ST ROW

RIGHT

	4 8 5 SPACING	4 SPACING 5 MARKING	4 MARKING 5 SPACING	4 8 5 MARKING
	BLANK -----	T ----5	C R ---4-	O --45
	E 1----	Z 1---5	D 1--4-	B 1--45
	L F -2---	L -2--5	R -2-4-	G -2-45
	A 12---	W 12--5	J 12-4-	FIGURES 12-45
	3 SPACING			
	1ST ROW	2ND ROW	3RD ROW	4TH ROW

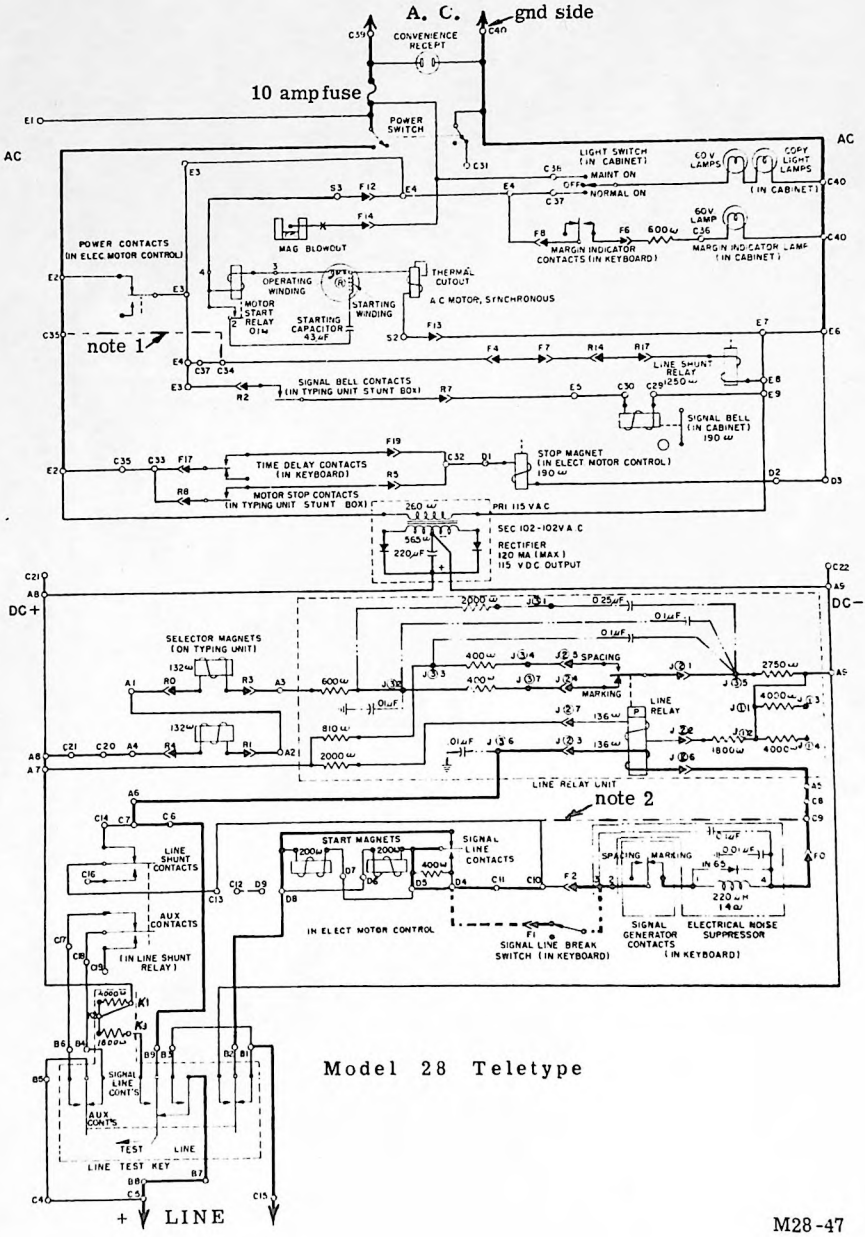
FIGURES

LEFT

	4 8 5 MARKING	4 MARKING 5 SPACING	4 SPACING 5 MARKING	4 8 5 SPACING
	. --345	' --34-	# --3-5	SPACE --3--
	/ 1-345	! 1-34-	6 1-3-5	▼ 1-3--
	; -2345	: -234-	0 -23-5	8 -23--
	LETTERS 12345	(1234-	1 123-5	7 123--
	3 MARKING			
	4TH ROW	3RD ROW	2ND ROW	1ST ROW

RIGHT

	4 8 5 SPACING	4 SPACING 5 MARKING	4 MARKING 5 SPACING	4 8 5 MARKING	
	BLANK -----	5 ----5	C R ---4-	9 ---45	1 8 2 SPACING
	3 1----	" 1---5	$ 1--4-	? 1--45	MARKING 2 SPACING
	L F -2---	) -2--5	4 -2-4-	& -2-45	1 SPACING 2 MARKING
	— 12---	2 12--5	BELL 12-4-	FIGURES 12-45	1 8 2 MARKING
	3 SPACING				
	1ST ROW	2ND ROW	3RD ROW	4TH ROW	



Model 28 Teletype

MODEL 28 WIRING

NON-RELAY OPERATION

Strap - A3 & A5
Strap - A4 & A6
Remove Line Relay
Remove & tape Transformer lead on E2.

SELECTOR MAGNETS PARALLEL

Remove 2 Bk straps - A1 & A2
strap - A2 & A3
strap - A1 & A4.

LEGEND

A- sel. mag. block (LESU)
B- line-test (LESU)
C- cabinet block
D- mtr. control block (LESU)
E- power block (LESU)
F- keyboard connector
J(1)- term. strip (line relay assem. LESU)
J(2)- line relay connector (LESU)
J(3)- line relay filter (LESU)
K - term. strip (line-test key LESU)
R - typing unit connector
S - motor term. block (LK)

CN TELECOMMUNICATIONS
ENGINEERING DEPARTMENT

PLANT MANUAL BK2.6.3
ISSUE 1
AUGUST, 1964

MODEL 28 TRANSMITTER DISTRIBUTOR (LXD)

ADJUSTMENTS

CONTENTS

1. SPRING TENSIONS

Armature bail	1 to 2 oz.
Clutch latch lever	3 to 5-1 2 oz.
Clutch shoe lever	15 to 20 oz.
Clutch shoe	3 to 5 oz.
Clutch trip lever	7 to 10-1 2 oz.
Cover plate detent	28 to 40 oz.
Depressor bail torsion	3 to 7-1 2 oz.
Feed pawl	2 to 3-1 2 oz.
Feed ratchet detent	8 to 13 oz.
Intermediate tape out bail	3 to 5 oz.
Locking bail	6-1 2 to 10-1 2 oz.
Main bail latch	3 4 to 2 oz.
Main bail	10 to 15 oz.
Stabilizer	2-1 2 to 5 oz.
Sensing finger	2 to 3 oz.
Signal contact	2 to 3-1 2 oz.
Start-stop detent	14 to 22 oz.
Tape lid release plunger	3 to 6 oz.
Tape out sensing pin	1 to 3 oz.

Tight tape intermediate Arm	3 4 to 1-1 2 oz.
Tight tape start-stop contact	3 to 4 oz.
Transfer lever	1-1 2 to 2-1 2 oz.
Toggle link (signal contact)	6 to 9 oz.

2. COVER ADJUSTMENTS

2.1 Tape Lid

(1) REQUIREMENT: With the tape lid held against notch in tape guide plate there should be some clearance,not more than .010", between the shoulder and tape lid bearings. The tape-out pin and the feed wheel grove should align with their respective slots.

TO ADJUST: Reposition the tape lid bracket with its mounting nuts friction tight, place the tip of a 156743 gauge thru slot and into groove of lid.

(2) REQUIREMENT: Tape lid front bearing surface should be flush against tape guide plate and rear bearing surface should be flush or within .003" of being flush.

TO ADJUST: Reposition tape lid bearing bracket with its mounting screws loosened.

2.2 Tape Lid Release Plunger

REQUIREMENT: With the tape lid latched the release plunger should have some end play.

TO ADJUST: With the eccentric mounting post friction tight and tape lid unlatched, rotate the high part of eccentric towards the tape guide plate. Hold tape lid down and rotate eccentric towards the bracket until latch just falls under post.

2.3 Tape Guide

REQUIREMENT: With perforated tape inserted, the tape should be centrally located and not have more than .003" between either edge of tape and tape guide.

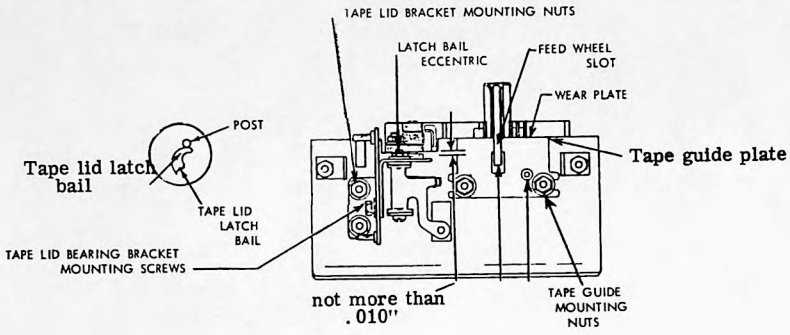


Figure 1

2.3 TO ADJUST: Reposition tape guide with its mounting nut loosened.

2.4 Tape Guide Plate Position

REQUIREMENT: Tape guide plate should be firmly seated against the front and rear plates.

TO ADJUST: With the tape guide plate mounting bracket friction tight, place the start-stop lever to the run position and unlatch the tape lid. Trip the clutch and press guide plate into position.

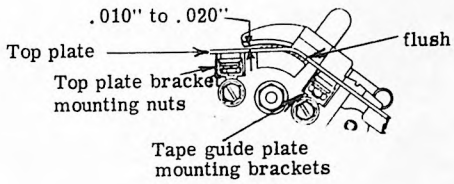
2.5 Top Plate Position

(1) REQUIREMENT: The top plate should be approximately flush with the left edge of the tape guide plate and the feed wheel should rotate freely in slot when the start-stop lever is in the freewheeling position.

TO ADJUST: Reposition top plate with its mounting screws loosened.

(2) REQUIREMENT: The tape lid projection should clear the top plate by .010" to .020" with the tap lid latched.

2.5 TO ADJUST: Refine requirement #1. It may be necessary to reposition the tape lid.



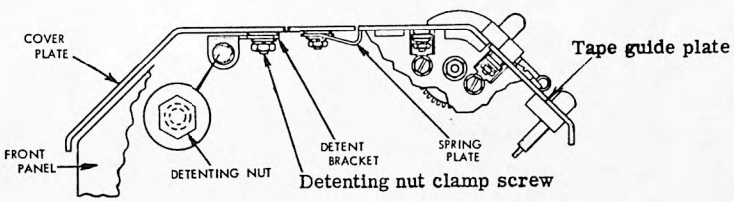


Figure 2

2.6 Cover Plate Position

(1) REQUIREMENT: The cover plate should be held flush against the left edge of the top plate by the cover plate detents.

(2) REQUIREMENT: The cover plate should be firmly seated against the front and rear plates.

TO ADJUST: Reposition the detenting nut with its clamp screws loosened.

3. CONTROL CONTACTS ADJUSTMENTS

3.1 Tape-Out Contact Assembly

REQUIREMENT: It should require 8 to 15 grams to separate the

3.1 REQUIREMENT: normally closed contacts and there should be .008" to .015" clearance between the normally open contacts (1 oz = 28 grams).

3.2 Tape-Out Contact Bracket

REQUIREMENT: With the tape inserted, there should be a clearance of .006" to .012" between the tape-out pin shoulder and the swinger contact insulator.

TO ADJUST: Reposition the contact bracket with its mounting screws loosened.

3.3 Tape-Out Sensing Pin

(1) REQUIREMENT: With the start-stop lever in the freewheeling position, the tape-out pin should be flush or not more than .010" below the top surface of the tape guide plate.

TO ADJUST: Reposition the sensing pin stop arm with its clamp screw loosened.

(2) REQUIREMENT: With the start-stop lever in the run position, the tape-out pin should extend at least .050" above the top surface of the tape guide plate.

TO ADJUST: Reposition the intermediate tape out bail with its clamp screw loosened.

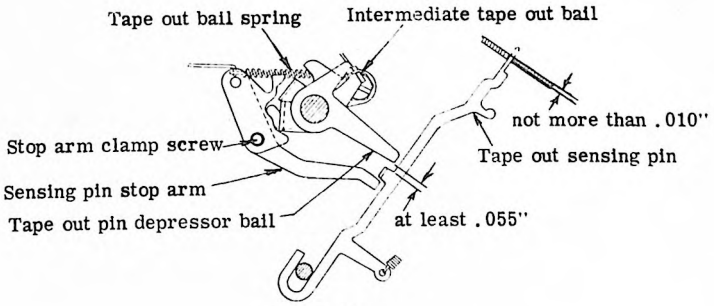


Figure 3

3.4 Start-Stop Switch Bracket

REQUIREMENT: With the start-stop lever in the run position, there should be a .006" to .015" clearance between the start stop bail extension and the contact swinger.

TO ADJUST: Reposition the contact bracket with its mounting screws loosened.

3.5 Tight Tape Intermediate Arm

REQUIREMENT: Place the start-stop lever in the run position and a .060" gauge under the tight tape bail; under this condition the contacts should be open and with a .040" gauge placed under the tight tape bail the contacts should close.

TO ADJUST: Reposition the tight tape intermediate arm by its pry point with its clamp screw loosened.

4. CLUTCH AND MAGNET ADJUSTMENTS

4.1 Clutch Shoe Lever

REQUIREMENT: The clearance between the clutch shoe and stop lug should be .050" to .080" greater with the clutch engaged than disengaged.

TO ADJUST: Reposition clutch disk with clamping screws loosened.

4.2 Clutch Trip Lever

(1) REQUIREMENT: Trip clutch and rotate shaft until the clutch trip lever is opposite the clutch stop lug, the clearance between the trip lever and stop lug should be .012" to .025".

TO ADJUST: Reposition the trip bail eccentric post with its clamp nut loosend (keep eccentric in its lower extremity).

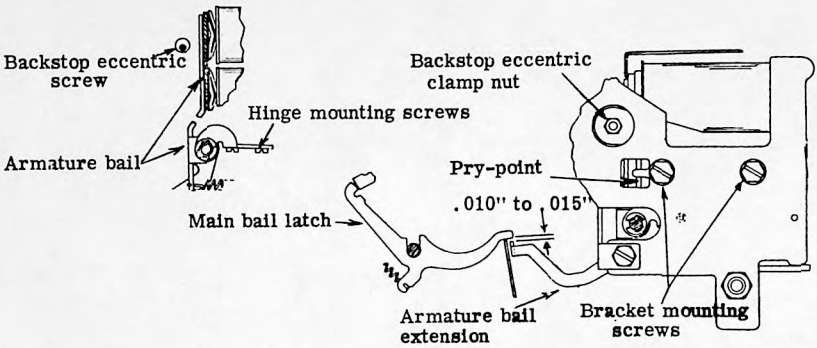


Figure 4

4.3 Clutch Magnet

(1) REQUIREMENT: With the armature in operated position, the armature should engage the upper magnet core and have some clearance not more than .002" at the lower magnet core.

TO ADJUST: Reposition hinge bracket with its mounting screws loosened after magnet assembly is removed.

(2) REQUIREMENT: With the armature in the operated position, there should be a .045" to .055" clearance between the armature and the backstop eccentric screw.

TO ADJUST: Reposition the backstop eccentric with its clamp screw loosened (keep eccentric in its upper extremity).

(3) REQUIREMENT: With clutch disengaged, there should be a .010" to .015" clearance between the armature bail extension and the main bail latch.

TO ADJUST: Reposition the magnet bracket by its pry points with its mounting screws loosend.

5. MAIN BAIL ADJUSTMENTS

5.1 Main Bail

REQUIREMENT: With the sensing pins in their lowest position. there should be a .010" to .020" clearance between the highest sensing pin and the top surface of the tape guide plate.

TO ADJUST: Reposition the main bail eccentric with its lock nut loosened (keep eccentric to its right extremity).

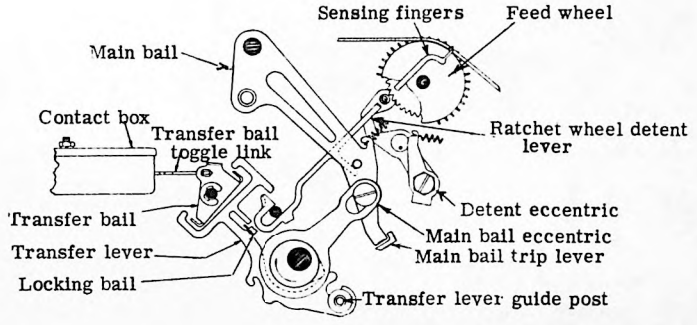


Figure 5

5.2 Main Bail Trip Lever

REQUIREMENT: With clutch fully disengaged. the highest sensing finger should be flush or not more than .005" below the top surface of tape guide plate.

TO ADJUST: Reposition the sensing finger eccentric post with its front and rear lock nuts loosened.

5.3 Feed Wheel Detent (Figure 5)

REQUIREMENT: With the sensing fingers down and the tape lid unlatched, place a letters perforation on the feed wheel. The fingers should be centrally located below their code holes when the tape is being lightly pulled to the right.

TO ADJUST: Reposition the detent eccentric with its clamp screw loosened.

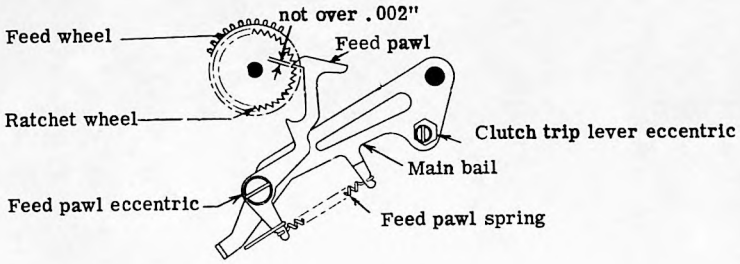


Figure 6

5.4 Feed Pawl

REQUIREMENT: With the sensing fingers in their lowest position, there should be some clearance not more .002" between the feed pawl and a ratchet wheel tooth.

TO ADJUST: Reposition feed pawl eccentric with its lock nut loosened (keep eccentric to its right extremity).

6. GENERATOR CONTACT ADJUSTMENTS

6.1 Transfer Bail Stabilizer

REQUIREMENT: With the clutch fully disengaged, manually position

6.1 REQUIREMENT: the transfer bail to marking and check the clearance between the side of the transfer bail extension and the side of its latch. Repeat the above procedure with the transfer bail positioned to spacing and check clearance. The two clearance should be equal within .002".

TO ADJUST: Reposition the stabilizer assembly with its mounting screws loosened.

6.2 Signal Contact

REQUIREMENT: Disengage the clutch with the toggle positioned from marking to spacing; the contact clearance should be equal.

TO ADJUST: Reposition the contact box eccentric with the contact box mounting screws loosened.

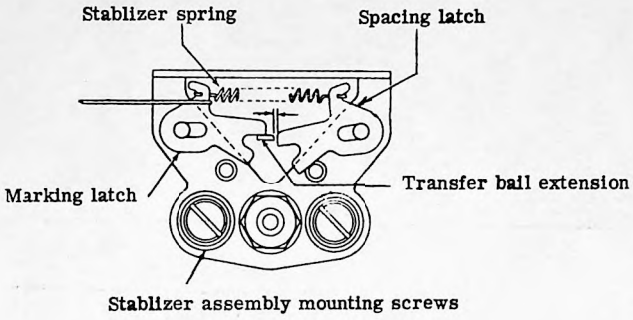


Figure 7

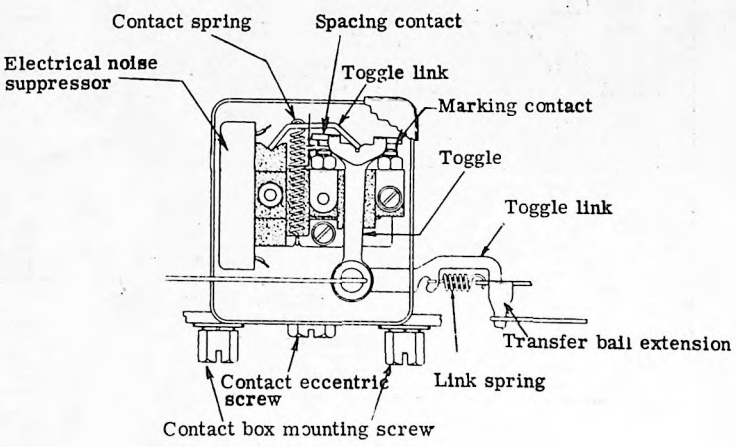
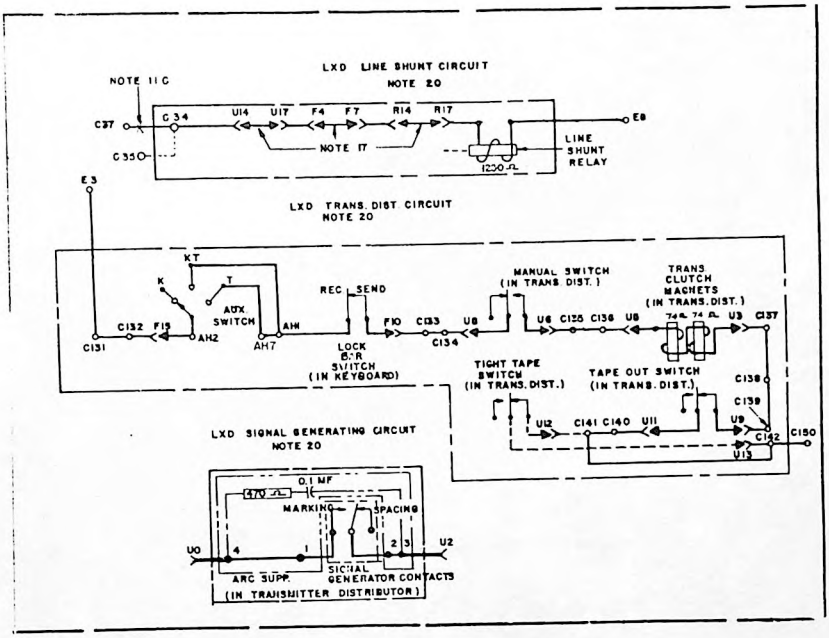


Figure 8



LXD Wiring Diagram

CN TELECOMMUNICATIONS
ENGINEERING DEPARTMENT

PLANT MANUAL BK2.6.4
ISSUE 1
AUGUST, 1964

MODEL 28 TRANSMITTER DISTRIBUTOR (LAXD, LBXD AND LCXD)

ADJUSTMENTS

CONTENTS

1. SPRING TENSIONS

Armature bail	2-1 4 to 4-1 2 oz.
Auxiliary lever	1-1 2 to 3 oz.
Cam follower lever	1 2 to 1-1 2 oz.
Check Pawl	7 to 11 oz.
Clutch latch lever	1 2 to 1-1 2 oz.
Cover plate	28 to 40 oz.
Clutch shoe lever	15 to 20 oz.
Clutch shoe	3 to 5 oz.
Clutch trip lever	2 to 3 oz.
Contact lever extension	1-3 4 to 3-1 2 oz.
Contact lever slide	3-1 2 to 5-1 2 oz.
Distributor rocker	6-1 2 to 9-1 2 oz.
Feed lever	30 to 40 oz.
Feed pawl	1 4 to 1-1 2 oz.
Feed ratchet detent	7 to 13 oz.

1.	Last character contacts	1 4 to 1 2 oz.
	Latch lever	1 to 2-1 2 oz.
	Latch bail	2-3 4 to 5 oz.
	Push lever	1 to 2 oz.
	Pusher stripper bail	7 to 19 oz.
	Sensing bail	1 4 to 1 oz.
	Sensing pins	2 to 3 oz.
	Tape deflector	1 2 to 1-1 2 oz.
	Tape depressor	1 4 to 3 4 oz.
	Tape lid pin	1-1 2 to 3 oz.
	Tape lid release plunger	3 to 6 oz.
	Tape out pin (fixed head)	1 to 3 oz.
	Tape out pin (pivoted head)	3 to 5 oz.
	Tight-tape, start-stop contact	3 to 4 oz.

2. COVER ADJUSTMENTS (see LXD section BK2.6.3)

3. CONTROL CONTACT ADJUSTMENTS (FIXED HEAD)
(see LXD section BK2.6.3)

4. CONTROL CONTACT ADJUSTMENTS (PIVOTED HEAD)

4.1 Tape-Out and Tape Lid Contacts

REQUIREMENTS: It should require 8 to 15 grams to separate the normally closed contacts (1 oz. = 28 grams) The normally open contact should have a .008" to .015" gap.

4.2 Tape-Out and Tape Lid Downstop

REQUIREMENT: The downstop post should be adjusted so that each may be lowered to flush with and not more than .005" below the top surface of the tape guide plate.

5. CLUTCH AND MAGNET ADJUSTMENTS

5.1 Cam Sleeve End Play

REQUIREMENT: There should be end play not more than .010" between the cam sleeve and spacer.

5.1 TO ADJUST: Remove the drive gear and position cam sleeve with its mounting screw loosened.

5.2 Cam Shaft Bearing Retainer

REQUIREMENT: All ball bearings shall be fully seated in their mounting position.

TO ADJUST: Rotate bearing retainer 180 degrees and reposition bearing.

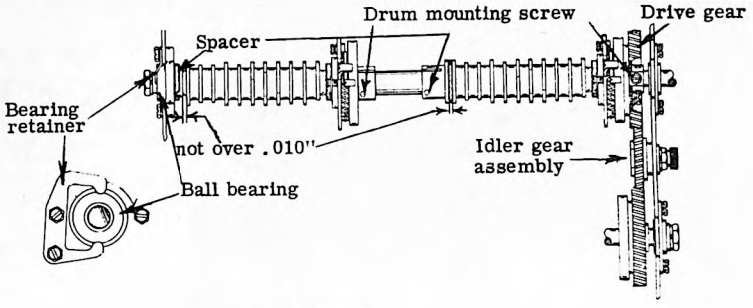


Figure 1

5.3 Idler Gear Assembly

REQUIREMENT: The idler gear should be equidistant between the sensing and distributor drive gears, and should not have more than .003" backlash.

TO ADJUST: Reposition idler gear assembly with its lock nut loosened.

5.4 Clutch Trip Magnet Armature Hinge

REQUIREMENT: With the armature flush against the magnet core, there should be a .004" to .008" gap between the magnet bracket assembly and the armature.

5.4 TO ADJUST: Remove armature extension spring post; reposition the hinge with its mounting screw loosened.

5.5 Magnet Bracket and Clutch Trip Assembly Mounting Plate

(1) REQUIREMENT: With the clutch trip lever reset extension on the peak of its cam, there should be a .020" to .030" clearance between the trip lever latching surface and the end of the armature bail.

TO ADJUST: Reposition the mounting plate by its pry point with its mounting screws loosened.

(2) REQUIREMENT: Under the above conditions with the armature in attracted position, there should be a .030" to .040" clearance between the armature bail lower surface and top edge of trip lever.

TO ADJUST: Reposition magnet bracket by its upper pry point with its mounting and clamp screw loosened.

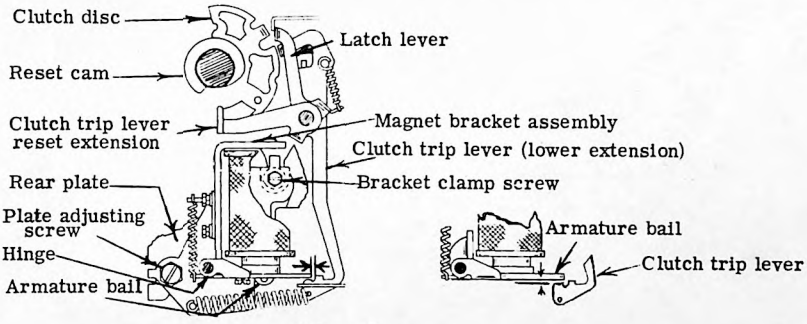


Figure 2

5.6 Clutch Trip Lever

(1) REQUIREMENT: Clutch fully disengaged, the trip lever should have a full bite of the clutch shoe lever.

5.6 (2) REQUIREMENT: There should be at least a .005" clearance between the shoe lever and stop lug when they are opposite each other.

TO ADJUST: Reposition trip lever upper extension by its pry point with its clamp screw loosened.

5.7 Oil Reservoir Assembly

REQUIREMENT: The oil wicks should rest lightly on the cam sleeves.

TO ADJUST: Reposition reservoir assembly with its four mounting screws loosened and set it parallel to the cam sleeves.

5.8 Clutch Shoe Lever

REQUIREMENT: With the clutch engaged, the clearance between the shoe lever and stop lug should be .050" to .080" greater than when the clutch is engaged.

TO ADJUST: Reposition clutch disk with its clamp screws loosened.

6. DISTRIBUTOR ADJUSTMENTS

6.1 Distributor Cam Follower

REQUIREMENT: The cam followers should be centrally located on their cams and should be free of binds.

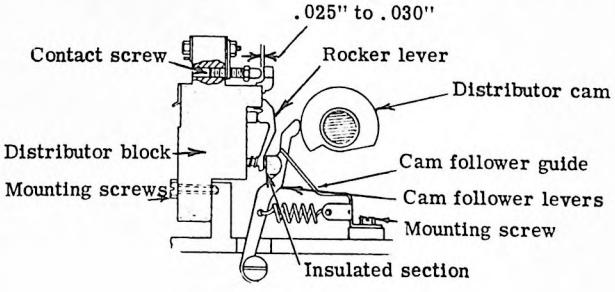


Figure 3

6.1 TO ADJUST: Reposition the cam follower guide with its mounting screws loosened.

6.2 Distributor Contact Gap

REQUIREMENT: With the cam follower lever on the high part of its cam, the contacts should have .025" to .030" clearance.

TO ADJUST: Reposition contact screw.

6.3 Distributor Block Assembly

REQUIREMENT: The rocker levers should be centrally located on their individual cam follower lever insulator.

TO ADJUST: Reposition the distributor block with its mounting screw.

7. STORING SWITCH ADJUSTMENTS

7.1 Storing Switch Guides

REQUIREMENT: There should be a .005" to .008" clearance between the contact lever slide and the post. (check only first and last slides).

TO ADJUST: Reposition guide, with its mounting screws loosened.

7.2 Storing Switch Assembly

REQUIREMENT: The latch levers and contact lever slides should be free from binds when operated.

TO ADJUST: Reposition storing contact block with its mounting screws loosened.

7.3 Contact Lever Slide

REQUIREMENT: With the sensing pins in their highest position, push levers selected and latch levers stripped; there should be a .005" to .012" clearance between the closest push lever and contact lever slide.

7.3 TO ADJUST: Reposition contact lever slide eccentric shaft with its lock nuts loosened (keep eccentric in its right extremity).

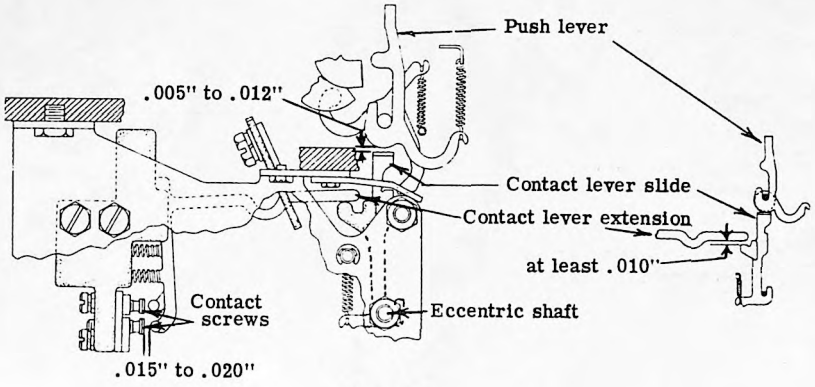


Figure 4

7.4 Storing Switch Contacts

(1) REQUIREMENT: Select blank and rotate shaft until clutch fully disengaged; there should be a .015" to .020" gap between each contact and its contact lever extension.

TO ADJUST: Reposition the contact screw.

(2) REQUIREMENT: Select letters and rotate shaft until disengaged: there should be .010" clearance between the contact slide and the contact lever extension.

TO ADJUST: Refine the above adjustment.

8. SENSING ADJUSTMENTS

8.1 Sensing Pins

REQUIREMENT: With clutch fully disengaged, pins should be flush

8.1 REQUIREMENT: or not more than .005" below surface of tape guide plate.

TO ADJUST: Reposition transfer lever eccentric with its lock nut loosened (keep eccentric in its right extremity).

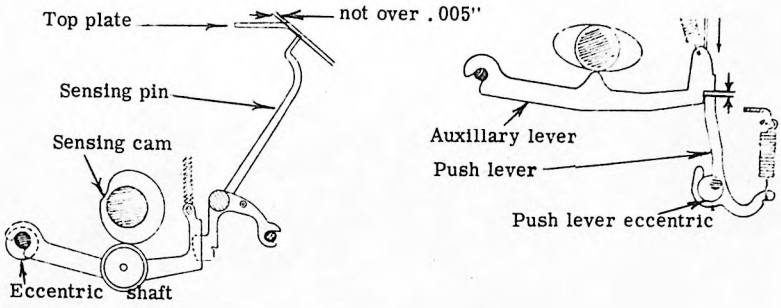


Figure 5

8.2 Push Lever

REQUIREMENT: With clutches fully disengaged the auxiliary lever with the least clearance should clear its push lever by .025" to .040".

TO ADJUST: Reposition the push lever eccentric with its lock nut loosened (keep eccentric in its upper extremity).

9. FEED ADJUSTMENTS

9.1 Feed Lever Set Collar

REQUIREMENT: The feed lever should move freely in its guide without binding.

TO ADJUST: Reposition the feed lever with its set collar screws loosened.

9.2 The Following Adjustments Pertain to the Fixed Head Mechanism

9.2.1 Feed Wheel Detent

REQUIREMENT: With clutches fully disengaged, place a letters perforated tape on the tape wheel and pull the tape lightly to the right. The sensing pins should be centrally located below the code holes or slightly to right of centre.

TO ADJUST: Reposition the detent eccentric with its lock nut loosened.

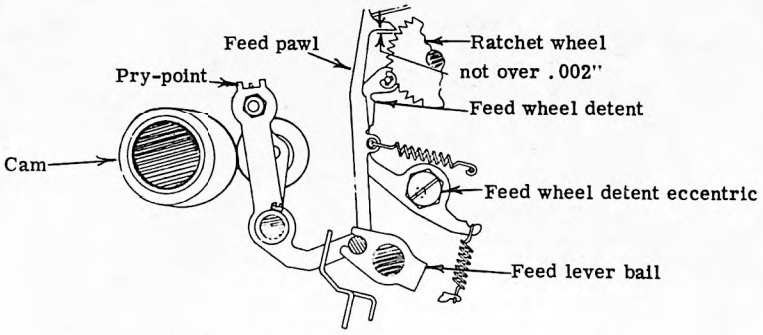


Figure 6

9.2.2 Feed Pawl

REQUIREMENT: Place the start-stop lever in the run position and the feed pawl in its lowest position; there should be some clearance,not more than .002" between the feed pawl and a tooth on the ratchet wheel when the play is taken to make the clearance a maximum.

TO ADJUST: Reposition the feed lever by its pry points with its lock nut loosened.

9.3 The Following Adjustments Pertain to the Pivoted Head Mechanism

9.3.1 Check Pawl

REQUIREMENT: With the feed pawl positioned upwards, the check pawl shall be fully seated between two teeth on the ratchet. Continue rotating shaft until clutch fully disengaged, the feed wheel should remain stationary.

TO ADJUST: Reposition check pawl eccentric with its lock nut loosened (keep eccentric in its left extremity).

9.3.2 Feed Pawl

REQUIREMENT: With the feed pawl resting against its upper stop, the feed wheel follower roller should not engage its cam. Continue rotating shaft until clutch is fully disengaged; there should be a .030" to .035" clearance between the upper surface of the feed pawl and a tooth of its ratchet.

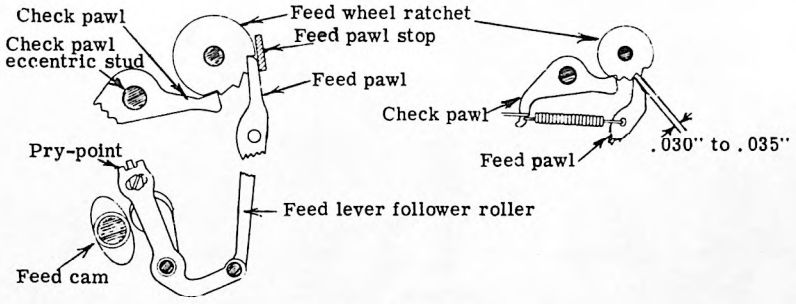


Figure 7

TO ADJUST: Reposition feed lever by its pry point with its lock nut loosened.

9.3.3 Tape Retaining Lid Latch

REQUIREMENT: With the retaining lid latched there should be no play between the retaining lid and the top plate.

TO ADJUST: Reposition the lid latch spring with its adjusting screw loosened. It should also require 1-1 2 to 2-1 2 ozs. to start the retaining lid latch spring moving.

9.3.4 Top Plate

REQUIREMENT: Place a letters perforated tape on the feed wheel and rotate shaft until sensing pins are in their highest position; the sensing pins should be centrally located in their code holes.

TO ADJUST: Reposition the retaining lid with its adjusting screws loosened.

9.3.5 Tape Deflector

REQUIREMENT: The tape deflector should pass freely between the 1st and 2nd sensing pins and should have a minimum amount of end play.

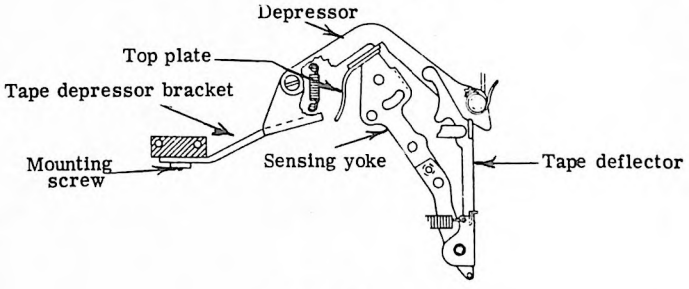


Figure 8

9.3.5 TO ADJUST: Reposition the tape deflector with its pivot screws loosened.

9.3.6 Tape Deflector Bracket

REQUIREMENT: The tape deflector should engage both arms of the deflector bracket.

TO ADJUST: Reposition the deflector bracket with its mounting screws loosened.

9.3.7 Tape Depressor

(1) REQUIREMENT: There should be some clearance,not more than .002" between the tape depressor and its bracket.

TO ADJUST: Reposition the depressor by its adjusting screw with its lock nut loosened.

(2) REQUIREMENT: With the depressor locked on the top plate, there should be a .005" to .012" clearance between the top plate and the depressor.

TO ADJUST: Reposition tape depressor with its mounting screws loosened.

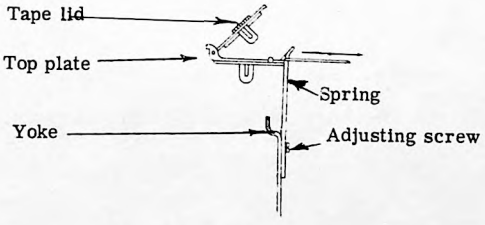
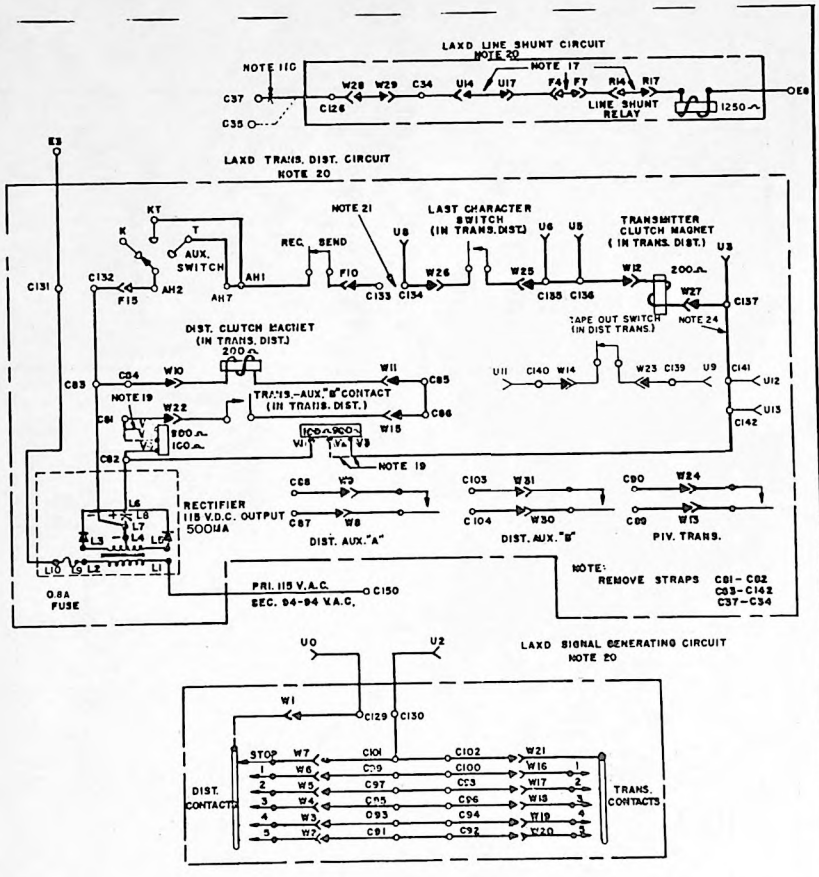
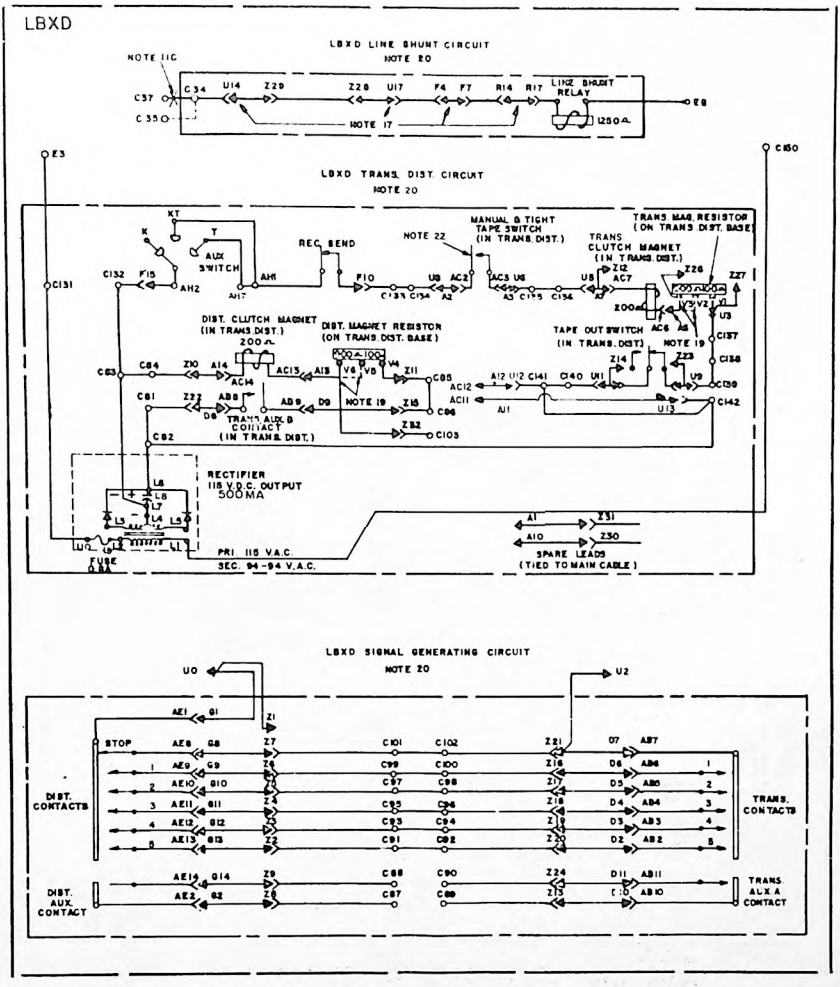


Figure 9

LAXD



LAXD Wiring Diagram



LBXD Wiring Diagram

LCXD-14

TELECOMMUNICATIONS
ENGINEERING DEPARTMENT

PLANT MANUAL BK2.6.5
ISSUE 1
AUGUST, 1964

MODEL 28 TYPING REPERFORATOR (LPR)

ADJUSTMENTS

CONTENTS

1. SPRING TENSIONS

Accelerator	20 to 26 oz.
Adjusting arm	2-1 2 to 4 oz.
Bell crank	1 to 3 oz.
Clutch shoe lever	15 to 20 oz.
Clutch shoe	3 to 5 oz.
Correcting drive link	2 to 4 oz.
Detent lever	7 to 10 oz.
Eccentric shaft detent lever	7 to 10 oz.
Feed pawl	3 to 4-1 2 oz.
Figures arm assembly	1-1 2 to 3-1 2 oz.
Figures extension arm	5 to 8 oz.
Function blade	7 to 10 oz.
Function clutch latch lever	12 to 15 oz.
Function clutch release	5 to 8 oz.
Letters arm assembly	1-1 2 to 3-1 2 oz.

1.	Letters extension are	5 to 8 oz.
	Lifter	7 to 9 oz.
	Lifter toggle link	1-1 2 to 2-1 4 oz.
	Main trip lever	2-1 2 to 4-1 2 oz.
	Marking lock lever	1-1 2 to 3 oz.
	No. 5 pulse beam	10 to 15 oz.
	Print hammer	1-1 2 to 2-1 2 oz.
	Printing latch	5 to 7 oz.
	Printing trip link	4 to 7 oz.
	Punch slide latch	1 to 3 oz.
	Punch slide	2-1 4 to 3-1 4 oz.
	Push lever reset bail	4 to 8 oz.
	Retractor bail	4 to 5 lbs.
	Ribbon feed drive arm	3 to 5 oz.
	Ribbon feed pawl	6 to 8 oz.
	Ribbon feed reversing arm	5 to 15 oz.
	Selector armature	3 oz.
	Selector clutch latch lever	2 to 3-1 2 oz.
	Selector lever	1-1 4 to 2-1 2 oz.
	Selector push lever	3 4 to 1-1 2 oz.
	Spacing lock lever	3 to 6 oz.
	Start lever	2-1 2 to 4-1 2 oz.
	Tape chute guide	1 2 to 1 oz.
	Tape shoe torsion	15 to 18 oz.

2. CLUTCH RELEASE AND RESET ADJUSTMENTS

2.1 Clutch Shoe Lever

REQUIREMENT: With the clutch engaged, the clearance between the shoe lever and stop lug should be .050" to .080" greater than when the clutch is engaged.

TO ADJUST: Reposition clutch disk with its clamp screws loosened.

2.2 Clutch Drum End Play

REQUIREMENT: The cam sleeve should have some end play not more than .010", with the clutch fully disengaged.

TO ADJUST: Reposition collar with its mounting screw loosened.

2.3 Rocker Bail

REQUIREMENT: With the rocker bail in its extreme left position, the function cam should have some play, not more than .003" between the upper and lower rollers.

TO ADJUST: Reposition the lower roller in its elongated hole with its lock nut loosened.

2.4 Function Clutch Trip Lever

REQUIREMENT: The trip lever should have some end play not more than .006" and should engage the full thickness of shoe lever when clutch is disengaged.

TO ADJUST: Reposition trip lever with its clamp screw loosened.

2.5 Reset Arm

See LPE section BK2.6.6 paragraph 3.6 and change the requirement to read as follows:

.010" to .030" clearance between the clutch release and the main trip lever.

2.6 Rocker Bail Guide Bracket

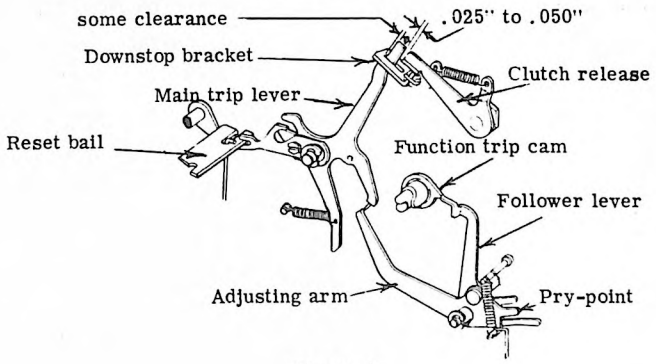


Figure 1

2.6 REQUIREMENT: The rocker bail rollers should engage the full thickness of its cam and the lifter roller should engage the full thickness of rocker bail.

TO ADJUST: Reposition the rocker bail guide bracket with its mounting screws loosened.

2.7 Follower Lever

REQUIREMENT: With the follower lever on the peak of the function trip cam, there should be a .025" to .050" clearance between the clutch release and the main trip lever.

TO ADJUST: Reposition the follower lever by its pry-point with its lock nut loosened.

2.8 Release Downstop Bracket

REQUIREMENT: Function clutch operated, there should be a .010" to to .030" clearance between the clutch shoe lever and the trip lever.

TO ADJUST: Reposition the downstop bracket with its mounting screws loosened.

3. PERFORATOR ADJUSTMENTS

3.1 Punch Position

REQUIREMENT: The punch mounting screws should be centrally located in their elongated holes and the punch slide latches shall be horizontal when engaged by the punch slides.

TO ADJUST: All clutch disengaged, remove the rear plate mounting screw of the punch mechanism and reposition punch mechanism with remaining mounting screws loosened.

3.2 Rocker Arm

REQUIREMENT: With rocker bail upper roller on the peak of its cam, place a 159926 gauge on the toggle shaft as shown in Figure 6: there should be the following

3.2 REQUIREMENT: clearances:

(1) .002" to .005" between the upper surface of 159926 gauge and the feed pawl stud.
(2) at least .002" end play in rocker arm shaft.
(3) at least .015" clearance between the rocker arm and bearing hub.

TO ADJUST: Select blank, remove punch slide guide and loosen downstop studs (see Figure 7). Rotate shaft until rocker bail upper roller is on peak of its cam, reposition rocker arm with its clamp screw loosened. Readjust the punch slide guide and downstop studs as described in the succeeding adjustments.

* Any change in this adjustment will require the re-checking all perforating and feeding adjustments that follow.

3.3 Perforator Position

(1) REQUIREMENT: Select letters and rotate shaft until function clutch just trips, there should be a .020" to .030" clearance between the punch slide and its latch.

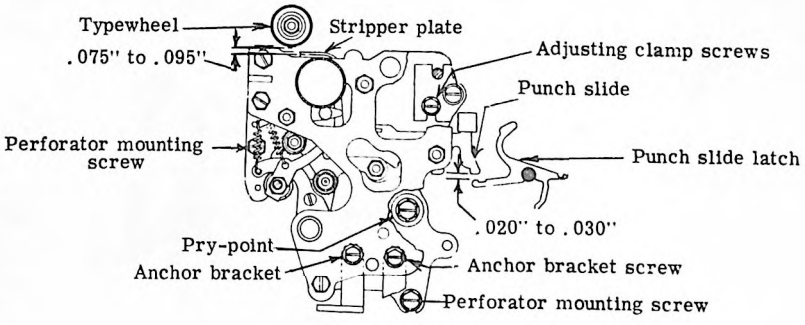


Figure 2

3.3 TO ADJUST: Reposition the adjusting clamp with the mounting screws and adjusting clamp screw loosened.

(2) REQUIREMENT: Select "V" and rotate shaft until rocker bail is in the extreme left position; there should be a .075" to .095" clearance the typewheel and the stripper plate.

TO ADJUST: Reposition the perforator with its two mounting screws loosened.

3.4 Punch Slide Downstop Plate

REQUIREMENT: Function clutch fully disengaged, punch slides positioned upwards until blocked; there should be some clearance not more the .008" between the punch slides and their downstop.

TO ADJUST: Loosen the punch slide guide mounting screws and downstop plate mounting studs and reposition the downstop.

3.5 Punch Pin Penetration

REQUIREMENT: With letters selected and shaft rotated until punch pins reach their highest travel, there should be a .060" to .070" clearance between the punch retractor bail and the upper surface of the guide plate.

TO ADJUST: Reposition the toggle bail eccentric shaft with its lock nut loosened (keep eccentric to its left extremity).

3.6 Punch Slide Guide

REQUIREMENT: With letters selected and the function clutch engaged the punch slides should engage and align with its punch pins.

TO ADJUST: Reposition the punch slide guide with its mounting nuts.

3.7 Reset Bail Trip Lever

REQUIREMENT: With letters selected and follower lever on the peak of function trip cam (selector cam sleeve), there should be some clearance, not more than .007", between the upper surface of reset bail and the punch slides.

TO ADJUST: Reposition the reset bail trip lever by its pry-point with its clamp screw loosened.

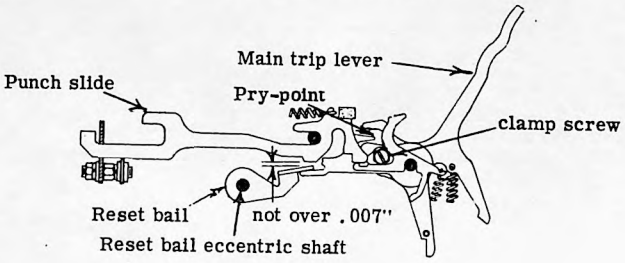


Figure 3

3.8 Punch Slide Reset Bail

See LPE, section BK2.6.6 paragraph 4.6. change requirement to read as follows:

some clearance not more than .008".

4. FEED ADJUSTMENTS

4.1 Feed Pawl

REQUIREMENT: All clutches disengaged and detent roller in contact with the ratchet wheel. the feed pawl should engage the first tooth below the horizontal centre of the ratchet with no perceptible clearance.

TO ADJUST: Reposition the feed pawl eccentric with its clamp screw loosened (keep eccentric to its right extremity).

4.2 Feed Hole Spacing

REQUIREMENT: With the tape removed there should be a .002" to .004" clearance between the feed wheel and die wheel. The tape should conform to 10 holes to the inch; check same with a 2215 or 156011 tape gauge.

TO ADJUST: Reposition the die wheel eccentric with its lock nut loosened (keep eccentric to its lower extremity).

4.3 Detent Lever

REQUIREMENT: The feed hole should align centrally to the code holes. Check with a 156011 tape gauge if available.

TO ADJUST: Reposition the detent eccentric with its clamp screw loosened, keep indentation approximately perpendicular to feed pawl.

4.4 Feed Hole Lateral Alignment

REQUIREMENT: Letters combinations should be centrally perforated on the tape.

TO ADJUST: Reposition the feed wheel adjusting screw with its lock nut loosened. If a 156011 tape gauge is available, the tape should conform to the gauge.

4.5 Punch Block Tape Guide Spring

The tape should not distort the tape while the perforator is in operation.

5. POSITIONING ADJUSTMENTS

5.1 Push Bar Operating Blade Shim

REQUIREMENT: Select letters and rotate main shaft until function clutch just trips. the top surface of the operating blade should be parallel with the =2 and =3 push bars.

5.1 TO ADJUST: Add or remove shims under the operating blade rear mounting screw.

5.2 Push Bar Operating Blade

(1) REQUIREMENT: Select letters, rotate main shaft until function clutch trips, move push bars to detented position: there should be a .015" to .025" clearance between the nearest push bar and the left edge of operating blade.

(2) REQUIREMENT: There should be some clearance between the push bars and the right edge of operating blade.

(3) REQUIREMENT: With all clutches disengaged, there should be some clearance between the push bars and right edge of operating blade.

TO ADJUST: Reposition the operating blade with its mounting screws loosened.

5.3 Rocker Bail Pilot Stud

REQUIREMENT: With blank selected and rocker bail to its extreme left, there should be a .005" to .015" clearance between the operating blade and the function box rear plate.

TO ADJUST: Reposition the pilot stud with its lock nut loosened.

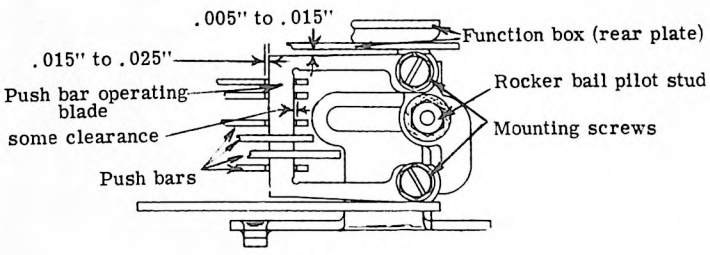


Figure 4

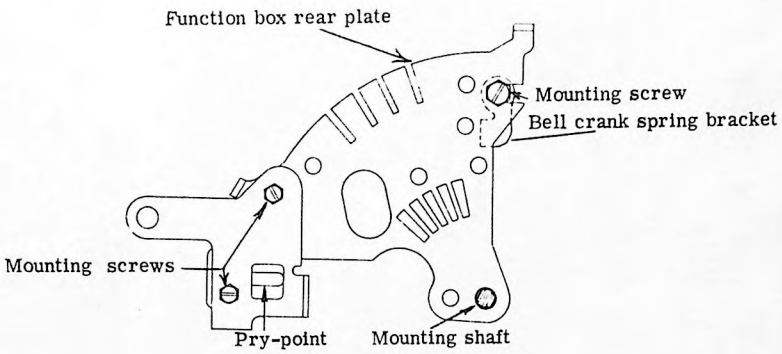


Figure 5

5.4 Function Box

REQUIREMENT: With letters selected, rotate main shaft until function clutch trips and operating just touches the push bars; the top surface of the operating blade should be flush or not more than .010" below the top surface of #2 and #3 push bars.

TO ADJUST: Reposition function box by its pry-point with its three rear and one front mounting screws loosened.

5.5 Transfer Mounting Bracket

REQUIREMENT: Blank selected and main shaft rotated until function clutch trips; there should be some clearance, not more than .018" between the bell crank and its top post (one or more bell cranks may touch the stop post).

TO ADJUST: Reposition transfer mounting bracket by its pry-point with its mounting screws loosened.

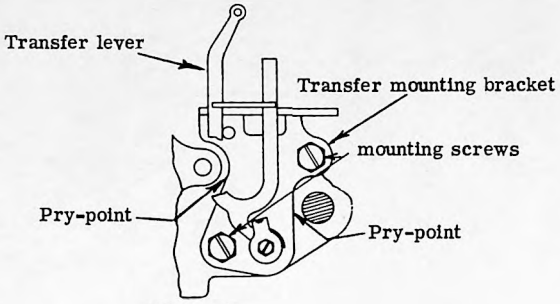


Figure 6

5.6 Letters and Figures Yield Arms

(1) REQUIREMENT: Rotate main shaft until rocker bail is to the extreme left, move arm assemblies to the letters position (letters arm just below figures arm) and hold the letters-figures bell crank against the left edge of its stop post. There should be some clearance not more than .006" between the bell crank and the letters extension arm.

TO ADJUST: Reposition the letters yield arm by its pry-point with its clamp screw loosend.

(2) REQUIREMENT: Rotate main shaft until rocker bail is to the extreme left, move arm assemblies to figures (figures arm just below letters arm) and hold the letters-figures bell crank against the right edge of its stop post. There should be some clearance.not more than .006" between the bell crank and the figures extension arm.

TO ADJUST: Reposition the figures yield arm by its pry-point with its clamp screw loosened.

5.7 Lifter Arm

REQUIREMENT: With function clutch operated and the main

5.7 REQUIREMENT: shaft rotated, the lifter roller should have approximately equal travel on the well surfaces.

TO ADJUST: Reposition lifter arm with its lock nut and eccentric screw lock nut loosened.

5.8 Lifter Arm Eccentric Screw

REQUIREMENT: All clutches disengaged, there should be a .005" to .016" clearance between the bell cranks and the function blades.

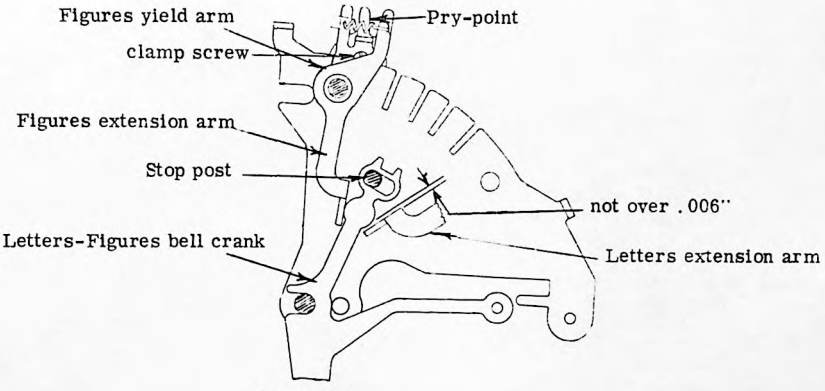


Figure 7

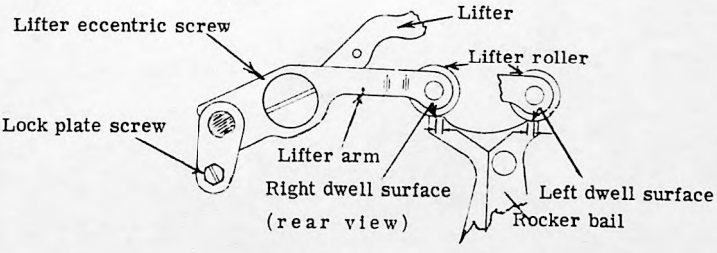


Figure 8

5.8 TO ADJUST: Reposition lifter arm eccentric screw with its lock nut loosened.

5.9 Lock Lever

(1) REQUIREMENT: Letters selected and rocker bail to its left position when the toggle linkage and lock lever are in a straight line; the lifter should not rise.

(2) REQUIREMENT: Under the above conditions there should be some clearance,not more than .010" between the toggle link and the lifter pin.

TO ADJUST: Reposition lock lever with its clamp screw loosened.

5.10 Lock Lever Trip Post

REQUIREMENT: The lifter roller should drop onto the right dwell (rear view), just before the rocker bail reaches its extreme right position.

TO ADJUST: Reposition lock lever trip post by its pry-points with its clamp screw loosened.

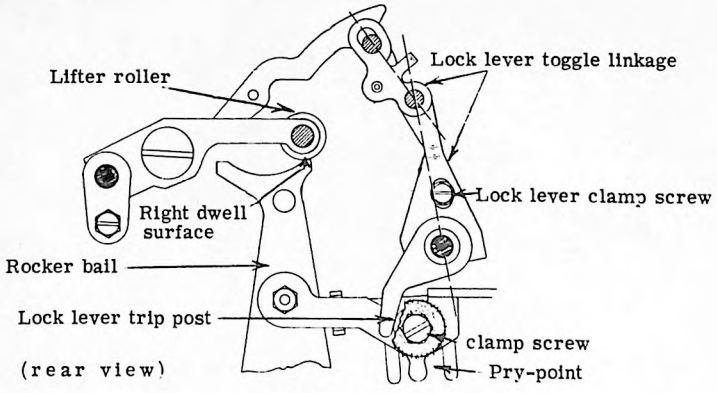


Figure 9

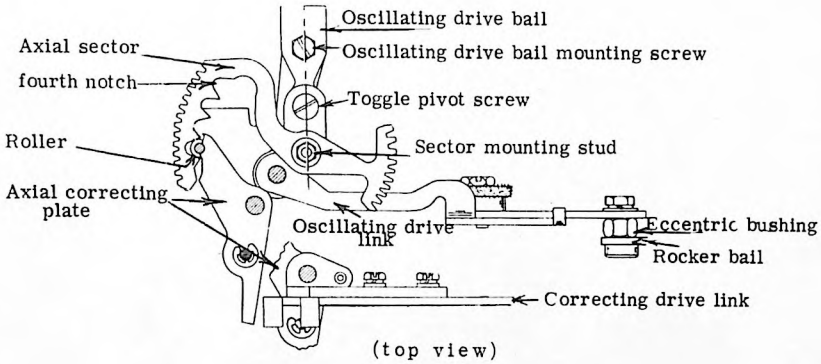


Figure 10

5.11 Oscillating Drive Link

REQUIREMENT: With rocker bail to its extreme left, the sector mounting stud, toggle pivot screw and oscillating drive bail mounting screw should be in line.

TO ADJUST: Reposition oscillating drive link by its eccentric bushing.

5.12 Oscillating Drive Bail

REQUIREMENT: Select Blank and rotate main shaft until the rocker bail is to its extreme left. The axial correcting plate roller should be fully seated in the first notch of the axial sector.

TO ADJUST: Reposition the correcting drive link with the oscillating drive bail mounting screw loosened.

5.13 Axial Sector Alignment

REQUIREMENT: The top surfaces of the axial sector and axial output rack should align.

5.13 TO ADJUST: Add or remove shims under the axial output rack guide roller.

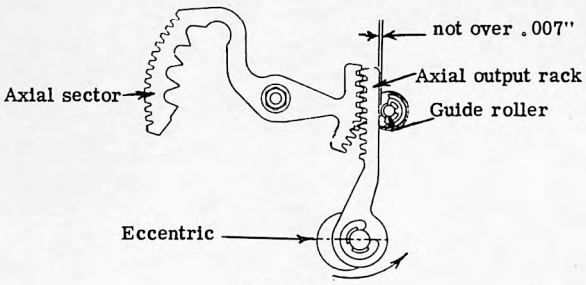


Figure 11

5.14 Axial Output Rack Guide Roller

REQUIREMENT: Select line feed and rotate main shaft until upper eccentric is positioned to extreme right; there should be some play, not more than .007" between the axial output rack and its guide roller.

TO ADJUST: Reposition guide roller stud in its elongated hole with its lock nut loosened.

5.15 Push Bar Guide Bracket

REQUIREMENT: Select carriage return and rotate main shaft. During the complete travel of the #4 push bar there should be some play, not more than .005" between the #4 push bar and the guide bracket.

TO ADJUST: Reposition the guide bracket with its two mounting screws loosened.

5.16 Correcting Drive Link (Figure 10)

(1) REQUIREMENT: With blank selected the axial correcting roller should seat firmly in the first notch of axial sector.

5.16 (2) REQUIREMENT: With letters selected the axial correcting roller should seat firmly in the fourth notch of axial sector.

TO ADJUST: Reposition correcting drive link with its clamping screws loosened.

5.17 Idler Gear Eccentric Shaft

REQUIREMENT: Select letters and rotate main shaft until clutches disengaged; there should be a .003" to .012" clearance between the typewheel rack and idler gear.

TO ADJUST: Reposition the idler gear eccentric shaft with a tommy, with its mounting screw loosened.

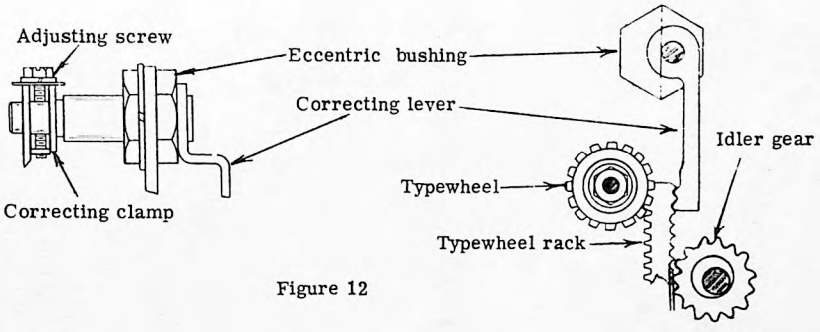


Figure 12

5.18 Rotary Correcting Lever

(1) REQUIREMENT: The following typewheel rack teeth should be firmly seated between the lobes of the correcting lever with these selections.

1. 2nd tooth select 9 (Figures -4. 5).
2. 4th tooth select comma (Figures -3. 4).
3. 9th tooth select CR (Letters -4).
4. 16th tooth select H (Letters -3. 5).

5.18 TO ADJUST: Reposition the rotary correcting lever eccentric bushing with its lock nut and the correcting clamp adjusting screw loosened.

(2) REQUIREMENT: With letters slected, when the rotary correcting lever is just seated in the typewheel rack, there should be some clearance not more than .005" between the axial correcting plate roller and the axial sector.

TO ADJUST: Reposition the rotary correcting lever with its adjusting screw loosened. There should not be more than .006" end play between the rotary correcting clamp and eccentric bushing.

6. PRINTING ADJUSTMENTS

6.1 Ribbon Carrier

REQUIREMENT: All clutches disengaged, ribbon should slightly overlap tape and last character printed should be visible.

TO ADJUST: Reposition ribbon oscillating lever with its lock screw loosened.

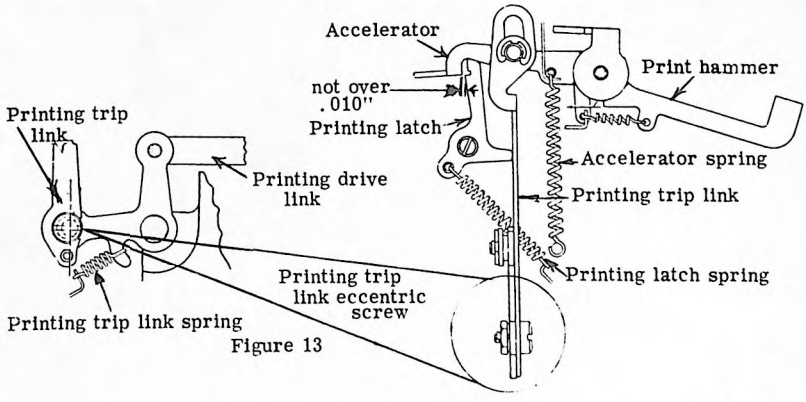


Figure 13

6.2 Printing Trip Link

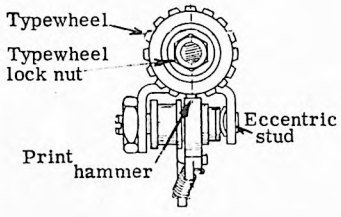
REQUIREMENT: With rocker bail to its extreme left, raise the accelerator until latching surfaces of accelerator and printing latch are opposite; there should be some clearance not more than .010" between the two latching surfaces.

TO ADJUST: Reposition printing trip link eccentric screw with its lock nut loosened (keep eccentric to its left extremity).

6.3 Typewheel Position

REQUIREMENT: With "M" selected, the character should be uniformly printed.

TO ADJUST: Reposition the typewheel with its lock nut loosened.



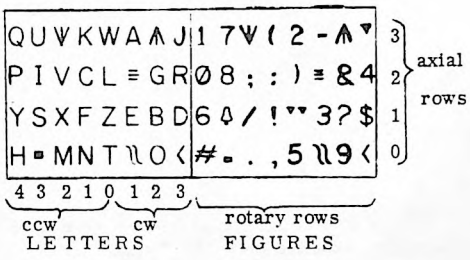


Figure 14

6.4 Print Hammer

REQUIREMENT: When operated the print hammer should strike the characters squarely.

TO ADJUST: Reposition eccentric stud with its lock nut loosened.

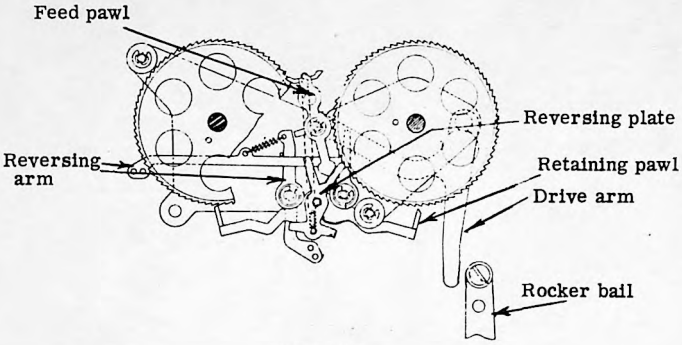


Figure 15

6.5 Ribbon Feed Eccentric Stud

REQUIREMENT: With rocker bail to its extreme left, there should be a .004" to .012" clearance between retaining pawl and ribbon ratchet tooth (check side with least clearance).

TO ADJUST: Reposition ribbon feed eccentric stud (on rocker bail) with its lock nut loosened.

6.6 Ribbon Feed Pawl Downstop Eccentric

REQUIREMENT: All clutches disengaged, there should be a .010" to .030" clearance between feed pawl and ratchet tooth.

TO ADJUST: Reposition downstop eccentric with its lock nut loosened.
Note: feed pawl should feed one tooth at a time.

6.7 Ribbon Reversing Plate

REQUIREMENT: With rocker bail to its extreme left, position the reversing arm under reversing plate and there should be a .010" to .020" clearance between the arm and plate.

6.7 TO ADJUST: Reposition reversing plate with its clamp screw loosened.

7. GEAR BOX AND MOTOR ADJUSTMENTS

7.1 Gear Alignment

REQUIREMENT: Motor pinion and intermediate shaft driven gear should mesh at right angles and should have barely perceptible backlash.

TO ADJUST: Reposition gear assembly and adjusting stud with mounting screws loosened.

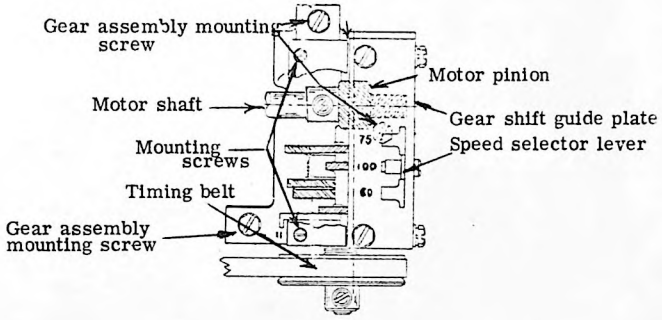


Figure 16

7.2 Gear Shift Guide Plate

REQUIREMENT: With speed selector lever set at 100 wpm, the 100 wpm driving gear should mesh and fully engage its driven gear.

TO ADJUST: Reposition guide plate, with mounting screws loosened.

* Note: Shift gears only while motor is off.

7.3 Timing Belt

REQUIREMENT: The belt should have some play, not more than 1/16" when tested at the middle.

TO ADJUST: Reposition gear assembly with mounting screws loosened.

8. NON-INTERFERING BLANK TAPE FEED OUT ADJUSTMENTS

8.1 Spring Tensions

Armature lock lever	1 2 to 1-1 2 oz.
Armature	7 to 8 oz.
Drive arm	3 to 5 oz.
Feed out pawl	1 2 to 2 oz.
Inner ratchet check pawl	1 2 to 1-1 2 oz.
Latch arm	1-1 2 to 2-1 2 oz.
Metering feed pawl	2 to 3 oz.
Outer ratchet check pawl	4 to 5 oz.
Outer ratchet return	2 to 3 oz.
Release arm latch	1-1 2 to 2-1 2 oz.
Release arm	10 to 15 oz.
Switch lever	3 to 6 oz.

8.2 Drive Arm Shaft Rear Bearing

REQUIREMENT: The drive arm shaft should move freely without binding.

TO ADJUST: Reposition rear bearing with its two mounting screws loosened.

8.3 Drive Arm

REQUIREMENT: The drive arm should fully engage the release arm and should not engage the function cam.

TO ADJUST: Reposition drive arm with its clamp screw loosened.

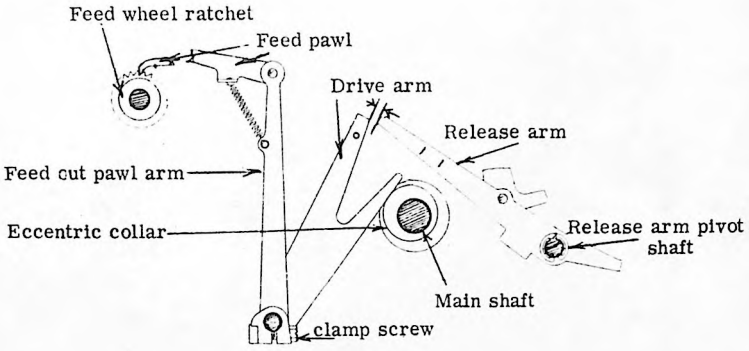


Figure 17

8.4 Release Arm

REQUIREMENT: With drive arm on the peak of eccentric collar, there should be a .005" to .010" clearance between the release arm and drive arm.

TO ADJUST: Reposition release arm pivot shaft in its elongated hole with its lock nut loosened.

8.5 Feed Out Pawl

REQUIREMENT: With power on, allow tape feed out to be terminated by the reception of any impulse; the feed hole should align with perforated code holes.

TO ADJUST: With power off, feed out mechanism operated, main shaft rotated until drive arm on peak of eccentric follower and detent roller between teeth of ratchet. Reposition feed out pawl against first tooth to the left of vertical centre of ratchet with clamp screw friction tight, and rotate main shaft until feed out pawl is returned .020" to .030" from tooth. Reposition feed out pawl against tooth and tighten clamp screw.

8.6 Armature Bail Hinge

REQUIREMENT: With armature operated, the armature should be flush with magnet core and there should be some clearance not more than .003" between armature and magnet mounting bracket.

TO ADJUST: Reposition hinge with mounting screw and armature spring post loosened.

8.7 Magnet Mounting Bracket

REQUIREMENT: With tape feed out mechanism unoperated, move armature bail against lock lever roller; there should be a .030" to .025" clearance between antifreeze strip and magnet core.

TO ADJUST: Reposition magnet bracket by its pry-points with its mounting screws loosened.

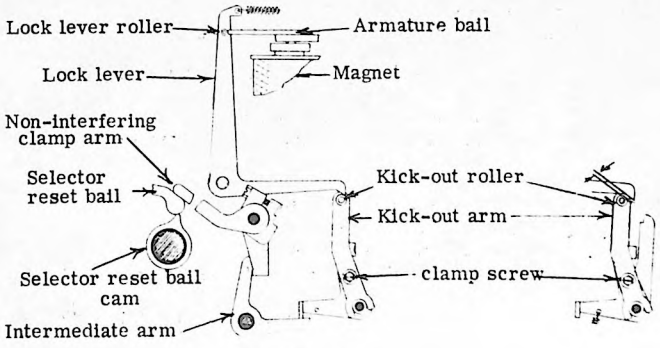


Figure 18

8.8 Release Arm Latch

REQUIREMENT: With kick-out roller positioned away from lock

8.8 REQUIREMENT: lever and armature operated. there should be some clearance,not more than .005" between release arm and release arm latch (see Figure 19).

TO ADJUST: Reposition release arm latch shaft in its elongated hole with its lock nut loosened.

8.9 Inner Ratchet Check Pawl

REQUIREMENT: With feed out operated but drive arm unlatched. position a deep notch of both ratchets opposite inner ratchet check pawl; there should be a .005" to .015" clearance between check pawl and ratchet tooth

TO ADJUST: Reposition check pawl mounting plate with its two mounting screws loosened.

8.10 Non-Interfering Clamp Arm (Figure 18)

REQUIREMENT: With selector reset bail on peak of its cam. there should be a .002" to .015" clearance between release arm and release arm latch. Also. the clamp arm should have some side play.not more than .006".

TO ADJUST: Reposition clamp arm with its clamp screw loosened.

8.11 Kick-Out Arm (Figure 18)

(1) REQUIREMENT: With selector reset bail on peak of its cam. there should be some clearance between kick-out roller and lock lever.

(2) REQUIREMENT: With feed out magnet energized. the lock lever roller should disengage from armature bail before the selector reset bail reaches the peak of cam.

TO ADJUST: Reposition kick-out arm with its clamp screw loosened.

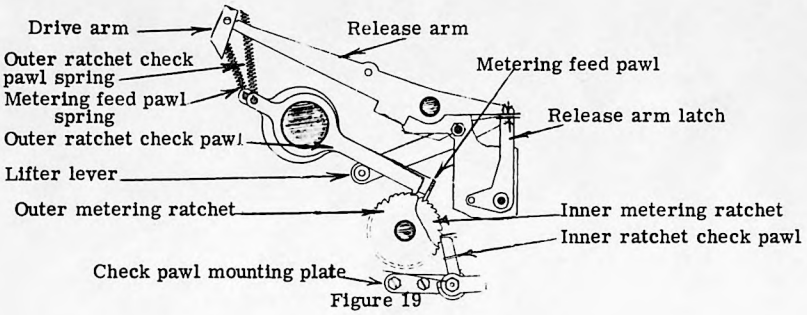


Figure 19

8.12 Tape Length Adjusting Plate

REQUIREMENT: Reposition adjusting plate with its spring post loosened to have desired length of tape (maximum 17") feed out. After feed out is operated and ratchet is rotated so that the next advance of feed pawl will terminate feed out operation, there should be some clearance — not more than .020" between the adjusting plate and latch arm.

TO ADJUST: Reposition adjusting plate.

9. SELECTOR ADJUSTMENTS (See M28 Selector section)

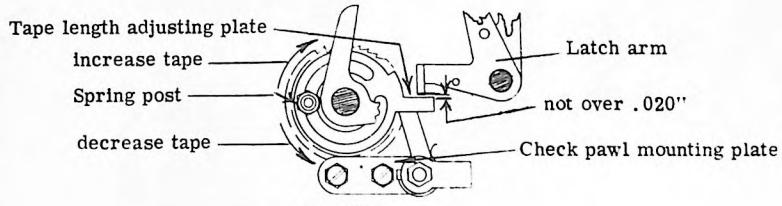


Figure 20

CN TELECOMMUNICATIONS
ENGINEERING DEPARTMENT

PLANT MANUAL BK2.6.6
ISSUE 1
AUGUST, 1964

MODEL 28 PERFORATOR TRANSMITTER (LPE)

ADJUSTMENTS

CONTENTS

1. SPRING TENSIONS

* Place Control Knob in K-T position, unless otherwise indicated.

Clutch shoe lever	16 to 22 oz.
Clutch shoe	3 to 5 oz.
Clutch trip bar link return	3 to 4 oz.
Code bar extension	4 to 5 oz.
Code bar extension bail	7 to 10 oz.
Detent lever	7 to 10 oz.
Feed pawl	3 to 4-1 2 oz.
Function clutch latch lever	12 to 15 oz.
Function clutch release	5 to 8 oz.
Keyboard control cam detent	4 to 5 lbs.
Keyboard control cam follower	3 to 5 oz.
Keyboard control contacts	1 to 2 oz.
Keyboard control reset lever	3 to 5 oz.
Main trip lever	1-1 2 to 3 oz.
Punch pin retractor	4 to 5 lbs.

1.	Punch slide	2-1 4 to 3-1 4 oz.
	Punch slide latch	3 4 to 2 oz.
	Reset follower lever	12 to 18 oz.
	Reset cam follower	3 to 5 oz.
	Tape chute guide	1 2 to 1 oz.
	Tape shoe torsion	13 to 18 oz.
	Tape depressor slide	1-1 2 to 2-1 2 oz.

2. KEYBOARD ADJUSTMENTS (see M28 Keyboard section BK2.6.2)

3. CLUTCH RELEASE AND RESET ADJUSTMENTS

3.1 Clutch Shoe Lever

REQUIREMENT: With the clutch engaged, the clearance between the shoe lever and stop lug should be .050" to 080" greater than when the clutch is engaged.

TO ADJUST: Reposition clutch disk with its clamp screws loosened.

3.2 Clutch Drum End Play

REQUIREMENT: The cam sleeve should have some end play not more than .010", with the clutch fully disengaged.

TO ADJUST: Reposition collar with its mounting screw loosened.

3.3 Rocker Bail Lower Roller

REQUIREMENT: With the rocker bail in its extreme left position, the function cam should have some play not more than .003" between the upper and lower rollers.

TO ADJUST: Repos ition the lower roller in its elongated hole with its lock nut loosened.

3.4 Rocker Bail Guide Bracket

REQUIREMENT: The clearance between the following should be at least .010":

3.4 REQUIREMENT: (1) Upper roller and reset pins.
(2) Lower roller screw head and front cam.
(3) Rocker bail and rear rocker cam.

TO ADJUST: Reposition rocker bail with its mounting screws loosened.

3.5 Function Clutch Trip Lever

REQUIREMENT: The trip lever should have some end play, not more than .006" and should engage the full thickness of shoe lever when clutch is disengaged.

TO ADJUST: Reposition trip lever with its clamp screw loosened.

3.6 Reset Arm

REQUIREMENT: With the reset arm in its highest position there should be a .005" to .025" clearance between the clutch release and the main trip lever and should have some end play, not more than .010".

TO ADJUST: Reposition reset arm with its clamp screw loosened.

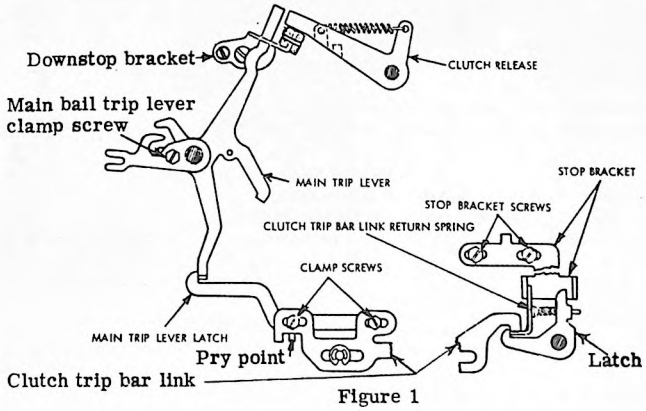


Figure 1

3.7 Release Downstop Bracket

REQUIREMENT: When the reset arm reaches its lowest travel, it should just touch the felt oiler on the shaft.

TO ADJUST: Reposition the release downstop bracket with its mounting screw loosened.

3.8 Perforator Alignment

(1) REQUIREMENT: There should be a .010" to .020" clearance between the punch slide latches and the code bar extensions which should be centrally located with all clutches disengaged.

(2) REQUIREMENT: The cam follower roller should extend approximately .030" beyond the rear edge of the reset cam.

TO ADJUST: Reposition the alignment bracket with the couplings disengaged and two alignment and four perforator mounting screws loosened. If necessary, refine code bar extension line-up by adjusting the code bar extension guide bracket mounting screw to its mid-point.

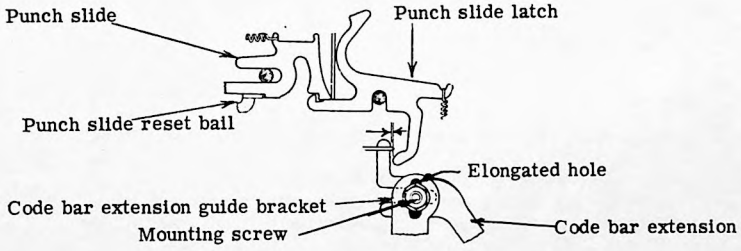


Figure 2

3.9 Code Bar Extension and Punch Slide Latch

REQUIREMENT: Place control knob to tape, with letters selected

3.9 REQUIREMENT: all punch slides should release; with blank selected there should be some clearance,not more than .006" between code bar extensions and closest punch slide latch.

TO ADJUST: Reposition code bar extension guide vertically with its lock nut loosened.

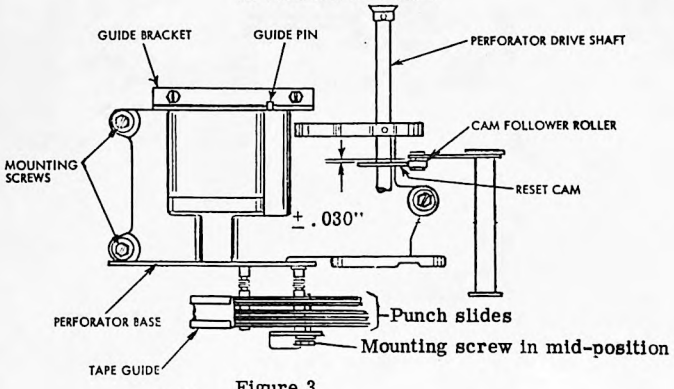


Figure 3

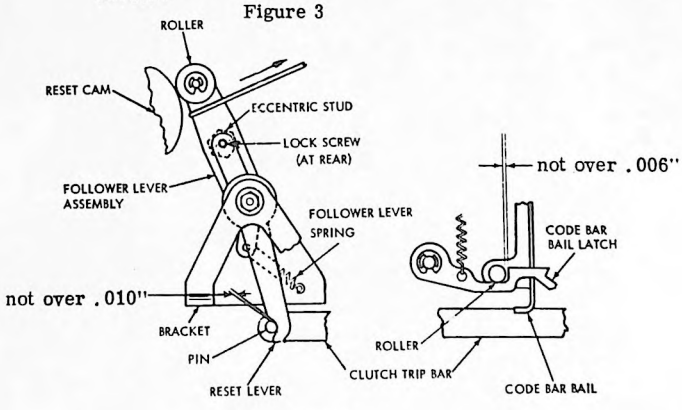


Figure 4

3.10 Reset Lever

REQUIREMENT: Place control knob in the T position, select any keylever and rotate shaft until the code bar bail is in the extreme left position; there should be some clearance not more than .010" between the code bar bail roller and its latch.

TO ADJUST: Reposition the reset lever eccentric stud with its clamp screw loosened.

3.11 Main Trip Lever (Figure 1)

REQUIREMENT: Clutch disengaged, punch reset bail in its highest position, the left surface of the trip lever should be flush with the left end of the clutch release.

TO ADJUST: Reposition the trip lever with its clamp screw loosened and the main trip latch lever positioned away.

3.12 Perforator Clutch Release Trip (Figure 1)

REQUIREMENT: Perforator clutch should not fail to operate when a repeated blank is selected, while the control knob is in the T and K - T position. There should also be a clearance of .015" to .025" between the main trip lever and clutch release when the clutch is just tripped.

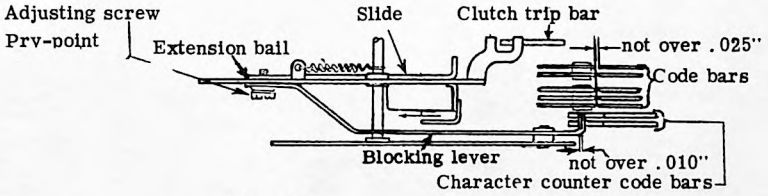


Figure 5

3.12 TO ADJUST: Move the main trip lever latch to the extreme left with its clamp screws loosened, select the blank keylever and move stop bracket with its clamp screws loosened to the extreme right. Move clutch trip bar link to the right until it latches. Position main trip lever latch to the right to obtain the above clearance. Recheck requirement.

3.13 Code Bar Extension Blocking Assembly

REQUIREMENT: Place control knob to K. There should be some clearance, not more than .025" between the ends of the code bars and the code bar extensions and there should be some clearances, not more than .010", between the blocking lever and the left side of the notch in the character counter code bars.

TO ADJUST: Select letters, rotate shaft until code bars are in their extreme left hand position. Reposition the extension bail by its pry points with its adjusting screw loosened to meet the code bar extension clearance and reposition the blocking lever to meet the latter requirement.

4. PERFORATOR ADJUSTMENTS

4.1 Punch Position

REQUIREMENT: The punch mounting screws should be centrally located in their elongated holes and the punch slide latches shall be horizontal when engaged by the punch slides.

TO ADJUST: All clutch disengaged, remove the rear plate mounting screw of the punch mechanism, and reposition punch mechanism with remaining mounting screws loosened.

4.2 Rocker Arm

REQUIREMENT: With rocker bail upper roller on the peak of its cam, place a 159926 gauge on the toggle shaft as shown in Figure 6, there should be the following

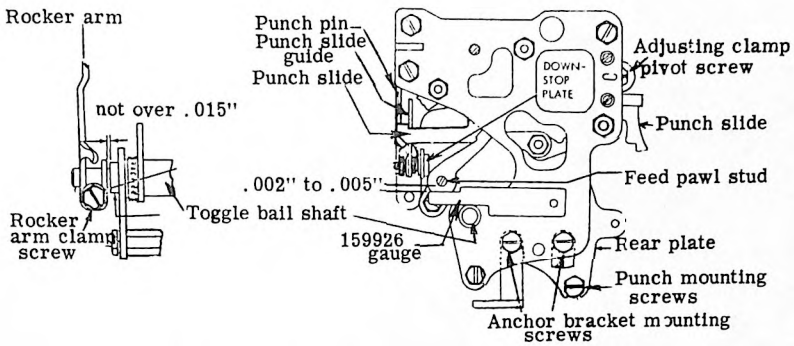


Figure 6

4.2 REQUIREMENT: clearances:

(1) .002" to .005" between the upper surface of 159926 gauge and the feed pawl stud.
(2) at least .002" end play in rocker arm shaft.
(3) at least .015" clearance between the rocker arm and bearing hub.

TO ADJUST: Select blank, remove punch slide guide and loosen downstop studs (see Figure 7). Rotate shaft until rocker bail upper roller is on peak of its cam, reposition rocker arm with its clamp screw loosened. Readjust the punch slide guide and downstop studs as described in the succeeding adjustments.

* Any change in this adjustment will require the rechecking all perforating and feeding adjustments that follow.

4.3 Punch Slide Downstop Position

REQUIREMENT: Function clutch fully disengaged, punch slides positioned upwards until blocked; there should be some clearance, not more than .008", between the

4.3 REQUIREMENT: punch slides and their downstop.

TO ADJUST: Loosen the punch slide guide mounting screws and downstop plate mounting studs and reposition the downstop.

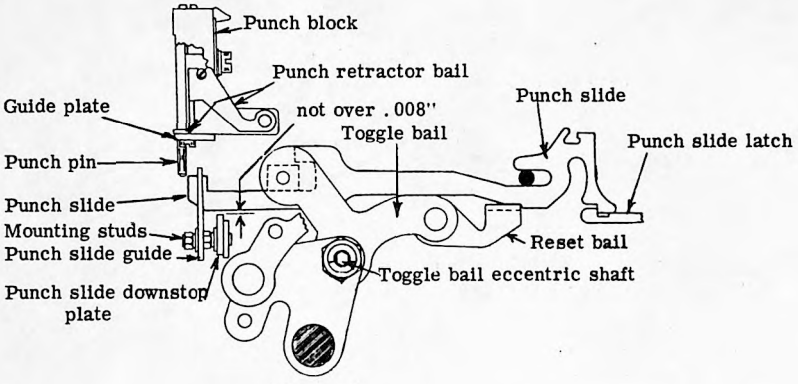


Figure 7

4.4 Punch Slide Guide Position

REQUIREMENT: With letters selected and the function clutch engaged, the punch slides should engage and align with its punch pins.

TO ADJUST: Reposition the punch slide guide with its mounting nuts.

4.5 Punch Pin Penetration

REQUIREMENT: With letters selected and shaft rotated until punch pins reach their highest travel, there should be a .060" to .070" clearance between the punch retractor bail and the upper surface of the guide plate.

4.5 TO ADJUST: Reposition the toggle bail eccentric shaft with its lock nut loosened (keep eccentric to its left extremity).

4.6 Punch Slide Reset Bail

REQUIREMENT: Blank selected and shaft rotated until all clutches disengaged, there should be a .015" to .025" clearance between the punch slides and the closest latch.

TO ADJUST: Reposition the reset bail eccentric shaft with its lock nut loosened (keep eccentric to its left extremity).

5. FEED ADJUSTMENTS

5.1 Feed Pawl

REQUIREMENT: All clutches disengaged and detent roller in contact with the ratchet wheel, the feed pawl should engage the first tooth below the horizontal centre of the ratchet with no perceptible clearance.

TO ADJUST: Reposition the feed pawl eccentric with its clamp screw loosened (keep eccentric to its right extremity).

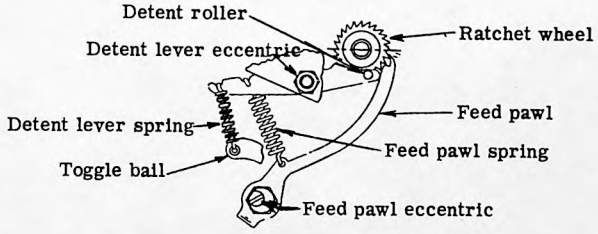


Figure 8

5.2 Feed Hole Spacing

REQUIREMENT: With the tape removed, there should be a .002" to .004" clearance between the feed wheel and die wheel. The tape should conform to 10 holes to the inch, check same with a 2215 or 156011 tape gauge.

TO ADJUST: Reposition the die wheel eccentric with its lock nut loosened (keep eccentric to its lower extremity).

5.3 Detent Lever

REQUIREMENT: The feed hole should align centrally to the code holes. Check with a 156011 tape gauge if available.

TO ADJUST: Reposition the detent eccentric with its clamp screw loosened, keep indentation approximately perpendicular to feed pawl.

5.4 Feed Hole Lateral Alignment

REQUIREMENT: Letters combinations should be centrally perforated on the tape.

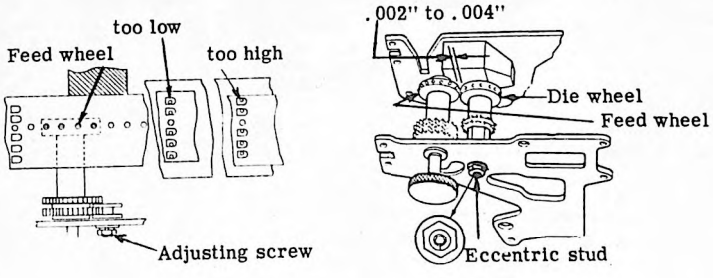


Figure 9

5.4 TO ADJUST: Reposition the feed wheel adjusting screw with its lock nut loosened. If a 156011 tape gauge is available, the tape should conform to the gauge.

5.5 Tape Guide

REQUIREMENT: With the tape guide adjusting plate resting against its backstop there should be a .002" to .006" clearance between the tape guide and the tape in the tape chute.

TO ADJUST: Reposition adjusting plate with its clamp screw loosened.

6. BACKSPACE ADJUSTMENTS

6.1 Rake

REQUIREMENT: With the rake held in the operated position there should be a .008" to .010" clearance between the rake teeth and tape slot in the punch block.

TO ADJUST: With the bell crank fully operated, reposition the rake's front and rear plates with their four mounting screws loosened.

6.2 Backspacing Feed Pawl Adjusting Plate

REQUIREMENT: When bell crank is operated, the feed pawl should clear the first tooth of the feed wheel by .004" to .020".

TO ADJUST: Reposition the adjusting plate with its mounting screws loosened.

6.3 Return Latch

REQUIREMENT: With the backspace unoperated, there should be a .004" to .020" clearance between the return latch and backspacing feed pawl extension.

TO ADJUST: Reposition the return latch eccentric with its clamp screw loosened.

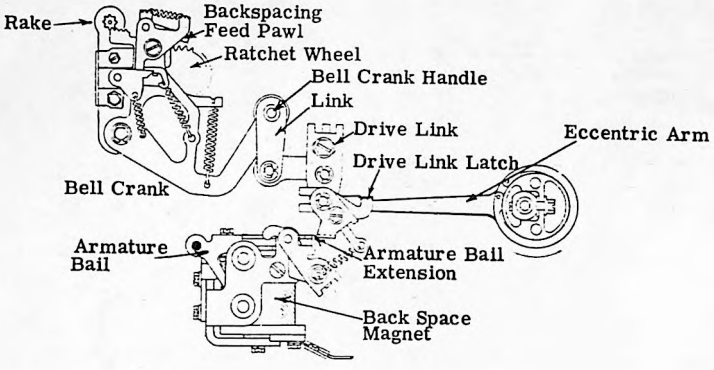


Figure 10

6.4 Bell Crank Handle Eccentric

REQUIREMENT: With the backspacing feed pawl in the fully operated position, there should be some clearance,not more than .003",between the feed pawl and a ratchet tooth.

TO ADJUST: Reposition the eccentric with its lock nut loosened.

6.5 Armature Hinge

REQUIREMENT: The armature should be flush on the pole piece when operated.

TO ADJUST: Reposition armature hinge with its mounting screws loosened.

* Check the above only after disassembly.

6.6 Armature Upstop

REQUIREMENT: With the armature unoperated, there should be a .025" to .030" clearance between the armature and the pole piece at the point of minimum clearance.

6.6 TO ADJUST: Reposition the upstop eccentric with its lock nut loosened (keep eccentric to its left extremity).

6.7 Drive Link Latch

REQUIREMENT: With the armature unoperated and the drive link latch against the end of the armature bail extension, there should be a .005" to .025" clearance between the drive link latch and the eccentric arm at the point of minimum clearance.

TO ADJUST: Reposition latch with its clamp screw loosened.

6.8 Non-Repeat Arm

REQUIREMENT: Backspace mechanism unoperated, there should be a .002" to .010" clearance between the top surface of the non-repeat arm and the lowest point of the drive link latch.

TO ADJUST: Reposition the non-repeat adjusting arm with its clamp screw loosened.

SPRING TENSION
(in ounces)

Armature bail	10 to 16
Backspacing feed pawl	1-3/4 to 3-3/4
Non-repeat arm	3/4 to 1-1/4
Return Latch	2-1/2 to 3-1/2

7. CHARACTER COUNTER ADJUSTMENTS

7.1 Character Counter End-of-Line Switch

REQUIREMENT: The contact gap should be .012" to .025" when the contacts are on the low part of its cam. The contacts should close on the sixty fifth combination.

TO ADJUST: Reposition the contact bracket with its mounting screws loosened for the contact gap. Reposition the cam with its clamp screws loosened for the

7.1 TO ADJUST: correct contact closure.

7.2 Character Counter Scale Bracket

REQUIREMENT: Indicator should rest lightly on the bracket for its full travel.

TO ADJUST: Reposition bracket with its clamp screws loosened.

7.3 Character Counter Idler Pulley

REQUIREMENT: The pulley should be adjusted so that the indicator cord does not sag.

7.4 Stop Lever

REQUIREMENT: With the counter returned, there should be a .002" to .010" clearance between the latch lever and the face of the fourth tooth on the ratchet.

TO ADJUST: Reposition the stop lever eccentric with the feed lever held away from the ratchet.

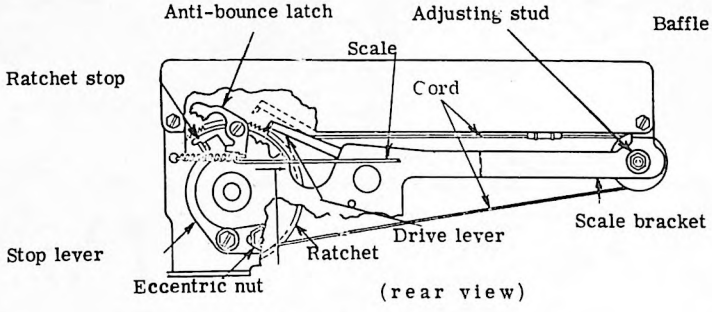


Figure 11

7.5 Character Counter

REQUIREMENT: With counter returned, the indicator should point to zero.

TO ADJUST: Reposition counter scale with its clamp screws loosened.

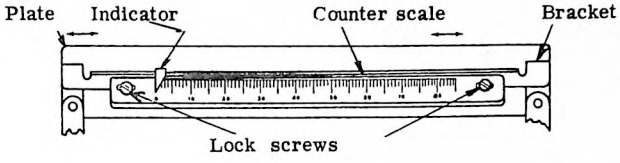


Figure 12

7.6 Character Counter Stroke

REQUIREMENT: The counter should operate without failure when a character is repeated, with the control knob in T and K-T, and should restart correctly after carriage return is selected.

TO ADJUST: Reposition the character counter frame with its mounting screws loosened, until all the above conditions are met.

SPRING TENSIONS
(in ounces)

Anti-bounce latch	3 4 to 1-1 2
Drive lever	1 2 to 1
Latch lever	1 2 to 1
Ratchet drum assembly return:	
(indicator at zero)	1-1 2 to 2-1 2
(indicator at 70)	3-1 2 to 6-1 2
Reset lever extension	3 4 to 1-1 4

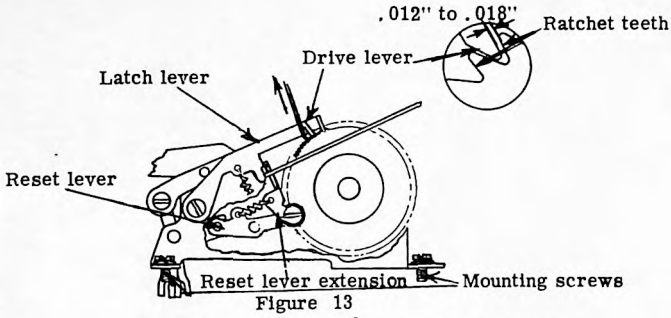


Figure 13

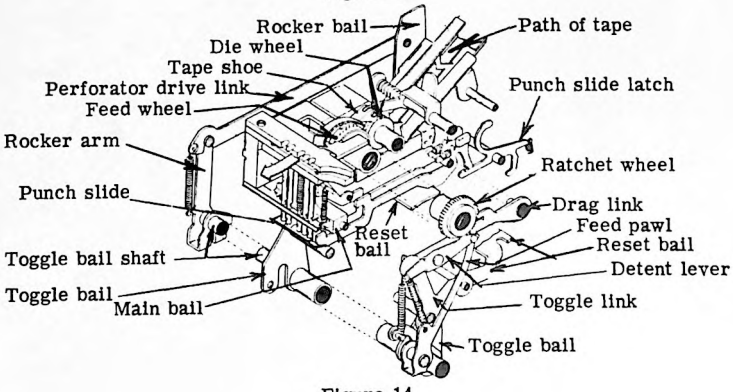


Figure 14

TELECOMMUNICATIONS
ENGINEERING DEPARTMENT

PLANT MANUAL BK2.6.7
SUB-SECTION 1, ISSUE 1
MARCH, 1965

MODEL 28 RECEIVING SELECTOR SET (LRS)

CONTENTS

CN TELECOMMUNICATIONS ENGINEERING DEPARTMENT

PLANT MANUAL BK2.6.7
SUB-SECTION 5, ISSUE 1
MARCH, 1965

MODEL 28 RECEIVING SELECTOR SET (LRS)

ADJUSTMENTS

CONTENTS

1. REFERENCES

1.1 Teletype Corporation Technical Manual, Bulletin 276B.

2. GENERAL

2.1 The illustrations contained in this section are viewed from the front of the equipment, unless otherwise specified. In the line drawings, fixed pivot points are shown by solid black circles and movable points are shown in cross-hatched circles. References in the test to left, right, front, or rear apply to the unit in its normal operating position when viewed from a point in front of the selector clutch assembly.

.2 A complete adjusting procedure should be read before making the adjustment or checking the spring tension. The adjustments are arranged in a sequence that should be followed if a complete readjustment of the unit were undertaken.

.3 The spring tensions should be measured with Teletype scales in the positions shown in the drawings. Springs which do not meet the requirements, and for which there are no adjusting procedures, should be discarded and replaced by new springs.

.4 When rotating the drive shaft gear by hand, rotation is counterclockwise as viewed from a position in front of the selector clutch.

2.5 When the requirement calls for a clutch to be *DISENGAGED*, the clutch shoe lever must be fully latched between its trip lever and latch lever so that the clutch shoes release their tension on the clutch drum. When *ENGAGED*, the clutch shoe lever is unlatched and the clutch shoes are wedged firmly against the clutch drum.

NOTE: When rotating the main shaft by hand, the function or selector clutch may not fully disengage upon reaching its stop position. To disengage the clutch, rotate it to its stop position, apply a screwdriver to the cam disk stop lug and move the disk in the normal direction of shaft rotation until the latch lever seats in its notch in the disk.

.6 If parts are removed, all adjustments which the removal of parts might facilitate should be made before the parts are replaced. When a part mounted on shims is removed, the number of shims at each mounting screw should be noted so that the identical shim pile-up can be made when the part is remounted. Unless stated otherwise, all nuts and screws that were loosened should be tightened after an adjustment has been made.

.7 The cover may be removed for inspection and minor repair of the components. However, when more extensive maintenance is to be undertaken, it is recommended that the unit be removed from its operating location and the power disconnected.

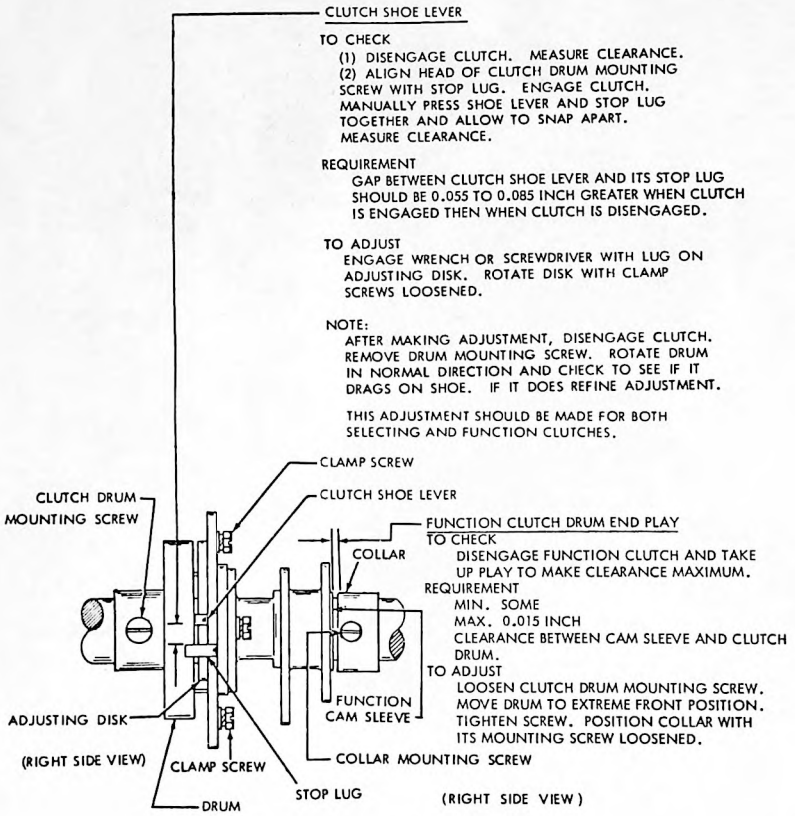
.8 All contact points should meet squarely. Contacts with the same diameter should not be out of alignment more than 25% of the contact diameter. Avoid sharp kinks or bends in the contact springs.

CAUTION

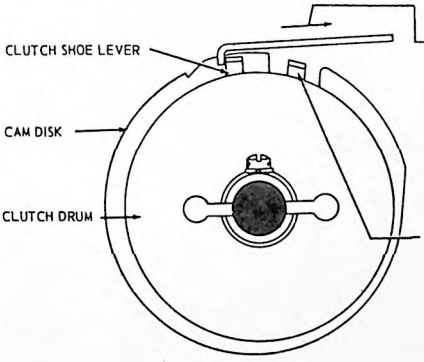
Improperly adjusted equipment may be seriously damaged in a matter of seconds if operated under power.

3. ADJUSTMENTS AND SPRING TENSIONS

3.1 Receiving Selector



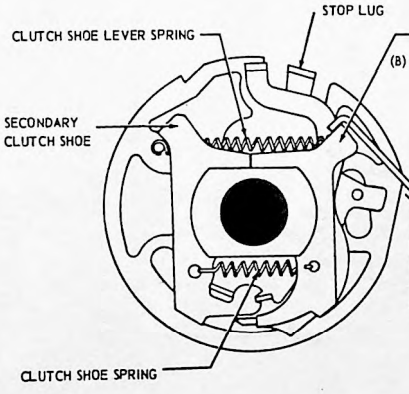
NOTE:
THESE SPRING TENSIONS APPLY TO BOTH CLUTCHES.



(A)
CLUTCH SHOE LEVER SPRING

TO CHECK
ENGAGE CLUTCH. HOLD CAM DISK TO PREVENT ITS TURNING.

REQUIREMENT
MIN. 15 OZS.
MAX. 20 OZS.
TO PULL SHOE LEVER IN CONTACT WITH STOP LUG.



(B) CLUTCH SHOE SPRING

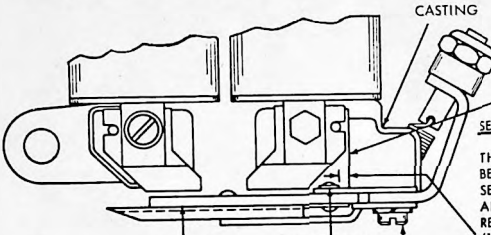
NOTE:
IN ORDER TO CHECK THIS SPRING TENSION, IT IS NECESSARY TO REMOVE THE CLUTCH FROM THE MAIN SHAFT. THEREFORE, IT SHOULD NOT BE CHECKED UNLESS THERE IS REASON TO BELIEVE IT WILL NOT MEET ITS REQUIREMENT.

TO CHECK
REMOVE CLUTCH FROM DRUM.

REQUIREMENT
MIN. 3 OZS.
MAX. 5 OZS.
TO START PRIMARY SHOE MOVING.

NOTE

TO FACILITATE MAKING THE FOLLOWING ADJUSTMENTS, REMOVE THE RANGE FINDER AND SELECTOR MAGNET ASSEMBLIES. TO INSURE BETTER OPERATION, PULL A PIECE OF KS BOND PAPER BETWEEN THE ARMATURE AND THE POLE PIECES TO REMOVE ANY OIL OR FOREIGN MATTER THAT MAY BE PRESENT. MAKE CERTAIN THAT NO LINT OR PIECES OF PAPER REMAIN BETWEEN THE POLE PIECES AND ARMATURE.

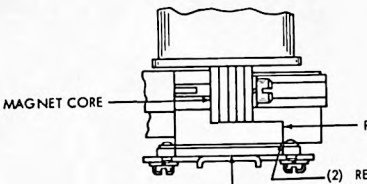


SELECTOR ARMATURE

NOTE

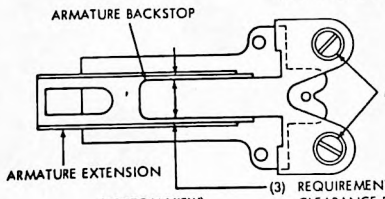
THIS REQUIREMENT NEED NOT BE MADE NOR CHECKED IF THE SELECTOR MAGNET BRACKET AND RECEIVING MARGIN REQUIREMENTS ARE MET.

(1) REQUIREMENT (ARMATURE CLAMP STRIP) CLEARANCE BETWEEN ARMATURE CLAMP STRIP AND CASTING.
MIN. 0.025 INCH
MAX. 0.045 INCH



(LEFT SIDE VIEW)

(2) REQUIREMENT (ARMATURE ALIGNMENT) FRONT EDGE OF ARMATURE SHOULD BE FLUSH WITHIN 0.015 INCH WITH FRONT EDGE OF POLE PIECES.



(BOTTOM VIEW)

(3) REQUIREMENT (ARMATURE BACKSTOP ALIGNMENT) CLEARANCE BETWEEN SIDES OF BACKSTOP AND SIDES OF ARMATURE EXTENSION.
MIN. 0.010 INCH

TO ADJUST

1. POSITION ARMATURE SPRING ADJUSTING NUT TO HOLD ARMATURE FIRMLY AGAINST PIVOT EDGE OF CASTING.
2. POSITION ARMATURE AND BACKSTOP WITH MOUNTING SCREWS LOOSENED.

SELECTOR ARMATURE DOWNSTOP BRACKET

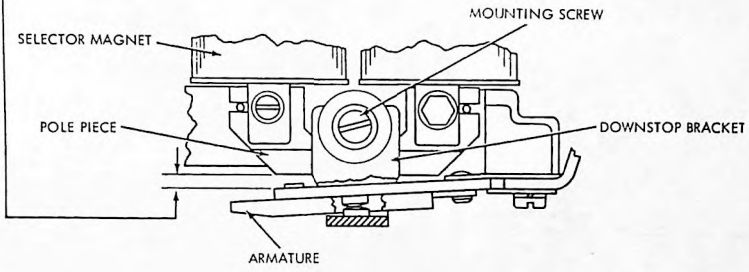
REQUIREMENT

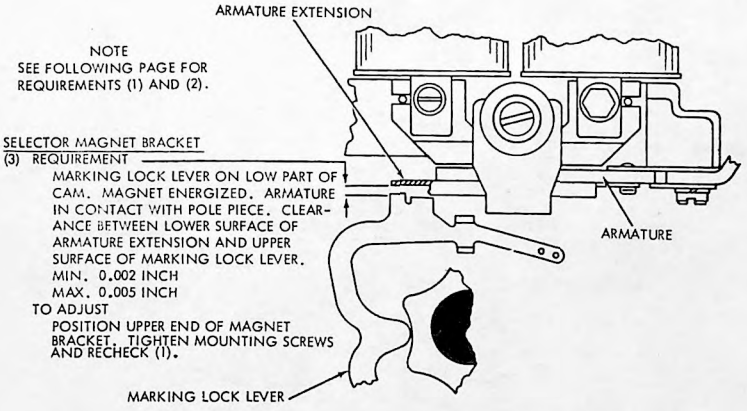
REMOVE OIL SHIELD. WITH MAGNET DE-ENERGIZED, LOCK LEVERS ON HIGH PART OF THEIR CAM, AND ARMATURE RESTING AGAINST ITS DOWNSTOP, CLEARANCE BETWEEN END OF ARMATURE AND LEFT EDGE OF LEFT POLE PIECE.

MIN. 0.025 INCH
MAX. 0.030 INCH

TO ADJUST

POSITION DOWNSTOP BRACKET WITH MOUNTING SCREW LOOSENED. REPLACE OIL SHIELD AND CHECK OIL SHIELD ADJUSTMENT, FIGURE 3-6.





SELECTOR MAGNET BRACKET

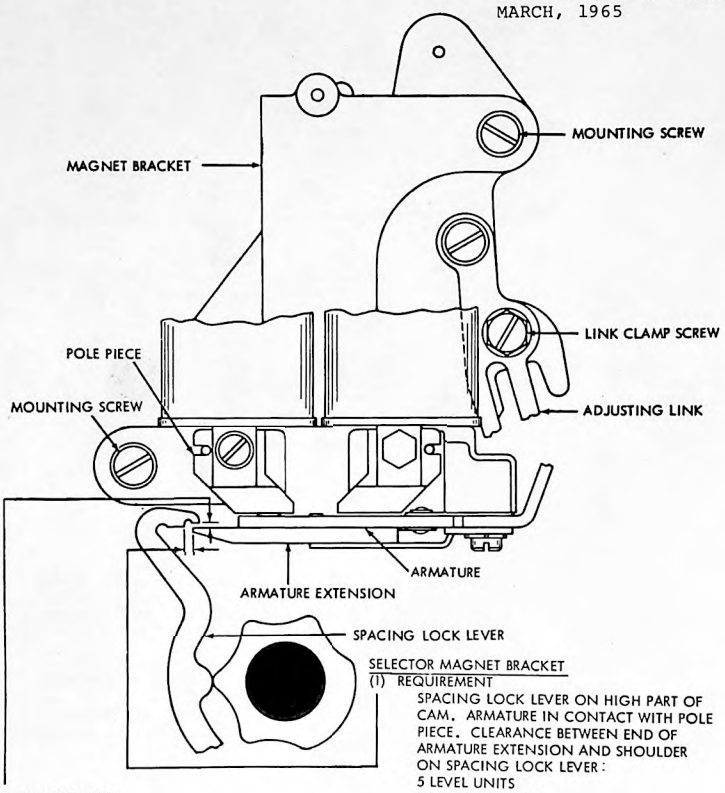
(3) REQUIREMENT

MARKING LOCK LEVER ON LOW PART OF CAM. MAGNET ENERGIZED. ARMATURE IN CONTACT WITH POLE PIECE. CLEARANCE BETWEEN LOWER SURFACE OF ARMATURE EXTENSION AND UPPER SURFACE OF MARKING LOCK LEVER.

MIN. 0.002 INCH
MAX. 0.005 INCH

TO ADJUST

POSITION UPPER END OF MAGNET BRACKET. TIGHTEN MOUNTING SCREWS AND RECHECK (1).



SELECTOR MAGNET BRACKET

(1) REQUIREMENT

SPACING LOCK LEVER ON HIGH PART OF CAM. ARMATURE IN CONTACT WITH POLE PIECE. CLEARANCE BETWEEN END OF ARMATURE EXTENSION AND SHOULDER ON SPACING LOCK LEVER:

5 LEVEL UNITS
MIN. 0.020 INCH
MAX. 0.035 INCH
8 LEVEL UNITS
MIN. 0.012 INCH
MAX. 0.030 INCH

TO ADJUST

LOOSEN TWO MAGNET BRACKET MOUNTING SCREWS AND ADJUSTING LINK CLAMP SCREW. POSITION MAGNET BRACKET BY MEANS OF ADJUSTING LINK AND TIGHTEN LINK CLAMP SCREW ONLY.

(2) REQUIREMENT

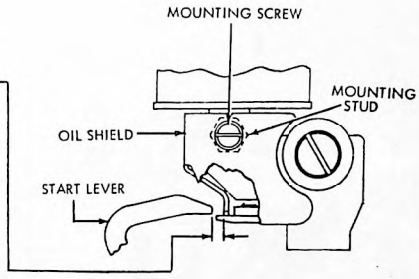
SPACING LOCK LEVER ON HIGH PART OF CAM. ARMATURE IN CONTACT WITH POLE PIECE. SOME CLEARANCE BETWEEN UPPER SURFACE OF ARMATURE EXTENSION AND LOWER SURFACE OF SPACING LOCK LEVER WHEN LOCK LEVER IS HELD DOWNWARD.
MAX. 0.003 INCH

TO ADJUST

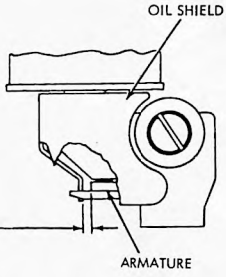
POSITION UPPER END OF MAGNET BRACKET. TIGHTEN TWO MAGNET BRACKET MOUNTING SCREWS. RECHECK REQUIREMENT (1).

NOTE

SEE PRECEDING PAGE FOR REQUIREMENT (3).

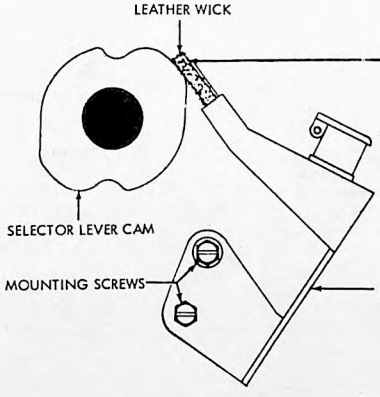


OIL SHIELD
REQUIREMENT
(1) MAGNET DE-ENERGIZED. STOP ARM BAIL FOLLOWER ON LOW PART OF ITS CAM. CLEARANCE BETWEEN START LEVER AND OIL SHIELD: MIN. 0.020 INCH



(2) MAGNET ENERGIZED STOP ARM BAIL FOLLOWER ON HIGH PART OF ITS CAM. CLEARANCE BETWEEN END OF ARMATURE AND OIL SHIELD: MIN. 0.010 INCH

TO ADJUST
POSITION SHIELD WITH MOUNTING SCREW LOOSENED. MAKE SURE OIL SHIELD MOUNTING STUD IS SECURE BEFORE MAKING ADJUSTMENT.



SELECTOR CAM LUBRICATOR
REQUIREMENT
HIGH PART OF SELECTOR LEVER CAMS SHOULD CONTACT LEATHER WICK BUT SHOULD NOT DEFLECT WICK MORE THAN 1/32 INCH GAUGED VISUALLY

TO ADJUST
WITH MOUNTING SCREWS FRICTION TIGHT, POSITION LUBRICATOR ASSEMBLY USING LOWER SCREW AS A PIVOT POINT.

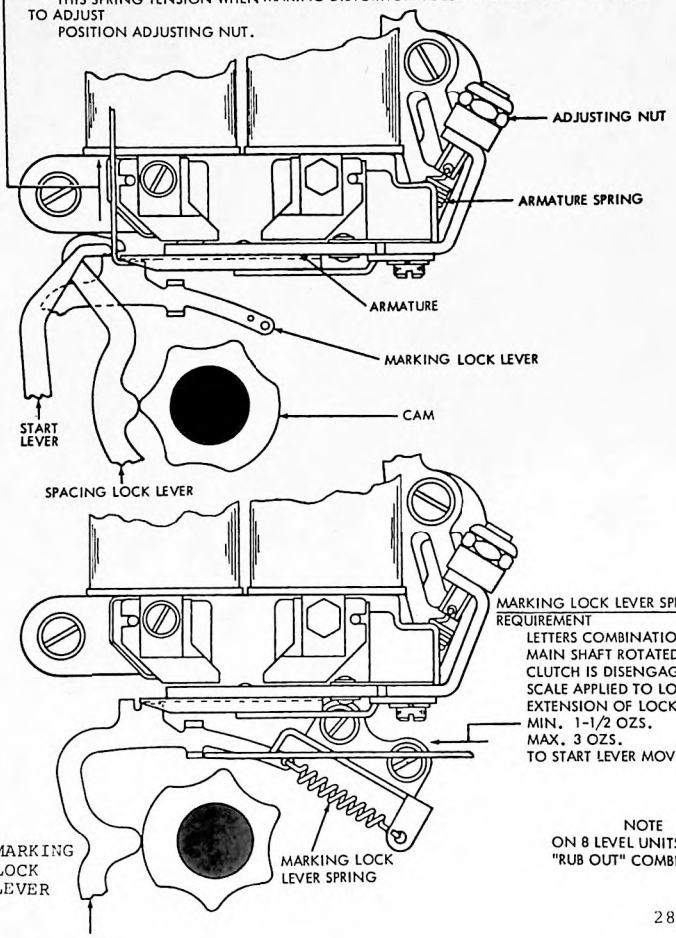
SELECTOR ARMATURE SPRING

REQUIREMENT

MARKING LOCK LEVER, SPACING LOCK LEVER, AND START LEVER ON HIGH PART OF THEIR CAMS. SCALE APPLIED AS NEARLY VERTICAL AS POSSIBLE UNDER END OF ARMATURE EXTENSION.
30 M.A. OPERATION - 1 1/2 OZS. TO 2 OZS.
60 M.A. OPERATION - 2 1/2 OZS. TO 3 OZS.
TO PULL ARMATURE TO MARKING POSITION, IT MAY BE NECESSARY TO READJUST THIS SPRING TENSION WHEN MAKING DISTORTION TOLERANCE TESTS OF THE UNIT.

TO ADJUST

POSITION ADJUSTING NUT.

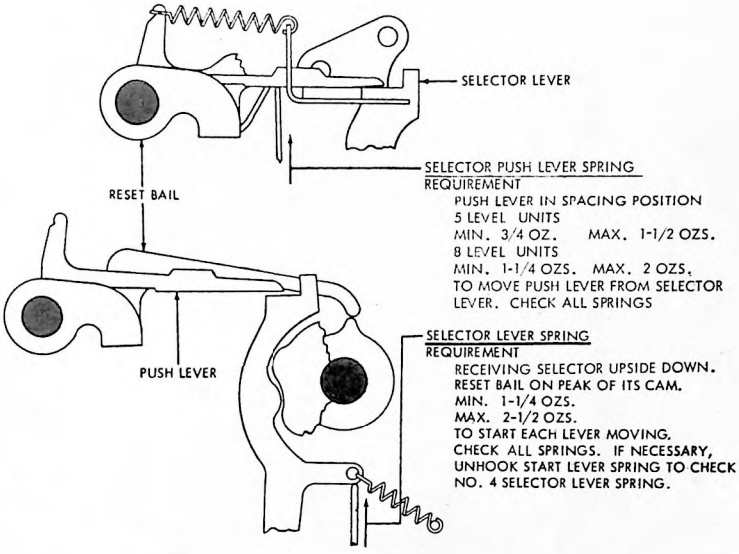


MARKING LOCK LEVER SPRING

REQUIREMENT

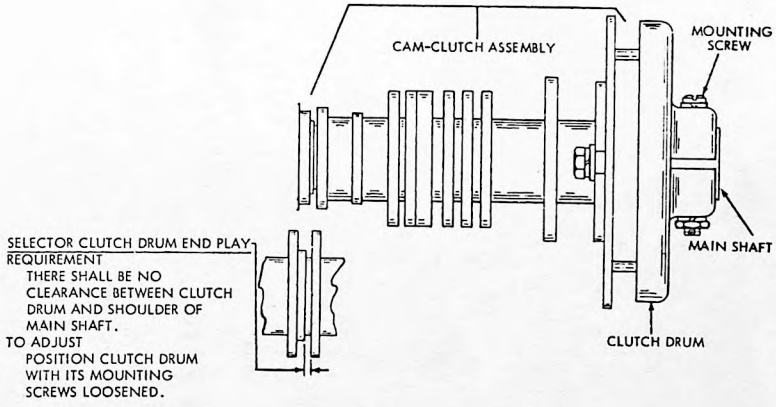
LETTERS COMBINATION SELECTED, MAIN SHAFT ROTATED UNTIL CLUTCH IS DISENGAGED. PUSH SCALE APPLIED TO LOWER EXTENSION OF LOCK LEVER.
MIN. 1-1/2 OZS.
MAX. 3 OZS.
TO START LEVER MOVING.

NOTE
ON 8 LEVEL UNITS, SELECT "RUB OUT" COMBINATION.

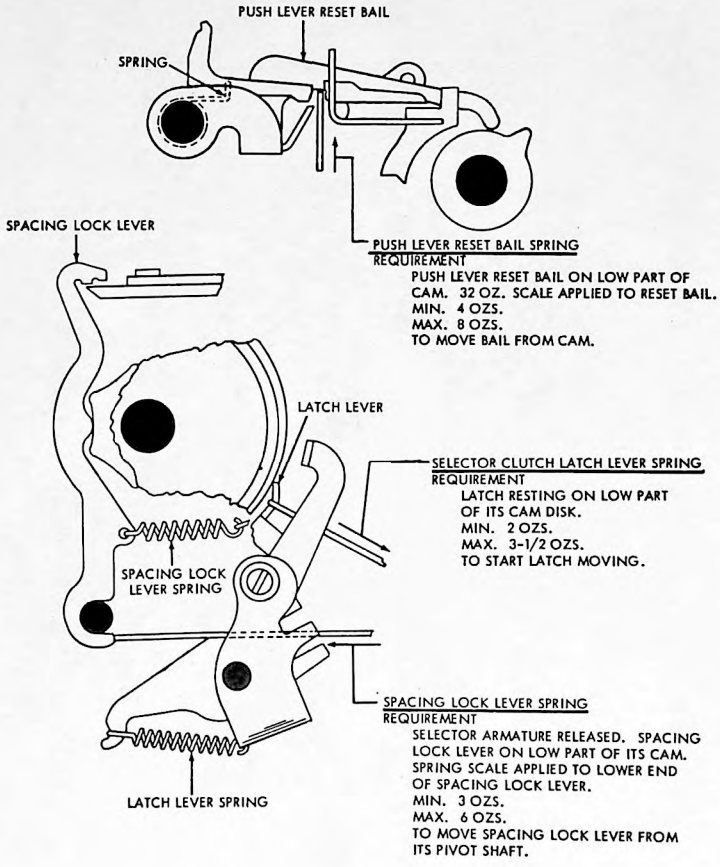


SELECTOR PUSH LEVER SPRING
REQUIREMENT
PUSH LEVER IN SPACING POSITION
5 LEVEL UNITS
MIN. 3/4 OZ. MAX. 1-1/2 OZS.
8 LEVEL UNITS
MIN. 1-1/4 OZS. MAX. 2 OZS.
TO MOVE PUSH LEVER FROM SELECTOR LEVER. CHECK ALL SPRINGS

SELECTOR LEVER SPRING
REQUIREMENT
RECEIVING SELECTOR UPSIDE DOWN. RESET BAIL ON PEAK OF ITS CAM.
MIN. 1-1/4 OZS.
MAX. 2-1/2 OZS.
TO START EACH LEVER MOVING.
CHECK ALL SPRINGS. IF NECESSARY, UNHOOK START LEVER SPRING TO CHECK NO. 4 SELECTOR LEVER SPRING.

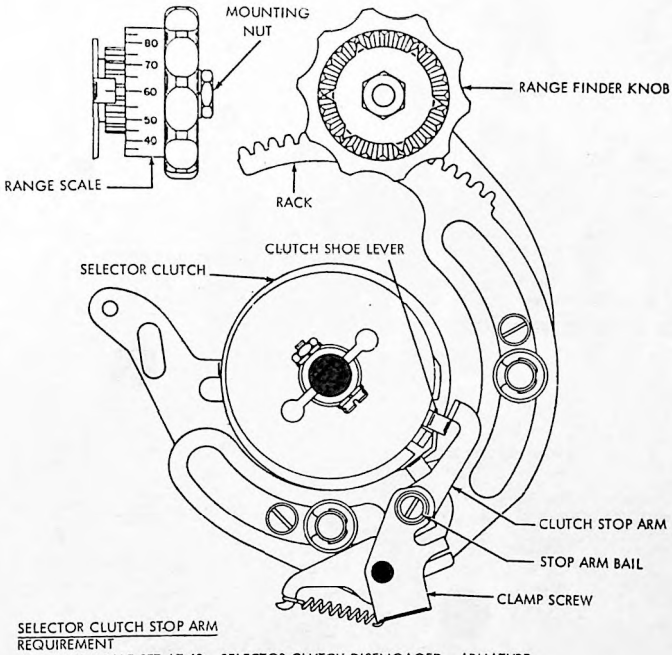


SELECTOR CLUTCH DRUM END PLAY
REQUIREMENT
THERE SHALL BE NO CLEARANCE BETWEEN CLUTCH DRUM AND SHOULDER OF MAIN SHAFT.
TO ADJUST
POSITION CLUTCH DRUM WITH ITS MOUNTING SCREWS LOOSENED.

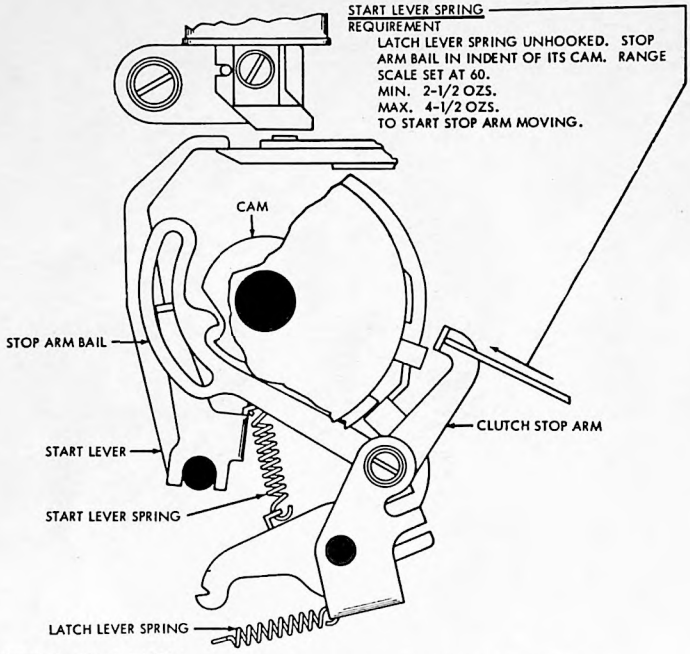

PUSH LEVER RESET BAIL
SPRING
SPACING LOCK LEVER
PUSH LEVER RESET BAIL SPRING
REQUIREMENT
PUSH LEVER RESET BAIL ON LOW PART OF CAM. 32 OZ. SCALE APPLIED TO RESET BAIL.
MIN. 4 OZS.
MAX. 8 OZS.
TO MOVE BAIL FROM CAM.
LATCH LEVER
SELECTOR CLUTCH LATCH LEVER SPRING
REQUIREMENT
LATCH RESTING ON LOW PART OF ITS CAM DISK.
MIN. 2 OZS.
MAX. 3-1/2 OZS.
TO START LATCH MOVING.
SPACING LOCK LEVER SPRING
SPACING LOCK LEVER SPRING
REQUIREMENT
SELECTOR ARMATURE RELEASED. SPACING LOCK LEVER ON LOW PART OF ITS CAM. SPRING SCALE APPLIED TO LOWER END OF SPACING LOCK LEVER.
MIN. 3 OZS.
MAX. 6 OZS.
TO MOVE SPACING LOCK LEVER FROM ITS PIVOT SHAFT.
LATCH LEVER SPRING

NOTE: REPLACE RANGE FINDER AND SELECTOR MAGNET ASSEMBLY.

RANGE FINDER KNOB PHASING
REQUIREMENT
WITH RANGE FINDER KNOB TURNED TO EITHER END OF RACK, ZERO MARK ON SCALE FOR:
5 LEVEL UNIT SHOULD BE WITHIN + 3 POINTS OF SCRIBED LINE ON RANGE FINDER PLATE.
8 LEVEL UNIT SHOULD BE IN LINE WITH SCRIBED LINE ON RANGE FINDER PLATE.
TO ADJUST
REMOVE MOUNTING NUT, DISENGAGE KNOB FROM RACK AND POSITION KNOB.
RE-ENGAGE KNOB WITH RACK AND REPLACE MOUNTING NUT.



SELECTOR CLUTCH STOP ARM
REQUIREMENT
RANGE SCALE SET AT 60. SELECTOR CLUTCH DISENGAGED. ARMATURE IN MARKING POSITION. CLUTCH STOP ARM SHOULD ENGAGE CLUTCH SHOE LEVER BY APPROXIMATELY FULL THICKNESS OF SHOE LEVER.
TO ADJUST
POSITION STOP ARM ON STOP ARM BAIL WITH CLAMP SCREW LOOSENED.



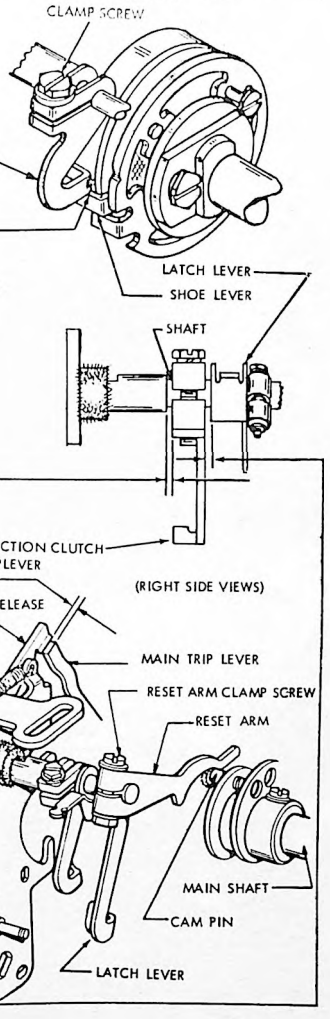
SELECTOR RECEIVING MARGIN

WHEN A SIGNAL DISTORTION TEST SET IS USED FOR DETERMINING THE RECEIVING MARGINS OF THE SELECTOR, AND WHERE THE CONDITION OF THE COMPONENTS IS EQUIVALENT TO THAT OF NEW EQUIPMENT, THE RANGE AND DISTORTION TOLERANCES BELOW SHOULD BE MET.

SELECTOR RECEIVING MARGIN MINIMUM REQUIREMENTS

CURRENT	SPEED IN WPM	POINTS RANGE WITH ZERO DISTORTION		PERCENTAGE OF MARKING AND SPACING BIAS TOLERATED		END DISTORTION TOLERATED WITH SCALE AT BIAS OPTIMUM SETTING	
		5 LEVEL	8 LEVEL	5 LEVEL	8 LEVEL	5 LEVEL	8 LEVEL
0.060 AMP (WINDINGS PARALLEL)	60	72	65	40	35	35	30
	100	72	65	40	35	35	30
0.020 AMP. (WINDINGS SERIES)	60	72	65	40	35	35	30

TO ADJUST: REFINE THE SELECTOR ARMATURE SPRING



(A)
FUNCTION CLUTCH STOP LEVER
(1) REQUIREMENT
WITH RELEASE RESTING ON MAIN TRIP LEVER (SEE BELOW), FUNCTION CLUTCH STOP LEVER SHOULD ENGAGE FULL THICKNESS OF SHOE LEVER.
(2) REQUIREMENT
MIN. SOME
MAX. 0.006 INCH
TO ADJUST
POSITION STOP LEVER ON ITS SHAFT WITH CLAMP SCREW LOOSENED.
TO ADJUST
POSITION STOP LEVER ON ITS SHAFT WITH CLAMP SCREW LOOSENED.

(B)
RESET ARM
TO CHECK
TRIP FUNCTION CLUTCH AND POSITION MAIN SHAFT SO RESET ARM IS IN UPPERMOST POSITION.
(1) REQUIREMENT
5 LEVEL UNIT
MIN. 0.010 INCH
MAX. 0.030 INCH
8 LEVEL UNIT
MIN. 0.015 INCH
MAX. 0.025 INCH
CLEARANCE BETWEEN RELEASE AND TRIP LEVERS.
(2) REQUIREMENT
MIN. SOME
MAX. 0.010 INCH
BETWEEN STOP AND LATCH LEVERS.

TO ADJUST
POSITION RESET ARM WITH CLAMP SCREW LOOSENED.

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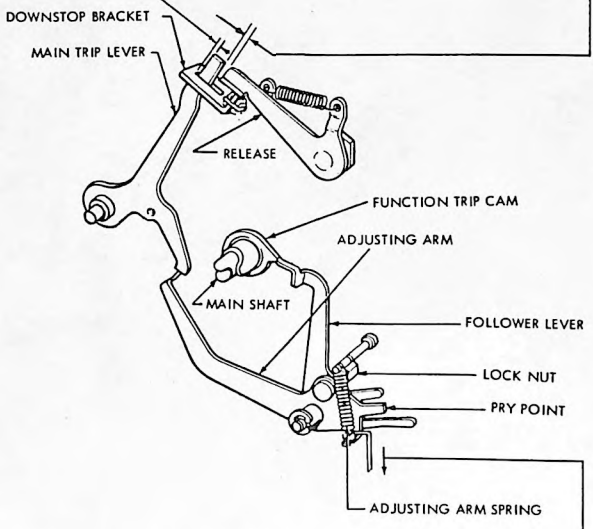
FOLLOWER LEVER
TO CHECK
FOLLOWER LEVER ON HIGH PART OF CAM.
(1) REQUIREMENT
5 LEVEL UNITS
MIN. 0.010 INCH
MAX. 0.030 INCH
8 LEVEL UNITS
MIN. 0.005 INCH
MAX. 0.020 INCH
CLEARANCE BETWEEN MAIN TRIP LEVER AND DOWNSTOP BRACKET.
(2) REQUIREMENT
SOME CLEARANCE BETWEEN MAIN TRIP LEVER AND DOWNSTOP BRACKET.
TO ADJUST
BY MEANS OF PRY POINT, POSITION ADJUSTING ARM ON FOLLOWER LEVER WITH LOCK NUT LOOSENED.



ADJUSTING ARM SPRING
REQUIREMENT
WITH FOLLOWER LEVER ON HIGH PART OF TRIP CAM, AND MAIN TRIP LEVER HELD AWAY FROM ADJUSTING ARM:
MIN. 2-1/2 OZS.
MAX. 4 OZS.
TO START ADJUSTING LEVER MOVING.

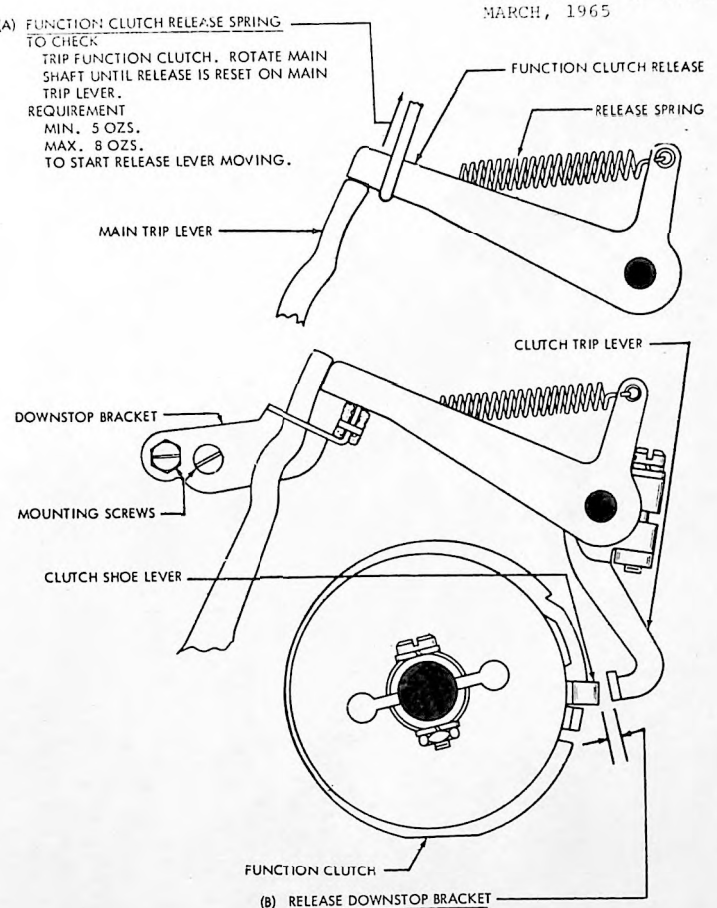
(A) FUNCTION CLUTCH RELEASE SPRING

TO CHECK

TRIP FUNCTION CLUTCH. ROTATE MAIN SHAFT UNTIL RELEASE IS RESET ON MAIN TRIP LEVER.

REQUIREMENT

MIN. 5 OZS.
MAX. 8 OZS.
TO START RELEASE LEVER MOVING.



(B) RELEASE DOWNSTOP BRACKET

REQUIREMENT

WITH FUNCTION CLUTCH TRIPPED:
MIN. 0.002 INCH
MAX. 0.045 INCH
CLEARANCE BETWEEN TRIP LEVER AND CLUTCH SHOE LEVER AT POINT WHERE CLEARANCE IS LEAST.

TO ADJUST

POSITION DOWNSTOP BRACKET WITH MOUNTING SCREWS FRICTION TIGHT.

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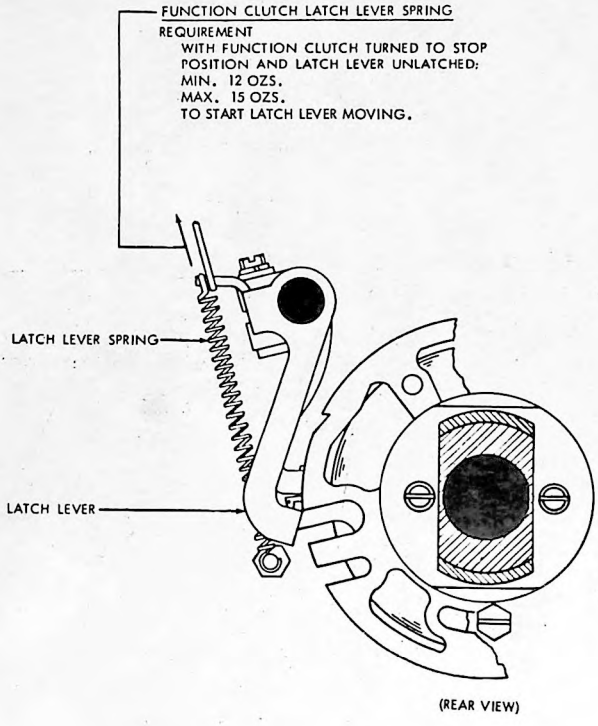
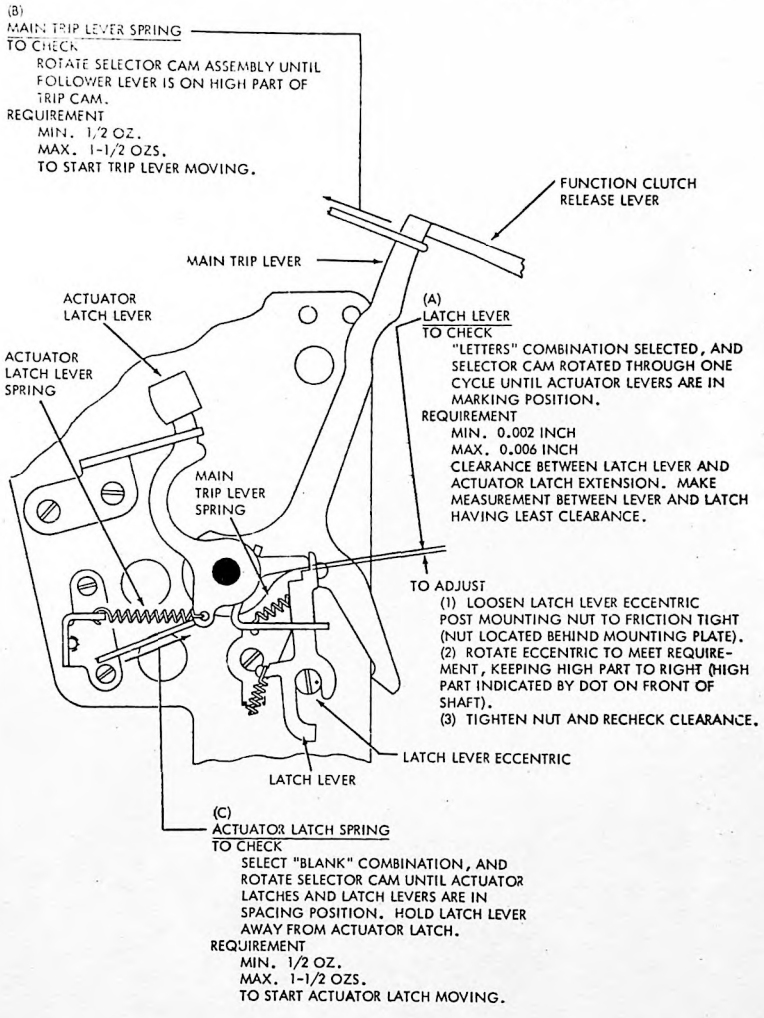
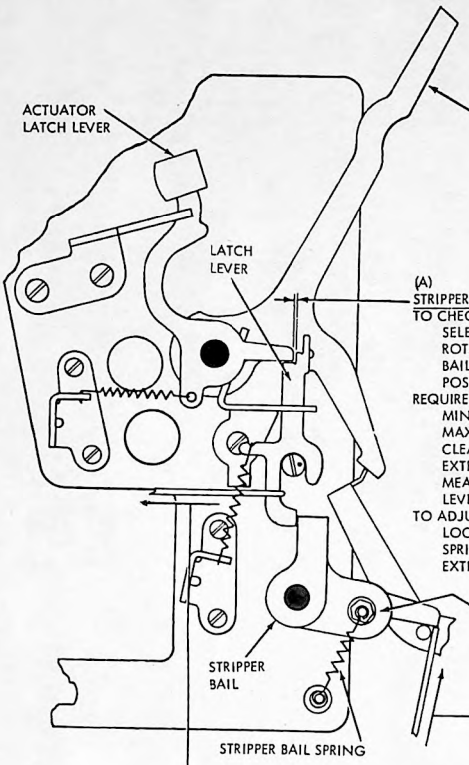

FUNCTION CLUTCH LATCH LEVER SPRING
REQUIREMENT
WITH FUNCTION CLUTCH TURNED TO STOP POSITION AND LATCH LEVER UNLATCHED:
MIN. 12 OZS.
MAX. 15 OZS.
TO START LATCH LEVER MOVING.
LATCH LEVER SPRING
LATCH LEVER
(REAR VIEW)


(B)
MAIN TRIP LEVER SPRING
TO CHECK
ROTATE SELECTOR CAM ASSEMBLY UNTIL FOLLOWER LEVER IS ON HIGH PART OF TRIP CAM.
REQUIREMENT
MIN. 1/2 OZ.
MAX. 1-1/2 OZS.
TO START TRIP LEVER MOVING.
FUNCTION CLUTCH RELEASE LEVER
MAIN TRIP LEVER
ACTUATOR LATCH LEVER
ACTUATOR LATCH LEVER SPRING
MAIN TRIP LEVER SPRING
(A)
LATCH LEVER
TO CHECK
"LETTERS" COMBINATION SELECTED, AND SELECTOR CAM ROTATED THROUGH ONE CYCLE UNTIL ACTUATOR LEVERS ARE IN MARKING POSITION.
REQUIREMENT
MIN. 0.002 INCH
MAX. 0.006 INCH
CLEARANCE BETWEEN LATCH LEVER AND ACTUATOR LATCH EXTENSION. MAKE MEASUREMENT BETWEEN LEVER AND LATCH HAVING LEAST CLEARANCE.
TO ADJUST
(1) LOOSEN LATCH LEVER ECCENTRIC POST MOUNTING NUT TO FRICTION TIGHT (NUT LOCATED BEHIND MOUNTING PLATE).
(2) ROTATE ECCENTRIC TO MEET REQUIREMENT, KEEPING HIGH PART TO RIGHT (HIGH PART INDICATED BY DOT ON FRONT OF SHAFT).
(3) TIGHTEN NUT AND RECHECK CLEARANCE.
LATCH LEVER ECCENTRIC
LATCH LEVER
(C)
ACTUATOR LATCH SPRING
TO CHECK
SELECT "BLANK" COMBINATION, AND ROTATE SELECTOR CAM UNTIL ACTUATOR LATCHES AND LATCH LEVERS ARE IN SPACING POSITION. HOLD LATCH LEVER AWAY FROM ACTUATOR LATCH.
REQUIREMENT
MIN. 1/2 OZ.
MAX. 1-1/2 OZS.
TO START ACTUATOR LATCH MOVING.



(A)
STRIPPER BAIL
TO CHECK
SELECT "BLANK" COMBINATION, AND ROTATE SELECTOR CAM UNTIL STRIPPER BAIL IS IN EXTREME COUNTERCLOCKWISE POSITION.
REQUIREMENT
MIN. 0.010 INCH
MAX. 0.020 INCH
CLEARANCE BETWEEN ACTUATOR LATCH EXTENSION AND LATCH LEVER. MAKE MEASUREMENT BETWEEN LATCH AND LEVER HAVING LEAST CLEARANCE.
TO ADJUST
LOOSEN STRIPPER BAIL EXTENSION SPRING POST MOUNTING NUT. POSITION EXTENSION TO MEET REQUIREMENT.

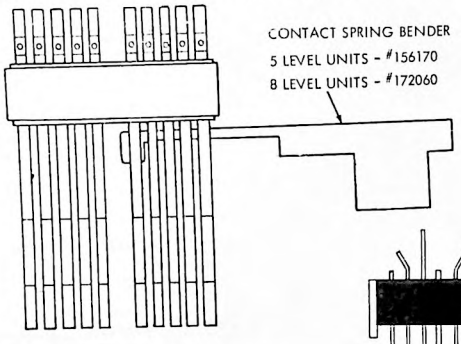
(B)
LATCH LEVER SPRING
TO CHECK
SELECT "BLANK" COMBINATION AND ROTATE SELECTOR CAM UNTIL LATCH LEVERS ARE IN SPACING POSITION.
REQUIREMENT
MIN. 1 OZ.
MAX. 2-1/2 OZS.
TO START LATCH LEVERS MOVING. HOLD ACTUATOR LATCHES AWAY WHEN MAKING MEASUREMENTS.

(C)
STRIPPER BAIL SPRING
TO CHECK
LATCH LEVERS IN SPACING POSITION AS OUTLINED IN ADJUSTMENT (B) ABOVE.
REQUIREMENT
MIN. 1/2 OZ.
MAX. 1-1/2 OZS.
TO START BAIL MOVING.

CODE READING CONTACT ASSEMBLY ADJUSTMENTS

NOTE

THE FOLLOWING FIVE (5) ADJUSTMENTS ARE TO BE MADE WITH THE CODE READING CONTACT ASSEMBLY REMOVED FROM THE UNIT. OBSERVE THAT THE CONTACTS ARE ARRANGED IN TWO GROUPS OF FIVE (5) CONTACTS EACH. WORK ON ONLY ONE GROUP AT A TIME. USE A CONTACT SPRING BENDER TO BEND THE CONTACTS. FOR EACH ADJUSTMENT, START WITH THE CONTACT PILE-UP FARTHEST FROM THE HANDLE OF THE BENDING TOOL TO AVOID DISTURBING COMPLETED ADJUSTMENTS.



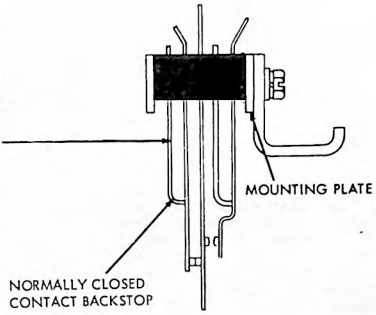
(1) BACKSTOP - NORMALLY CLOSED CONTACTS

REQUIREMENT

NORMALLY CLOSED CONTACT LEAVES PARALLEL TO MOUNTING PLATE AND IN LINE WITH EACH OTHER AS GAUGED BY EYE.

TO ADJUST

BEND BACKSTOPS.



(2) SPRING TENSION - NORMALLY CLOSED CONTACT

REQUIREMENT

WITH SWINGER CONTACT HELD AWAY

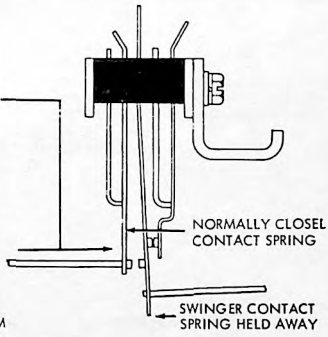
MIN. 2 OZS.

MAX. 6 OZS.

TO MOVE EACH NORMALLY CLOSED LEAF AWAY FROM ITS BACKSTOP.

TO ADJUST

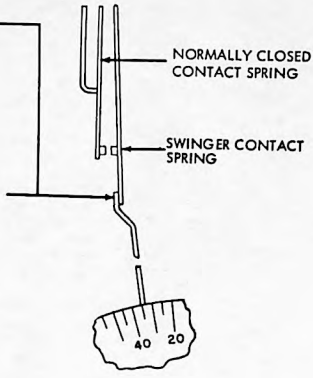
BEND NORMALLY CLOSED LEAF SPRING.



NOTE

TO INCREASE TENSION OF NORMALLY CLOSED LEAF, IT MAY BE NECESSARY TO BEND BACKSTOP AWAY FROM LEAF, BEND LEAF, AND THEN REMAKE ADJUSTMENT (1).

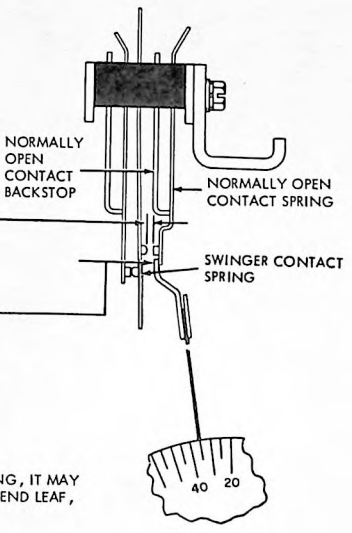
(3) SWINGER SPRING TENSION
REQUIREMENT
MIN. 30 GRAMS
MAX. 40 GRAMS
TO OPEN NORMALLY CLOSED CONTACTS.
TO ADJUST
BEND SWINGER LEAF.



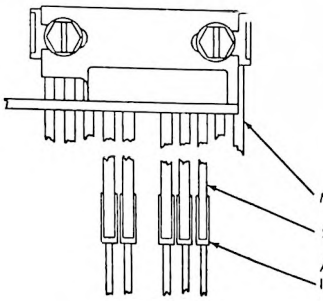
(4) NORMALLY OPEN CONTACT GAP
REQUIREMENT
MIN. 0.010 INCH
MAX. 0.015 INCH
CLEARANCE.
TO ADJUST
BEND NORMALLY OPEN CONTACT BACKSTOP.

(5) SPRING TENSION - NORMALLY OPEN CONTACT
REQUIREMENT
MIN. 30 GRAMS
MAX. 40 GRAMS
TO MOVE EACH NORMALLY OPEN LEAF AWAY FROM ITS BACKSTOP.
TO ADJUST
BEND NORMALLY OPEN SPRING.

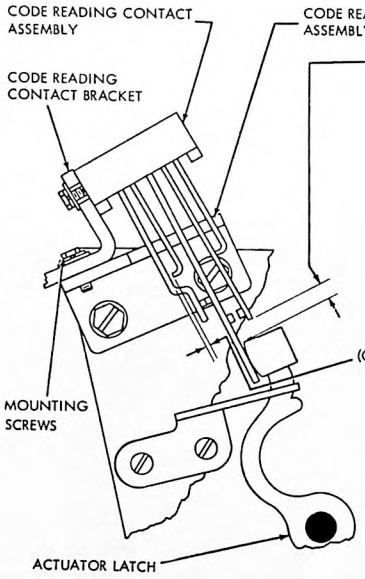
NOTE
TO INCREASE TENSION OF NORMALLY OPEN LEAF SPRING, IT MAY BE NECESSARY TO BEND BACKSTOP AWAY FROM LEAF, BEND LEAF, AND THEN REMAKE ADJUSTMENT(4).



CODE READING CONTACT ASSEMBLY



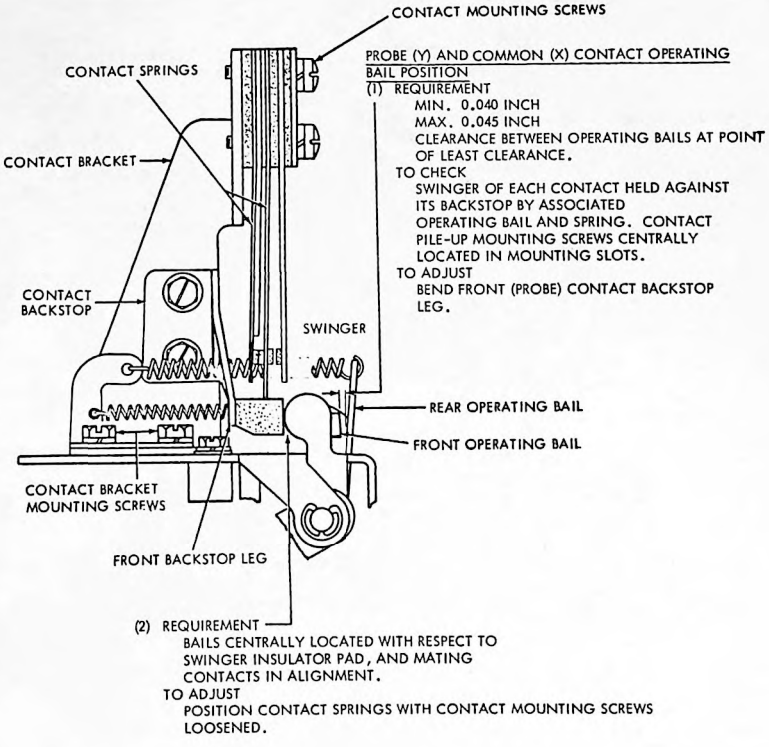
(A) CODE READING CONTACT POSITION
REQUIREMENT
CODE READING CONTACT SWINGERS CENTERED ON THEIR RESPECTIVE ACTUATOR LATCH INSULATOR PADS.
TO ADJUST
POSITION CODE READING CONTACT PILE-UP WITH ITS MOUNTING SCREWS LOOSENED.



(B) CODE READING CONTACT SPRING CLEARANCE
REQUIREMENT
MIN. 0.035 INCH
MAX. 0.070 INCH
CLEARANCE BETWEEN TOP OF ACTUATOR LATCH INSULATOR PAD AND TIP OF NORMALLY CLOSED (SPACING) CONTACT SPRING.
TO CHECK
OPERATE ACTUATOR LATCHES TO MARKING (LEFT) POSITION. MEASURE BETWEEN PAD AND SPRING TIP HAVING LEAST CLEARANCE.
TO ADJUST
POSITION CODE READING CONTACT ASSEMBLY MOUNTING BRACKET UP OR DOWN, WITH ITS MOUNTING SCREWS FRICTION TIGHT.

(C) CODE READING CONTACT BRACKET
REQUIREMENT
MIN. 0.002 INCH
MAX. 0.008 INCH
CLEARANCE BETWEEN NORMALLY OPEN CODE READING CONTACT SPRING AND ITS ASSOCIATED BACKSTOP.
TO CHECK
SELECT "BLANK" COMBINATION. ROTATE MAIN SHAFT UNTIL SELECTOR AND FUNCTION CLUTCHES ARE DISENGAGED AND LATCHED. MANUALLY OPERATED ACTUATOR LATCHES TO MARKING (LEFT) POSITION. MAKE MEASUREMENT AT FOREMOST AND REARMOST CONTACTS.
TO ADJUST
POSITION CODE READING CONTACT MOUNTING BRACKET WITH ITS MOUNTING SCREWS FRICTION TIGHT.

TIMING CONTACT ASSEMBLY ADJUSTMENTS



NOTE

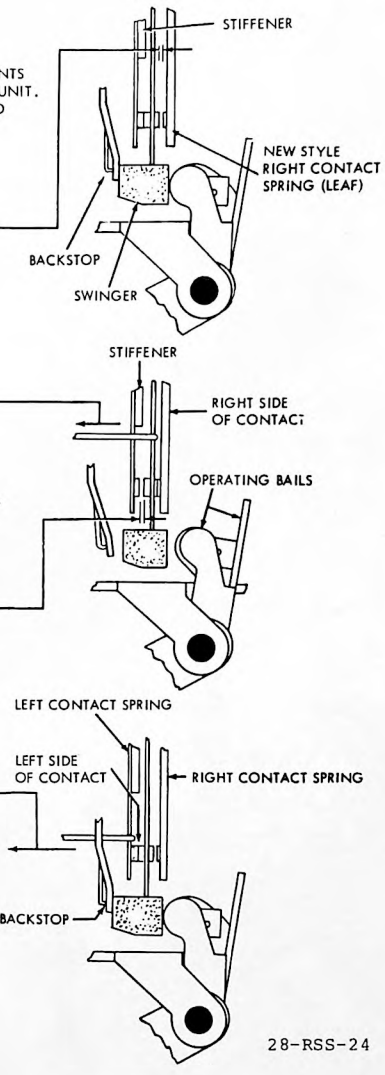
MAKE THE FOLLOWING TIMING CONTACT ADJUSTMENTS WITH THE CONTACT ASSEMBLIES REMOVED FROM THE UNIT. THE ADJUSTMENTS APPLY TO BOTH THE PROBE (Y) AND COMMON (X) CONTACT ASSEMBLIES.

(A) NORMALLY CLOSED CONTACT GAP
REQUIREMENT
MIN. 0.020 INCH
MAX. 0.025 INCH
GAP BETWEEN CONTACTS WHEN SWINGER IS HELD AGAINST BACKSTOP.
TO ADJUST
BEND THICK (RIGHT) SPRING LEAF.

(B) NORMALLY CLOSED CONTACT PRESSURE
REQUIREMENT
MIN. 4 1/2 OZS.
MAX. 5 1/2 OZS.
TO OPEN NORMALLY CLOSED CONTACTS
TO CHECK
HOLD OPERATING BAIL AWAY FROM SWINGER.
TO ADJUST
BEND SWINGER. RECHECK ADJUSTMENT (A). AND REFINE IF NECESSARY.

(C) NORMALLY OPEN CONTACT GAP
REQUIREMENT
MIN. 0.020 INCH
MAX. 0.025 INCH
GAP BETWEEN CONTACTS WHEN SWINGER IS HELD AGAINST BACKSTOP.
TO ADJUST
BEND STIFFENER.

(D) NORMALLY OPEN CONTACT PRESSURE
TO CHECK
SWINGER HELD AGAINST BACKSTOP BY ITS OPERATING BAIL.
REQUIREMENT
MIN. 4 1/2 OZS.
MAX. 5 1/2 OZS.
TO OPEN LEFT SIDE OF CONTACT.
TO ADJUST
BEND LEFT CONTACT SPRING. RECHECK ADJUSTMENTS (A) AND (C), AND REFINE IF NECESSARY.



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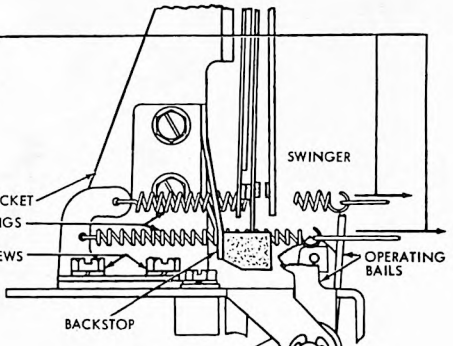
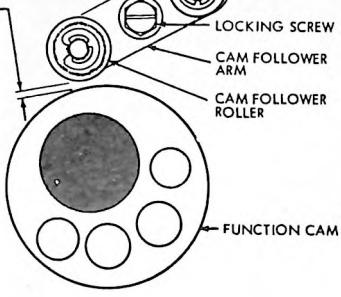
NOTE
REPLACE TIMING CONTACT ASSEMBLY ON UNIT.

OPERATING BAIL SPRINGS
TO CHECK
UNHOOK SPRINGS. HOLD SWINGER AGAINST BACKSTOP BY MEANS OF OPERATING BAIL.
REQUIREMENT
MIN. 7 OZS.
MAX. 12 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

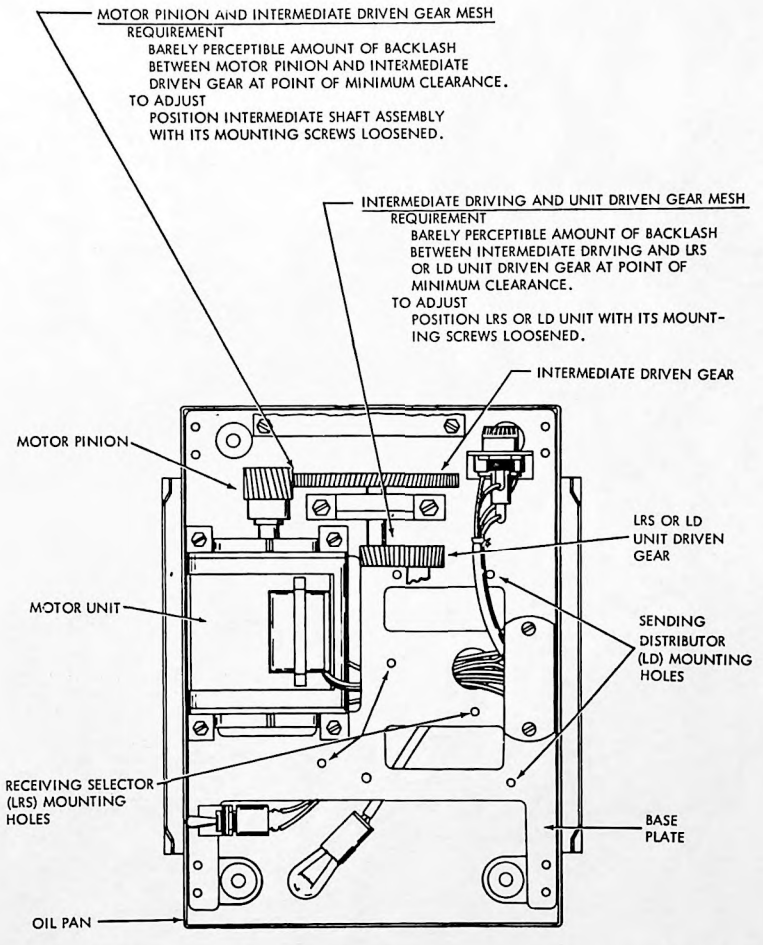


CONTACT BRACKET
TO CHECK
LOOSEN LOCKING SCREW. POSITION CAM FOLLOWER ARM, BY MEANS OF ITS ELONGATED MOUNTING HOLE, TO ITS MINIMUM LENGTH ON OPERATING BAIL. TIGHTEN LOCKING SCREW. DISENGAGE AND LATCH SELECTOR AND FUNCTION CLUTCHES.
REQUIREMENT
MIN. 0.050 INCH
MAX. 0.055 INCH
CLEARANCE BETWEEN CAM FOLLOWER ROLLER AND FUNCTION CAM.
TO ADJUST
POSITION CONTACT BRACKET WITH ITS MOUNTING SCREWS LOOSENED.



NOTE
RECHECK PROBE (Y) AND COMMON (X) CONTACT OPERATING BAIL POSITION ADJUSTMENT (SEE FIGURE 3-21). IF BAIL CLEARANCE IS NOT MET, REFINE SWITCH MOUNTING BRACKET POSITION.

3.2 Base and Motor Unit



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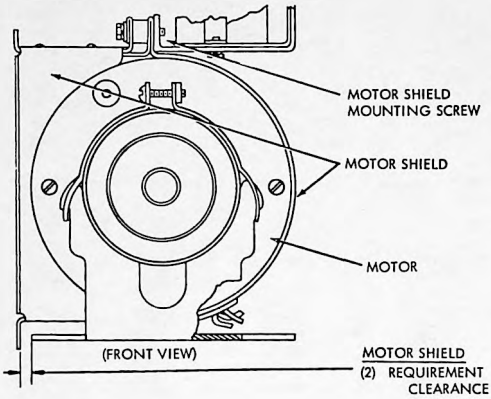
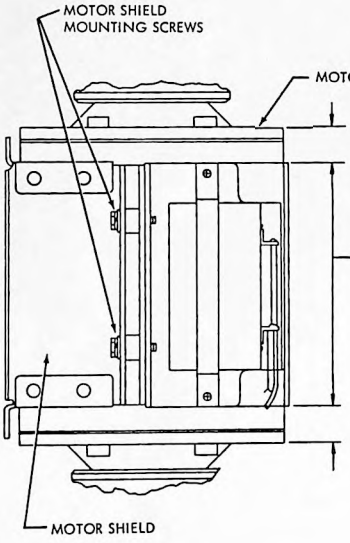


MOTOR SHIELD

(2) REQUIREMENT
CLEARANCE BETWEEN MOTOR SHIELD AND MOTOR MOUNTING BRACKET:
MIN. 0.062 INCH
TO ADJUST
POSITION MOTOR SHIELD WITH ITS MOUNTING SCREWS LOOSENED.



(1) REQUIREMENT
EQUAL CLEARANCE BETWEEN FRONT AND REAR ENDS OF MOTOR AND MOTOR SHIELD.

(TOP VIEW)

4. CODE READING AND TIMING CONTACT STROBING PROCEDURE

4.1 Introduction

4.1.1 The following adjustment procedure outlines pulse length requirements for the code reading and timing contacts of the (LRS) Receiving Selector Set. In all cases, both the test set and the unit under test *must* be operating at the same speed for proper strobing. All pulse length requirements are made with respect to a 7.42 unit code test set scale. To strobe the code reading and timing contacts, a Signal Distortion Test Set (DXD) is used. For operation of this set, refer to Teletype Bulletin 181B.

4.2 General Testing Information

4.2.1 Preliminary Prepartion: Perform the following tests after completing the adjustment of the code reading and timing contacts as outlined in paragraph 3.1. For all strobing tests, the DXD and LRS should be operating at 600 OPM.

.2 DXD Zero: In order to perform the following tests, observation of a neon trace on the scale of the DXD will have to be made. Since the trace has a tendency to *jump* (i.e., the trace will not remain steady, but may vary as much as 10 scale divisions), the following steps should be taken to *zero* the DXD:

(a) While receiving alternate *LETTERS-BLANK* (all marking-all spacing) code combinations, connect the neon trace lamp to the #1 normally open code reading contact. Observe, *and note*, the point at which the trace begins. This point will *jump*, as mentioned above, and only the *minimum* reading should be noted.

(b) Repeat the above procedure for all the contacts, and choose the trace which *starts latest*. Set the *START* zero mark of the DXD scale to this point.

(c) Record the *earliest end* of the trace for future adjustment reference.

4.3 Code Reading Contacts - Strobing Procedure

4.3.1 Zero the DXD test set as outlined in paragraph 4.2.2.

.2 Connect the neon trace lamp to the 5th (5 level units) or 8th (eight level units) normally open contact of the contact assembly.

4.3.2 (a) Requirements (See Figure 1)

The marking code reading contact trace - including breaks - shall have a minimum signal length of 700 divisions in the *LETTERS* (all marking) position. All bounce must end within 20 divisions of the earliest start or latest end of the contact traces (as determined during the DXD *zero* procedure - paragraph 4.2.2).

To Check: Receiving Selector Set operating, and receiving alternate *LETTERS* - *BLANK* (all marking- and spacing) code combinations.

To Adjust: Refine code reading contact assembly adjustments and spring tensions.

(b) Requirement

Normally closed contact opens before normally open contact closes (i.e., contacts should break-before-make).

To Check: Turn unit off. With code reading contact swinger in spacing position, manually operate swinger to marking position. Check all contacts.

To Adjust: Refine code reading contact assembly adjustments and spring tensions. Recheck requirements (a) and (b) if any refinements are made.

4.4 Timing Contacts - Strobing Procedure

4.4.1 Zero the DXD test set as outlined in paragraph 4.2.2.

.2 With the Receiving Selector Set in idle position, connect the neon trace lamp to the normally open contact of the Common (X) contact pile-up.

(a) Requirements (See Figure 2)

The earliest starting trace shall begin no sooner than 50 divisions after the DXD zero mark, and the latest ending trace shall end no later than 50 divisions from the earliest end of the code reading contact traces (as determined during the DXD zero procedure - paragraph 4.2.2. The minimum trace length shall be 225 divisions. All bounce must end

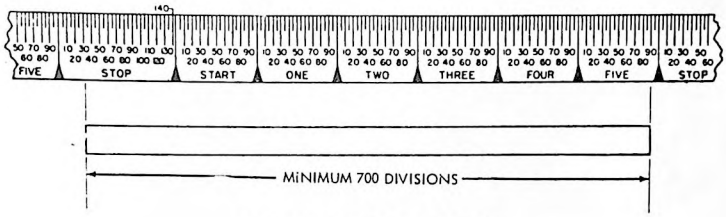


FIGURE 1. CODE READING CONTACT

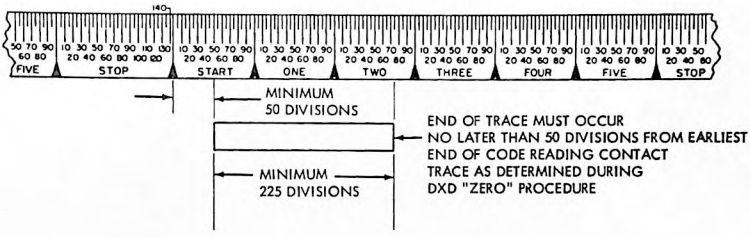


FIGURE 2. COMMON (X) CONTACT

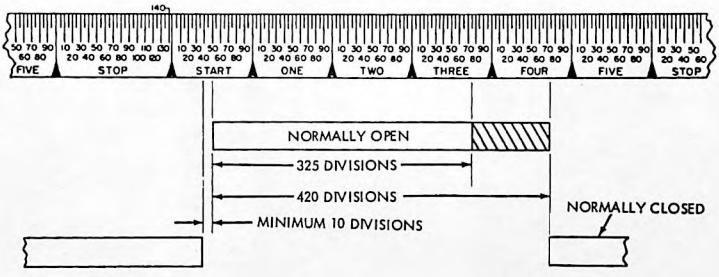


FIGURE 3. PROBE (Y) CONTACT

4.4.2 (a) within 5 divisions of the earliest start and latest end of a trace.

To Check: Receiving Selector Set operating and receiving *LETTERS* (all marking) code combinations.

To Adjust: Refine timing contact adjustments and spring tensions.

(b) Requirements (See Figure 3)

Connect neon trace to both contacts of the Probe (Y) contact pile-up. There shall be at least a 10 division break in the trace indicating the break-before-make contact. There shall be at least 325 to 420 division between the earliest starts of the normally open and normally closed contacts. All bounce must end within 5 divisions of the earliest start and latest end of a trace.

To Adjust: Refine timing contact adjustments and spring tensions. Recheck requirements (a) and (b) if any refinements are made.

5. DISASSEMBLY

5.1 General Disassembly Instructions

(a) During the disassembly of a mechanism, take careful note of the position and order of removed parts to facilitate reassembly. Retaining rings are made of spring steel and have a tendency to release suddenly. Loss of these rings can be minimized as follows: Hold the retaining ring to prevent it from rotating. Place a screwdriver blade into one of the ring's slots. Rotate the screwdriver in a direction to increase the diameter of the retaining ring.

(b) When unsoldering leads from switch and connector terminals, the thermoplastic tubing over the leads might be damaged from the heat. Replace any damaged tubing. During the resoldering operation, avoid using an excessive amount of solder. Be especially careful to prevent solder from falling onto and becoming wedged between moving parts and electrical contact springs.

(c) After all removed parts have been replaced, and any

5.1 (c) necessary adjustments made, the Set should be checked for proper operation before applying power to it. With the use of an armature spring clip (see Bulletin 1185B) to hold the selector armature in the attracted position, manually rotate the main shaft until the clutches latch. Operate the selector armature to allow unlatching of the clutches, and manually select various code combinations while checking operation of the set.

5.2 Cover

5.2.1 The LRS cover is removed by simply lifting it up from the base. Lift it straight up, making certain it clears the selector mechanism before moving it in a lateral direction. To replace the cover, reverse the removal procedure.

5.3 Receiving Selector (LRS)

5.3.1 Removal from Base: Disconnect the 36 point female connector from the connector brackets at the rear of the base. Remove the three mounting screws, lock washers, and flat washers which secure the Receiving Selector to the base plate. Remove the LRS from the base while guiding the cable assembly forward and up through the base plate cutout.

.2 To remount the Receiving Selector (LRS) on the base, route the cable assembly (with connector) down through the rectangular hole in the base plate nearest the left rear corner of the 4 point terminal block. Direct the cable assembly under the base plate to the rear of the set. Secure the 36 point connector to the connector brackets using the two screws and lock washers supplied. Secure the Receiving Selector to the base using the mounting screws, lock washers and flat washers found in the muslin bag attached to the selector. Refer to paragraph 3, for adjustments and clearance requirements between the intermediate driving gear and the Receiving Selector driven gear.

.3 Selecting Mechanism Removal:

(a) Remove the screw, lock washer, and nut from the selector clutch drum. Hold the push lever reset bail in its raised position, and the stop arm and marking lock lever to the left (see NOTE). Grasp the cam-clutch by the cam disk (not by the drum) and pull forward while rotating the cam-clutch slowly. The cam-clutch should come off easily; *it should not be forced.*

5.3.3 NOTE: To hold the push lever reset bail in its raised position, place the blade of a screwdriver under the forward extension of the reset bail. Apply pressure on the bail to push it toward the rear, and simultaneously lift upward on the extension with the screwdriver. The reset bail arm will engage a step in the push lever guide bracket, and hold the push levers in a raised position. To hold the marking lock lever and stop arm to the left, push the lock lever to the left until the left hole in its extension is on the left side of the guide bracket. Insert a pin (or other device) into this hole and release the lever. The pin will stop the marking lock lever from returning to the right.

(b) Unhook the spring on the function latch lever. Remove the spring post by removing its nut and lock washer (located below the forward main shaft bearing on the function cam-clutch side of the frame) which passes through the frame and selector mounting plate into the selector lever guide. Remove the oil wick, screw, lock washer, and wick holder. Remove the selecting mechanism.

(c) To replace the selecting mechanism, reverse the above procedure.

.4 Main Shaft Removal:

(a) Remove the selector cam-clutch (refer to paragraph 5.3.3 (a).

(b) Remove the spring from the function clutch latch lever. Remove the retaining ring, spring washer and flat washers from the forward end of the main shaft.

(c) Remove the screw and lock washer from the function clutch drum. Remove the screw and lock washer from the collar. Remove the screw and lock washer which secures the rear bearing clamp.

(d) Pull the main shaft out towards the rear, removing the function cam-clutch and collar in the process.

5.3.4

CAUTION

Note the location of the main shaft needle roller bearings, as shown in Bulletin 1185B. Move the main shaft toward the rear of the unit a small amount at a time. Exercise care not to drop or contaminate the 20 needle bearing rollers in each race. A spring may be stretched around the shaft and rollers, and its ends hooked together. The spring, in conjunction with the lubricant on the bearings, will hold the bearings in place.

5.3.4 (e) To replace the main shaft assembly, reverse the disassembly procedure. Make sure the rollers are clean, and lubricate them as specified in paragraph 6.

NOTE: When the main shaft is inserted into the cam-clutch assemblies, hold the latter firmly so that the drum is not pushed off the clutch. Compress the drum and cam disk together so that the holes in the drum and the clutch bearings are aligned.

5.3.5 Main Plate Assembly Removal:

(a) Place the actuator latch levers in the spacing position. Remove the spring which holds the latch lever reset bail biased against the trip lever. Remove the spring post and screw, at the bottom of the bottom of the main plate, which secure the plate to the frame. Remove the oil wick, screw, lock washer, and wick holder. Remove the main plate assembly.

(b) To replace the main plate assembly, reverse the above procedure.

5.4 Motor Unit

5.4.1 Disconnect the wiring at the 4 point terminal.

.2 Remove the four screws and lock washers which secure the motor to the base plate. Remove the motor unit.

.3 To remount the motor unit, proceed as follows: Assemble the motor unit on the base using the four screws, lock washers, and flat washers supplied. Position the flat washers between the motor bracket and the base plate. Refer to

5.4.3 paragraph 3, for adjustments and clearance requirements between the motor pinion and intermediate driven gears. Route the power cable from the motor unit, under the base plate, and up through the hole immediately to the left of the 4 point terminal block (see Figure 4). Connect the leads to terminals 3 and 4 (see wiring diagram 4705WD shipped with the Base).

6. LUBRICATION

6.1 General Lubrication Information

6.1.1 The specific points to receive lubrication are indicated by line drawings and descriptive text. These line drawings are keyed to photographs which show the general area referred to by the line drawing. The symbols in the text indicate the following directions:

O	Apply one drop of oil.
O2	Apply two drops of oil.
O3	Apply three drops of oil, etc.
G	Apply thin coat of grease.
SAT	Saturate with oil.

.2 The equipment should be thoroughly lubricated, but over-lubrication, which might allow oil to drip or grease to be thrown on other parts, should be avoided. Exercise special care to prevent any lubricant from getting between armature and pole faces. Keep all electrical contacts free from oil or grease.

.3 The following general instructions supplement the specific lubrication points illustrated in this section.

(a) Apply one drop of oil to all spring hooks.

(b) Apply a light film of oil to all cam surfaces.

(c) Apply a coat of grease to all gears.

(d) Saturate all felt washers, oilers, etc.

(e) Apply oil to all pivot points.

(f) Apply oil to all sliding surfaces.

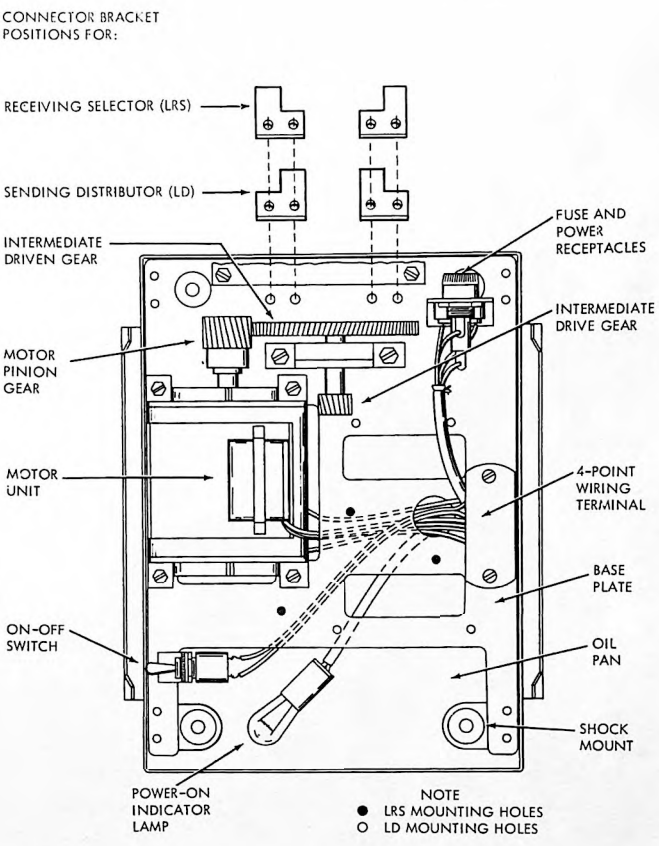
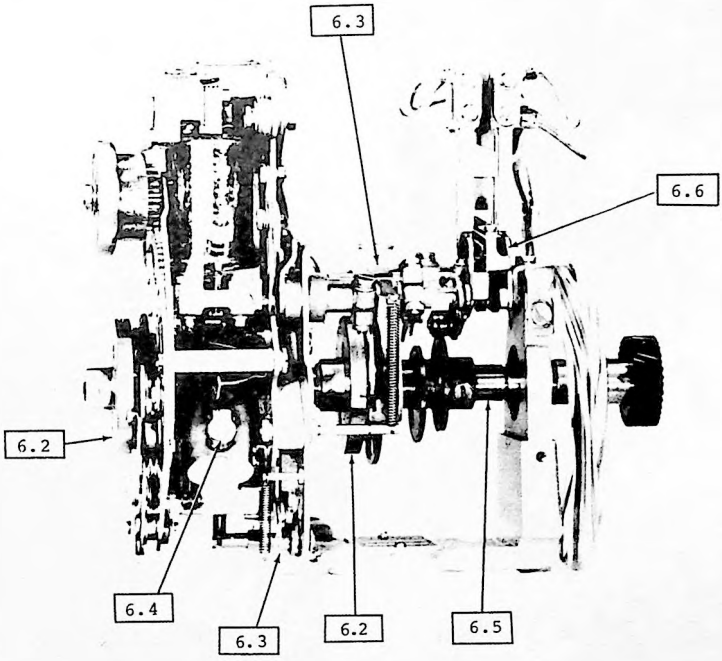


Figure 4. Cable Routing and Components Layout.

6.1.4 After a few weeks of service, re-lubricate the Set to make certain that all specified points have received lubricant. Thereafter, adhere to the following schedule unless otherwise specified:

OPERATING SPEED	LUBRICATION INTERVAL
60 WPM	3000 hours or 1 year*
75 WPM	2400 hours or 9 months*
100 WPM	1500 hours or 6 months*

* Whichever occurs first.



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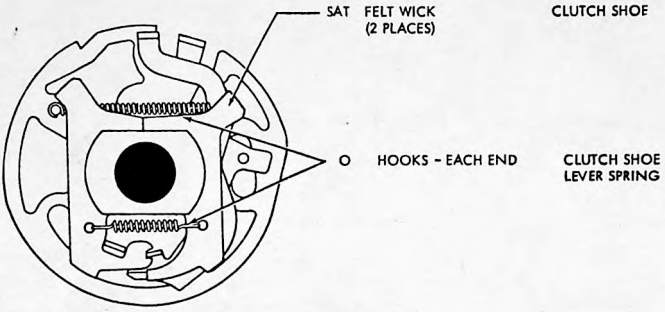
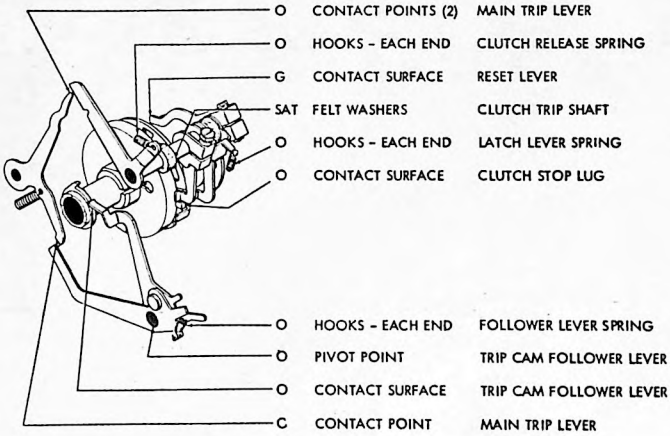
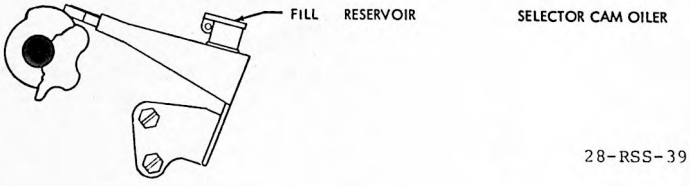
6.2 Function and Selector Clutch



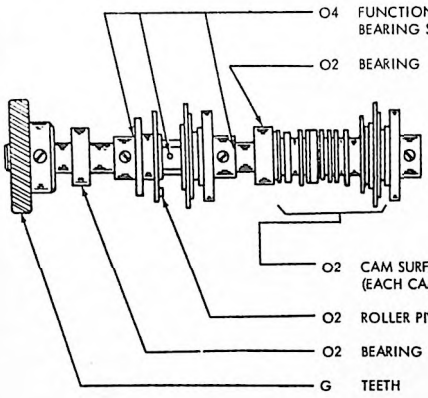
6.3 Function Cam and Clutch Trip Mechanism



6.4 Oil Reservoir

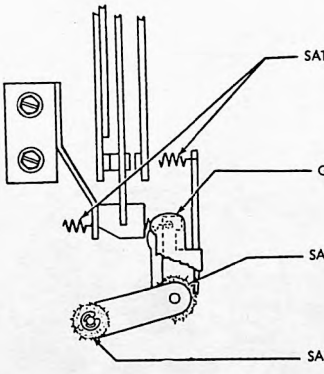


6.5 Main Shaft

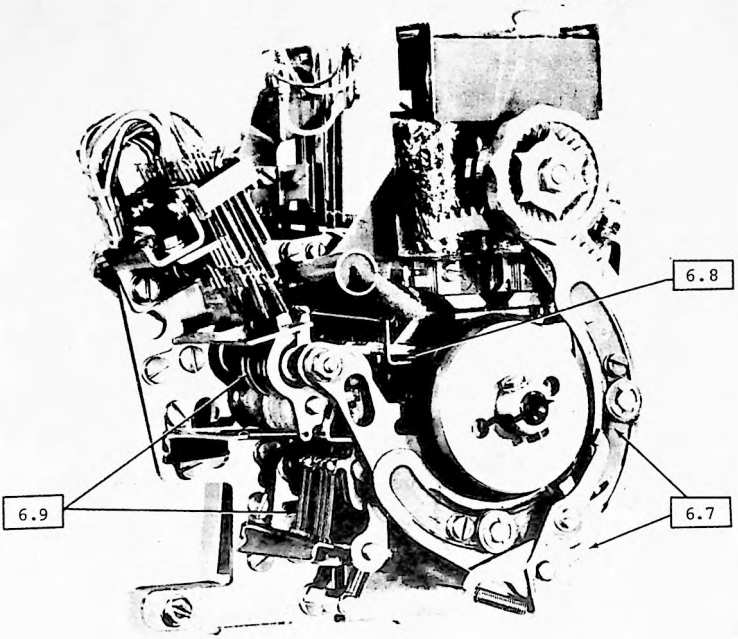


O4	FUNCTION CAM NEEDLE BEARING SLEEVE (3)	BOTH ENDS OF SLEEVE AND OIL HOLE IN SLEEVE
O2	BEARING	MAIN SHAFT
O2	CAM SURFACES (EACH CAM)	SELECTOR CAM
O2	ROLLER PIVOT	FUNCTION CAM
O2	BEARING	MAIN SHAFT
G	TEETH	DRIVEN GEAR (IF UNIT IS SO EQUIPPED)

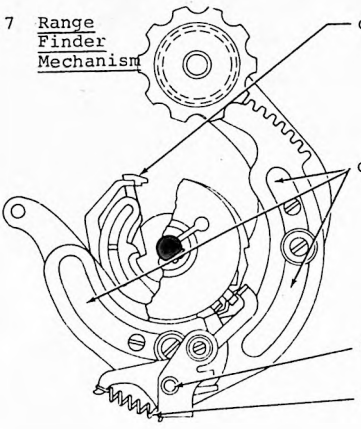
6.6 Timing Contact Bails



SAT	FELT WICKS (2)	OPERATING BAIL SPRINGS
G	SURFACES (2)	OPERATING BAILS
SAT	FELT WASHER	CAM FOLLOWER ARM
SAT	FELT WASHER	CAM FOLLOWER ROLLER

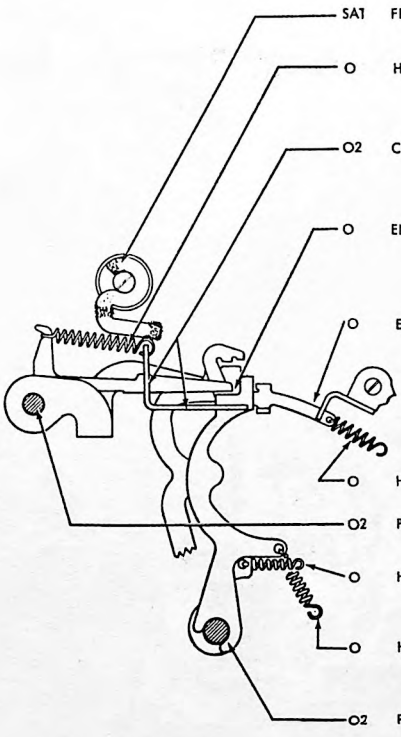


6.7 Range Finder Mechanism



O2	CONTACTING SURFACES	SPACING LOCK AND START LEVERS
O2	SURFACE	SELECTOR FRAME SURFACE
O2	PIVOT	CLUTCH STOP ARM
O	HOOKS - EACH END	LATCH LEVER SPRING

6.8 Selector Lever and Springs



SA1	FELT WICK OILER	PUSH LEVER SPRINGS
O	HOOKS - EACH END	PUSH LEVER SPRINGS
O2	CONTACTING SURFACES	PUSH LEVER AND SELECTOR LEVER GUIDE
O	ENGAGING SURFACES	PUSH AND SELECTOR LEVERS
O	EXTENSION	MARKING LOCK LEVER
O	HOOKS - EACH END	MARKING LOCK LEVER
O2	PIVOT	STRIPPER BAIL
O	HOOKS - EACH END	SPACING LOCK LEVER SPRING
O	HOOKS - EACH END	SELECTOR LEVER SPRINGS
O2	PIVOTS	SELECTOR AND LOCK LEVERS

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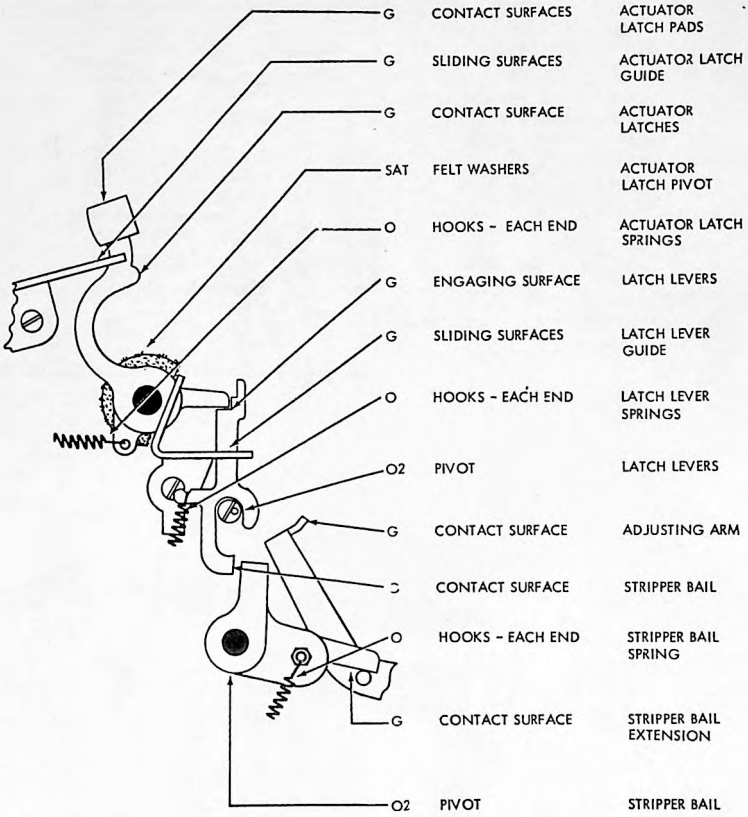
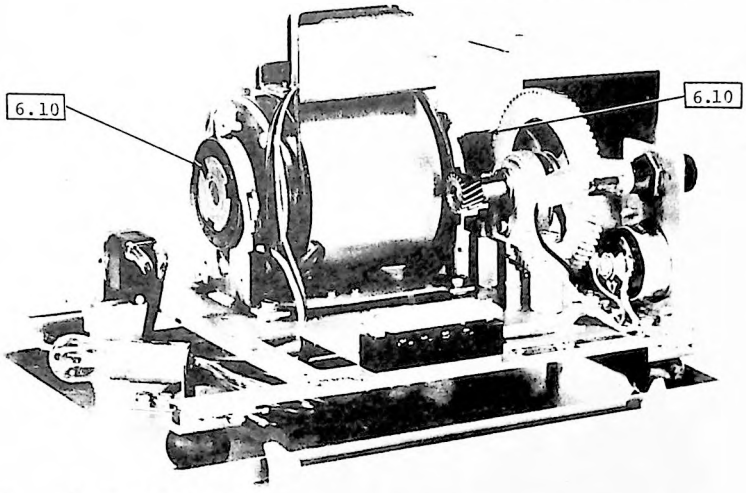
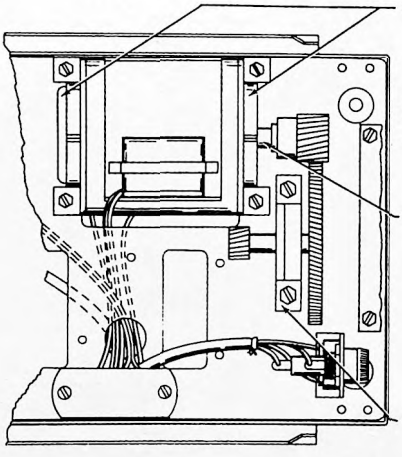
6.9 Actuator Latches and Springs





6.10 Motor and Gears



O6	OILERS	MOTOR BEARINGS (EACH END OF SHAFT)

NOTE
OIL MOTOR EVERY 750 HOURS OF CONTINUOUS OPERATION OR EVERY 3 MONTHS, WHICHEVER OCCURS FIRST.

G	SHAFT	MOTOR UNIT

NOTE
IF MOTOR IS DISASSEMBLED, REPACK BEARINGS WITH KS7471 GREASE.

G	GEARS	MOTOR PINION, INTERMEDIATE, AND UNIT GEARS

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CN TELECOMMUNICATIONS ENGINEERING DEPARTMENT

PLANT MANUAL BK2.7.2
SUB-SECTION 5, ISSUE 1
MARCH, 1965

TELETYPE MODEL 32 AND 33 SEND-RECEIVE PAGE PRINTER SETS (KSR, RO, ASR)

ADJUSTMENTS

CONTENTS

1. REFERENCES

1.1 Teletype Corporation Technical Manual, Bulletin 273B.

Send-Receive Page Printer Sets (KSR)
Receive-Only Page Printer Sets (RO)
Automatic Send and Receive Sets (ASR)

2. GENERAL

2.1 The sequence in which the adjustments appear is that which should be followed when complete readjustment of the Printer is undertaken.

.2 Unless otherwise specified make screws or nuts friction-tight to make an adjustment, and tighten them securely once the adjustment has been made.

.3 When a procedure calls for using pry points or slots to make an adjustment, place a screwdriver between the points or in the slots and pry parts in proper direction.

.4 Read a procedure all the way through before making an adjustment or checking a spring tension.

2.5 Stop Condition

2.5.1 All procedures should be started with the Printer in the stop

2.5.1 condition. It is in the stop condition when the selector armature is in its attracted (frontward) position (see page 28), all clutches are disengaged,and the keyboard universal lever is latched in its down position (see page 70).

.2 To place the Printer in the stop condition, hold the selector armature in its frontward position (see page 28). Rotate the main shaft clockwise (as viewed from left) until all clutches are in stop position. Fully disengage the clutches as instructed in paragraph 2.5.4.

NOTE: The distributor clutch will not disengage unless the answer-back drum is in its home position as shown on page 84.

.3 *The keyboard is tripped* when the universal lever is in its up position.

.4 When *disengaged*, the clutches are latched in their *stop position* between a trip lever, which bears against a shoe lever, and a latch lever which seats in a clutch cam disk (see page 26). The main shaft will then turn freely without the clutch shoes dragging. When the clutch is engaged, or tripped, the shoe lever and a stop lug on the cam disk are moved apart, and the clutch shoes are wedged against the drum so that the clutch turns in unison with the shaft (see page 27). If the shaft is turned by hand, a clutch will not fully disengage upon reaching its stop position. Where a procedure calls for disengagement, rotate the clutch to its stop position, apply a screwdriver to the stop lug and turn the disk in the normal direction of shaft rotation until the latch lever seats in its notch in the disk. As a reminder, the word *LATCHED* follows instructions to disengage the clutches.

2.6 Manual Operation

2.6.1 To manually operate the Printer, place it in the stop condition as instructed in paragraph 2.5.2 above.Momentarily permit armature to move to its unattracted (rearward) position to trip the selector clutch. Slowly rotate the main shaft clockwise (as viewed from left) until all push levers have moved under their respective selector levers (see page 31). Using spring hook, strip the push levers from under the selector levers corresponding to the spacing elements of the code combination to be set up. Then continue to rotate the shaft until the proper condition is set up or the character is cleared through the Printer.

.2 On Model 32 Printers, the selector levers are numbered 1 through 5 from left to right. To set up the letter Y, for

2.6.2 example, whose teletypewriter code combination is 1-3-5, strip the push levers from the No. 2 and No. 4 selector levers. On Model 33 Printers, the selector levers are numbered 1, 2, 3, 4, 5, 7, 6, 8 from left to right. To set up the letter Y, for example, whose eight-level code combination is 1--45-78, strip the push levers from the No. 2, 3 and 6 selector levers.

2.7 Alphabetical Index

Basic Printer - Adjustments

(Basic Printer - Adjustments Continued) Page

(Basic Printer - Adjustments Continued) Page

Spring Tensions

(Spring Tensions Continued) Page

Spring Tensions

2.10 Basic Tape Punch

Adjustments

Spring Tensions

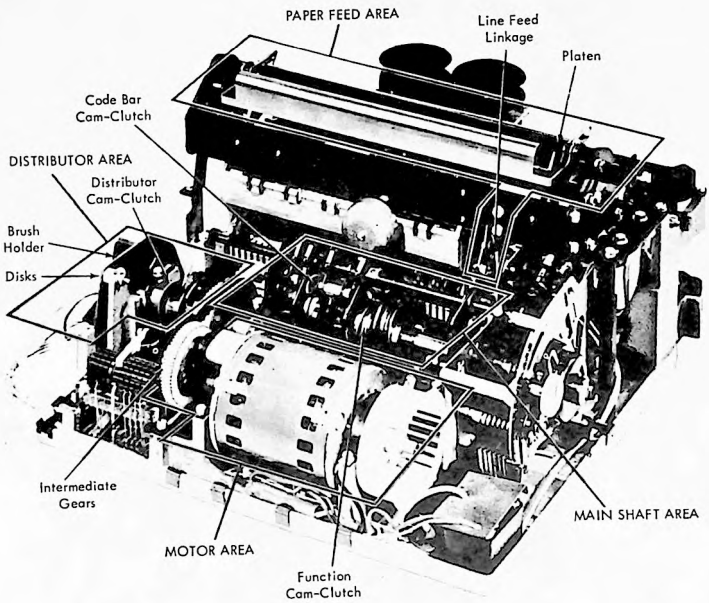


Figure 1. Printer Assembly - Rear View.

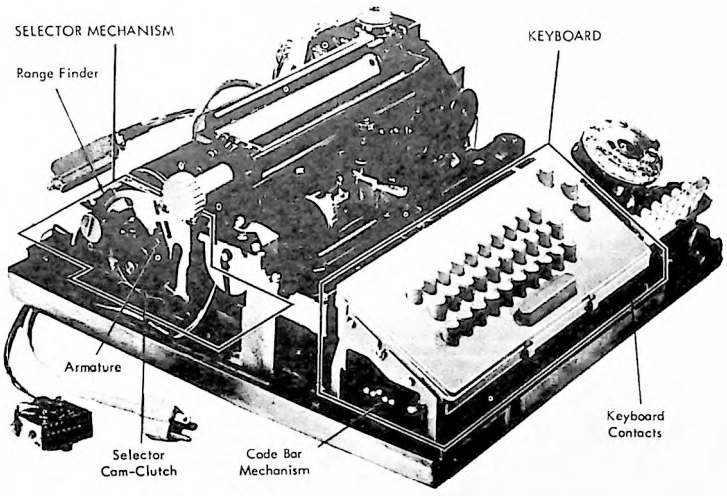


Figure 2. Printer Set.

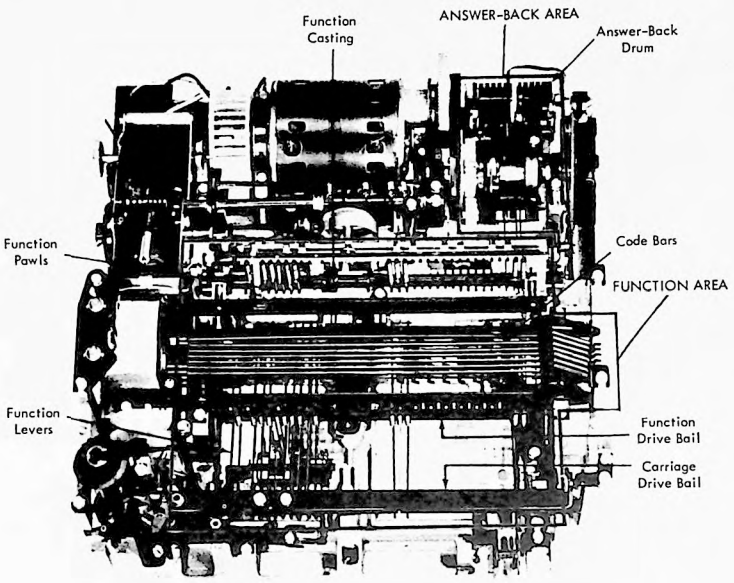


Figure 3. Printer Assembly - Carriage and Platen Removed.

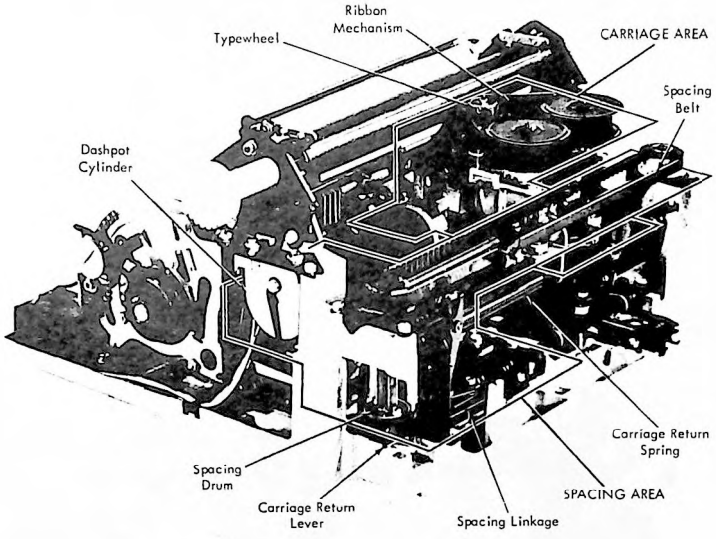


Figure 4. Printer Assembly.

GEAR BRACKET (MOTOR)- PRELIMINARY

REQUIREMENT

WITH HEAD OF MOTOR PINION MOUNTING SCREW POINTING UPWARD AND INTERMEDIATE GEAR HELD STATIONARY

MIN. SOME---MAX. 0.032 INCH PLAY AT RIM OF FAN.

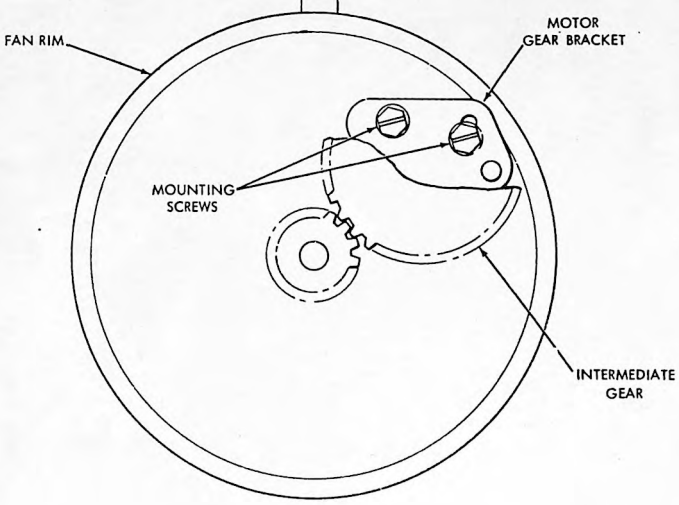
TO ADJUST

POSITION MOTOR GEAR BRACKET WITH MOUNTING SCREWS LOOSENED.

RELATED ADJUSTMENT

AFFECTS

BELT TENSION



(RIGHT SIDE VIEW)

BELT TENSION (MOTOR)- PRELIMINARY

REQUIREMENT

MIN. 0.100 INCH-- MAX. 0.135 INCH DEFLECTION AT CENTER OF MOTOR BELT WHEN 16 OZS. PRESSURE IS APPLIED AT CENTER OF BELT.

TO ADJUST

WITH FOUR CLAMP SCREWS LOOSENED, ROTATE MOTOR IN CRADLE.

RELATED ADJUSTMENT AFFECTED BY

GEAR BRACKET

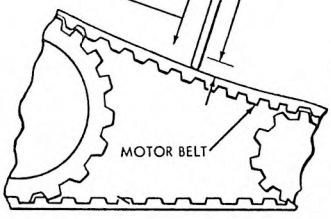
MOTOR GEAR BACKLASH AND BELT TENSION - FINAL

REQUIREMENT

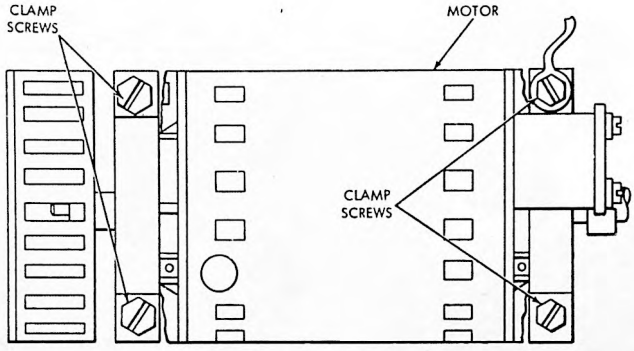
THE REQUIREMENTS SPECIFIED IN THE GEAR BRACKET (MOTOR) - PRELIMINARY AND THE MOTOR BELT TENSION - PRELIMINARY ADJUSTMENTS SHALL BE CONSIDERED FINAL IF THE RECEIVING MARGIN REQUIREMENTS SPECIFIED IN THE ARMATURE SPRING TENSION, BRACKET POSITION AND RECEIVING MARGIN (SELECTOR) CAN BE OBTAINED.

TO ADJUST

IF NECESSARY, REFINE ADJUSTMENTS SPECIFIED IN GEAR BRACKET (MOTOR) - PRELIMINARY AND THE MOTOR BELT TENSION - PRELIMINARY TO MEET RECEIVING MARGIN REQUIREMENTS.



(RIGHT SIDE VIEW)



(TOP VIEW)

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(B) LEFT BEARING (DISTRIBUTOR)

REQUIREMENT
AS GAGED BY EYE
MIN. SOME---MAX. 0.012 INCH
BETWEEN LEFT BEARING
AND CLUTCH GEAR ASSEMBLY.

TO ADJUST
DISENGAGE (LATCH) CLUTCH. HOLD
CLUTCH GEAR FIRMLY TO RIGHT.
POSITION LEFT BEARING WITH LEFT
BEARING CLAMP SCREWS LOOSENED.

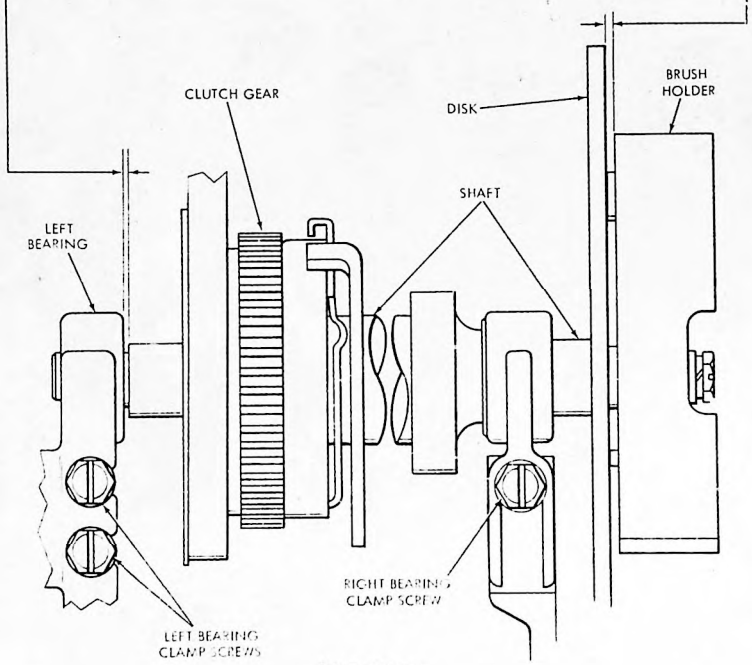
RELATED ADJUSTMENTS
AFFECTED BY
SHAFT

(A) SHAFT (DISTRIBUTOR)

REQUIREMENT
AS GAGED BY EYE
MIN. 0.010 INCH --- MAX. 0.060 INCH
BETWEEN BRUSH HOLDER AND
DISTRIBUTOR DISK AT CLOSEST POINT.

TO ADJUST
POSITION SHAFT WITH THREE BEARING
CLAMP SCREWS LOOSENED. TIGHTEN
RIGHT, BUT NOT LEFT, CLAMP SCREW
AND PROCEED TO LEFT BEARING ADJUSTMENT.

RELATED ADJUSTMENTS
AFFECTS
LEFT BEARING
TRIP SHAFT



(TOP VIEW)

TRIP SHAFT (DISTRIBUTOR)

REQUIREMENT

(1) WITH DISTRIBUTOR CLUTCH IN STOP POSITION, TAKE UP AND HOLD THE PLAY OF DISTRIBUTOR SHAFT TOWARD LEFT SIDE OF UNIT. TAKE UP PLAY OF CLUTCH LATCH LEVER TOWARDS RIGHT SIDE OF UNIT AND RELEASE. CLUTCH LATCH LEVER SHALL ENGAGE AT LEAST THE FULL THICKNESS OF DISTRIBUTOR CLUTCH DISK. TAKE UP PLAY OF CLUTCH SHOE LEVER TOWARDS LEFT SIDE OF UNIT AND RELEASE. TAKE UP PLAY OF CLUTCH STOP LEVER TOWARDS RIGHT SIDE OF UNIT AND RELEASE, CLUTCH STOP LEVER SHALL ENGAGE AT LEAST 2/3 OF WIDTH OF FORMED END OF CLUTCH SHOE LEVER.

(2) TAKE UP PLAY OF DISTRIBUTOR SHAFT TOWARDS RIGHT SIDE OF UNIT AND RELEASE. TAKE UP PLAY OF CLUTCH SHOE LEVER TOWARDS RIGHT SIDE OF UNIT AND RELEASE. TAKE UP PLAY OF CLUTCH STOP LEVER TOWARDS LEFT SIDE OF UNIT AND RELEASE. THE CLUTCH STOP LEVER SHALL ENGAGE AT LEAST 2/3 OF WIDTH OF FORMED END OF CLUTCH SHOE LEVER.

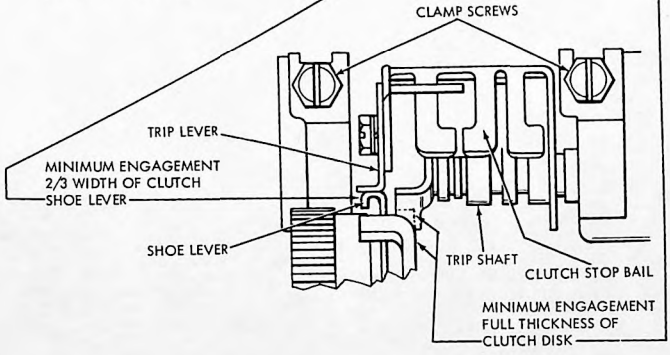
(3) THE REAR EXTENSION OF THE CONTROL LEVER SHALL NOT BIND IN ITS SLOT IN THE ANSWER-BACK BLOCK.

TO ADJUST

POSITION TRIP SHAFT WITH CLAMP SCREWS LOOSENED.

RELATED ADJUSTMENTS

AFFECTED BY SHAFT



(TOP VIEW)

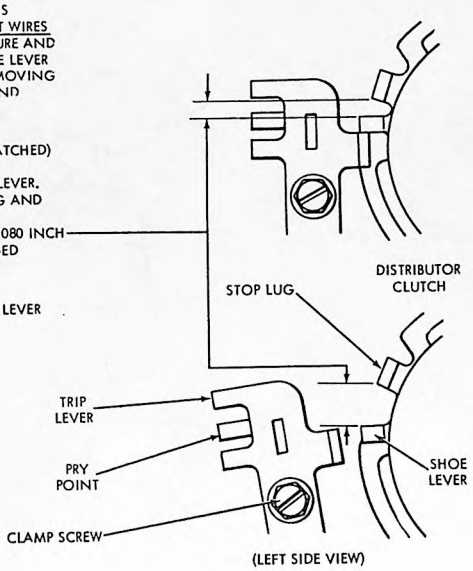
TRIP LEVER (DISTRIBUTOR)

TO CHECK
DISENGAGE (LATCH) CLUTCH. MAKE SURE KEYBOARD UNIVERSAL LEVER IS IN DOWN POSITION (SEE CONTACT WIRES (KEYBOARD) ADJUSTMENT). MEASURE AND RECORD CLEARANCE BETWEEN SHOE LEVER AND STOP LUG. TRIP CLUTCH BY MOVING TRIP LEVER REARWARD. MEASURE AND RECORD SAME CLEARANCE.

REQUIREMENT
(1) WITH CLUTCH DISENGAGED (LATCHED)
MIN. 0.015 INCH
BETWEEN STOP LUG AND SHOE LEVER.
(2) CLEARANCE BETWEEN STOP LUG AND SHOE LEVER
MIN. 0.050 INCH---MAX. 0.080 INCH
GREATER WHEN CLUTCH ENGAGED
THAN WHEN DISENGAGED.

TO ADJUST
USING PRY POINT, POSITION TRIP LEVER WITH CLAMP SCREW LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
BRUSH HOLDER



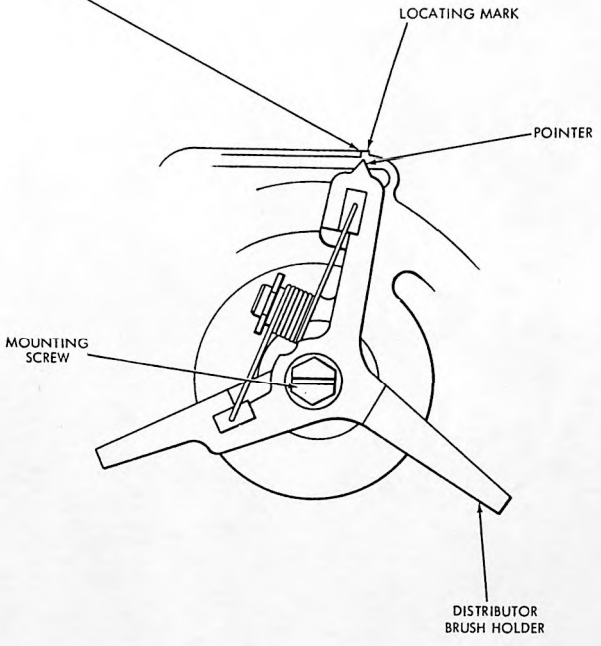
(LEFT SIDE VIEW)

BRUSH HOLDER (DISTRIBUTOR)

REQUIREMENT
WITH DISTRIBUTOR CLUTCH DISENGAGED (LATCHED), POINTER WITHIN LOCATING MARK.

TO ADJUST
POSITION BRUSH HOLDER WITH MOUNTING SCREWS LOOSENED.

RELATED ADJUSTMENTS
AFFECTED BY
TRIP LEVER



(RIGHT SIDE VIEW)

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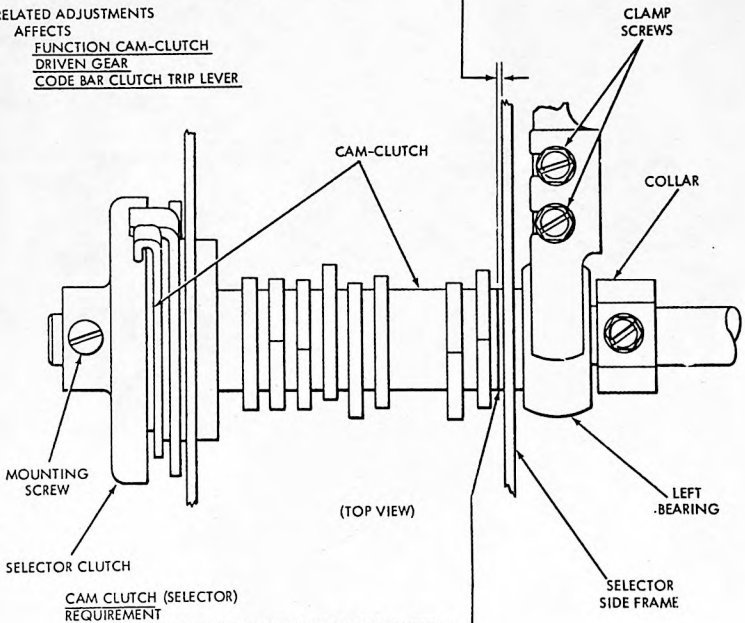
LEFT BEARING (MAIN SHAFT)
REQUIREMENT
THE SELECTOR LEVERS AND START LEVER SHALL FULLY ENGAGE THEIR CAMS WHEN SELECTOR CAM IS IN CONTACT WITH THE BEARING AND THE LEFT SIDE OF BEARING SHALL PROTRUDE BEYOND SELECTOR MOUNTING PLATE.
TO ADJUST
WITH BEARING CLAMP MOUNTING SCREWS LOOSENED POSITION THE BEARING.

RELATED ADJUSTMENTS
AFFECTS
FUNCTION CAM-CLUTCH
DRIVEN GEAR
CODE BAR CLUTCH TRIP LEVER



CAM CLUTCH (SELECTOR)
REQUIREMENT
WITH SELECTOR CLUTCH DISENGAGED AND LATCHED, THERE SHALL BE
MIN. 0.005 INCH --- MAX. 0.012 INCH
END PLAY IN THE SELECTOR CAM ASSEMBLY.
TO ADJUST
WITH THE SELECTOR CLUTCH DRUM SCREW FRICTION TIGHT POSITION DRUM IN ITS OVERSIZED HOLE. (IF A COMPLETE RE-ADJUSTMENT OF THE MACHINE IS TO BE MADE, LOOSEN ALL SCREWS ON MAIN SHAFT EXCEPT FOR COLLAR TO RIGHT OF LEFT HAND MAIN SHAFT BEARING).

NOTE
IF COMPLETE READJUSTMENT OF PRINTER IS BEING UNDERTAKEN, LOOSEN ALL SET SCREWS ON MAIN SHAFT EXCEPT FOR ONE IN COLLAR TO RIGHT OF LEFT BEARING.

FUNCTION CAM-CLUTCH (MAIN SHAFT) - PRELIMINARY NOTE

MAKE THIS ADJUSTMENT ONLY WHEN COMPLETE ADJUSTMENT OF THE PRINTER IS BEING UNDERTAKEN.

REQUIREMENT

AS GAGED BY EYE CLEARANCE BETWEEN CARRIAGE DRIVE ECCENTRIC AND THE END OF FUNCTION STRIPPER BAIL CAM FOLLOWER ROLLER SHAFT

MIN. 0.020 INCHES --- MAX. 0.040 INCHES

WHEN ALL PLAY IS TAKEN UP TO MAKE THIS CLEARANCE A MINIMUM

TO ADJUST

WITH FUNCTION CASTING MOUNTING SCREWS FRICTION TIGHT (SEE FUNCTION CASTING ADJUSTMENT) POSITION LEFT SIDE OF LOWER PORTION OF FUNCTION CASTING WITH LEFT SIDE OF PROJECTION FROM CODE BAR BASKET REAR TIE BAR BY MOVING THE FUNCTION CASTING. LOOSEN SCREW IN THE COLLAR IMMEDIATELY TO LEFT OF FUNCTION CLUTCH AND FUNCTION CLUTCH DRUM MOUNTING SCREW AND POSITION CAM CLUTCH TO MEET THE REQUIREMENT.

RELATED ADJUSTMENTS

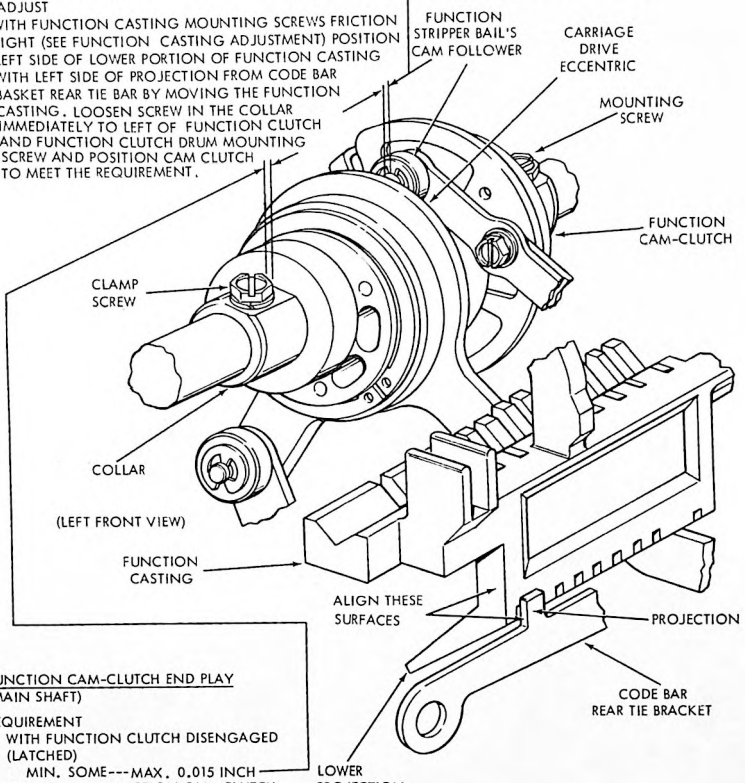
AFFECTS

FUNCTION CAM-CLUTCH END PLAY

AFFECTED BY

LEFT BEARING

CASTING (FUNCTION)



FUNCTION CAM-CLUTCH END PLAY (MAIN SHAFT)

REQUIREMENT

WITH FUNCTION CLUTCH DISENGAGED (LATCHED)

MIN. SOME---MAX. 0.015 INCH END PLAY IN FUNCTION CAM-CLUTCH, AS GAGED BY EYE, WHEN ALL PLAY IS TAKEN UP TO MAKE IT MAXIMUM.

TO ADJUST

POSITION CAM-CLUTCH WITH MOUNTING SCREW LOOSENED.

RELATED ADJUSTMENTS

AFFECTS

CODE BAR CAM-CLUTCH

AFFECTED BY

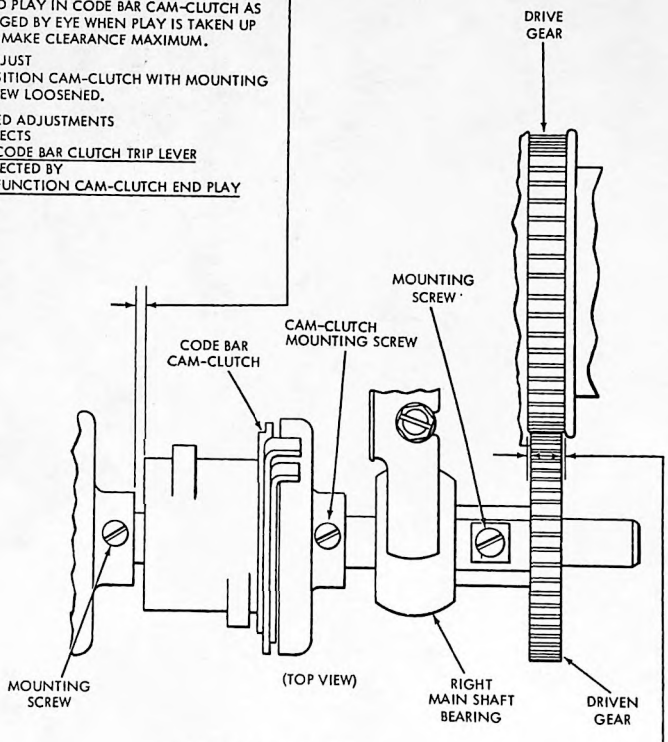
FUNCTION CAM-CLUTCH

CODE BAR CAM-CLUTCH (MAIN SHAFT)

REQUIREMENT
WITH CLUTCH DISENGAGED (LATCHED)
MIN. SOME---MAX. 0.015 INCH
END PLAY IN CODE BAR CAM-CLUTCH AS GAGED BY EYE WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE MAXIMUM.

TO ADJUST
POSITION CAM-CLUTCH WITH MOUNTING SCREW LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
CODE BAR CLUTCH TRIP LEVER
AFFECTED BY
FUNCTION CAM-CLUTCH END PLAY



DRIVEN GEAR (MAIN SHAFT)

REQUIREMENT
DRIVEN GEAR CENTERED ON DRIVE GEAR.

TO ADJUST
POSITION DRIVEN GEAR WITH MOUNTING SCREW LOOSENED.

RELATED ADJUSTMENTS
AFFECTED BY
LEFT BEARING (DISTRIBUTOR)
SHAFT (DISTRIBUTOR)

CODE BAR CLUTCH TRIP LEVER (MAIN SHAFT)

REQUIREMENT

(1) AS GAGED BY EYE, CODE BAR CLUTCH TRIP LEVER APPROXIMATELY ALIGNED WITH SHOE LEVER WITHIN 0.020 INCH

(2) MIN. 0.005 INCH BETWEEN FUNCTION CLUTCH TRIP ROLLER'S SHAFT AND CODE BAR RESET CAM WHEN ALL PLAY IS TAKEN UP TO MAKE CLEARANCE MINIMUM.

TO ADJUST

POSITION TRIP LEVER WITH CLAMP SCREW LOOSENED. IT MAY ALSO BE NECESSARY TO LOOSEN SET SCREW IN COLLAR.

RELATED ADJUSTMENTS

AFFECTS

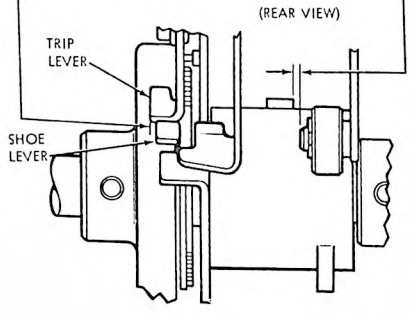
LATCH LEVERS

CODE BAR CLUTCH FOLLOWER ARM

AFFECTED BY

LEFT BEARING

CODE BAR CAM-CLUTCH



LATCH LEVERS (MAIN SHAFT)

REQUIREMENT

AS GAGED BY EYE

MIN. SOME---MAX. 0.012 INCH END PLAY IN LATCH LEVERS.

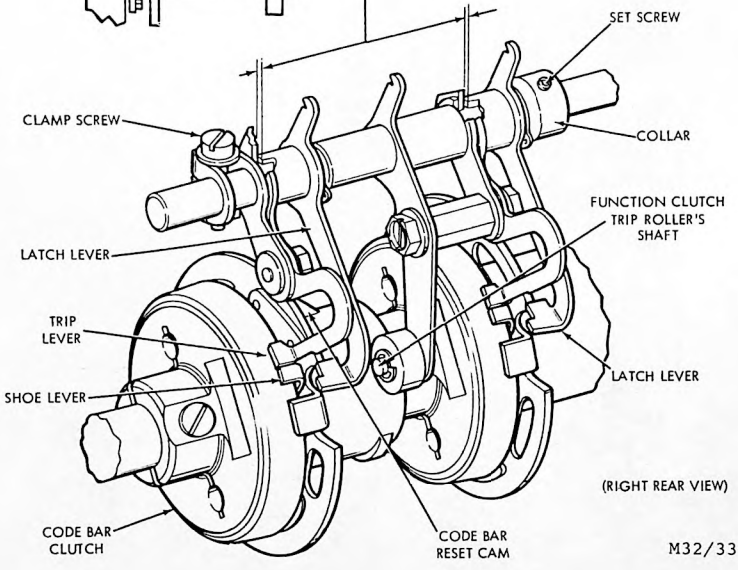
TO ADJUST

POSITION COLLAR WITH SET SCREW LOOSENED.

RELATED ADJUSTMENTS

AFFECTED BY

CODE BAR CLUTCH TRIP LEVER



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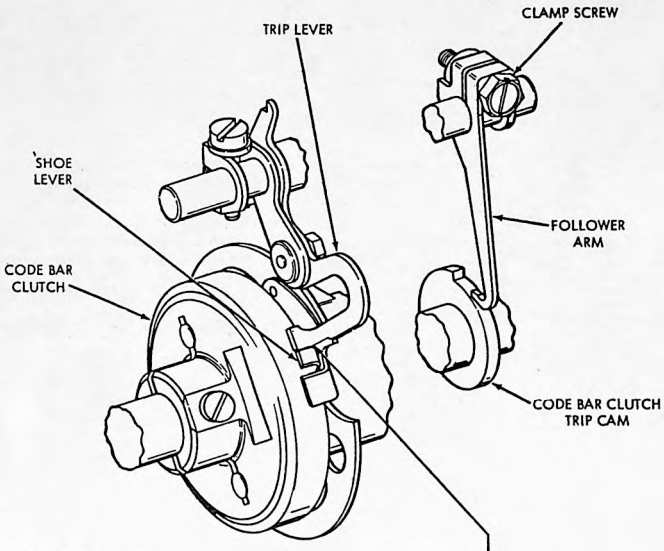


CODE BAR CLUTCH FOLLOWER ARM
(MAIN SHAFT)

REQUIREMENT
WITH PRINTER IN STOP CONDITION, TRIP LEVER SHOULD FULLY ENGAGE SHOE LEVER BY APPROXIMATELY FULL THICKNESS OF CLUTCH SHOE LEVER. AS GAGED BY EYE.

TO ADJUST
POSITION CODE BAR FOLLOWER ARM WITH ITS CLAMP SCREW LOOSENED. MAKE SURE FOLLOWER IS AT CENTER OF TRIP CAM.

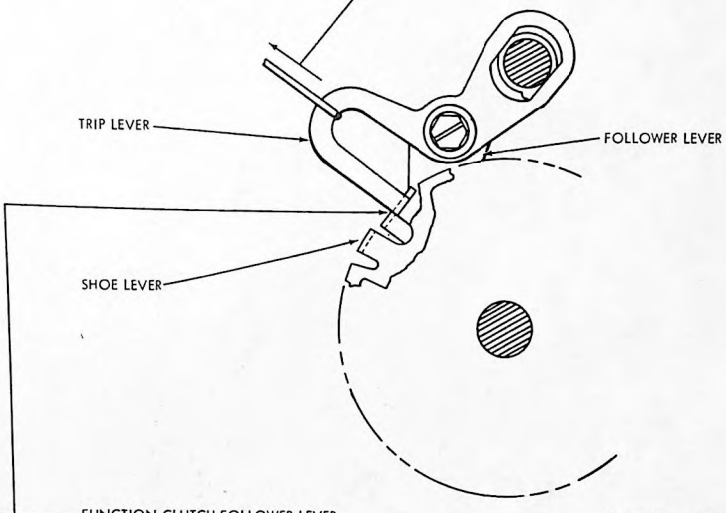
RELATED ADJUSTMENTS AFFECTED BY
CODE BAR CLUTCH TRIP LEVER

TRIP LEVER SPRINGS (MAIN SHAFT)

NOTE

CHECK FOR BOTH CODE BAR AND FUNCTION CLUTCHES.

REQUIREMENT
WITH CLUTCH ENGAGED
CODE BAR CLUTCH
MIN. 6 OZS. ---MAX. 12 OZS.
FUNCTION CLUTCH
MIN. 2 OZS. ---MAX. 4 OZS.
TO START TRIP LEVER MOVING.

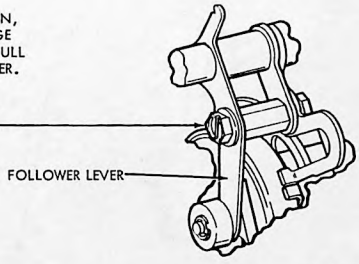


FUNCTION CLUTCH FOLLOWER LEVER (MAIN SHAFT)

(LEFT SIDE VIEW)

REQUIREMENT
WITH PRINTER IN STOP CONDITION, TRIP LEVER SHOULD FULLY ENGAGE SHOE LEVER BY APPROXIMATELY FULL THICKNESS OF CLUTCH SHOE LEVER.

TO ADJUST
POSITION FOLLOWER LEVER WITH CLAMP SCREW LOOSENED.



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NOTE

MAKE THIS ADJUSTMENT FOR BOTH FUNCTION AND CODE BAR CLUTCHES.

CODE BAR AND FUNCTION CLUTCH TRIP LEVERS (MAIN SHAFT)

TO CHECK

DISENGAGE (LATCH) CLUTCH. MEASURE AND RECORD CLEARANCE BETWEEN SHOE LEVER AND STOP LUG ON CLUTCH DISK. TRIP CLUTCH BY MOVING TRIP LEVER REARWARD. MEASURE AND RECORD SAME CLEARANCE.

REQUIREMENT

(1) WITH CLUTCH DISENGAGED (LATCHED) MIN. 0.015 INCH. BETWEEN SHOE LEVER AND STOP LUG.

(2) WITH CLUTCH DISENGAGED AND LATCHED, TRIP CLUTCH BY LIFTING STOP LEVER PERMITTING STOP LEVER TO COME TO REST ON CLUTCH SHOE RELEASE LEVER. MIN. 0.055 INCH --- MAX. 0.085 INCH BETWEEN EDGE OF STOP LEVER AND EDGE OF CLUTCH SHOE RELEASE LEVER CLOSEST TO DISK STOP LUG.

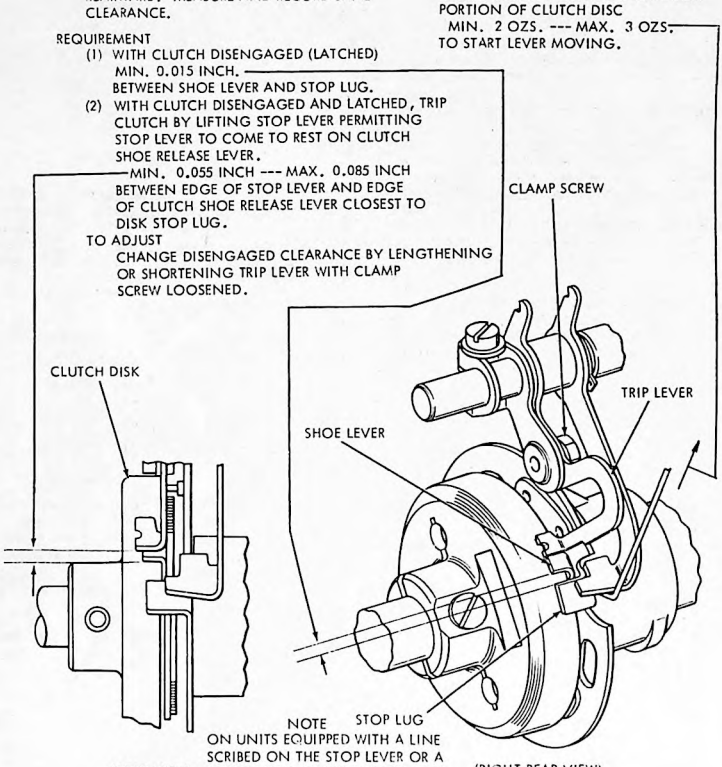
TO ADJUST

CHANGE DISENGAGED CLEARANCE BY LENGTHENING OR SHORTENING TRIP LEVER WITH CLAMP SCREW LOOSENED.

FUNCTION AND CODE BAR CLUTCH LATCH LEVER SPRING TENSION

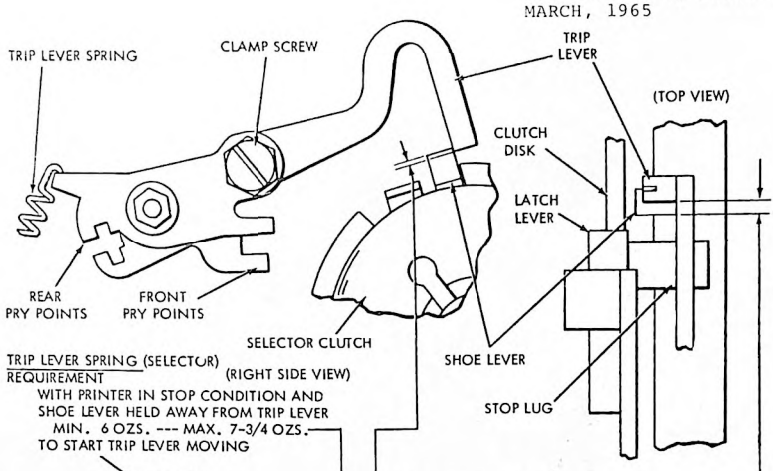
REQUIREMENT

WITH LATCH LEVER RESTING ON HIGH PORTION OF CLUTCH DISC MIN. 2 OZS. --- MAX. 3 OZS. TO START LEVER MOVING.



NOTE

ON UNITS EQUIPPED WITH A LINE SCRIBED ON THE STOP LEVER OR A NOTCH IN THE EDGE OF THE STOP LEVER, THE LINE SHOULD LINE UP (AS GAGED BY EYE) WITH THE EDGE OF THE CLUTCH SHOE LEVER FURTHEST FROM THE CLUTCH DISK STOP LUG.



TRIP LEVER SPRING (SELECTOR) (RIGHT SIDE VIEW)

REQUIREMENT

WITH PRINTER IN STOP CONDITION AND SHOE LEVER HELD AWAY FROM TRIP LEVER

MIN. 6 OZS. --- MAX. 7-3/4 OZS. TO START TRIP LEVER MOVING

NOTE

START LEVER AND LATCH LEVER SPRINGS ALSO INFLUENCE THIS SPRING TENSION. CHECK THEM INDIVIDUALLY IF ABOVE REQUIREMENT IS NOT MET. IF THEY MEET REQUIREMENTS, REPLACE TRIP LEVER SPRING.

CLUTCH TRIP LEVER (SELECTOR)

TO CHECK

DISENGAGE (LATCH) SELECTOR CLUTCH. CHECK ENGAGEMENT BETWEEN SHOE LEVER AND TRIP LEVER (SEE REQUIREMENT (1) BELOW). MEASURE AND RECORD CLEARANCE BETWEEN SHOE LEVER AND STOP LUG ON CLUTCH DISK. TRIP CLUTCH BY MOVING SELECTOR ARMATURE REARWARD. MAKE SURE CLUTCH DISK IS AGAINST LATCH LEVER. MEASURE AND RECORD SAME CLEARANCE.

REQUIREMENT

THE SELECTOR CLUTCH TRIP LEVER SHOULD

(1) ENGAGE CLUTCH SHOE LEVER BY APPROXIMATELY THE FULL THICKNESS OF CLUTCH SHOE LEVER.

(2) WITH CLUTCH DISENGAGED (LATCHED) MIN. 0.015 INCH BETWEEN SHOE LEVER AND STOP LUG.

(3) WITH CLUTCH IN STOP POSITION (DISENGAGED) AND LATCHED, TRIP CLUTCH BY LIFTING TRIP LEVER PERMITTING TRIP LEVER TO COME TO REST ON CLUTCH SHOE RELEASE LEVER.

MIN. 0.055 INCH --- MAX. 0.085 INCH BETWEEN THE EDGE OF THE TRIP LEVER AND THE EDGE OF THE CLUTCH SHOE RELEASE LEVER CLOSEST TO THE DISK STOP LUG.

TO ADJUST:

USING REAR PRY POINTS, POSITION TRIP LEVER, CHANGING THE CLOSED GAP. USING THE FRONT PRY POINTS, VARY THE CLUTCH "BITE."

RELATED ADJUSTMENTS

AFFECTS

MAGNET CORE

ARMATURE BRACKET

NOTE

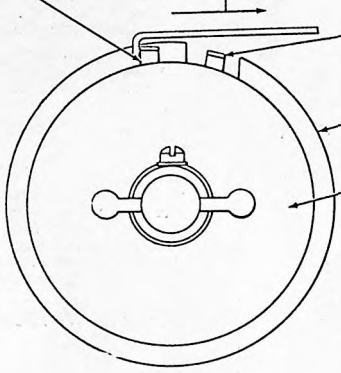
ON UNITS EQUIPPED WITH A LINE SCRIBED ON THE TRIP LEVER OR A NOTCH IN THE EDGE OF THE TRIP LEVER, THE LINE SHOULD LINE UP (AS GAGED BY EYE) WITH THE EDGE OF THE CLUTCH SHOE LEVER FURTHEST FROM THE CLUTCH DISK STOP LUG.

NOTE

THESE TENSIONS APPLY TO ALL CLUTCHES.

CLUTCH SHOE LEVER SPRING (SELECTOR)

REQUIREMENT
WITH CLUTCH ENGAGED AND CLUTCH DISK HELD TO PREVENT ITS TURNING
MIN. 15 OZS. ---MAX. 20 OZS.
TO PULL SHOE LEVER IN CONTACT WITH STOP LUG.



(RIGHT SIDE VIEW)

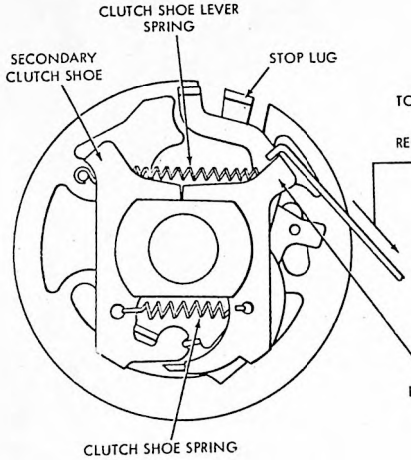
CLUTCH SHOE SPRING (SELECTOR)

NOTE

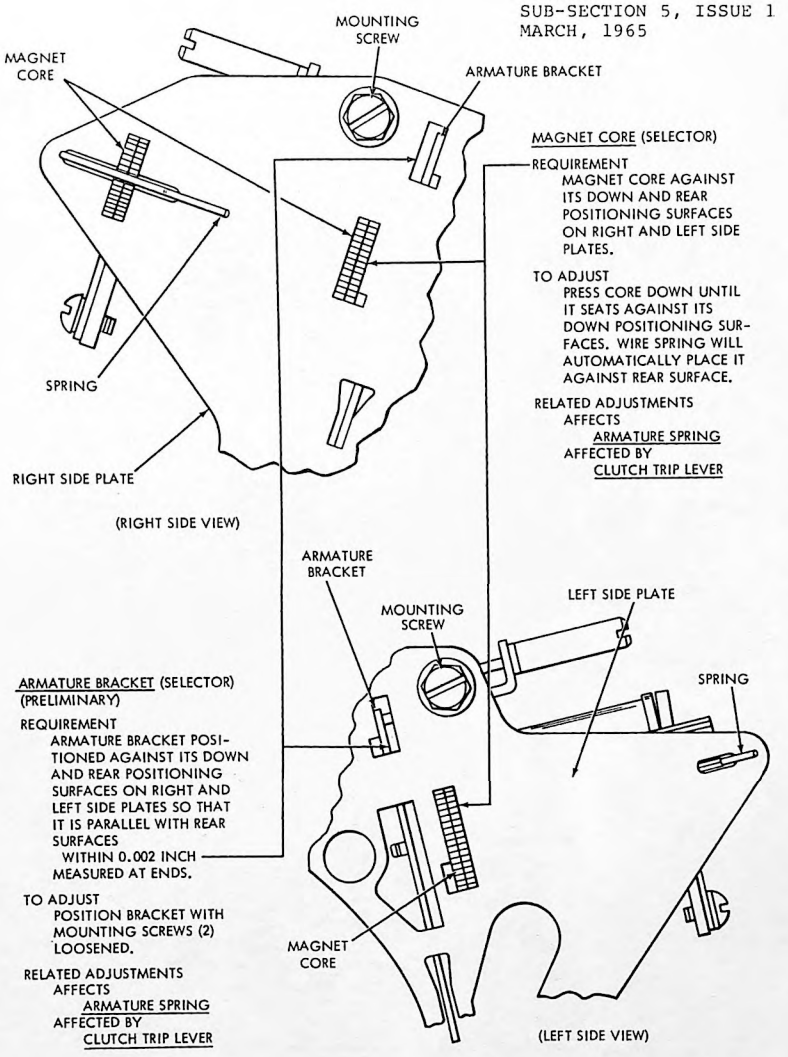
IN ORDER TO CHECK THIS SPRING TENSION, IT IS NECESSARY TO REMOVE THE CLUTCH FROM THE MAIN SHAFT. THEREFORE IT SHOULD NOT BE CHECKED UNLESS THERE IS REASON TO BELIEVE IT WILL NOT MEET ITS REQUIREMENTS.

TO CHECK
REMOVE DRUM.

REQUIREMENT
MIN. 3 OZS. ---MAX. 5 OZS.
TO START PRIMARY SHOE MOVING.



(LEFT SIDE VIEW)



MAGNET CORE (SELECTOR)

REQUIREMENT
MAGNET CORE AGAINST ITS DOWN AND REAR POSITIONING SURFACES ON RIGHT AND LEFT SIDE PLATES.

TO ADJUST
PRESS CORE DOWN UNTIL IT SEATS AGAINST ITS DOWN POSITIONING SURFACES. WIRE SPRING WILL AUTOMATICALLY PLACE IT AGAINST REAR SURFACE.

RELATED ADJUSTMENTS
AFFECTS
ARMATURE SPRING
AFFECTED BY
CLUTCH TRIP LEVER

ARMATURE BRACKET (SELECTOR) (PRELIMINARY)

REQUIREMENT
ARMATURE BRACKET POSITIONED AGAINST ITS DOWN AND REAR POSITIONING SURFACES ON RIGHT AND LEFT SIDE PLATES SO THAT IT IS PARALLEL WITH REAR SURFACES WITHIN 0.002 INCH MEASURED AT ENDS.

TO ADJUST
POSITION BRACKET WITH MOUNTING SCREWS (2) LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
ARMATURE SPRING
AFFECTED BY
CLUTCH TRIP LEVER

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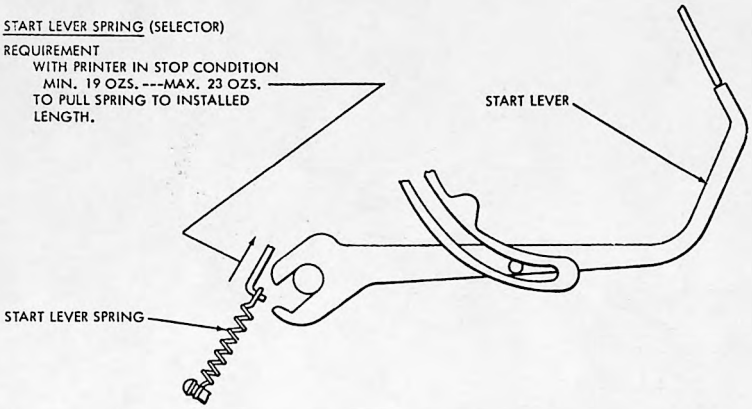
START LEVER SPRING (SELECTOR)

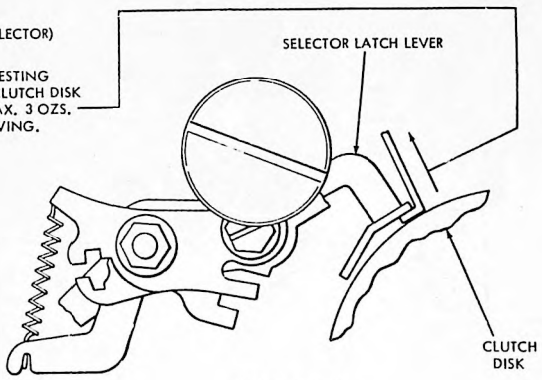
REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 19 OZS. ---MAX. 23 OZS.
TO PULL SPRING TO INSTALLED
LENGTH.



(LEFT SIDE VIEW)

LATCH LEVER SPRING (SELECTOR)

REQUIREMENT
WITH LATCH LEVER RESTING
ON HIGH PART OF CLUTCH DISK
MIN. 2 OZS. ---MAX. 3 OZS.
TO START LEVER MOVING.



(LEFT SIDE VIEW)

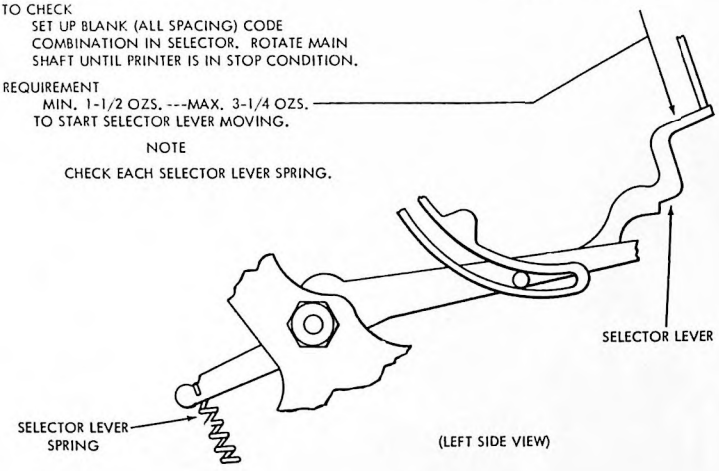
SELECTOR LEVER SPRINGS (SELECTOR)

TO CHECK
SET UP BLANK (ALL SPACING) CODE COMBINATION IN SELECTOR. ROTATE MAIN SHAFT UNTIL PRINTER IS IN STOP CONDITION.

REQUIREMENT
MIN. 1-1/2 OZS. ---MAX. 3-1/4 OZS. TO START SELECTOR LEVER MOVING.

NOTE

CHECK EACH SELECTOR LEVER SPRING.

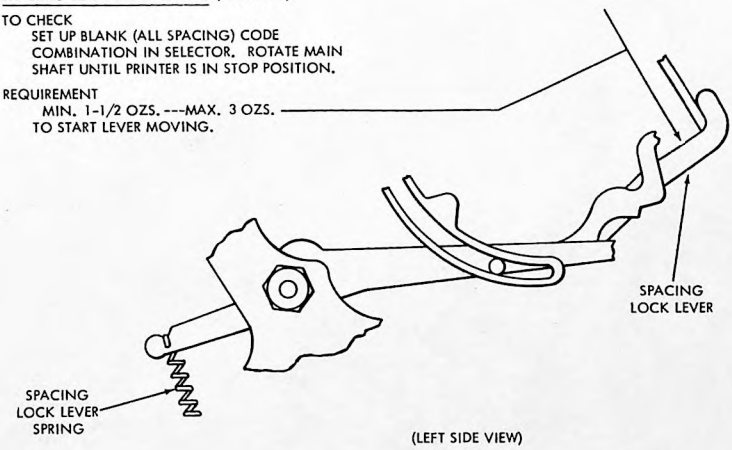


(LEFT SIDE VIEW)

SPACING LOCK LEVER SPRING (SELECTOR)

TO CHECK
SET UP BLANK (ALL SPACING) CODE COMBINATION IN SELECTOR. ROTATE MAIN SHAFT UNTIL PRINTER IS IN STOP POSITION.

REQUIREMENT
MIN. 1-1/2 OZS. ---MAX. 3 OZS. TO START LEVER MOVING.



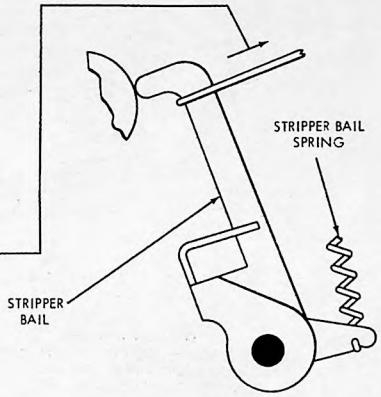
(LEFT SIDE VIEW)

M32/33-30

STRIPPER BAIL SPRING (SELECTOR)

TO CHECK
SET RANGE FINDER AT 60. SET UP BLANK CODE COMBINATION (ALL SPACING) IN SELECTOR. ROTATE MAIN SHAFT UNTIL PRINTER IS IN STOP CONDITION.

REQUIREMENT
MIN. 1/4 OZ. ---MAX. 1 OZ.
TO START BAIL MOVING.



(LEFT SIDE VIEW)

PUSH LEVER SPRINGS (SELECTOR)

NOTE

TO MEASURE THIS TENSION, SELECTOR MUST BE REMOVED FROM PRINTER. THEREFORE, DO NOT CHECK IT UNLESS THERE IS CAUSE TO SUSPECT IT WILL NOT MEET REQUIREMENT.

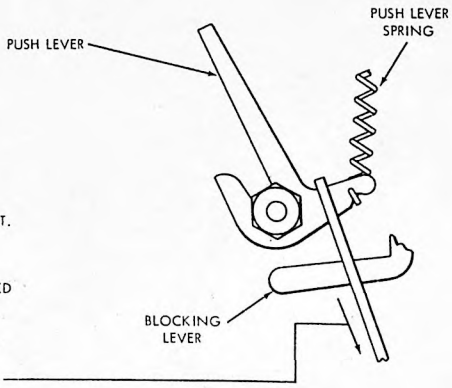
CAUTION

BEFORE REMOVING SELECTOR, MAKE SURE ARMATURE IS LOCKED IN SPACING POSITION.

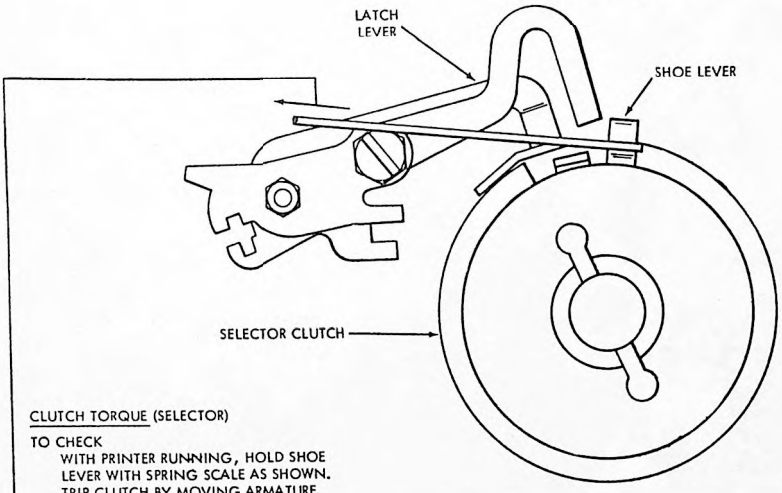
REQUIREMENT
WITH BLOCKING LEVER HELD AWAY FROM PUSH LEVER
MIN. 1-1 2 OZS. ---MAX. 3 OZS.
TO START LEVER MOVING.

NOTE

CHECK EACH PUSH LEVER SPRING.



(LEFT SIDE VIEW)



(LEFT SIDE VIEW)

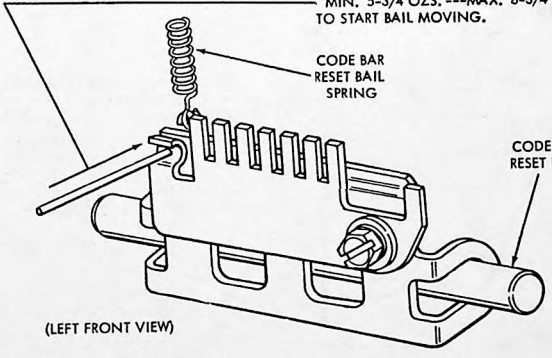
CLUTCH TORQUE (SELECTOR)

TO CHECK
WITH PRINTER RUNNING, HOLD SHOE LEVER WITH SPRING SCALE AS SHOWN. TRIP CLUTCH BY MOVING ARMATURE REARWARD. ALLOW CLUTCH TO ADVANCE UNTIL LATCH LEVER IS DISENGAGED.

REQUIREMENT
MIN. 13 OZS. ---MAX. 16 OZS. TO HOLD SHOE LEVER.

CODE BAR RESET BAIL SPRING (FUNCTION)

REQUIREMENT
WITH BLANK SELECTED AND MAIN SHAFT ROTATED UNTIL CODE BAR RESET BAIL IS IN HIGHEST POSITION, MIN. 5-3/4 OZS. ---MAX. 8-3/4 OZS. TO START BAIL MOVING.



(LEFT FRONT VIEW)

M32/33-32

MAIN SHAFT TORQUE (VARIOUS AREAS)

NOTE

THIS ADJUSTMENT REQUIRES USE OF TORQUE WRENCH. IT NEED NOT BE CHECKED UNLESS COMPLETE READJUSTMENT IS BEING UNDERTAKEN OR ADJUSTMENTS AFFECTING DRIVE SYSTEM HAVE BEEN CHANGED.

REQUIREMENT

(1) WITH MOTOR BELT OFF AND ALL CLUTCHES DISENGAGED (LATCHED)
MAX. 35 IN. -OZS.
TO START MAIN SHAFT ROTATING.

(2) WITH MOTOR BELT IN PLACE AND ALL CLUTCHES DISENGAGED (LATCHED)
MAX. 45 IN. -OZS.
TO START MAIN SHAFT ROTATING (CHECK IN AT LEAST EIGHT DIFFERENT POSITIONS ON SHAFT).

TO ADJUST

IF REQUIREMENTS ARE NOT MET, CHECK FOLLOWING ADJUSTMENTS:

(1) GEAR BRACKET (MOTOR)
(2) BELT TENSION (MOTOR)
(3) CAM-CLUTCH (SELECTOR)
(4) LEFT BEARING (MAIN SHAFT)
(5) BEARING ALIGNMENT (VARIOUS AREAS)
(6) FUNCTION CAM-CLUTCH END PLAY (MAIN SHAFT)
(7) CODE BAR CAM-CLUTCH (MAIN SHAFT)
(8) DRIVEN GEAR (MAIN SHAFT)
(9) CLUTCH TRIP LEVER (SELECTOR)

IF ANY OF ABOVE ADJUSTMENTS ARE CHANGED, RECHECK BEARING ALIGNMENT (VARIOUS AREAS).

BEARING ALIGNMENT (VARIOUS AREAS)

NOTE

THIS ADJUSTMENT APPLIES TO MAIN SHAFT BEARINGS (PAGE 19 AND 21) DISTRIBUTOR SHAFT BEARINGS (PAGE 15), FUNCTION ROCKER SHAFT BEARINGS (PAGE 34), AND CODE BAR RESET BAIL BEARINGS (PAGE 35). IT SHOULD ONLY BE MADE IF BEARING CLAMPS HAVE LOOSENED, OR IF A BIND IS DETECTED IN ASSOCIATED SHAFT.

REQUIREMENT

BEARINGS ALIGNED WITH THEIR RESPECTIVE SHAFTS.

TO ADJUST

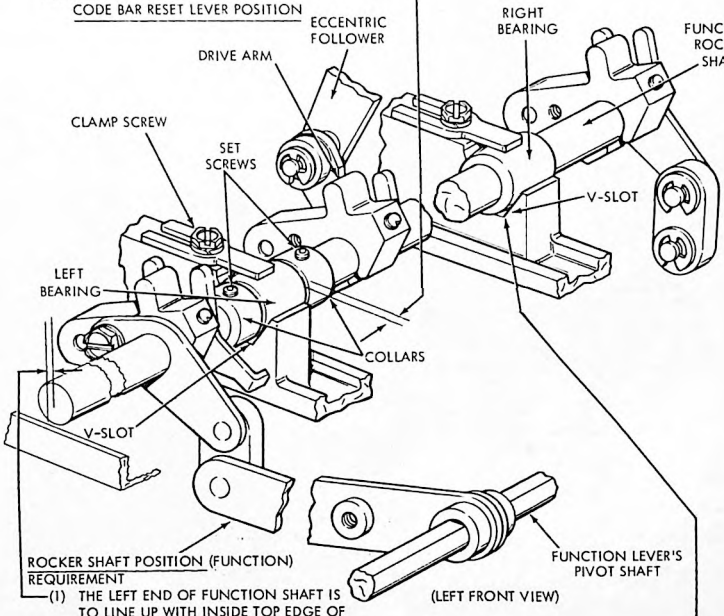
WITH BEARING CLAMP SCREWS TIGHT, TAP SHAFT WITH SCREWDRIVER HANDLE, PIECE OF WOOD, OR SOFT MALLET IN AREA ADJACENT TO BEARING. WHEN ALIGNING MAIN SHAFT BEARINGS, LOOSEN SELECTOR MOUNTING SCREWS.

ROCKER SHAFT END PLAY (FUNCTION)

REQUIREMENT
AS GAGED BY EYE
MIN. SOME---MAX. 0.010 INCH
END PLAY IN FUNCTION ROCKER SHAFT.

TO ADJUST
POSITION TWO COLLARS WITH SET SCREWS LOOSENED.

RELATED ADJUSTMENT
AFFECTS
CODE BAR RESET LEVER POSITION



ROCKER SHAFT POSITION (FUNCTION)

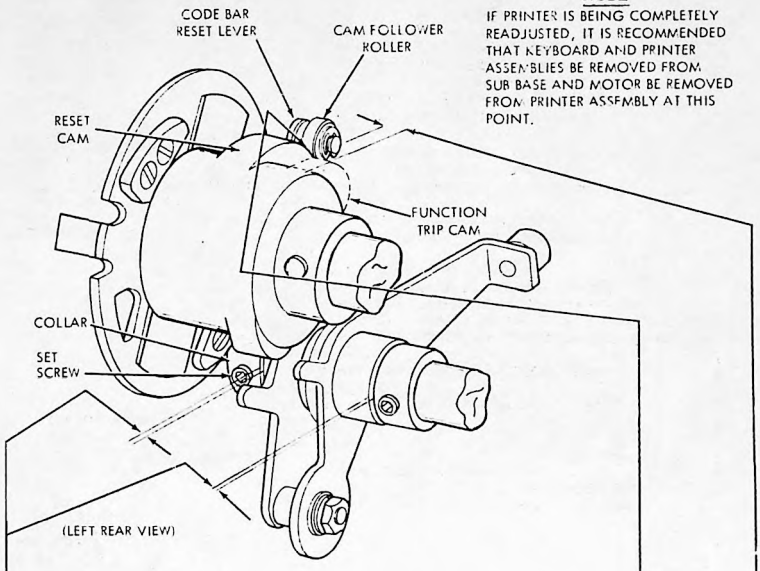
REQUIREMENT
(1) THE LEFT END OF FUNCTION SHAFT IS TO LINE UP WITH INSIDE TOP EDGE OF DIE CASTING "LIP".
0.020 INCH MISALIGNMENT IS PERMISSIBLE TO THE LEFT.
0.030 INCH MISALIGNMENT IS PERMISSIBLE TO THE RIGHT.
(2) BOTH BEARINGS TO BE CENTERED ON BASE CASTING, AS GAGED BY EYE.

TO ADJUST
POSITION SHAFT WITH LEFT BEARINGS CLAMP SCREW LOOSENED.

RELATED ADJUSTMENT
AFFECTS
CODE BAR RESET LEVER POSITION

NOTE

IF PRINTER IS BEING COMPLETELY READJUSTED, IT IS RECOMMENDED THAT KEYBOARD AND PRINTER ASSEMBLIES BE REMOVED FROM SUB BASE AND MOTOR BE REMOVED FROM PRINTER ASSEMBLY AT THIS POINT.



CODE BAR RESET LEVER POSITION (FUNCTION)

REQUIREMENT

WITH PRINTER IN STOP CONDITION:

(1) CODE BAR RESET LEVER'S CAM FOLLOWER ROLLER APPROXIMATELY CENTERED ON RESET CAM, AS GAGED BY EYE

MAX. 0.020 INCH OVERHANG PERMITTED ON RIGHT SIDE ONLY.

(2) MIN. SOME---MAX. 0.010 INCH END PLAY IN RESET LEVER.

(3) MIN. 0.005 INCH BETWEEN ROLLER'S SHAFT AND FUNCTION TRIP CAM.

TO ADJUST

POSITION TWO COLLARS WITH SET SCREWS LOOSENED.

RELATED ADJUSTMENTS

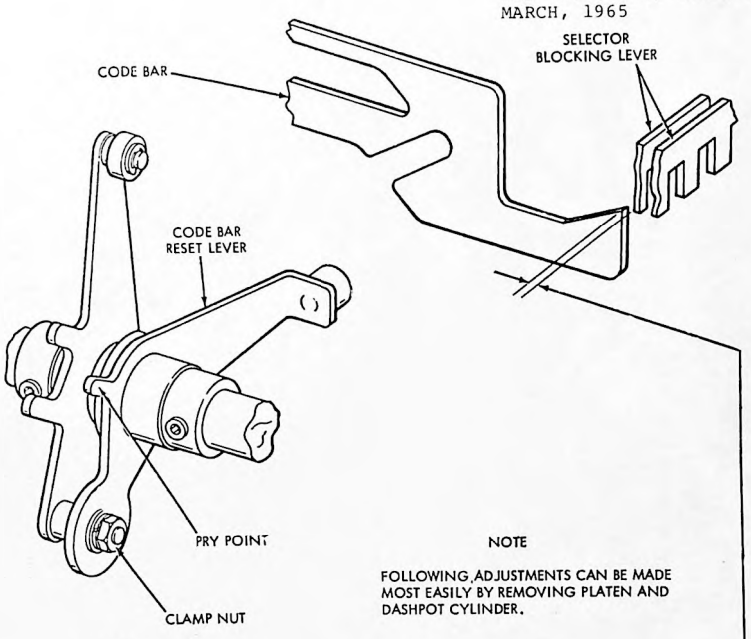
AFFECTS

CODE BAR RESET LEVER

AFFECTED BY

ROCKER SHAFT POSITION

ROCKER SHAFT END PLAY



(LEFT REAR VIEW)

NOTE

FOLLOWING ADJUSTMENTS CAN BE MADE MOST EASILY BY REMOVING PLATEN AND DASHPOT CYLINDER.

CODE BAR RESET LEVER (FUNCTION)

REQUIREMENT

WITH PRINTER IN STOP CONDITION (ALL CLUTCHES LATCHED)

MIN. 0.012 INCHES --- MAX. 0.030 INCHES CLEARANCE BETWEEN CODE BAR CLOSEST TO FRONT OF UNIT AND ITS SELECTING BLOCKING LEVER WHEN ALL PARTS ARE POSITIONED TO MAKE THIS CLEARANCE A MINIMUM.

TO ADJUST

USING PRY POINT, ADJUST CODE BAR RESET LEVER WITH CLAMP NUT LOOSENED.

(1) TO CHECK

PUSH ALL CODE BARS DOWN. IF NO MOVEMENT IS NOTED BETWEEN CODE BARS AND THEIR GUIDE POSTS, REFINE ADJUSTMENT ABOVE.

(2) TO CHECK

IF INTERFERENCE IS NOTED BETWEEN THE CARRIAGE DRIVE LINK AND CODE BARS DURING THE NORMAL OPERATING CYCLE AND/OR IF IT ADDS TO THE PRINTERS INHERENT NOISE, REFINE REQUIREMENT ABOVE.

RELATED ADJUSTMENTS

AFFECTS

PRINT SUPPRESSION LATCH

PRINT SUPPRESSION CAM FOLLOWER

AFFECTED BY

CODE BAR RESET LEVER POSITION

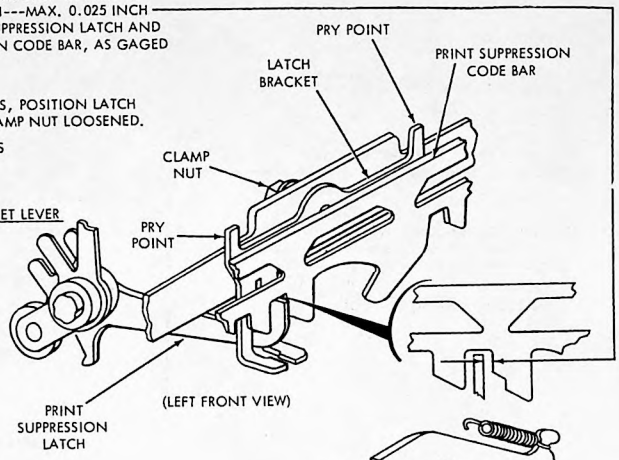
M32/33-36

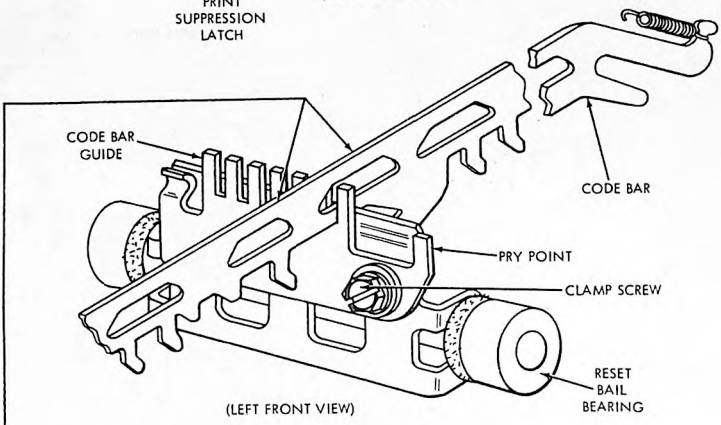
PRINT SUPPRESSION LATCH (FUNCTION)

REQUIREMENT
WITH PRINTER IN THE STOP CONDITION MIN. 0.010 INCH---MAX. 0.025 INCH BETWEEN PRINT SUPPRESSION LATCH AND PRINT SUPPRESSION CODE BAR, AS GAGED BY EYE.

TO ADJUST
USING PRY POINTS, POSITION LATCH BRACKET WITH CLAMP NUT LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
CASTING
AFFECTED BY
CODE BAR RESET LEVER





CODE BAR GUIDE (FUNCTION)

TO CHECK
POSITION CARRIAGE AT LEFT SIDE OF PRINTER. PUSH AND PULL CODE BARS AT SPRING HOOK END.

REQUIREMENT
NO EXCESSIVE DEFLECTION IN EITHER DIRECTION OF CODE BARS NEAR THEIR CENTER.

TO ADJUST
USING PRY POINT, POSITION CODE BAR GUIDE WITH CLAMP SCREW LOOSENED.

BLOCKING LEVERS (SELECTOR)

REQUIREMENT

WITH THE "RUB-OUT" CODE COMBINATION SET UP IN SELECTOR, SELECTOR LEVERS ON PEAK OF THEIR RESPECTIVE CAMS, AND CODE BAR ENDS APPROXIMATELY FLUSH WITH THE LEFT (OUTER) EDGE OF THE BLOCKING LEVERS,

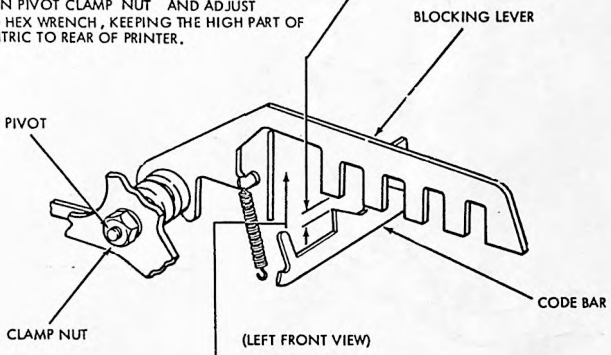
MIN. 0.006 INCH --- MAX. 0.060 INCH BETWEEN THE BLOCKING LEVERS AND THE CODE BARS.

TO CHECK

(ON 8 LEVEL UNITS ONLY SET THE RANGE SCALE INDICATOR BETWEEN 70 AND 80) ENERGIZE THE SELECTOR MAGNET AND SET UP "RUB-OUT" CODE COMBINATION IN SELECTOR, WITH SELECTOR CLUTCH LATCHED IN ITS "STOP" POSITION, MANUALLY TRIP CODE BAR CLUTCH AND ROTATE MAINSHAFT, ALLOWING CODE BARS TO RISE UNTIL THEIR ENDS ARE APPROXIMATELY FLUSH WITH LEFT (OUTER) EDGE OF BLOCKING LEVERS.

TO ADJUST

LOOSEN PIVOT CLAMP NUT AND ADJUST USING HEX WRENCH, KEEPING THE HIGH PART OF ECCENTRIC TO REAR OF PRINTER.



(LEFT FRONT VIEW)

BLOCKING LEVER SPRINGS (SELECTOR)

TO CHECK

SET UP BLANK (ALL SPACING) CODE COMBINATION IN SELECTOR. ROTATE MAIN SHAFT UNTIL PRINTER IS IN STOP CONDITION.

REQUIREMENT

MIN. 1/2 OZ. ---MAX. 1-1/4 OZS. TO START LEVER MOVING.

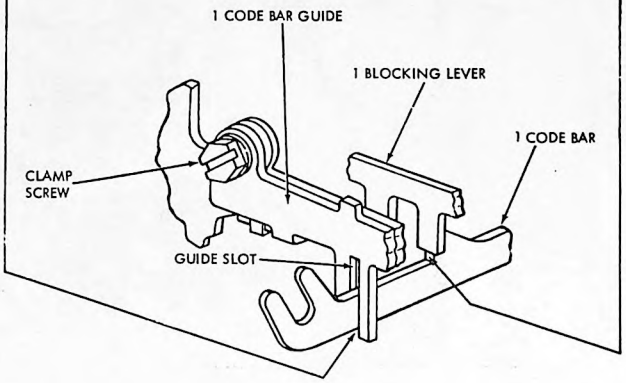
NOTE

CHECK FOR EACH BLOCKING LEVER SPRING.

NO. 1 CODE BAR GUIDE (FUNCTION) - MODEL 33 ONLY

REQUIREMENT
WITH PRINTER IN STOP CONDITION
(1) 1 CODE BAR CENTRALLY LOCATED IN GUIDE SLOT.
(2) 1 BLOCKING LEVER ENGAGING AT LEAST FULL THICKNESS OF 1 CODE BAR.

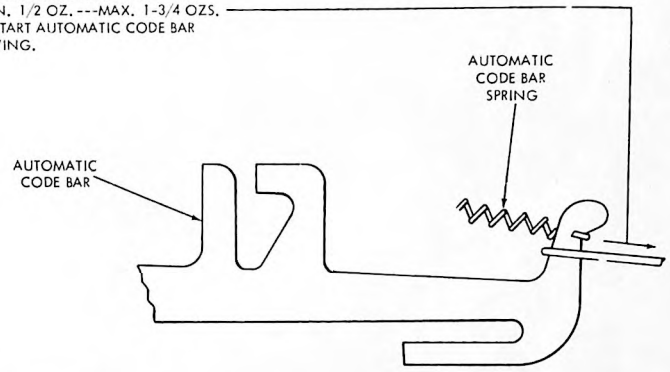
TO ADJUST
POSITION GUIDE WITH CLAMP SCREW LOOSENED.



AUTOMATIC CODE BAR SPRING (FUNCTION)

REQUIREMENT

WITH CARRIAGE AT LEFT MARGIN
MIN. 1/2 OZ. ---MAX. 1-3/4 OZS.
TO START AUTOMATIC CODE BAR
MOVING.



NO. 3 CODE BAR SPRING (FUNCTION)*

REQUIREMENT

WITH PRINTER IN STOP CONDITION
AND NO. 3 CODE BAR'S FOLLOWER *
ON CARRIAGE LIFTED
MIN. 12 OZS. ---MAX. 14 OZS.
TO START CODE BAR MOVING.

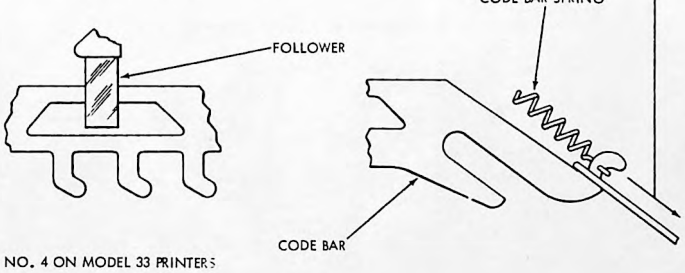
NOTE

CHECK FOR EACH CODE BAR SPRING
OTHER THAN AUTOMATIC AND NO. 3.*

CODE BAR SPRINGS (FUNCTION)
(OTHER THAN NO.3 AND AUTOMATIC)*

REQUIREMENT

WITH PRINTER IN STOP CONDITION
AND CODE BAR'S FOLLOWER LIFTED
MIN. 5-1/2 OZS. ---MAX. 7-1/2 OZS.
TO START BAR MOVING.



* NO. 4 ON MODEL 33 PRINTERS

FUNCTION PAWL SPRING (FUNCTION)

REQUIREMENT

WITH PRINTER IN STOP POSITION, AND ALL EXTERNAL LOADS WHICH WOULD INFLUENCE THE REQUIREMENT REMOVED

MIN. 1-1/4 OZS. --- MAX. 2-1/2 OZS. TO START PAWL MOVING

MIN. 9 OZS. --- MAX. 13 OZS. ON PAWLS FOR "BELL" AND WHERE FUNCTION CONTACTS ARE USED.

MIN. 6 OZS. --- MAX. 8-1/2 OZS. FOR ANSWER-BACK FUNCTION PAWL.

LEFT ROCKER DRIVE ARM (FUNCTION)

TO CHECK

SET UP CARRIAGE RETURN CODE COMBINATION (---4-) or (1-34---8) IN SELECTOR. ROTATE MAIN SHAFT UNTIL FUNCTION BAIL IS AT HIGHEST POINT OF TRAVEL.

REQUIREMENT

MIN. 0.020 INCH---MAX. 0.040 INCH BETWEEN CARRIAGE-RETURN FUNCTION LEVER AND ITS FUNCTION PAWL.

TO ADJUST

USING PRY POINT, ADJUST ROCKER DRIVE ARM (ON FUNCTION ROCKER SHAFT) WITH CLAMP SCREW LOOSENED.

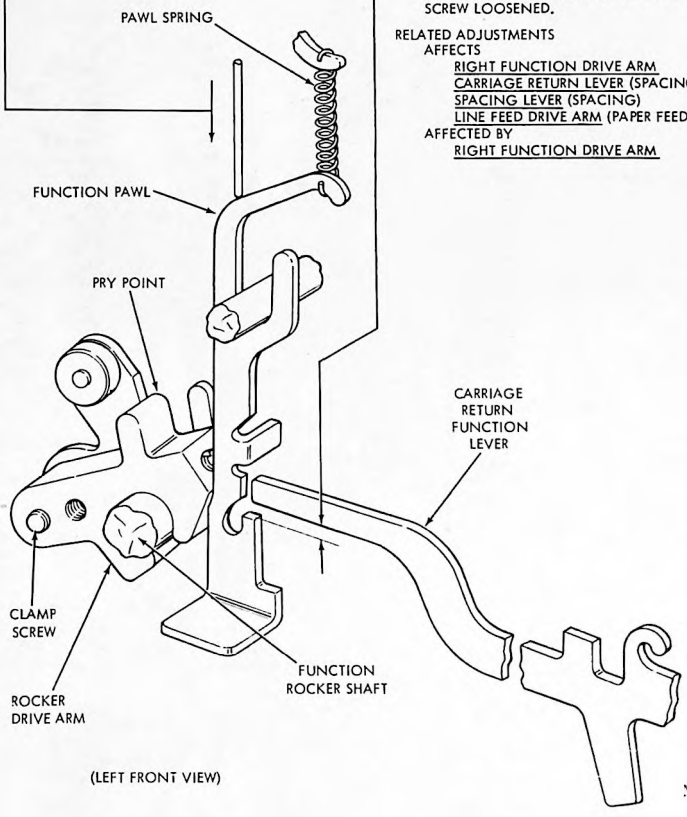
RELATED ADJUSTMENTS

AFFECTS

RIGHT FUNCTION DRIVE ARM
CARRIAGE RETURN LEVER (SPACING)
SPACING LEVER (SPACING)
LINE FEED DRIVE ARM (PAPER FEED)

AFFECTED BY

RIGHT FUNCTION DRIVE ARM



(LEFT FRONT VIEW)

M32/33-41

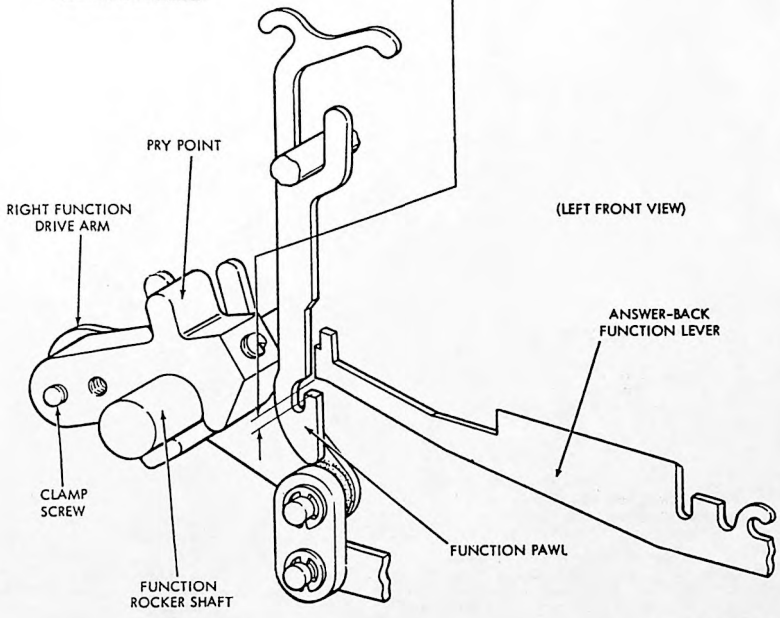
RIGHT FUNCTION DRIVE ARM (FUNCTION)

TO CHECK
SET UP ANSWER-BACK CHARACTER (WRU) IN SELECTOR. ROTATE MAIN SHAFT UNTIL FUNCTION BAIL IS AT ITS HIGHEST POINT. MAKE SURE THAT DISTRIBUTOR CLUTCH HAS NOT BEEN TRIPPED.

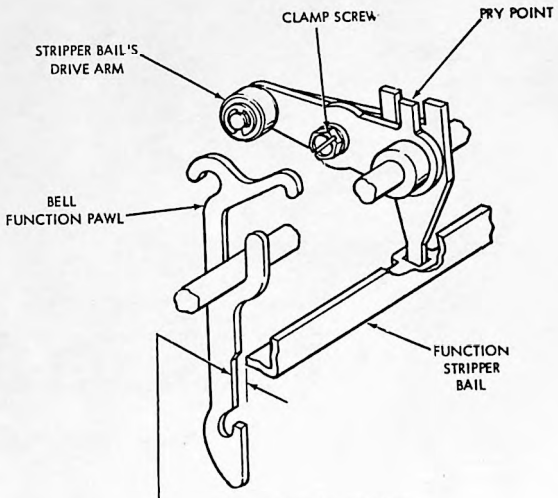
REQUIREMENT
MIN. 0.020 INCH---MAX. 0.040 INCH BETWEEN ANSWER-BACK FUNCTION LEVER AND ITS FUNCTION PAWL. RECHECK ROCKER DRIVE ARM.

TO ADJUST
USING PRY POINT, ADJUST RIGHT FUNCTION DRIVE ARM (ON FUNCTION ROCKER SHAFT) WITH CLAMP SCREW LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
CARRIAGE RETURN LEVER (SPACING)
SPACING LEVER (SPACING)
LINE FEED DRIVE ARM (PAPER FEED)
AFFECTED BY
ROCKER DRIVE ARM



M32/33-42



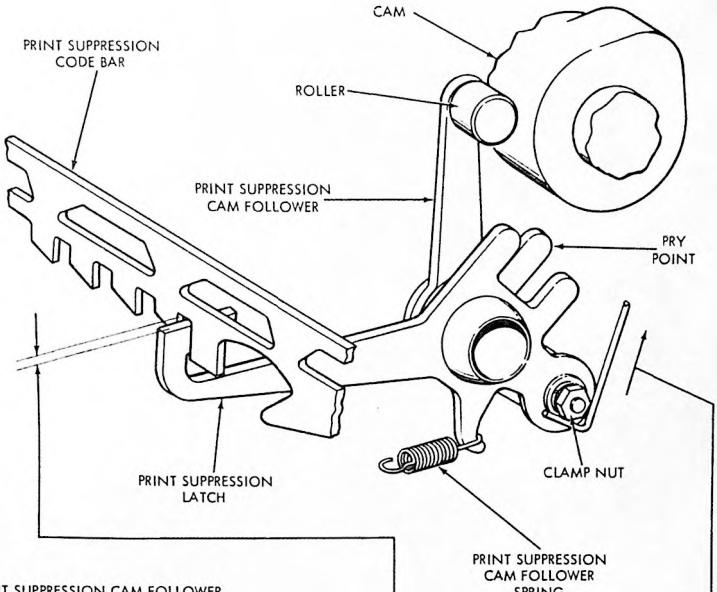
(LEFT FRONT VIEW)

STRIPPER BAIL (FUNCTION)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 0.015 INCH---MAX. 0.025 INCH
BETWEEN FUNCTION STRIPPER BAIL AND
EDGE OF STRIPPED FUNCTION PAWL.

TO ADJUST
USING PRY POINT, ADJUST STRIPPER
BAIL'S DRIVE ARM WITH CLAMP SCREW
LOOSENED. CHECK AT MARGIN BELL PAWL.

RELATED ADJUSTMENT
AFFECTS
LINE FEED STRIPPER PLATE (PAPER FEED)



PRINT SUPPRESSION CAM FOLLOWER
(FUNCTION)

REQUIREMENT
WITH PRINTER IN STOP CONDITION AND CAM FOLLOWER ROLLER RESTING ON ITS CAM
MIN. 0.005 INCH---MAX. 0.030 INCH
BETWEEN PRINT SUPPRESSION LATCH AND PRINT SUPPRESSION CODE BAR.

(RIGHT SIDE VIEW)

PRINT SUPPRESSION CAM FOLLOWER SPRING
(FUNCTION)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 5-3/4 OZS. ---MAX. 7-1/4 OZS.
TO START CAM FOLLOWER MOVING.

TO ADJUST
USING PRY POINT, POSITION CAM FOLLOWER WITH CLAMP NUT LOOSENED.

RELATED ADJUSTMENTS
AFFECTED BY
CODE BAR RESET LEVER

M32/33-44

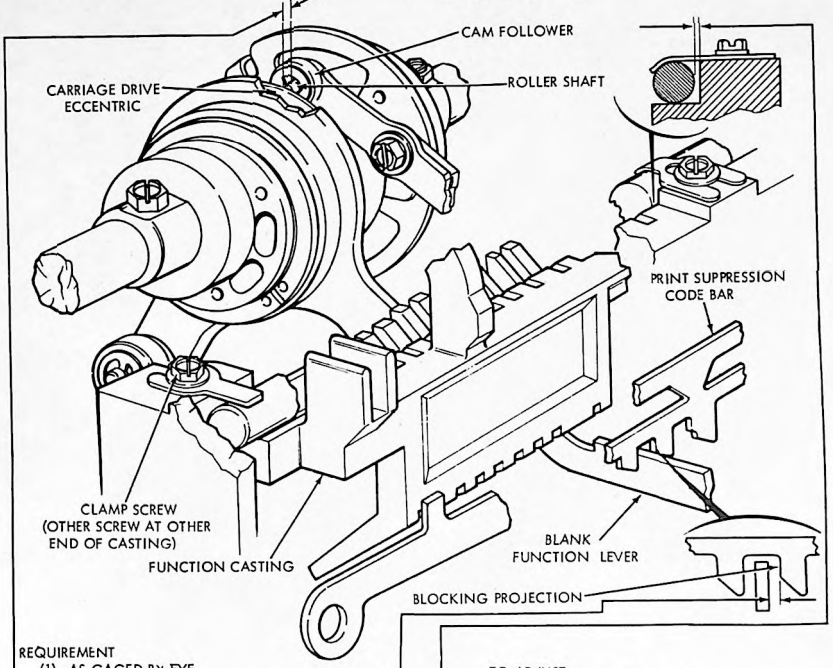
CASTING (FUNCTION)

TO CHECK

SET UP BLANK (ALL SPACING) CODE COMBINATION IN SELECTOR. ROTATE MAIN SHAFT UNTIL FUNCTION BAIL APPROACHES HIGH PART OF TRAVEL, BUT PRINT SUPPRESSION CAM FOLLOWER HAS NOT REACHED HIGH PART OF ITS CAM.

NOTE

(1) MODEL 32 PRINTER HAS BLANK FUNCTION LEVER IN THE NO. 6 SLOT.
(2) MODEL 33 DOES NOT HAVE A BLANK FUNCTION LEVER. WHENEVER THE NO. 6 AND 7 CODE ELEMENTS ARE SPACING THE FUNCTION LEVER IN THE NO. 6 SLOT IS ACTIVATED TO BLOCK THE PRINT SUPPRESSION CODE BAR.



REQUIREMENT

(1) AS GAGED BY EYE
MIN. 0.030 INCH---MAX. 0.050 INCH
BETWEEN BLOCKING PROJECTION ON PRINT SUPPRESSION CODE BAR AND BLANK FUNCTION LEVER.

(2) MIN. 0.005 INCH
BETWEEN CARRIAGE DRIVE ECCENTRIC AND ROLLER'S SHAFT ON STRIPPER BAIL'S CAM FOLLOWER.

TO ADJUST

POSITION FUNCTION CASTING WITH CLAMP SCREWS LOOSENED.

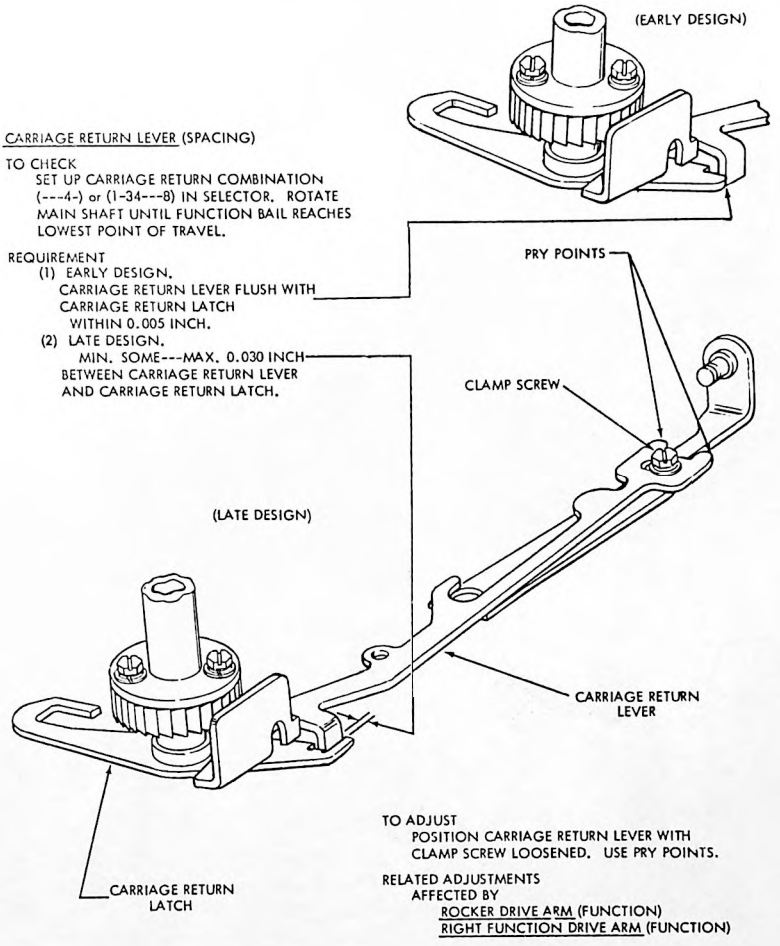
(3) THE FUNCTION SHAFT SHALL BE IN CONTACT WITH, OR NOT MORE THAN
MAX. 0.003 INCH
AWAY FROM THE VERTICAL SURFACE AT THE CENTER OF THE CASTING.

TO ADJUST

LOOSEN CENTER CLAMP MOUNTING SCREW, POSITION SHAFT AND CLAMP.

RELATED ADJUSTMENTS

AFFECTS
FUNCTION CAM CLUTCH (MAIN SHAFT)
AFFECTED BY
PRINT SUPPRESSION LATCH



CARRIAGE RETURN LEVER (SPACING)

TO CHECK
SET UP CARRIAGE RETURN COMBINATION (---4-) or (1-34---8) IN SELECTOR. ROTATE MAIN SHAFT UNTIL FUNCTION BAIL REACHES LOWEST POINT OF TRAVEL.

REQUIREMENT
(1) EARLY DESIGN.
CARRIAGE RETURN LEVER FLUSH WITH CARRIAGE RETURN LATCH WITHIN 0.005 INCH.
(2) LATE DESIGN.
MIN. SOME---MAX. 0.030 INCH BETWEEN CARRIAGE RETURN LEVER AND CARRIAGE RETURN LATCH.

TO ADJUST
POSITION CARRIAGE RETURN LEVER WITH CLAMP SCREW LOOSENED. USE PRY POINTS.

RELATED ADJUSTMENTS
AFFECTED BY
ROCKER DRIVE ARM (FUNCTION)
RIGHT FUNCTION DRIVE ARM (FUNCTION)

M32/33-46

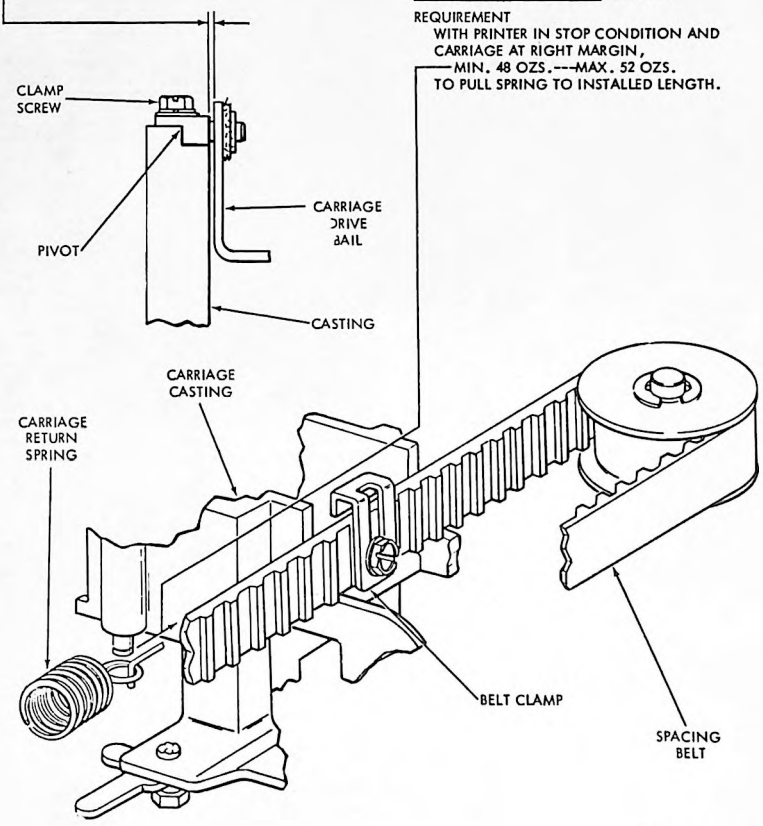
CARRIAGE DRIVE BAIL (FUNCTION)

REQUIREMENT
AS GAGED BY EYE
MIN. SOME---MAX. 0.015 INCH
END PLAY IN CARRIAGE DRIVE BAIL.

TO ADJUST
POSITION BAIL'S LEFT PIVOT WITH CLAMP SCREW LOOSENED.

CARRIAGE RETURN SPRING (SPACING)

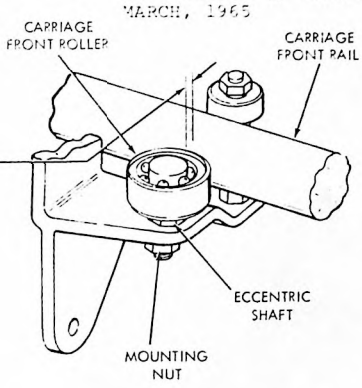
REQUIREMENT
WITH PRINTER IN STOP CONDITION AND CARRIAGE AT RIGHT MARGIN,
MIN. 48 OZS.---MAX. 52 OZS.
TO PULL SPRING TO INSTALLED LENGTH.



FRONT ROLLERS (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP CONDITION, CARRIAGE FRONT ROLLERS (2) SHALL SPIN FREELY WITH MAX. CLEARANCE OF 0.004 INCH.

TO ADJUST
BY MEANS OF ECCENTRIC SHAFT, POSITION EACH ROLLER TIGHT AGAINST RAIL WITH MOUNTING NUT LOOSENED. SLOWLY BACK OFF ECCENTRIC TO MEET REQUIREMENT.

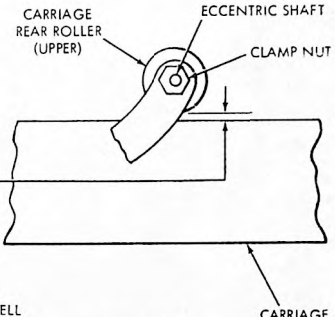


REAR ROLLER (CARRIAGE)

TO CHECK
POSITION CARRIAGE NEAR RIGHT MARGIN. TRIP SELECTOR CLUTCH. ROTATE MAIN SHAFT UNTIL CARRIAGE DRIVE BAIL IS IN REARMOST POSITION.

REQUIREMENT
MIN. SOME---MAX. 0.005 INCH BETWEEN CARRIAGE REAR RAIL AND UPPER CARRIAGE REAR ROLLER.

TO ADJUST
USING HEXAGON WRENCH, POSITION ROLLER'S ECCENTRIC SHAFT WITH CLAMP NUT LOOSENED.

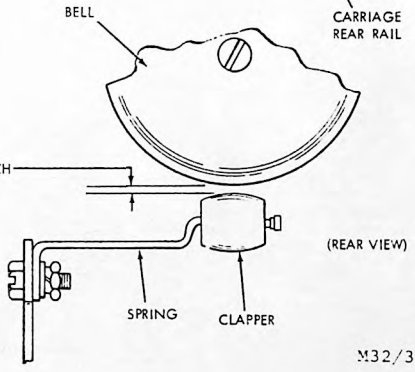


BELL CLAPPER (FUNCTION)

REQUIREMENT
WITH PRINTER IN STOP CONDITION MIN. 0.030 INCH --- MAX. 0.070 INCH BETWEEN CLAPPER AND BELL.

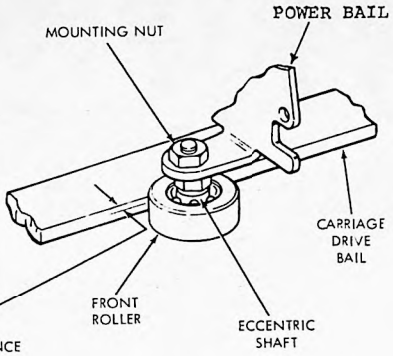
TO ADJUST
USING PLIERS, BEND CLAPPER SPRING.

REQUIREMENT (FINAL)
THE BELL MUST BE AUDIBLE WHEN THE APPROPRIATE SELECTION IS MADE.



NOTE

REMOVE RIBBON MECHANISMS AT THIS POINT IN COMPLETE READJUSTMENT PROCEDURE



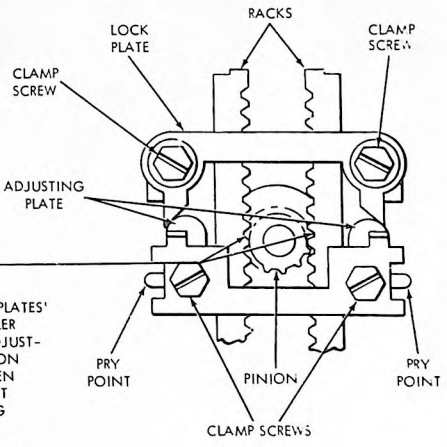
(LEFT FRONT VIEW)

POWER BAIL ROLLER (CARRIAGE)

TO CHECK
TRIP FUNCTION CLUTCH AND ROTATE MAIN SHAFT UNTIL CARRIAGE DRIVE BAIL REACHES APPROXIMATE VERTICAL POSITION.

REQUIREMENT
FRONT ROLLER SHALL SPIN FREELY WITH MIN. SOME --- MAX. 0.005 INCH CLEARANCE

TO ADJUST
WITH MOUNTING NUT LOOSENED, POSITION ROLLER AGAINST DRIVE BAIL BY MEANS OF ECCENTRIC SHAFT. BACK OFF SHAFT TO MEET REQUIREMENT.



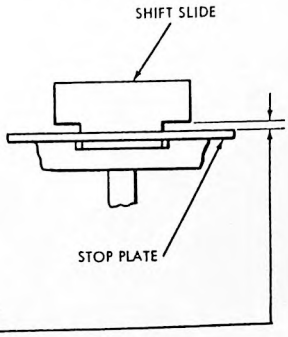
(TOP VIEW)

ROTARY RACKS (CARRIAGE)

REQUIREMENT
0.004 INCH BACKLASH BETWEEN PINION AND EACH RACK.

TO ADJUST
LOOSEN ADJUSTING AND MOUNTING PLATES' CLAMP SCREWS. PLACE 0.004 INCH FEELER GAGE BETWEEN ONE OF RACKS AND ADJUSTING PLATE. USING PRY POINT, POSITION ADJUSTING PLATE FOR NO PLAY BETWEEN RACK AND PINION. MAKE ADJUSTMENT FOR OTHER RACK. TIGHTEN ADJUSTING PLATE CLAMP SCREWS. REMOVE FEELER GAGE. POSITION LOCK PLATE TIGHT AGAINST ADJUSTING PLATE AND TIGHTEN ITS CLAMP SCREWS.

RELATED ADJUSTMENT
AFFECTS
STOP PLATE



REAR RAIL - LEFT END (CARRIAGE)

REQUIREMENT

PLACE PRINTER IN FIGURES POSITION ("0" SELECTED) (*). ROTATE MAIN SHAFT UNTIL CODE BARS HAVE RISEN FULLY, POSITION CARRIAGE SO CENTER LINE OF TYPEWHEEL IS APPROXIMATELY 2-7/8 INCHES FROM LEFT END OF PLATEN (DASHPOT PLUNGER ALMOST COMPLETELY WITHDRAWN FROM DASHPOT). CLEARANCE BETWEEN BOTTOM EDGE OF NUMBER "0" SHIFT SLIDE (*) AND TOP EDGE OF STOP PLATE MIN. 0.030 INCH --- MAX. 0.040 INCH

TO ADJUST

BY MEANS OF PRY POINT, POSITION LEFT END OF CARRIAGE REAR RAIL WITH MOUNTING SCREWS FRICTION TIGHT.

* NO. 1 ON MODEL 33 PRINTER

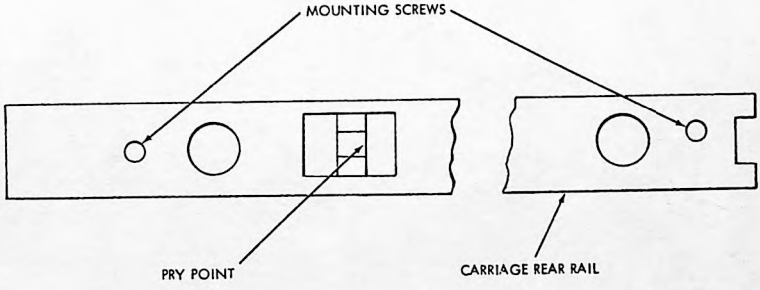
RELATED ADJUSTMENTS

AFFECTS

REAR ROLLER
ROTARY RESET LEVER
THIRD PULSE LINK
REAR RAIL - RIGHT END
DRIVE BAIL
PRINT RESET ARM
PRINT DRIVE LEVER
PLATEN - VERTICAL (PAPER FEED)

AFFECTED BY

REAR RAIL - RIGHT END



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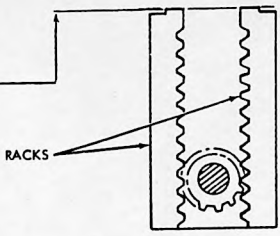
ROTARY RESET LEVER (CARRIAGE)

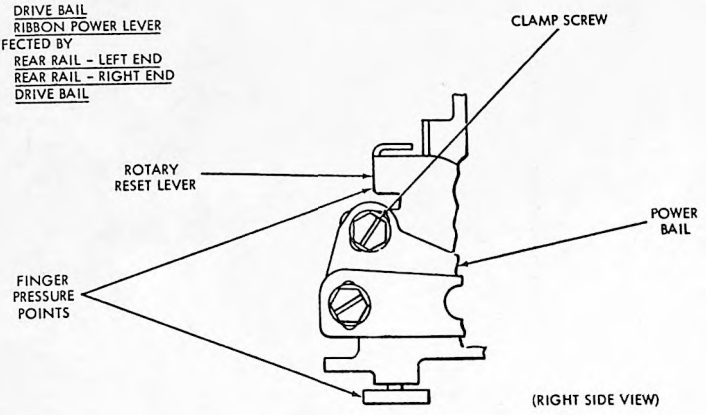
REQUIREMENT
WHEN PRINTER RETURNS TO STOP CONDITION, RACKS SHALL BE COMPLETELY RESET.



(TOP VIEW)

TO ADJUST
PLACE CARRIAGE AT LEFT MARGIN. USING FINGER PRESSURE ON POWER BAIL AND RESET LEVER, POSITION RESET LEVER WITH CLAMP SCREW LOOSENED. WIGGLE TYPEWHEEL. ONLY SMALL AMOUNT OF ROTATIONAL PLAY SHOULD BE PRESENT.

RELATED ADJUSTMENTS
AFFECTS
DRIVE BAIL
RIBBON POWER LEVER
AFFECTED BY
REAR RAIL - LEFT END
REAR RAIL - RIGHT END
DRIVE BAIL



(RIGHT SIDE VIEW)

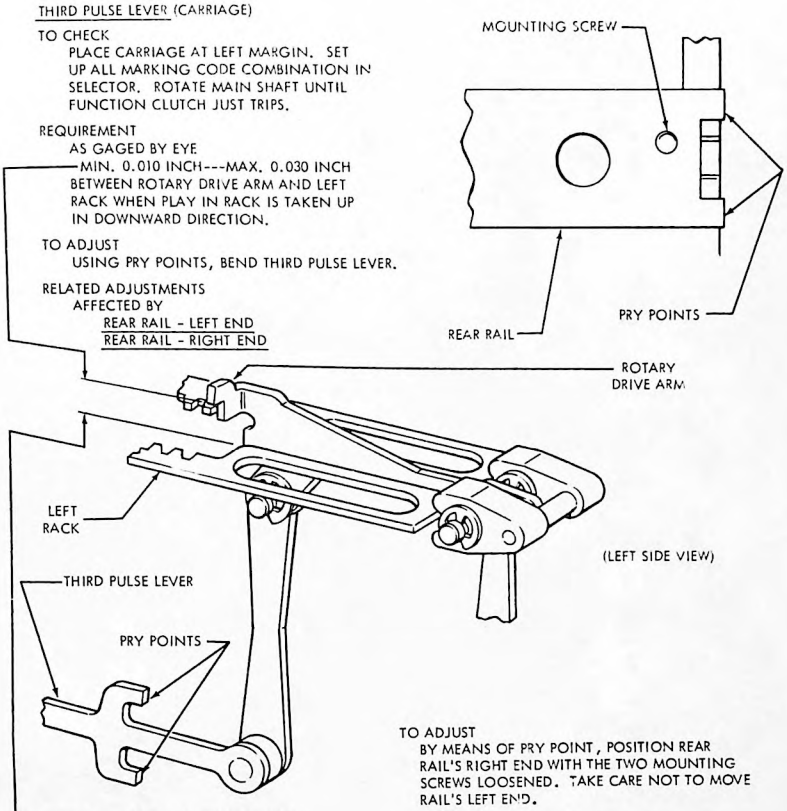
THIRD PULSE LEVER (CARRIAGE)

TO CHECK
PLACE CARRIAGE AT LEFT MARGIN. SET UP ALL MARKING CODE COMBINATION IN SELECTOR. ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH JUST TRIPS.

REQUIREMENT
AS GAGED BY EYE
MIN. 0.010 INCH---MAX. 0.030 INCH BETWEEN ROTARY DRIVE ARM AND LEFT RACK WHEN PLAY IN RACK IS TAKEN UP IN DOWNWARD DIRECTION.

TO ADJUST
USING PRY POINTS, BEND THIRD PULSE LEVER.

RELATED ADJUSTMENTS
AFFECTED BY
REAR RAIL - LEFT END
REAR RAIL - RIGHT END



TO ADJUST
BY MEANS OF PRY POINT, POSITION REAR RAIL'S RIGHT END WITH THE TWO MOUNTING SCREWS LOOSENED. TAKE CARE NOT TO MOVE RAIL'S LEFT END.

REAR RAIL - RIGHT END (CARRIAGE)

(1) REQUIREMENT - PRELIMINARY
PLACE CARRIAGE AT RIGHT HAND MARGIN. ROTATE MAIN SHAFT UNTIL FUNCTION CLUTCH JUST TRIPS.
MIN. 0.010 INCH --- MAX. 0.030 INCH CLEARANCE BETWEEN LEFT RACK AND UNDER SIDE OF DOWN STOP ON THIRD PULSE LEVER, AS GAGED BY EYE.

(2) REQUIREMENT - FINAL
WHEN UNIT IS OPERATED UNDER POWER, TYPE WHEEL SHOULD SHIFT FROM RIGHT TO LEFT OR LEFT TO RIGHT SIDE AND PRINT PROPER CHARACTER UNIFORMALY.

RELATED ADJUSTMENTS
AFFECTS
REAR RAIL - LEFT END
ROTARY RESET LEVER
THIRD PULSE LEVER
DRIVE BAIL
PRINT RESET ARM
PLATEN-VERTICAL (PAPER FEED)
AFFECTED BY
REAR RAIL - LEFT END

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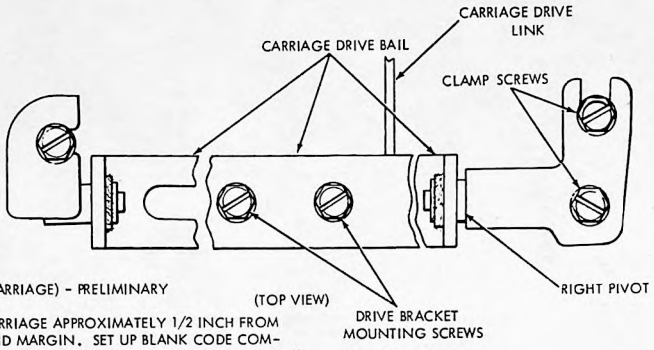


DRIVE BAIL (CARRIAGE) - PRELIMINARY REQUIREMENT

(1) PLACE CARRIAGE APPROXIMATELY 1/2 INCH FROM LEFT-HAND MARGIN. SET UP BLANK CODE COMBINATION IN SELECTOR. ROTATE MAIN SHAFT UNTIL CARRIAGE DRIVE BAIL REACHES ITS REARMOST POSITION. THERE SHALL BE APPROXIMATELY
0.030 INCH
CLEARANCE BETWEEN PRINT HAMMER BAIL AND PRINT HAMMER TRIP LEVER.

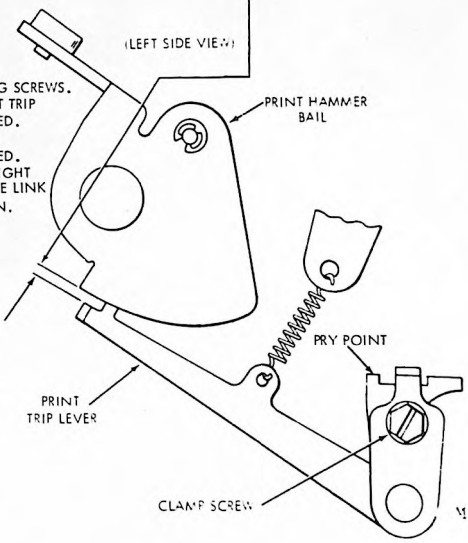
(2) THIS CLEARANCE SHALL BE EQUAL WITHIN
0.020 INCH
APPROXIMATELY 1/2 INCH OF THE RIGHT-HAND MARGIN.

TO ADJUST

(1) REQUIREMENT
LOOSEN DRIVE BRACKET MOUNTING SCREWS. USING PRY POINT, POSITION PRINT TRIP LEVER WITH CLAMP SCREW LOOSENED.

(2) REQUIREMENT
WITH MOUNTING SCREWS LOOSENED. POSITION CARRIAGE DRIVE BAIL'S RIGHT PIVOT. MAKE SURE CARRIAGE DRIVE LINK IS NOT BIASED IN EITHER DIRECTION.

RELATED ADJUSTMENTS
AFFECTS
PRINT TRIP LEVER
PRINT RESET ARM
PRINT DRIVE LEVER
ROTARY RESET LEVER
AFFECTED BY
REAR RAIL - LEFT END
REAR RAIL - RIGHT END
ROTARY RESET LEVER



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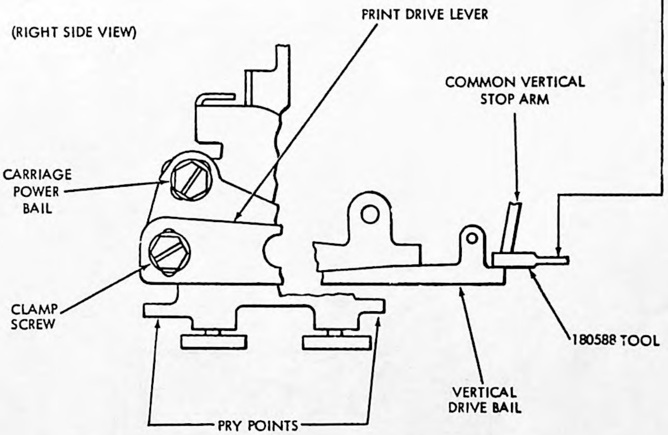
PRINT DRIVE LEVER (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP CONDITION, TELETYPE TOOL NO. 180588 SHALL FIT BETWEEN VERTICAL DRIVE BAIL AND COMMON VERTICAL STOP ARM
WITHIN 0.005 INCH
(CLEARANCE IS NOMINAL 0.234 INCH.)

TO ADJUST
USING PRY POINTS, POSITION PRINT DRIVE LEVER ON POWER BAIL WITH CLAMP SCREW LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
- PRINT TRIP LEVER
- PLATEN - VERTICAL (PAPER FEED)
- PRINT RESET ARM

AFFECTED BY
- REAR RAIL - LEFT END
- REAR RAIL - RIGHT END
- DRIVE BAIL

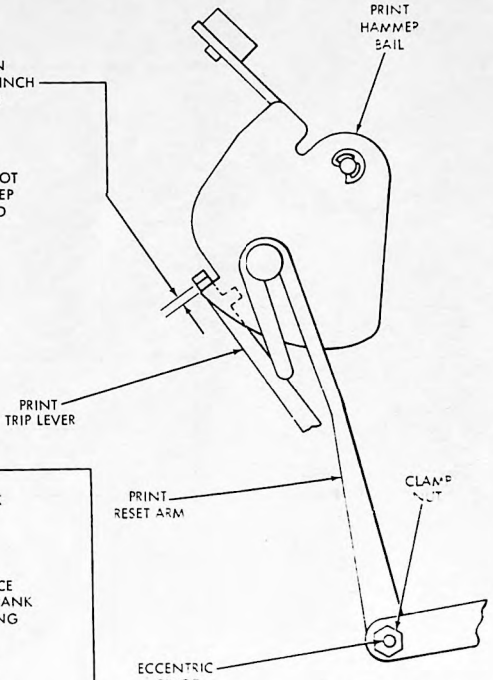


PRINT RESET ARM (CARRIAGE)

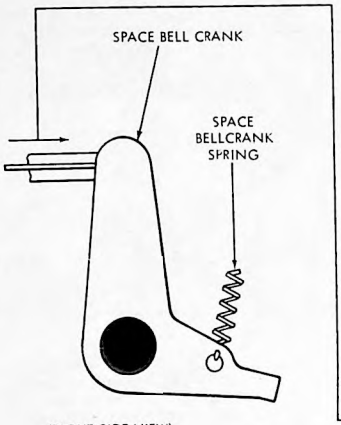
REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 0.009 INCH---MAX. 0.030 INCH
BETWEEN PRINT HAMMER BAIL AND
PRINT TRIP LEVER.

TO ADJUST
USING HEX WRENCH, POSITION
PRINT RESET ARM'S ECCENTRIC PIVOT
WITH CLAMP NUT LOOSENED. KEEP
HIGH PART OF ECCENTRIC TOWARD
FRONT OF PRINTER.

RELATED ADJUSTMENTS
AFFECTED BY
DRIVE BAIL
REAR RAIL - LEFT END
REAR RAIL - RIGHT END
PRINT LATCH ARM



(RIGHT SIDE VIEW)



(RIGHT SIDE VIEW)

SPACE BELLCRANK SPRING (SPACING)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 3 OZS. ---MAX. 5 OZS.
TO START BELLCRANK MOVING.

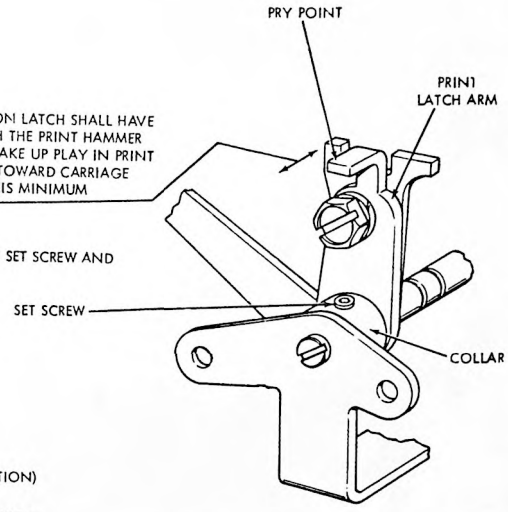
PRINT LATCH ARM (CARRIAGE)

REQUIREMENT

THE PRINT HAMMER SUPPRESSION LATCH SHALL HAVE A MINIMUM OF FULL BITE WITH THE PRINT HAMMER RESET BAIL WITH NO BINDS. TAKE UP PLAY IN PRINT HAMMER SUPPRESSION LATCH TOWARD CARRIAGE CASTING WHEN CHECKING THIS MINIMUM REQUIREMENT.

TO ADJUST

USING HEX WRENCH, LOOSEN SET SCREW AND POSITION COLLAR.

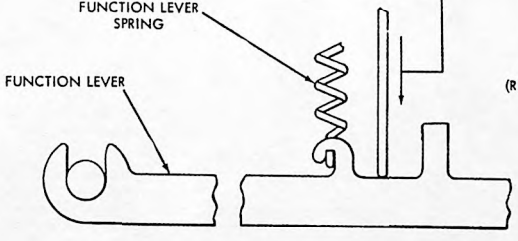


(RIGHT REAR VIEW)

FUNCTION LEVER SPRINGS (FUNCTION)

REQUIREMENT

WITH PRINTER IN STOP CONDITION
MIN. 19 OZS. --- MAX. 24 OZS.
FOR LINE-FEED AND AUTOMATIC LINE FEED FUNCTION LEVERS WHEN LINE FEED BLOCKING LEVER IS HELD UP.
MIN. 3-1/2 OZS. ---MAX. 5-1/2 OZS.
FOR CARRIAGE RETURN FUNCTION LEVER WHEN CARRIAGE RETURN LEVER IS HELD IN FRONTWARD POSITION.
MIN. 3-1/2 OZS. ---MAX. 5-1/2 OZS.
FOR ALL OTHER FUNCTION LEVERS.



(RIGHT SIDE VIEW)

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SLIDE GUIDE PLATE SPRINGS (CARRIAGE)

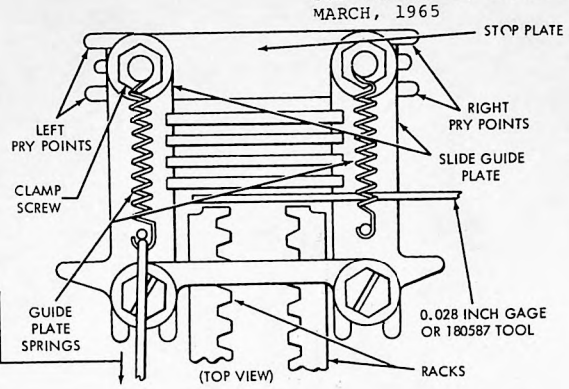
NOTE

TO CHECK THIS SPRING TENSION REQUIRES REMOVING CARRIAGE FROM PRINTER. THEREFORE, DO NOT CHECK IT UNLESS THERE IS REASON TO BELIEVE THAT IT WILL NOT MEET REQUIREMENT.

REQUIREMENT
MIN. 1 OZ. ---
MAX. 3 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

NOTE

CHECK RIGHT AND LEFT SPRING.



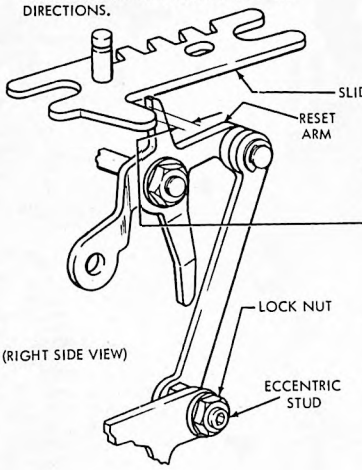
STOP PLATE (CARRIAGE) - PRELIMINARY

TO CHECK
SET UP CODE COMBINATION OF A CHARACTER IN COUNTERCLOCKWISE FIELD OF TYPEWHEEL. ROTATE MAIN SHAFT UNTIL CARRIAGE DRIVE BAIL IS IN REARMOST POSITION. CHECK TO SEE IF VERTICAL ROW CONTAINING CHARACTER IS PROPERLY SELECTED. REPEAT FOR CHARACTER IN CLOCKWISE FIELD.

REQUIREMENT
TYPEWHEEL POSITIONING CORRECT IN BOTH CLOCKWISE AND COUNTERCLOCKWISE DIRECTIONS.

TO ADJUST
PLACE PRINTER IN STOP CONDITION. BACK OFF LEFT AND RIGHT SLIDE GUIDE PLATE ADJUSTMENTS. (SEE BELOW.) MAKE TWO CLAMP SCREWS FRICTION TIGHT. PLACE 0.028 INCH GAGE OR ADJUSTING TOOL NO. 180587 ACROSS END OF RACKS. HOLD ROTARY POSITIONING BAIL SO THAT IT DOES NOT YIELD, AND POSITION STOP PLATE SO THAT ENTIRE SLIDE ASSEMBLY IS TIGHT AGAINST RACK AND TOOL.

RELATED ADJUSTMENTS
AFFECTS
RIGHT SLIDE GUIDE PLATE
LEFT SLIDE GUIDE PLATE
AFFECTED BY
ROTARY RACKS



RIGHT SLIDE GUIDE PLATE (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP POSITION
MIN. SOME---MAX. 0.015 INCH CLEARANCE BETWEEN RIGHT SLIDE GUIDE PLATE AND THE RESET ARM WHEN CLEARANCE IS TAKEN UP FOR MAXIMUM (BOTH GUIDE PLATES HELD TOWARD FRONT).

TO ADJUST
USING HEX WRENCH, ROTATE ECCENTRIC STUD WITH ITS LOCK NUT LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
LEFT SLIDE GUIDE PLATE
PRINT TRIP LEVER
AFFECTED BY
PRINT DRIVE LEVER
STOP PLATE

LEFT SLIDE GUIDE PLATE (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. SOME---MAX. 0.015 INCH
CLEARANCE BETWEEN LEFT SLIDE GUIDE PLATE AND LEFT RIBBON LIFTER ARM WHEN CLEARANCE IS TAKEN UP FOR MAXIMUM (BOTH GUIDE PLATES HELD TOWARD FRONT).

TO ADJUST
USING PRY POINTS, POSITION LEFT RIBBON LIFTER ARM WITH CLAMP NUT LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
RIBBON GUIDE
AFFECTED BY
RIGHT SLIDE GUIDE PLATE

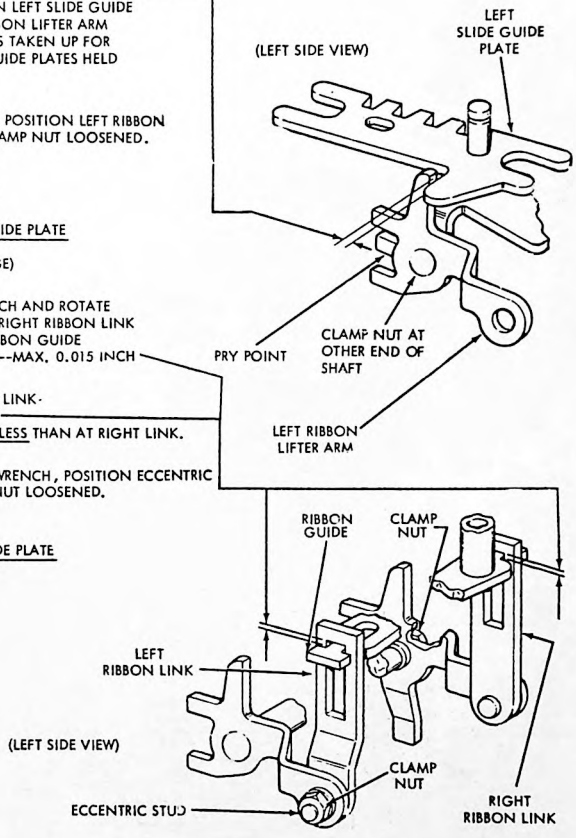
RIBBON GUIDE (CARRIAGE)

TO CHECK
TRIP SELECTOR CLUTCH AND ROTATE MAIN SHAFT UNTIL RIGHT RIBBON LINK SEPARATES FROM RIBBON GUIDE
MIN. 0.010 INCH---MAX. 0.015 INCH

REQUIREMENT
CLEARANCE AT LEFT LINK-
MAX. 0.010 INCH
GREATER AND NOT LESS THAN AT RIGHT LINK.

TO ADJUST
USING HEXAGON WRENCH, POSITION ECCENTRIC STUD WITH CLAMP NUT LOOSENED.

RELATED ADJUSTMENT
AFFECTED BY
LEFT SLIDE GUIDE PLATE



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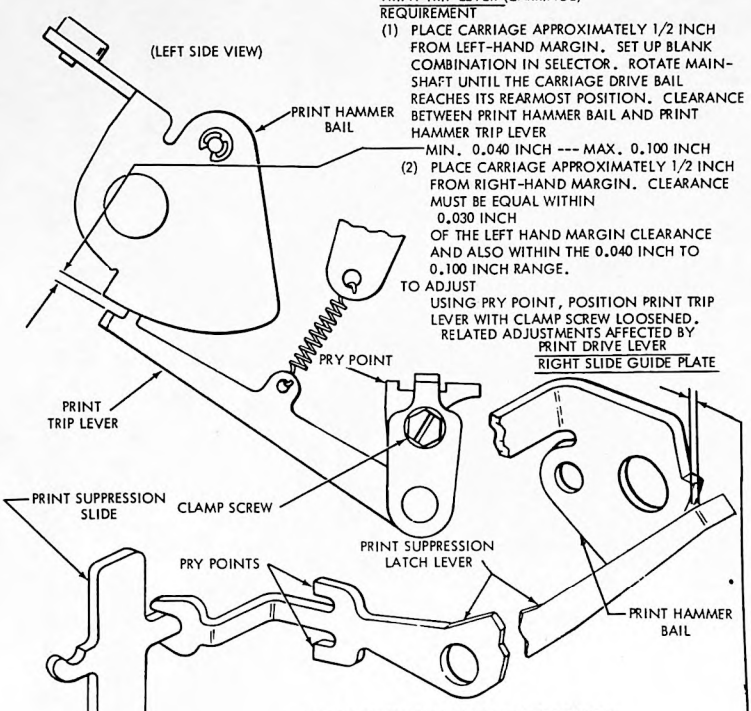

PRINT TRIP LEVER (CARRIAGE)

REQUIREMENT

(1) PLACE CARRIAGE APPROXIMATELY 1/2 INCH FROM LEFT-HAND MARGIN. SET UP BLANK COMBINATION IN SELECTOR. ROTATE MAIN-SHAFT UNTIL THE CARRIAGE DRIVE BAIL REACHES ITS REARMOST POSITION. CLEARANCE BETWEEN PRINT HAMMER BAIL AND PRINT HAMMER TRIP LEVER MIN. 0.040 INCH --- MAX. 0.100 INCH

(2) PLACE CARRIAGE APPROXIMATELY 1/2 INCH FROM RIGHT-HAND MARGIN. CLEARANCE MUST BE EQUAL WITHIN 0.030 INCH OF THE LEFT HAND MARGIN CLEARANCE AND ALSO WITHIN THE 0.040 INCH TO 0.100 INCH RANGE.

TO ADJUST

USING PRY POINT, POSITION PRINT TRIP LEVER WITH CLAMP SCREW LOOSENED.

RELATED ADJUSTMENTS AFFECTED BY

PRINT DRIVE LEVER

RIGHT SLIDE GUIDE PLATE

PRINT SUPPRESSION LATCH LEVER (CARRIAGE)

TO CHECK

WITH BLANK CODE COMBINATION (ALL SPACING) SELECTED AND DRIVE BAIL IN REARMOST POSITION. AT LEAST SOME CLEARANCE BETWEEN TOP OF PRINT SUPPRESSION CODE BAR AND BOTTOM OF PRINT SUPPRESSION SLIDE.

REQUIREMENT

WITH THE "T" CODE COMBINATION SET UP IN SELECTOR, CARRIAGE TO THE LEFT HAND MARGIN, ROTATE MAIN SHAFT UNTIL CARRIAGE DRIVE BAIL REACHES ITS REARMOST SHAFT UNTIL CARRIAGE DRIVE BAIL REACHES ITS REARMOST POSITION.

MIN. 0.030 INCH --- MAX. 0.050 INCH BETWEEN PRINT SUPPRESSION LATCH AND PRINT HAMMER BAIL.

TO ADJUST

USING PRY POINTS, BEND PRINT SUPPRESSION LATCH LEVER. USE FINGER PRESSURE TO HOLD LATCH LEVER AGAINST BAIL WHILE MAKING ADJUSTMENT. IF GAP IS TOO SMALL, USE TOP PRY POINT. IF IT IS TO LARGE, USE BOTTOM PRY POINT.

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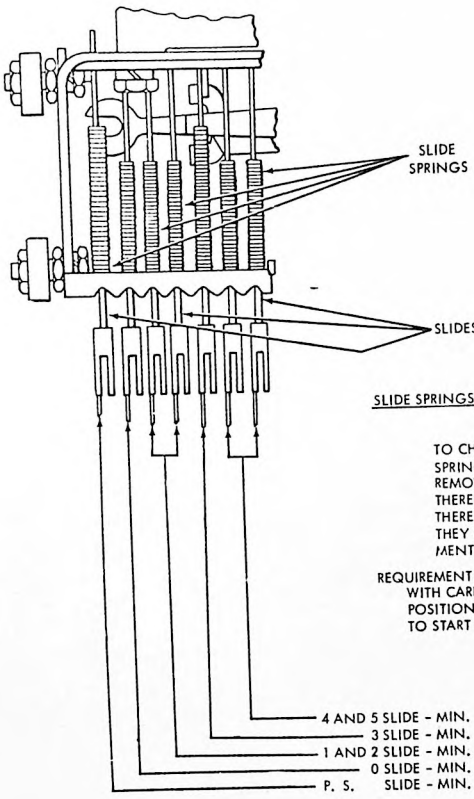


(LEFT SIDE VIEW)

SLIDE SPRINGS (CARRIAGE)

NOTE

TO CHECK TENSIONS OF THESE SPRINGS, IT IS NECESSARY TO REMOVE CARRIAGE FROM PRINTER. THEREFORE, DO NOT CHECK UNLESS THERE IS REASON TO BELIEVE THAT THEY DO NOT MEET THEIR REQUIREMENTS.

REQUIREMENT

WITH CARRIAGE POWER BAIL IN THE STOP POSITION, IT SHALL REQUIRE FOLLOWING TO START SLIDES MOVING.

4 AND 5 SLIDE - MIN.	1/4 OZ.	---MAX.	1-1/4 OZS.
3 SLIDE - MIN.	3-3/4 OZS.	---MAX.	4-1/2 OZS.
1 AND 2 SLIDE - MIN.	2 OZS.	---MAX.	3 OZS.
0 SLIDE - MIN.	1/4 OZ.	---MAX.	1 OZ.
P. S. SLIDE - MIN.	1/2 OZ.	---MAX.	1-1/4 OZS.

NOTE

THE ADJUSTMENTS AND SPECIAL REQUIREMENTS CONTAINED HEREIN WERE WRITTEN FOR 5 LEVEL MACHINES. THE SLIDE NUMBERING IS DIFFERENT ON THE 8 LEVEL MACHINES. TO CONVERT FROM 5 LEVEL TO 8 LEVEL SLIDE NUMBERS IT WILL MERELY BE NECESSARY TO MENTALLY ADD ONE (1) TO THE 5 LEVEL SLIDE NUMBER. EXAMPLE: NUMBER 0 SLIDE FOR 5 LEVEL BECOMES NUMBER 1 SLIDE FOR 8 LEVEL, NUMBER 3 SLIDE FOR 5 LEVEL BECOMES NUMBER 4 SLIDE FOR 8 LEVEL, ETC.

ROTARY DRIVE LEVER SPRING (CARRIAGE)

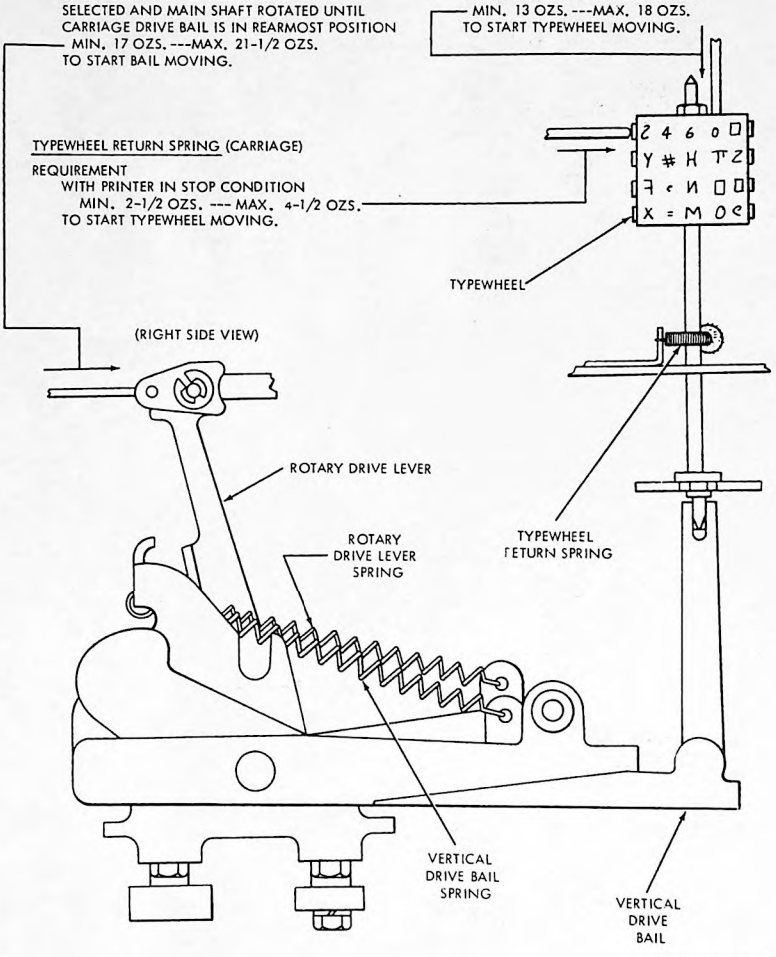
REQUIREMENT
WITH ALL MARKING CODE COMBINATION SELECTED AND MAIN SHAFT ROTATED UNTIL CARRIAGE DRIVE BAIL IS IN REARMOST POSITION
MIN. 17 OZS. ---MAX. 21-1/2 OZS.
TO START BAIL MOVING.

VERTICAL DRIVE BAIL SPRING (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 13 OZS. ---MAX. 18 OZS.
TO START TYPEWHEEL MOVING.

TYPEWHEEL RETURN SPRING (CARRIAGE)

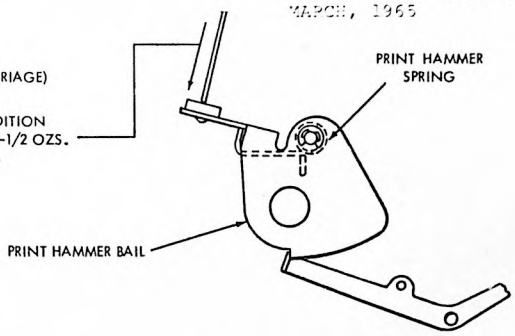
REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 2-1/2 OZS. --- MAX. 4-1/2 OZS.
TO START TYPEWHEEL MOVING.



M32/33-61

PRINT HAMMER BAIL SPRING (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 3 OZS. --- MAX. 4-1/2 OZS.
TO START HAMMER MOVING.

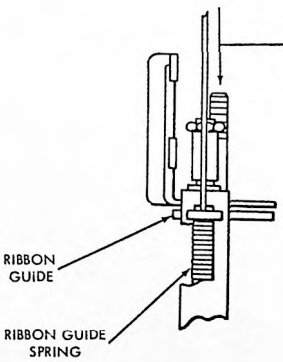


(RIGHT SIDE VIEW)

RIBBON GUIDE SPRING (CARRIAGE)

TO CHECK
REMOVE RIBBON FROM GUIDE. TRIP SELECTOR CLUTCH AND ROTATE MAIN SHAFT UNTIL CARRIAGE DRIVE BAIL IS IN REARMOST POSITION.

REQUIREMENT
MIN. 6 OZS. --- MAX. 9 OZS.
TO START GUIDE MOVING.

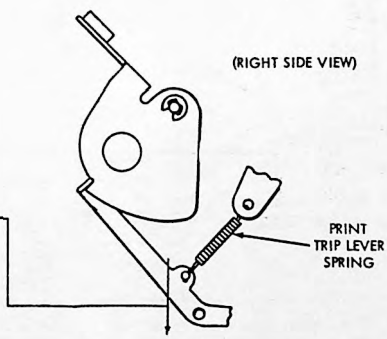


(LEFT SIDE VIEW)

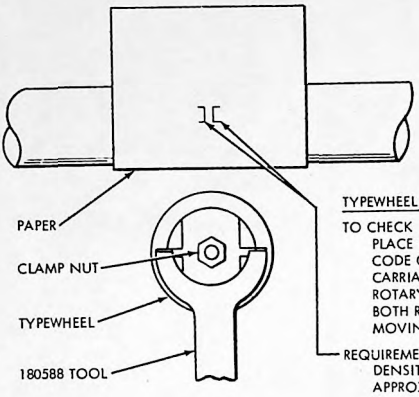
(RIGHT SIDE VIEW)

PRINT TRIP LEVER SPRING (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 1 OZ. ---MAX. 2-1/2 OZS.
TO START LATCH MOVING



M32 33-62



NOTE

REPLACE PLATEN AND RIBBON MECHANISM AND DASHPOT CYLINDER.

TYPEWHEEL (CARRIAGE)

TO CHECK

PLACE PAPER IN PRINTER. SELECT BLANK (ALL SPACING) CODE COMBINATION. ROTATE MAIN SHAFT UNTIL CARRIAGE DRIVE BAIL IS IN REARMOST POSITION. HOLD ROTARY DRIVE LEVER ALL THE WAY REARWARD TO RESET BOTH RACKS. MANUALLY TRIP PRINT HAMMER BY MOVING PRINT SUPPRESSION LATCH LEVER FRONTWARD.

REQUIREMENT

DENSITY OF LEFT AND RIGHT LINE OF PRINTED IMPRESSION APPROXIMATELY EQUAL. (DENSITY AT TOP AND BOTTOM MAY BE UNEQUAL BECAUSE OF MISADJUSTMENT OF PLATEN-VERTICAL (PAPER FEED).

TO ADJUST

POSITION TYPEWHEEL WITH CLAMP NUT LOOSENED. HOLD TYPEWHEEL WITH 180588 TOOL WHEN TIGHTENING NUT.

RIBBON POWER LEVER (CARRIAGE)

(1) REQUIREMENT

WITH CARRIAGE DRIVE BAIL IN REARMOST POSITION AND RIBBON RATCHET SEATED AGAINST FEED PAWL, CLEARANCE BETWEEN FACE OF A RATCHET TOOTH AND THE CORNER TIP OF CHECK PAWL ON BOTH RIGHT AND LEFT RIBBON RATCHETS AS GAGED BY EYE

MIN. SOME --- MAX. 0.045 INCH

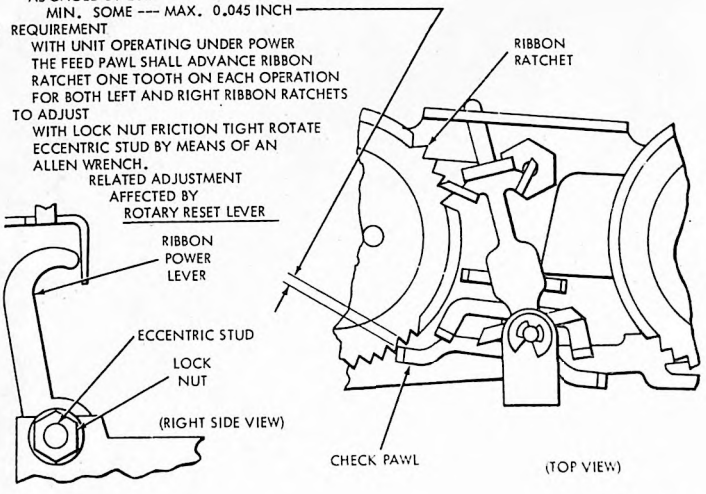
(2) REQUIREMENT

WITH UNIT OPERATING UNDER POWER THE FEED PAWL SHALL ADVANCE RIBBON RATCHET ONE TOOTH ON EACH OPERATION FOR BOTH LEFT AND RIGHT RIBBON RATCHETS

TO ADJUST

WITH LOCK NUT FRICTION TIGHT ROTATE ECCENTRIC STUD BY MEANS OF AN ALLEN WRENCH.

RELATED ADJUSTMENT AFFECTED BY ROTARY RESET LEVER

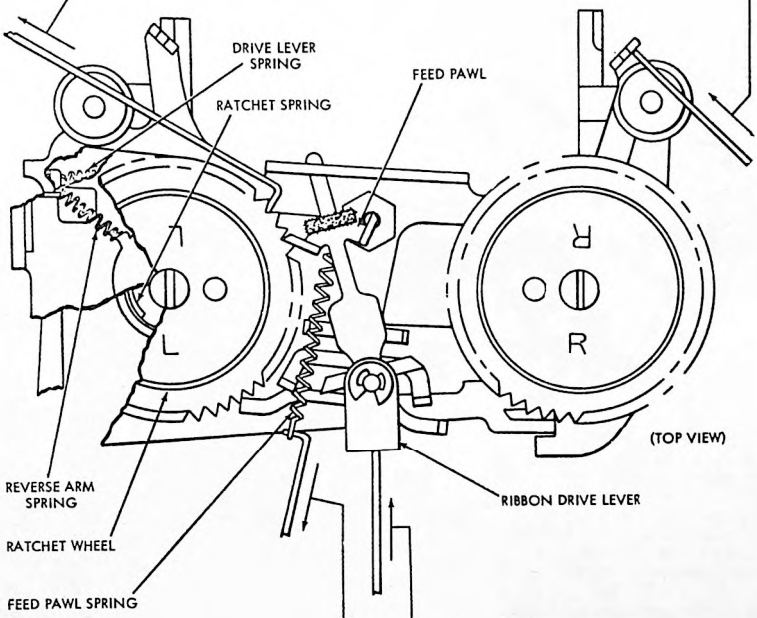


RIBBON RATCHET SPRING (CARRIAGE)

REQUIREMENT
WITH FEED AND CHECK PAWLS DISENGAGED FROM RATCHET
MIN. 1-1/2 OZS. ---MAX. 3-1/2 OZS TO START RATCHET MOVING.

RIBBON REVERSE ARM SPRING (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP CONDITION AND RIBBON REMOVED
MIN. 1-1/2 OZS. ---MAX. 3 OZS. TO START ARM MOVING.



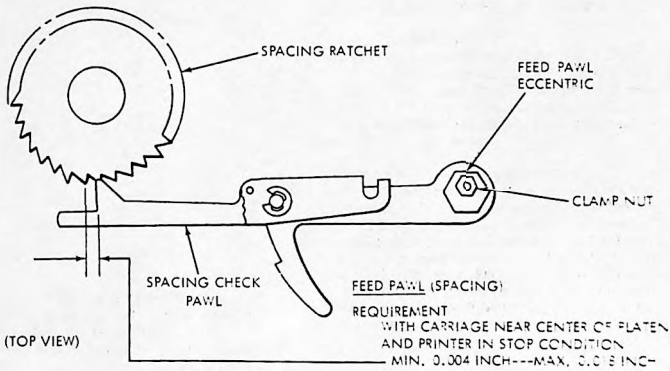
RIBBON FEED PAWL SPRING (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 2-1/2 OZS. ---MAX. 4 OZS. TO PULL SPRING TO INSTALLED LENGTH.

RIBBON DRIVE LEVER SPRING (CARRIAGE)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 5-1/2 OZS. ---MAX. 9 OZS. TO START LEVER MOVING.

M32/33-64



FEED PAWL (SPACING)

REQUIREMENT
WITH CARRIAGE NEAR CENTER OF PLATEN AND PRINTER IN STOP CONDITION
MIN. 0.004 INCH---MAX. 0.0 8 INCH BETWEEN CHECK PAWL AND SPACING RATCHET TOOTH, AS GAGED BY EYE.

TO ADJUST
ROTATE FEED PAWL ECCENTRIC WITH CLAMP NUT LOOSENED. KEEP HIGH PART OF ECCENTRIC TOWARD FRONT.

RELATED ADJUSTMENT
AFFECTED BY
DRIVE BAIL (CARRIAGE)

SPACE SUPPRESSION LEVER

REQUIREMENT

(1) CLEARANCE BETWEEN RIGHT END OF SPACING FEED PAWL AND TIP OF NOTCH ON SPACE SUPPRESSION LEVER
MIN. 0.005 INCH --- MAX. 0.040 INCH

(2) SOME CLEARANCE BETWEEN LEFT END OF "0" CODE BAR AND REAR EXTENSION OF SPACE SUPPRESSION LEVER.

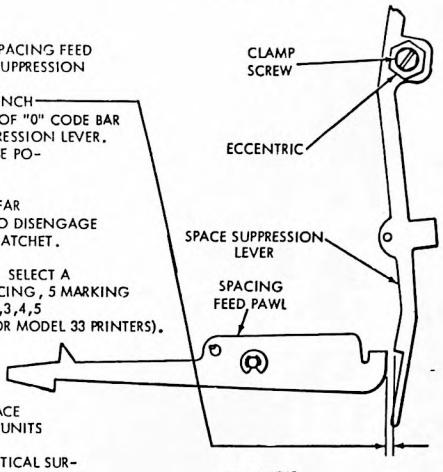
(3) THE HIGH PART OF ECCENTRIC SHALL BE POSITIONED TOWARD REAR OF UNIT.

NOTE

IF SPACING FEED PAWL IS MOVED TO FAR TO THE REAR, IT WILL BE NECESSARY TO DISENGAGE SPACING FEED PAWL FROM SPACING RATCHET.

TO ADJUST

(1) PLACE CARRIAGE IN CENTER OF UNIT. SELECT A TYPING CHARACTER ("T" 1,2,3,4, SPACING, 5 MARKING FOR MODEL 32 PRINTERS AND "@" 1,2,3,4,5 SPACING, 6 MARKING, 7 SPACING FOR MODEL 33 PRINTERS).



(TOP VIEW)

NOTE

IT MAY BE NECESSARY TO TRIP THE SPACE SUPPRESSION LEVER WHEN REPAIRING UNITS WHICH HAVE BEEN MALADJUSTED.

(2) ROTATE MAINSHAFT UNTIL FRONT VERTICAL SURFACE OF RIGHT END OF SPACING FEED PAWL IS ALIGNED, AS GAGED BY EYE, WITH NOTCH ON SPACE SUPPRESSION LEVER.

(3) WITH SPACE SUPPRESSION LEVER ECCENTRIC CLAMP SCREW FRICTION TIGHT. POSITION ECCENTRIC SO THAT WHEN THE FOLLOWING CHECKS ARE PERFORMED, REQUIREMENTS NOS. (1), (2), AND (3) ARE MET.

TO CHECK

(1) MOVE AND HOLD SPACE SUPPRESSION LEVER AGAINST RIGHT END OF SPACING FEED PAWL. TO DO THIS, PUSH AND HOLD PRINT SUPPRESSION CODE BAR TOWARD RIGHT SIDE OF UNIT. ROTATE SHAFT VERY SLOWLY (FORWARD OR BACKWARD AS NECESSARY) UNTIL FRONT VERTICAL SURFACE OF SPACING FEED PAWL AND FRONT SURFACE OF NOTCH IN SPACE SUPPRESSION LEVER ARE ALIGNED FLUSH WITH EACH OTHER.

NOTE

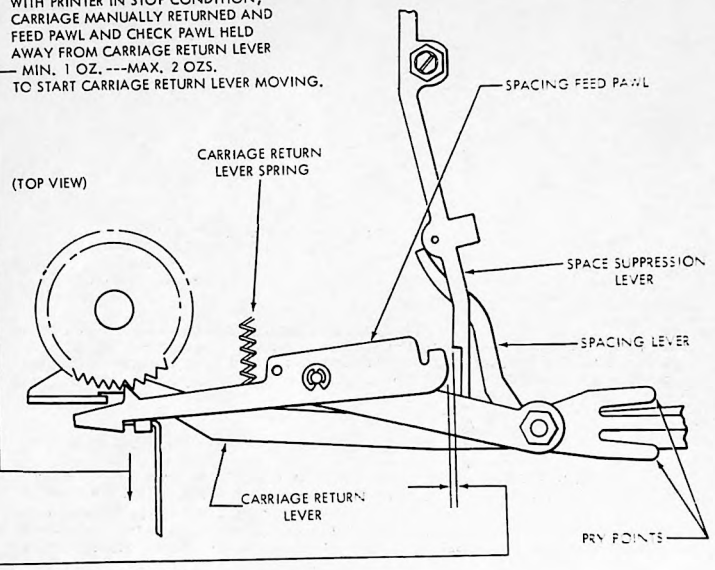
IF THE SPACING FEED PAWL IS MOVED TOO FAR TO THE REAR WHILE ATTEMPTING TO OBTAIN THE DESIRED ALIGNMENT, (THIS APPLIES TO THE CHECKING PROCEDURE ONLY) IT WILL BE NECESSARY TO REPEAT ADJUSTMENTS NOS. 2,3, AND TO CHECK NO. 1.

(2) RELEASE PRINT SUPPRESSION CODE BAR SO THAT THE SPACE SUPPRESSION LEVER MOVES TO RIGHT WITH A SNAP.

(3) TIGHTEN ECCENTRIC CLAMP SCREW. PERFORM TO CHECK NOS. 1 AND 2 AND RECHECK ALL THREE REQUIREMENTS. READJUST IF NECESSARY.

CARRIAGE RETURN LEVER SPRING (SPACING)

REQUIREMENT
WITH PRINTER IN STOP CONDITION, CARRIAGE MANUALLY RETURNED AND FEED PAWL AND CHECK PAWL HELD AWAY FROM CARRIAGE RETURN LEVER
MIN. 1 OZ. ---MAX. 2 OZS.
TO START CARRIAGE RETURN LEVER MOVING.



SPACING LEVER (SPACING)

REQUIREMENT

(1) CLEARANCE BETWEEN RIGHT END OF SPACING FEED PAWL AND TIP OF NOTCH ON SPACE SUPPRESSION LEVER AS GAGED BY EYE
MIN. 0.005 INCH --- MAX. 0.040 INCH

(2) THE SPACE SUPPRESSION TRIP LEVER SHALL FULLY RETURN TO ITS FORWARD POSITION POSITIVELY AND WITHOUT HESITATION.

TO ADJUST

(1) PLACE CARRIAGE IN CENTER OF UNIT. WITH SPACE CODE COMBINATION --3--) FOR 5 LEVEL UNITS OR (-----6-8) FOR 8 LEVEL UNITS SELECTED.

NOTE

IT MAY BE NECESSARY TO TRIP THE SPACE SUPPRESSION LEVER ON UNITS WHICH HAD NOT BEEN PREVIOUSLY ADJUSTED OR WHEN REPAIRING UNITS WHICH HAD BEEN MALADJUSTED.

(2) ROTATE THE MAINSHAFT UNTIL FRONT VERTICAL SURFACE OF RIGHT END OF SPACING FEED PAWL IS ALIGNED (AS GAGED BY EYE) WITH THE NOTCH ON THE SPACE SUPPRESSION LEVER.

(CONTINUED ON NEXT PAGE)

(CONTINUED FROM PRECEDING PAGE)

NOTE

IF THE SPACING FEED PAWL IS MOVED TOO FAR TO THE REAR, IT WILL BE NECESSARY TO DISENGAGE THE SPACING FEED PAWL FROM THE SPACING RATCHET.

(3) POSITION SPACE SUPPRESSION TRIP LEVER BY BENDING MIDDLE PRONG OF ITS PRY POINTS SO THAT WHEN THE FOLLOWING CHECKS ARE PERFORMED, REQUIREMENTS NOS. 1, AND 2 ARE MET.

NOTE

IF SPACE SUPPRESSION TRIP LEVER BINDS AT ITS CONNECTION TO OPERATING LINK, BEND THE FORMED EAR ON RIGHT END OF SPACE SUPPRESSION TRIP LEVER TO MAKE IT PARALLEL TO OPERATING LINK AND TO RELIEVE THE "BIND". TO ADJUST FOR REQUIREMENT NO. 1, USE THE FRONT PRY POINT TO INCREASE THE GAP AND USE THE REAR PRY POINT TO DECREASE THE GAP.

TO CHECK

(1) MOVE AND HOLD SPACE SUPPRESSION LEVER AGAINST RIGHT END OF SPACING FEED PAWL. TO DO THIS, PUSH TOWARD THE REAR OF UNIT, ON RIGHT END OF SPACE SUPPRESSION TRIP LEVER, AT POINT WHERE IT IS CONNECTED TO ITS OPERATING LINK. ROTATE SHAFT VERY SLOWLY (FORWARD AND/OR BACKWARD WHEN NECESSARY) UNTIL FRONT VERTICAL SURFACE OF SPACING FEED PAWL AND FRONT SURFACE OF NOTCH IN SPACE SUPPRESSION LEVER ARE ALIGNED FLUSH WITH EACH OTHER.

NOTE

IF SPACING FEED PAWL IS MOVED TOO FAR TO REAR WHILE ATTEMPTING TO OBTAIN DESIRED ALIGNMENT (THIS APPLIES TO THE CHECKING PROCEDURE ONLY), IT WILL BE NECESSARY TO REPEAT ADJUSTMENTS NOS. 1, AND 2, AND CHECK (1) ABOVE.

(2) RELEASE SPACE SUPPRESSION LEVER SO THAT IT MOVES TO RIGHT WITH A "SNAP".

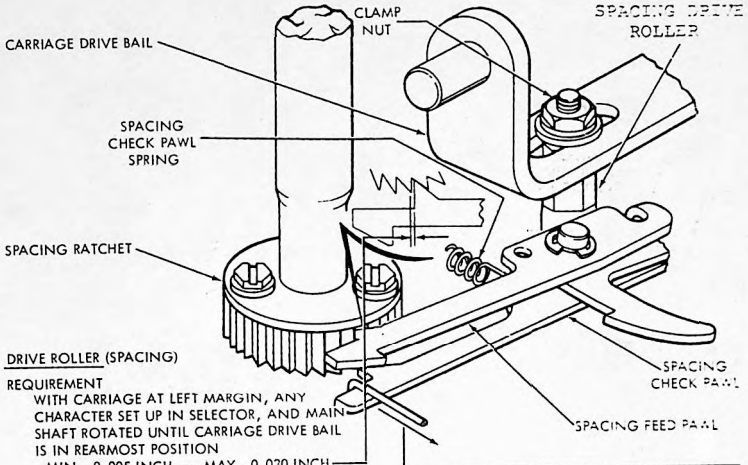
(3) TAKE UP PLAY OF SPACING FEED PAWL AT ITS LEFT END IN AN UPWARD DIRECTION.

READJUST, IF NECESSARY.

NOTE

SELECT "BLANK" FUNCTION (ALL SPACING), ROTATE MAIN-SHAFT, AND CHECK FOR MINIMUM .015 INCH ENGAGEMENT (GAGE BY EYE) BETWEEN RIGHT END OF SPACING FEED PAWL AND TIP OF NOTCH ON SPACE SUPPRESSION LEVER. REFINE SPACE SUPPRESSION LEVER, AND SPACE LEVER ADJUSTMENTS WITHIN THEIR REQUIREMENTS, IF NECESSARY.

RELATED ADJUSTMENTS
AFFECTED BY
ROCKER DRIVE ARM (FUNCTION)
RIGHT FUNCTION DRIVE ARM (FUNCTION)



DRIVE ROLLER (SPACING)

REQUIREMENT
WITH CARRIAGE AT LEFT MARGIN, ANY CHARACTER SET UP IN SELECTOR, AND MAIN SHAFT ROTATED UNTIL CARRIAGE DRIVE BAIL IS IN REARMOST POSITION
MIN. 0.005 INCH --- MAX. 0.030 INCH BETWEEN SPACING FEED PAWL AND RATCHET TOOTH.

TO ADJUST
POSITION SPACING DRIVE ROLLER CARRIAGE DRIVE BAIL WITH CLAMP NUT LOOSENED.

REQUIREMENT (FINAL)
THE UNIT SHALL CONSISTENTLY SINGLE SPACE FROM RIGHT TO LEFT HAND MARGIN.
RELATED ADJUSTMENT
AFFECTED BY DRIVE BAIL (CARRIAGE)

SPACING CHECK PAWL SPRING (SPACING)

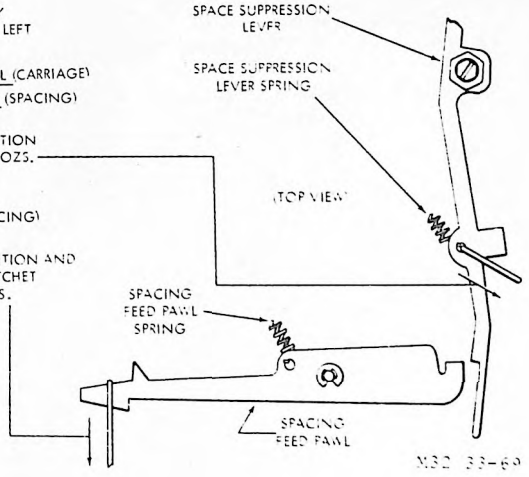
REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 3 4 OZ. ---MAX. 1-1 2 OZS.
TO START PAWL MOVING.

SPACE SUPPRESSION LEVER SPRING (SPACING)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 1-1 2 OZS. ---MAX. 3 OZS.
TO START LEVER MOVING.

SPACING FEED PAWL SPRING (SPACING)

REQUIREMENT
WITH PRINTER IN STOP CONDITION AND PAWL DISENGAGED FROM RATCHET
MIN. 2 OZS. ---MAX 4 OZS.
TO START PAWL MOVING.



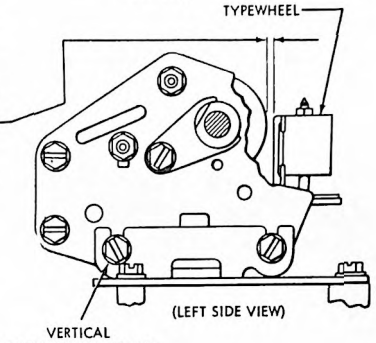
M32 33-69

PLATEN-HORIZONTAL (PAPER FEED)

(1) REQUIREMENT

WITH BLANK COMBINATION SELECTED, ROTATE MAIN SHAFT UNTIL DRIVE BAIL IS IN REAR-MOST POSITION. ROTATE PLATEN UNTIL FLAT ON LEFT-HAND SIDE OF PLATEN IS ALIGNED HORIZONTALLY ON TOP OR THE "0" ON KNOB IS IN ITS UPPERMOST POSITION

MIN. 0.042 INCH --- MAX. 0.058 INCH BETWEEN RIBBON GUIDE AND PLATEN AT BOTH MARGINS WHEN PLAY IN RIBBON GUIDE IS TAKEN UP TOWARDS PLATEN WITH A SPRING HOOK APPLIED IN THE WEDGE SHAPED PROJECTION OF RIBBON GUIDE.



(2) REQUIREMENT

WHEN PRINTED UNDER POWER, THERE SHALL NOT BE ANY RIBBON SMUDGE.

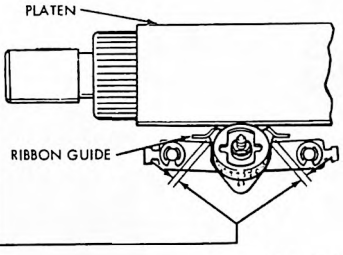
(3) REQUIREMENT

PLACE CARRIAGE AT MIDDLE OF LINE, SELECT "M" FOR THE MODEL 32 AND "X" FOR MODEL 33 PRINTERS. ROTATE MAIN SHAFT UNTIL DRIVE BAIL IS IN ITS REARMOST POSITION AND PRINT HAMMER STRIKES TYPEWHEEL. MANUALLY PUSH TYPEWHEEL REARWARD UNTIL IT JUST TOUCHES PLATEN. THE TYPEWHEEL SHALL NOT TOUCH RIBBON GUIDE OR CAUSE RIBBON GUIDE TO MOVE TOWARDS PLATEN.

NOTE: NO PAPER OR RIBBON IN THE UNIT.

TO ADJUST

LOOSEN FOUR VERTICAL POSITIONING SCREWS. PLACE BOTH ENDS OF PLATEN IN LOWEST POSITION. LOOSEN FOUR HORIZONTAL POSITIONING SCREWS. POSITION PLATEN HORIZONTALLY TO MEET REQUIREMENTS. TIGHTEN HORIZONTAL POSITION SCREWS. ADJUST RIBBON GUIDE BY BENDING IF NECESSARY, PROCEED TO PLATEN-VERTICAL ADJUSTMENT.



PLATEN-VERTICAL (PAPER FEED)

REQUIREMENT

AS GAGED BY EYE, APPROXIMATE UNIFORM DENSITY AT TOP AND BOTTOM OF PRINTED CHARACTER ALONG ENTIRE LENGTH OF PRINTED LINE.

TO ADJUST

USING PRY POINTS POSITION PLATEN VERTICALLY WITH VERTICAL POSITIONING SCREWS LOOSENED. BE SURE TO RAISE OR LOWER PLATEN MOUNTING PLATES AND NOT JUST TWIST THEM.

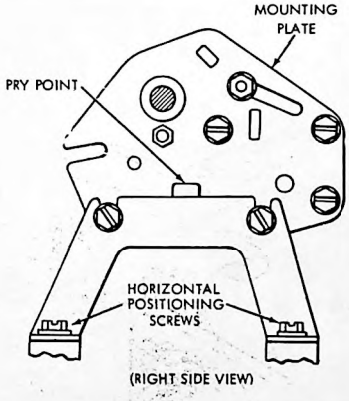
RELATED ADJUSTMENTS

AFFECTS

LINE FEED UPSTOP BRACKET
PRESSURE ROLLER

AFFECTED BY

REAR RAIL - LEFT END (CARRIAGE)
REAR RAIL - RIGHT END (CARRIAGE)
PRINT DRIVE LEVER (CARRIAGE)



SINGLE-DOUBLE LINE FEED (PAPER FEED)

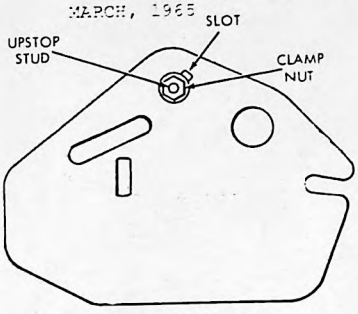
REQUIREMENT
UPSTOP STUD AT LOWER END OF SLOT.

TO ADJUST
POSITION STUD WITH CLAMP NUT LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
PLATEN DETENT

NOTE

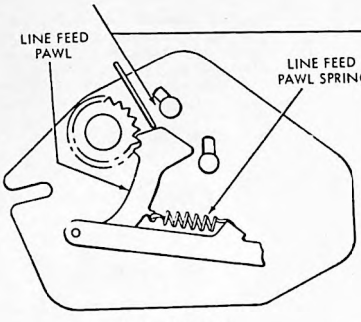
IF DOUBLE LINE FEED IS DESIRED, POSITION STUD AT UPPER END OF SLOT AFTER ALL ADJUSTMENTS HAVE BEEN MADE.



(LEFT SIDE VIEW)

LINE FEED PAWL SPRING (PAPER FEED)

REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 3/4 OZ.---MAX. 1-3/4 OZS.
TO START PAWL MOVING.



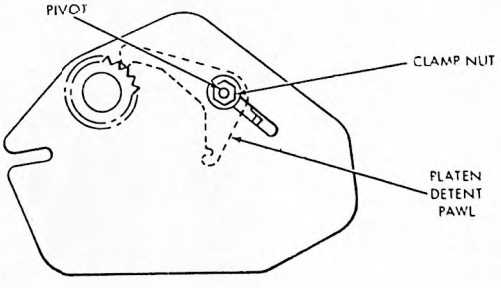
(RIGHT SIDE VIEW)

PLATEN DETENT (PAPER FEED)

REQUIREMENT
WHEN OPERATED BY FINGER PRESSURE, LINE FEED PAWL SHALL FULLY SEAT IN PLATEN RATCHET WITHOUT INTERFERENCE FROM TEETH.

TO ADJUST
POSITION PLATEN DETENT PAWL'S PIVOT WITH CLAMP NUT LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
LINE FEED PAWL DOWNSTOP
AFFECTED BY
SINGLE-DOUBLE LINE FEED



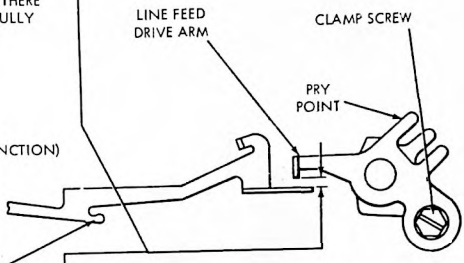
LINE FEED DRIVE ARM (PAPER FEED)
REQUIREMENT
CARRIAGE IN THE CENTER OF UNIT, WITH LINE FEED CODE COMBINATION (-2---) OR (-2-4---8) SET UP IN SELECTOR AND MAIN SHAFT ROTATED UNTIL FUNCTION BAIL IS AT HIGHEST POINT
MIN. SOME --- MAX. 0.010 INCH BETWEEN LINE FEED DRIVE ARM AND LINE FEED BLOCKING LEVER, WHEN THE PLAY IN THE DRIVE ARM AND BLOCKING LEVER IS TAKEN UP TO MAKE THIS CLEARANCE A MINIMUM.
TO ADJUST
USING PRY POINTS, POSITION DRIVE ARM WITH CLAMP SCREW LOOSENED UNITL THERE IS DEFINITE CLEARANCE. THEN CAREFULLY POSITION IT TO MEET REQUIREMENT.

RELATED ADJUSTMENTS
AFFECTS
LINE FEED UPSTOP BRACKET
AFFECTED BY
ROCKER DRIVE ARM (FUNCTION)
RIGHT FUNCTION DRIVE ARM (FUNCTION)

NOTE

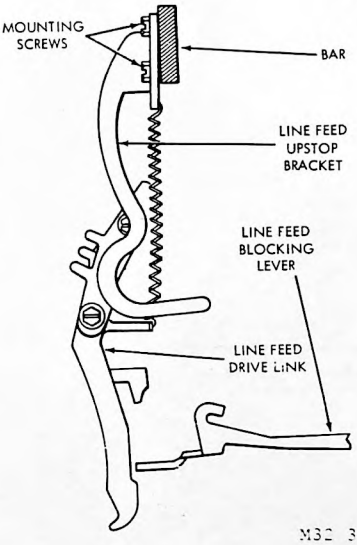
REPLACE MOTOR ON PRINTER ASSEMBLY AND REPLACE PRINTER ASSEMBLY ON SUB-BASE AT THIS POINT.

MAKE GEAR BRACKET (MOTOR) AND BELT TENSION (MOTOR) ADJUSTMENTS.



(RIGHT SIDE VIEW)

LINE FEED BLOCKING LEVER



LINE FEED UPSTOP BRACKET (PAPER FEED)
REQUIREMENT
CARRIAGE IN THE CENTER OF UNIT, WITH LINE FEED CODE COMBINATION (-2---) OR (-2-4---8) SET UP IN SELECTOR AND MAIN SHAFT ROTATED UNTIL FUNCTION BAIL IS AT HIGHEST POINT, PUSH DOWN ON LINE FEED FUNCTION LEVER TO TRIP THE PRINT SUPPRESSION CODE BAR
MIN. 0.020 INCH --- MAX. 0.040 INCH BETWEEN LINE FEED BLOCKING LEVER AND LINE FEED DRIVE ARM.
TO ADJUST
POSITION LINE FEED UPSTOP BRACKET WITH CLAMP SCREWS LOOSENED TO MEET THE REQUIREMENT.

RELATED ADJUSTMENTS
AFFECTED BY
PLATEN-VERTICAL
LINE FEED DRIVE ARM

M3C 33-72

PLATEN DETENT PAWL SPRING (PAPER FEED)

REQUIREMENT
MIN. 24 OZS. ---MAX. 30 OZS.
TO START PAWL MOVING.

LINE FEED DRIVE LINK (PAPER FEED)

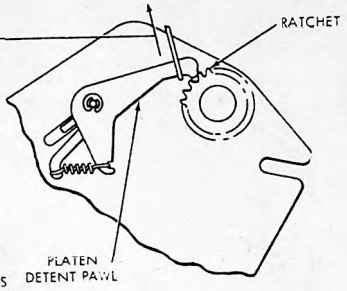
REQUIREMENT
THE MOTION SUPPLIED BY FUNCTION BAIL SHOULD MATCH MOTION REQUIRED BY LINE FEED PAWL.

TO ADJUST (PRELIMINARY)
BACK OFF LINE FEED STRIPPER PLATE. LOOSEN BOTH LINE FEED LINK CLAMP SCREWS VERY LOOSE. PLACE CARRIAGE IN CENTER OF UNIT, ROTATE PLATEN SO FLAT ON LEFT SIDE OF PLATEN IS ALIGNED HORIZONTALLY ON TOP. SET UP LINE FEED CODE COMBINATION (-2---) OR (-2-4---8) IN SELECTOR. ROTATE MAIN SHAFT UNTIL FUNCTION BAIL REACHES LOWEST POINT. USING PRY POINT, POSITION DRIVE LINK SO THAT WHEN LINE FEED LINKAGE HAS ROTATED PLATEN ONE TOOTH, DETENT PAWL SEATS FULLY IN RATCHET. TIGHTEN CLAMP SCREWS.

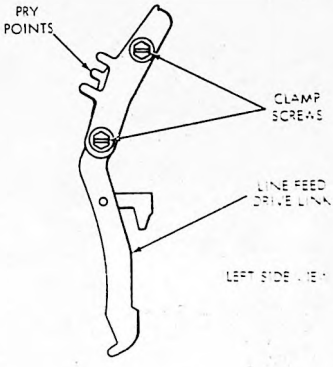
TO CHECK
ROTATE FUNCTION MECHANISM TO ITS LOWEST POINT, WITH LINE FEED DETENT HELD AWAY FROM PLATEN LOWER DETENT INTO ITS NOTCH. THE PLATEN SHOULD BARELY MOVE.

FINAL
WITH UNIT OPERATING UNDER POWER, THE SPACING OF THE LINE FEED SHALL BE UNIFORM AND CONSISTENT WITH NO BACKLASH.

RELATED ADJUSTMENT
AFFECTED BY LINE FEED PAWL DOWNSTOP



(LEFT SIDE VIEW)



(LEFT SIDE VIEW)

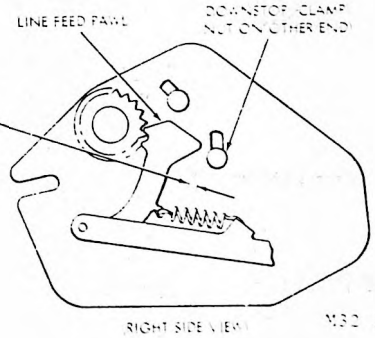
LINE FEED PAWL DOWNSTOP (PAPER FEED)

REQUIREMENT
CARRIAGE IN CENTER OF UNIT, ROTATE PLATEN SO FLAT LOCATED ON LEFT END (VISIBLE AFTER REMOVAL OF PLATEN KNOB) IS HORIZONTAL AND ON TOP. SET UP LINE FEED CODE COMBINATION (-2---) OR (-2-4---8) AND ROTATE MAIN SHAFT UNTIL FEED PAWL HAS ROTATED PLATEN ONE TOOTH AND PLATEN DETENT HAS FULLY SEATED IN RATCHET.

REQUIREMENT
MIN. SOME---MAX. 0.010 INCH BETWEEN BACK OF LINE FEED PAWL AND ITS DOWNSTOP.

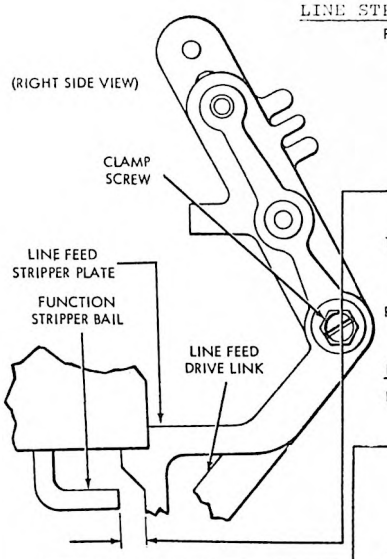
TO ADJUST
POSITION DOWNSTOP WITH CLAMP NUT LOOSENED.

RELATED ADJUSTMENTS
AFFECTS
LINE FEED DRIVE LINK
AFFECTED BY
PLATEN DETENT
LINE FEED DRIVE LINK



(RIGHT SIDE VIEW)

LINE STRIPPER PLATE (PAPER FEED)



REQUIREMENT

CARRIAGE IN CENTER OF UNIT, ROTATE PLATEN SO FLAT ON LEFT END (VISIBLE AFTER REMOVAL OF PLATEN KNOB) IS HORIZONTAL AND ON TOP. WITH LINE FEED CODE COMBINATION (-2---) OR (-2-4---9) SET UP IN SELECTOR AND MAIN SHAFT ROTATED UNTIL FUNCTION BAIL IS AT ITS LOWEST POINT. THE LINE FEED STRIPPER PLATE SHALL BE IN CONTACT WITH OR

— MIN. SOME --- MAX. 0.010 INCH FROM THE FUNCTION STRIPPER BAIL.

TO ADJUST

POSITION LINE FEED STRIPPER PLATE WITH CLAMP SCREW LOOSENED.

RELATED ADJUSTMENT

AFFECTED BY

STRIPPER BAIL (FUNCTION)

PRESSURE ROLLER (PAPER FEED)

REQUIREMENT

WITH PRESSURE ROLLER RELEASED (PRESSURE LEVER IN FRONTWARD POSITION)

— MIN. 0.010 INCH

GAGED BY EYE, BETWEEN PRESSURE ROLLER AND SLIDE SPRING POSTS ON SLIDE GUIDE ON CARRIAGE. (CLEARANCE SHOULD NOT BE SO LARGE THAT ROLLER IS NOT DETENTED IN RELEASED POSITION.)

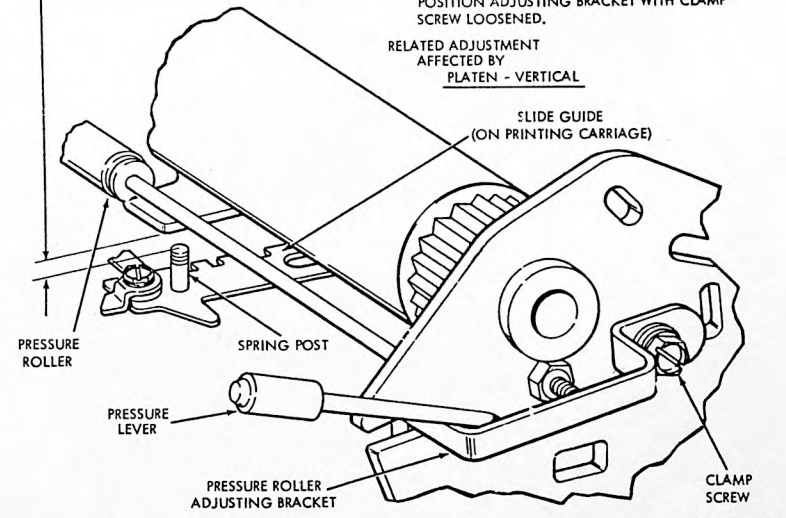
TO ADJUST

POSITION ADJUSTING BRACKET WITH CLAMP SCREW LOOSENED.

RELATED ADJUSTMENT

AFFECTED BY

PLATEN - VERTICAL



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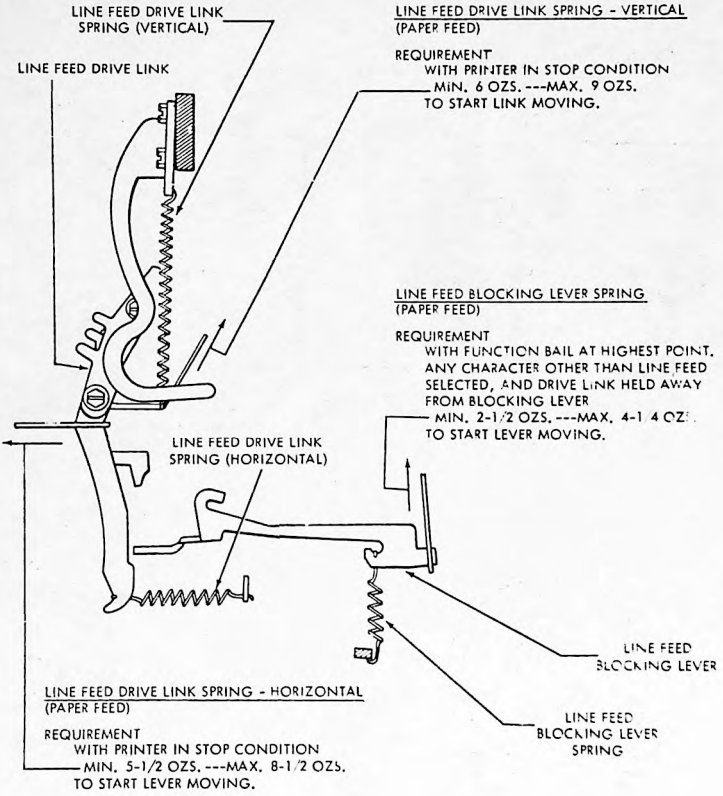

LINE FEED DRIVE LINK SPRING (VERTICAL)
LINE FEED DRIVE LINK
LINE FEED DRIVE LINK SPRING - VERTICAL
(PAPER FEED)
REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 6 OZS. ---MAX. 9 OZS.
TO START LINK MOVING.
LINE FEED BLOCKING LEVER SPRING
(PAPER FEED)
REQUIREMENT
WITH FUNCTION BAIL AT HIGHEST POINT,
ANY CHARACTER OTHER THAN LINE FEED
SELECTED, AND DRIVE LINK HELD AWAY
FROM BLOCKING LEVER
MIN. 2-1/2 OZS. ---MAX. 4-1/4 OZS.
TO START LEVER MOVING.
LINE FEED DRIVE LINK SPRING (HORIZONTAL)
LINE FEED BLOCKING LEVER
LINE FEED BLOCKING LEVER SPRING
LINE FEED DRIVE LINK SPRING - HORIZONTAL
(PAPER FEED)
REQUIREMENT
WITH PRINTER IN STOP CONDITION
MIN. 5-1/2 OZS. ---MAX. 8-1/2 OZS.
TO START LEVER MOVING.

PAPER GUIDE SPRINGS (PAPER FEED)

REQUIREMENT
WITH SCALE AT ONE END OF PAPER GUIDE
MIN. 1-1/2 OZS. ---MAX. 3-1/2 OZS.
TO START GUIDE MOVING.

PAPER STRAIGHTENER BAIL SPRING (PAPER FEED)

REQUIREMENT
WITH SCALE AT CENTER OF BAIL
MIN. 1 OZ.---MAX. 3 OZS.
TO START BAIL MOVING.

PAPER GUIDE PLATE SPRINGS (PAPER FEED)

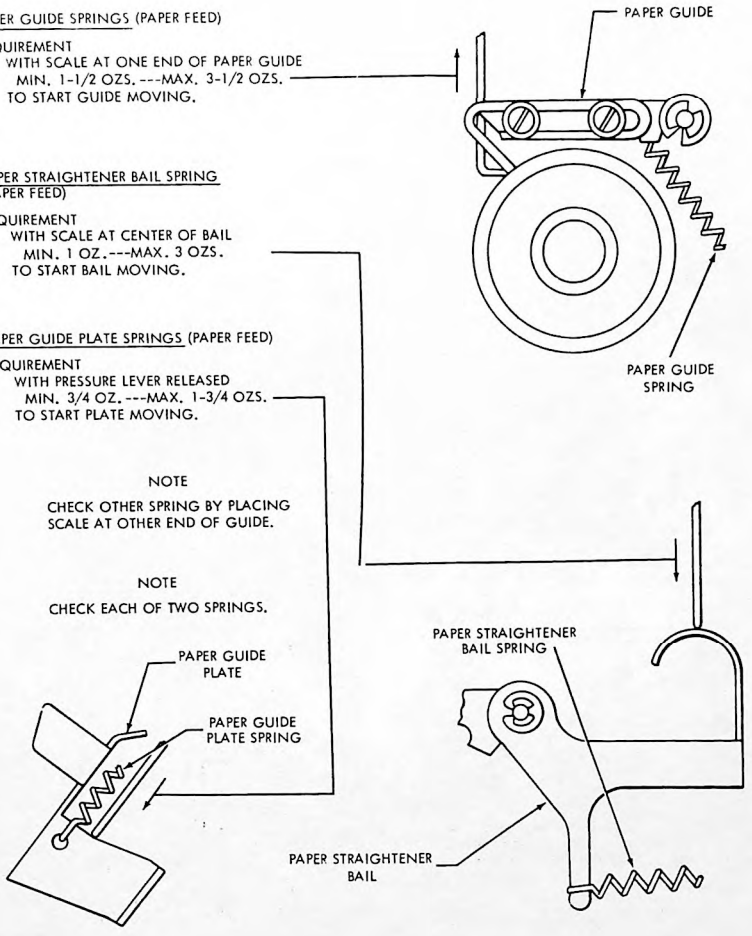
REQUIREMENT
WITH PRESSURE LEVER RELEASED
MIN. 3/4 OZ. ---MAX. 1-3/4 OZS.
TO START PLATE MOVING.

NOTE

CHECK OTHER SPRING BY PLACING SCALE AT OTHER END OF GUIDE.

NOTE

CHECK EACH OF TWO SPRINGS.



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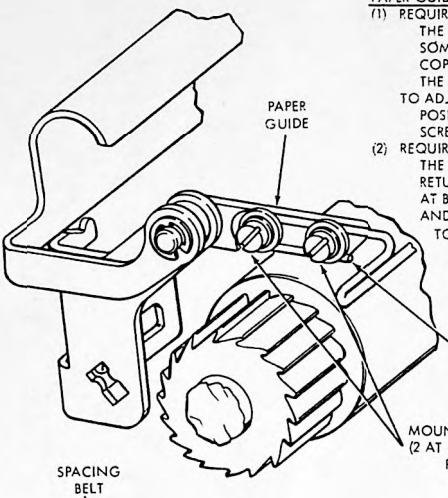
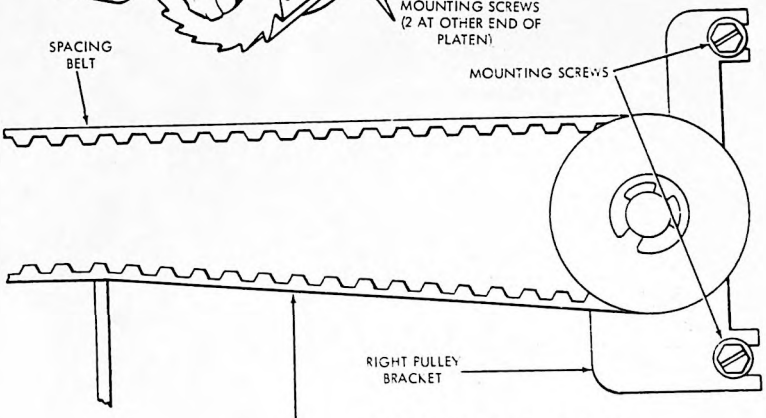
PAPER GUIDE (PAPER FEED)

(1) REQUIREMENT
THE WIRE ON PAPER FINGERS SHALL FALL SOMEWHERE BETWEEN TWO LINES OF PRINTED COPY, NOT OBSCURING MORE THAN 1/2 THE HEIGHT OF EITHER LINE.
TO ADJUST
POSITION PAPER GUIDE WITH FOUR MOUNTING SCREWS LOOSENED.

(2) REQUIREMENT
THE WIRE ON PAPER FINGER SHOULD RETURN AND REST AGAINST THE PLATEN AT BOTH ENDS AND MIDDLE AFTER RAISING AND RELEASING FINGERS.
TO ADJUST
FORM EARS ON PAPER FINGER WIRE TO FREE PAPER FINGER PIVOT.



(RIGHT SIDE VIEW)

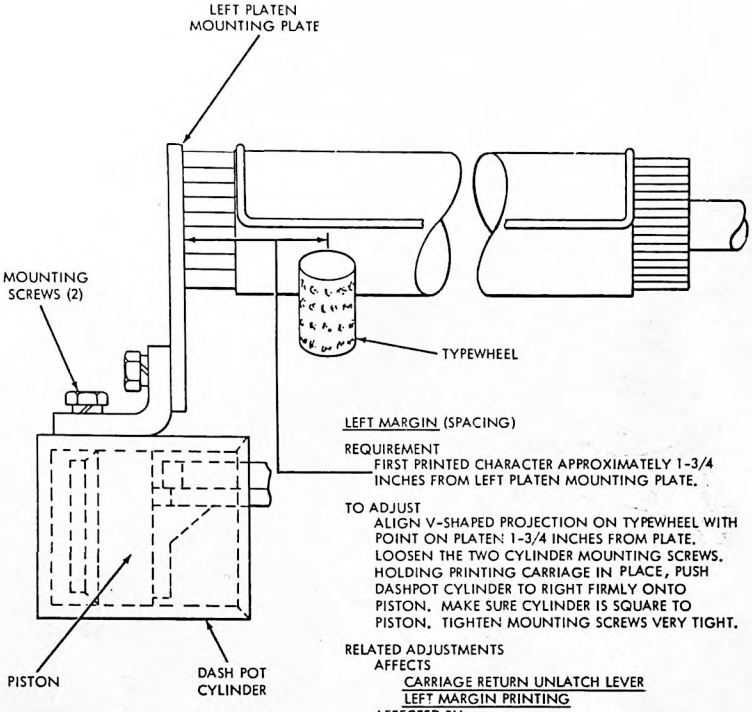


(TOP VIEW)

SPACING BELT TENSION SPACING

REQUIREMENT
WITH PRINTER IN STOP CONDITION, CARRIAGE AT LEFT MARGIN, AND 5 OZS. OF PRESSURE APPLIED NEAR CENTER OF BELT — MIN. 9/16 INCH---MAX. 11/16 INCH BETWEEN OUTER SURFACES OF BELT.

TO ADJUST
POSITION RIGHT PULLEY BRACKET WITH MOUNTING SCREWS LOOSENED



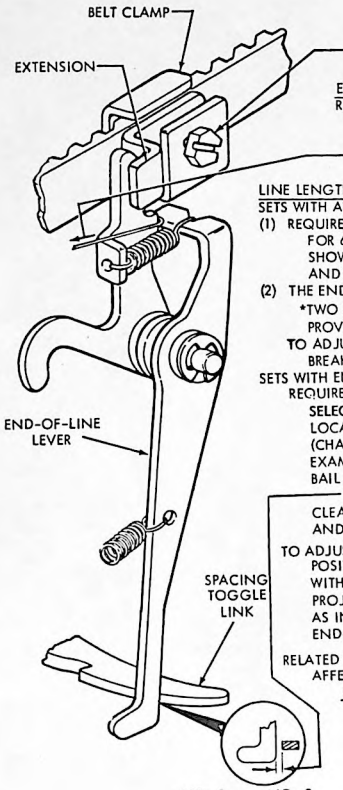
(FRONT VIEW)

LEFT MARGIN (SPACING)

REQUIREMENT
FIRST PRINTED CHARACTER APPROXIMATELY 1-3/4 INCHES FROM LEFT PLATEN MOUNTING PLATE.

TO ADJUST
ALIGN V-SHAPED PROJECTION ON TYPEWHEEL WITH POINT ON PLATEN 1-3/4 INCHES FROM PLATE. LOOSEN THE TWO CYLINDER MOUNTING SCREWS. HOLDING PRINTING CARRIAGE IN PLACE, PUSH DASHPOT CYLINDER TO RIGHT FIRMLY ONTO PISTON. MAKE SURE CYLINDER IS SQUARE TO PISTON. TIGHTEN MOUNTING SCREWS VERY TIGHT.

RELATED ADJUSTMENTS
AFFECTS
CARRIAGE RETURN UNLATCH LEVER
LEFT MARGIN PRINTING
AFFECTED BY
LINE LENGTH (FUNCTION AND SPACING)

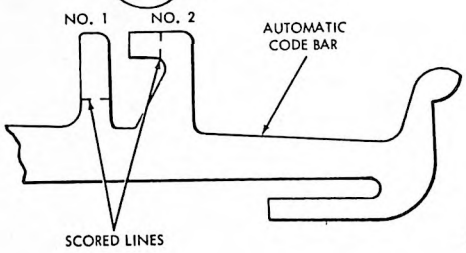


END OF LINE LATCH SPRING
REQUIREMENT
WITH PRINTER IN STOP POSITION, CARRIAGE RETURN LEVER UNLATCHED
— MIN. 1-1/2 OZS. --- MAX. 3 OZS.
TO START LATCH MOVING.

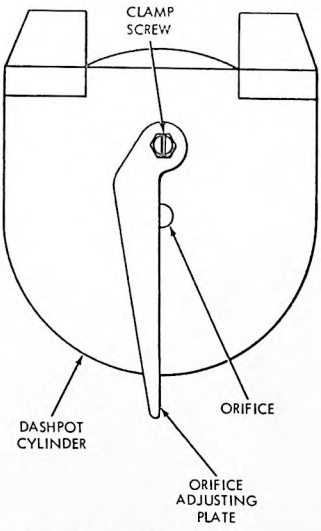
LINE LENGTH (FUNCTION AND SPACING)
SETS WITH AUTOMATIC CR-LF.
(1) REQUIREMENT
FOR 69 CHARACTER LINE, AUTOMATIC CODE BAR AS SHOWN. FOR 72 CHARACTER LINE, PROJECTION NO. 1 AND 2 REMOVED.
(2) THE END OF LINE MARGIN BELL SHALL RING AS FOLLOWS:
*TWO RINGS SHALL BE PERMITED ON SUCCESSIVE CHARACTERS, PROVIDED THE FIRST RING OCCURS AS SHOWN ABOVE.
TO ADJUST
BREAK OFF PROJECTIONS AT SCORED LINES AS REQUIRED.

SETS WITH END-OF-LINE SPACE SUPPRESSION
REQUIREMENT
SELECTION OF PROPER LENGTH OF LINE: WITH CARRIAGE LOCATED ONE CHARACTER BEFORE END OF LINE, (CHARACTER NO. 71 ON A 72 CHARACTER LINE FOR EXAMPLE). ROTATE MAIN SHAFT UNTIL CARRIAGE DRIVE BAIL REACHES ITS REARMOST POSITION.
— MIN. 0.025 INCH --- MAX. 0.100 INCH CLEARANCE BETWEEN END OF LINE SUPPRESSION LATCH AND TOGGLE LINK OF SPACING MECHANISM.
TO ADJUST
POSITION BELT CLAMP (AND EXTENSION) WITH CLAMP SCREW LOOSENED. BREAK OFF PROJECTIONS ON AUTOMATIC CODE BAR AS INSTRUCTED IN PART (1), SO THAT END-OF-LINE BELL WILL RING AT PROPER TIME.

RELATED ADJUSTMENT
AFFECTS
LEFT MARGIN (SPACING)



(LEFT SIDE VIEW)



DASHPOT ORIFICE (SPACING)

REQUIREMENT
NO PNEUMATIC OR MECHANICAL BOUNCE OF CARRIAGE UPON ITS RETURN.

TO ADJUST
POSITION ORIFICE ADJUSTING PLATE WITH CLAMP SCREW LOOSENED.

CARRIAGE RETURN UNLATCH LEVER (SPACING)

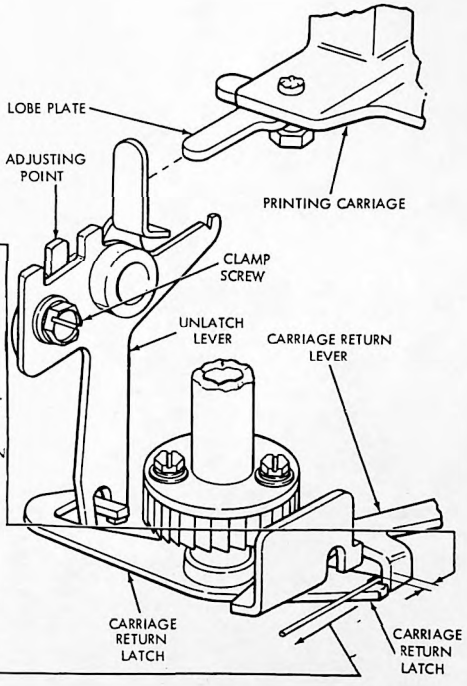
REQUIREMENT
WHEN THE CARRIAGE RETURNS, CARRIAGE RETURN LEVER UNLATCHED AND MIN. SOME --- MAX. 0.050 INCH BETWEEN THE CARRIAGE RETURN LATCH AND THE CARRIAGE RETURN LEVER. WHEN PLAY IN LATCH IS TAKEN UP TO MAKE THE CLEARANCE A MINIMUM.

TO ADJUST
PRELIMINARY: PLACE ADJUSTING POINT AT CENTER OF RANGE WITH MOUNTING SCREWS LOOSENED. POSITION LOBE PLATE SO AS TO SELECT LOBE THAT MOST NEARLY TOUCHES UNLATCH LEVER. CHECK FRONT ROLLERS (CARRIAGE).
FINAL: USING ADJUSTING POINT, POSITION UNLATCH LEVER WITH CLAMP SCREW LOOSENED.

RELATED ADJUSTMENT AFFECTED BY
LEFT MARGIN

CARRIAGE RETURN LATCH SPRING (SPACING)

REQUIREMENT
WITH PRINTER IN STOP CONDITION AND CARRIAGE RETURN LEVER UNLATCHED MIN. 1-1/2 OZS. ---MAX. 3 OZS. TO START LATCH MOVING



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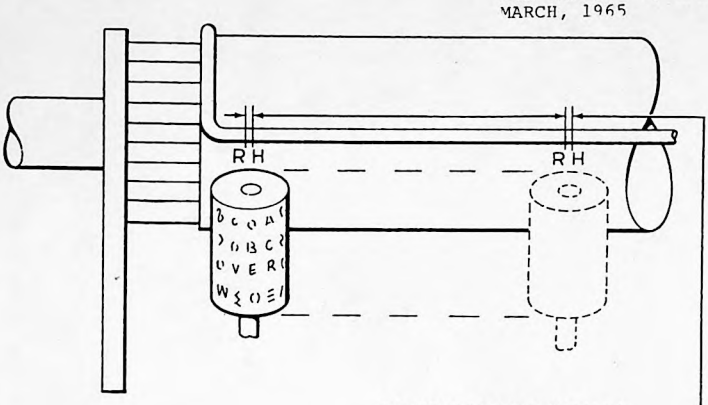
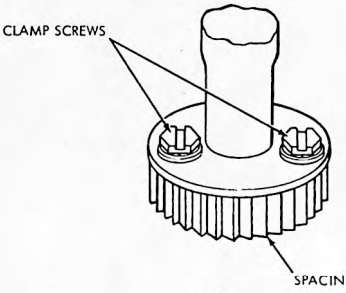


LEFT MARGIN PRINTING (SPACING)

TO CHECK
PRINT TWO OR MORE CHARACTERS SUCH AS RH AT LEFT MARGIN AND AT CENTER OF LINE.

REQUIREMENT
CHARACTER TO CHARACTER SPACING APPROXIMATELY SAME AT CENTER OF LINE AS AT LEFT MARGIN.

TO ADJUST
POSITION SPACING RATCHET WITH CLAMP SCREWS LOOSENED.



NOTE

THIS ADJUSTMENT CAN BE MADE EASIER BY REMOVING KEYBOARD.

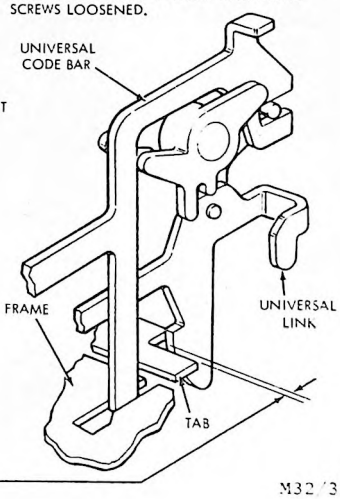
UNIVERSAL LINK (KEYBOARD)

REQUIREMENT
WITH PRINTER IN STOP CONDITION MIN. 0.089 INCH---MAX. 0.103 INCH BETWEEN THE UNIVERSAL LINK AND KEYBOARD FRAME.

TO ADJUST
PLACE SCREWDRIVER THROUGH OPENING AND BEND TAB ON FRAME.

NOTE

REPLACE KEYBOARD.



NOTE

REPLACE MOTOR ON PRINTER ASSEMBLY AND REPLACE KEYBOARD AND PRINTER ASSEMBLIES ON SUB-BASE AT THIS POINT.

NOTE

PRIOR TO GAGING THE REQUIRED GAP, PUSH END OF KEYBOARD UNIVERSAL LEVER THAT PROTRUDES THROUGH THE FRONT OF KEYBOARD FRAME TO BOTTOM OF ITS GUIDE SLOT AND ALLOW IT TO SNAP UP.

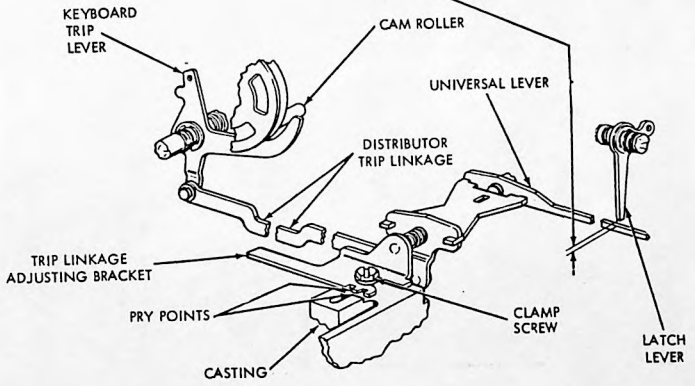
DISTRIBUTOR TRIP LINKAGE (KEYBOARD)

TO CHECK
WITH PRINTER IN STOP CONDITION, DEPRESS A KEY TO TRIP DISTRIBUTOR CLUTCH. ROTATE MAIN SHAFT UNTIL KEYBOARD TRIP LEVER IS AT HIGHEST POINT OF CAM FOLLOWER'S THROW AND UNIVERSAL LEVER IS IN LOWEST POSITION.

REQUIREMENT
MIN. 0.010 INCH---MAX. 0.035 INCH BETWEEN LATCH LEVER AND UNIVERSAL LEVER.

TO ADJUST
USING PRY POINTS ON CASTING AND BRACKETS, POSITION TRIP LINKAGE ADJUSTING BRACKET WITH CLAMP SCREWS LOOSENED.

RELATED ADJUSTMENT
AFFECTS
TRIP LEVER ENGAGEMENT (DISTRIBUTOR)



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CONTACT WIRES (KEYBOARD)

(1) REQUIREMENT
WITH PRINTER IN STOP CONDITION AND T-LEVER IN MARKING POSITION
MIN. 0.010 INCH---MAX. 0.025 INCH BETWEEN CONTACT WIRE AND TERMINAL.

TO ADJUST
BEND WIRE WITH 98055 BENDING TOOL.

(2) TO CHECK
WITH PRINTER IN STOP CONDITION, PLACE T-LEVERS IN SPACING POSITION. PLACE UNIVERSAL LEVER IN UP POSITION BY DEPRESSING UNIVERSAL CODE BAR (SEE UNIVERSAL LINK ADJUSTMENT).

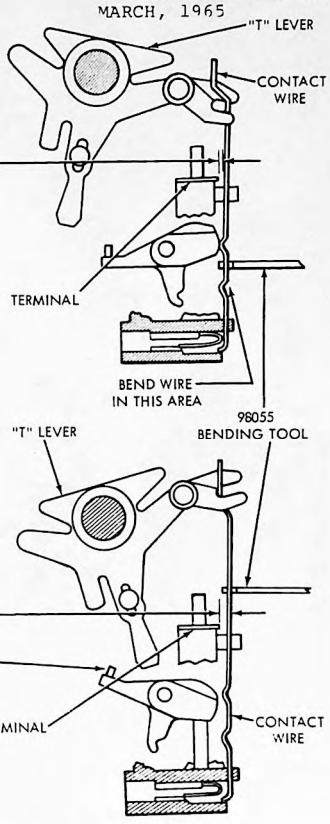
REQUIREMENT
MIN. 0.020 INCH --- MAX. 0.040 INCH BETWEEN CONTACT WIRE AND TERMINAL.

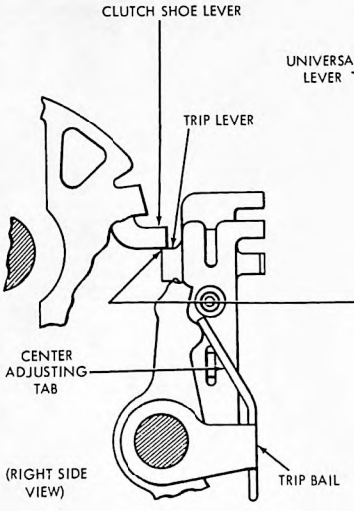
TO ADJUST
BEND WIRE WITH 98055 BENDING TOOL.

RELATED ADJUSTMENT
PART (2) OF THIS ADJUSTMENT IS AFFECTED BY PART (1).

NOTE

CHECK REQUIREMENTS FOR EACH CONTACT WIRE.





TRIP LEVER ENGAGEMENT (DISTRIBUTOR)
REQUIREMENT
WITH KEYBOARD TRIP ARM IN LATCHED POSITION, THE CLUTCH STOP LEVER SHOULD ENGAGE CLUTCH SHOE LEVER BY APPROXIMATELY FULL THICKNESS OF CLUTCH SHOE LEVER.

TO ADJUST
REMOVE ANSWER-BACK DRUM. BEND CENTER ADJUSTING TAB WITH 180993 BENDING TOOL. REPLACE DRUM.

RELATED ADJUSTMENT
AFFECTED BY
DISTRIBUTOR TRIP LINKAGE (KEYBOARD)

DRUM (ANSWER-BACK)

TO CHECK

DISENGAGE (LATCH) DISTRIBUTOR CLUTCH. LOOSEN NUT ON ADJUSTING SCREW SO THAT FEED PAWL IS FREE TO MOVE. POSITION DRUM SO THAT DETENT LEVER IS BETWEEN STOP (ST) AND NO. 20 ROW. MAKE SURE CONTROL LEVER IS FULLY SEATED IN INDENT AND DRUM IS FULLY DETENTED.

REQUIREMENT

(1) BARELY PERCEPTIBLE CLEARANCE BETWEEN DRUM AND CONTROL LEVER.
(2) THE AXIS OF THE ANSWER-BACK DRUM SHALL BE PARALLEL TO DISTRIBUTOR TRIP PIVOT SHAFT AS GAUGED BY EYE.

TO ADJUST

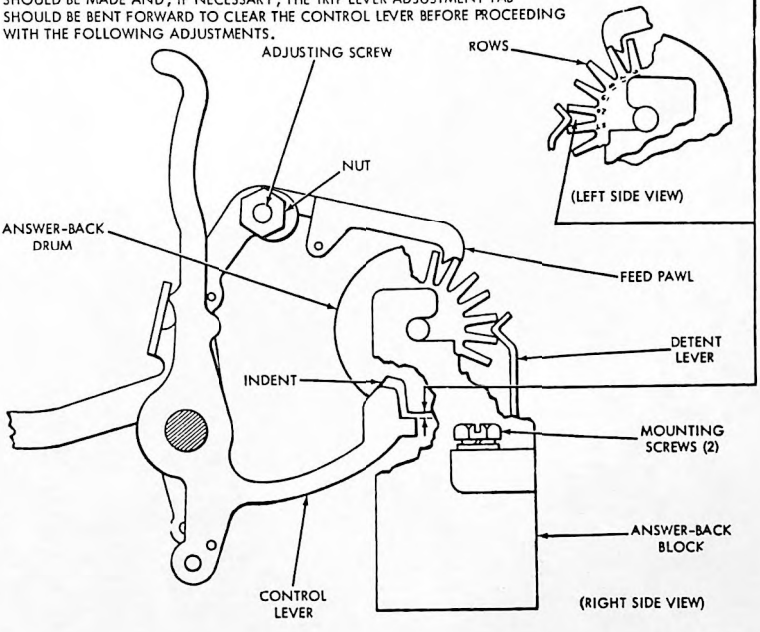
LOOSEN "HERE IS" ADJUSTING BRACKET AND ANSWER-BACK ADJUSTING BRACKET SCREWS SO BOTH BRACKETS ARE FREE TO MOVE. LOOSEN ANSWER-BACK BLOCK SCREWS (2) FRICTION TIGHT. MOVE ANSWER-BACK BLOCK TO MEET REQUIREMENTS.

RELATED ADJUSTMENTS

AFFECTS

CLUTCH TRIP BAIL, FEED PAWL, BLINDING CONTACT WIRE, FEED LEVER

NOTE: IF THE SET IS EQUIPPED WITH THE ANSWER-BACK MAGNET TRIP (VARIABLE FEATURE), THE ANSWER-BACK TRIP LEVER OVERTRAVEL ADJUSTMENT, SHOULD BE MADE AND, IF NECESSARY, THE TRIP LEVER ADJUSTMENT TAB SHOULD BE BENT FORWARD TO CLEAR THE CONTROL LEVER BEFORE PROCEEDING WITH THE FOLLOWING ADJUSTMENTS.



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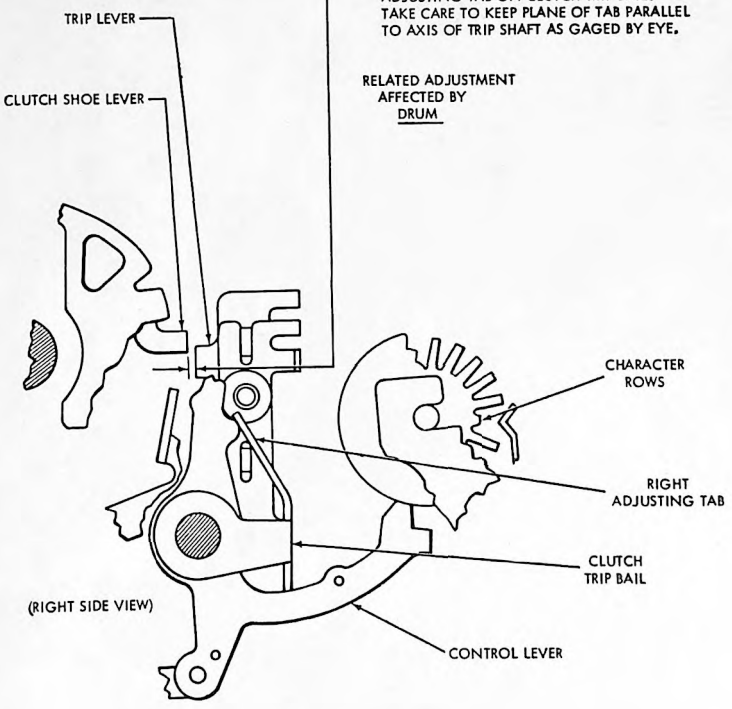
CLUTCH TRIP BAIL (ANSWER BACK)
REQUIREMENT
WITH CLUTCH TRIPPED AND UPPER EDGE OF SHOE LEVER IN LINE WITH UPPER EDGE OF CLUTCH STOP ARM AND ANSWER-BACK DRUM ROTATED TWO CHARACTER CYCLES, (DETENT BETWEEN NO. 1 AND NO. 2 LEVELS). CLEARANCE BETWEEN THE CLUTCH SHOE LEVER AND CLUTCH STOP ARM
— MIN. 0.020 INCH --- MAX. 0.040 INCH
TO ADJUST
USING 180993 BENDING TOOL, BEND RIGHT ADJUSTING TAB ON CLUTCH TRIP BAIL. TAKE CARE TO KEEP PLANE OF TAB PARALLEL TO AXIS OF TRIP SHAFT AS GAGED BY EYE.

RELATED ADJUSTMENT
AFFECTED BY
DRUM



FEED PAWL (ANSWERBACK)

REQUIREMENT

WITH DISTRIBUTOR CLUTCH DISENGAGED (LATCHED) MANUALLY ROTATE ANSWER-BACK DRUM ONE CHARACTER CYCLE. MANUALLY ROTATE THE DISTRIBUTOR SHAFT UNTIL THE DISTRIBUTOR SHAFT CAM ROLLER IS ON HIGH PART OF ANSWER-BACK FEED LEVER. POSITION FEED LEVER SIDEWAYS SO IT IS PERPENDICULAR TO AXIS OF DRUM AS GAGED BY EYE AND AS ENTIRE WIDTH OF FEED PAWL TOOTH RIDES ONLY IN RATCHET SECTION OF ANSWER-BACK DRUM. TAKE UP PLAY OF FEED PAWL TOWARDS REAR OF UNIT AND RELEASE. CLEARANCE BETWEEN FEED PAWL AND NO. 17 DRUM TOOTH

MIN. SOME --- MAX. 0.010 INCH

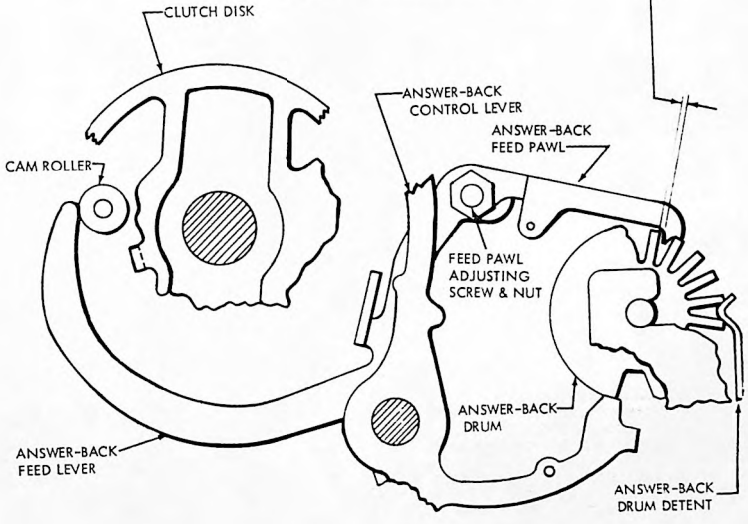
TO ADJUST

POSITION FEED PAWL WITH NUT ON ADJUSTING SCREW FRICTION TIGHT.

RELATED ADJUSTMENTS

AFFECTS

"HERE IS" ADJUSTING BRACKET TRIP BAIL



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FEED LEVER (ANSWERBACK)

REQUIREMENT

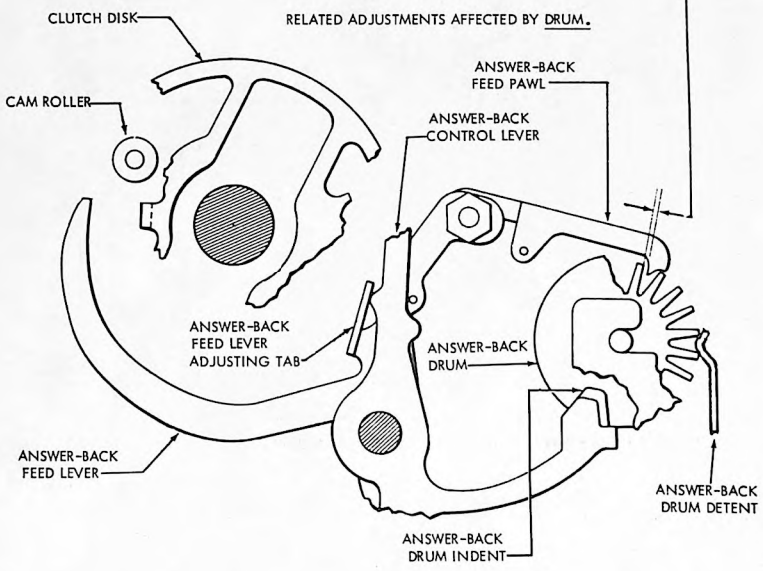
WITH ANSWER-BACK CONTROL LEVER IN INDENT OF ANSWER-BACK DRUM. MANUALLY TRIP THE DISTRIBUTOR CLUTCH, ROTATE DISTRIBUTOR SHAFT UNTIL CAM ROLLER IS NOT IN CONTACT WITH ANSWER-BACK FEED LEVER. POSITION FEED LEVER SIDEWAYS SO IT IS PERPENDICULAR TO THE AXIS OF DRUM AS GAGED BY EYE AND SO THAT THE ENTIRE WIDTH OF FEED PAWL TOOTH RIDES ONLY IN RATCHET SECTION OF ANSWER-BACK DRUM. TAKE UP PLAY OF FEED PAWL TOWARDS REAR OF UNIT AND RELEASE. CLEARANCE BETWEEN ANSWER-BACK FEED PAWL AND NO. 16 DRUM TOOTH.

MIN. 0.006 INCH -- MAX. 0.020 INCH

TO ADJUST

USING 180993 BENDING TOOL, BEND FEED LEVER'S ADJUSTING TAB.

RELATED ADJUSTMENTS AFFECTED BY DRUM.



"HERE-IS" ADJUSTING BRACKET (ANSWER-BACK)

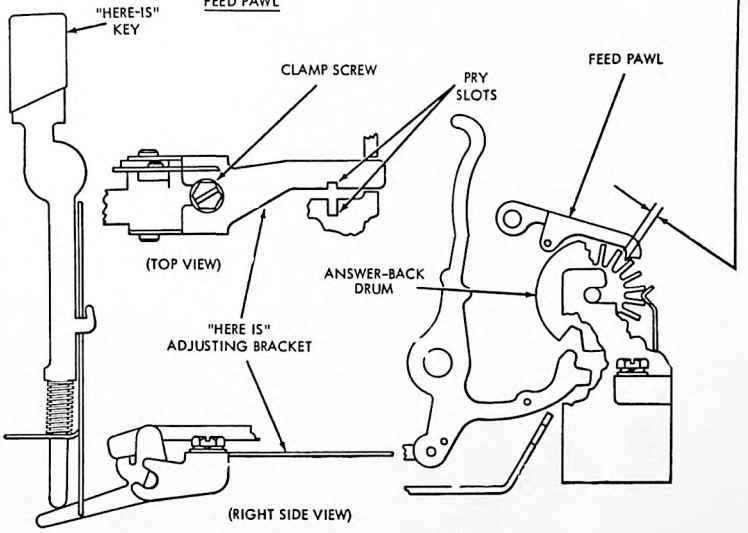
REQUIREMENT

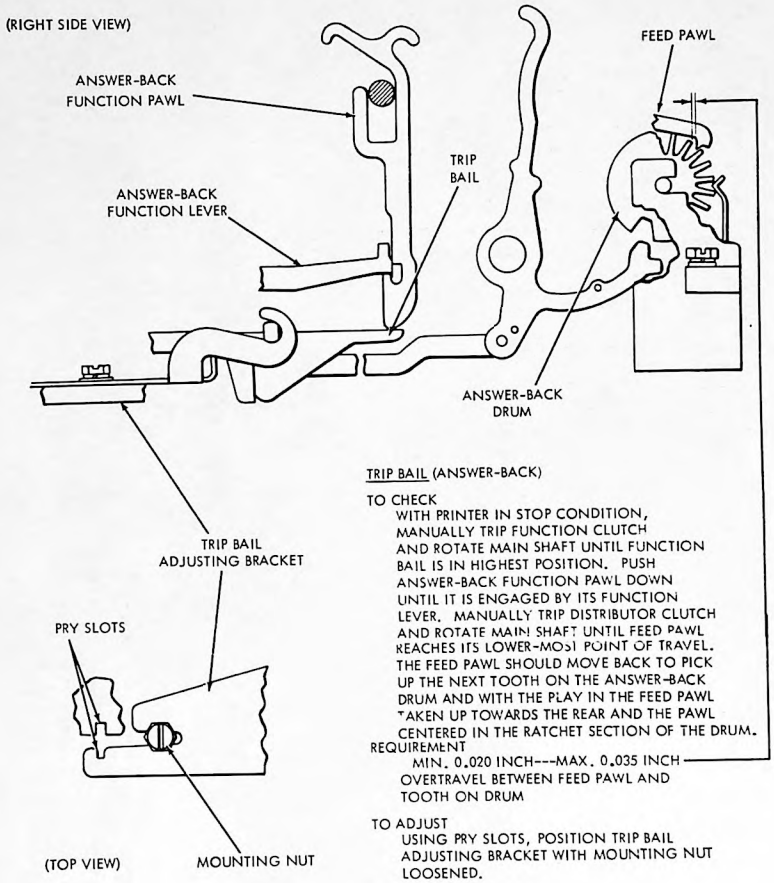
WITH ANSWER-BACK CONTROL LEVER IN INDENT OF ANSWER-BACK DRUM, DISTRIBUTOR CLUTCH TRIPPED MANUALLY AND DISTRIBUTOR SHAFT ROTATED CLOCKWISE UNTIL FEED LEVER IS NOT IN CONTACT WITH CAM ROLLER (SEE FEED LEVER)
MIN. 0.015 INCH---MAX. 0.030 INCH
OVERTRAVEL BETWEEN FEED PAWL AND TOOTH ON ANSWER-BACK DRUM WHEN "HERE IS" KEY IS FULLY DEPRESSED.

TO ADJUST

USING PRY SLOTS, POSITION "HERE-IS" ADJUSTING BRACKET WITH CLAMP SCREW LOOSENED.

RELATED ADJUSTMENT
AFFECTS
BLINDING CONTACT WIRE
BLOCKING FOLLOWER
AFFECTED BY
FEED PAWL





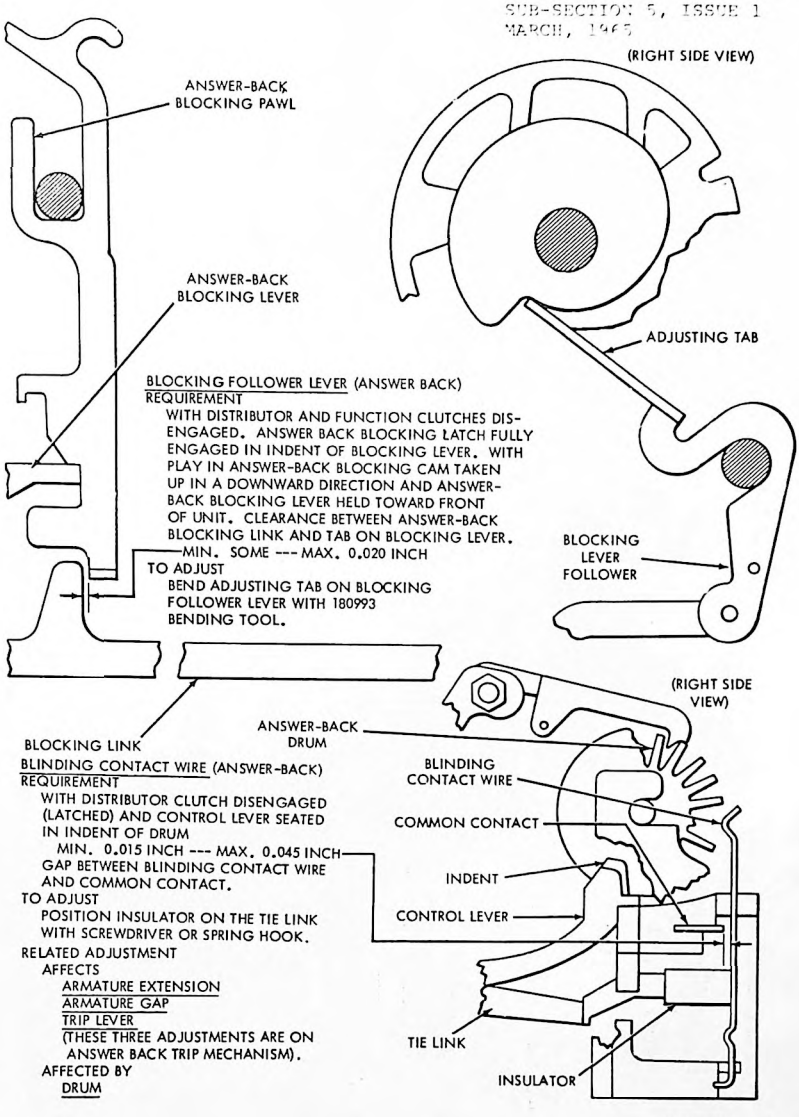
TRIP BAIL (ANSWER-BACK)

TO CHECK
WITH PRINTER IN STOP CONDITION, MANUALLY TRIP FUNCTION CLUTCH AND ROTATE MAIN SHAFT UNTIL FUNCTION BAIL IS IN HIGHEST POSITION. PUSH ANSWER-BACK FUNCTION PAWL DOWN UNTIL IT IS ENGAGED BY ITS FUNCTION LEVER. MANUALLY TRIP DISTRIBUTOR CLUTCH AND ROTATE MAIN SHAFT UNTIL FEED PAWL REACHES ITS LOWER-MOST POINT OF TRAVEL. THE FEED PAWL SHOULD MOVE BACK TO PICK UP THE NEXT TOOTH ON THE ANSWER-BACK DRUM AND WITH THE PLAY IN THE FEED PAWL TAKEN UP TOWARDS THE REAR AND THE PAWL CENTERED IN THE RATCHET SECTION OF THE DRUM.

REQUIREMENT
MIN. 0.020 INCH---MAX. 0.035 INCH OVERTRAVEL BETWEEN FEED PAWL AND TOOTH ON DRUM

TO ADJUST
USING PRY SLOTS, POSITION TRIP BAIL ADJUSTING BRACKET WITH MOUNTING NUT LOOSENED.

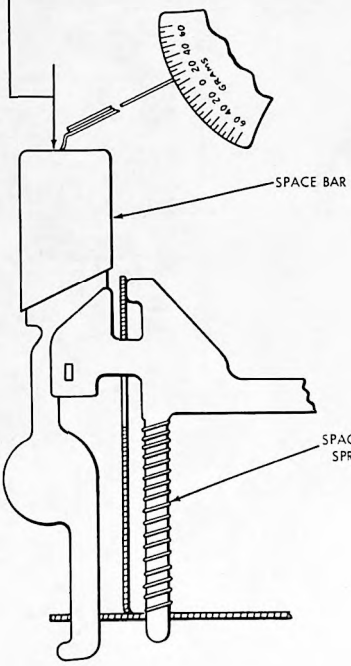
RELATED ADJUSTMENT AFFECTED BY
FEED PAWL


(RIGHT SIDE VIEW)
ANSWER-BACK BLOCKING PAWL
ANSWER-BACK BLOCKING LEVER
ADJUSTING TAB
BLOCKING FOLLOWER LEVER (ANSWER BACK)
REQUIREMENT
WITH DISTRIBUTOR AND FUNCTION CLUTCHES DISENGAGED. ANSWER BACK BLOCKING LATCH FULLY ENGAGED IN INDENT OF BLOCKING LEVER. WITH PLAY IN ANSWER-BACK BLOCKING CAM TAKEN UP IN A DOWNWARD DIRECTION AND ANSWER-BACK BLOCKING LEVER HELD TOWARD FRONT OF UNIT. CLEARANCE BETWEEN ANSWER-BACK BLOCKING LINK AND TAB ON BLOCKING LEVER.
MIN. SOME --- MAX. 0.020 INCH
TO ADJUST
BEND ADJUSTING TAB ON BLOCKING FOLLOWER LEVER WITH 180993 BENDING TOOL.
BLOCKING LEVER FOLLOWER
BLOCKING LINK
(RIGHT SIDE VIEW)
ANSWER-BACK DRUM
BLINDING CONTACT WIRE (ANSWER-BACK)
REQUIREMENT
WITH DISTRIBUTOR CLUTCH DISENGAGED (LATCHED) AND CONTROL LEVER SEATED IN INDENT OF DRUM
MIN. 0.015 INCH --- MAX. 0.045 INCH
GAP BETWEEN BLINDING CONTACT WIRE AND COMMON CONTACT.
TO ADJUST
POSITION INSULATOR ON THE TIE LINK WITH SCREWDRIVER OR SPRING HOOK.
RELATED ADJUSTMENT
AFFECTS
ARMATURE EXTENSION
ARMATURE GAP
TRIP LEVER
(THESE THREE ADJUSTMENTS ARE ON ANSWER BACK TRIP MECHANISM).
AFFECTED BY
DRUM
BLINDING CONTACT WIRE
COMMON CONTACT
INDENT
CONTROL LEVER
TIE LINK
INSULATOR

M32/33-90

SPACE BAR SPRING (KEYBOARD)

REQUIREMENT
WITH SPACE BAR DEPRESSED AND THEN RELEASED
MIN. 5 GRAMS---MAX. 25 GRAMS TO START BAR MOVING.

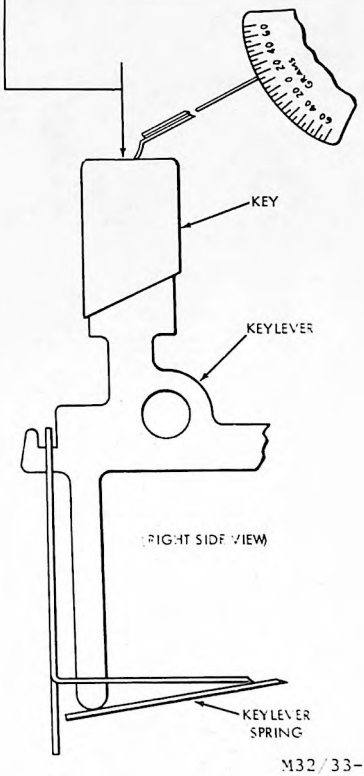


NOTE

CHECK EACH KEYLEVER SPRING.

KEYLEVER SPRING (KEYBOARD)

REQUIREMENT
WITH KEY DEPRESSED AND THEN RELEASED
MIN. 5 GRAMS---MAX. 25 GRAMS TO START KEY MOVING.



M32/33-91

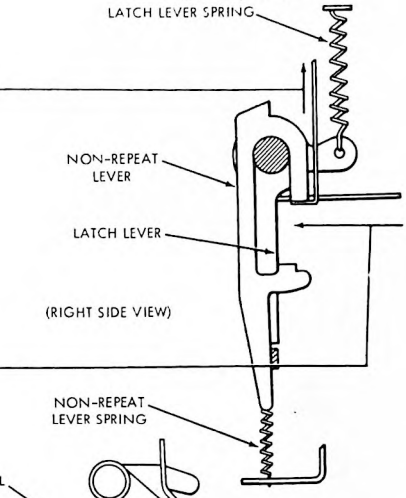
NON-REPEAT LEVER SPRING (KEYBOARD)

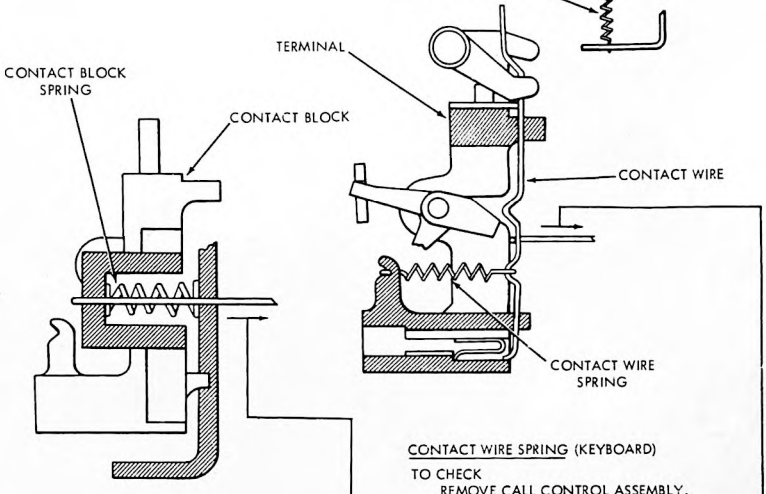
REQUIREMENT
WITH KEYBOARD COVER REMOVED AND PRINTER IN STOP CONDITION
MIN. 3/4 OZS.---MAX. 1 1/2 OZS.
TO START NON-REPEAT LEVER MOVING.

LATCH LEVER SPRING (KEYBOARD)

TO CHECK
REMOVE CALL CONTROL ASSEMBLY. TRIP DISTRIBUTOR CLUTCH AND ROTATE MAIN SHAFT UNTIL DISTRIBUTOR TRIP CAM FOLLOWER IS AT HIGH POINT OF CAM ROLLER'S THROW (SEE DISTRIBUTOR TRIP LINKAGE).

REQUIREMENT
MIN. 1/2 OZ.---MAX. 1 OZ.
TO START LATCH LEVER MOVING.





CONTACT BLOCK SPRING (KEYBOARD)

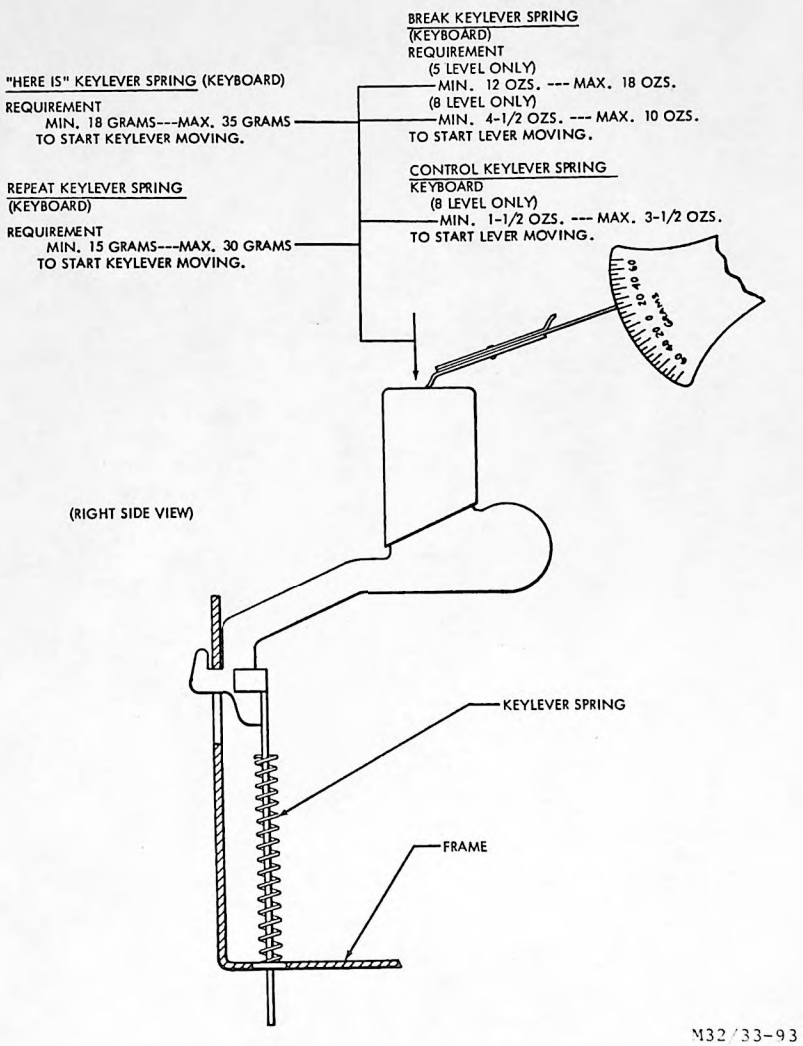
REQUIREMENT
WITH CALL CONTROL ASSEMBLY REMOVED
MIN. 18 OZS.---MAX. 24 OZS.
TO START CONTACT BLOCK MOVING.

CONTACT WIRE SPRING (KEYBOARD)

TO CHECK
REMOVE CALL CONTROL ASSEMBLY. PLACE T-LEVERS IN MARKING (CLOCKWISE POSITION). TRIP KEYBOARD BY DEPRESSING UNIVERSAL CODE BAR (SEE UNIVERSAL LINK).

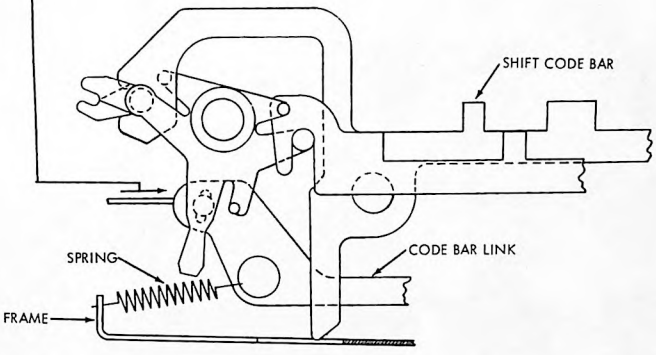
REQUIREMENT
MIN. 3 4 OZ.---MAX. 1-1 4 OZS.
TO START CONTACT WIRE MOVING AWAY FROM TERMINAL.

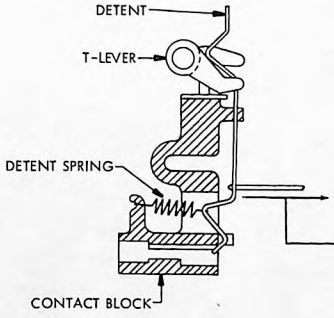
M32/33-92


BREAK KEYLEVER SPRING
(KEYBOARD)
REQUIREMENT
(5 LEVEL ONLY)
MIN. 12 OZS. --- MAX. 18 OZS.
(8 LEVEL ONLY)
MIN. 4-1/2 OZS. --- MAX. 10 OZS.
TO START LEVER MOVING.
"HERE IS" KEYLEVER SPRING (KEYBOARD)
REQUIREMENT
MIN. 18 GRAMS---MAX. 35 GRAMS
TO START KEYLEVER MOVING.
CONTROL KEYLEVER SPRING
KEYBOARD
(8 LEVEL ONLY)
MIN. 1-1/2 OZS. --- MAX. 3-1/2 OZS.
TO START LEVER MOVING.
REPEAT KEYLEVER SPRING
(KEYBOARD)
REQUIREMENT
MIN. 15 GRAMS---MAX. 30 GRAMS
TO START KEYLEVER MOVING.
(RIGHT SIDE VIEW)
KEYLEVER SPRING
FRAME

SHIFT CODE BAR SPRING (KEYBOARD)

MIN.1-1/4 OZS.---MAX. 2-1/2 OZS.
TO START SHIFT CODE BAR LINK MOVING.





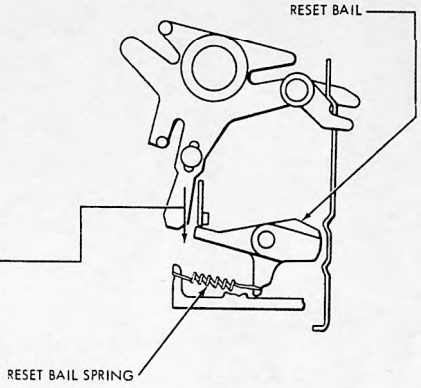
LETTERS - FIGURES DETENT SPRING
(FOUR ROW FIVE LEVEL KEYBOARD ONLY)
REQUIREMENT
WITH KEYBOARD IN "LETTERS" OR "FIGURES" CONDITION.
MIN. 1-1 2 OZS.
MAX. 3 OZS.
TO START DETENT MOVING AWAY FROM T-LEVER.

M32/33-94

RESET BAIL SPRING (KEYBOARD)

TO CHECK
REMOVE KEYBOARD COVER. TRIP KEYBOARD BY DEPRESSING LETTERS OR DELETE KEY.

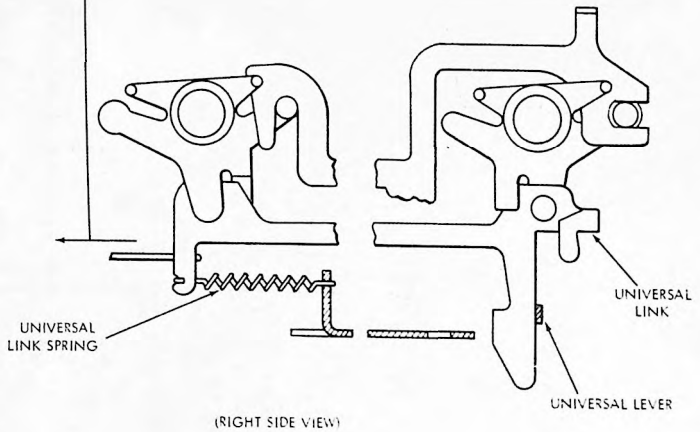
REQUIREMENT
MIN. 1-1/2 OZS. ---MAX. 2 OZS. TO START BAIL MOVING.



(RIGHT SIDE VIEW)

UNIVERSAL LINK SPRING (KEYBOARD)

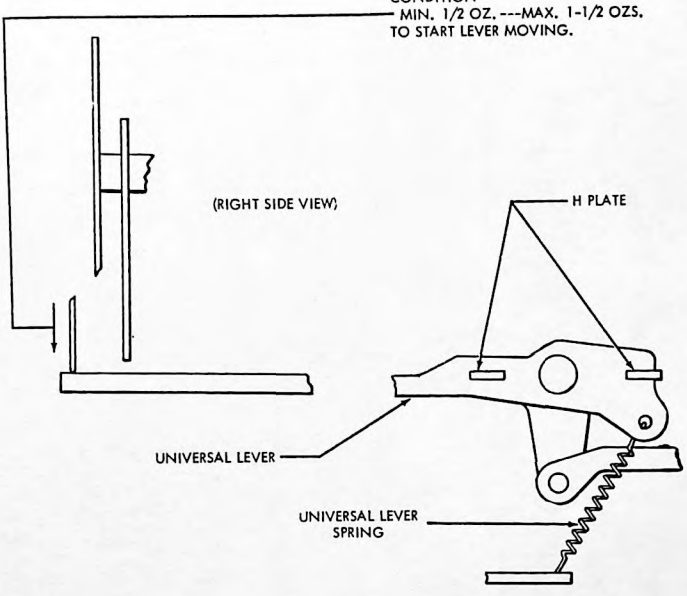
REQUIREMENT
WITH KEYBOARD TRIPPED (UNIVERSAL LEVER IN UP POSITION)
MIN. 1/2 OZ. ---MAX. 1-1 4 OZS. TO START UNIVERSAL LINK MOVING.



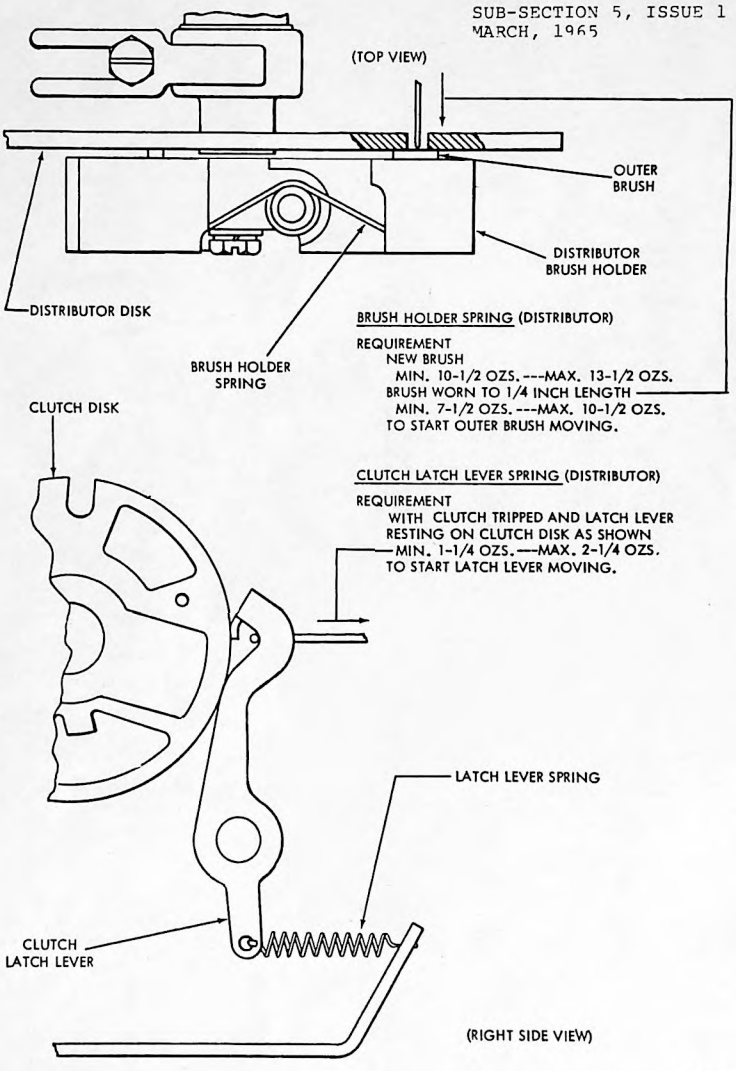
(RIGHT SIDE VIEW)

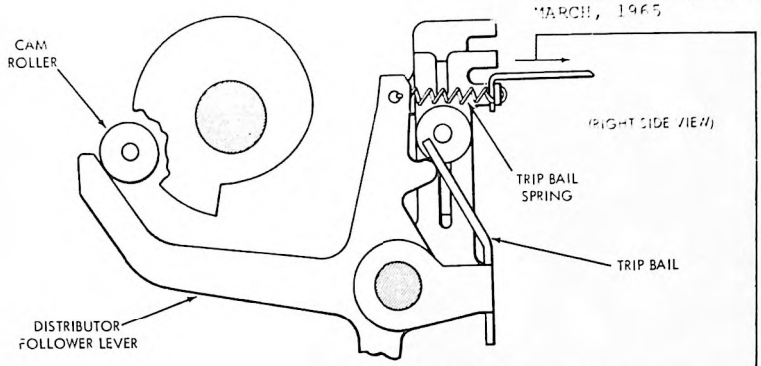
UNIVERSAL LEVER SPRING (KEYBOARD)

REQUIREMENT
WITH KEYBOARD COVER AND H PLATE REMOVED, AND PRINTER IN STOP CONDITION
MIN. 1/2 OZ. ---MAX. 1-1/2 OZS. TO START LEVER MOVING.



M32 33-96


(TOP VIEW)
OUTER BRUSH
DISTRIBUTOR BRUSH HOLDER
DISTRIBUTOR DISK
BRUSH HOLDER SPRING
BRUSH HOLDER SPRING (DISTRIBUTOR)
REQUIREMENT
NEW BRUSH
MIN. 10-1/2 OZS. ---MAX. 13-1/2 OZS.
BRUSH WORN TO 1/4 INCH LENGTH
MIN. 7-1/2 OZS. ---MAX. 10-1/2 OZS.
TO START OUTER BRUSH MOVING.
CLUTCH DISK
CLUTCH LATCH LEVER SPRING (DISTRIBUTOR)
REQUIREMENT
WITH CLUTCH TRIPPED AND LATCH LEVER
RESTING ON CLUTCH DISK AS SHOWN
MIN. 1-1/4 OZS. —MAX. 2-1/4 OZS.
TO START LATCH LEVER MOVING.
LATCH LEVER SPRING
CLUTCH LATCH LEVER
(RIGHT SIDE VIEW)



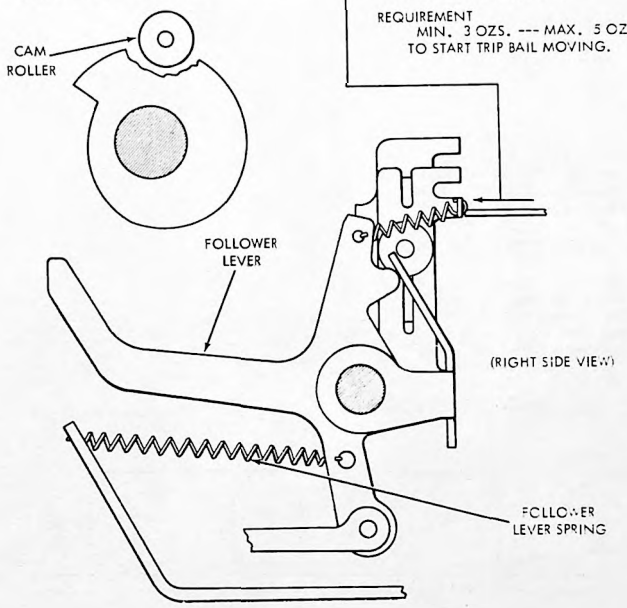
FOLLOWER LEVER (DISTRIBUTOR)

REQUIREMENT
WITH H PLATE REMOVED AND FOLLOWER LEVER NOT IN CONTACT WITH ROLLER
MIN. 2 OZS.---MAX. 3 OZS.
TO START LEVER MOVING.

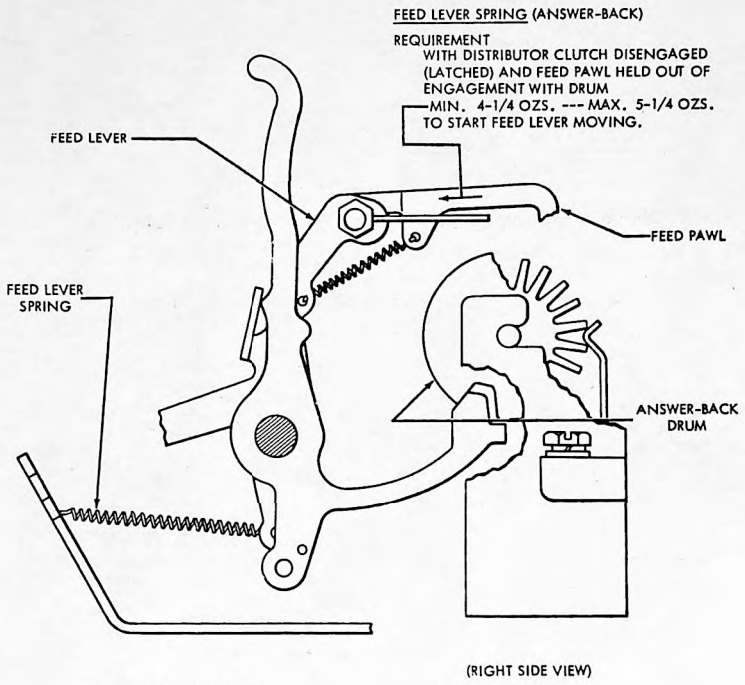
TRIP BAIL SPRING (DISTRIBUTOR)

TO CHECK
PLACE ANSWER-BACK DRUM IN HOME POSITION (DETENT LEVER BETWEEN NO. 20 AND STOP (ST) ROWS). TRIP DISTRIBUTOR CLUTCH AND ROTATE MAIN SHAFT UNTIL FOLLOWER LEVER IS AT HIGHEST POINT OF CAM ROLLER'S THROW.

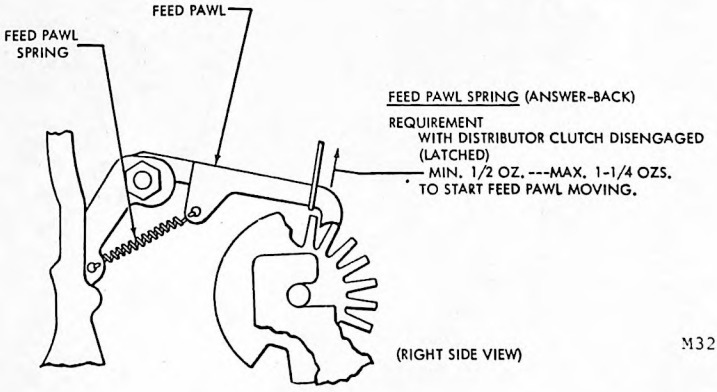
REQUIREMENT
MIN. 3 OZS. --- MAX. 5 OZS.
TO START TRIP BAIL MOVING.



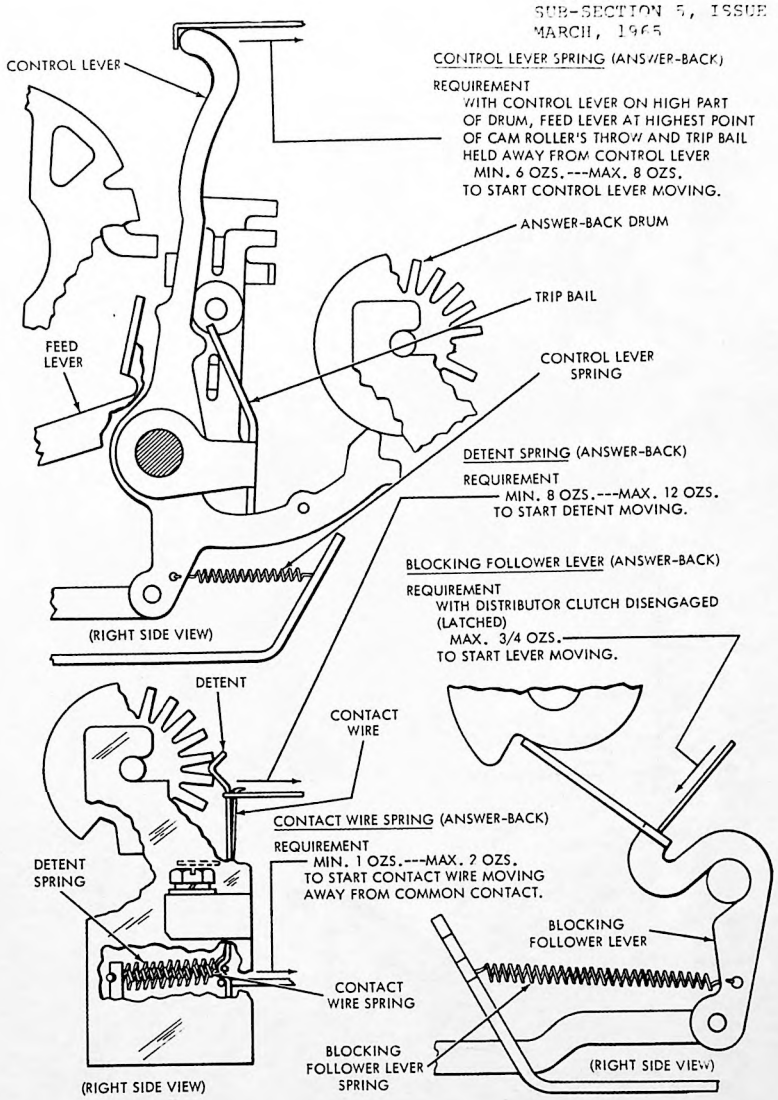
M32/33-98



(RIGHT SIDE VIEW)



(RIGHT SIDE VIEW)


CONTROL LEVER
CONTROL LEVER SPRING (ANSWER-BACK)
REQUIREMENT
WITH CONTROL LEVER ON HIGH PART OF DRUM, FEED LEVER AT HIGHEST POINT OF CAM ROLLER'S THROW AND TRIP BAIL HELD AWAY FROM CONTROL LEVER
MIN. 6 OZS.---MAX. 8 OZS.
TO START CONTROL LEVER MOVING.
ANSWER-BACK DRUM
TRIP BAIL
FEED LEVER
CONTROL LEVER SPRING
DETENT SPRING (ANSWER-BACK)
REQUIREMENT
MIN. 8 OZS.---MAX. 12 OZS.
TO START DETENT MOVING.
(RIGHT SIDE VIEW)
BLOCKING FOLLOWER LEVER (ANSWER-BACK)
REQUIREMENT
WITH DISTRIBUTOR CLUTCH DISENGAGED (LATCHED)
MAX. 3/4 OZS.
TO START LEVER MOVING.
DETENT
CONTACT WIRE
CONTACT WIRE SPRING (ANSWER-BACK)
REQUIREMENT
MIN. 1 OZS.---MAX. 2 OZS.
TO START CONTACT WIRE MOVING AWAY FROM COMMON CONTACT.
DETENT SPRING
BLOCKING FOLLOWER LEVER
CONTACT WIRE SPRING
BLOCKING FOLLOWER LEVER SPRING
(RIGHT SIDE VIEW)
(RIGHT SIDE VIEW)

M32/33-100

ARMATURE SPRING (SELECTOR)

(1) REQUIREMENT (PRELIMINARY)
WITH PRINTER IN STOP CONDITION, CARRIAGE NEAR RIGHT MARGIN, AND START LEVER HELD AWAY FROM ARMATURE
MIN. 3 OZS. ---MAX. 3-1/2 OZS.
TO START ARMATURE MOVING.

(2) REQUIREMENT (FINAL)
WHEN CHECKED WITH SIGNAL DISTORTION SET (DXD), MINIMUM SELECTOR RECEIVING MARGINS AS FOLLOWS:

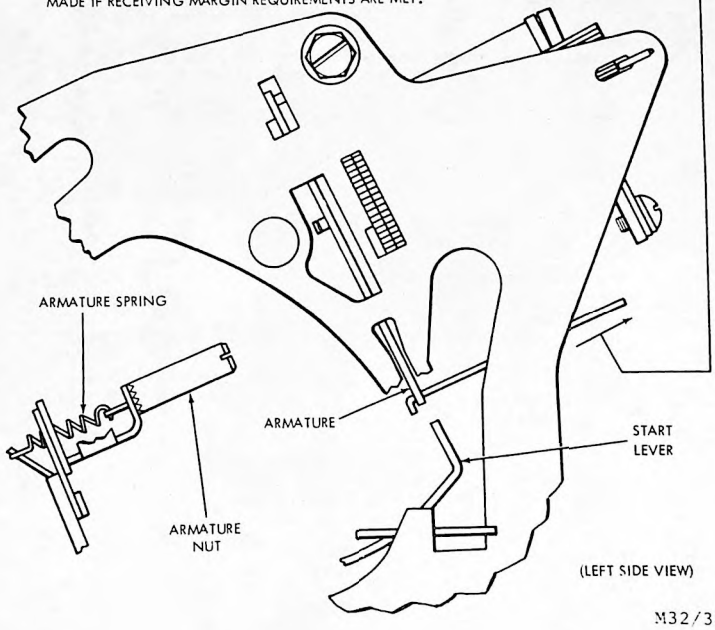
	RANGE		OVERALL	END DISTORTION AT
	SPEED	ZERO DISTORTION	BIAS	BIAS OPTIMUM SETTING
5 AND 6 LEVEL	100 WPM	72 PTS	38 PER CENT	35 PER CENT

TO ADJUST
ROTATE ADJUSTING NUT CLOCKWISE TO INCREASE ARMATURE SPRING TENSION AND COUNTERCLOCKWISE TO DECREASE IT.

RELATED ADJUSTMENTS
AFFECTED BY, MAGNET CORE, ARMATURE BRACKET

ARMATURE SPRING TENSION, BRACKET POSITION AND RECEIVING MARGIN (SELECTOR)

REQUIREMENT
A FINAL CHECK OF ARMATURE BRACKET POSITIONING ADJUSTMENT NEED NOT BE MADE IF RECEIVING MARGIN REQUIREMENTS ARE MET.



(LEFT SIDE VIEW)

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FINAL PRINTING ALIGNMENT

GENERAL

WHEN PRINTER IS ADJUSTED AS INSTRUCTED ON PREVIOUS PAGES, QUALITY OF PRINTED COPY SHOULD BE GOOD. HOWEVER, MINOR READJUSTMENTS MAY BE NECESSARY.

TO CHECK

PRINT "TH" AT VARIOUS POINTS ALONG LENGTH OF PRINTING LINE.

REQUIREMENT

QUALITY OF PRINTED CHARACTERS GOOD.

TO ADJUST

USE THE FOLLOWING GUIDE IN MAKING READJUSTMENTS:

DENSITY OF TOP AND BOTTOM OF CHARACTERS NOT EQUAL AND/OR UNDERSCORING OR OVERSCORING OF CHARACTERS
---REFINE PLATEN - VERTICAL (PAPER FEED) ADJUSTMENT BY MOVING PLATEN TOWARD PORTION OF LIGHT DENSITY.

LEFT CHARACTER (T) OF POOR QUALITY
---USING LEFT PRY POINTS, REFINE STOP PLATE (CARRIAGE) ADJUSTMENT.

RIGHT CHARACTER (H) OF POOR QUALITY
---USING RIGHT PRY POINTS, REFINE STOP PLATE (CARRIAGE) ADJUSTMENT.

CHARACTERS SPREAD OUT
---REFINE STOP PLATE (CARRIAGE) ADJUSTMENT BY MOVING PLATE FRONTWARD.

CHARACTERS RUN TOGETHER
---REFINE STOP PLATE (CARRIAGE) ADJUSTMENT BY MOVING PLATE REARWARD.

BOTH CHARACTERS LIGHT ON LEFT SIDE
---REFINE TYPEWHEEL (CARRIAGE) ADJUSTMENT BY ROTATING WHEEL CLOCKWISE AS VIEWED FROM TOP.

BOTH CHARACTERS LIGHT ON RIGHT SIDE
---REFINE TYPEWHEEL (CARRIAGE) ADJUSTMENT BY ROTATING WHEEL COUNTERCLOCKWISE AS VIEWED FROM TOP.

ANSWER-BACK TRIP MAGNET MECHANISM

TRIP MAGNET (ANSWER-BACK)

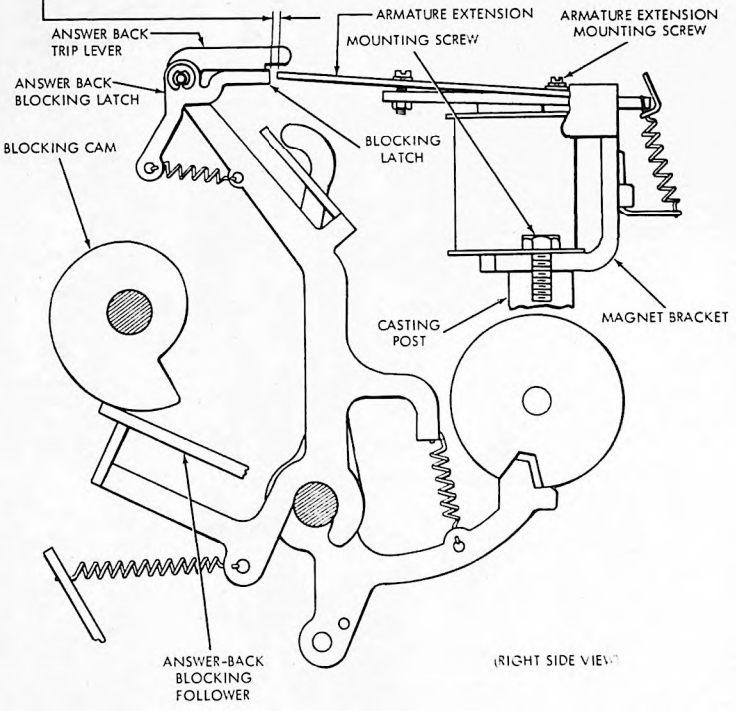
REQUIREMENT
MAGNET BRACKET ALL THE WAY TO LEFT ON CASTING POST.

TO ADJUST
POSITION MAGNET BRACKET WITH MOUNTING SCREWS (2) LOOSENED.

TRIP LEVER OVERTRAVEL (ANSWER-BACK)

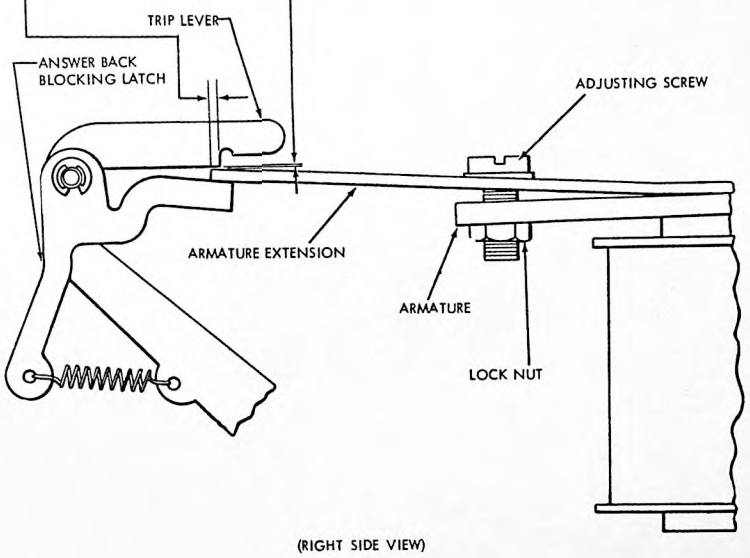
REQUIREMENT
WITH ANSWER-BACK DRUM FULLY DETENTED IN STOP POSITION, ARMATURE IN ATTRACTED POSITION, WITH PLAY TAKEN UP TOWARD THE REAR OF UNIT. ANSWER-BACK BLOCKING FOLLOWER ON HIGH PART OF BLOCKING CAM. TAKE UP AND RELEASE PLAY OF ANSWER-BACK TRIP LEVER TOWARD RIGHT REAR CORNER OF UNIT. TAKE UP AND HOLD PLAY OF BLOCKING CAM IN AN UPWARD DIRECTION. CLEARANCE BETWEEN END OF MAGNET ARMATURE EXTENSION AND END OF BLOCKING LATCH.
MIN. 0.006 INCH --- MAX. 0.015 INCH

TO ADJUST
POSITION ARMATURE EXTENSION WITH MOUNTING SCREW LOOSENED.



ANSWER-BACK TRIP MAGNET MECHANISM

ARMATURE GAP (ANSWER-BACK)
(1) REQUIREMENT
WITH DISTRIBUTOR CLUTCH IN STOP POSITION. ARMATURE IN ATTRACTED POSITION. ROTATE MAINSHAFT UNTIL SHOULDER ON THE ANSWER-BACK TRIP LEVER OVERLAPS END OF ARMATURE EXTENSION BY APPROXIMATELY
MIN. SOME --- MAX. 0.015 INCH
AS GAGED BY EYE.
(2) REQUIREMENT
CLEARANCE BETWEEN TOP OF ARMATURE EXTENSION AND LOWER STEP OF ANSWER-BACK TRIP LEVER.
MIN. SOME --- MAX. 0.010 INCH
TO ADJUST
POSITION ARMATURE EXTENSION BY MEANS OF ADJUSTING SCREW WITH LOCK NUT LOOSENED.

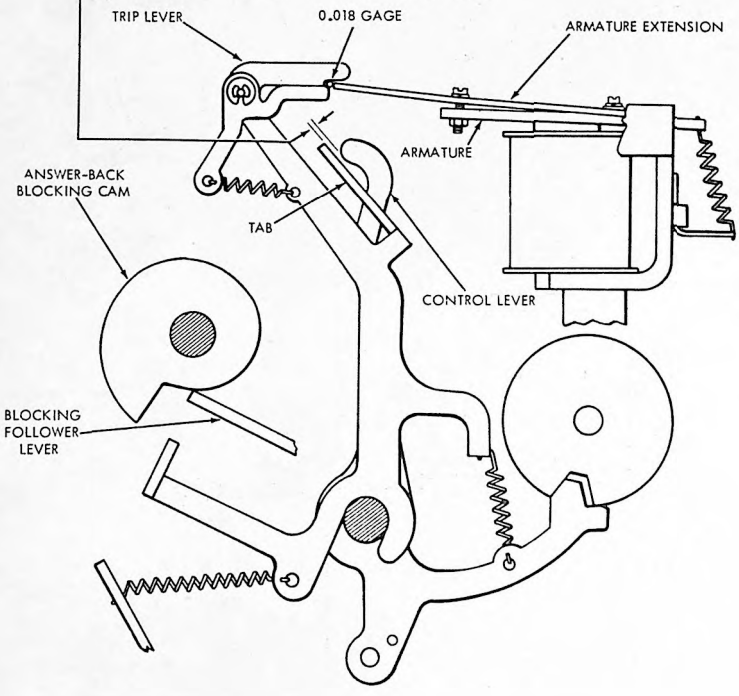


(RIGHT SIDE VIEW)

M32/33-104

ANSWER-BACK TRIP MAGNET MECHANISM

TRIP LEVER - (ANSWER-BACK)
REQUIREMENT
WITH DISTRIBUTOR CLUTCH DISENGAGED. ANSWER-BACK DRUM FULLY DETENTED. MAGNET ARMATURE IN UNATTRACTED POSITION. TAKE UP PLAY IN TRIP LEVER TO THE RIGHT OF THE UNIT AND PLAY IN THE CONTROL LEVER TO THE LEFT OF UNIT. WITH AN 0.018 INCH GAGE PLACED BETWEEN THE END OF THE ARMATURE EXTENSION AND THE SHOULDER OF TRIP LEVER
—MIN. SOME --- MAX. 0.008 INCH
CLEARANCE BETWEEN THE ADJUSTING TAB ON THE TRIP LEVER AND THE CONTROL LEVER.
TO ADJUST
BEND TAB ON TRIP LEVER WITH 180993 BENDING TOOL.



(RIGHT SIDE VIEW)

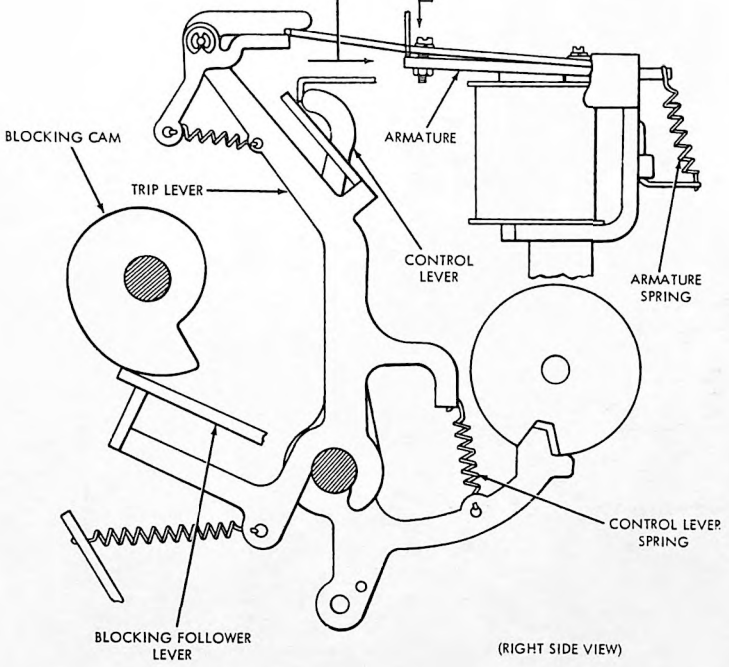
ANSWER-BACK TRIP MAGNET MECHANISM

CONTROL LEVER SPRING (ANSWER-BACK)

REQUIREMENT
WITH DISTRIBUTOR CLUTCH TRIPPED AND BLOCKING FOLLOWER LEVER ON HIGH PART OF BLOCKING CAM
MIN. 7-1/2 OZS.---MAX. 10-1/2 OZS.
TO START LEVER MOVING.

ARMATURE SPRING (ANSWER-BACK)

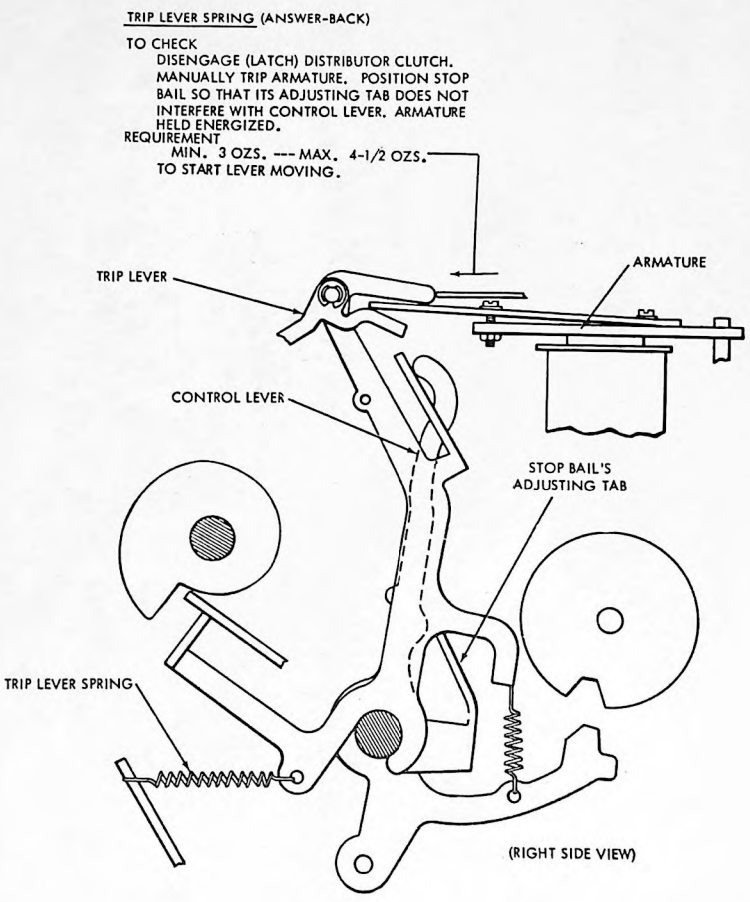
REQUIREMENT
WITH DISTRIBUTOR CLUTCH TRIPPED AND BLOCKING FOLLOWER LEVER ON HIGH PART OF CAM, AND ARMATURE IN UNATTRACTED POSITION (UP)
MIN. 2 OZS. --- MAX. 2-1/2 OZS.
TO START ARMATURE MOVING.



(RIGHT SIDE VIEW)

M32/33-106

ANSWER-BACK TRIP MAGNET MECHANISM

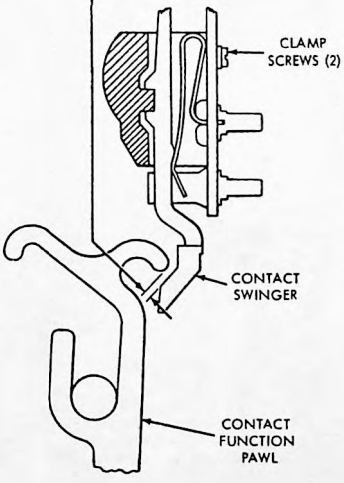


FUNCTION BOX MECHANISM

FUNCTION BOX CONTACTS (FUNCTION)

REQUIREMENT
WITH CODE COMBINATION THAT OPERATES CONTACTS SET UP IN SELECTOR AND MAIN SHAFT ROTATED UNTIL FUNCTION BAIL IS IN HIGHEST POSITION
MIN. SOME---MAX. 0.010 INCH BETWEEN CONTACT FUNCTION PAWL AND CONTACT SWINGER WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE MINIMUM.

TO ADJUST
POSITION CONTACT WITH CLAMP SCREWS LOOSENED.



(RIGHT SIDE VIEW)

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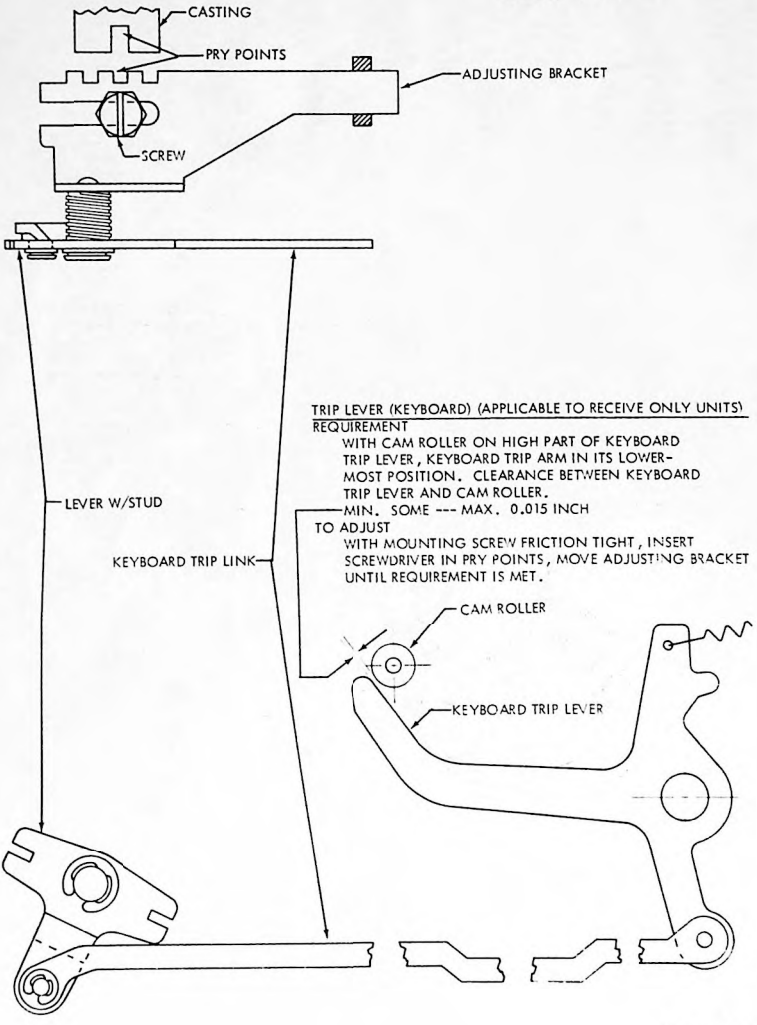
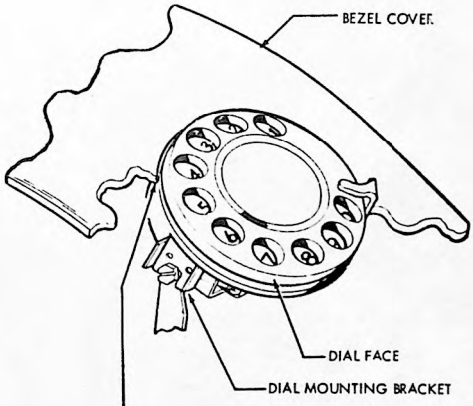

CASTING
PRY POINTS
ADJUSTING BRACKET
SCREW
LEVER W/STUD
KEYBOARD TRIP LINK
TRIP LEVER (KEYBOARD) (APPLICABLE TO RECEIVE ONLY UNITS)
REQUIREMENT
WITH CAM ROLLER ON HIGH PART OF KEYBOARD TRIP LEVER, KEYBOARD TRIP ARM IN ITS LOWER-MOST POSITION. CLEARANCE BETWEEN KEYBOARD TRIP LEVER AND CAM ROLLER.
MIN. SOME --- MAX. 0.015 INCH
TO ADJUST
WITH MOUNTING SCREW FRICTION TIGHT, INSERT SCREWDRIVER IN PRY POINTS, MOVE ADJUSTING BRACKET UNTIL REQUIREMENT IS MET.
CAM ROLLER
KEYBOARD TRIP LEVER



DIAL TO COVER

REQUIREMENT

THE NUMBERED FACE OF DIAL SHALL BE FLUSH TO OUTSIDE SURFACE OF COVER WITHIN 1/16 INCH BELOW TO 3/32 INCH ABOVE AND PARALLEL TO OUTSIDE SURFACE OF COVER WITHIN 1/16 INCH AS GAGED BY EYE.

TO ADJUST

WITH DIAL MOUNTING BRACKET SCREWS FRICTION TIGHT POSITION DIAL.

LOW PAPER CONTACTS (WHEN USED)

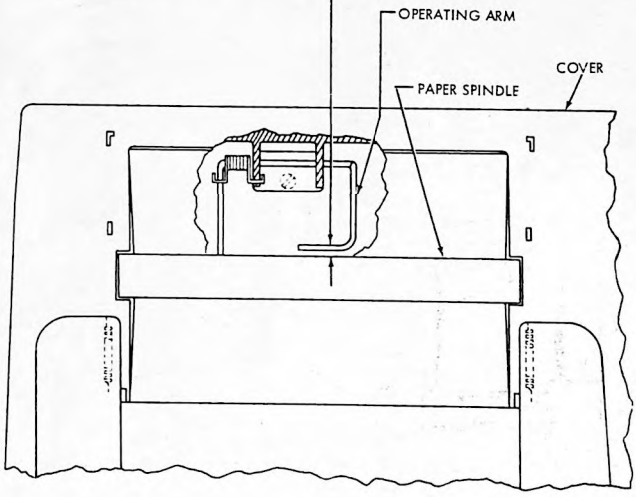
OPERATING ARM

REQUIREMENT

WITH PAPER SPINDLE IN PLACE, CLEARANCE BETWEEN OPERATING ARM AND SPINDLE MIN. 0.25 INCH --- MAX. 0.30

TO ADJUST

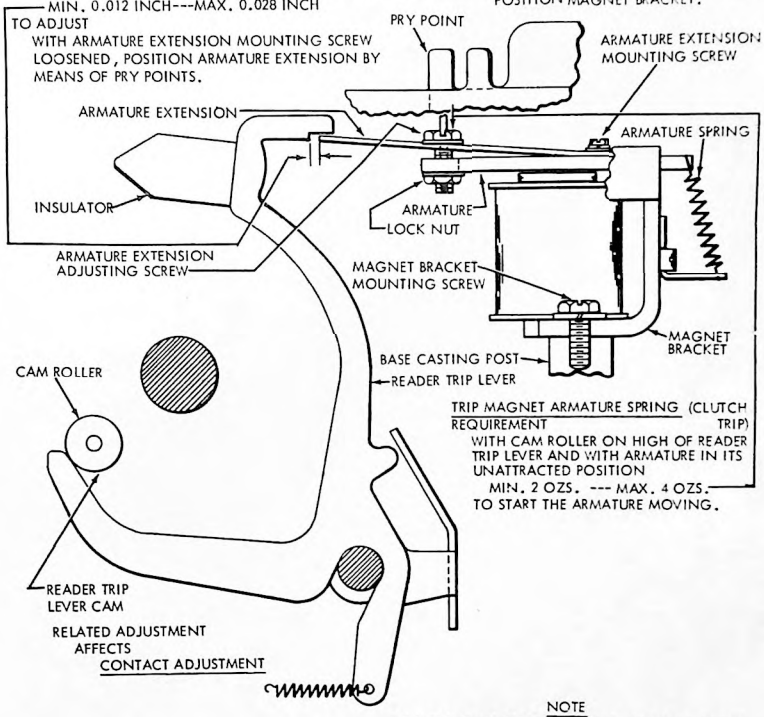
BEND THE WIRE OPERATING ARM. IF CONTACT OPERATES WHEN ROLL DIAMETER IS TOO LARGE, BEND ARM CLOSER TO ROLL. IF CONTACT OPERATES WHEN ROLL DIAMETER IS TOO SMALL, BEND ARM AWAY FROM ROLL.



4. BASIC TAPE READER ADJUSTMENTS

READER TRIP LEVER OVERTRAVEL (CLUTCH TRIP)
REQUIREMENT
ARMATURE IN UNATTRACTED POSITION. CAM ROLLER ON HIGH PART OF READER TRIP LEVER CAM. TAKE UP AND RELEASE PLAY IN ARMATURE PIVOT TO REAR OF UNIT. POSITION THE READER TRIP LEVER IN THE CENTER OF ARMATURE EXTENSION. CLEARANCE BETWEEN END OF ARMATURE EXTENSION AND LATCHING SURFACE OF READER TRIP LEVER
MIN. 0.012 INCH---MAX. 0.028 INCH
TO ADJUST
WITH ARMATURE EXTENSION MOUNTING SCREW LOOSENED, POSITION ARMATURE EXTENSION BY MEANS OF PRY POINTS.

TRIP MAGNET (CLUTCH TRIP)
REQUIREMENT
POSITION MAGNET BRACKET ON THE BASE CASTING POST AS FAR TO THE FRONT AS THE MAGNET BRACKET MOUNTING SCREW PERMITS.
TO ADJUST
WITH AUXILIARY BRACKET MOUNTING SCREWS AND MAGNET BRACKET MOUNTING SCREW FRICTION TIGHT, POSITION MAGNET BRACKET.



TRIP MAGNET ARMATURE SPRING (CLUTCH TRIP)
REQUIREMENT
WITH CAM ROLLER ON HIGH OF READER TRIP LEVER AND WITH ARMATURE IN ITS UNATTRACTED POSITION
MIN. 2 OZS. --- MAX. 4 OZS.
TO START THE ARMATURE MOVING.

RELATED ADJUSTMENT AFFECTS
CONTACT ADJUSTMENT

CAUTION
THE READER FEED MAGNET OPERATES UNDER HIGH VOLTAGE. PRECAUTIONARY MEASURES SHOULD BE TAKEN WHENEVER POWER TO THE READER IS TURNED ON. HIGH VOLTAGE WILL PERSIST FROM THE POWER PACK UNTIL APPROXIMATELY 10 SECONDS AFTER DISCONNECT.

NOTE
REQUIREMENTS SPECIFYING THE ARMATURE IN THE ATTRACTED POSITION REFERS TO THE ARMATURE BEING MAGNETICALLY ATTRACTED TO THE MAGNET CORE. THE MAGNET CORE SHOULD BE ASSEMBLED TO THE MAGNET BRACKET SUCH THAT THE MAGNET CORE SLOT IS PERPENDICULAR TO THE MAGNET BRACKET PIVOT SURFACE AS GAGED BY EYE. (SEE CONTACT GAPS ADJUSTMENT).

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ARMATURE EXTENSION (CLUTCH TRIP)

REQUIREMENT

(1) WITH DISTRIBUTOR CLUTCH IN STOP POSITION. ARMATURE HELD DOWN MANUALLY IN ATTRACTED POSITION. ROTATE DISTRIBUTOR CLUTCH UNTIL A CLEARANCE OF
—MIN. SOME --- MAX. 0.040 INCH
EXISTS BETWEEN END OF ARMATURE EXTENSION AND TRIP LEVER.

(2) THERE SHALL BE
—MIN. SOME --- MAX. 0.010 INCH
CLEARANCE BETWEEN THE ARMATURE EXTENSION AND TRIP LEVER AT ITS CLOSEST POINT.

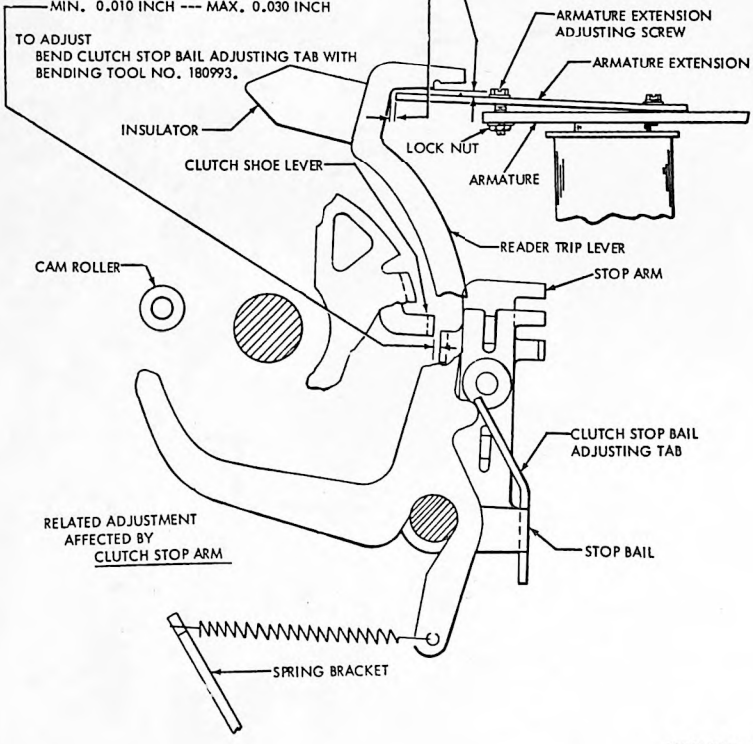
TO ADJUST
LOOSEN ARMATURE EXTENSION ADJUSTING SCREW LOCK NUT. POSITION ARMATURE EXTENSION BY MEANS OF THE ARMATURE EXTENSION ADJUSTING SCREW.

STOP ARM (CLUTCH TRIP)

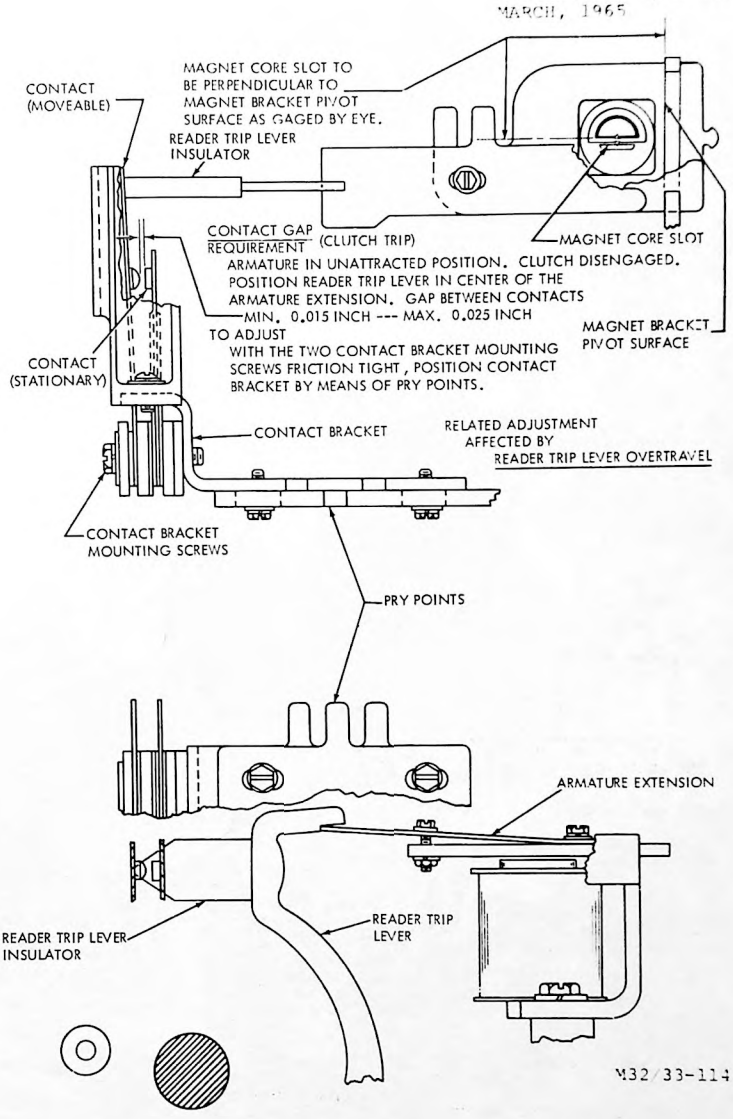
REQUIREMENT

CLUTCH TRIPPED BY MOMENTARILY HOLDING ARMATURE IN ITS ATTRACTED POSITION. CLEARANCE BETWEEN CLUTCH PRY BAR AND STOP ARM
—MIN. 0.010 INCH --- MAX. 0.030 INCH

TO ADJUST
BEND CLUTCH STOP BAIL ADJUSTING TAB WITH BENDING TOOL NO. 180993.



RELATED ADJUSTMENT AFFECTED BY
CLUTCH STOP ARM


MAGNET CORE SLOT TO BE PERPENDICULAR TO MAGNET BRACKET PIVOT SURFACE AS GAGED BY EYE.
CONTACT (MOVEABLE)
READER TRIP LEVER INSULATOR
CONTACT GAP REQUIREMENT (CLUTCH TRIP)
ARMATURE IN UNATTRACTED POSITION. CLUTCH DISENGAGED. POSITION READER TRIP LEVER IN CENTER OF THE ARMATURE EXTENSION. GAP BETWEEN CONTACTS MIN. 0.015 INCH --- MAX. 0.025 INCH
TO ADJUST WITH THE TWO CONTACT BRACKET MOUNTING SCREWS FRICTION TIGHT, POSITION CONTACT BRACKET BY MEANS OF PRY POINTS.
MAGNET CORE SLOT
MAGNET BRACKET PIVOT SURFACE
CONTACT (STATIONARY)
CONTACT BRACKET
RELATED ADJUSTMENT AFFECTED BY READER TRIP LEVER OVERTRAVEL
CONTACT BRACKET MOUNTING SCREWS
PRY POINTS
ARMATURE EXTENSION
READER TRIP LEVER INSULATOR
READER TRIP LEVER
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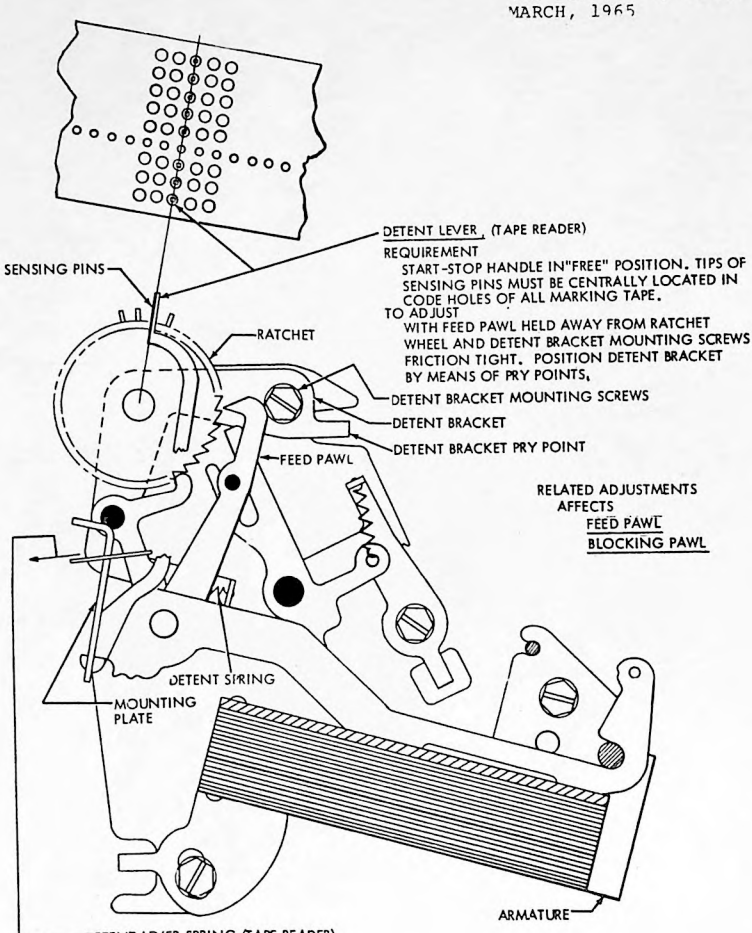

DETENT LEVER (TAPE READER)
REQUIREMENT
START-STOP HANDLE IN "FREE" POSITION. TIPS OF SENSING PINS MUST BE CENTRALLY LOCATED IN CODE HOLES OF ALL MARKING TAPE.
TO ADJUST
WITH FEED PAWL HELD AWAY FROM RATCHET WHEEL AND DETENT BRACKET MOUNTING SCREWS FRICTION TIGHT. POSITION DETENT BRACKET BY MEANS OF PRY POINTS.
SENSING PINS
RATCHET
DETENT BRACKET MOUNTING SCREWS
DETENT BRACKET
DETENT BRACKET PRY POINT
FEED PAWL
RELATED ADJUSTMENTS
AFFECTS
FEED PAWL
BLOCKING PAWL
DETENT SPRING
MOUNTING PLATE
ARMATURE
DETENT LEVER SPRING (TAPE READER)
REQUIREMENT
MIN. 3-1/2 OZS. --- MAX. 5-1/2 OZS.
TO START DETENT MOVING.

FEED PAWL - ADJUSTMENT WITH GAGE NO. 183102 (TAPE READER)

REQUIREMENT

ARMATURE IN UNATTRACTED POSITION, SOME CLEARANCE MUST EXIST, BETWEEN BLOCKING PAWL AND RATCHET TOOTH. (SEE BLOCKING PAWL ADJUSTMENT FOR PROCEDURE IN OBTAINING CLEARANCE.) THERE SHALL BE:

MIN. SOME --- MAX. 0.008 INCH CLEARANCE BETWEEN FEED PAWL AND RATCHET TOOTH AND A TOTAL OF FIVE RATCHET TEETH BETWEEN DETENT AND FEED PAWL.

(CONTINUED ON FOLLOWING PAGE)

UPSTOP SPRING (TAPE READER)

REQUIREMENT

WITH ARMATURE SPRING POST REMOVED FROM ITS SLOT IN MAGNET BRACKET

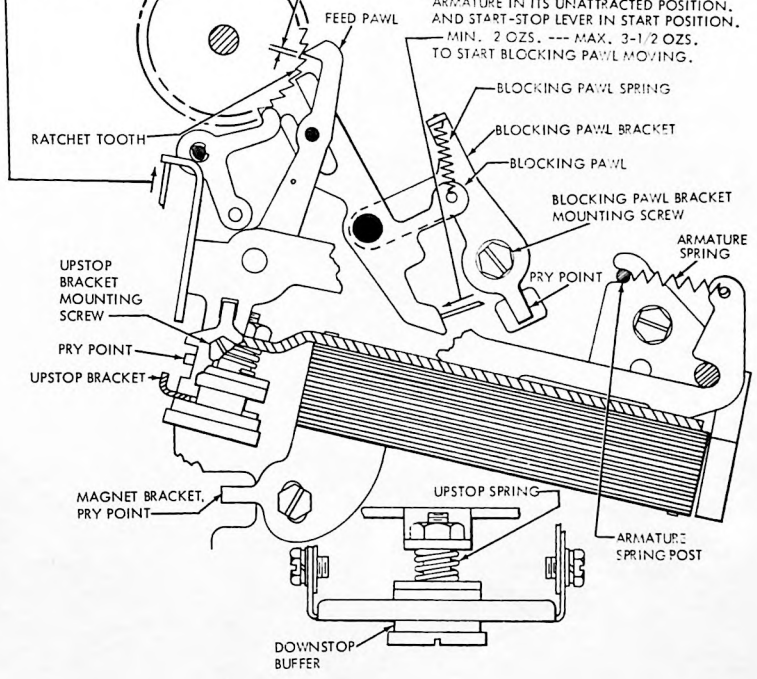
MIN. 21 OZS. --- MAX. 28 OZS. TO START UPSTOP BUSHING MOVING.

BLOCKING PAWL SPRING (TAPE READER)

REQUIREMENT

ARMATURE IN ITS UNATTRACTED POSITION, AND START-STOP LEVER IN START POSITION.

MIN. 2 OZS. --- MAX. 3-1/2 OZS. TO START BLOCKING PAWL MOVING.



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(CONTINUED FROM PRECEDING PAGE)

TO ADJUST

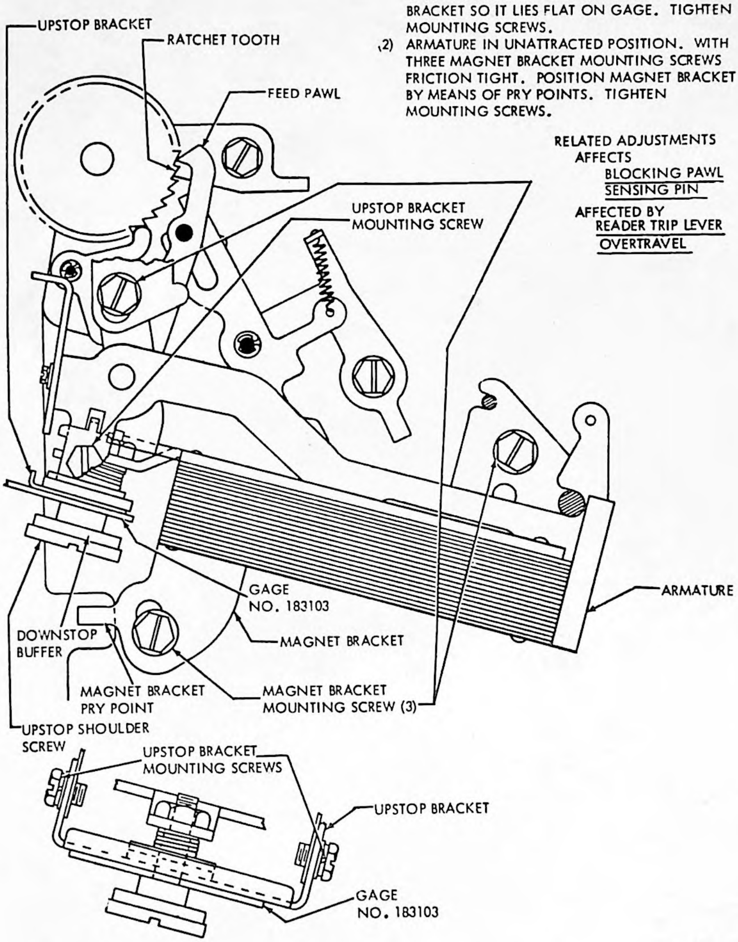
(1) ARMATURE IN ATTRACTED POSITION. WITH TWO UPSTOP BRACKET MOUNTING SCREWS FRICTION TIGHT. INSERT GAGE NO. 183103 BETWEEN UPSTOP BRACKET AND SHOULDER OF UPSTOP SHOULDER SCREW. POSITION UPSTOP BRACKET SO IT LIES FLAT ON GAGE. TIGHTEN MOUNTING SCREWS.

(2) ARMATURE IN UNATTRACTED POSITION. WITH THREE MAGNET BRACKET MOUNTING SCREWS FRICTION TIGHT. POSITION MAGNET BRACKET BY MEANS OF PRY POINTS. TIGHTEN MOUNTING SCREWS.

RELATED ADJUSTMENTS

AFFECTS
BLOCKING PAWL
SENSING PIN

AFFECTED BY
READER TRIP LEVER
OVERTRAVEL



FEED PAWL - ADJUSTMENT WITHOUT GAGE NO. 183103 (TAPE READER)

REQUIREMENT (PRELIMINARY)

(1) ARMATURE IN ATTRACTED POSITION. LOOSEN TWO UPSTOP BRACKET MOUNTING SCREWS SO THE UPSTOP BRACKET DOES NOT LIMIT FEED PAWL MOTION. CLEARANCE BETWEEN FEED PAWL AND RATCHET TOOTH:
MIN. 0.035 INCH --- MAX. 0.045 INCH
A TOTAL OF SIX RATCHET TEETH ARE BETWEEN THE DETENT AND FEED PAWL

TO ADJUST
WITH THREE MAGNET BRACKET MOUNTING SCREWS FRICTION TIGHT, POSITION MAGNET BRACKET BY MEANS OF PRY POINTS.

REQUIREMENT (SEE FEED PAWL ADJUSTMENT WITH GAGE NO. 183103)

(2) ARMATURE IN UNATTRACTED POSITION. SOME CLEARANCE MUST EXIST BETWEEN BLOCKING PAWL AND RATCHET TOOTH. (SEE BLOCKING PAWL ADJUSTMENT FOR PROCEDURE IN OBTAINING CLEARANCE.) THE UPSTOP BRACKET SHALL LIE FLAT AGAINST THE DOWN-STOP BUFFER. CLEARANCE BETWEEN FEED PAWL AND RATCHET TOOTH.
MIN. SOME --- MAX. 0.003 INCH

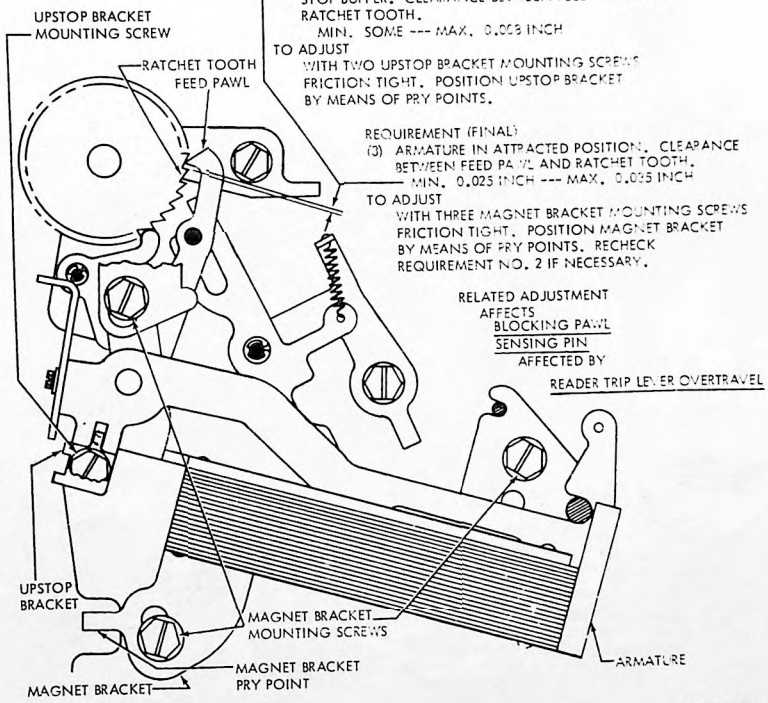
TO ADJUST
WITH TWO UPSTOP BRACKET MOUNTING SCREWS FRICTION TIGHT, POSITION UPSTOP BRACKET BY MEANS OF PRY POINTS.

REQUIREMENT (FINAL)

(3) ARMATURE IN ATTRACTED POSITION. CLEARANCE BETWEEN FEED PAWL AND RATCHET TOOTH.
MIN. 0.025 INCH --- MAX. 0.035 INCH

TO ADJUST
WITH THREE MAGNET BRACKET MOUNTING SCREWS FRICTION TIGHT, POSITION MAGNET BRACKET BY MEANS OF PRY POINTS. RECHECK REQUIREMENT NO. 2 IF NECESSARY.

RELATED ADJUSTMENT
AFFECTS
BLOCKING PAWL
SENSING PIN
AFFECTED BY
READER TRIP LEVER OVERTRAVEL



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BLOCKING PAWL (TAPE READER)

REQUIREMENT

ARMATURE IN UNATTRACTED POSITION. SOME CLEARANCE MUST EXIST BETWEEN BOTTOM SURFACE OF FEED PAWL AND RATCHET TOOTH. CLEARANCE BETWEEN END OF BLOCKING PAWL AND RATCHET TOOTH

MIN. SOME --- MAX. 0.010 INCH

(THE CLEARANCE SHALL BE SOME TO 0.003 INCH WHEN USING A TELETYPE TAPE-WINDER).

TO ADJUST

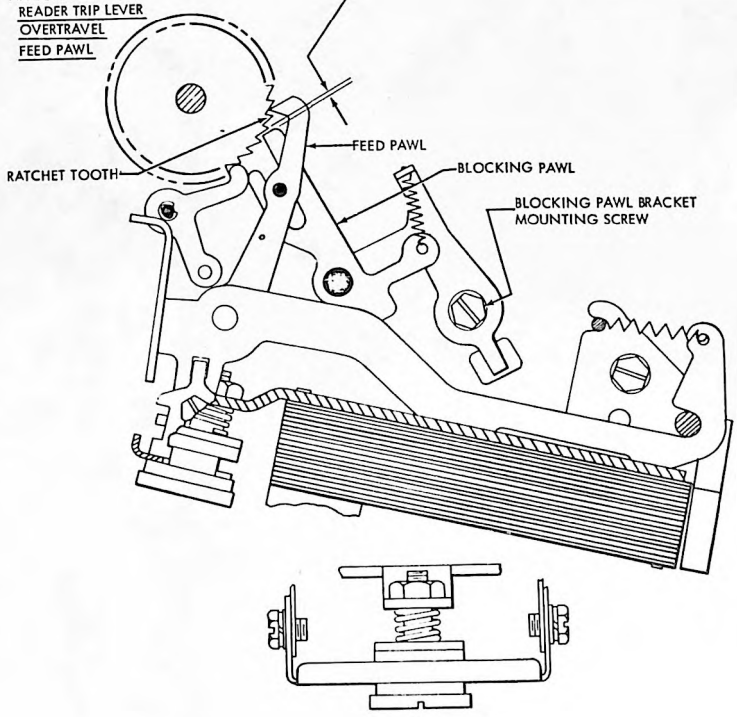
WITH BLOCKING PAWL BRACKET MOUNTING SCREW FRICTION TIGHT. POSITION BLOCKING PAWL BRACKET BY MEANS OF PRY POINT.

RELATED ADJUSTMENT

AFFECTED BY

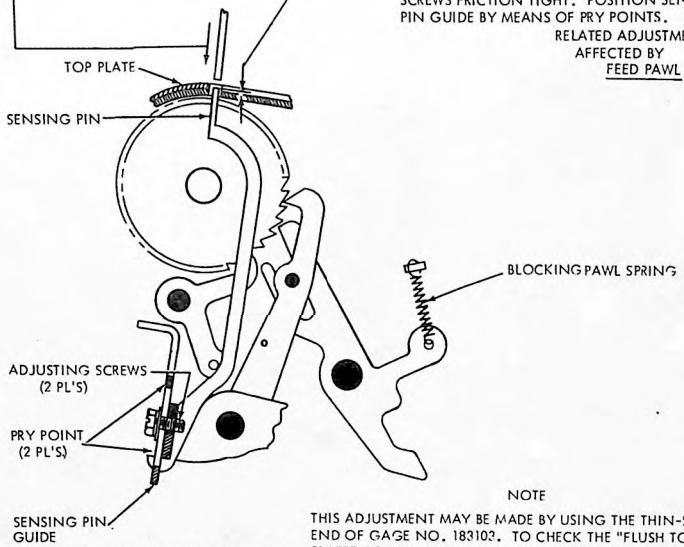
READER TRIP LEVER OVERTRAVEL

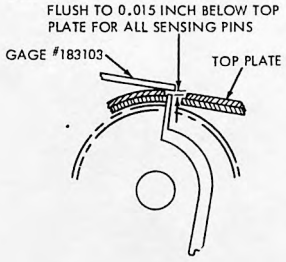
FEED PAWL



SENSING PIN SPRING (TAPE READER)
REQUIREMENT
ARMATURE IN ITS ATTRACTED POSITION
MIN. 1-1/2 OZS. --- MAX. 2-3/4 OZS.
TO POSITION SENSING PIN FLUSH WITH TOP PLATE

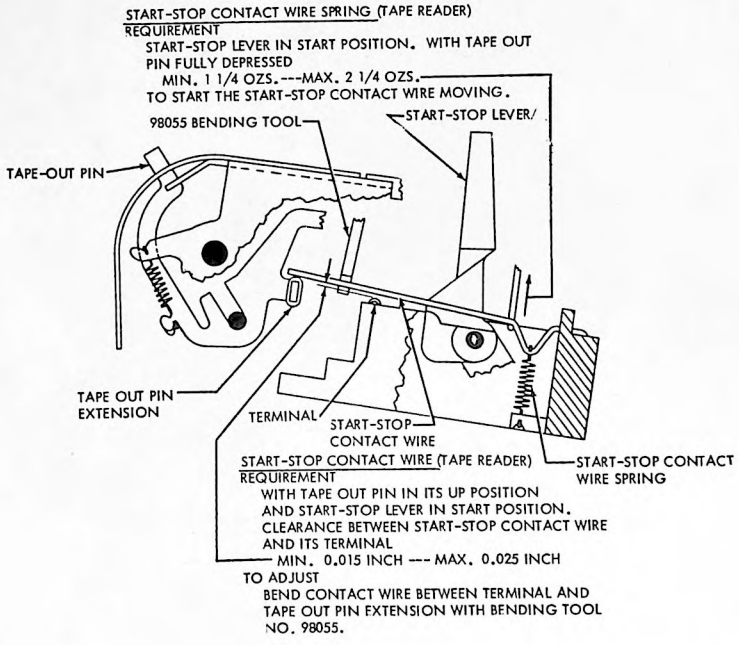
SENSING PIN (TAPE READER)
REQUIREMENT
ARMATURE IN UNATTRACTED POSITION. TIP OF ALL SENSING PINS SHALL BE FLUSH --- MAX. 0.015 INCH BELOW THE TOP PLATE.
TO ADJUST
WITH TWO SENSING PIN GUIDE MOUNTING SCREWS FRICTION TIGHT. POSITION SENSING PIN GUIDE BY MEANS OF PRY POINTS.
RELATED ADJUSTMENT AFFECTED BY
FEED PAWL

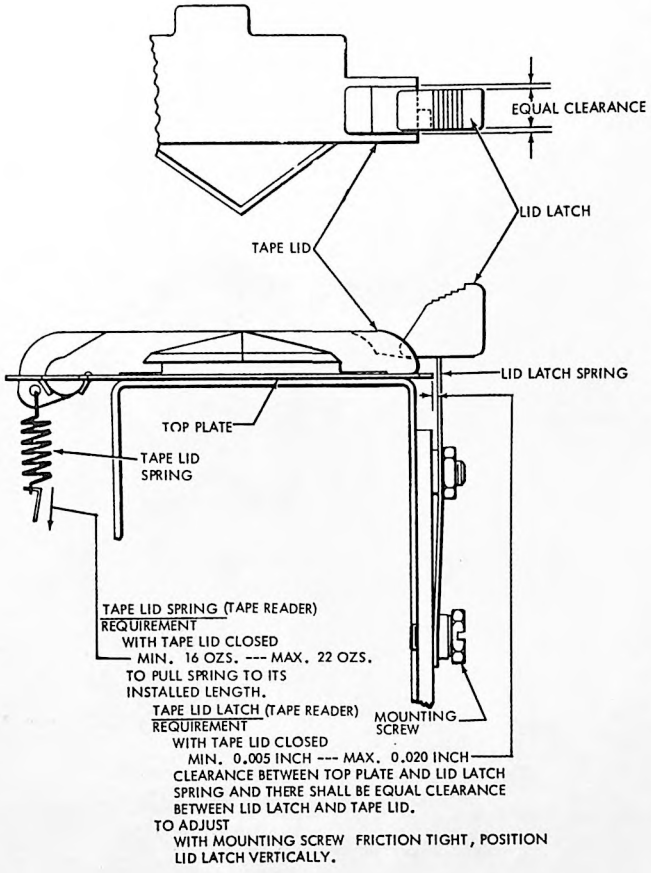




NOTE

THIS ADJUSTMENT MAY BE MADE BY USING THE THIN-SLOTTED END OF GAGE NO. 183103. TO CHECK THE "FLUSH TO TOP PLATE" CONDITION, THE GAGE IS HELD FLAT AGAINST THE TOP PLATE IN BACK OF THE SENSING PINS AND MOVED FORWARD AGAINST THE SENSING PINS. IF ANY SENSING PINS ARE DEFLECTED BY THE GAGE, THEN THE "FLUSH TO TOP PLATE" CONDITION HAS NOT BEEN MET AND THE SENSING PIN GUIDE MUST BE LOWERED. TO CHECK THE ".015" BELOW THE PLATE" CONDITION, THE GAGE IS HELD DIRECTLY ABOVE THE SENSING PINS. A CLEARANCE OF .015" OR LESS MUST BE PRESENT.


START-STOP CONTACT WIRE SPRING (TAPE READER)
REQUIREMENT
START-STOP LEVER IN START POSITION. WITH TAPE OUT PIN FULLY DEPRESSED
MIN. 1 1/4 OZS.---MAX. 2 1/4 OZS.
TO START THE START-STOP CONTACT WIRE MOVING.
98055 BENDING TOOL
START-STOP LEVER
TAPE-OUT PIN
TAPE OUT PIN EXTENSION
TERMINAL
START-STOP CONTACT WIRE
START-STOP CONTACT WIRE SPRING
START-STOP CONTACT WIRE (TAPE READER)
REQUIREMENT
WITH TAPE OUT PIN IN ITS UP POSITION AND START-STOP LEVER IN START POSITION.
CLEARANCE BETWEEN START-STOP CONTACT WIRE AND ITS TERMINAL
MIN. 0.015 INCH --- MAX. 0.025 INCH
TO ADJUST
BEND CONTACT WIRE BETWEEN TERMINAL AND TAPE OUT PIN EXTENSION WITH BENDING TOOL NO. 98055.


EQUAL CLEARANCE
LID LATCH
TAPE LID
LID LATCH SPRING
TOP PLATE
TAPE LID SPRING
TAPE LID SPRING (TAPE READER)
REQUIREMENT
WITH TAPE LID CLOSED
MIN. 16 OZS. --- MAX. 22 OZS.
TO PULL SPRING TO ITS INSTALLED LENGTH.
TAPE LID LATCH (TAPE READER)
REQUIREMENT
WITH TAPE LID CLOSED
MIN. 0.005 INCH --- MAX. 0.020 INCH
CLEARANCE BETWEEN TOP PLATE AND LID LATCH SPRING AND THERE SHALL BE EQUAL CLEARANCE BETWEEN LID LATCH AND TAPE LID.
TO ADJUST
WITH MOUNTING SCREW FRICTION TIGHT, POSITION LID LATCH VERTICALLY.
MOUNTING SCREW

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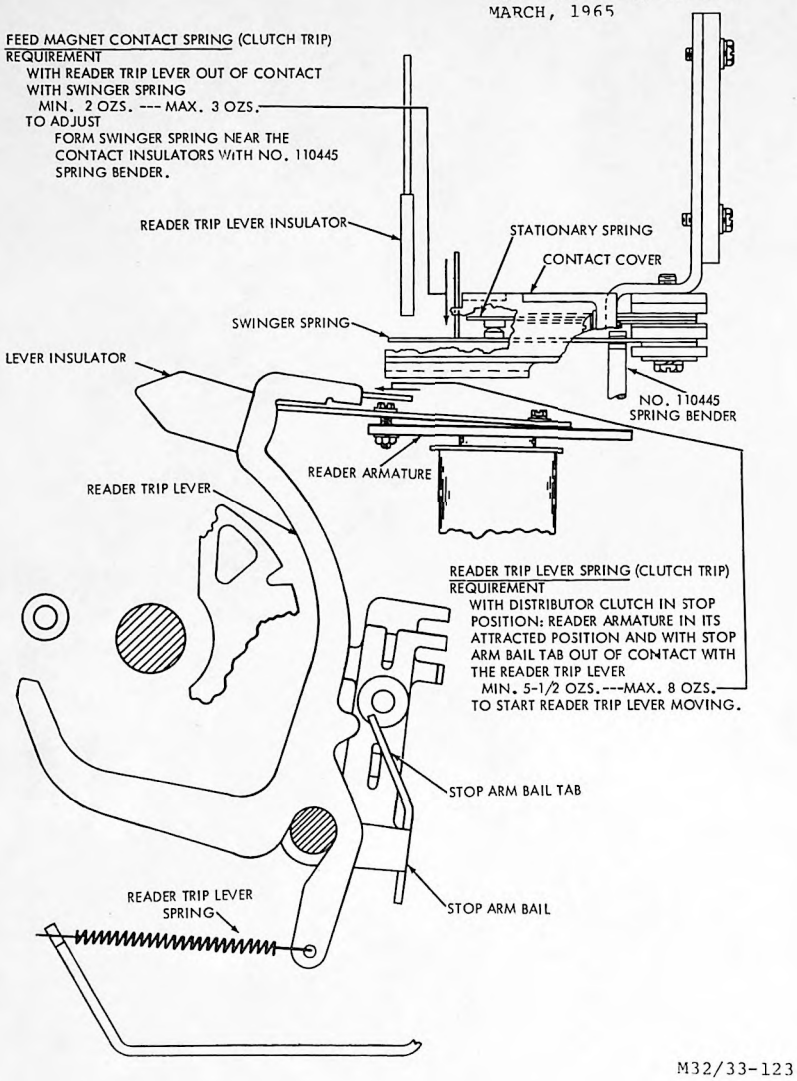
FEED MAGNET CONTACT SPRING (CLUTCH TRIP)
REQUIREMENT
WITH READER TRIP LEVER OUT OF CONTACT
WITH SWINGER SPRING
MIN. 2 OZS. --- MAX. 3 OZS.
TO ADJUST
FORM SWINGER SPRING NEAR THE
CONTACT INSULATORS WITH NO. 110445
SPRING BENDER.
READER TRIP LEVER INSULATOR
STATIONARY SPRING
CONTACT COVER
SWINGER SPRING
LEVER INSULATOR
NO. 110445
SPRING BENDER
READER ARMATURE
READER TRIP LEVER
READER TRIP LEVER SPRING (CLUTCH TRIP)
REQUIREMENT
WITH DISTRIBUTOR CLUTCH IN STOP
POSITION: READER ARMATURE IN ITS
ATTRACTED POSITION AND WITH STOP
ARM BAIL TAB OUT OF CONTACT WITH
THE READER TRIP LEVER
MIN. 5-1/2 OZS.---MAX. 8 OZS.
TO START READER TRIP LEVER MOVING.
STOP ARM BAIL TAB
STOP ARM BAIL
READER TRIP LEVER
SPRING

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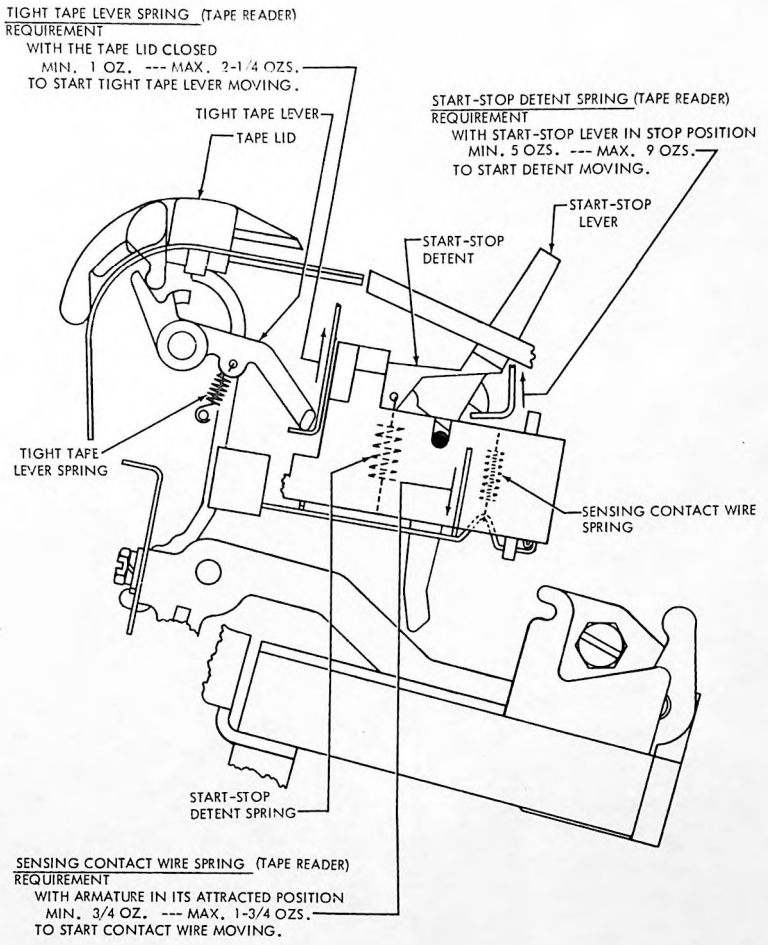
TIGHT TAPE LEVER SPRING (TAPE READER)
REQUIREMENT
WITH THE TAPE LID CLOSED
MIN. 1 OZ. --- MAX. 2-1/4 OZS.
TO START TIGHT TAPE LEVER MOVING.
TIGHT TAPE LEVER
TAPE LID
START-STOP DETENT SPRING (TAPE READER)
REQUIREMENT
WITH START-STOP LEVER IN STOP POSITION
MIN. 5 OZS. --- MAX. 9 OZS.
TO START DETENT MOVING.
START-STOP LEVER
START-STOP DETENT
TIGHT TAPE LEVER SPRING
SENSING CONTACT WIRE SPRING
START-STOP DETENT SPRING
SENSING CONTACT WIRE SPRING (TAPE READER)
REQUIREMENT
WITH ARMATURE IN ITS ATTRACTED POSITION
MIN. 3/4 OZ. --- MAX. 1-3/4 OZS.
TO START CONTACT WIRE MOVING.

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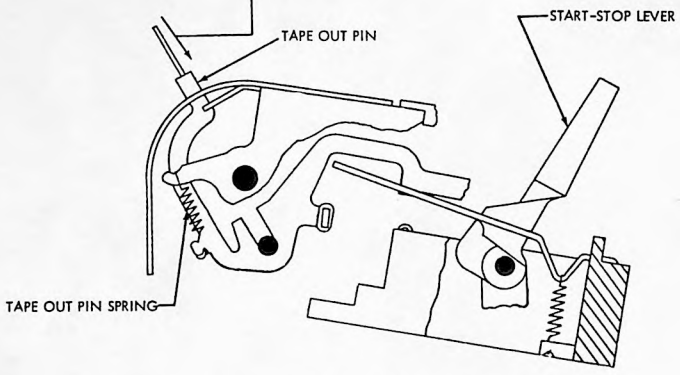
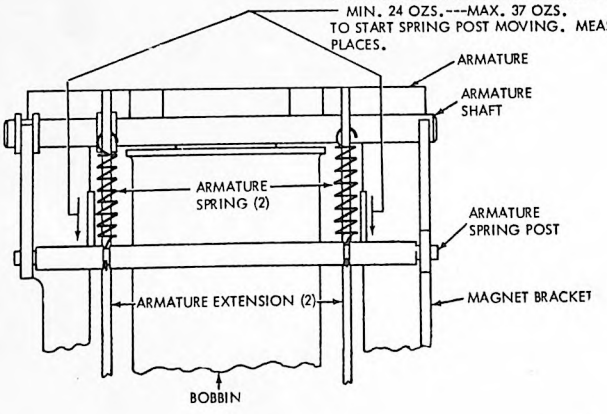
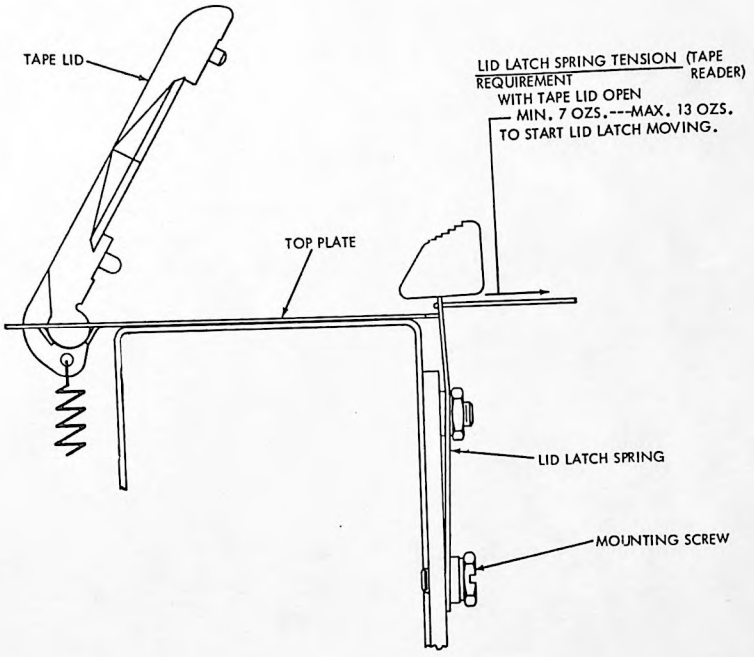
TAPE OUT PIN SPRING (TAPE READER)
REQUIREMENT
WITH START-STOP LEVER IN STOP POSITION.
MIN. 1 OZ. --- MAX. 3 OZS.
TO START TAPE OUT PIN MOVING.



ARMATURE SPRING (TAPE READER)
REQUIREMENT
WITH ARMATURE IN ITS UNATTRACTED POSITION
MIN. 24 OZS.---MAX. 37 OZS.
TO START SPRING POST MOVING. MEASURE AT TWO PLACES.




TAPE LID
LID LATCH SPRING TENSION (TAPE READER)
REQUIREMENT
WITH TAPE LID OPEN
MIN. 7 OZS.---MAX. 13 OZS.
TO START LID LATCH MOVING.
TOP PLATE
LID LATCH SPRING
MOUNTING SCREW

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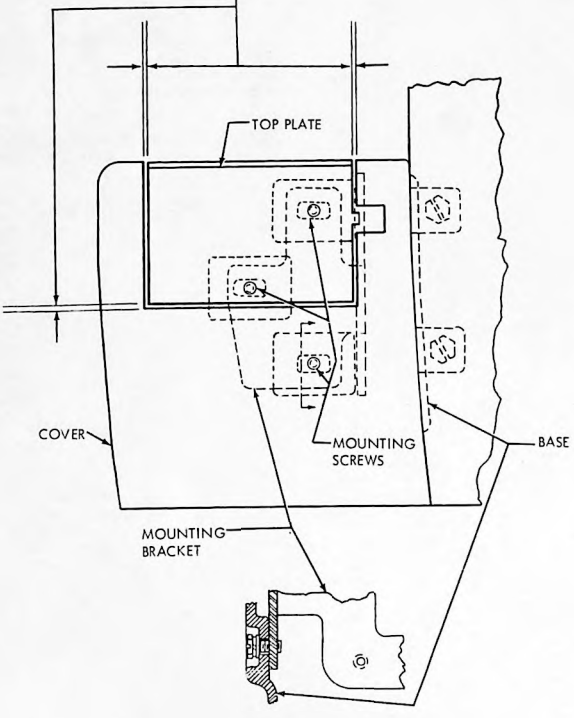
READER MOUNTING BRACKET (TAPE READER)

REQUIREMENT

THERE SHALL BE EQUAL CLEARANCE ON THREE SIDES BETWEEN TOP PLATE ASSEMBLY AND READER COVER.

TO ADJUST

WITH THREE MOUNTING SCREWS FRICTION TIGHT, POSITION READER BASE.



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5. BASIC PUNCH ADJUSTMENTS

TAPE PUNCH

NOTE

CHAD EXTENSION - PRIOR TO MAKING ADJUSTMENTS REMOVE THE CHAD EXTENSION. REASSEMBLE WHEN THE ADJUSTMENTS ARE COMPLETED.

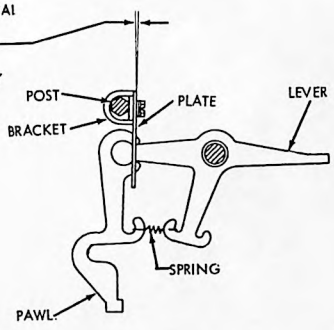
POST, BRACKET AND PLATE

REQUIREMENT (PRELIMINARY)

AT THE TIME OF ASSEMBLY OR REASSEMBLY THE POST, BRACKET AND PLATE ASSEMBLY SHALL BE ASSEMBLED SO THAT THE PLATE SHALL BE VERTICAL OR WITHIN 2 DEGREES FROM VERTICAL IN A CLOCKWISE DIRECTION (AS GAGED BY EYE).

TO ADJUST

ASSEMBLE POST, BRACKET AND PLATE ASSEMBLY TO MEET REQUIREMENT.



ARM (TAPE NUDGER) POST

NOTE

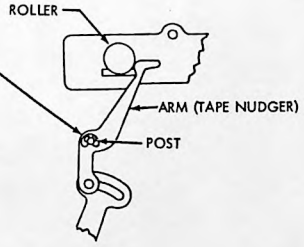
THIS ADJUSTMENT APPLIES ONLY TO UNITS WHICH HAVE AN ELONGATED HOLE IN THE CASTING.

REQUIREMENT

AT THE TIME OF ASSEMBLY OR REASSEMBLY THE POST SHALL BE IN ITS MOST REARWARD POSITION.

TO ADJUST

ASSEMBLE POST TO MEET REQUIREMENT.



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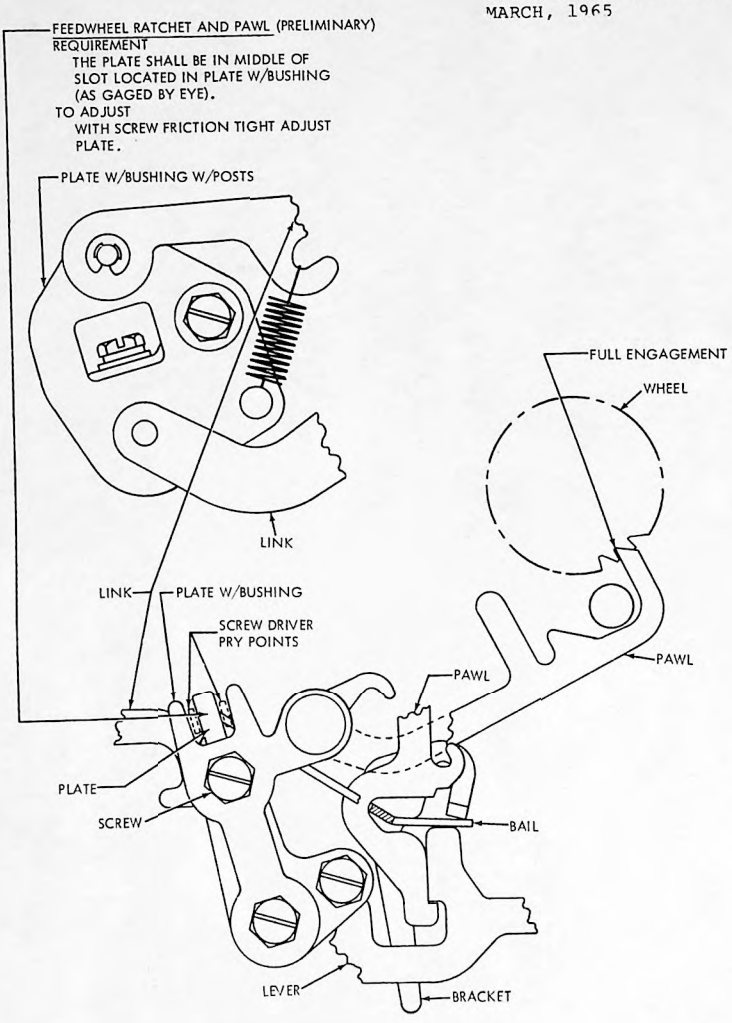
FEEDWHEEL RATCHET AND PAWL (PRELIMINARY)
REQUIREMENT
THE PLATE SHALL BE IN MIDDLE OF SLOT LOCATED IN PLATE W/BUSHING (AS GAGED BY EYE).
TO ADJUST
WITH SCREW FRICTION TIGHT ADJUST PLATE.
PLATE W/BUSHING W/POSTS
LINK
FULL ENGAGEMENT
WHEEL
LINK
PLATE W/BUSHING
SCREW DRIVER PRY POINTS
PAWL
PAWL
PLATE
SCREW
BAIL
LEVER
BRACKET

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STRIPPER BAIL UPSTOP

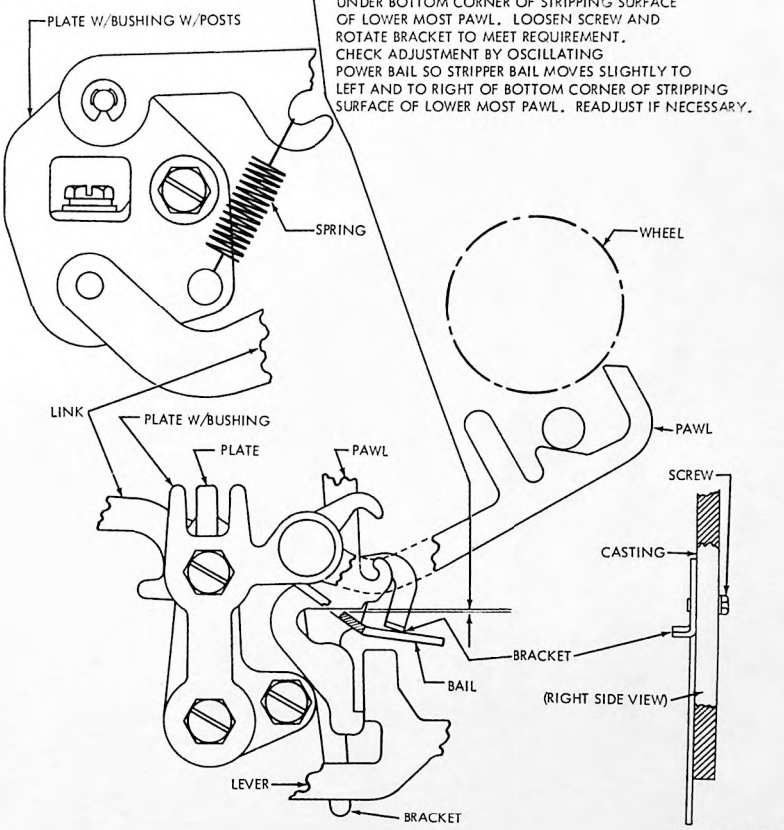
REQUIREMENT

WITH PERFORATOR UNIT REMOVED FROM PRINTER AND WITH ALL PAWLS IN THEIR UPPERMOST POSITION THE STRIPPER BAIL SHALL CLEAR THE BOTTOM CORNER OF THE STRIPPING SURFACE OF LOWER MOST PAWL BY

- MIN. SOME --- MAX. 0.010 INCH AS GAGED BY EYE.

TO ADJUST

STRIP ALL PAWLS TO THEIR UPPERMOST POSITION. MANUALLY OPERATE POWER BAIL SO THE STRIPPER BAIL LINES UP DIRECTLY UNDER BOTTOM CORNER OF STRIPPING SURFACE OF LOWER MOST PAWL. LOOSEN SCREW AND ROTATE BRACKET TO MEET REQUIREMENT. CHECK ADJUSTMENT BY OSCILLATING POWER BAIL SO STRIPPER BAIL MOVES SLIGHTLY TO LEFT AND TO RIGHT OF BOTTOM CORNER OF STRIPPING SURFACE OF LOWER MOST PAWL. READJUST IF NECESSARY.



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SEE NOTE BELOW

TAPE PUNCH DRIVE (PRELIMINARY)
REQUIREMENT

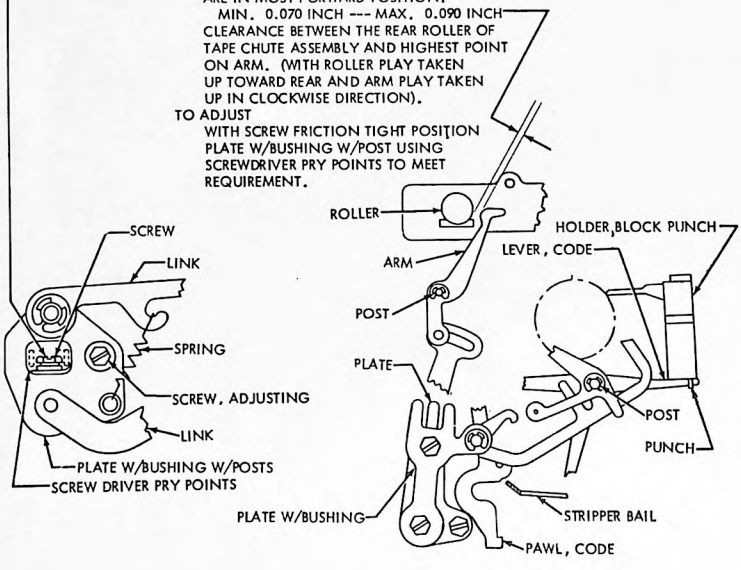
(1) THE SCREW HEAD THAT SECURES THE ARM TO FUNCTION SHAFT SHALL BE IN MIDDLE OF OPENING IN PLATE W/BUSHING W/POST (AS GAGED BY EYE).

TO ADJUST
LOOSEN ADJUSTING SCREW AND POSITION PLATE W/BUSHING W/POST.

REQUIREMENT

(2) WITHOUT TAPE IN TAPE PUNCH UNIT. ROTATE PRINTER MAIN SHAFT UNTIL THE FUNCTION SHAFT AND POWER BAIL ARE IN MOST FORWARD POSITION.
MIN. 0.070 INCH --- MAX. 0.090 INCH CLEARANCE BETWEEN THE REAR ROLLER OF TAPE CHUTE ASSEMBLY AND HIGHEST POINT ON ARM. (WITH ROLLER PLAY TAKEN UP TOWARD REAR AND ARM PLAY TAKEN UP IN CLOCKWISE DIRECTION).

TO ADJUST
WITH SCREW FRICTION TIGHT POSITION PLATE W/BUSHING W/POST USING SCREWDRIVER PRY POINTS TO MEET REQUIREMENT.



NOTE

TAPE PUNCH DRIVE, PUNCH PIN PENETRATION, POST BRACKET AND PLATE, AND FEED WHEEL RATCHET AND PAWL ADJUSTMENT MUST BE MADE IN SEQUENCE. PRIOR TO MAKING THESE ADJUSTMENTS CHECK, POST BRACKET AND PLATE, ARM (TAPE NUDGER) POST, FEED WHEEL RATCHET AND PAWL, AND STRIPPER BAIL UPSTOP ADJUSTMENTS.

PUNCH PENETRATION

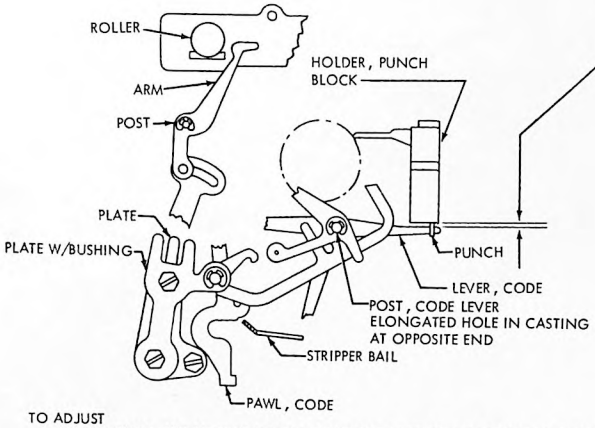
REQUIREMENT: UNDER THE FOLLOWING CONDITIONS:

(1) MOUNTED TAPE PUNCH UNIT (WITHOUT TAPE) IN THE "ON" POSITION.

(2) 5 LEVEL UNIT - WITH EITHER THE FIGS. "D" OR THE RUB-OUT COMBINATION IN THE TAPE PUNCH UNIT.
8 LEVEL UNIT - WITH THE RUB-OUT COMBINATION IN THE TAPE PUNCH UNIT.

(3) WITH THE PRINTER FUNCTION SHAFT AND THE POWER BAIL IN THE MOST FORWARD POSITION.

MIN. 0.032 INCH --- MAX. 0.037 INCH
CLEARANCE BETWEEN TOP SURFACE OF FURTHEST LEVER AND BOTTOM SURFACE OF PUNCH BLOCK HOLDER. THERE SHALL BE NO LESS THAN 0.017 INCH CLEARANCE BETWEEN THE CLOSEST LEVER AND THE BOTTOM SURFACE OF THE PUNCH BLOCK HOLDER.



TO ADJUST

5 LEVEL UNIT: MOVE CODE LEVER MOUNTING POST TO ITS LOWER MOST POSITION AND TIGHTEN SCREW FRICTION TIGHT. WITH RUB-OUT COMBINATION IN TAPE PUNCH UNIT AND POWER BAIL IN MOST FORWARD POSITION MEASURE THE GAP BETWEEN TOP SURFACE OF FURTHEST LEVER AND BOTTOM SURFACE OF PUNCH BLOCK HOLDER. REPEAT OPERATION WITH FIGS. "D" COMBINATION. WITH COMBINATION THAT MEASURES LARGEST GAP OF THE TWO COMBINATIONS IN TAPE PUNCH UNIT MANUALLY ROTATE PRINTER MAIN SHAFT SO FUNCTION SHAFT AND POWER BAIL ARE IN MOST FORWARD POSITION. WITH A 0.037 INCH GAGE PLACED TO RIGHT OF PUNCH PIN AND BETWEEN FURTHEST CODE LEVER AND IN CONTACT WITH BOTTOM SURFACE OF PUNCH BLOCK HOLDER MOVE POST UPWARD SO THAT TOP SURFACE OF LEVER JUST TOUCHES THE GAGE. RECYCLE AND CHECK THE GAP AT THE FURTHEST LEVER. THE GAP SHALL BE BETWEEN 0.032 INCH TO 0.037 INCH. THE GAP BETWEEN TOP SURFACE OF CLOSEST LEVER AND BOTTOM SURFACE OF PUNCH BLOCK HOLDER SHALL NOT BE LESS THAN 0.017 INCH (WITH GAGE PLACED TO THE RIGHT OF THE PUNCH PIN). REFINE ADJUSTMENT TO MEET REQUIREMENT.

8 LEVEL UNIT: MOVE CODE LEVER MOUNTING POST TO ITS LOWER MOST POSITION AND TIGHTEN SCREW FRICTION TIGHT. WITH RUB-OUT COMBINATION IN TAPE PUNCH UNIT MANUALLY ROTATE PRINTER MAIN SHAFT SO THAT FUNCTION SHAFT AND POWER BAIL ARE IN MOST FORWARD POSITION. WITH A 0.037 INCH GAGE PLACED TO RIGHT OF PUNCH PIN AND BETWEEN FURTHEST CODE LEVER AND IN CONTACT WITH BOTTOM SURFACE OF PUNCH BLOCK HOLDER MOVE POST UPWARD SO THAT TOP SURFACE OF LEVER JUST TOUCHES GAGE. RECYCLE AND CHECK GAP AT FURTHEST LEVER. THE GAP SHALL BE BETWEEN 0.032 INCH TO 0.037 INCH. THE GAP BETWEEN TOP SURFACE OF CLOSEST LEVER AND BOTTOM SURFACE OF PUNCH BLOCK HOLDER SHALL NOT BE LESS THAN 0.017 INCH (WITH GAGE PLACED TO RIGHT OF PUNCH PIN). REFINE ADJUSTMENT TO MEET REQUIREMENT.

POST, BRACKET AND PLATE
REQUIREMENT: (FINAL)

5 LEVEL UNIT: WITH FIGS. "D" COMBINATION IN TAPE PUNCH UNIT AND WITH PRINTER FUNCTION SHAFT AND POWER BAIL IN REAR MOST POSITON THERE SHALL BE

MIN. 0.005 INCH --- MAX. 0.015 INCH

CLEARANCE BETWEEN THE "A-O" SENSING LEVER AND PAWL. THERE SHALL BE SOME CLEARANCE BETWEEN THE "A-8" SENSING LEVER AND ITS PAWL. WITH RUB-OUT COMBINATION IN TAPE PUNCH UNIT AND WITH PRINTER FUNCTION SHAFT AND POWER BAIL IN REAR MOST POSITION THERE SHALL BE SOME CLEARANCE BETWEEN THE FEED SENSING LEVER AND ITS PAWL AND CODE SENSING LEVERS AND THEIR PAWLS.

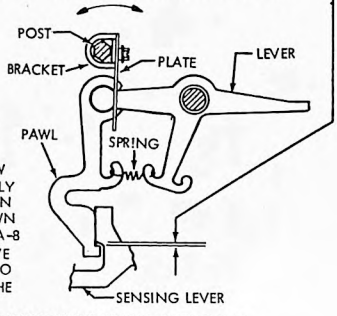
8 LEVEL UNIT: WITH RUB-OUT COMBINATION IN TAPE PUNCH UNIT AND WITH FUNCTION SHAFT AND POWER BAIL IN REAR MOST POSITION THERE SHALL BE

MIN. 0.005 INCH --- MAX. 0.015 INCH

CLEARANCE BETWEEN "0" SENSING LEVER AND PAWL. THERE SHALL BE SOME CLEARANCE BETWEEN THE FEED SENSING LEVER AND ITS PAWL AND CODE SENSING LEVERS AND THEIR PAWLS.

CAUTION: EXERCISE CARE SO THAT THE GUIDE ALWAYS GUIDES THE PAWL AND LEVER SIMULTANEOUSLY. AVOID ROTATING GUIDE IN THE COUNTER-CLOCKWISE DIRECTION FROM ITS MOST VERTICAL POSITION.

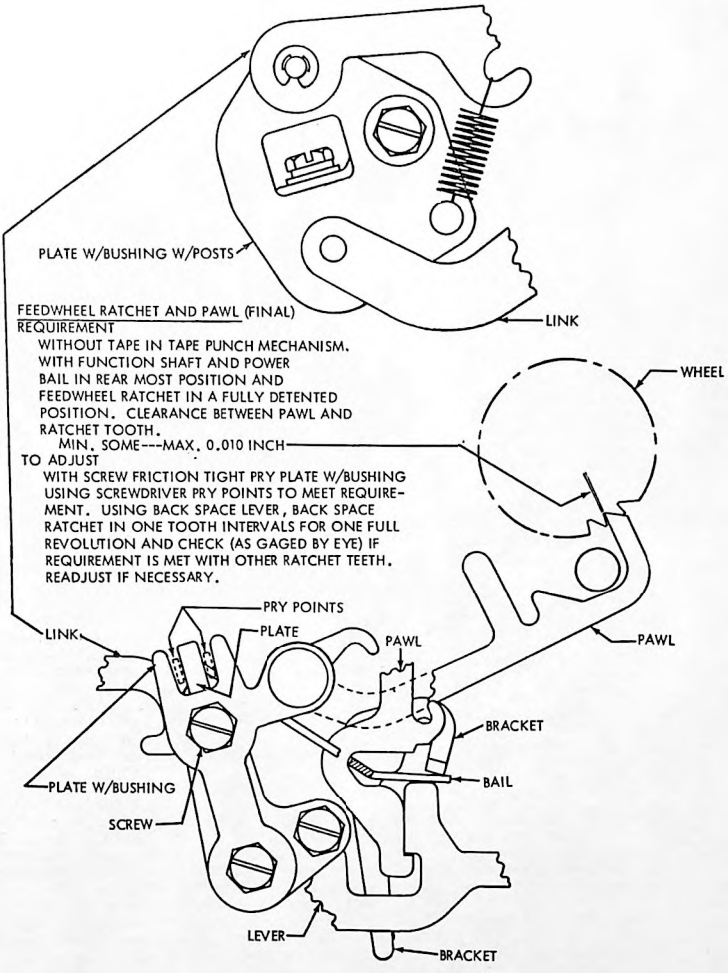
TO ADJUST



5 LEVEL UNIT: WITH FIGS. "D" COMBINATION IN TAPE PUNCH UNIT AND WITH PRINTER FUNCTION SHAFT AND POWER BAIL IN REAR MOST POSITION CHECK THE GAP BETWEEN THE A-O SENSING LEVER AND ITS PAWL. LOOSEN SCREW AND ROTATE POST, BRACKET AND PLATE ASSEMBLY ONLY IF THE GAP IS NOT PER REQUIREMENT. (DO NOT POSITION POST, BRACKET AND PLATE ASSEMBLY JUST TO BIAS THE LOW OR HIGH SIDE OF THE CLEARANCE.) WHILE MANUALLY BIASING THE AUXILIARY BAIL (JUST BELOW THE TABS IN NO. 2 AND 5 CODE LEVERS) DOWNWARD, PRESS DOWN LIGHTLY ON THE MOST REARWARD PORTION OF THE A-8 SENSING LEVER. THE A-8 SENSING LEVER SHALL HAVE SOME MOVEMENT BEFORE MOTION IS TRANSFERRED TO ITS PAWL. IF NO MOVEMENT IS PRESENT INCREASE THE GAP SLIGHTLY BETWEEN THE A-O SENSING LEVER AND ITS PAWL WITHIN ITS 0.005 INCH TO 0.015 INCH LIMITS UNTIL SOME MOVEMENT IS PRESENT. WITH RUB-OUT COMBINATION IN TAPE PUNCH UNIT AND WITH PRINTER FUNCTION SHAFT AND POWER BAIL IN REAR MOST POSITION MANUALLY BIAS CODE LEVERS IN FRONT OF PUNCH PINS DOWNWARD AND CHECK THE 1,2,F,3,4, AND 5 SENSING LEVERS FOR MOVEMENT BEFORE MOTION IS TRANSFERRED TO THEIR PAWLS. READJUST THE POST, BRACKET AND PLATE ASSEMBLY UNTIL SOME MOVEMENT IS PRESENT BETWEEN EACH SENSING LEVER AND ITS PAWLS. RECHECK THE 0.005 INCH TO 0.015 INCH GAP REQUIREMENT BETWEEN THE A-O SENSING LEVER AND ITS PAWL.

8 LEVEL UNIT: WITH RUB-OUT COMBINATION IN TAPE PUNCH UNIT AND WITH PRINTER FUNCTION SHAFT AND POWER BAIL IN REAR MOST POSITION CHECK THE GAP BETWEEN THE NO. "0" SENSING LEVER AND ITS PAWL. LOOSEN SCREW AND ROTATE POST, BRACKET AND PLATE ASSEMBLY ONLY IF GAP IS NOT PER REQUIREMENT. (DO NOT POSITION POST, BRACKET AND PLATE ASSEMBLY JUST TO BIAS THE LOW OR HIGH SIDE OF THE CLEARANCE.) WHILE MANUALLY BIASING CODE LEVERS IN FRONT OF THE PUNCH PINS DOWNWARD PRESS DOWN LIGHTLY ON THE MOST REARWARD PORTION OF EACH SENSING LEVER. EACH SENSING LEVER SHALL HAVE SOME MOVEMENT BEFORE MOTION IS TRANSFERRED TO ITS PAWL. READJUST THE POST, BRACKET AND PLATE ASSEMBLY UNTIL THE REQUIREMENT IS MET. RECHECK THE 0.005 INCH --- 0.015 INCH GAP REQUIREMENT.

NOTE: REMAKE STRIPPER BAIL UPSTOP ADJUSTMENT ONLY IF POST, BRACKET AND PLATE ASSEMBLY IS ROTATED TO MEET THIS REQUIREMENT.



FEEDWHEEL RATCHET AND PAWL (FINAL)

REQUIREMENT

WITHOUT TAPE IN TAPE PUNCH MECHANISM. WITH FUNCTION SHAFT AND POWER BAIL IN REAR MOST POSITION AND FEEDWHEEL RATCHET IN A FULLY DETENTED POSITION. CLEARANCE BETWEEN PAWL AND RATCHET TOOTH.

MIN. SOME---MAX. 0.010 INCH

TO ADJUST

WITH SCREW FRICTION TIGHT PRY PLATE W/BUSHING USING SCREWDRIVER PRY POINTS TO MEET REQUIREMENT. USING BACK SPACE LEVER, BACK SPACE RATCHET IN ONE TOOTH INTERVALS FOR ONE FULL REVOLUTION AND CHECK (AS GAGED BY EYE) IF REQUIREMENT IS MET WITH OTHER RATCHET TEETH. READJUST IF NECESSARY.

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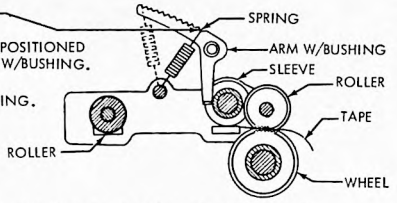
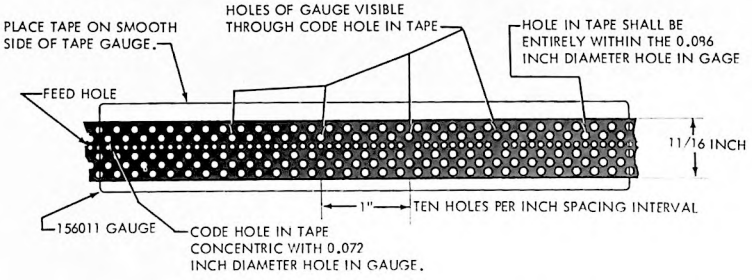
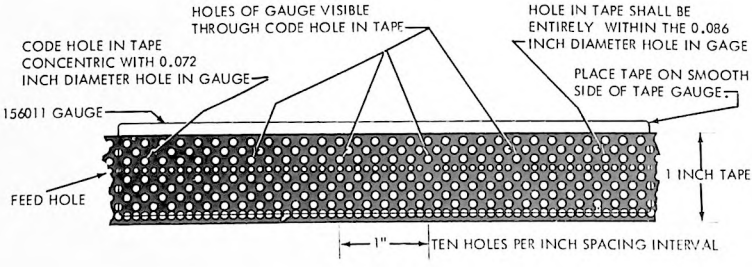
TEN CHARACTERS PER INCH

(1) REQUIREMENT (PRELIMINARY)
THE OPEN END OF SPRING SHALL BE POSITIONED ON LOWER MOST GROOVE ON ARM W/BUSHING.
TO ADJUST
WITH A SPRING HOOK POSITION SPRING.



(2) REQUIREMENT
WITH A PIECE OF TAPE PERFORATED WITH A SERIES OF "R AND Y" COMBINATIONS FOR FIVE LEVEL UNITS OR "R AND - HYPHEN" COMBINATIONS FOR EIGHT LEVEL UNITS PLACED OVER THE SMOOTH SIDE OF THE 156011 TAPE GAUGE SO THAT THE CIRCULAR PORTION OF THE FIRST NUMBER 2 CODE HOLE IN THE TAPE IS CONCENTRIC WITH THE FIRST HOLE OF THE TAPE GAUGE, THE NEXT FOUR HOLES IN THE TAPE GAUGE SHOULD BE VISIBLE THROUGH THE NUMBER 2 CODE HOLES IN THE TAPE AND THE CIRCULAR PORTION OF THE LAST (SIXTH) NUMBER 2 CODE HOLE IN THE TAPE SHALL BE ENTIRELY WITHIN THE 0.086 INCH DIAMETER HOLE OF THE TAPE GAUGE. OPERATE THE TAPE PUNCH MECHANISM UNDER POWER AND CHECK PERFORATIONS TO MEET REQUIREMENT.
TO ADJUST
POSITION SPRING UPWARDS IN GROOVES UNTIL REQUIREMENT IS MET.





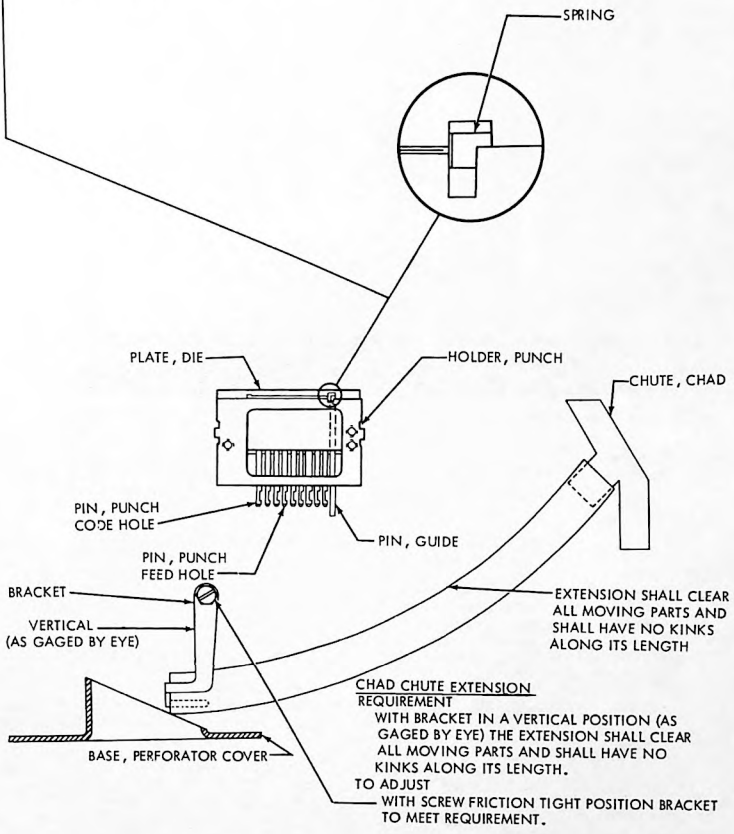
PUNCH BLOCK BIAS SPRING

REQUIREMENT

WITH TAPE REMOVED FROM THE MECHANISM THE BIASING SPRING SHALL REST AGAINST SIDE OF THE CLEARANCE SLOT IN BLOCK AND SHALL BE SYMMETRICAL (AS GAGED BY EYE) ABOUT THE TAPE OPENING OF THE BLOCK.

TO ADJUST

WITH SCREW FRICTION TIGHT POSITION SPRING SO THAT IT JUST RESTS AGAINST THE SIDE OF CLEARANCE AND IS SYMMETRICAL ABOUT THE TAPE OPENING.



CHAD CHUTE EXTENSION

REQUIREMENT

WITH BRACKET IN A VERTICAL POSITION (AS GAGED BY EYE) THE EXTENSION SHALL CLEAR ALL MOVING PARTS AND SHALL HAVE NO KINKS ALONG ITS LENGTH.

TO ADJUST

WITH SCREW FRICTION TIGHT POSITION BRACKET TO MEET REQUIREMENT.

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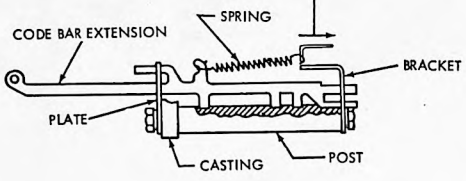
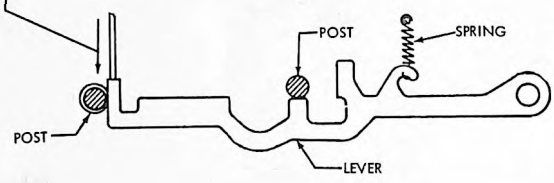
CODE BAR LEVER SPRINGS
REQUIREMENT
WITH THE PRINTER IN STOP POSITION AND TAPE PUNCH UNIT MOUNTED TO PRINTER
MIN. 3/4 OZ. --- MAX. 1-3/4 OZS.
TO PULL SPRING TO ITS INSTALLED LENGTH.



SENSING LEVERS SPRINGS
REQUIREMENT
WITH TAPE PUNCH IN STOP POSITION
MIN. 15 GRAMS---MAX. 32 GRAMS
TO START LEVER MOVING.

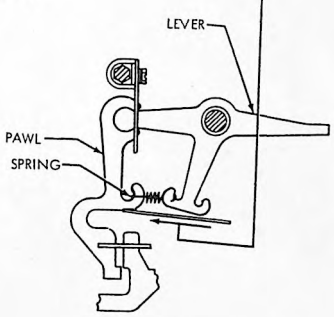


PAWL AND LEVER SPRING
REQUIREMENT
WITH A SPRING SCALE LOCATED ON STEP BELOW SPRING HOOK AND WITH SENSING LEVER SPRING REMOVED

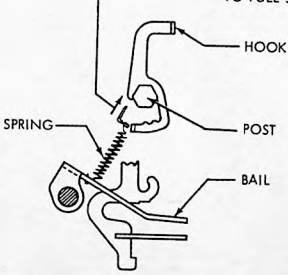
UPPER SPRING
MIN. 7/8 OZ.
MAX. 1 1/2 OZS.

LOWER SPRING
MIN. 1 1/2 OZS.
MAX. 2 1/8 OZS.

TO START PAWL MOVING.



STRIPPER BAIL SPRING
REQUIREMENT
WITH TAPE PUNCH IN STOP POSITION
MIN. 12 OZS.---MAX. 15 OZS.
TO PULL SPRING TO ITS INSTALLED LENGTH.



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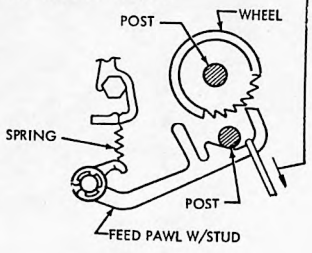
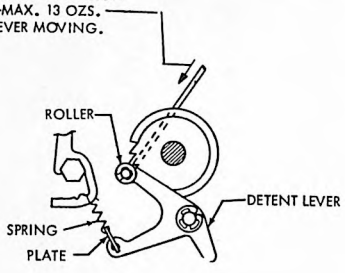
FEED PAWL SPRING
REQUIREMENT
WITH TAPE PUNCH IN STOP POSITION
MIN. 1/2 OZ. --- MAX. 1 OZ.
TO START PAWL MOVING.



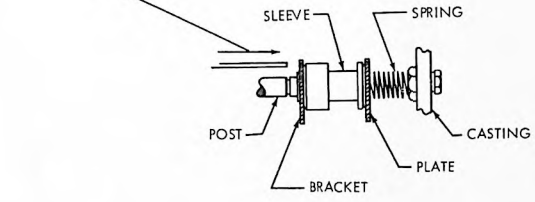
DETENT LEVER SPRING
REQUIREMENT
WITH TAPE PUNCH IN STOP POSITION
MIN. 10 OZS.---MAX. 13 OZS.
TO START DETENT LEVER MOVING.



TAPE CHUTE ASSEMBLY COMPRESSION SPRING

REQUIREMENT

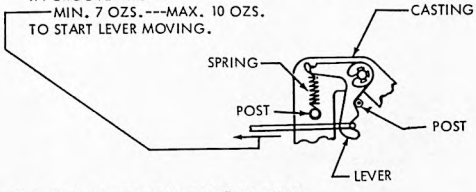
WITH TENSION SPRING REMOVED AND THE PRESSURE ROLLER SLIGHTLY ABOVE THE FEED WHEEL PUSH AXIALLY ON THE FRONT PLATE OF TAPE CHUTE ASSEMBLY
MIN. 24 OZS.---MAX. 34 OZS.
TO START TAPE CHUTE ASSEMBLY MOVING.



ON-OFF CONTROL LEVER DETENT SPRING

REQUIREMENT

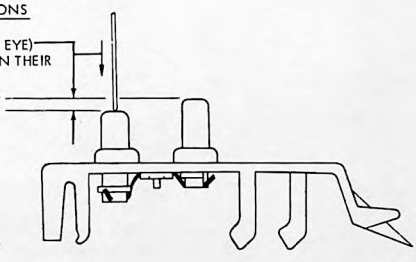
WITH THE LEVER WITH BUSHING AND POST HELD IN THE "OFF" POSITION (TAPE PUNCH UNIT OFF) HOOK SCALE IN GROOVE AND PULL
MIN. 7 OZS.---MAX. 10 OZS.
TO START LEVER MOVING.



"REL.", "B.S.P.", "ON" OR "OFF" BUTTONS

REQUIREMENT

PUSH DOWN 1/8 INCH (AS GAGED BY EYE) WHILE THE OTHER BUTTONS REMAIN IN THEIR NORMAL UPWARD POSITION.
MIN. 1/2 OZ. ---MAX. 1 1/2 OZS.



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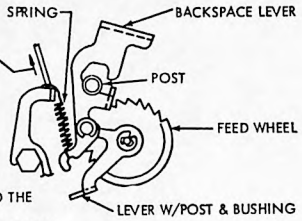
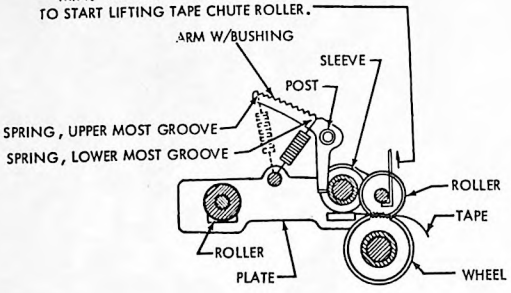
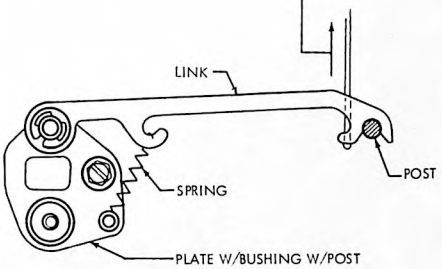
BACK SPACE LEVER SPRING
REQUIREMENT
WITH TAPE PUNCH IN STOP POSITION
MIN. 3/4 OZ. ---MAX. 1 1/2 OZS.
TO PULL SPRING TO ITS INSTALLED LENGTH.



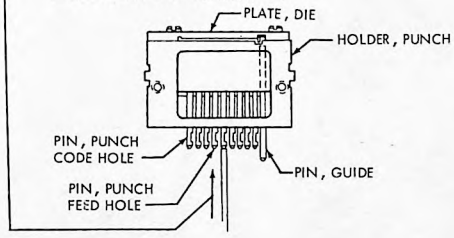
TAPE CHUTE ROLLER SPRING
REQUIREMENT
PULL UP ON THE SHAFT JUST TO THE LEFT OF THE ROLLER
(1) WITH SPRING IN UPPER MOST GROOVE
MIN. 40 OZS. --- MAX. 48 OZS.
(2) WITH SPRING IN LOWER MOST GROOVE
MIN. 22 OZS. --- MAX. 28 OZS.
TO START LIFTING TAPE CHUTE ROLLER.



DRIVE LINK SPRING
REQUIREMENT
WITH TAPE PUNCH IN STOP POSITION
MIN. 7 OZS.---MAX. 9 OZS.
TO START DRIVE LINK MOVING.



PUNCH BLOCK ASSEMBLY (5 LEVEL & 8 LEVEL)
REQUIREMENT
REMOVE PUNCH BLOCK ASSEMBLY FROM TAPE PUNCH UNIT TO PERFORM THIS CHECK.
WITH THE PUNCH PIN SLOTS FACING THE GUIDE PIN
MIN. SOME---MAX. 4 OZS.
TO START EACH PUNCH MOVING. THIS REQUIREMENT MUST BE MET ANYWHERE ALONG THE PUNCHES TRAVEL IN THE TAPE PUNCH UNIT.



CN TELECOMMUNICATIONS ENGINEERING DEPARTMENT

PLANT MANUAL BK2.7.3
SUBSECTION 5, ISSUE 1
AUGUST 1973

TELEX ROTARY DIAL ASSEMBLY

SERVICING

CONTENTS

1. GENERAL

1.1 This section outlines for Equipment Technicians the procedure for checking and servicing rotary dial assemblies.

1.2 The procedure applies to all teleprinter equipment using a rotary dial assembly.

2. REQUIREMENTS

2.1 The dial assembly shall operate smoothly without slipping or skipping pulses.

2.2 Dial pulses are produced at the rate of ten per second with the contacts open for 0.061 ± 0.003 second during each pulse interval.

2.3 The off-normal contacts are normally open, and close when the dial wheel is rotated from its idle position. These contacts are used to blind the printer selector when dialling is in process.

3. PROCEDURES

3.1 All rotary dial assemblies are to be checked during service calls and when telex units are being set up in Service Centres.

3.2 The dial assembly shall not require excessive windup force nor stall on slow return. Check by operating the dial several times. If the dial fails these requirements or is suspected of giving wrong numbers, replace the dial assembly.

3.3 Inspect dial assembly for grease, grit, or other foreign matter that may impair its operation. If any of these conditions prevail, replace the dial assembly.

3.4 Inspect the wiring. The wires should be arranged so that they will not interfere with any moving parts.

3.5 Inspect the contact springs for sharp kinks, bends, or pitting of the contacts. Replace dial assembly if kinks bends or pitting is excessive.

3.6 Remove any lubricant which may be present on contacts.

3.7 Do not lubricate any part of dial assembly.

3.8 Testing and Adjustment of Pulsing Contacts

3.8.1 The dial pulsing contacts shall be checked after disconnecting dial assembly from call control unit. With ohmmeter on XI ohms scale and meter leads connected to either side of dial pulsing contacts, dial zero and note deflection of meter needle. The needle should vibrate either 40 percent of full deflection from left hand side of scale or 60 percent from right hand side.

3.8.2 To adjust, carefully bend the spring shelf that rides the pulsing cam. Increasing tension, or downward pressure on the adjustable spring shelf, will decrease contact break length. Decreasing tension, or upward pressure on spring shelf will increase the contact break length.

4. PARTS REPLACEMENT

4.1 Replacement dial assemblies for model 32, 33 or 35 printers are available from Teletype Corpn. by ordering part number 181645 dial assemblies.

CN TELECOMMUNICATIONS
ENGINEERING DEPARTMENT

PLANT MANUAL BK2.13
ISSUE 1
AUGUST, 1964

5-A TICKER

ADJUSTMENTS

CONTENTS

CONTENTS

1. 5-A TICKER CODE

5-A TICKER CODE

	1	2	3	4	5	6		1	2	3	4	5	6
S	O		O				s	O		O			O
Pr			O				.			O			O
U	O	O	O				1/4	O	O	O			O
I		O	O				9		O	O			O
E	O						5	O					O
.													
A	O	O					1	O	O				O
.		O					c		O				O
F	O			O	O		6	O			O	O	
N				O	O								
K	O	O	O	O	O		£	O	O	O	O		O
C		O	O	O			3		O	O	O		O
D	O				O		4	O			O		O
Ct					O		0				O		O
J	O	O			O								
R		O			O								
Y	O			O		O	3/4	O			O		O
H				O		O	8				O		O
Q	O	O	O			O	*	O	O	O			O
P		O	O			O							
Z	O					O	7/8	O					O
T						O	1/8						O
W	O	O				O	1/2	O	O				O
L		O				O							
X	O			O	O	O	5/8	O			O	O	O
M				O	O	O	$				O	O	O
.		O	O	O	O	O	rubout	O	O	O	O	O	O
V		O	O	O	O	O	3/8		O	O	O	O	O
B	O				O	O	2	O				O	O
O					O	O	-					O	O
&	O	O			O	O	b	O	O			O	O
G		O			O	O	7		O			O	O

2. ORIENTATION SCALE GUIDE ADJUSTMENT (Figure 1)

2.1 Loosen the guide mounting screws and the orientation scale thumb nut. Set the scale at 60 and turn the thumb nut in until the scale is friction tight. Rotate the selector cam drum until the stop arm is opposite the stop lug on the scale. Pivot the scale on the scale stud so that the top surface of the stop lug is in line with the top surface of the stop arm. Tighten thumb nut. Adjust the position of the guide by means of its mounting screws so that the front and rear of the guide touches or is within .010" of the orientation scale.

3. MAIN SHAFT POSITION (Figure 1)

3.1 With the selector armature to the spacing side, rotate the main shaft until the selector cam drum stop arm is in front of the stop lug. Loosen the four main shaft bearing bracket screws and adjust the position of the main shaft so that there is .004" clearance between the selector cam drum stop arm and the stop lug, after the right hand bearing bracket screws have been tightened.

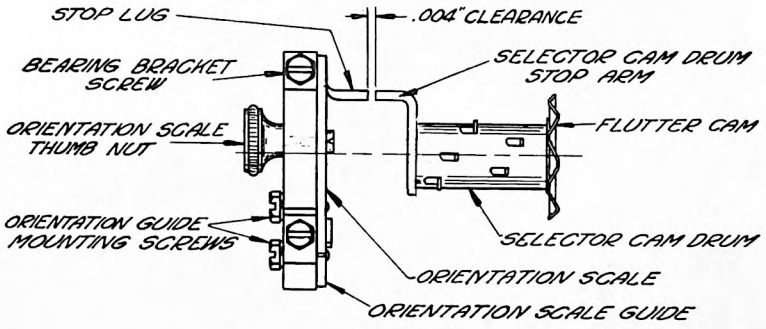


Fig. 1

4. OPERATING CAM CLUTCH RELEASE ARM POSITION (Figure 2)

4.1 Rotate the main shaft until the operating cam is stopped by the cam release bail arm. Adjust the position of the clutch release arm by

4.1 means of its clamping screws so that the clutch teeth are separated between .012" to .015", so that there is at least .002" between the rear of the clutch release arm and the clutch driven member. In this position the engaging edge of the clutch release arm and the high part of the driven member cam should engage 1/32" and to the full depth of the clutch release arm. If the release arm is not safely on the high part of the driven member cam, when the operating cam is stopped by the cam release bail arm, the clutch teeth may become engaged at this time, causing damage to the printer.

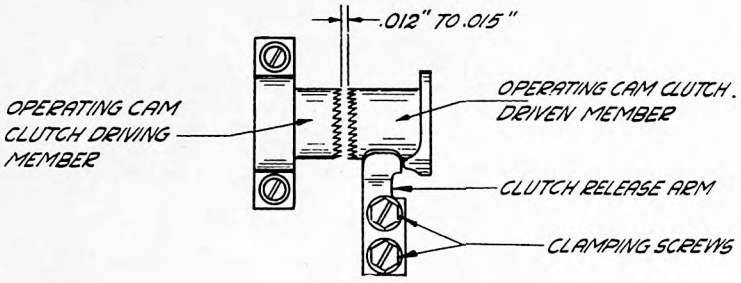


Fig. 2

MAIN SHAFT JAW CLUTCH SPRING TENSION

It should require from 12 to 18 ozs. to separate the clutch teeth.

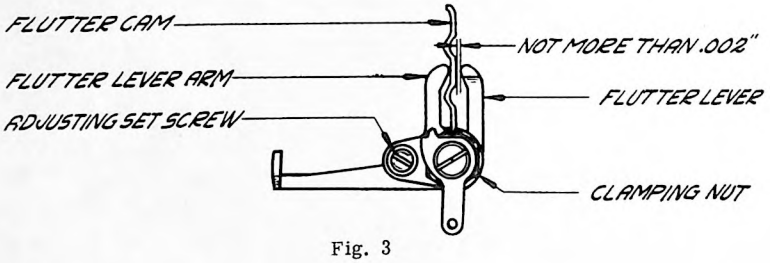


Fig. 3

5. FLUTTER LEVER GAP ADJUSTMENT (Figure 3)

5.1 Remove flutter lever and spring. Loosen flutter lever clamping nut and set screw. Replace flutter lever and adjust the flutter lever gap so that the flutter cam will turn freely in the gap and minimum play of the flutter lever on the cam, checked for one complete revolution, is less than .002". Tighten set screw. Remove flutter lever, tighter clamping nut and replace the flutter lever and spring.

6. DETENT BRACKET ADJUSTMENT

6.1 Adjust the position of the detent bracket so that the travel of the detent is equidistant from the point on the selector lever when the selector lever is moved to either marking or spacing positions. Check #1 and #6 detents. When making this adjustment, make certain that the centres of the detents and the centres of the selector levers are in line.

7. DETENT SPRING TENSION

7.1 It should require from 3 to 4 ozs. to start each detent moving.

8. SELECTOR LEVER GUIDE ADJUSTMENT (Figure 4)

8.1 Loosen the selector lever guide mounting screws and adjust the position of the selector lever guide so that when the selector armature is held to the spacing side and the main shaft rotated, the left side of the spacing cams on the selector cam drum will line up with the left side of the spacing arms of the selector levers. When making this adjustment, the spacing arms should be moved toward the front of the printer so as to take up all play of the lever in the guide.

NOTE: Due to variations, all the selector lever arms may not line up with the left side of the cams. It is , therefore, satisfactory if one or more arms line up with the left side of the cams , provided the other cams are fully on.

9. SELECTOR LEVER GUIDE SHIMS ADJUSTMENT (Figure 4)

9.1 With the selector levers in the spacing position (up) and the selector armature to the spacing side, turn the main shaft and check to see

9.1 that the spacing cams on the selector cam drum clear the spacing arms of the selector levers by at least .002" (See "A" Figure 4). Place the selector levers in the marking position (down). Turn the main shaft and at the same time move the selector cam drum by hand so that the marking cams on the drum will be in line with the marking arms of the selector levers. The marking cams should clear the marking arms by at least .002" (See "B" Figure 4). Add or remove shims located under the selector lever guide to divide the clearance equally between the spacing and marking cams and arms.

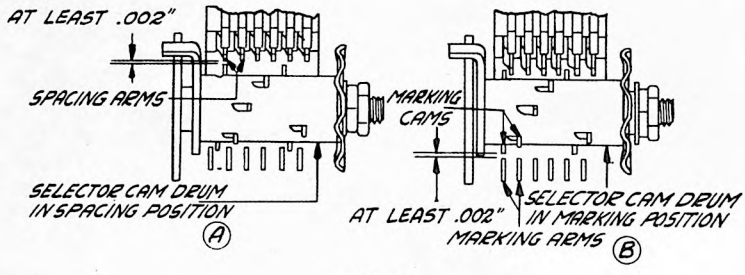


Fig. 4

10. SELECTOR ARMATURE PIVOT SCREWS ADJUSTMENT

10.1 Remove the permanent magnet and back off the armature buffer screws. Then adjust the up and down position of the selector armature, by means of its pivot screws, so that the top surface of the armature is flush with the top surface of the left end of the pole pieces, and the selector armature is free and without play.

11. SELECTOR ARMATURE POLE PIECES AND BUFFER SCREWS ADJUSTMENTS (Figure 5)

11.1 Back off the armature buffer screws and loosen the armature pole piece mounting screws and posts. Place a .020" gauge on each end of the front and rear pole pieces. Clamp the pole pieces together by hand and tighten the pole piece mounting screws and posts.

11.1 Before removing the gauges, adjust the buffer screws so that there is .003" clearance between each buffer screw and the side of the armature.

Remove gauges and replace the permanent magnet so that the ends of the magnet are approximately 3/4" from the left hand end of the laminated pole pieces.

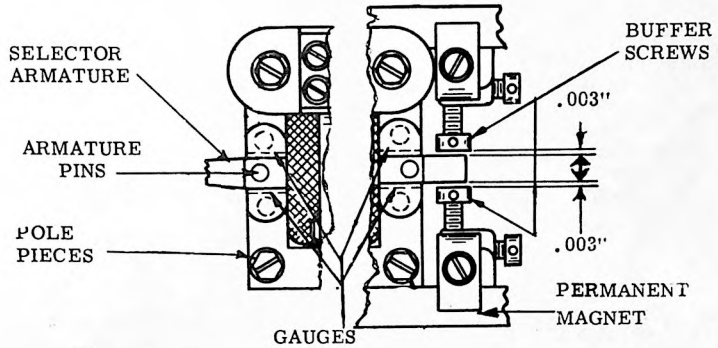


Fig. 5

.2 After tightening the permanent magnet clamping screws, recheck the armature buffer screws adjustment as follows: Place the selector armature on the spacing side. Hook an 8 oz. scale over the armature pin and pull at right angles to the armature towards the front of the printer. Observe the tension required to pull the armature to the marking side. Now hook the scale over the pin and pull at right angles to the armature towards the rear of the printer. Observe the tension required to pull the armature to the spacing side. The two tensions should be within one ounce of being equal. Adjust the position of the buffer screws to obtain this result. Each tension should be at least 4 ozs. After this adjustment, the armature should still be .006" travel.

NOTE: In cases where at least 4 oz. tensions cannot be obtained, it may be necessary to replace the permanent magnet with a stronger one. (This tension does not apply in cases where non-magnetic buffer screws are used.)

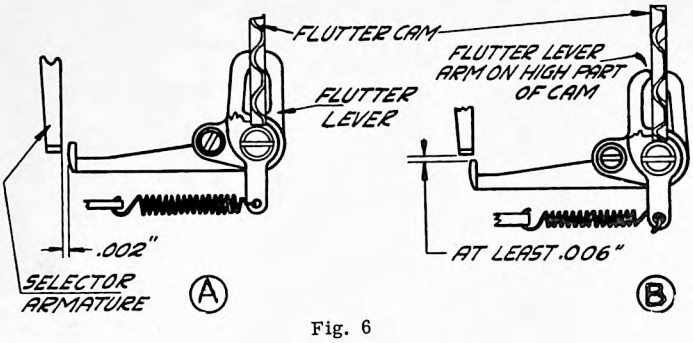


Fig. 6

12. MAGNET BASE POSITION (Figure 6)

12.1 Loosen base mounting screws. With the selector armature to the spacing side, rotate the main shaft until the selector cam stop arm has just passed the stop lug. Place the selector armature on the "marking side" and the flutter lever against the end of the armature. Then adjust the position of the magnet base so that when the main shaft is turned, the right side of the marking cams on the selector cam drum line up with the right side of the marking arms of the selector lever. When making this adjustment, the marking arms should be moved toward the rear of the printer so as to take up all the play of the lever in the guide.

.2 Due to the variations, all the selector lever arms may not line up with the right side of the cams. It is, therefore, satisfactory if one or more arms line up with the right side of the cams, provided the other cams are fully on. Now pivot the magnet base on the front mounting screw so that there is .002" clearance between the side of the selector armature and the end of the flutter lever throughout its entire travel when the selector armature is in the spacing position (See "A" Fig. 6). Recheck the alignment of the marking cams and marking arms. Tighten the mounting screws.

.3 With the selector armature held to the spacing side, rotate the main shaft until the selector cam stop has just passed the stop lug. Hold the selector armature to the marking side and rotate the main shaft. There should be at least .006" clearance between the end of the selector armature and the side of the flutter lever when the flutter lever is

12.3 on each high part of the flutter cam and the selector cam drum is on the spacing side (See "B" Figure 6).

.4 This clearance must be sufficient to prevent any bind between the selector cam and its limiting sleeve and washer (on the main shaft) for a complete revolution of the main shaft. With the selector armature in the marking position, re-check the engagement of the marking cams and arms and the clearance of the spacing cams and arms. With the selector armature in the spacing position, check the reverse engagements and clearances.

13. SELECTOR DRUM RETURN LEVER SPRING TENSION

13.1 Adjust the flutter lever backstop by means of its mounting screws so that the return lever spring tension is from 10 to 11 ozs. and the overall length of the spring is about 1-3/8".

14. FLUTTER LEVER STOP SCREW ADJUSTMENT

14.1 Place the armature on the spacing side. Rotate the main shaft and determine which point on the flutter cam causes the flutter lever to travel "out" the farthest. Then, with the flutter lever resting on this highest point, adjust the stop screw so that there is .004" clearance between the screw and flutter lever.

15. TRANSFER BAIL SHAFT POSITION

15.1 Loosen the transfer bail shaft set screw and set the shaft so that the right end of the shaft projects beyond the side of the transfer bail approximately 1/32".

16. OPERATING CAM AND RELEASE BAIL ROLLERS ADJUSTMENT

16.1 Adjust the feed bail, printing bail, transfer bail and cam release bail rollers by means of their bearing screws and nuts so that the rollers turn freely and have no play. Care should be used when adjusting printers having new style studs and rollers to see that the screw slot in the stud is not burred, as this will cause the roller to bind and wear excessively. The rollers must turn freely on the studs.

17. CAM RELEASE BAIL POSITION

17.1 Remove the cam release bail spring and loosen the bail collar screw.

17.1 Set the collar so that the bail has from .002" to .004" play between the collar and casting. Replace the spring. With the selector armature on the marking side, rotate the main shaft until the operating cam lug is stopped by the cam release bail. In this position the overlap of the stop lug on the bail arm should be 1/16".

18. CAM RELEASE BAIL SPRING TENSION

18.1 With the cam release bail roller resting on the low part of the cam, it should require from 16 to 20 ounces to just start the bail moving.

19. TRANSFER LEVER BEARING-BRACKET POSITION (Figure 7)

19.1 Remove the four screws and clamp holding the typewheel shaft unit to the main casting and remove the unit from the printer. Loosen the transfer bail roller arm clamping screws.

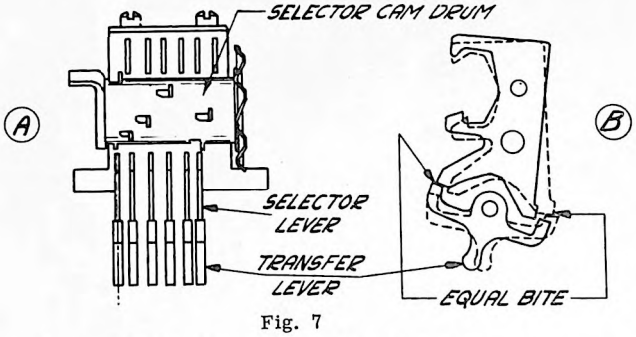


Fig. 7

.2 Loosen the transfer lever bearing bracket clamping screws. The bracket may now be moved in all directions. First set the lateral position of the bracket, as described under "A".

A. With the transfer bail held in the "upward" position, set the transfer bracket so that both arms of the transfer levers in line with the selector levers.

B. With the selector armature on the marking side and the flutter lever against the end of the selector armature, rotate

19.2 B. the main shaft until the selector cam stop arm is resting against the stop lug. Place all selector levers in the marking position (down). Raise the transfer bracket and check the bite that the transfer levers have on the selector levers. Then set the selector levers in the spacing position (up). Raise the transfer bracket and check the bite on the spacing side. Now shift the bracket forward or backward so that the bite on the spacing side is equal to the bite on the marking side (Figure 7). Tighten bracket clamping screws. Recheck adjustment "A".

20. TYPEWHEEL STOP PIN SPRING TENSION

20.1 Hold the typewheel stop unit in a horizontal position. Hook an 8 oz. scale over the front of the unselected stop pin and pull vertically in line with the pin slot. It should require not more than 6 ozs. to start the stop pin moving.

.2 Allow a maximum of 7 ozs. for the "S" and "G" stop pins. The tenion of selected pins should not be less than 2 ozs. With the rubout bar in the unselected position, it should require from 5 to 7 ozs. to start the bar moving.

21. TYPEWHEEL STOP ARM LATCH SPRING TENSION

21.1 It should require 3 ozs. to just start the latch moving.

22. TYPEWHEEL SHAFT UNIT REPLACEMENT AND TRANSFER BAIL ADJUSTMENT

22.1 Loosen the transfer bail arm clamping screws until they are friction tight. Move all the code discs to marking, then replace the typewheel shaft unit and allow transfer levers to line up with their respective code discs. Replace the unit clamp and screws, leave the clamping screws friction tight so that the typewheel shaft unit can be easily repositioned. Then proceed as follows:

A. Move the armature to spacing and rotate the main shaft until the transfer bail arm roller just starts to ride up the high part of its cam.

B. Move the 1, 3 and 5 selector levers to marking (down) and the 2, 4 and 6 selector levers to spacing (up). Recheck the

22.1 B. alignment of code discs and transfer levers.

C. Rotate the main shaft until the transfer bail arm roller is on the peak of its cam.

D. Firmly press the transfer bail inward so that the code discs are completely repositioned. While holding the transfer bail, tighten the typewheel shaft clamping screws and the transfer bail arm clamping screws.

E. Rotate the main shaft, the typewheel stop arm should engage on the "Y" stop pin.

23. TYPEWHEEL SHAFT GEAR POSITION ADJUSTMENT

23.1 Shims may be used to align the centres of the typewheel shaft gear and motor pinion. The shims should be placed on the typewheel shaft between the friction clutch assembly and the bearing.

24. MOTOR POSITION ADJUSTMENT

24.1 By means of the motor adjusting nuts and motor mounting nut, move one end of the motor up or down so that the minimum play between the motor pinion and the main shaft gear, checked for one complete revolution of the main shaft, is .002".

25. FEED BAIL SPRING TENSION

25.1 It should require from 18 to 24 ozs. to support the feed bail.

26. PRESSURE WHEEL LEVER SPRING TENSION

26.1 It should require from 14 to 18 ozs. to just start the lever moving. The pressure wheel should line up with the roll evenly on the feed wheel. Check this by observing that the tape passes from the printer with equal clearance between the tape guide flanges.

27. FEED RATCHET DETENT LEVER SPRING TENSION

27.1 It should require from 8 to 10 ozs. to just start the lever moving.

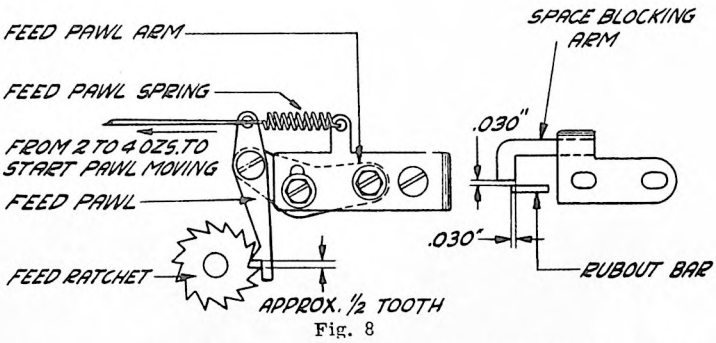


Fig. 8

28. FEED PAWL ARM AND SPACE BLOCKING ARM ADJUSTMENT

28.1 With the selector armature on the spacing side, rotate the main shaft until the transfer bail roller is at the place where it just starts to ride up the cam. Move all selector levers to the marking position (down) and rotate all the code discs to the marking position (counterclockwise) so that the rub-out bar is selected. Now continue rotating the main shaft (about one-half revolution) until the feed bail roller is on the high part of its cam.

.2 Loosen the two screws holding the feed pawl arm and the space blocking arm. Set the position of the space blocking arm so that the arm overlaps the selected rub-out bar by .030". There should also be a clearance of .030" between the blocking arm and the rub-out bar. Then, before tightening the screws and without disturbing the position of the blocking arm, set the position of the feed pawl arm so that the end of the pawl overtravels the tooth that is in the horizontal centre of the feed ratchet wheel by approximately 1/2 tooth, or sufficient to prevent any movement of the feed ratchet when the feed bail roller passes over the low point of the operating cam. Tighten the screws.

29. FEED PAWL SPRING TENSION

29.1 It should require from 2 to 4 ozs. to just start the pawl moving.

30. PRINTING HAMMERS ADJUSTMENT

30.1 Remove the typewheel. Adjust the position of the printing hammers

30.1 by means of shims between the printing hammer stud nut and the rear tape guide flange so that the sides of the strip between the two openings in the tape shield are equally distant from the sides of the letters and figures printing hammers when the printing hammers are flush against the hammer spacer. Replace the typewheel.

31. TYPEWHEEL SHAFT ADJUSTMENT

31.1 Adjust the position of the typewheel shaft by means of its bearing bracket so that the space between the letter and figure characters on the typewheel lines up with the strip between the two openings in the tape shield. Re-check typewheel shaft gear adjustment.

32. PRINTING BAIL ADJUSTMENT

32.1 Loosen printing link eccentric screw nut and turn eccentric screw so that the printing link is midway between its upper and lower adjusting limits. Tighten eccentric screw nut. With the selector armature on the spacing side, turn the main shaft until the printing arm roller is on the high part of the operating cam. Loosen the printing link clamping screws and set the position of the printing bail so that when the printing hammer striker is in the "figures" position, the "figures" printing hammer is lightly touching a "figures" character on the typewheel.

33. HAMMER BACKSTOP ADJUSTMENT

33.1 Loosen the hammer backstop mounting screw and adjust the hammer backstop so that when the hammers are held lightly against a character on the typewheel there is from .020" to .030" between the hammers and the hammer backstop. Tighten the screw. The backstop in this position should now hold the hammers in a very nearly horizontal position and allow the tape to pass through the feed unit in a straight line.

34. HAMMER STRIKER SPRING TENSION

34.1 It should require from 4 to 6 ozs. to pull the striker from "figures" to "letters" position.

35. TAPE SHIELD ADJUSTMENT

35.1 Set the position of the tape shield by means of its clamping screws

35.1 so that the strip between the two openings in the tape shield is approximately .010" away from the section of the typewheel between the letter and figure characters. This adjustment should be such as to give clear printing with a minimum crimping of the tape.

.2 Care should be taken when making this adjustment that the shield is in a horizontal plane and that the printing surfaces of the printing hammers pass through the middle of the openings in the tape shield.

36. SHIFT LEVER ADJUSTMENT

(For printers equipped with printing bails of 54° angle between the hammer striker stops.)

36.1 With the selector armature to the spacing side, rotate the main shaft until the printing bail roller has just passed the peak of the cam. Move the #6 selector lever to the marking position (down). Now continue rotating the main shaft until the transfer bail roller is on the peak of the cam. Adjust the vertical position of the shift lever so that the end of the left tine of the fork of the lever is 1/16" below the lower edge of the hammer striker arm. Also adjust the horizontal position of the shift lever so that there is at least .005" clearance between the shift transfer lever and the right arm of the selector lever when the print hammer striker arm is against the figures stop. Tighten clamping screws.

.2 Back the transfer bail roller off the peak of the cam and place the #6 selector lever in the spacing position (up). Turn the main shaft until the transfer bail roller is again on the peak of the cam. Then check the clearance between the shift transfer lever and the left arm of the selector lever. If necessary, adjust the shift lever so that this clearance is also at least .005". If it is necessary to readjust the shift lever, recheck adjustment (paragraph 36.1).

.3 When the shift lever has been properly adjusted, there will be at least .005" clearance between the shift transfer lever and the selector lever when in either the "letters" or "figures" position.

37. TYPEWHEEL STOP ARM ADJUSTMENT

37.1 Set up the "A" combination and select the "A" stop pin. Loosen the typewheel stop arm clamping screw and set the position of the arm on the shaft so that the arm lock latch bites fully on the sel-

37.1 ected stop pin and so that the stop arm clears the front guide disc by .004". Rotate the typewheel shaft until the "H" character on the typewheel is approximately opposite the stop arm. Press the "letters" printing hammer up against the tap and rotate the typewheel a small amount either way until the "A" character is printed clearly on the tape. Tighten clamping screw.

38. TAPE GUIDE POSITION

38.1 Loosen the tape guide screws and set the tape guide so that its top surface is horizontally in line with the top of the tape pressure wheel and that the guide is in line with the tape guide flanges.

39. PRINTING LINK ECCENTRIC SCREW ADJUSTMENT

39.1 Loosen the eccentric screw nut just enough to allow the eccentric screw to be turned. Turn the screw until the printing just fails. Then turn the screw in slowly until the printing is legible and tighten the nut.

.2 Before making this adjustment, care should be taken that the inker roller rides evenly over both letters and figures on the typewheel.

40. SELECTOR CAM FRICTION CLUTCH TENSION

40.1 With the motor running, hold the flutter lever against its backstop. Hook the scale over the selector cam stop arm and pull horizontally. It should require 18 to 22 ozs. to start the stop arm moving away from the stop lug.

41. OPERATING CAM FRICTION CLUTCH TENSION

41.1 With the motor running, hold the flutter lever against its backstop. Hook the scale over the operating cam friction clutch drive pin and pull up vertically. It should require 20 to 24 ozs. to start the operating cam stop lug moving away from the cam release arm.

42. TYPEWHEEL SHAFT FRICTION CLUTCH TENSION

42.1 With the motor running, stop the typewheel stop arm by holding the selector armature to spacing. Hook the scale over the end of the stop arm, then lift the selector stop pin. Pull at right angles to the stop arm, it should require from 12 to 16 ozs. to hold the stop arm against the clutch friction.

43. TROUBLE CHECK

(1) MOTOR DOES NOT OPERATE:

1. AC plug out of receptacle.
2. Blown fuse (base, table or building).
3. Faulty base switch.
4. Broken or loose connection in powers leads of equipment.
5. Motor control relay not functioning.
6. Pinion and gear binding.

SERIES MOTOR FAILURE:

1. Faulty brushes.
2. Damaged rings.
3. Low brush tension.
4. Governor contacts pitted.
5. Shorted condenser.
6. Governor contact tension.

(2) PRINTING BLOTCHES:

1. Low clutch torque.
2. Bent or broken stop pin.
3. Worn stop arm.
4. Incomplete transfer.
5. Loose front guide disc.
6. High clutch torque.
7. Ball bearings binding.
8. Loose code disc posts.
9. Sticky code disc.
10. Worn transfer bail arm roller.
11. Space blocking arm maladjusted.
12. Loose typewheel shaft unit.
13. Shift lever maladjusted.
14. Typewheel rubbing on tape shield.
15. Stop arm maladjusted.
16. Typewheel lineup.

(3) ERRORS IN COPY:

1. Speed.
2. Friction clutch torque,
   SELECTOR CAM . 18 - 22 ozs.
   OPERATING CAM . 20 - 24 ozs.
   TYPEWHEEL . 12 - 16 ozs.
3. Selector armature maladjusted.

43. (3) 4. Worn flutter lever or maladjusted.
5. Main shaft position.
6. Detent spring tension.
7. Selector lever and selector camalignment.
8. Selector lever and transfer lever alignment.
9. Transfer lever and code disc alignment.
10. Stop pins should drop in position when selected.
11. Stop arm engagement of stop pin.
12. Position of range finder.
13. Worn stop lug.
14. Selector magnet unit biased.
15. Selector magnet base position.

(4) SPRING TENSIONS: (in ounces)

Main shaft jaw clutch	12 to 18
Cam drum return lever	10 to 11
Stop pin (unselected) less than	6
Typewheel stop arm latch	3
Pressure wheel lever	14 to 18
Feed pawl	2 to 4
Detent spring	3 to 4
Cam release bail	16 to 20
Rubout bar	5 to 7
Feed bail	18 to 24
Feed ratchet detent	8 to 10
Hammer striker	4 to 6
SELECTOR CAM CLUTCH	18 to 22
OPERATING CAM CLUTCH	20 to 24
TYPEWHEEL SHAFT CLUTCH	12 to 16

A.C. POWER
MOTOR CONTROL CONTACT
R
A.C. POWER
MOTOR CONTROL CONTACT
IMF
300
300
GOV. CONT.
A.C. MOTOR
A
MOTOR CONTROL CONTACT
MOTOR CONTROL CABLE
MOTOR CONNECTORS
4 MOTOR CONTROL RELAY
MOTOR CONTROL MAGNET
STRAP
WHITE
GREEN
SELECTOR COILS
TO LINE
2 AMP FUSES
A.C. POWER
POWER SWITCH
A.C. MOTOR
GOVERNOR
IMF
MOTOR CONTROL CONTACT
MOTOR CONTROL CABLE
MOTOR CONNECTORS
4 MOTOR CONTROL RELAY
MOTOR CONTROL MAGNET
STRAP
WHITE
GREEN
SELECTOR COILS
TO LINE
6 AMP FUSES
A.C. POWER
POWER SWITCH
ROTOR
INDUCTION MOTOR
RUNNING WINDING
CENTRIFUGAL SWITCH
STARTING WINDING

5-A TICKER

128B2 SUBSET

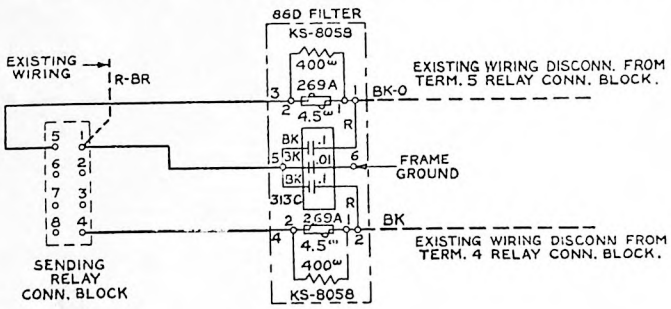
CONTENTS

1. 88D FILTER INSTALLATION

1.1 88D Filter Installation on 255 Send Relay

(a) Move BK-O wire from pin 5 of relay to term. 1 of filter.

(b) Strap term. 3 of left-hand coil of filter to pin 5 of relay.



1.1 (c) Move BK wire from pin 4 of relay to term. 2 of filter.

(d) Strap term. 4 of right-hand coil of filter to pin 4 of relay.

(e) Strap term. 5 of filter to pin 1 of relay.

1.2 88D Filter Installation on 209 Receive Relay

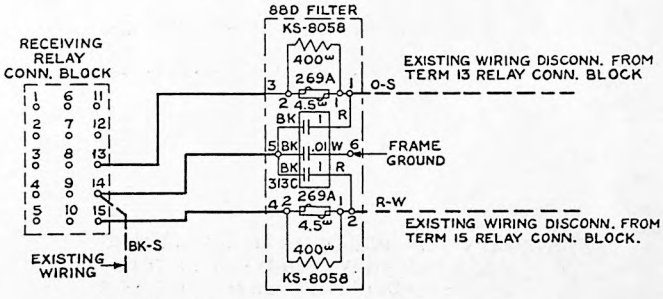
(a) Move O-S wire from pin 13 of the relay to term. 1 of the filter.

(b) Strap term. 3 of the left-hand coil of the filter to pin 13 of the relay.

(c) Move R-W wire from pin 15 of the relay to term. 2 of the filter.

(d) Strap term. 4 of the right-hand coil to pin 15 of the relay.

(e) Strap term. 5 of the filter to pin 14 of the relay.

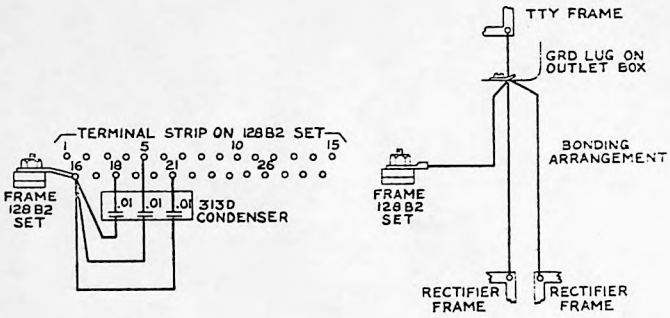


1.3 313D Capacitor Unit Installation

(a) Connect the three left-hand leads of the capacitor unit to term. 16.

(b) Connect the right-hand leads, one each to term. 21, 18 and 5.

(c) Strap term. 16 to nearest screw in the frame.



2. LINE SERIES RESISTANCE STRAPPING

Line Resistance	Line Series Resistance	Strapping
400 - 800Ω	300Ω	18-4 and 5-20
800 - 1200Ω	150Ω	3-4 and 19-20
over - 1200Ω	0	3-18 and 19-5

3. LINE EQUALIZER STRAPPING

Type of Line	Equalizer Strapping	Strapping
Open wire	250Ω	24-25 and 11-26 27-28 and 14-29
Cable	500Ω	10-25 and 13-28

4. OPTIONAL STRAPPING ARRANGEMENTS

Type of Operation	Options
Single Loop Operation	
(a) A polarential Tty and subset at drop	B,Y,F.
(b) A polarential Tty and subset at different locations	B,Y,F.
(c) B polarential Tty and subset at drop	B,X,F.
(d) B polarential Tty and subset at different locations	B,X,F.
Two Loop Operation without Line Relay	
(a) A polarential with pulling magnet	A,G,M,Y.
(b) A polarential with holding magnet	G,M,Y.
(c) B polarential with pulling magnet	A,M,X.
(d) B polarential with holding magnet	M,X.
Two Loop Operation with Line Relay	
(a) A polarential	S,Y.
(b) B polarential	G,S,X.
Additional Options	
(a) 60 cycle shunt	H
(b) 2-wire A polarential	K,Y.
(c) 2-wire B polarential	K
(d) Equalization	N. and para. 3.
(e) Potential ground on 14 Tty	J
(f) Relay kick-off elimination	E
(g) To obtain parallel cts. on 92AW test key	T
(h) Line Balance for: - composite lines over 200 miles long - lines with entrance over 10 miles - simplex cable over 100 miles - simplex cable phantom circuits over 90 miles - circuits with phantom coil midpoint grounded	E

5. DESCRIPTION OF STRAPPING ARRANGEMENTS

Option		Description
A	1.	Strap on M resistance. (When M wiring is not used the M resistance the upper term. is open ended and the A strap is not used.)
B	1.	Strap term. punchings 31-32
	2.	Strap term. punchings 34-36
	3.	Strap 4400Ω portion of resistor K.
	4.	Strap 4400Ω portion of resistor F.
	5.	Strap out the E resistor.
	6.	Strap the E resistor to the D resistor.
	7.	Strap from the L capacitor to term. punching near the AR resistor.
	8.	Strap from the E capacitor to the D capacitor.
	9.	Strap from the other term. of the E capacitor to its adjacent term. punch.
E	1.	Strap R-S wire on capacitor A.
	2.	Strap R-S wire on capacitor B.
	3.	If necessary strap terms. 1 to 16 to 17 for A or B polarential.
	4.	If A polarential is used the upper halves of AD and AN res. may be strapped.
	5.	If Figure B is used strap from H capacitor to G capacitor.
F	1-a	Strap the 400Ω portion of J resistor with Tty and subset at the drop.
	1-b	Strap the 43.4Ω portion of G resistor, H and J resistor to obtain a loop current of 60 to 65 ma if the subset is at another location.
G	1.	Strap the B resistor to the A resistor.
H	1.	Strap pin 2 of 209 receive relay to adjacent term. punch.
	2.	Strap pin 6 of 209 receive relay to adjacent term. punch.
	3.	Strap 60 cycle suppressor as indicated in Figure A and connect it to terms. 38 and 41.

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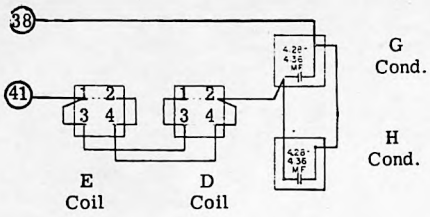


Figure A.

5.

Option	Description
J	1. Strap 14 Tty fram to term. 24 on Tty.

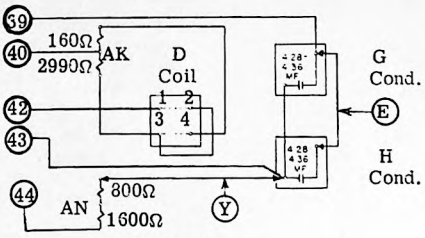
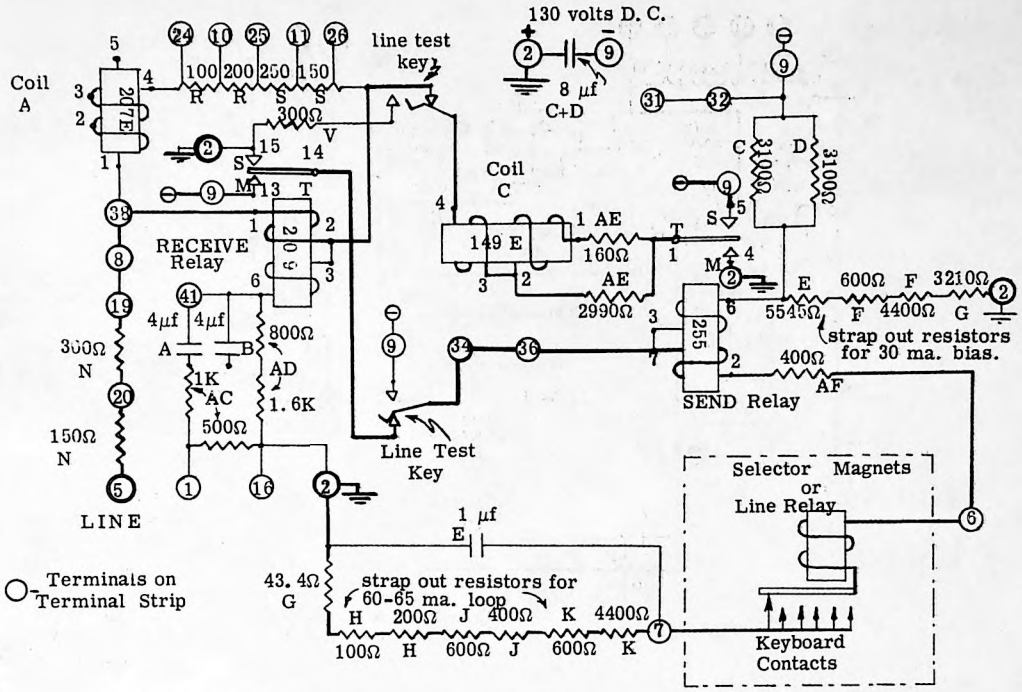


Figure B.

K	1. Strap pin 4 of 255 send relay to adjacent term. punch. 2. Strap pin 8 of 255 send relay to adjacent term. punch. 3. Strap suppressor as indicated on Figure B and connect to terms. 39. 40. 42. 43 and 44.
L	1. Strap terms. 1 to 16 to 17.
M	1. Strap put all terms. of F resistor. 2 straps. 2. Strap out all terms. of K resistor. 2 straps.

5.

Option		Description
M	3.	Strap 600Ω portion of J resistor
	4.	Strap 100Ω portion of H resistor
	5.	Strap out E resistor
	6.	Strap out L resistor
	7.	Strap from B res. to adjacent term. punch.
	8.	Strap from AF res. to adjacent term. punch.
	9.	Strap from F cond. to E cond. upper terminals.
	10.	Strap from F cond. to E cond. lower terminals.
	11.	Strap from L cond. to N cond.
	12.	Strap from term. punch. 30 to 32.
	13.	Strap from term. punch. 33 to 34.
	14.	Strap from term. punch. 36 to 37.
N	1.	Strap out R resistor by strapping terms. 24 to 10 to 25.
	2.	Strap out S resistor by strapping terms. 25 to 11 to 26.
	3.	Strap out T resistor by strapping terms. 27 to 13 to 28.
	4.	Strap out U resistor by strapping terms. 28 to 14 to 29.
		The above are strapped to provide best transmission results on circuit.
S	1.	Strap 600Ω portion of F resistor.
	2.	Strap 400Ω portion of J resistor.
	3.	Strap from M resistor to adjacent term. punch.
	4.	Strap from AF resistor to adjacent term. punching.
	5.	Strap from C resistor to B resistor.
	6.	Strap from AA resistor to W resistor.
	7.	Strap from L capacitor to N capacitor.
	8.	Strap from term. punch 32 to 33.
	9.	Strap from term. punch 35 to 36.
T		Strap the 92AW Line Test Key as follows: (from left to right)
	1.	Strap term. 5 to 7.
	2.	Strap term. 6 to 8.
X	1.	Strap from pin 2 of send relay to adjacent term punching.
	2.	Strap from pin 6 of send relay to adjacent term punching.
Y	1.	Strap from AD resistor to B capacitor.
	2.	Strap from pin 2 of send relay to adjacent term punching.
	3.	Strap from pin 6 of send relay to adjacent term punching.
	4.	When Figure B is used strap from H cond. to AN resistance.



"A" POLARENTIAL WITH SINGLE LOOP TO TELETYPE.

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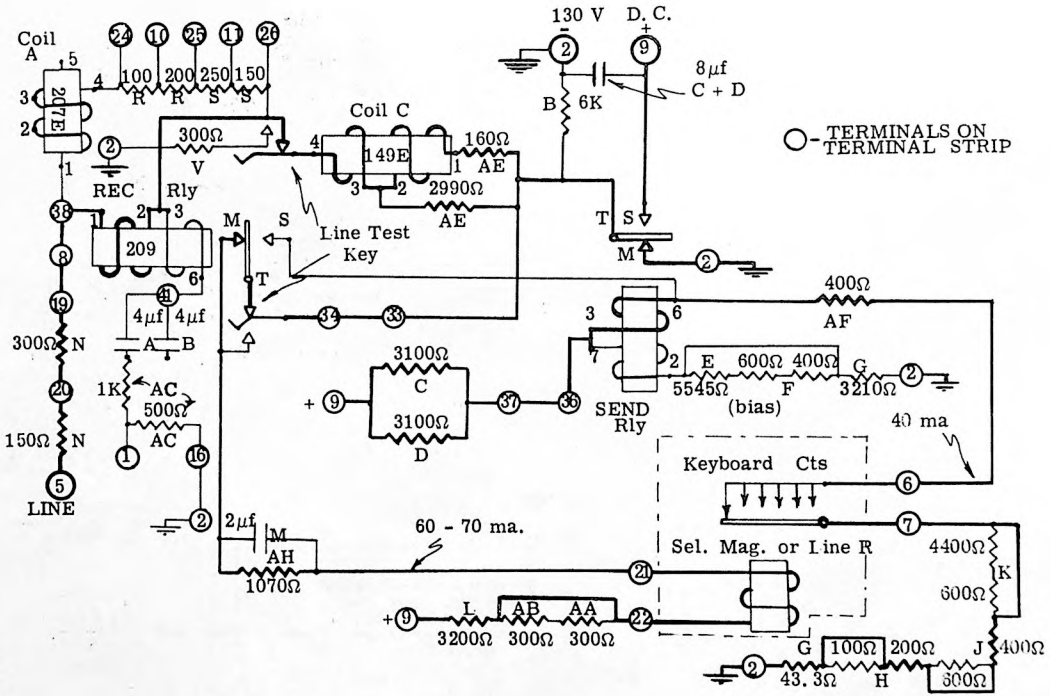

"B" POLARENTIAL WITH TWO LOOPS

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PLANT MANUAL BK2.15
ISSUE 1
AUGUST, 1964

TELETYPE TAPE PRINTER SET FOR STOCK TICKER SERVICE

ADJUSTMENTS

CONTENTS

1. GENERAL

1.1 This section provides adjusting information for the Teletype Tape Printer Set manufactured by Teletype Corporation for use in Stock Ticker Service.

.2 The illustrations contained herein give the location of clearances, position of parts and point of scale application. Read the adjusting procedure through before making the adjustment or checking the spring tension. After an adjustment has been completed be sure to tighten any screws or nuts which may have been loosened.

.3 Reference to left or right in the text indicates the viewer's left or right as he faces the front of the unit.

.4 When disengaged, the clutches are latched in their stop position between a trip lever, which bears against a shoe lever, and a latch lever which seats in a notch in a clutch cam disk. The shafts and clutch drums will then turn freely without the clutch shoes dragging. When

1.4 the clutch is engaged or tripped, the shoe lever and cam disk stop lug are moved apart, and the clutch shoes are wedged against the drum so that the clutch turns in unison with the shaft.

NOTE: When rotating the main shaft by hand, the clutches will not fully disengage upon reaching the stop position. In order to relieve the drag on the clutch and permit the main shaft to rotate freely, apply pressure on the lug of the clutch disk to permit the latch lever to fully latch. This procedure should be followed prior to applying power to the unit.

.5 To Manually Operate the Unit: Apply current to the selector coils while the adjustments are being made to hold the armature in the marking position. To manually select rubout combination, push the armature to the rear into the spacing position momentarily to permit the selector clutch to engage. Rotate the main shaft slowly (by means of the handwheel listed in tool bulletin 1124B) until No. 6 push lever has been selected by No. 6 selector lever and No. 6 lever is on the high part of its cam. The levers are numbered 1 to 6 from right to left. Strip levers from under selector levers corresponding to the spacing elements of the code combination to be set up. Let us take, for example, the letter R, which has a code combination of No. 2, 4, marking. By stripping No. 1, 3, 5 and 6 push levers we select R. Then rotate the main shaft until the required condition is set up or character has been cleared through the unit.

.6 Where a spring does not meet its requirement, replace the spring.

.7 Where applicable, all adjustments should be made with the related cam follower on that half of the two-cycle cam which causes the clearances to be least, unless otherwise specified.

2. TAPE PRINTER

Range Finder Knob Phasing

TO CHECK: Turn the range finder knob to its extreme right and left positions.

REQUIREMENT: The 0 mark and 120 mark should overtravel the scribed line on the knob mounting plate by an equal amount.

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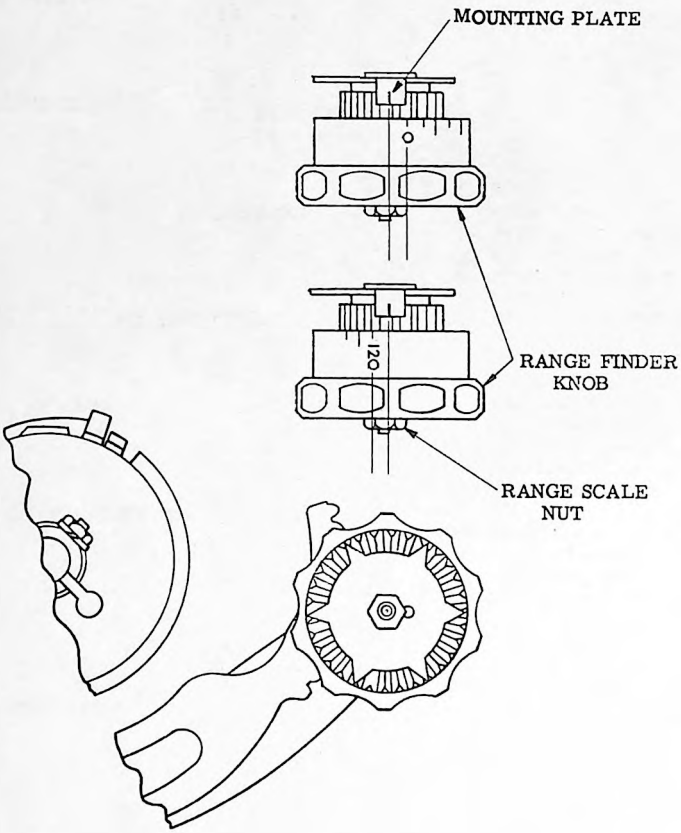
AUGUST, 1964

TO ADJUST: Position range scale knob with its mounting nut loosened.



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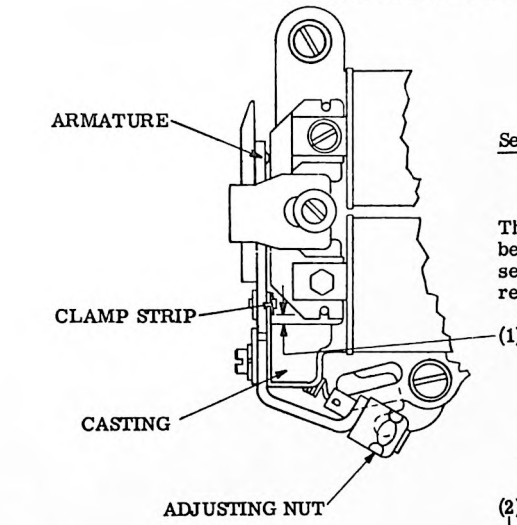
NOTE: To facilitate making the following adjustments, remove the range finder assembly and selector magnet assembly.



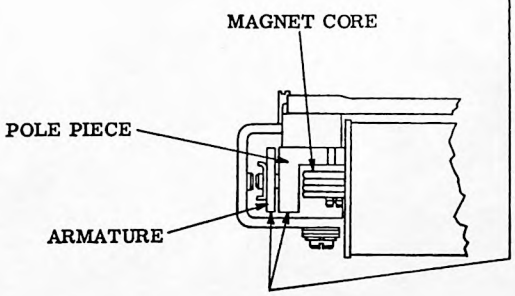
Selector Armature

NOTE

This requirement need not be made nor checked if the selector magnet bracket and receiving margin are met.

(1) Requirement (armature clamp strip)
Clearance between armature clamp strip and casting.
Min. 0.015 inch
Max. 0.045 inch

(2) Requirement (armature alignment)
Outer edge of the armature should be flush within 0.015 inch with outer edge of pole pieces.



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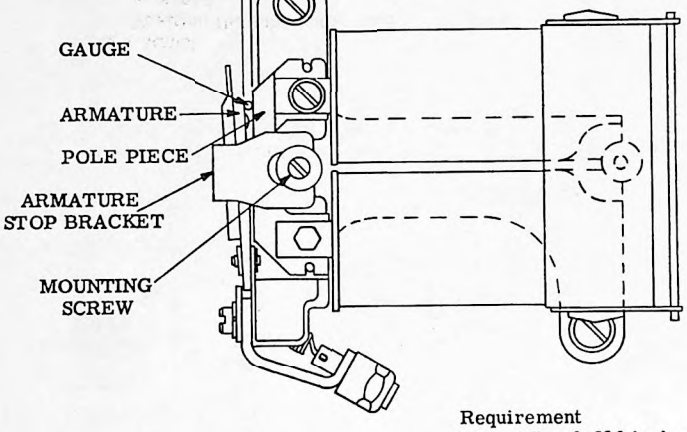
Selector Armature Stop (Preliminary)

To Check

Place gauge between armature and upper pole piece. When magnets are de-energized and armature resting against its stop button

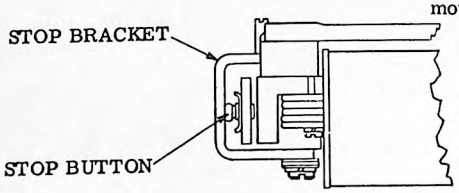


Requirement

Min. 0.020 inch --- Max. 0.025 inch between the end of the armature and the rear edge of the upper pole piece.

To Adjust

Position the stop bracket with its mounting screw loosened.

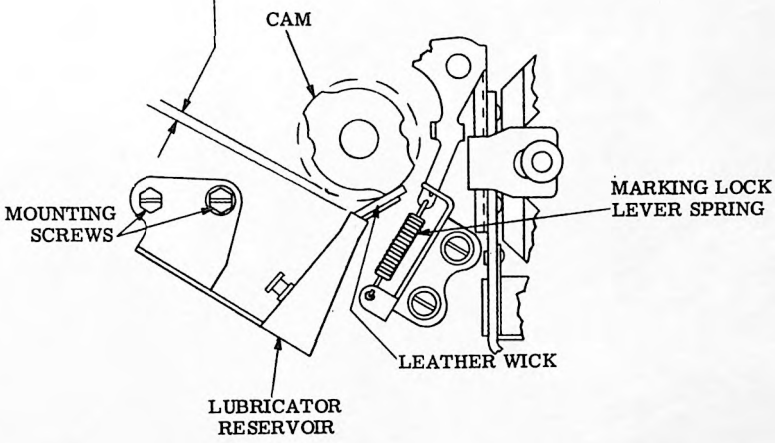


Selector Cam Lubricator

To Check
Rotate cam sleeve until high part of selector cam is opposite lubricator tube.

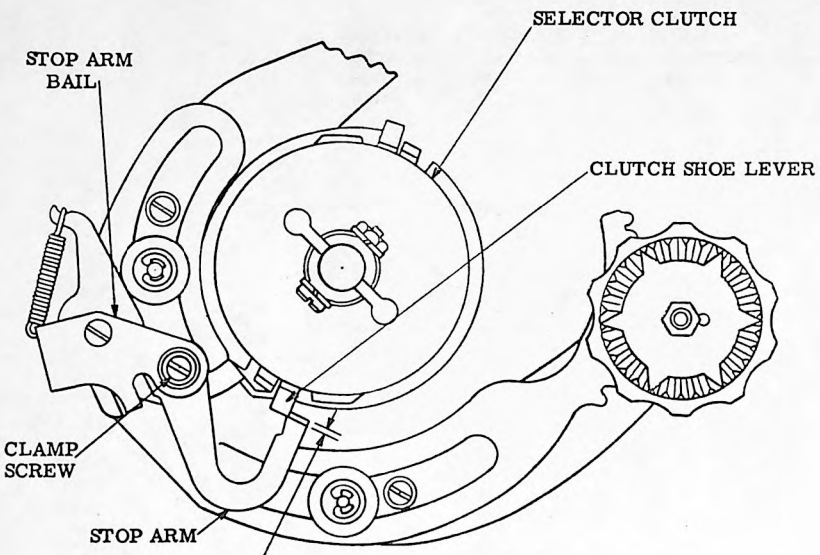
(1) Requirement
The lubricator tube should clear the high part of the cam by at least 0.020 inch.

(2) Requirement
The high part of the selector lever cams should contact the wick but not deflect it more than 1/32 inch.



To Adjust
Position the lubricator with its mounting screws loosened.

NOTE: There should be some clearance between the marking lock lever spring and the oil reservoir.



Selector Clutch Stop Arm

To Check

Set range scale at 60. Place armature in marking position. Disengage the clutch (latch up). Gauge by eye.

Requirement

The clutch stop arm should engage the clutch shoe lever by the full thickness of the stop arm.

To Adjust

Position the stop arm with its clamp screw loosened.

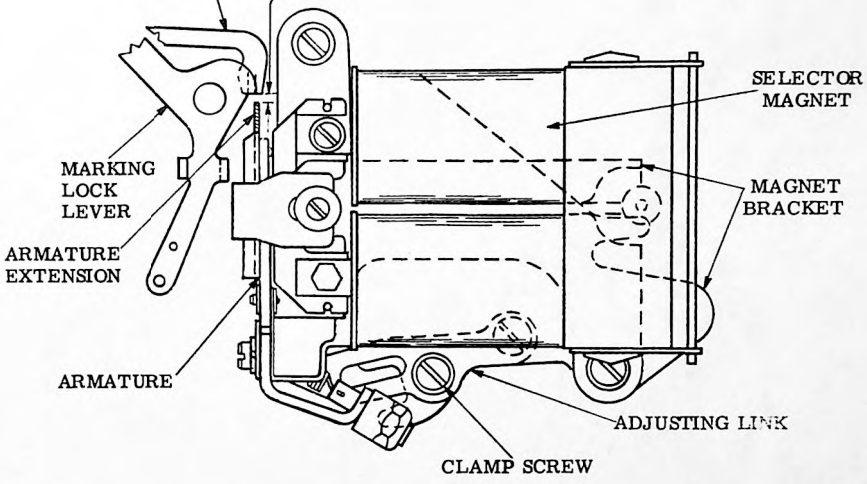
Selector Magnet Bracket

To Check

Marking and spacing lock lever on high part of their cams. Magnets de-energized.

(1) Requirement

Min. 0.010 inch ---Max. 0.015 inch between end of armature extension and the shoulder on the marking lock lever or the t of the space lock lever whichever is least.



To Adjust

Position the magnet bracket by means of the adjusting link with magnet bracket mounting screws loosened. Tighten link clamp screw only.

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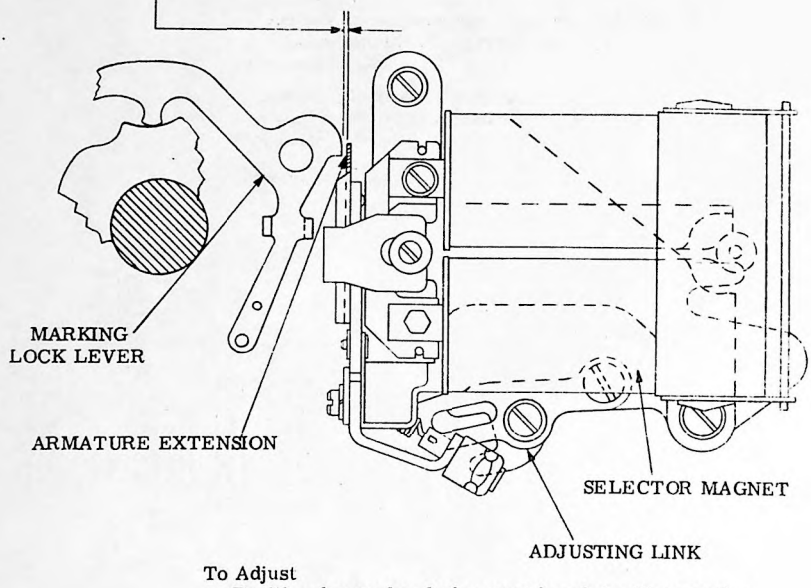
Selector Magnet Bracket (Cont.)

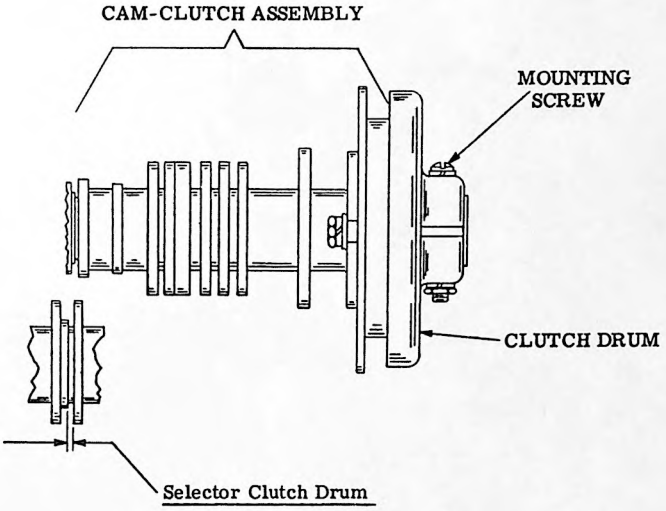
To Check
Marking lock lever on low part of cam. Magnets energized. Armature in contact with both pole pieces.

Requirement
Some to 0.003 inch clearance between rear surface of armature extension and forward surface of the marking lock lever.



To Adjust
Position forward end of magnet bracket with mounting screws loosened.

To Recheck
Rotate selector cam and check for smooth operation of start lever over armature extension. Refine if necessary.

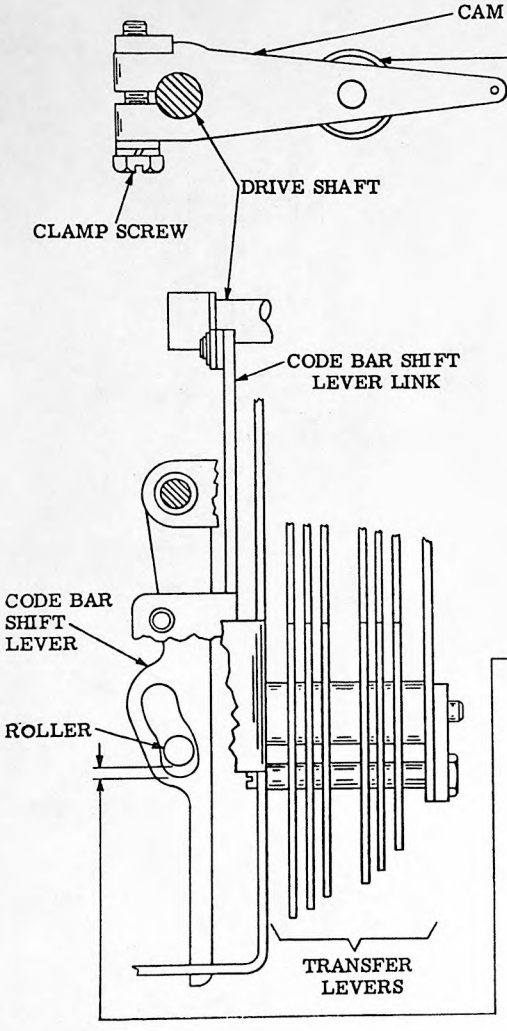


Selector Clutch Drum

To Check
Latch clutch in stop position. Clutch drum against shoulder on main shaft.

Requirement
Some end play---Max. 0.010 inch between cam-clutch assembly and shoulder on main shaft.

To Adjust
Position clutch drum with mounting screw loosened.



Code Bar Shift Lever Drive Arm

To Check

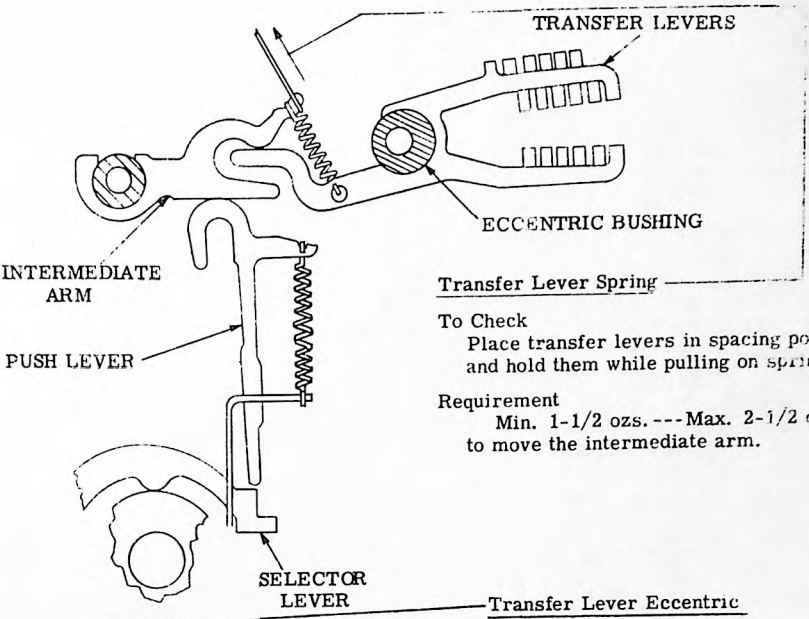
Rotate main shaft until code bar shift lever link is in its forward-most position. Play in shift lever and link taken up toward rear.

Requirement

Min. 0.010 inch--Max. 0.020 inch between forward surface of the rollers and the rear surface of the cam slot in the shift levers which provides the minimum clearance.

To Adjust

Position the cam follower arm on its drive shaft with its clamp screw loosened. Provide up to 0.006 inch end play.



Transfer Lever Spring

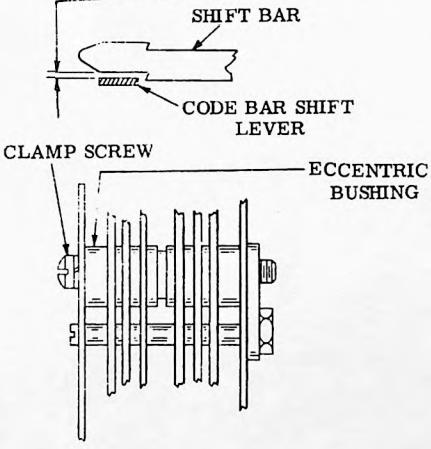
To Check

Place transfer levers in spacing position and hold them while pulling on spring.

Requirement

Min. 1-1/2 ozs. ---Max. 2-1/2 ozs. to move the intermediate arm.

Transfer Lever Eccentric



To Check

Set up rubout selection on the push bars. Disengage selector clutch. Rotate the code bar shift lever link to its forwardmost position.

Requirement

Min. 0.010 inch--Max. 0.025 inch clearance between the lower shift lever and the lower edge of code bar shift bar which is farthest from the lower shift lever when play is taken up to make the clearance maximum.

To Adjust

Loosen the transfer lever clamp screw. Rotate the eccentric bushing to the desired position by using the adjusting holes. Keep the high part of the eccentric to the front of the vertical centerline.

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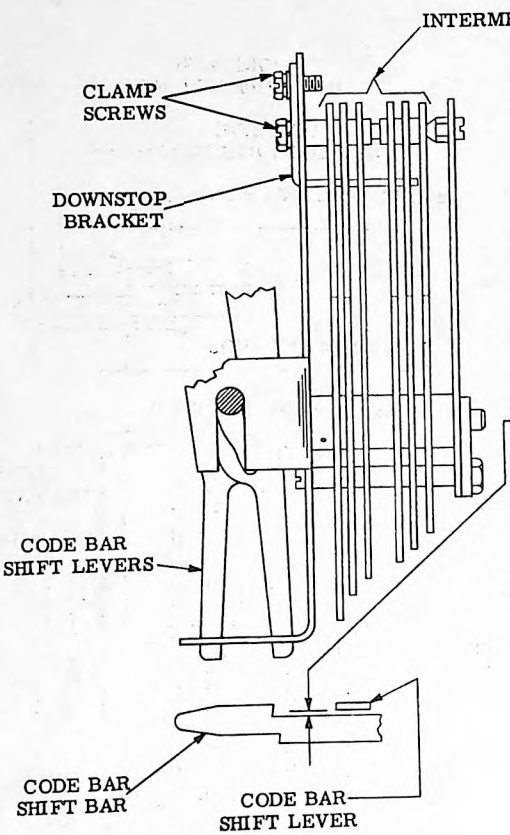


Intermediate Arm Downstop Bracket

To Check

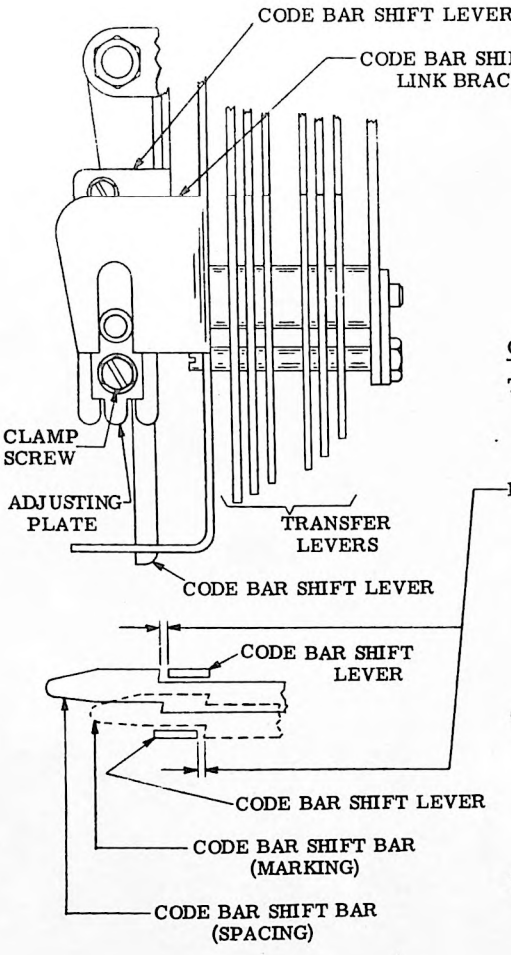
Rotate selector clutch to stop position. Strip the push bars. Rotate shaft until code bar shift lever link is in rearmost position.

Requirement

Min. 0.010--Max. 0.025 in. between the upper code bar shift lever and the upper edge of inner step on the code bar shift bar which is farthest from the upper shift lever when play is taken up for maximum clearance.

To Adjust

Position downstop bracket with its clamp screws loosened.



Code Bar Shift Lever Link Bracket

To Check (Upper)

Select blank combination. Rotate main shaft until code bar shift lever link reaches its forwardmost positio

Requirement

The motion of front and rear code bar shift levers should be equalized with respect to code bar travel. Clearance between upper code bar shift lever and shoulder on nearest code bar shift bar.

Min. 0.002---Max. 0.012 inch when play is taken up to make clearance maximum.

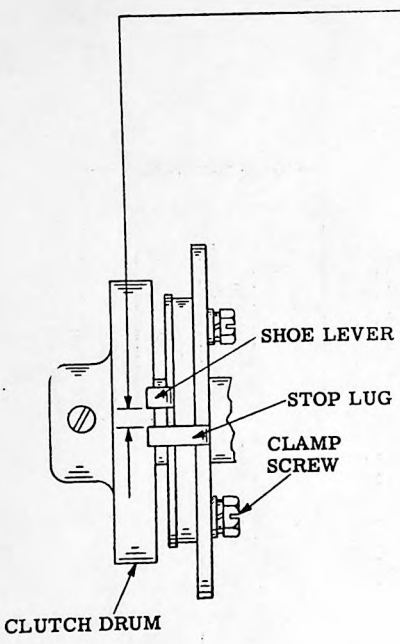
To Check (Lower)

Select rubout combination. Check clearance between lower code bar shift lever and shoulder on nearest code bar shift bar in the same manner.

Min. 0.002---Max. 0.012 inch

To Adjust

Position adjusting plate (upper and lower) with clamp screws loosened.



Clutch Shoe Lever (Selector, Code Bar, Function)

To Check

With clutch disengaged and latched in stop position, measure the gap between the clutch shoe lever and stop lug. Trip the clutch and rotate the clutch until the shoe lever is toward rear of unit. Compress the shoe lever against the clutch stop lug and allow it to snap back. Again measure the gap between the shoe lever and lug.

Requirement

The gap between the clutch shoe lever and stop lug should be 0.055 to 0.070 inch greater when clutch is engaged (unlatched) than when it is disengaged (latched). Measure clearance at the stop lug which has the least.

To Adjust

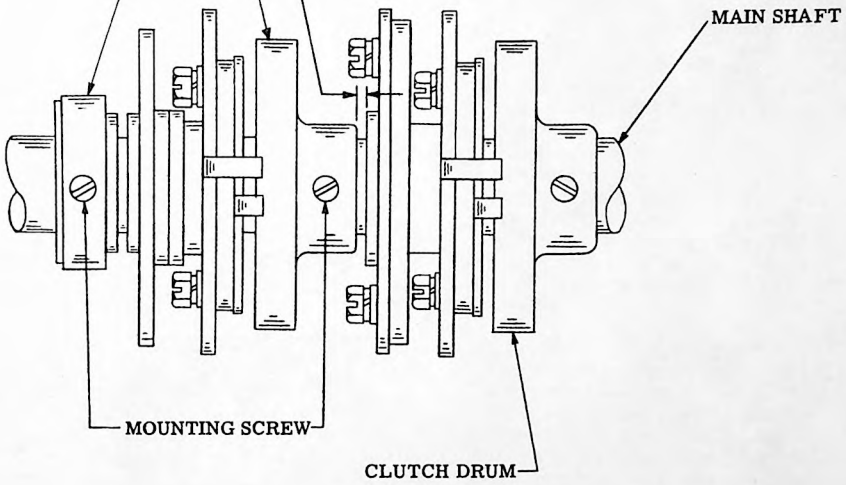
Rotate the adjusting plate by means of a screwdriver or wrench with the plate clamp screws loosened.

Note: After making this adjustment, disengage the clutch, remove the drum screw and rotate the drum in the normal direction. There should be no drag on the drum. If necessary, refine the adjustment toward the maximum clearance.

Clutch Drum Position (except Selector)

Requirement
Each clutch should have some end play
Max. 0.015 inch

To Adjust
Position the clutch drum on the main shaft with its mounting screw and spacing clutch set collar mounting screw loosened.



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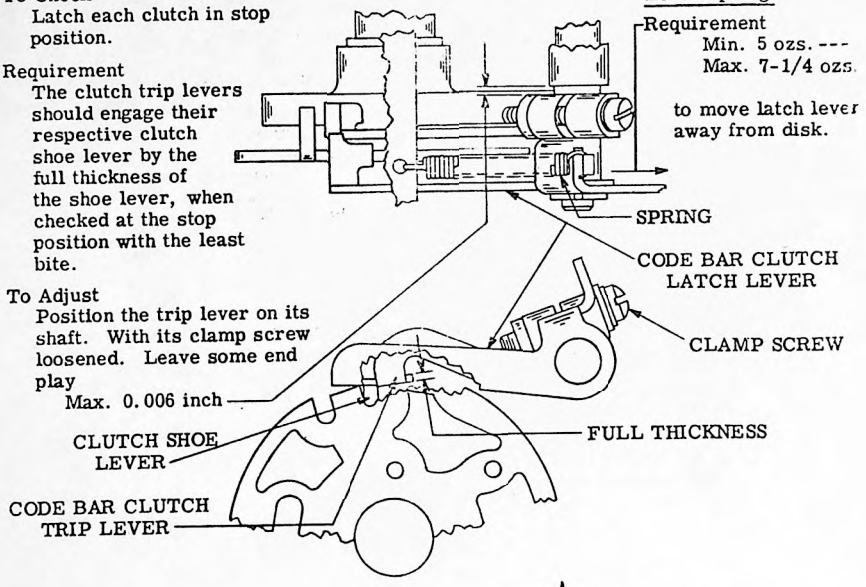
Code Bar Clutch and Function Clutch Trip Levers

To Check
Latch each clutch in stop position.

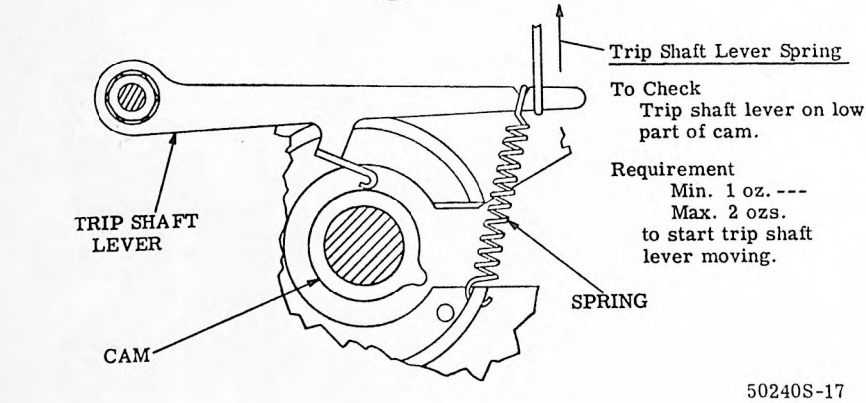
Requirement
The clutch trip levers should engage their respective clutch shoe lever by the full thickness of the shoe lever, when checked at the stop position with the least bite.

To Adjust
Position the trip lever on its shaft. With its clamp screw loosened. Leave some end play
Max. 0.006 inch



Code Bar Clutch and Function Clutch Latch Lever Spring

Requirement
Min. 5 ozs. ---
Max. 7-1/4 ozs.
to move latch lever away from disk.



Trip Shaft Lever Spring

To Check
Trip shaft lever on low part of cam.

Requirement
Min. 1 oz. ---
Max. 2 ozs.
to start trip shaft lever moving.

50240S-17

Code Bar Detent

To Check

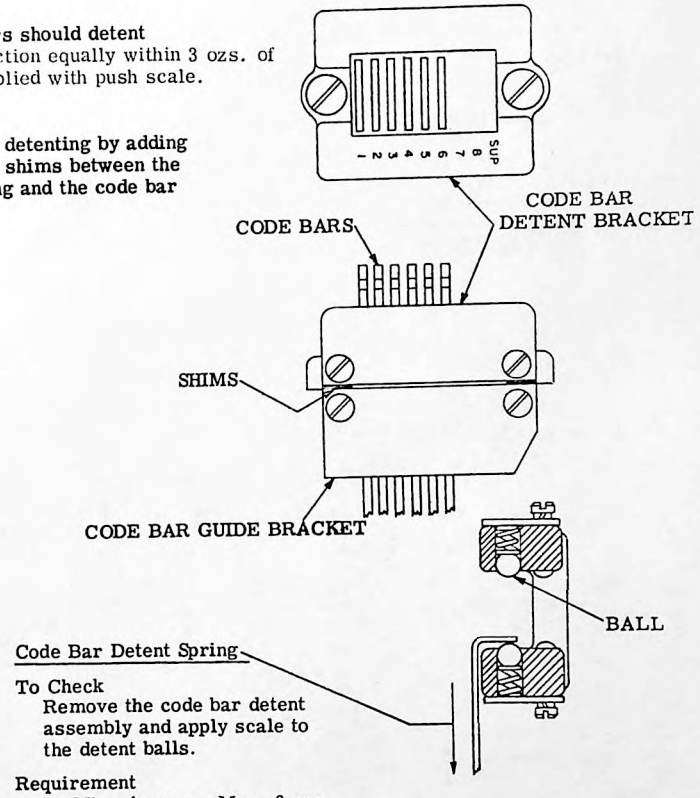
Select blank, trip code bar clutch and rotate main shaft until all clutches stop. Manually latch all clutches. Apply 32 oz. push scale to #4 code bar. Note pressure required to detent code bar. Rotate shaft until #4 aggregate motion clutch stops. Manually latch #4 clutch. Pull #4 code bar over detent. Note pull required.

Requirement

The code bars should detent in each direction equally within 3 ozs. of pressure applied with push scale.

To Adjust

Equalize the detenting by adding or removing shims between the detent casting and the code bar bracket.



Code Bar Detent Spring

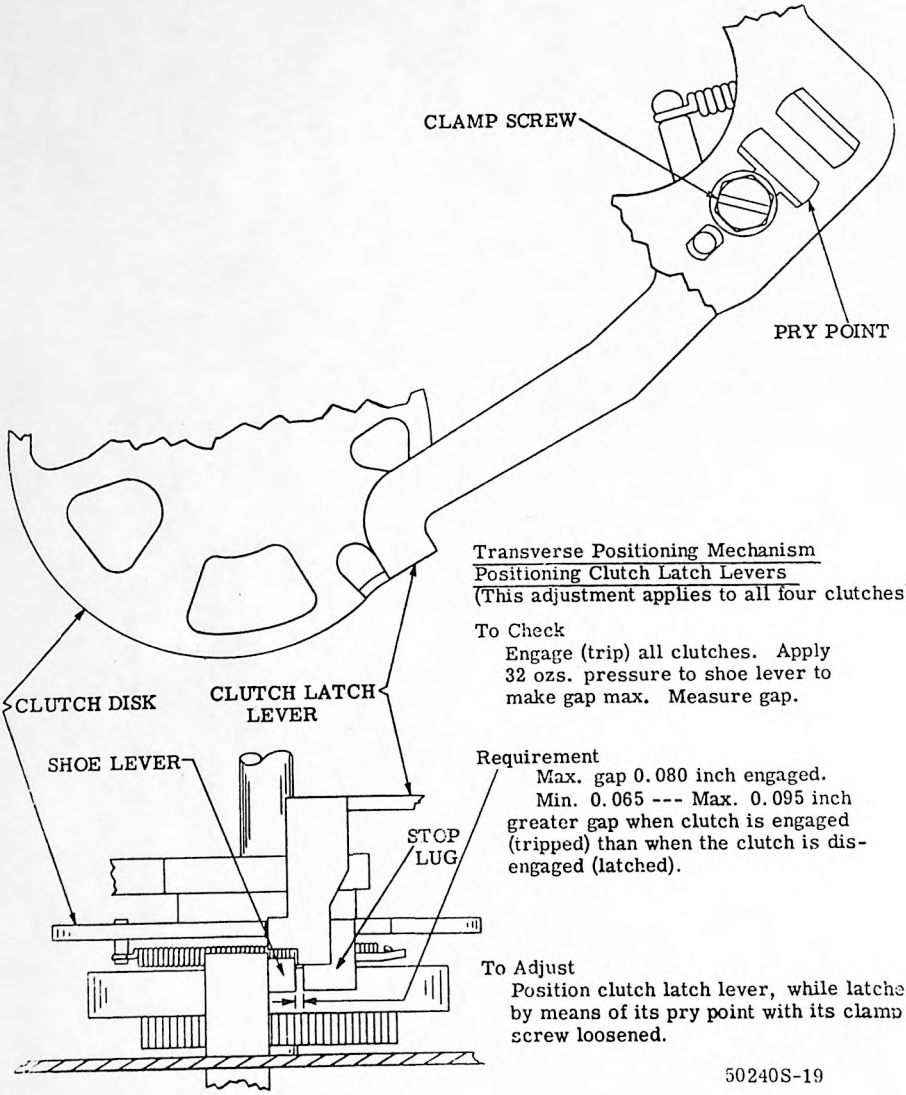
To Check

Remove the code bar detent assembly and apply scale to the detent balls.

Requirement

Min. 4 ozs. ---Max. 6 ozs. to start depressing a ball. Check each ball.

50240S-18



Transverse Positioning Mechanism
Positioning Clutch Latch Levers
(This adjustment applies to all four clutches)

To Check

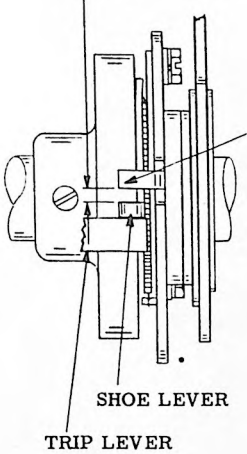
Engage (trip) all clutches. Apply 32 ozs. pressure to shoe lever to make gap max. Measure gap.

Requirement

Max. gap 0.080 inch engaged.
Min. 0.065 --- Max. 0.095 inch greater gap when clutch is engaged (tripped) than when the clutch is disengaged (latched).

To Adjust

Position clutch latch lever, while latched by means of its pry point with its clamp screw loosened.



Typebox Clutch Shoe Lever

To Check

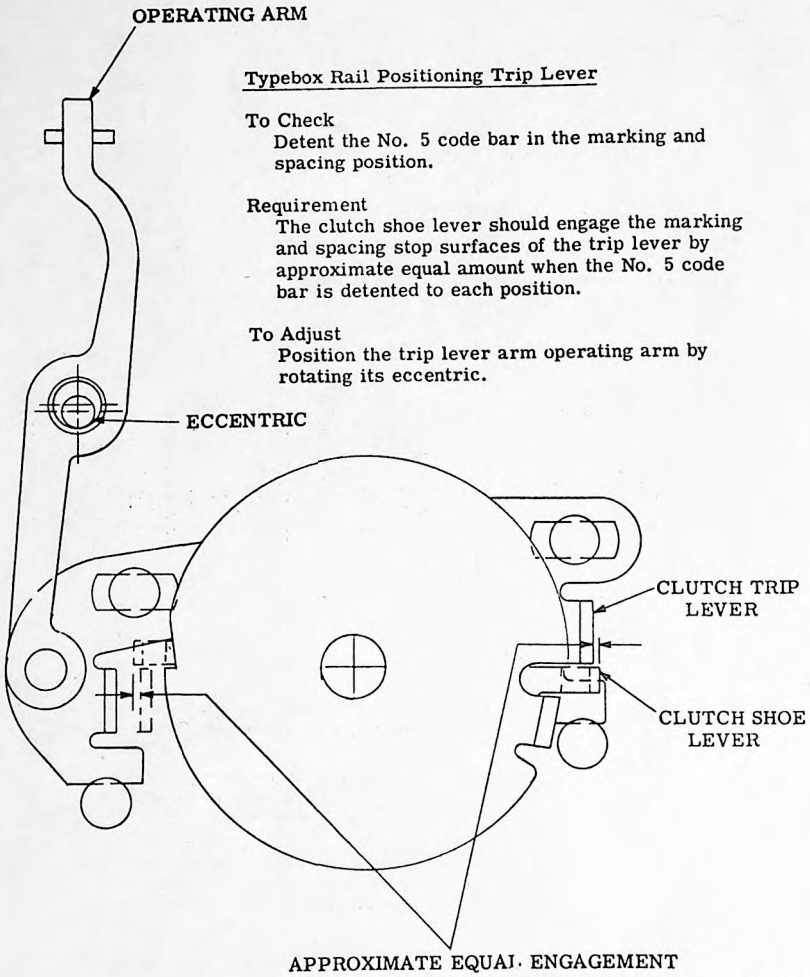
Disengage and latch typebox clutch. Measure gap between shoe lever and stop lug. Trip clutch and again measure the gap while pulling with 32 ozs. pressure against the trip lever to make the gap maximum.

Requirement

There should be Min. 0.055 to 0.070 inch greater gap when clutch is engaged (released) than when the clutch is disengaged (latched).

To Adjust

Rotate the adjusting plate by means of a screwdriver or wrench with the plate clamp screws loosened.



Typebox Rail Positioning Trip Lever

To Check
Detent the No. 5 code bar in the marking and spacing position.

Requirement
The clutch shoe lever should engage the marking and spacing stop surfaces of the trip lever by approximate equal amount when the No. 5 code bar is detented to each position.

To Adjust
Position the trip lever arm operating arm by rotating its eccentric.

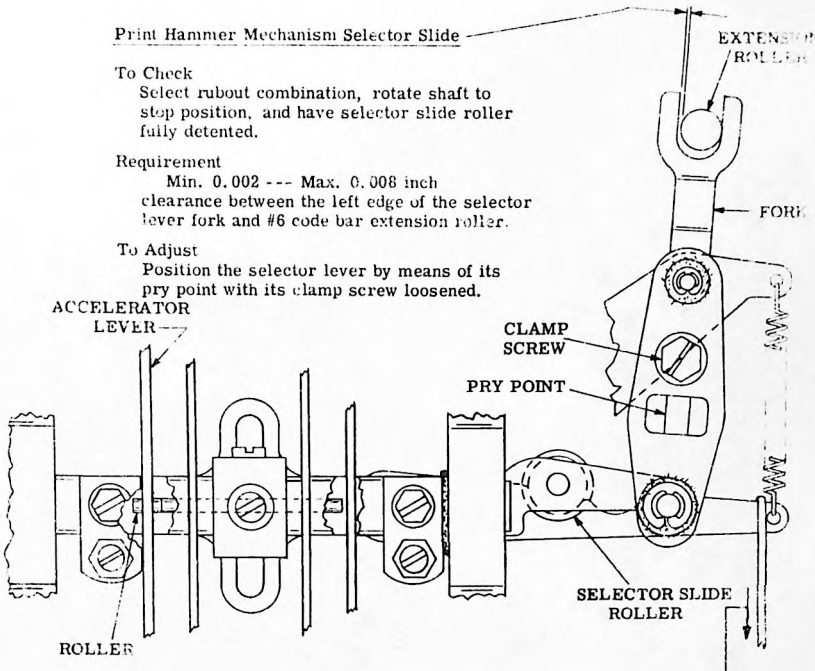
50240S-21

Print Hammer Mechanism Selector Slide

To Check
Select rubout combination, rotate shaft to stop position, and have selector slide roller fully detented.

Requirement
Min. 0.002 --- Max. 0.008 inch clearance between the left edge of the selector lever fork and #6 code bar extension roller.

To Adjust
Position the selector lever by means of its pry point with its clamp screw loosened.



Detent Spring

To Check
Operate unit to stop position with detent lever fully detented.

Requirement
Min. 2-1/2 ozs. --- Max. 3-1/4 ozs. to start lever moving.

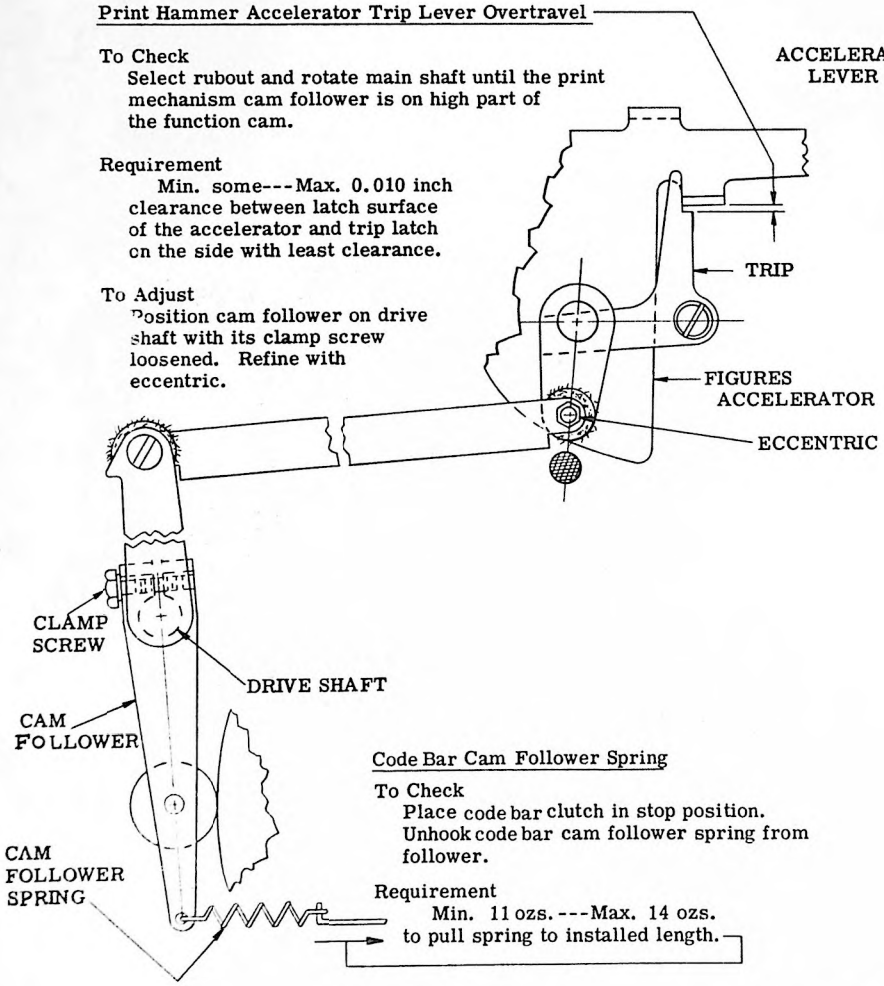
50240S-22

Print Hammer Accelerator Trip Lever Overtravel

To Check
Select rubout and rotate main shaft until the print mechanism cam follower is on high part of the function cam.

Requirement
Min. some---Max. 0.010 inch clearance between latch surface of the accelerator and trip latch on the side with least clearance.

To Adjust
Position cam follower on drive shaft with its clamp screw loosened. Refine with eccentric.



Code Bar Cam Follower Spring

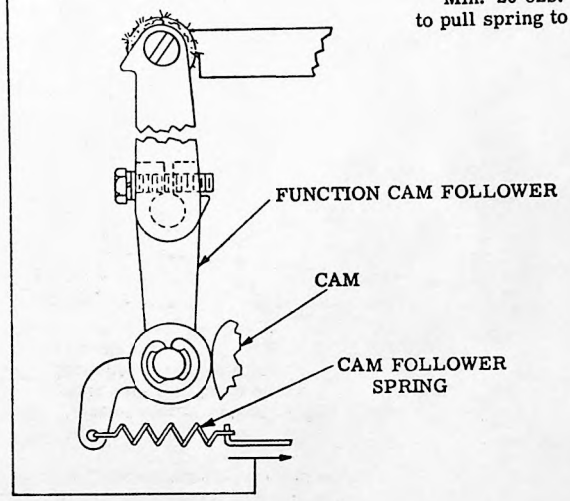
To Check
Place code bar clutch in stop position. Unhook code bar cam follower spring from follower.

Requirement
Min. 11 ozs. ---Max. 14 ozs. to pull spring to installed length.

Function Cam Follower Spring

To Check
Place function clutch in stop position.
Unhook spring.

Requirement
Min. 20 ozs. --- Max. 25 ozs.
to pull spring to position length.



50240S-24

Print Hammer Trip Lever

To Check

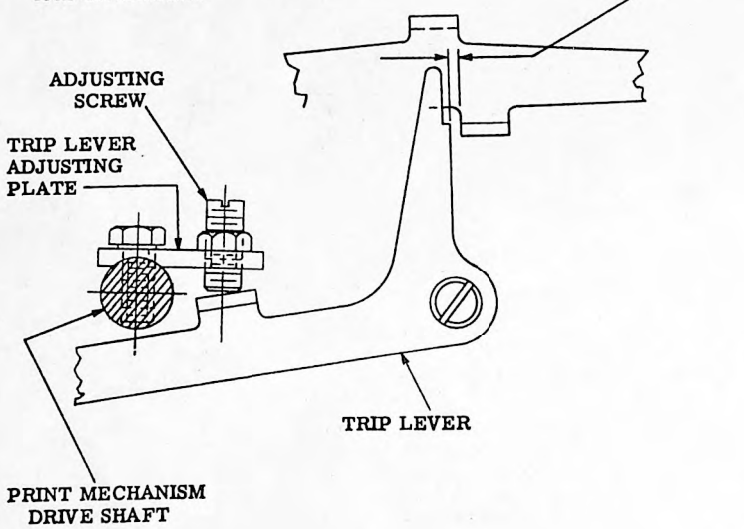
Place unit in stop position and manually raise the accelerator lever so that its latch extension lines up with the latching surface of the latch lever.

Requirement

Min. 0.005 --- Max. 0.015 inch
clearance between latch lever and accelerator extension.
This applies to both latches.

To Adjust

Rotate the adjusting screw in the adjusting plate with its lock nut loosened.



Ribbon Feed Mechanism Drive Slide

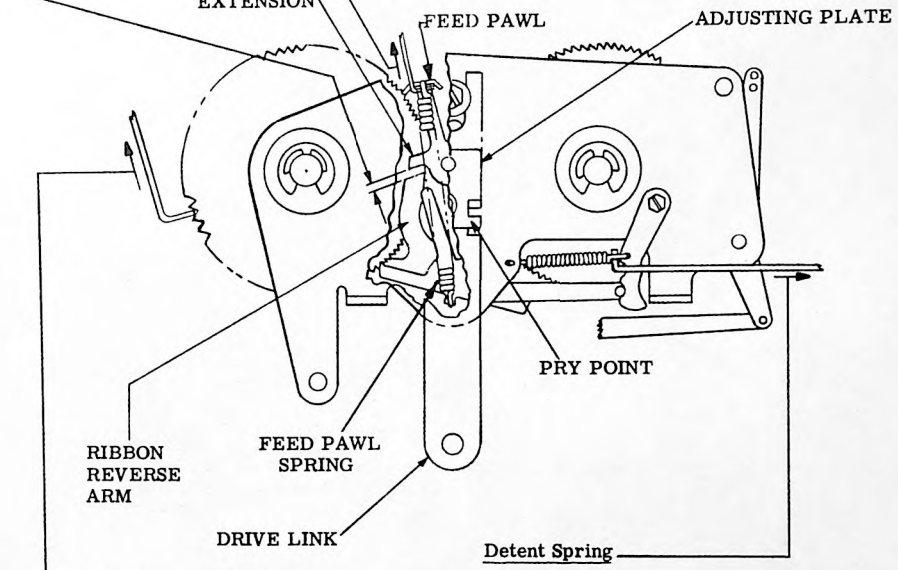
To Check
Place ribbon feed cam follower on the high part of function cam.

Requirement
Some clearance between the blocking edge of the ribbon reverse arm and the reversing extension of the feed pawl when the ribbon reversing arm is moved under the lower reversing extension of the feed pawl. The feed pawl should not feed more than two teeth. This applies to both upper and lower feed pawl positions.

To Adjust
Position drive slide with change screw loosened.

Feed Pawl Spring

Requirement
Min. 4 ozs.
Max. 6 ozs.
to pull spring to installed length.



Ribbon Ratchet Wheel Torsion

Requirement
Min. 1 oz.---Max. 3 ozs.
to start ratchet wheel moving.

Detent Spring

To Check
Place detent in either fully detented position.

Requirement
Min. 2 ozs.----Max. 4 ozs.
to pull spring to installed length.

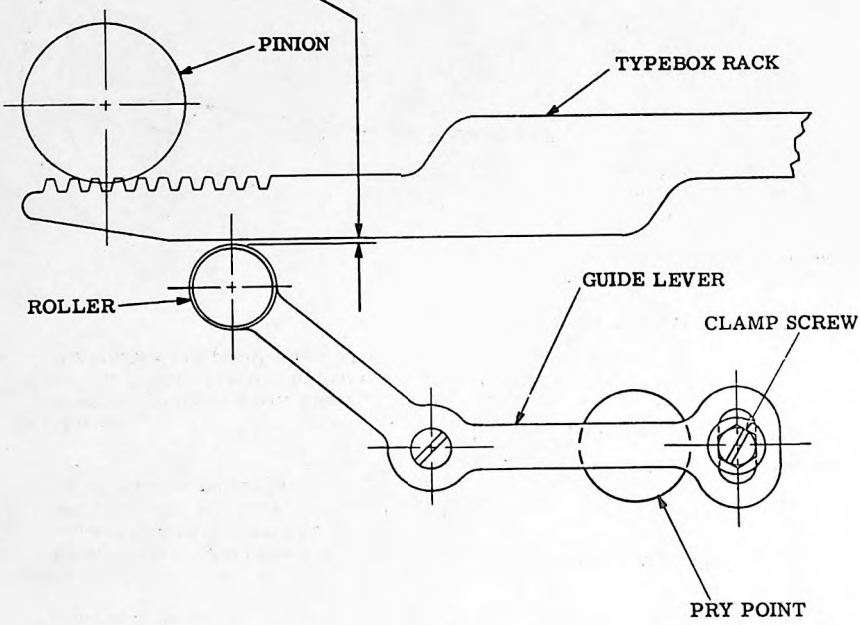
50240S-26

Typebox Rack and Pinion

To Check
Take up play between typebox rack and pinion.

Requirement
Some to 0.003 inch clearance between the typebox rack and its roller. This requirement applies to both racks.

To Adjust
Position the guide lever at its pry point with its clamp screw loosened.

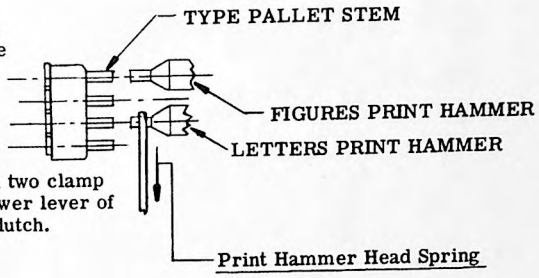


Typebox Alignment (Front to Rear)

To Check
Select No. 5 and No. 6 marking and place unit in stop position. Push Figures print hammer down against type pallet stem.

Requirement
Print hammer head should be centered (front to rear) on the extreme outer left hand pallet stem as gauged by eye.

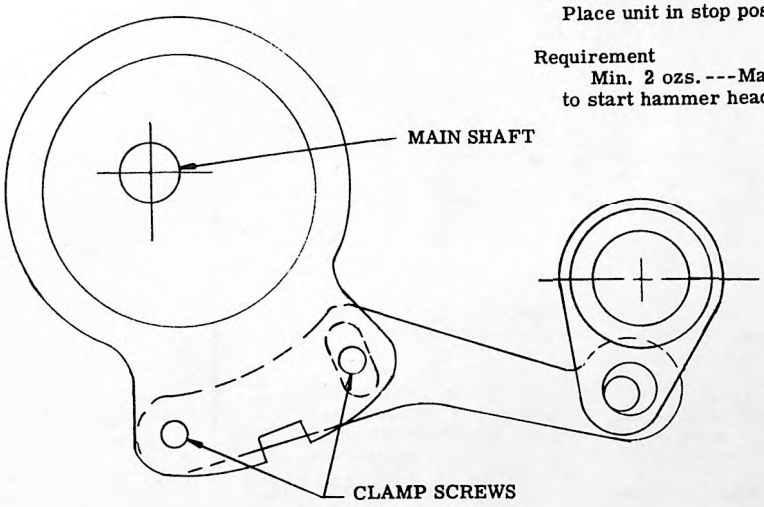
To Adjust
Position the typebox rail with two clamp screws on the eccentric follower lever of the typebox rail positioning clutch.



Print Hammer Head Spring

To Check
Place unit in stop position.

Requirement
Min. 2 ozs. ---Max. 3 ozs. to start hammer head moving.



50240S-28

Typebox Alignment (Transverse)

To Check

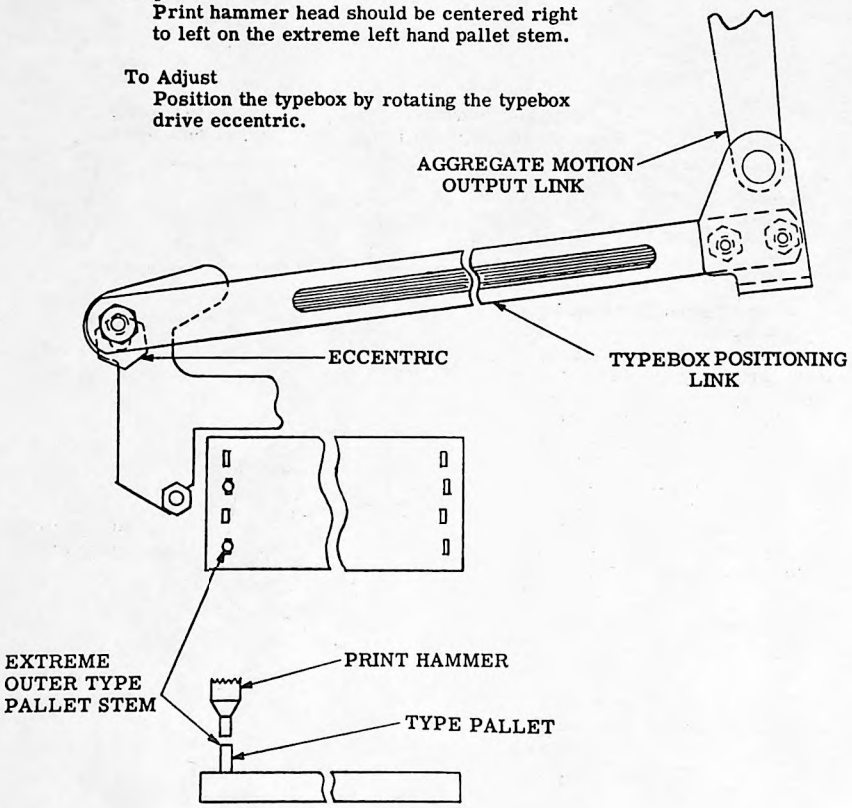
Select No. 5 and No. 6 marking and rotate mainshaft until Figures print hammer trips. Push Figures print hammer down against type pallet stem.

Requirement

Print hammer head should be centered right to left on the extreme left hand pallet stem.

To Adjust

Position the typebox by rotating the typebox drive eccentric.



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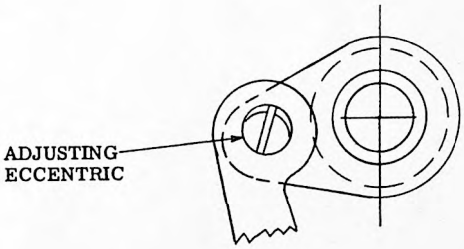
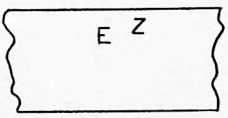


Character Alignment

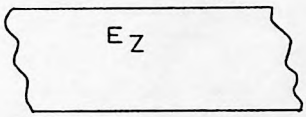
To Check
Select two character combinations E Z.

Requirement
Characters should be in line within 0.006 inch maximum.

To Adjust
Position the eccentric on the typebox rail drive arm so that the slot is aligned vertically and the large chamfer on its head is facing upward. Under power, select E (1 marking) and Z (1-5 marking). If the E is higher than Z, turn eccentric screw clockwise. If Z is higher than E, turn eccentric screw counterclockwise. Recheck typebox alignment (front to rear).



Turn adjusting screw clockwise.



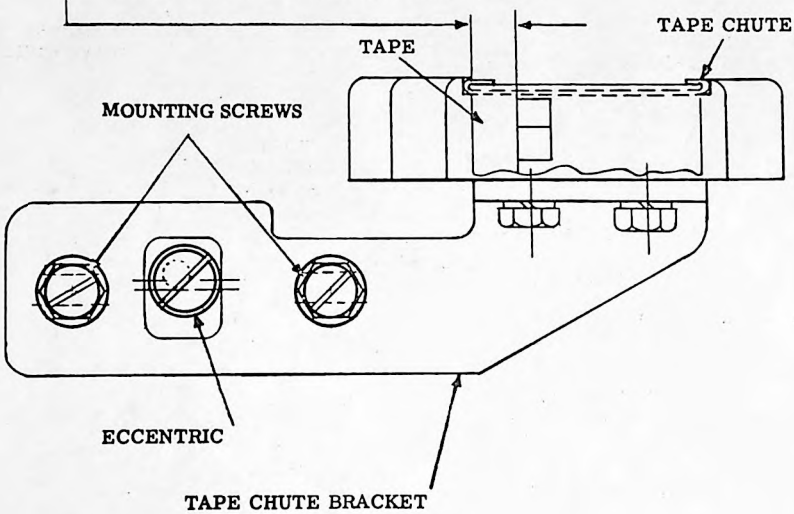
Turn adjusting eccentric counterclockwise.

Tape Margin

To Check
Hold the tape against the rear edge of the tape guide.

Requirement
The margin between the top edge of the tape and the top edge of the letter T
Min. 0.170 inch---Max. 0.210 inch

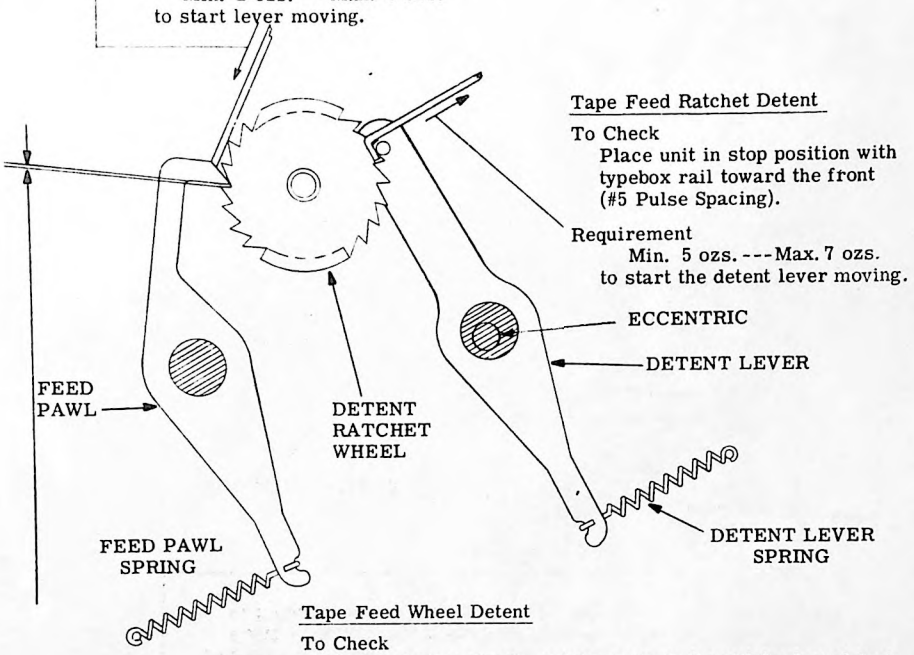
To Adjust
Position the mounting bracket by means of the eccentric with the bracket mounting screws loosened.



Tape Feed Pawl Spring

To Check
Place unit in stop position with typebox rail toward rear (#5 Marking).

Requirement
Min. 2 ozs. ---Max. 3 ozs. to start lever moving.



Tape Feed Ratchet Detent

To Check
Place unit in stop position with typebox rail toward the front (#5 Pulse Spacing).

Requirement
Min. 5 ozs. ---Max. 7 ozs. to start the detent lever moving.

Tape Feed Wheel Detent

To Check
Trip code bar clutch, rotate main shaft until feed pawl just contacts ratchet tooth. Step feed shaft to detented position Rotate main shaft until feed pawl is in lowest position.

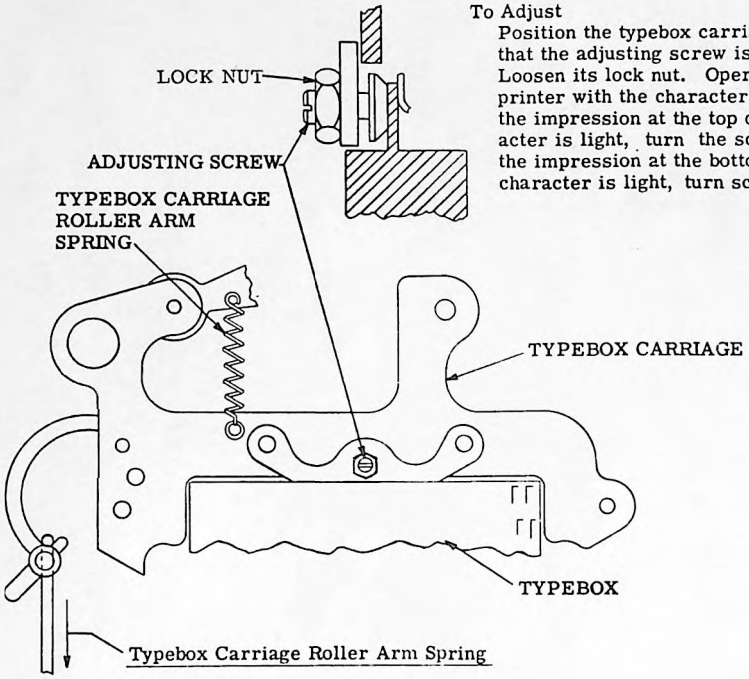
Requirement
Feed pawl should advance feed ratchet one full tooth with minimum perceptible overtravel beyond fully detented position.

To Adjust
Position detent by rotating the detent eccentric. Note: If necessary, loosen clamp screw on feed arm hub and take up play in hole to favor adjustment.

Typebox Alignment

Requirement
The impression printed by a type pallet should be equal at the top and bottom of the characters. Gauged by eye.

To Adjust
Position the typebox carriage so that the adjusting screw is accessible. Loosen its lock nut. Operate the printer with the characters E-7/8. If the impression at the top of the character is light, turn the screw in. If the impression at the bottom of the character is light, turn screw out.



Typebox Carriage Roller Arm Spring

Requirement
Min. 15 ozs. ---Max. 20 ozs.
to start front roller nearest typebox latch moving away from carriage track.

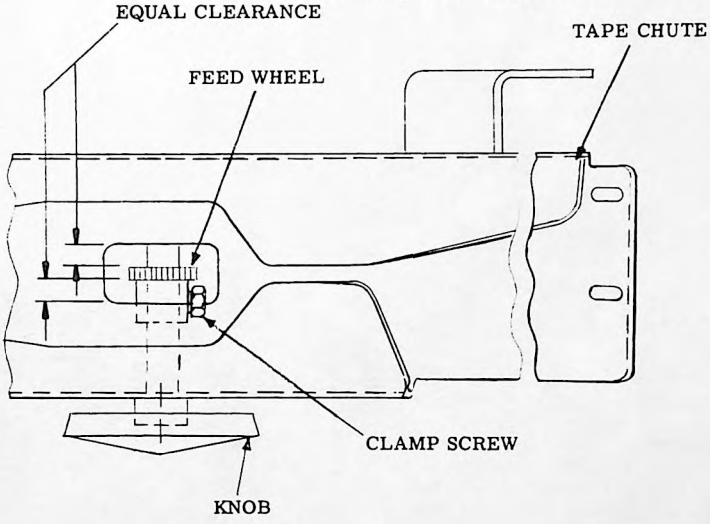
Tape Feed Wheel Centering

Requirement

The tape feed wheel should be centered within the tape chute opening as gauged by eye.

To Adjust

Position the feed wheel on its shaft with its clamp screw loosened.



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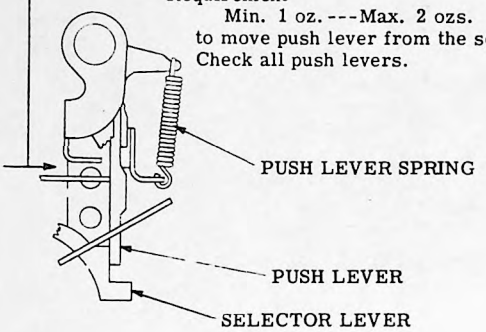
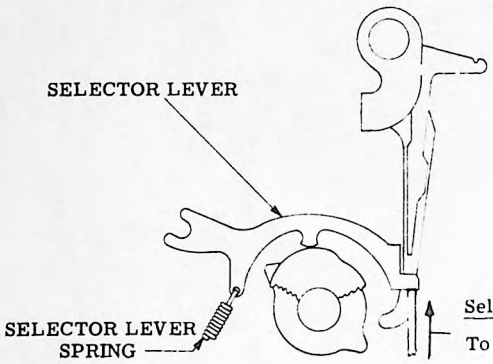
Push Lever Spring

To Check
Place push levers in spacing position.

Requirement
Min. 1 oz.---Max. 2 ozs.
to move push lever from the selector lever.
Check all push levers.

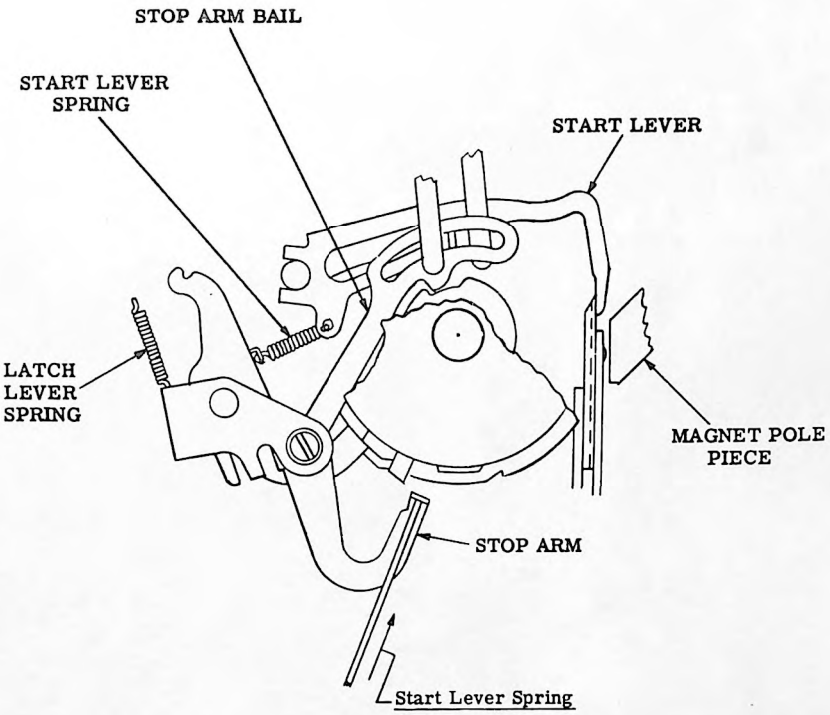




Selector Lever Spring

To Check
Rotate shaft until push lever reset bail is latched up on lever guide, and selector levers on high part of their cams.

Requirement
Min. 1-1/2 ozs.--Max. 2-1/2 ozs.
to start each lever moving.



Start Lever Spring

To Check

Unhook latch lever spring. Rotate shaft until stop arm bail is in the indent of its cam. Set range scale at 60.

Requirement

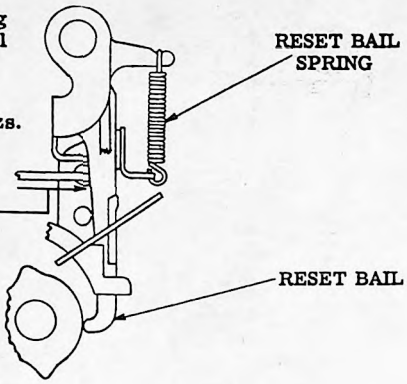
Min. 9-1/2 ozs.---Max. 13 ozs. to start the stop arm moving.

50240S-36

Push Lever Reset Bail

To Check
Place push lever in spacing position and push lever bail on low part of cam.

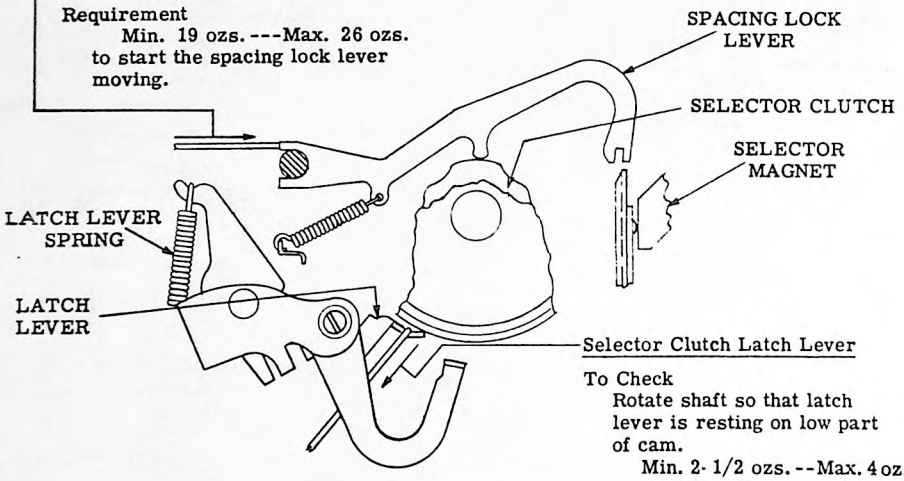
Requirement
Min. 1 oz. ---Max. 2 ozs. to move the bail from the cam.



Spacing Lock Lever Spring

To Check
Energize selector magnets. Disengage selector clutch.

Requirement
Min. 19 ozs. ---Max. 26 ozs. to start the spacing lock lever moving.



Selector Clutch Latch Lever

To Check
Rotate shaft so that latch lever is resting on low part of cam.
Min. 2-1/2 ozs. --Max. 4 ozs. to start latch lever moving.

Selector Armature Spring

To Check (No distortion test set available)
Place marking lock lever, spacing lock lever and start lever on high part of their cams.

(1) Requirement
Min. 4-1/2 ozs.---
Max. 5-1/2 ozs.
to pull armature
to marking position.

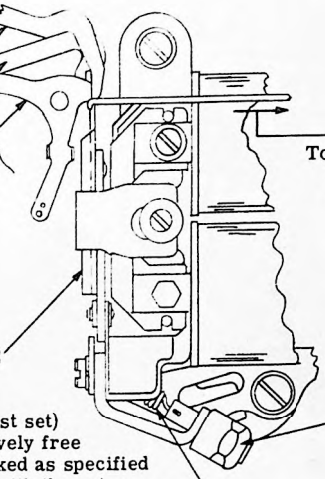
START LEVER

SPACING LOCK LEVER

MARKING LOCK LEVER

ARMATURE

To Adjust
Rotate the adjusting nut.



ADJUSTING NUT

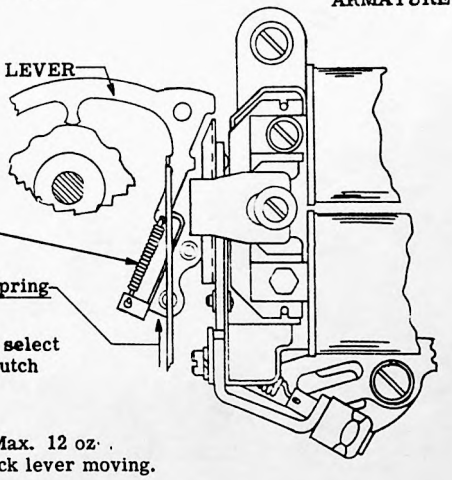
(2) Requirement (using distortion test set)
The selector should be relatively free from internal bias when checked as specified in the instructions furnished with the set.

To Adjust
Rotate the adjusting nut.

ARMATURE SPRING

MARKING LOCK LEVER

MARKING LOCK LEVER SPRING



Marking Lock Lever Spring

To Check
Energize magnets, select letters, selector clutch disengaged.

Requirement
Min. 9 ozs.---Max. 12 ozs.
to start marking lock lever moving.

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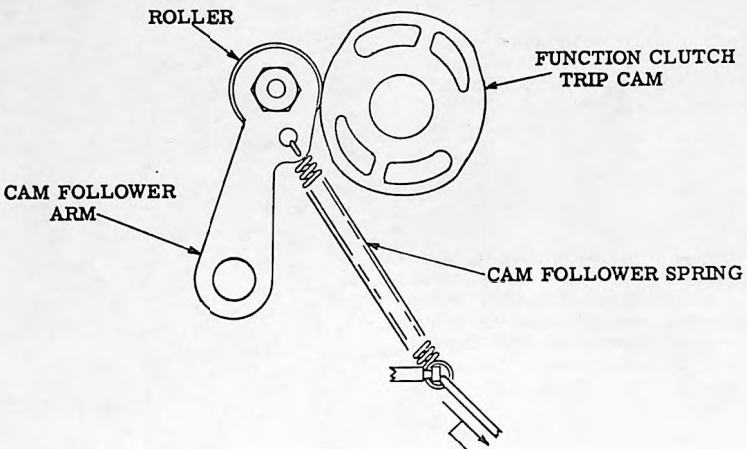
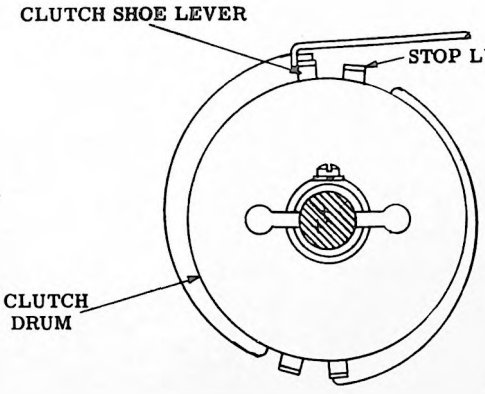


Function Clutch Trip Lever Follower Spring

To Check
Place cam follower on low part of cam.
Unhook cam follower spring from its bracket.

Requirement
Min. 20 ozs. ---Max. 24 ozs.
to pull spring to its installed length.



Clutch Shoe Lever Spring

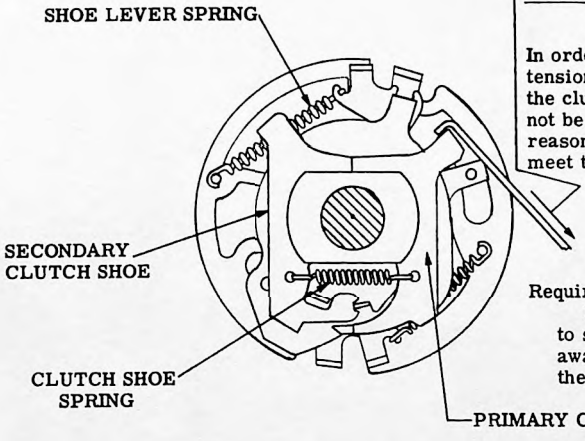
To Check

Engage (trip) the clutch. Hold the drum. Hook a scale to shoe lever and pull tangent to the clutch.

Requirement

Min. 16 ozs. ---Max. 22 ozs. to move the shoe lever into contact with stop lug.

Note: This requirement applies to all mainshaft clutches.



Clutch Shoe Spring

Note

In order to check this spring tension, it is necessary to remove the clutch drum. It therefore should not be checked unless there is good reason to believe that it does not meet the requirements.

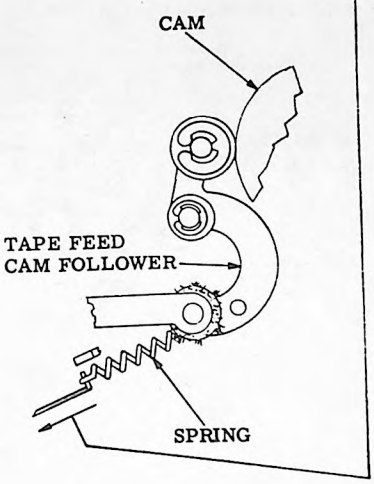
Requirement

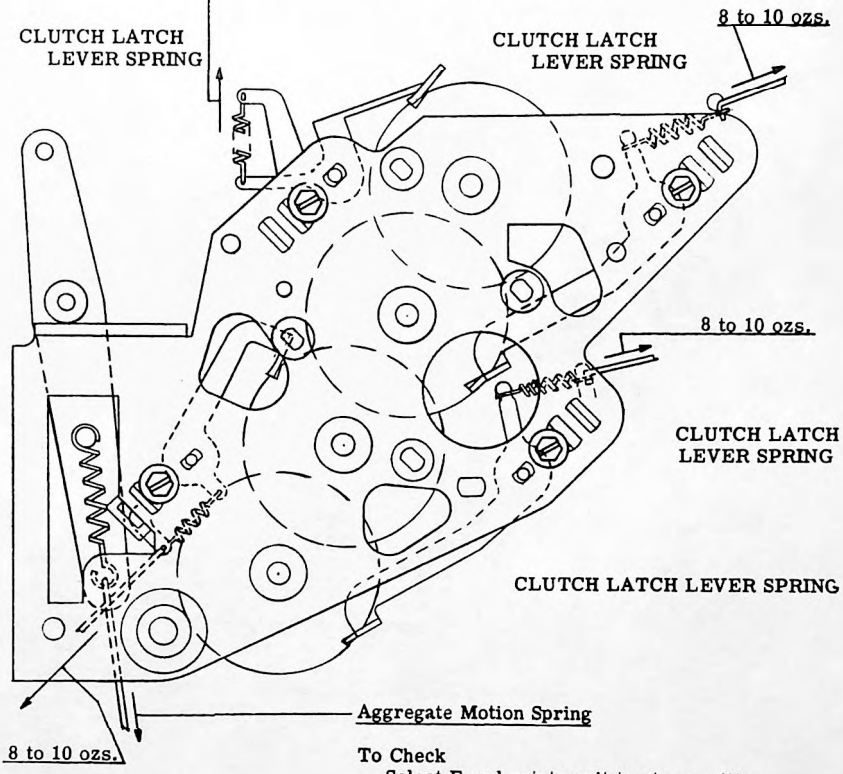
Min. 3 ozs. ---Max. 5 ozs. to start primary shoe moving away from secondary shoe at their point of contact.

Tape Feed - Ribbon Feed Cam Follower Spring

To Check
Unhook the function cam follower spring from its bracket.

Requirement
Min. 11 ozs. --- Max. 14 ozs.
to pull spring to installed length.





Clutch Latch Lever Springs (4 Springs)

To Check
Place latch levers in latched position.
Unhook spring.

Requirement
Min. 8 ozs.---Max. 10 ozs.
to pull springs to installed length.

Aggregate Motion Spring

To Check
Select E and rotate unit to stop position, unhook the spring.

Requirement
Min. 22 ozs.---Max. 26 ozs.
to pull spring to installed length. Check both springs.

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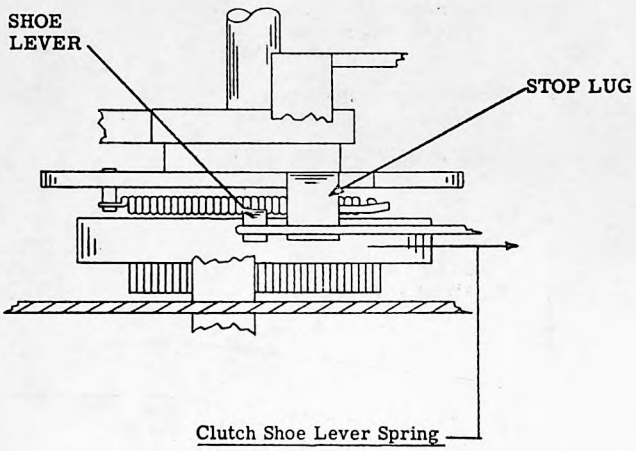
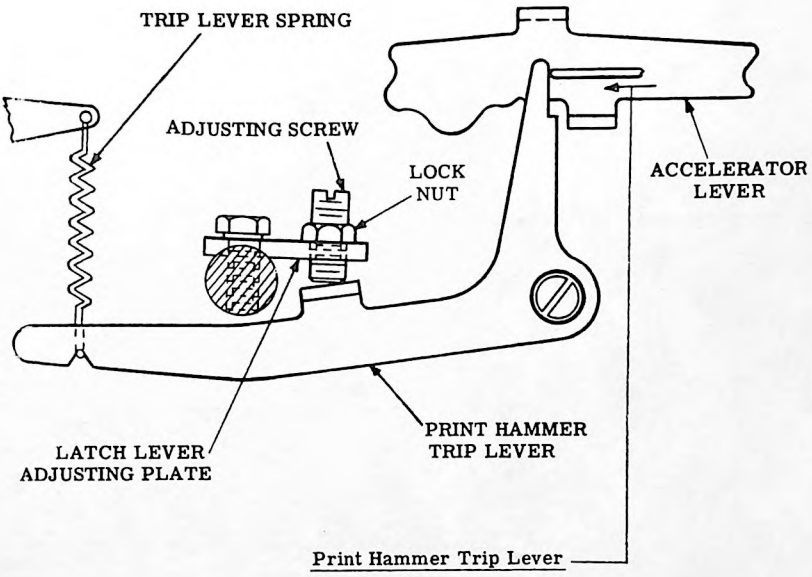


To Check

Trip clutch so that it is engaged. Hold clutch.

Requirement

Min. 9 ozs. ---Max. 11 ozs.
to move shoe lever into contact with
the stop lug.



Print Hammer Trip Lever

To Check
Place unit in stop position.

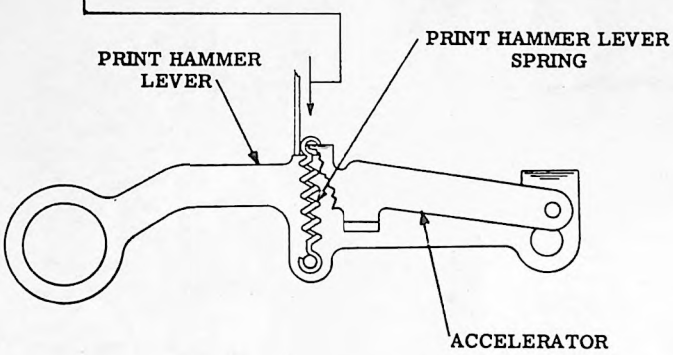
Requirement
Min. 3 ozs.---Max. 5 ozs.
to start lever moving away from
the accelerator.

50240S-44

Print Hammer Lever Spring

To Check
Place unit in stop position.

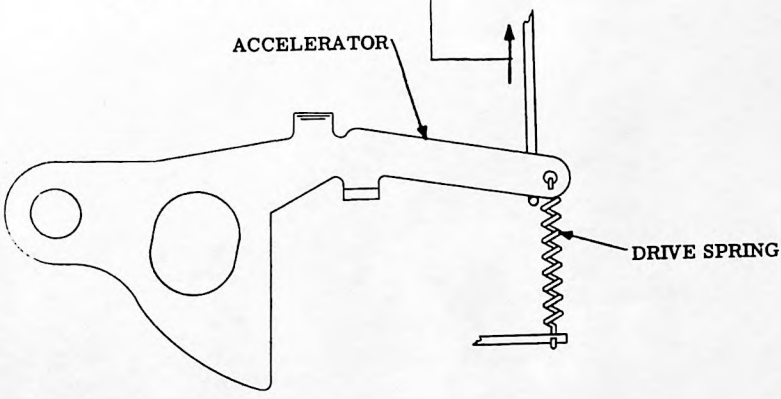
Requirement
Min. 1 oz. ---Max. 2 ozs.
to move lever away from accelerator.



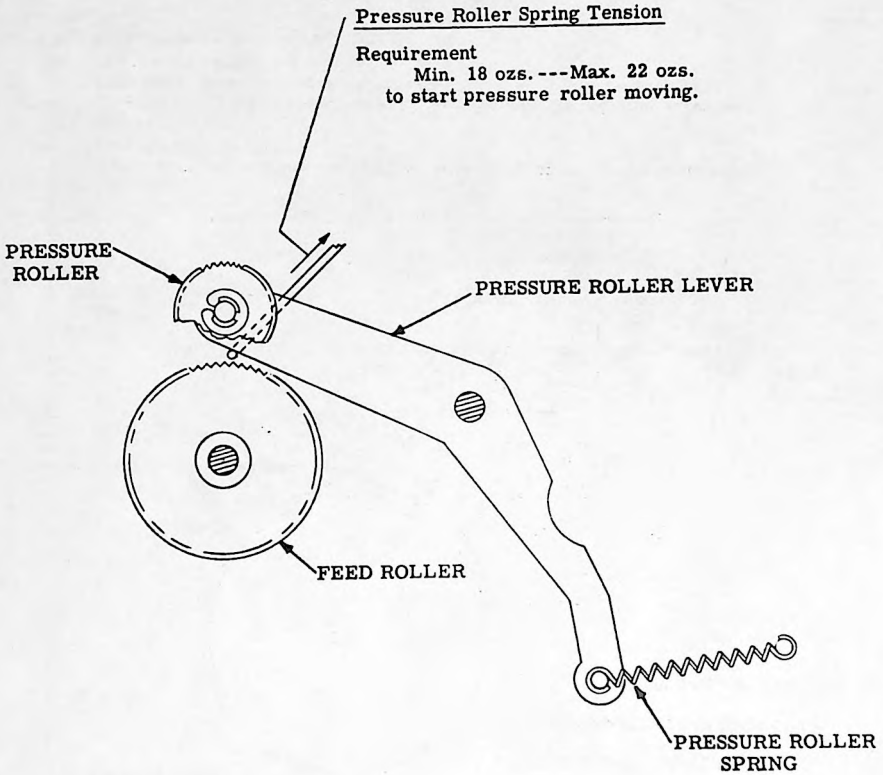
Accelerator Drive Spring

To Check
Place unit in stop position.

Requirement
Min. 10 ozs. --- Max. 13 ozs.
to start the lever moving.



50240S-46


Pressure Roller Spring Tension
Requirement
Min. 18 ozs. ---Max. 22 ozs.
to start pressure roller moving.
PRESSURE ROLLER
PRESSURE ROLLER LEVER
FEED ROLLER
PRESSURE ROLLER SPRING

3. BASE

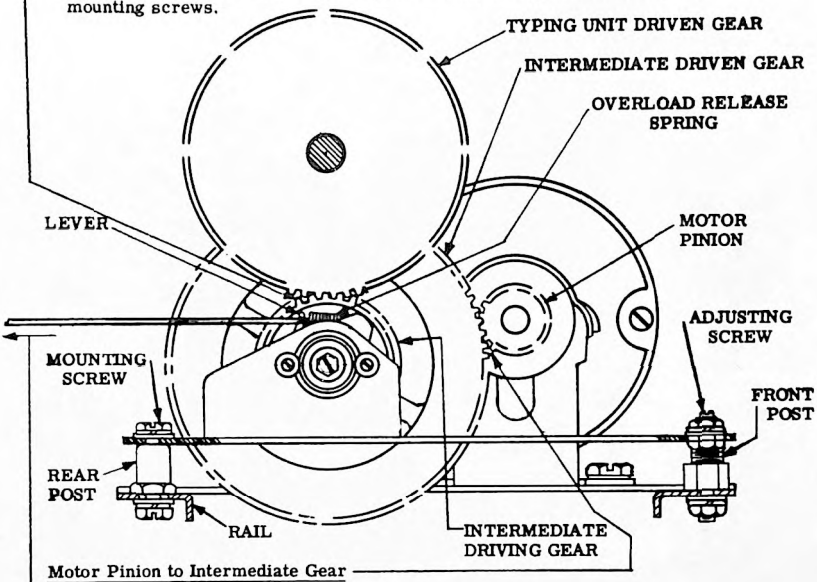
Intermediate Shaft Assembly Position

Requirement

Barely perceptible amount of backlash between the typing unit gear and the intermediate driving gear at the closest point.

To Adjust

Loosen the screws which secure the intermediate gear assembly mounting post to the rear rail. Loosen the nut on the adjusting screw of the front mounting post and position the intermediate gear assembly. Tighten the rear post mounting screws.



Motor Pinion to Intermediate Gear

Requirement

Barely perceptible amount of backlash between motor pinion and intermediate gear at closest point.

To Adjust

Raise or lower the intermediate gear assembly with the adjusting screw on the front post. Refine the intermediate shaft assembly position if necessary to obtain quiet operation.

Overload Release Mechanism Spring

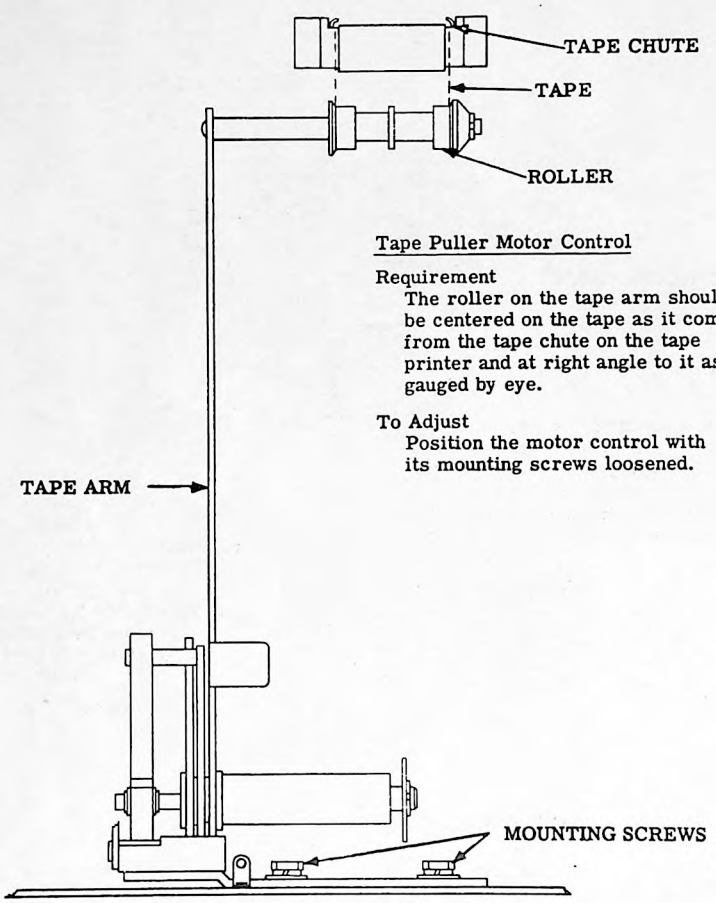
To Check

Hold plate of overload release mechanism stationary
to start lever moving.

Min. 40 ozs.---Max. 64 ozs.

50240S-48

4. PROJECTOR TAPE PRINTER



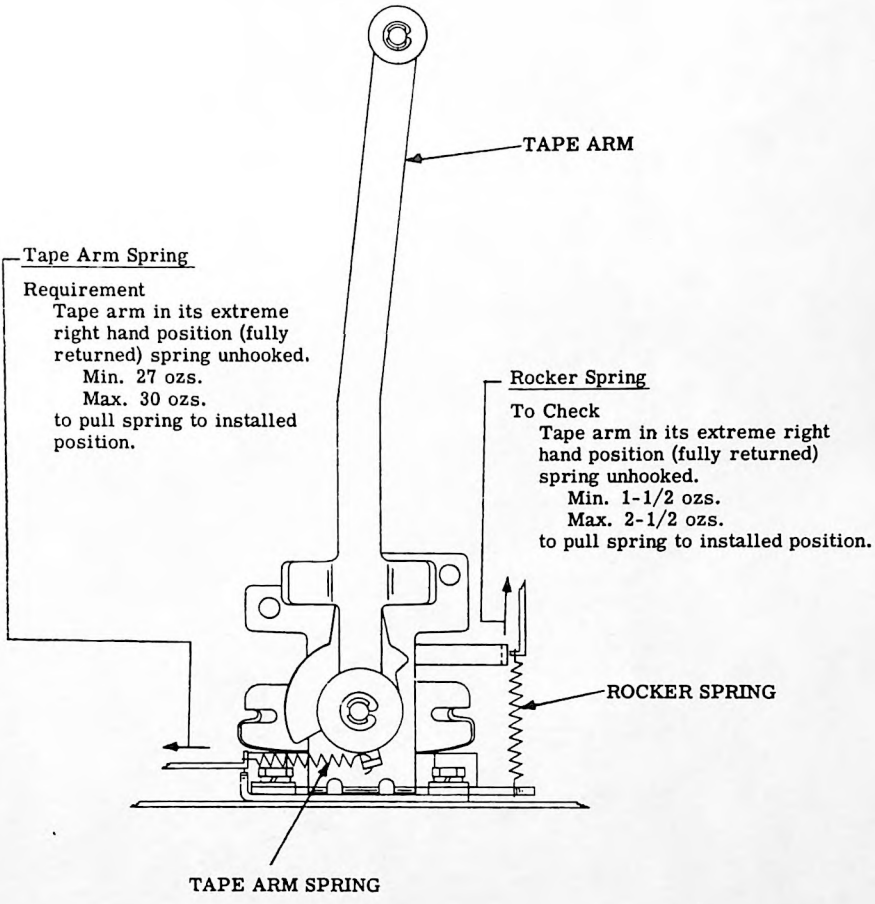
Tape Puller Motor Control

Requirement

The roller on the tape arm should be centered on the tape as it comes from the tape chute on the tape printer and at right angle to it as gauged by eye.

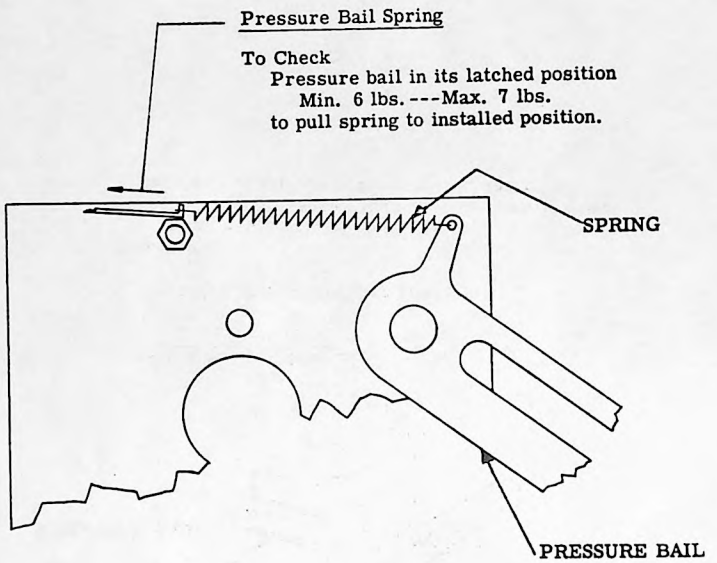
To Adjust

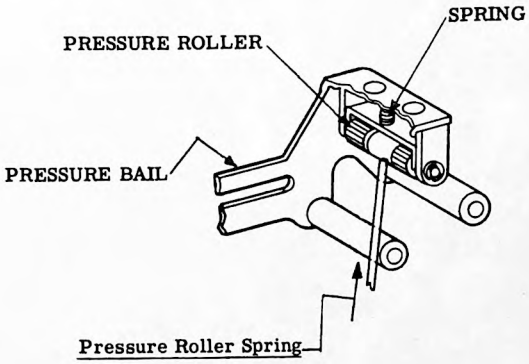
Position the motor control with its mounting screws loosened.


TAPE ARM
Tape Arm Spring
Requirement
Tape arm in its extreme right hand position (fully returned) spring unhooked.
Min. 27 ozs.
Max. 30 ozs.
to pull spring to installed position.
Rocker Spring
To Check
Tape arm in its extreme right hand position (fully returned) spring unhooked.
Min. 1-1/2 ozs.
Max. 2-1/2 ozs.
to pull spring to installed position.
ROCKER SPRING
TAPE ARM SPRING

50240S-50

5. TAPE PULLER





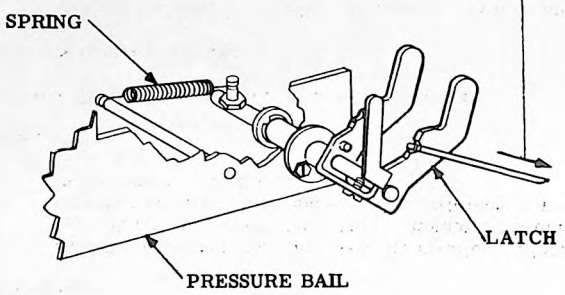
To Check
Pressure bail in unlatched position.

Requirement
Min. 9-1/2 ozs. ---Max. 14 ozs.
to start the pressure roller moving upward when the force is applied in the center of the roller.

Latch Bail Spring

To Check
Unlatch the bail.

Requirement
Min. 9 ozs. --- Max. 13 ozs.
to start latch bail moving away from its stop.



6. DISASSEMBLY AND REASSEMBLY

6.1 The disassembly outlined in this paragraph will break the Tape Printer down into major assemblies and mechanisms. For further disassembly refer to Teletype Parts Bulletin 1194B. To reassemble the mechanisms, reverse the procedure used in disassembly.

.2 Retaining rings are made of spring steel and have a tendency to release suddenly. To avoid loss of these rings when removing them proceed as follows:

Hold the retaining ring to prevent its rotation. Place blade of screwdriver in one of ring's slots. Rotate screwdriver in direction to increase diameter. Ring will then come off easily in fingers without flying.

6.3 Disassembly

6.3.1 Typebox - To remove, trip latch and pull typebox out.

.2 To remove double print hammer:

(a) Remove locknut, lockwasher, feltwasher, spacer and screw from print hammer drive link at rear connection.

(b) Remove the three mounting screws.

(c) Remove double print hammer assembly.

.3 To remove top plate assembly:

(a) Remove retaining ring from function cam follower shaft.

(b) Remove function cam follower arm spring.

(c) Slide the function cam follower shaft until it clears the bearing on casting of top plate assembly.

(d) Remove four mounting screws on top plate.

(e) Remove top plate assembly.

NOTE: The ball bearings in the top plate assembly have been assembled

6.3.3 NOTE: and locked in place on their respective links and eccentrics at the factory. Serious damage to the bearings may result from an attempt to remove them.

.4 To remove selector assembly:

(a) Remove the selector cover plate.

(b) Remove locknut, lockwashers and screw from selector clutch drum.

(c) Place stripper bail on its shoulder.

(d) Hold the mark-lock lever up and remove clutch and cam assembly.

(e) Remove electrical leads.

(f) Remove the four mounting screws.

(g) Remove selector assembly.

.5 To remove ribbon feed assembly:

(a) Remove ribbon.

(b) Remove ring retainer and felt washer from ribbon feed drive link.

(c) Remove ribbon feed mechanism.

.6 To remove code bar assembly:

(a) Remove code bar extension retaining bracket.

(b) Remove code bar extensions.

(c) Remove the four mounting screws (two in each side plate).

(d) Remove code bar assembly.

.7 To remove transfer lever assembly:

(a) Remove the two remaining mounting screws.

6.3.7 (b) Remove the ring retainer from the code bar shift lever drive arm.

(c) Remove the transfer lever assembly.

.8 To remove main shaft assembly:

(a) Unhook the code bar cam follower arm spring.

(b) Remove bearing clamp screws and remove bearing clamps.

(c) Remove locknut, lockwasher and eccentric shoulder screw from the typebox rail positioning clutch arm.

(d) Remove the locknut, lockwashers and screws from the typebox rail positioning clutch drum and collar and slide the clutch assembly to the left.

(e) Remove the main shaft assembly.

.9 To remove typebox rail positioning shaft:

(a) Remove the gear on each end of the shaft.

(b) Remove the bearing clamp brackets on each end of the shaft.

(c) Remove the typebox rail positioning shaft.

(d) Remove the typebox rail by removing its four mounting screws.

.10 To remove tape chute and platen assembly:

(a) Remove the two screws and lockwashers on the platen mounting bracket on the left side plate.

(b) Remove the tape chute mounting screw washer and lockwasher from the front plate.

(c) Remove the tape chute and platen assembly.

.11 To remove the front plate assembly:

(a) Disconnect the tape and ribbon feed drive link by removing the ring retainer.

6.3.11 (b) Remove the four shoulder mounting screws.

(c) Remove front plate assembly.

.12 To remove the clutch trip mechanism assembly:

(a) Remove the two screws mounting the bearing bracket to the rectangular bar.

(b) Remove the two screws mounting trip mechanism casting to the rectangular bar.

(c) Remove the one screw and one post mounting the trip mechanism casting to the left side frame.

(d) Remove the clutch trip mechanism assembly.

.13 To remove the side frame assemblies:

(a) Remove the two mounting screws for the hexangle tie bar and remove bar.

(b) Remove the four mounting screws for the rectangular tie bar and remove bar.

6.4 Reassembly

6.4.1 To assemble unit, reverse the steps given above taking the following precautions:

(a) Typebox rail positioning rack and pinion: Align hole in rack with V notch in gear flange.

(b) Top Plate Assembly: Take up play to the rear of the unit when assembling top plate in order to make gear clearance maximum.

(c) Completely readjust unit in accordance with the instructions given in paragraphs 1 to 5.

7. LUBRICATION

7.1 General

7.1.1 Lubricate the typing unit before storing or placing it in service. After

7.1.1 100 hours of operation, relubricate freely to make certain that all points receive ample lubrication.

.2 Readjust the unit.

.3 Relubricate thereafter every 500 hours of operation or every three months, whichever comes first.

.4 Use Teletype KS7470 oil and KS7471 grease.

.5 General Lubrication.

(a) All pivot points - one or two drops of oil.

(b) All coil springs - one drop of oil.

(c) All felt oilers - saturate with oil.

(d) All gear teeth - light film of grease.

(e) All cams - two drops of oil (not grease).

(f) All sliding surfaces - two drops of oil.

(g) Keep all surfaces between magnet pole piece and armature free from oil. To remove any oil or foreign matter that may be present and insure better operation, pull a piece of paper between the armature and pole pieces (energize the magnet). Make certain that no lint or pieces of paper remain between the pole pieces and armature.

7.2 Specific Lubrication Points

7.2.1	Clutches:		Oil
	(a)	Internal mechanism	Oil
	(b)	Disk camming surfaces	Oil
	(c)	Felt wick	Oil
.2	Selector Assembly		
	(a)	Push lever guide bearing (6 slots)	Oil

7.2.2	(b)	Push levers; engaging surfaces	Oil
	(c)	Lock levers; guide slots	Oil
	(d)	Selector and push lever guide slots	Oil
	(e)	Lever guide bearing slots	Oil
	(f)	Cam lubricator assembly	Oil - fill
	(g)	Cam sleeve bearings (2 oil holes)	Oil
	(h)	All felt washers or lubricators	Oil
	(i)	Selector cams - each cam	Oil
	(j)	Spring hooks - each end	Oil
	(k)	Tip of armature extension	Oil

NOTE: Care should be taken so that oil does not get between, or will not be thrown between the armature and magnet pole piece.

.3	Teeth of range scale knob assembly (knob, gear and internal detent)	Thin film of grease

.4 Transfer Lever Assembly

(a)	Transfer levers - bearings and working surfaces.	Oil
(b)	Intermediate levers - bearings, guides and working surfaces.	Oil
(c)	Scissors levers - bearings, guides and working surfaces.	Oil
(d)	Code bar shift lever - bearings, rollers, guide, felt oilers (3).	Oil
(e)	Code bar shift lever drive arm shaft - 3 drops oil in oil hole.	

7.2.5 Code Bar Clutch Stop Lever Shaft

(a) Bearing - felt oilers - saturate with oil.

(b) Clutch trip lever - felt oilers - saturate with oil.

.6 Code Bar Assembly

(a)	Guides	Oil
(b)	Detents	Oil
(c)	Connecting extensions	Oil

.7 Main Shaft Assembly

(a)	Code bar cam surface	Oil
(b)	Function cam surface	Oil
(c)	Function clutch trip cam surface	Oil
(d)	Gears	Grease
(e)	Typebox rail positioning eccentric	Oil

.8 Clutch Trip Mechanism

(a)	Spring ends	Oil
(b)	Trip lever	Oil
(c)	Latch levers	Oil
(d)	Function clutch trip cam follower roller	Oil
(e)	Function clutch trip cam follower pivot	Oil
(f)	Function cam follower roller (2)	Oil
(g)	Function cam follower pivot	Oil
(h)	Tape ribbon feed drive arm pivots	Oil

7.2.8	(i)	Typebox rail positioning clutch stop slide - sliding surfaces	Oil
	(j)	Type rail positioning clutch trip linkage - working surfaces	Oil
.9	Typebox Rail Positioning Mechanism		
	(a)	Drive arm pivot	Oil
	(b)	Cross shaft ball bearings	Oil
	(c)	Rack and pinion (2)	Grease
	(d)	Rack guide (2)	Oil
.10	Tape Feed Mechanism		
	(a)	Drive shaft bearings (2)	Oil
	(b)	Drive arm pivots	Oil
	(c)	Tape feed pawl and ratchet	Oil
	(d)	Tape feed wheel detent	Oil
	(e)	Tape feed wheel shaft	Oil
	(f)	Pressure roller bearing surface	Grease
	(g)	Pressure roller arm pivot	Oil
	(h)	Spring ends	Oil
.11	Ribbon Feed Mechanism		
	(a)	Spring hook ends	Oil
	(b)	Ribbon rollers	Oil
	(c)	Feed pawl pivot	Oil
	(d)	Reversing arms	Oil

7.2.11	(e)	Drive link working surfaces	Grease
	(f)	Reversing lever retaining pawl	Oil
	(g)	Ratchet shafts	Oil
.12	Double Print Hammer Assembly		
	(a)	Spring hook ends	Oil
	(b)	Drive link pivots	Oil
	(c)	Drive shaft bearings	Oil
	(d)	Latch lever contact surfaces	Grease
	(e)	Latch lever latch surfaces	Oil
	(f)	Felt washer inside drive block	Oil (Saturate)
	(g)	Accelerator and print lever pivot shaft	Oil
	(h)	Print hammer plunger pivot Print hammer plunger guide	Oil Oil
	(i)	Accelerator lever cam surfaces	Grease
	(j)	Selecting tee guide	Oil
	(k)	Selector slide guide	Oil
	(l)	Detent lever surfaces	Oil
	(m)	Detent roller	Oil
	(n)	Selector lever pivot	Oil
	(o)	Selector lever fork	Oil
	(p)	#6 code bar extension roller	Oil

7.2.13 Top Plate Assembly

(a)	Aggregate motion clutches (4)	Oil
	1. Disk camming surfaces	Oil
	2. Internal mechanism	Oil
	3. Felt wick	Oil
(b)	Clutch trip slides (4)	
	Sliding surfaces	Oil
(c)	Clutch trip lever pivots and working surfaces	Oil
(d)	Latch lever pivots	Oil
(e)	Eccentric shafts (at gears)	Oil
(f)	Gears	Grease
(g)	Drive shaft bearing felt wick (in casting)	Oil
(h)	Top thrust bearing	Oil
(i)	Oilite pivot on aggregate motion linkage	Oil
(j)	Aggregate motion guide block surfaces	Oil
(k)	Spring anchors	Oil

(l) Bail bearings are lubricated by the manufacturer and are not expected to require relubricating during the life of the unit.

NOTE: On no account may the unit be washed in degreaser as this will destroy the lubrication of the bearings, and traces of degreaser remaining in the bearings will make relubrication ineffective.

HIGH SPEED TAPE PUNCH SET (BRPE)

ADJUSTMENTS

CONTENTS

1. GENERAL

1.1 The information given in this section applies to late-design Punches. The manufacture of late-design equipment began in 1959 and includes the following coded units: Punch Units BRPE7 and up; Bases BRPEB6 and up; and Covers BRPEC200 and up. Early-design equipment consists of BRPE1 through 5 and BRPEB1 through 5. Information on early-design equipment is given in paragraph 4.

.2 References in the text to left or right indicates the viewers left or right as he faces the front of the equipment. He is facing the front when the tape reel and tape rollers are on his right and the tape cutter is on his left (see Figure 1). Pivot points are shown in the drawings by circles or ellipses which are solid black to indicate fixed points and cross-hatched to indicate floating points.

.3 Refer to Teletype Bulletin 215B for installation instructions, equipment description and principles of operation. For parts information refer to Teletype Bulletin 1145B.

.4 The Punch will require less maintenance and provide more satisfactory service if it is used properly. Although it will perforate tape at speeds less than the operating speed to increase operating life, the lowest suitable operating speed should be used. For example, if perforation is not to occur at a rate over 60 characters per second, drive parts providing 63.3 ops should be employed rather than those providing 110 ops. The Punch will accommodate most page tapes. However, standard teletypewriter paper tape is recommended because it is impregnated with oil which lubricates the punch pins. The equipment is subject to more wear when it is idling, i.e., running but not perforating tape. Therefore it should be turned off during period of idleness either manually or by the control circuits.

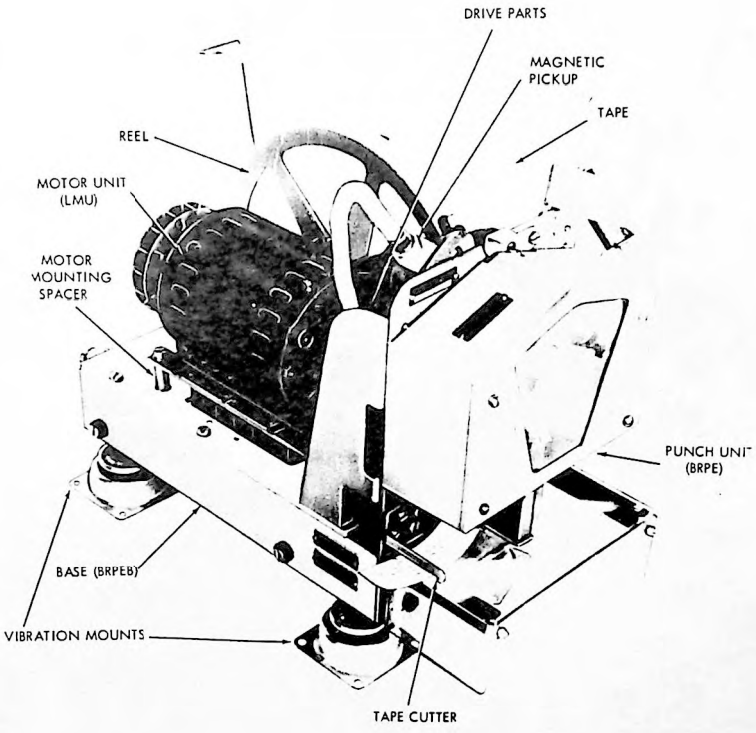


FIGURE 1. HIGH SPEED TAPE PUNCH

1.5 The Punch should be cleaned periodically, but care should be taken to avoid damaging or distorting delicate springs and thus reducing their tension. Inspect the equipment at intervals for conditions that might cause trouble later. Check the tightness of all wiring connections at terminal boards and connectors. Make sure that the nuts and screws that lock the adjustments are tight. Oxidized (red) metal dust near bearing surfaces may indicate insufficient clearance, a condition that should be rectified immediately. Manual operation is outlined in paragraph 2.6 below, should accompany inspection. Maintenance may require that the Punch be disassembled, as instructed in Section 3, to make certain adjustments and to replace parts. It is very important that the equipment be thoroughly lubricated at regular intervals in accordance with Section 6.

2. GENERAL ADJUSTING INFORMATION

2.1 Paragraph 3 (pages 3 through 23) covers adjustments and spring tensions for late-design Punches (BRPE7 and up), while paragraph 4 (pages 24 through 33) covers this material for early-design equipment (BRPE5 and lower).

.2 In the adjustments and spring tensions covered in this section locating of clearances, position of parts and point and angle of scale applications are illustrated by drawings. Requirements and procedures are set forth in the texts that accompany the drawings. The sequence of the adjustments is that which should be followed when complete readjustment of the Set is undertaken. The letters of the alphabet in parenthesis which precede the texts indicate the sequence to be followed on the individual pages. A procedure should be read all the way through before making the adjustment or testing the spring tension. If any adjustment is changed, related adjustments should be checked.

.3 Tools required to make the adjustments and test the spring tensions are not supplied with the equipment, but are listed in Teletype Bulletin 1124B. If parts are removed, all adjustments which the removal of these parts might facilitate should be made before the parts are replaced. When a part mounted on shims is removed, the number of shims at each mounting screw should be noted so that identical pile ups can be made when the part is replaced. Unless it is specifically stated to the contrary, after an adjustment has been made, all nuts and screws that were loosened should be tightened.

2.4 The spring tensions given in this bulletin are indications, not exact values, and should be check with Teletype scales in the positions shown in the drawings. Springs which do not meet the requirements and for which there are no adjusting procedures should be discarded and replaced by new springs.

.5 All contact points should meet squarely. Smaller points should fall wholly within the circumference of larger mating points. Points that are the same size should not be out of alignment more than 25 per cent of the point diameter. Avoid sharp kinks or bends in the contact springs.

.6 Before proceeding with the adjustments, remove the Cover, (if present) by simply lifting it from the Base, and take off the Punch Unit cover by removing its four mounting screws. Rotate the main shaft slowly in its normal direction (clockwise as viewed from the front) and activate all movable elements. Check for freedom of movement and eliminate any binds. The shaft should be rotated to set up the conditions required in the adjusting procedures.

CAUTION

Improperly adjusted equipment may be seriously damaged in a matter of seconds if operated under power.

3. LATE DESIGN PUNCH UNIT

3.1 Synchronization Pulse Orientation

3.1.1 The Flywheel may be oriented in 60-degree steps with respect to main shaft. This provides an option of six initial positions from which various combinations of operating speeds, magnets, and control-circuit delays may be accommodated.

3.2 Determining O'clock Position

3.2.1 Combine attract time of magnets and delay time of control circuits to obtain time (T) in milliseconds (MS) at which armatures are fully attracted after pickup fires when set at range 30.

.2 Locate T on time scale at lower left of Figure 2. Extend a line horizontally to right until it intersects line representing operating speed of Punch Unit in operations per second (OPS).

.3 Extend a line vertically upward from this point until it intersects one of the O'clock lines.

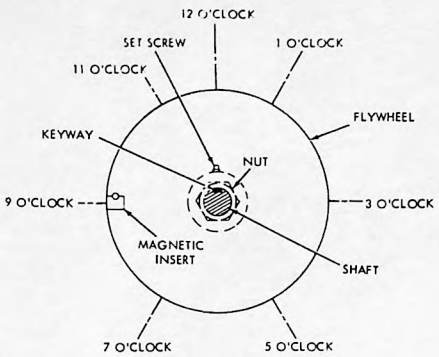


FIGURE 2.

3.2.4 Extend a line from this point horizontally to left until it intersects scale at upper left. This point represents position of toggle linkages in degrees when armatures reach fully attracted position. It should fall within selection interval. Use o'clock position represented by intersected line in positioning flywheel as instructed below.

3.3 Positioning Flywheel

3.3.1 View unit from front. Rotate flywheel until set screw is in 12 o'clock position. If magnetic insert is not at o'clock position deterimined above, loosen flywheel nut and remove set screw.

.2 Position shaft so that keyway is in 12 o'clock position. Hold shaft in this position and rotate flywheel so that magnetic insert is at o'clock position determined above.

.3 Insert set screw in hole in hub at 12 o'clock position and tighten just enough to hold flywheel in position. Tighten nut. Tighten set screw securely.

3.3.3 EXAMPLE:

(A) Assume that Punch Unit is to operate at speed of 110 ops that attract time of magnets is 2 ms and delay of control circuits is 1 ms. Combined time (T) is thus 3 ms.

(B) Locate 3 on time scale in Figure 2. Extend a line from 3 to right until it intersects 110 ops line.

(C) Extend a line vertically upward from this point. As can be seen in Figure 2, line intersects 9 o'clock line.

(D) When a line is extended to left from this point, it intersects scale at 339°. Thus toggle linkages are in selection interval when magnets reach fully attracted position.

(E) Position flywheel at 9 o'clock as instructed under positioning flywheel above.

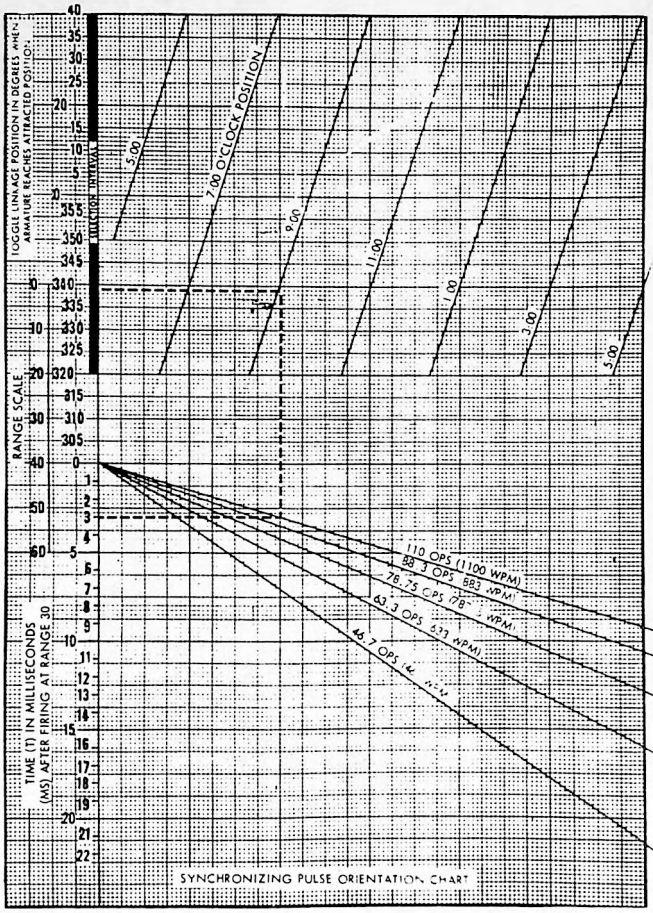
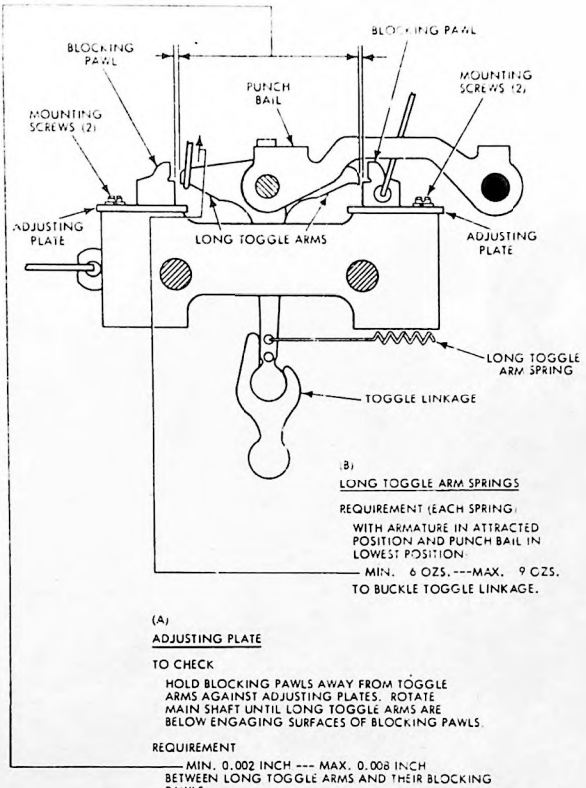

TOGGLE LINKAGE POSITION IN DEGREES AHEAD OF ARMATURE REACHES ATTRACTED POSITION
RANGE SCALE
TIME (T) IN MILLISECONDS (MS) AFTER FIRING AT RANGE 30
5:00
7:00 O'CLOCK POSITION
9:00
11:00
1:00
3:00
5:00
110 OPS (1100 WPM)
88.3 OPS (883 WPM)
76.75 CPS (768 WPM)
63.3 OPS (633 WPM)
46.7 OPS (467 WPM)
SYNCHRONIZING PULSE ORIENTATION CHART

FIGURE 3.



(B)

LONG TOGGLE ARM SPRINGS

REQUIREMENT (EACH SPRING)

WITH ARMATURE IN ATTRACTED POSITION AND PUNCH BAIL IN LOWEST POSITION.

MIN. 6 OZS. --- MAX. 9 OZS. TO BUCKLE TOGGLE LINKAGE.

(A)

ADJUSTING PLATE

TO CHECK

HOLD BLOCKING PAWLS AWAY FROM TOGGLE ARMS AGAINST ADJUSTING PLATES. ROTATE MAIN SHAFT UNTIL LONG TOGGLE ARMS ARE BELOW ENGAGING SURFACES OF BLOCKING PAWLS.

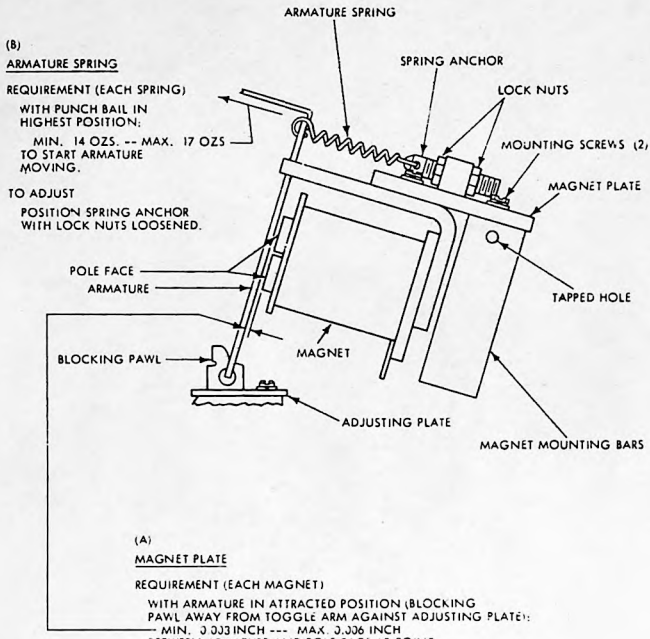
REQUIREMENT

MIN. 0.002 INCH --- MAX. 0.008 INCH BETWEEN LONG TOGGLE ARMS AND THEIR BLOCKING PAWLS.

TO ADJUST

POSITION ADJUSTING PLATES WITH MOUNTING SCREWS LOOSENED.

FIGURE 4.



(B)

ARMATURE SPRING

REQUIREMENT (EACH SPRING)

WITH PUNCH BAIL IN HIGHEST POSITION:

MIN. 14 OZS. -- MAX. 17 OZS TO START ARMATURE MOVING.

TO ADJUST

POSITION SPRING ANCHOR WITH LOCK NUTS LOOSENED.

(A)

MAGNET PLATE

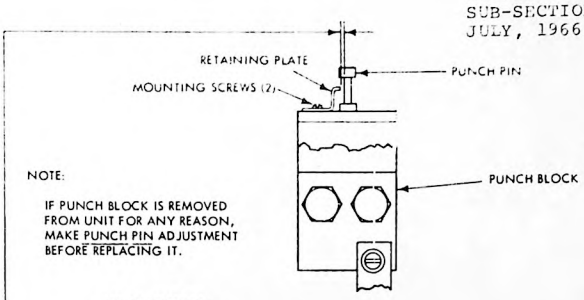
REQUIREMENT (EACH MAGNET)

WITH ARMATURE IN ATTRACTED POSITION (BLOCKING PAWL AWAY FROM TOGGLE ARM AGAINST ADJUSTING PLATE): MIN. 0.003 INCH --- MAX. 0.006 INCH BETWEEN ARMATURE AND POLE FACE AT POINT WHERE CLEARANCE IS LEAST.

TO ADJUST

MAKE CERTAIN THAT TAPPED HOLES IN MOUNTING BARS MATCH HOLES IN PUNCH UNIT COVER. IF NOT, POSITION BARS BY LOOSENING TWO MOUNTING SCREWS AT REAR. HOLD ARMATURE IN ATTRACTED POSITION AND POSITION MAGNET PLATE WITH MOUNTING SCREWS LOOSENED. RECHECK REQUIREMENT.

FIGURE 5.



NOTE:

IF PUNCH BLOCK IS REMOVED FROM UNIT FOR ANY REASON, MAKE PUNCH PIN ADJUSTMENT BEFORE REPLACING IT.

(A) PUNCH PIN

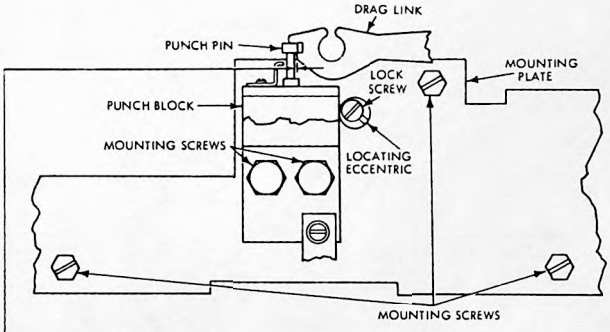
REQUIREMENT

PUNCH PINS SHOULD MOVE FREELY IN PUNCH BLOCK WITH MINIMUM CLEARANCE BETWEEN PUNCH PINS AND RETAINING PLATE.

TO ADJUST

POSITION RETAINING PLATE WITH MOUNTING SCREWS LOOSENED.

CAUTION: DO NOT ATTEMPT TO ADJUST PUNCH BLOCK DIE PLATE.



(B) PUNCH BLOCK

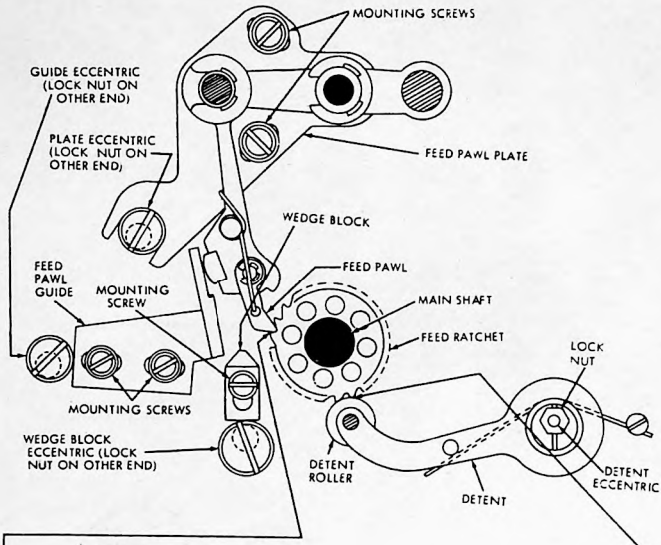
REQUIREMENT

PERCEPTIBLE CLEARANCE (MAX. 0.003 INCH) BETWEEN DRAG LINKS AND PUNCH PINS.

TO ADJUST

POSITION MOUNTING PLATE WITH MOUNTING SCREWS LOOSENED. TO REFINE ADJUSTMENT, LOOSEN PUNCH BLOCK MOUNTING SCREWS AND POSITION PUNCH BLOCK LOCATING ECCENTRIC WITH ITS LOCK SCREW LOOSENED. CHECK EACH PIN TO SEE THAT IT IS FREE FROM BINDS.

FIGURE 6.



FEED PAWL PLATE

TO CHECK

HOLD FEED MAGNET ARMATURE IN ATTRACTED POSITION (FIGURE 54). ROTATE MAIN SHAFT THROUGH ONE COMPLETE REVOLUTION

REQUIREMENT

(1) FEED PAWL SHOULD ADVANCE FEED RATCHET ONE TOOTH WITH NO PERCEPTIBLE UNDER OR OVER TRAVEL.

(2) DETENT ROLLER SHOULD FULLY DETENT FEED RATCHET.

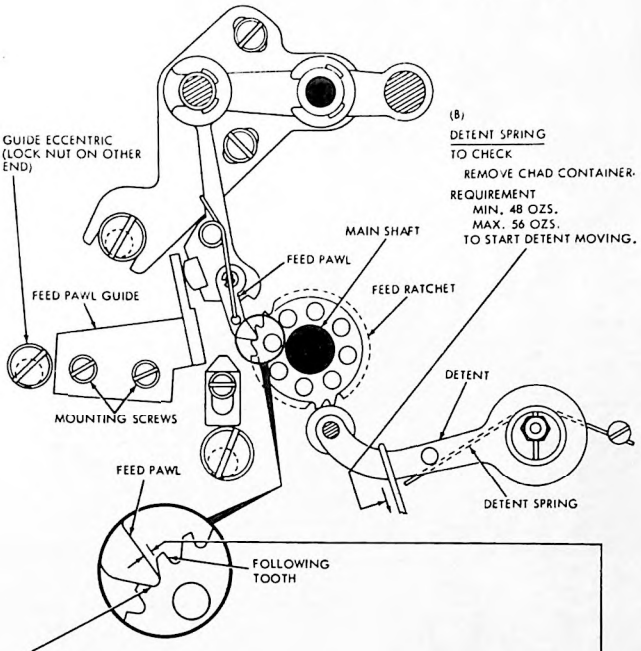
TO ADJUST

LOOSEN WEDGE BLOCK MOUNTING SCREW. LOOSEN WEDGE BLOCK ECCENTRIC LOCK NUT. MOVE BLOCK TO ITS LOWEST POSITION. LOOSEN FEED PAWL GUIDE MOUNTING SCREWS. LOOSEN GUIDE ECCENTRIC LOCK NUT SO THAT GUIDE IS FREE TO MOVE. LOOSEN DETENT ECCENTRIC LOCK NUT. PLACE DETENT IN LOWEST POSITION (AS SHOWN). TIGHTEN DETENT LOCK NUT. LOOSEN FEED PAWL PLATE MOUNTING SCREWS. LOOSEN LOCK NUT ON PLATE ECCENTRIC. POSITION PLATE TO MEET REQUIREMENT BY ROTATING PLATE ECCENTRIC. TIGHTEN PLATE ECCENTRIC LOCK NUT AND PLATE MOUNTING SCREWS. RECHECK REQUIREMENTS.

NOTE

IF THIS ADJUSTMENT IS CHANGED, CHECK FEED PAWL GUIDE (FIGURE 8), WEDGE BLOCK (FIGURE 9), AND FEED RATCHET DETENT (FIGURE 11) ADJUSTMENTS.

FIGURE 7.



(B)

DETENT SPRING

TO CHECK

REMOVE CHAD CONTAINER.

REQUIREMENT

MIN. 48 OZS.
MAX. 56 OZS.
TO START DETENT MOVING.

(A)

FEED PAWL GUIDE

TO CHECK

HOLD FEED MAGNET ARMATURE IN ATTRACTED POSITION. ROTATE MAIN SHAFT UNTIL FEED PAWL IS AT BOTTOM OF DOWNSTROKE.

REQUIREMENT

(1) SURFACE OF FEED PAWL SHOULD APPROXIMATELY CONFORM TO INDENTATION BETWEEN RATCHET TEETH.

(2) PERCEPTIBLE CLEARANCE BETWEEN PAWL AND FOLLOWING TOOTH.

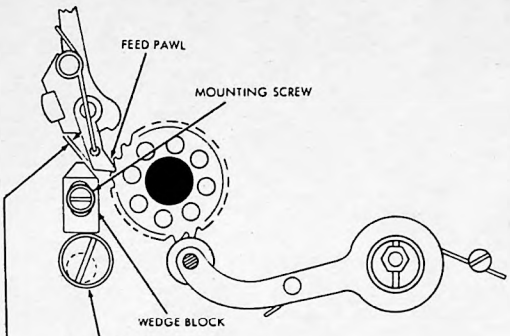
TO ADJUST

LOOSEN FEED PAWL GUIDE MOUNTING SCREWS AND GUIDE ECCENTRIC LOCK NUT. POSITION GUIDE BY MEANS OF ECCENTRIC. TIGHTEN SCREWS AND LOCK NUT AND RECHECK REQUIREMENTS.

NOTE

IF THIS ADJUSTMENT IS CHANGED, CHECK FEED PAWL PLATE (FIGURE 7), WEDGE BLOCK (FIGURE 9) AND FEED RATCHET DETENT (FIGURE 11) ADJUSTMENTS.

FIGURE 8.



WEDGE BLOCK

REQUIREMENT

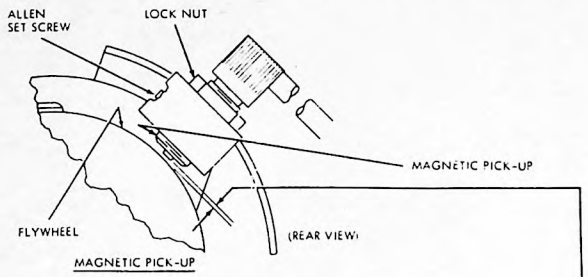
WITH FEED PAWL IN LOWEST POSITION:
MIN. 0.001 INCH --- MAX. 0.003 INCH
BETWEEN WEDGE BLOCK AND FEED PAWL

TO ADJUST

LOOSEN BLOCK MOUNTING SCREW AND ECCENTRIC LOCK NUT. POSITION WEDGE BLOCK BY MEANS OF ECCENTRIC. TIGHTEN MOUNTING SCREW AND LOCK NUT AND RECHECK REQUIREMENT.

NOTE

IF THIS ADJUSTMENT IS CHANGED, CHECK FEED PAWL PLATE (FIGURE 7), FEED PAWL GUIDE (FIGURE 8), AND FEED RATCHET DETENT (FIGURE 11) ADJUSTMENTS.



MAGNETIC PICK-UP

REQUIREMENT

MIN. 0.005 INCH --- MAX. 0.010 INCH
BETWEEN FLYWHEEL AND MAGNETIC PICK-UP WHERE CLEARANCE IS LEAST.

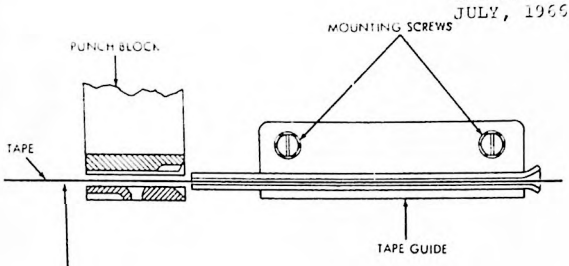
TO ADJUST

POSITION MAGNETIC PICK UP WITH LOCK NUT AND SET SCREW LOOSENED

NOTE

FOR RANGE ADJUSTMENT SEE FIGURE 13

FIGURE 9.



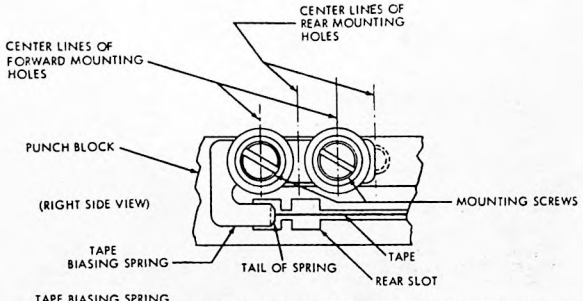
TAPE GUIDE

REQUIREMENT

WITH PUNCH BAIL IN HIGHEST POSITION, TAPE SHOULD PASS FREELY FROM TAPE GUIDE THROUGH PUNCH BLOCK.

TO ADJUST

POSITION TAPE GUIDE WITH MOUNTING SCREWS FRICTION TIGHT.



TAPE BIASING SPRING

ALL 6- TO 8-LEVEL PUNCHES ARE ADJUSTED AT FACTORY FOR 1-INCH WIDTH TAPE. IF 7/8-INCH TAPE (6- OR 7-LEVEL) IS TO BE USED, REMOVE BIASING SPRING BY REMOVING ITS MOUNTING SCREWS. INSERT TAIL OF SPRING IN REAR SLOT OF PUNCH BLOCK. INSERT SCREWS IN REAR MOUNTING HOLES AND MAKE FRICTION TIGHT.

REQUIREMENT

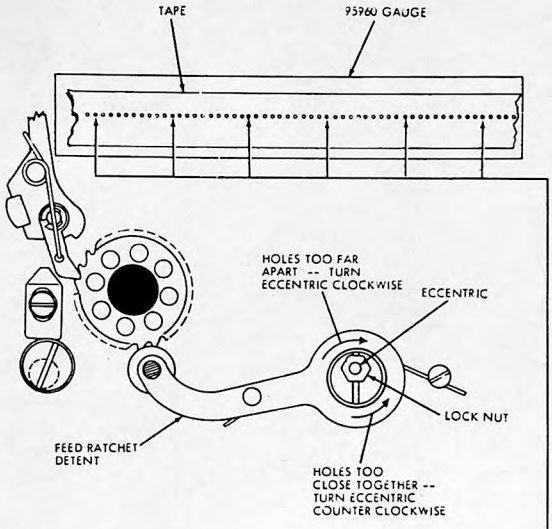
TAPE BIASING SPRING SHOULD HOLD TAPE AGAINST REAR OF PUNCH BLOCK WITHOUT CRIMPING OR CURLING FRONT EDGE.

TO ADJUST

POSITION SPRING WITH MOUNTING SCREWS FRICTION TIGHT.

NOTE: WHEN ADJUSTING COMPLETE PUNCH SET, MAKE TIMING BELT ADJUSTMENT (FIGURE 19) AT THIS POINT IN PROCEDURE.

FIGURE 10.



FEED RATCHET DETENT

TO CHECK

WITH PUNCH UNIT UNDER POWER, FEED OUT A SHORT LENGTH OF BLANK TAPE. PLACE TAPE ON 95960 TAPE GUAGE.

REQUIREMENT

SPACING OF FEED HOLES SHOULD BE 10 TO INCH, I.E., EVERY TENTH FEED HOLE SHOULD CONFORM TO A HOLE IN GAUGE.

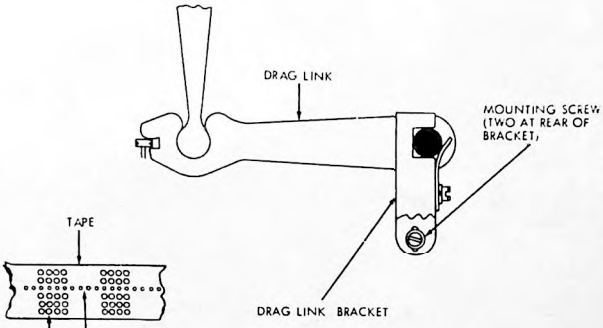
TO ADJUST

BY MEANS OF ITS ECCENTRIC, POSITION DETENT WITH LOCK NUT LOOSENED

NOTE

IF THIS ADJUSTMENT CHANGES, CHECK FEED PAWL PLATE (FIGURE 7), FEED PAWL GUIDE (FIGURE 8) AND WEDGE BLOCK (FIGURE 9) ADJUSTMENTS

FIGURE 11.



DRAG LINKS

TO CHECK

WITH PUNCH UNIT UNDER POWER, PERFORATE SERIES OF MARKING (HOLES) CODE COMBINATIONS ALTERNATED WITH SERIES OF SPACING (NO HOLES) CODE COMBINATIONS.

REQUIREMENT

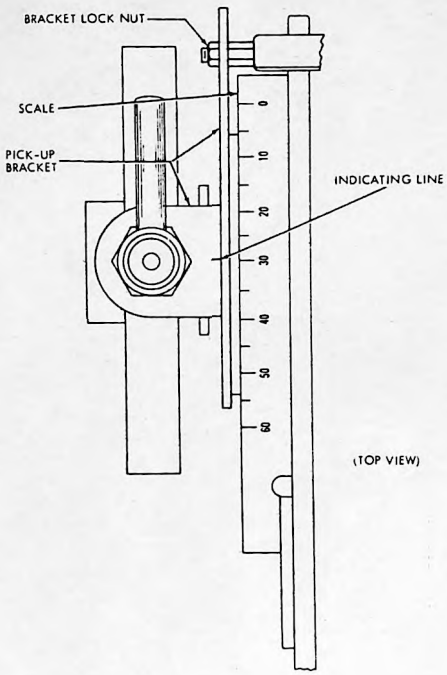
(1) EDGES OF HOLES CLEAN CUT.

(2) NO IMPRESSIONS OR PUNCH PIN MARKS ON SPACES BETWEEN HOLES.

TO ADJUST

POSITION DRAG LINK BRACKET WITH MOUNTING SCREWS LOOSENED. IF HOLES ARE NOT CLEAN CUT, MOVE BRACKET UP. IF SPACES BETWEEN HOLES ARE MARKED, MOVE BRACKET DOWN. TIGHTEN SCREWS AND RECHECK REQUIREMENTS.

FIGURE 12.



RANGE

TO CHECK

OPERATE PUNCH FROM CONTROL CIRCUITS. LOOSEN BRACKET LOCK NUT. TO DETERMINE OPERATING RANGE, ROTATE PICK-UP BRACKET IN ONE DIRECTION AND RECORD NUMBER ON SCALE OPPOSITE INDICATING LINE WHEN ERRORS BEGIN TO OCCUR. ROTATE BRACKET IN OTHER DIRECTION AND RECORD NUMBER WHERE ERRORS OCCUR

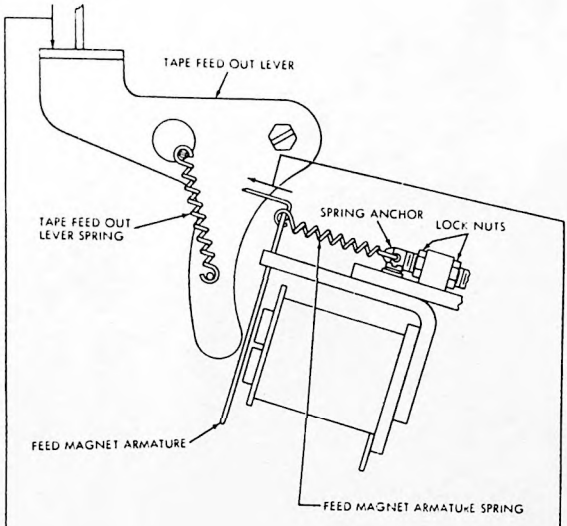
REQUIREMENT

MAGNETIC PICK-UP AT CENTER OF OPERATING RANGE.

TO ADJUST

POSITION BRACKET SO THAT INDICATING LINE IS OPPOSITE NUMBER ON SCALE AT CENTER OF OPERATING RANGE.

FIGURE 13.



(A)

TAPE FEED OUT LEVER SPRING

REQUIREMENT

MIN. 4 OZS ---MAX. 6 OZS.
TO START FEED OUT LEVER MOVING.

(B)

FEED MAGNET ARMATURE SPRING

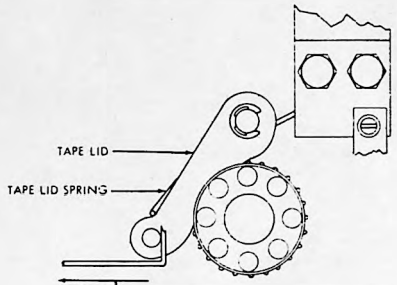
REQUIREMENT

WITH FEED DRIVE LEVER IN HIGHEST POSITION:
MIN. 14 OZS. --- MAX. 17 OZS. TO
START ARMATURE MOVING

TO ADJUST

POSITION SPRING ANCHOR WITH
LOCK NUTS LOOSENED

FIGURE 14.



(A)
TAPE LID SPRING
REQUIREMENT
MIN. 2-1/2 OZS.---MAX. 3 OZS.
TO START TAPE LID MOVING.

(B)
FEED PAWL SPRING
REQUIREMENT
WITH FEED OUT LEVER
DEPRESSED AND FEED PAWL
IN ITS HIGHEST POSITION:
MIN. 3 OZS. -- MAX. 5 OZS.
TO START PAWL MOVING.

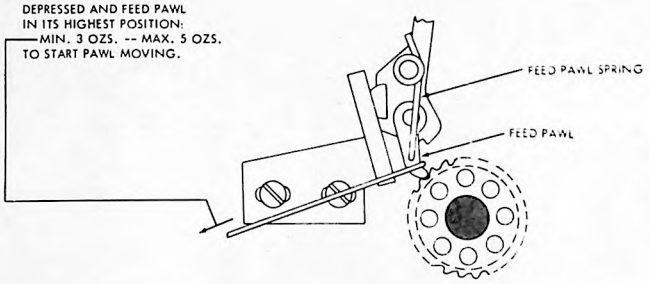
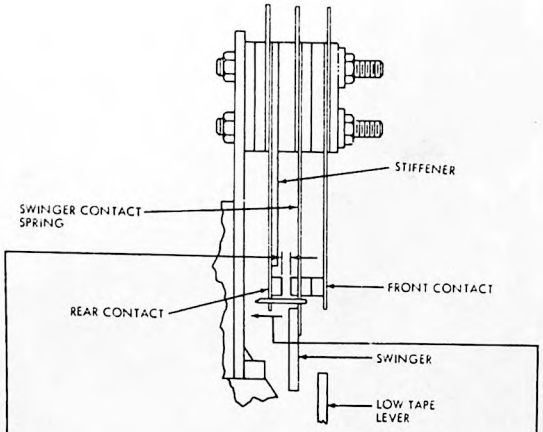


FIGURE 15.



LOW TAPE CONTACTS

REQUIREMENTS

WITH LOW-TAPE LEVER HELD AWAY FROM SWINGER:

(1) MIN. 0.025 INCH --- MAX. 0.035 INCH GAP AT REAR CONTACT.

(2) MIN. 4 OZS. --- MAX. 5 OZS. TO OPEN FRONT CONTACT.

TO ADJUST

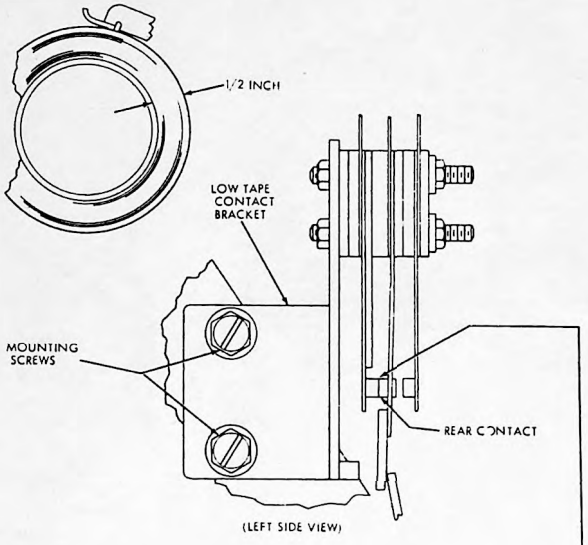
REMOVE TRANSPARENT COVER BY REMOVING ITS MOUNTING NUTS.

(1) BEND STIFFENER TO MEET (1) ABOVE.

(2) BEND SWINGER CONTACT SPRING TO MEET (2) ABOVE.

REPLACE COVER.

FIGURE 16.



LOW TAPE CONTACT BRACKET

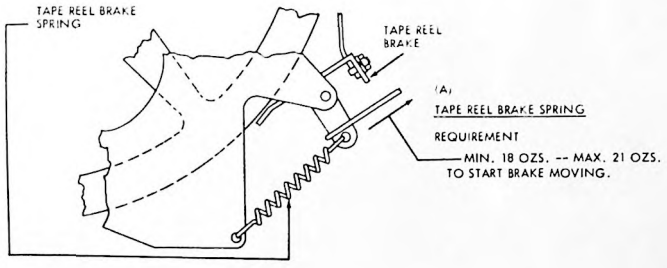
REQUIREMENT

WHEN THERE IS 1/2 INCH OF TAPE LEFT ON ROLL, REAR CONTACT SHOULD BE JUST CLOSED.

TO ADJUST

POSITION CONTACT BRACKET WITH MOUNTING SCREWS FRICTION TIGHT.

FIGURE 17.


TAPE REEL BRAKE SPRING
TAPE REEL BRAKE
(A)
TAPE REEL BRAKE SPRING
REQUIREMENT
MIN. 18 OZS. -- MAX. 21 OZS.
TO START BRAKE MOVING.

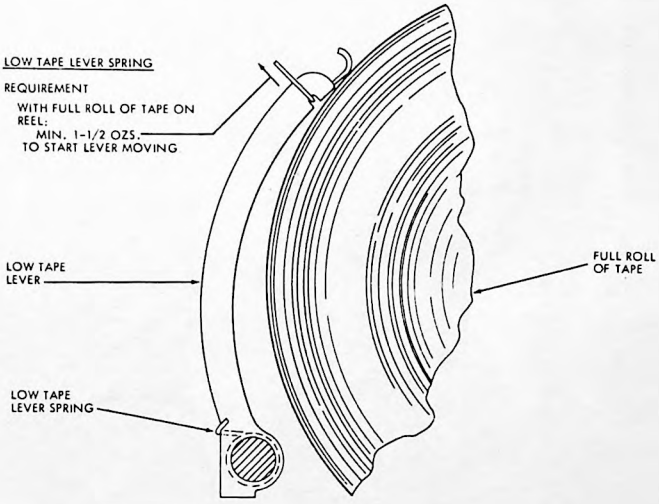
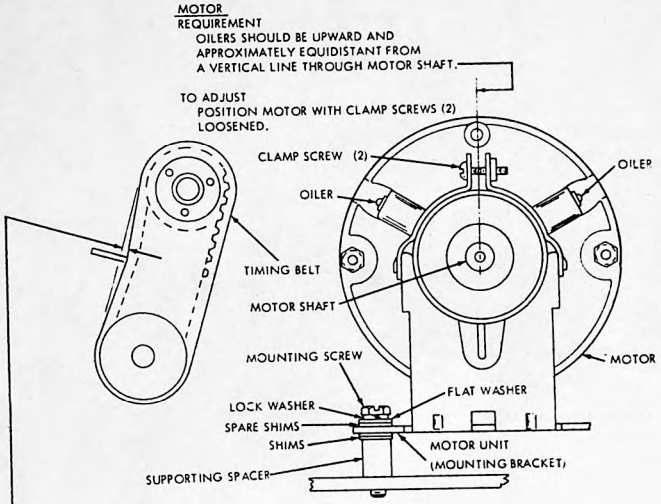

LOW TAPE LEVER SPRING
REQUIREMENT
WITH FULL ROLL OF TAPE ON REEL:
MIN. 1-1/2 OZS.
TO START LEVER MOVING
LOW TAPE LEVER
FULL ROLL OF TAPE
LOW TAPE LEVER SPRING

FIGURE 18.

c. MOTOR-MOUNTING AND DRIVE PARTS



CAUTION:
IF MOTOR BECOMES BLOCKED FOR SEVERAL SECONDS, THERMAL CUT-OUT SWITCH WILL BREAK CIRCUIT. SHOULD THIS HAPPEN, ALLOW MOTOR TO COOL AT LEAST 5 MINUTES BEFORE DEPRESSING RED RESET BUTTON.

TIMING BELT
REQUIREMENT

ONE POUND PRESSURE AT CENTER OF TIMING BELT SPAN SHOULD DEFLECT BELT APPROXIMATELY
1/16 INCH FOR 110 OPS OPERATION
3/16 INCH FOR 63.3 OPS OPERATION

TO ADJUST

REMOVE FOUR MOTOR MOUNTING SCREWS WITH LOCK WASHERS, FLAT WASHERS AND SPARE SHIMS. LIFT MOTOR UNIT FROM SUPPORTING SPACERS. ADD SHIMS TO, OR REMOVE THEM FROM, SUPPORTING SPACERS. REPLACE MOTOR UNIT. REPLACE MOUNTING SCREWS WITH THEIR HARDWARE *AND MAKE FRICTION TIGHT. REFINE ADJUSTMENT BY SHIFTING MOTOR HORIZONTALLY. TIGHTEN MOUNTING SCREWS AND RECHECK REQUIREMENT.

*RETAIN SPARE SHIMS BY PLACING THEM ON MOUNTING SCREWS ABOVE MOUNTING BRACKET AS SHOWN IN DRAWING

FIGURE 19.

4. EARLY DESIGN

CHECK FOR BINDS BY ROTATING MAIN SHAFT AS INSTRUCTED IN PAR. 3-1.f.

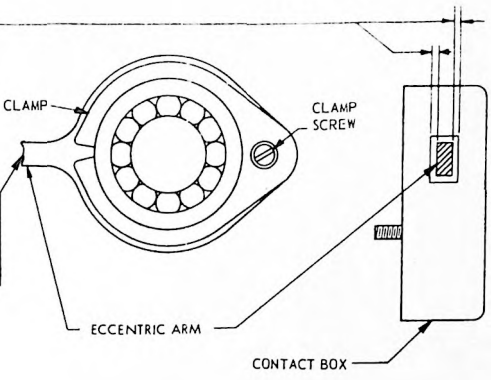
(A) ECCENTRIC ARMS

REQUIREMENT

SOME CLEARANCE BETWEEN SIDES OF ECCENTRIC ARMS AND CONTACT BOX OPENINGS

ADJUST

EACH ECCENTRIC ARM ON OUTER BEARING RACE WITH CLAMP SCREW LOOSENED.



(B) PUNCH BAIL ECCENTRIC STUD

REQUIREMENT

HOLD ARMATURES OPERATED (MARKING), BLOCKING PAWL AGAINST STOP PLATE. ROTATE THE MAIN SHAFT UNTIL THE ENGAGING SURFACES OF LONG TOGGLE ARMS ARE BELOW ENGAGING SURFACES OF THE BLOCKING PAWLS. CLEARANCE BETWEEN END OF LONG TOGGLE ARMS AND BLOCKING PAWLS

MIN. .003 INCH

MAX. .015 INCH.

ADJUST

PUNCH BAIL ECCENTRIC STUD WITH ITS LOCK NUT LOOSENED.

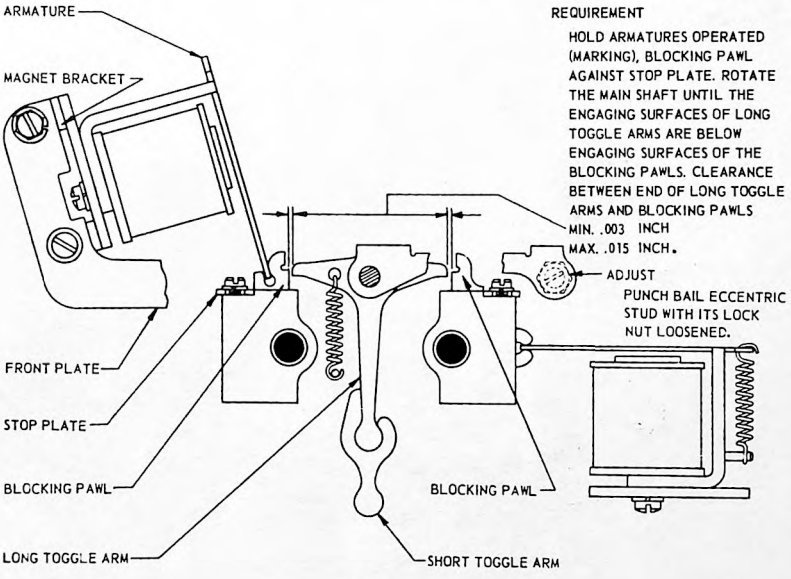


FIGURE 20.

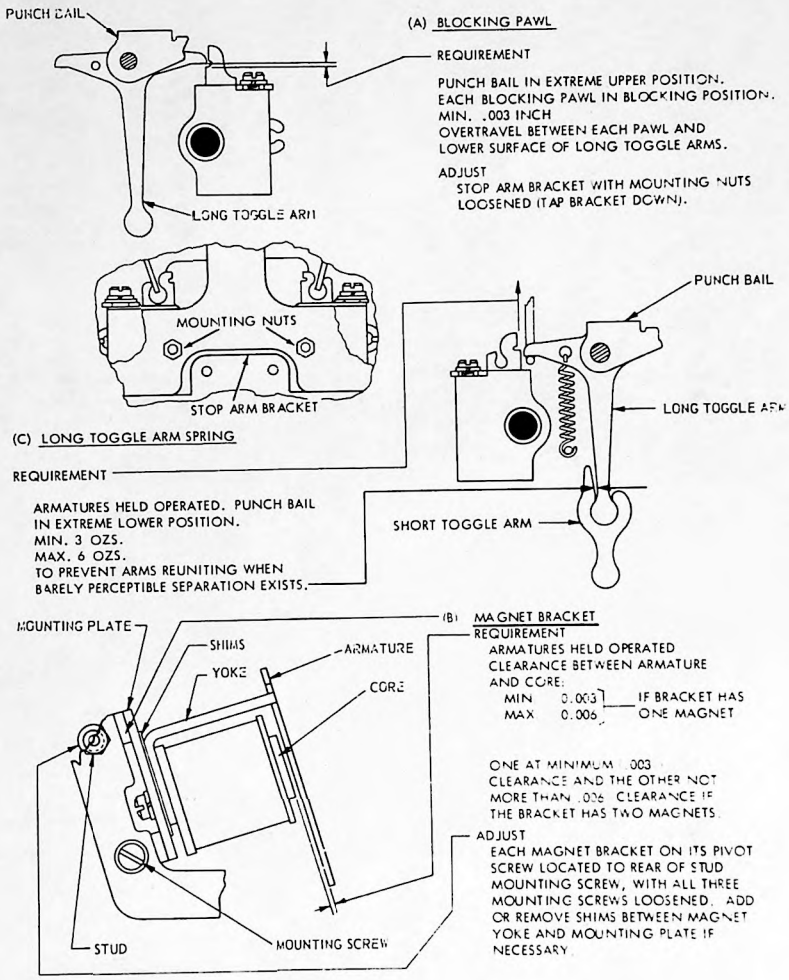
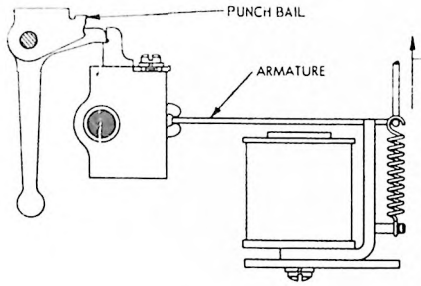

PUNCH BAIL
LONG TOGGLE ARM
(A) BLOCKING PAWL
REQUIREMENT
PUNCH BAIL IN EXTREME UPPER POSITION.
EACH BLOCKING PAWL IN BLOCKING POSITION.
MIN. .003 INCH
OVERTRAVEL BETWEEN EACH PAWL AND
LOWER SURFACE OF LONG TOGGLE ARMS.
ADJUST
STOP ARM BRACKET WITH MOUNTING NUTS
LOOSENED (TAP BRACKET DOWN).
MOUNTING NUTS
STOP ARM BRACKET
PUNCH BAIL
LONG TOGGLE ARM
(C) LONG TOGGLE ARM SPRING
REQUIREMENT
ARMATURES HELD OPERATED. PUNCH BAIL
IN EXTREME LOWER POSITION.
MIN. 3 OZS.
MAX. 6 OZS.
TO PREVENT ARMS REUNITING WHEN
BARELY PERCEPTIBLE SEPARATION EXISTS.
SHORT TOGGLE ARM
MOUNTING PLATE
SHIMS
YOKE
ARMATURE
CORE
STUD
MOUNTING SCREW
(B) MAGNET BRACKET
REQUIREMENT
ARMATURES HELD OPERATED
CLEARANCE BETWEEN ARMATURE
AND CORE:
MIN 0.003
MAX 0.006
IF BRACKET HAS
ONE MAGNET
ONE AT MINIMUM .003
CLEARANCE AND THE OTHER NOT
MORE THAN .006 CLEARANCE IF
THE BRACKET HAS TWO MAGNETS.
ADJUST
EACH MAGNET BRACKET ON ITS PIVOT
SCREW LOCATED TO REAR OF STUD
MOUNTING SCREW, WITH ALL THREE
MOUNTING SCREWS LOOSENED. ADD
OR REMOVE SHIMS BETWEEN MAGNET
YOKE AND MOUNTING PLATE IF
NECESSARY.

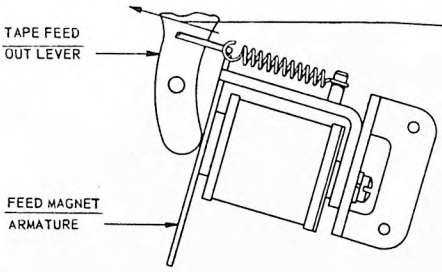
FIGURE 21.



(A) PUNCH MAGNET ARMATURE SPRING

REQUIREMENT

PUNCH BAIL DRIVE LINK ASSEMBLY IN TOP CENTER POSITION.
MIN. 13 OZ.
MAX. 15 OZ.
TO MOVE ARMATURE.



(B) FEED MAGNET ARMATURE SPRING

REQUIREMENT

PUNCH BAIL DRIVE LINK ASSEMBLY IN TOP CENTER POSITION.
MIN. 13 OZS.
MAX. 15 OZS.
TO MOVE ARMATURE.

(C) PUNCH BLOCK

REQUIREMENT

PINS MOVE FREELY IN PUNCH BLOCK. MINIMUM CLEARANCE BETWEEN STEMS OF PUNCH PINS AND EDGES OF DRAG LINK SLOTS.

SOME CLEARANCE BETWEEN RETAINING PLATE AND PUNCH PINS.

ADJUST

FIRST THE RETAINING PLATE WITH ITS MOUNTING SCREWS LOOSENED; THEN POSITION PUNCH BLOCK, WITH MOUNTING SCREWS LOOSENED, BY MEANS OF ITS LOCATING ECCENTRIC.

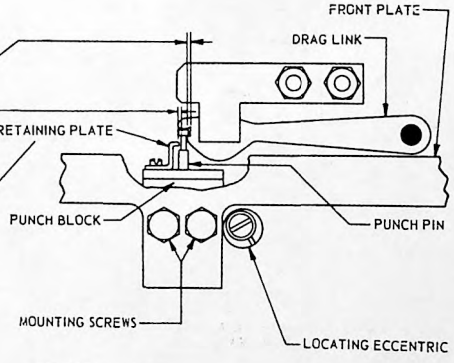


FIGURE 22.

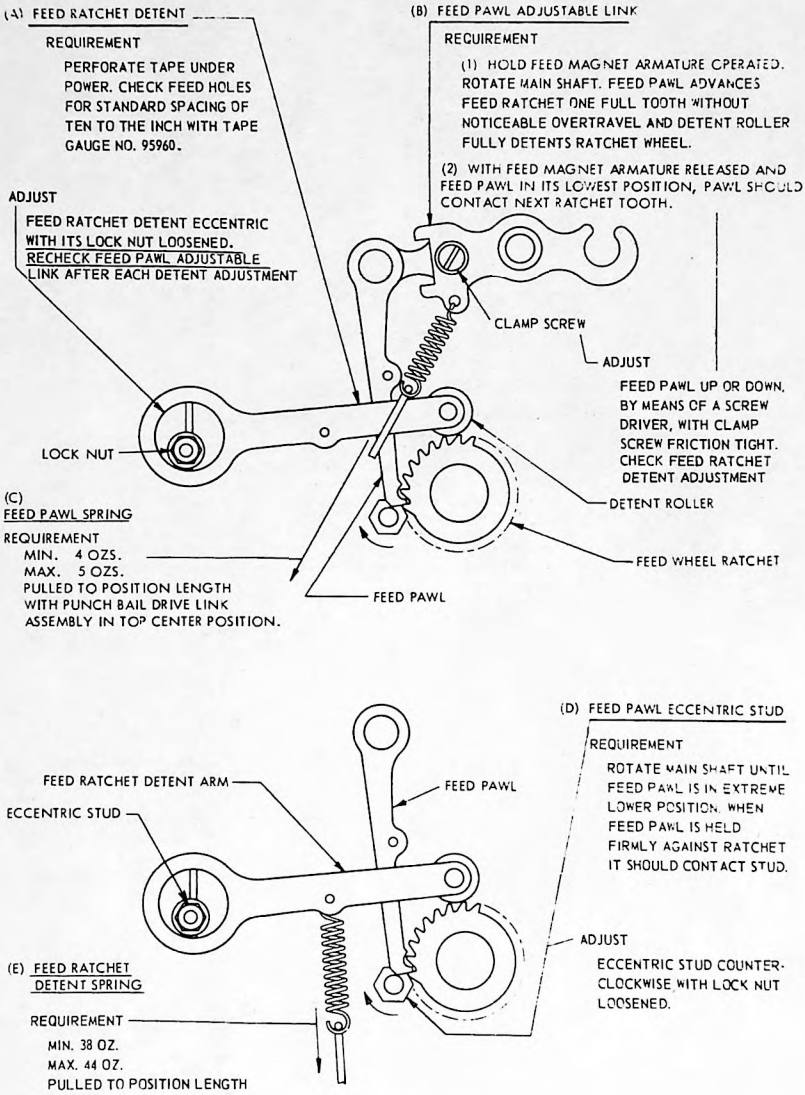
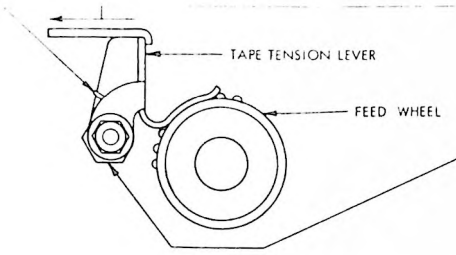

(A) FEED RATCHET DETENT
REQUIREMENT
PERFORATE TAPE UNDER POWER. CHECK FEED HOLES FOR STANDARD SPACING OF TEN TO THE INCH WITH TAPE GAUGE NO. 95960.
ADJUST
FEED RATCHET DETENT ECCENTRIC WITH ITS LOCK NUT LOOSENED. RECHECK FEED PAWL ADJUSTABLE LINK AFTER EACH DETENT ADJUSTMENT
(B) FEED PAWL ADJUSTABLE LINK
REQUIREMENT
(1) HOLD FEED MAGNET ARMATURE OPERATED. ROTATE MAIN SHAFT. FEED PAWL ADVANCES FEED RATCHET ONE FULL TOOTH WITHOUT NOTICEABLE OVERTRAVEL AND DETENT ROLLER FULLY DETENTS RATCHET WHEEL.
(2) WITH FEED MAGNET ARMATURE RELEASED AND FEED PAWL IN ITS LOWEST POSITION, PAWL SHOULD CONTACT NEXT RATCHET TOOTH.
CLAMP SCREW
ADJUST
FEED PAWL UP OR DOWN, BY MEANS OF A SCREW DRIVER, WITH CLAMP SCREW FRICTION TIGHT. CHECK FEED RATCHET DETENT ADJUSTMENT
LOCK NUT
DETENT ROLLER
(C) FEED PAWL SPRING
REQUIREMENT
MIN. 4 OZS.
MAX. 5 OZS.
PULLED TO POSITION LENGTH WITH PUNCH BAIL DRIVE LINK ASSEMBLY IN TOP CENTER POSITION.
FEED WHEEL RATCHET
FEED PAWL
(D) FEED PAWL ECCENTRIC STUD
REQUIREMENT
ROTATE MAIN SHAFT UNTIL FEED PAWL IS IN EXTREME LOWER POSITION. WHEN FEED PAWL IS HELD FIRMLY AGAINST RATCHET IT SHOULD CONTACT STUD.
FEED RATCHET DETENT ARM
FEED PAWL
ECCENTRIC STUD
ADJUST
ECCENTRIC STUD COUNTER-CLOCKWISE WITH LOCK NUT LOOSENED.
(E) FEED RATCHET DETENT SPRING
REQUIREMENT
MIN. 38 OZ.
MAX. 44 OZ.
PULLED TO POSITION LENGTH

FIGURE 23.

(A) TAPE TENSION LEVER SPRING

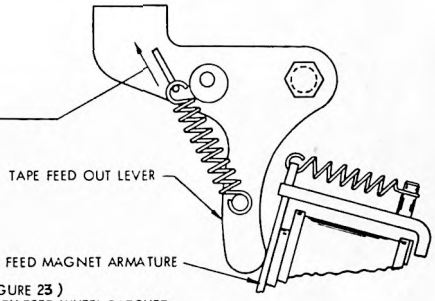


REQUIREMENT
MIN. 4-1/2 OZ.
MAX. 5-1/2 OZ.
TO START LEVER MOVING AWAY FROM FEED WHEEL.

ADJUST
TAPE TENSION LEVER STUD WITH LOCK NUT LOOSENED.

(B) TAPE FEED OUT LEVER SPRING TENSION

REQUIREMENT
MIN. 2-1/2 OZ.
MAX. 3-1/2 OZ.
PULLED TO POSITION LENGTH.



(C) FEED PAWL AND RATCHET ALIGNMENT (SEE FIGURE 23)
REQUIREMENT - FEED PAWL FULLY ALIGNED WITH FEED WHEEL RATCHET.
TO ADJUST - SHIM THE DETENT ARM ECCENTRIC STUD THAT IS FASTENED TO THE MOUNTING PLATE. USE 71074 WASHERS FOR SHIMS.

NOTE: THE FOLLOWING ADJUSTMENTS ARE ARRANGED TO PROVIDE CONTACTOR OPERATION. THE OPENING OR CLOSURE OF THE CONTACTS (OR CONTACT IN CASE OF SINGLE-CONTACT UNIT) MAY BE ADVANCED OR RETARDED IN THE PUNCHING CYCLE BY ROTATING THE CONTACTOR MOUNTING PLATES ABOUT THE MAIN SHAFT. ROTATING THE CONTACTORS IN THE DIRECTION OF SHAFT ROTATION WILL DELAY THE TIME AT WHICH THEY ARE ACTIVATED. ROTATING THE CONTACTORS AGAINST THE DIRECTION OF SHAFT ROTATION WILL ADVANCE THE TIME AT WHICH THEY ARE ACTIVATED. THE CONTACTORS (DOUBLE-CONTACT UNITS ONLY) MAY BE MOVED INDIVIDUALLY OR TOGETHER IN EITHER DIRECTION TO FACILITATE COUPLING OF THE PUNCH MECHANISM TO AUXILIARY CONTROL EQUIPMENT (REFER TO TIMING DIAGRAM, FIGURE 10).

(D) CONTACTS
REQUIREMENT
ECCENTRIC ARMS IN EXTREME RIGHT, THEN IN EXTREME LEFT POSITIONS.
ALL GAPS
MIN. .008 INCH
MAX. .012 INCH AND
EQUAL TO EACH OTHER WITHIN .002 INCH.

ADJUST
BOX HORIZONTALLY WITH SCREWS LOOSENED.

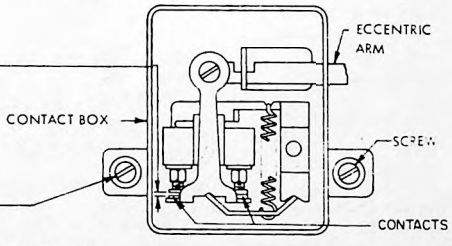


FIGURE 24.

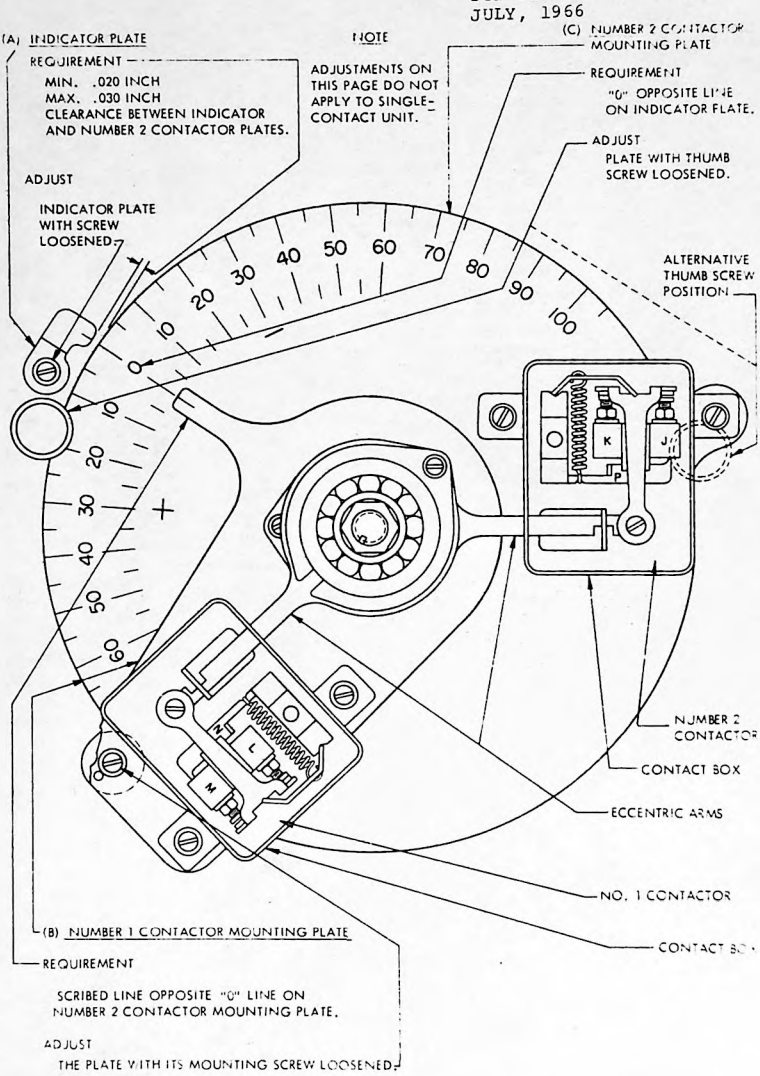
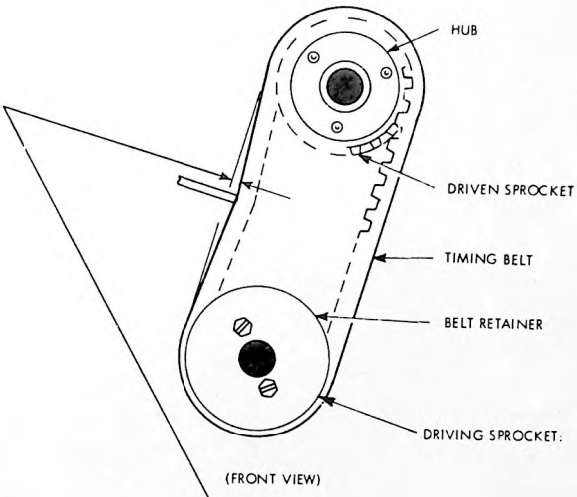
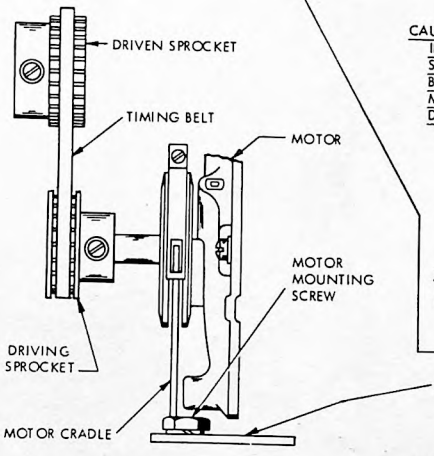

(A) INDICATOR PLATE
REQUIREMENT
MIN. .020 INCH
MAX. .030 INCH
CLEARANCE BETWEEN INDICATOR AND NUMBER 2 CONTACTOR PLATES.
ADJUST
INDICATOR PLATE WITH SCREW LOOSENED.
NOTE
ADJUSTMENTS ON THIS PAGE DO NOT APPLY TO SINGLE-CONTACT UNIT.
(C) NUMBER 2 CONTACTOR MOUNTING PLATE
REQUIREMENT
"0" OPPOSITE LINE ON INDICATOR PLATE.
ADJUST
PLATE WITH THUMB SCREW LOOSENED.
ALTERNATIVE THUMB SCREW POSITION
NUMBER 2 CONTACTOR
CONTACT BOX
ECCENTRIC ARMS
NO. 1 CONTACTOR
CONTACT BOX
(B) NUMBER 1 CONTACTOR MOUNTING PLATE
REQUIREMENT
SCRIBED LINE OPPOSITE "0" LINE ON NUMBER 2 CONTACTOR MOUNTING PLATE.
ADJUST
THE PLATE WITH ITS MOUNTING SCREW LOOSENED.

FIGURE 25.

NOTE
MAKE MOTOR ADJUSTMENT IN FIGURE 3-18.



(FRONT VIEW)



CAUTION:
IF MOTOR BECOMES BLOCKED FOR SEVERAL SECONDS, THERMAL CUT-OUT SWITCH WILL BREAK CIRCUIT. SHOULD THIS HAPPEN, ALLOW MOTOR TO COOL AT LEAST 5 MINUTES BEFORE DEPRESSING RED RESET BUTTON.

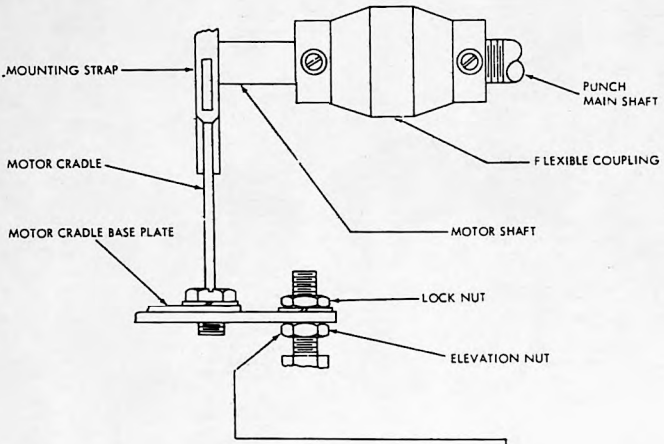
TIMING BELT

REQUIREMENT
BY MEANS OF A SCALE, APPLY A ONE POUND PUSH TO THE CENTER OF THE BELT SPAN. THE BELT SHOULD YIELD 3 16" SPROCKETS ALIGNED. SHAFTS PARALLEL.

ADJUST
MOTOR WITH FOUR MOUNTING SCREWS LOOSENED

FIGURE 26.

SINGLE UNIT BASE ADJUSTMENTS NOTE.
TO MOUNT THE PUNCH UNIT ON ITS BASE, REMOVE THE FLEXIBLE COUPLING LOCK SCREWS AND SLIDE THE COUPLING BACK ON THE MOTOR SHAFT. MOUNT THE PUNCH UNIT TO ITS BASE WITH THE FOUR MOUNTING SCREWS PROVIDED. AT THE REAR OF THE BASE, REMOVE THE PLATE THAT CONTAINS PROVISIONS FOR THE CONNECTORS AND ON THIS PLATE MOUNT THE PUNCH CABLE CONNECTOR PLUG WITH FOUR SCREWS AND LOCKWASHERS. DIRECT THE PUNCH CABLE THROUGH ITS OPENING IN THE BASE PLATE AND REPLACE THE CONNECTOR PLATE. PASS THE CABLE THROUGH THE CABLE CLAMPS.



MOTOR MOUNTING PLATE - (DIRECT DRIVE)

REQUIREMENT

MOTOR SHAFT IN ALIGNMENT WITH PUNCH MAIN SHAFT.

ADJUST

ELEVATION AND LOCK NUTS AT FOUR CORNERS OF MOTOR MOUNTING PLATE. POSITION MOTOR HORIZONTALLY WITH LOCK NUTS LOOSENED.

FIGURE 27.

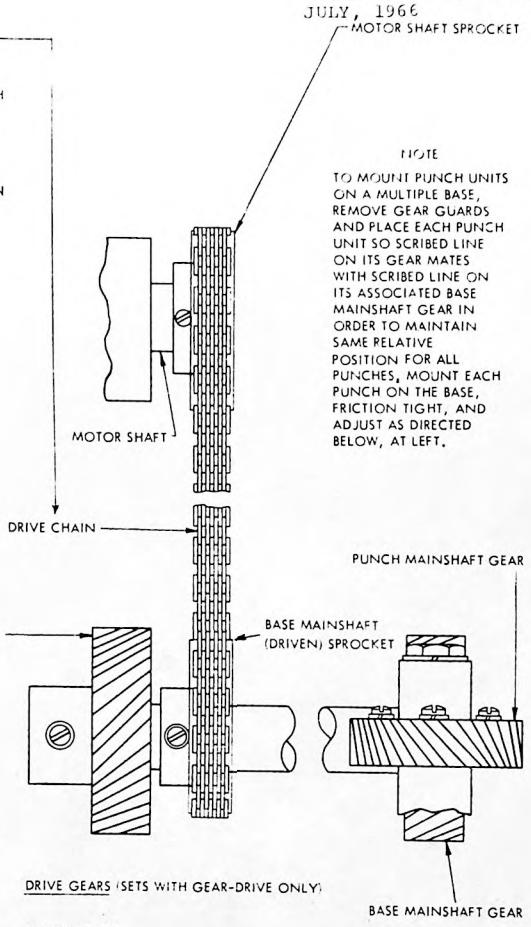
A) MULTIPLE UNIT BASE MAIN-SHAFT DRIVE CHAIN

REQUIREMENT

MOTOR SHAFT PARALLEL WITH BASE MAINSHAFT. DRIVING SPROCKET ALIGNED WITH DRIVEN SPROCKET. DRIVE CHAIN TAUT, WITHOUT NOTICEABLE SLACK, BETWEEN SPROCKETS

ADJUST

MOTOR WITH ITS MOUNTING SCREWS LOOSENED.



B) MULTIPLE UNIT PUNCH MAINSHAFT GEARS

REQUIREMENT

JUST PERCEPTIBLE BACK-LASH BETWEEN EACH PUNCH MAINSHAFT GEAR AND ITS ASSOCIATED BASE MAIN-SHAFT GEAR THROUGHOUT COMPLETE REVOLUTION OF GEARS.

ADJUST

EACH PUNCH UNIT UP OR DOWN WITH GEAR GUARDS REMOVED AND ITS MOUNTING SCREWS LOOSENED FRICTION TIGHT.

DRIVE GEARS (SETS WITH GEAR-DRIVE ONLY)

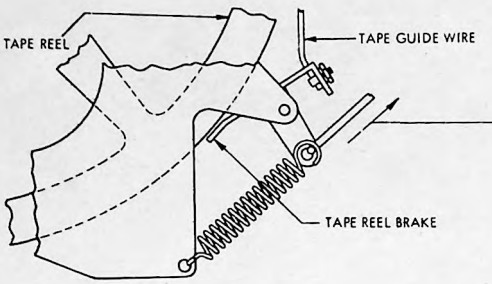
REQUIREMENT

GEARS ALIGNED, WITH MINIMUM BACKLASH AND NO BIND

ADJUST

MOTOR ON MOUNTING POSTS WITH MOUNTING SCREWS LOOSENED

FIGURE 28.



(A) TAPE REEL BRAKE SPRING

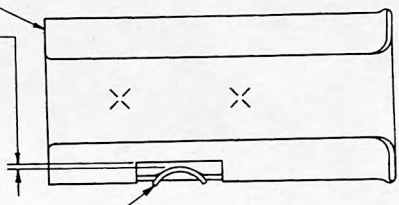
REQUIREMENT

MIN. 18 OZ.
MAX. 21 OZ.
PULLED TO POSITION LENGTH

(B)
TAPE GUIDE SPRING

REQUIREMENT

TOP, CURVED EDGE OF SPRING PARALLEL TO TOP EDGE OF TAPE GUIDE. CLEARANCE BETWEEN SPRING AND CUT-OUT PORTION OF GUIDE IS GREATER WITH A TAPE IN GUIDE THAN WHEN GUIDE IS EMPTY BY A
MIN. .005 INCH
MAX. .010 INCH.

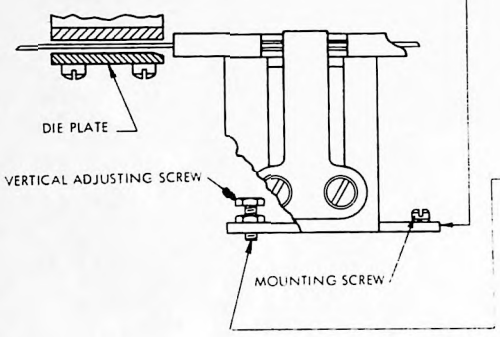


ADJUST
SPRING, WITH MOUNTING SCREWS LOOSENED, FOR ALIGNMENT. BEND SPRING FOR CLEARANCE.

(C)
TAPE GUIDE BRACKET

REQUIREMENT

WITH PUNCH BAIL IN EXTREME UPPER POSITION THE TAPE PASSES FREELY FROM THE TAPE GUIDE THROUGH PUNCH BLOCK DIE PLATES. CLEARANCE BETWEEN TAPE GUIDE AND DIE PLATES SHOULD BE
MIN. .010 INCH
MAX. .040 INCH.



ADJUST
VERTICALLY BY MEANS OF ADJUSTING SCREW WITH ITS LOCK NUT LOOSENED AND WITH MOUNTING SCREW TIGHT. CHECK WITH UNDERSIZE ONE HALF TAPE. POSITION HORIZONTALLY WITH MOUNTING SCREWS LOOSENED FRICTION TIGHT. REFINE VERTICAL POSITION IF NECESSARY.

FIGURE 29.

HIGH SPEED TAPE PUNCH SET

LUBRICATION

CONTENTS

1. GENERAL

1.1 The Punch should be thoroughly lubricated, but over-lubrication which might allow oil to drip or grease to be thrown on other parts should be avoided. Teletype KS7470 oil, KS7471 grease, or Mobilgrease No. 2 should be used as indicated in the specific instructions in this section.

.2 Lubricate the equipment before putting it in service or prior to storage. After a short period of service, repeat the procedure to make sure that all specified points have received lubricant. Thereafter, lubricate at regular intervals as needed. The lubrication interval should not be more than 160 hours or one month of service, whichever occurs first.

.3 Make certain that no oil or grease accumulates between the armatures and magnet pole faces or between contact points. Wipe off the excess lubricant from the armatures and yoke pivot points.

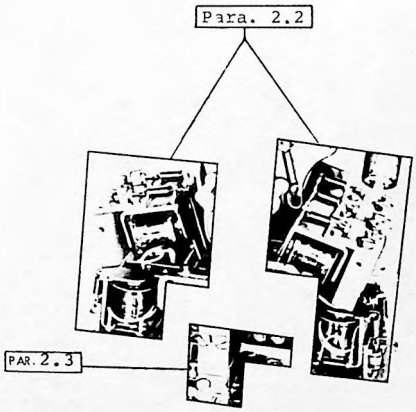
.4 General lubricating areas are shown by photographs. Specific areas to receive lubricant are indicated by line drawings with text. The drawings are keyed to the photographs by paragraph numbers.

.5 The symbols in the text indicate the following:

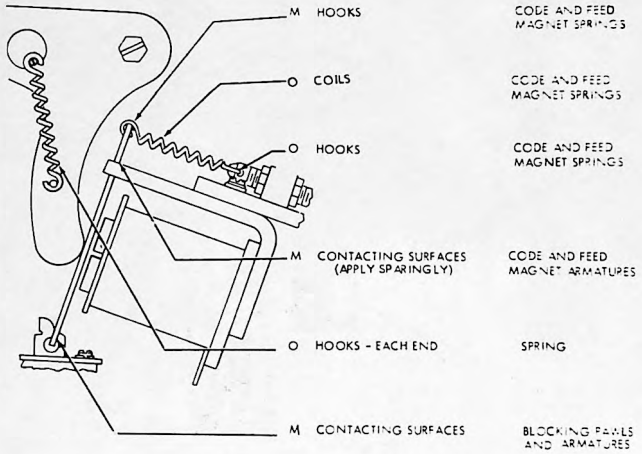
O	Apply one drop of KS7470 oil.
O2	Apply two drops of KS7470 oil, etc.
SAT	Saturate with KS7470 oil (felt washers, oilite bearings, etc.)
FILL	Fill with KS7470 oil (oil holes, oil cups etc.)
M	Apply 1/32 inch coating of Mobilgrease No. 2.

2. PUNCH UNIT (LATE DESIGN)

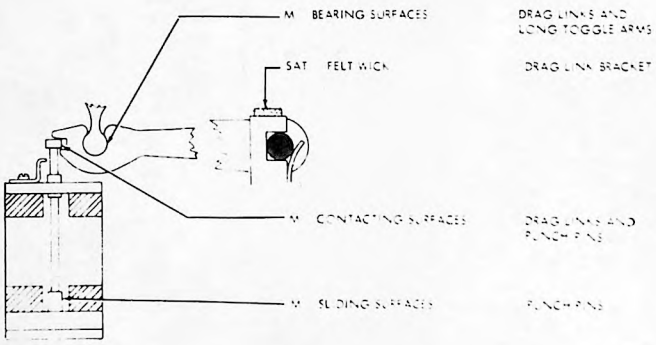
2.1 General Areas



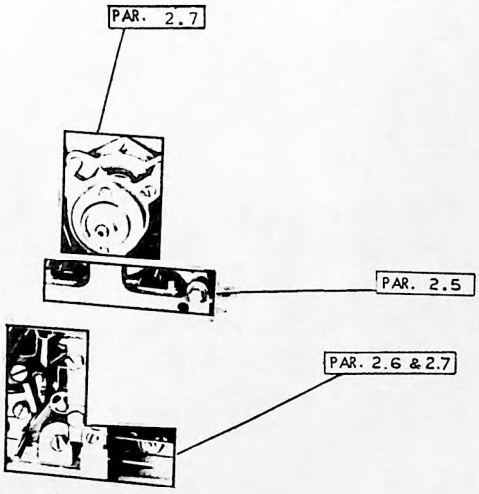
2.2 Feed and Code Magnets



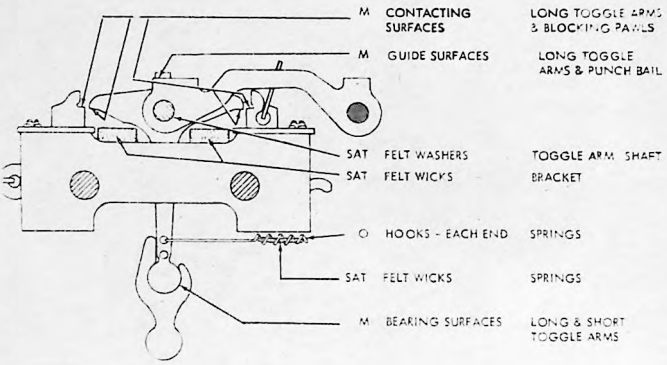
2.3 Perforating Mechanism



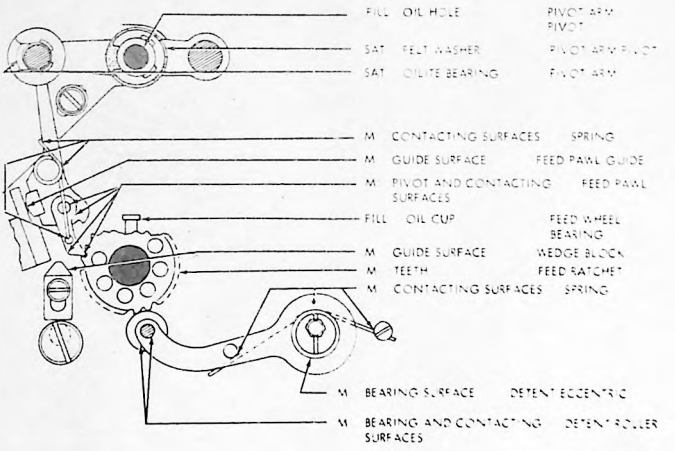
2.4 General Areas



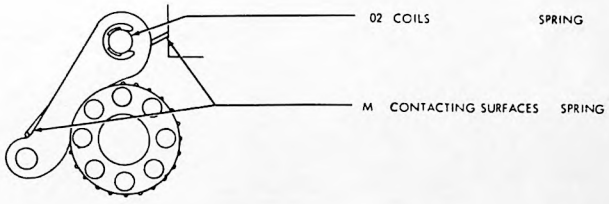
2.5 Perforating Mechanism



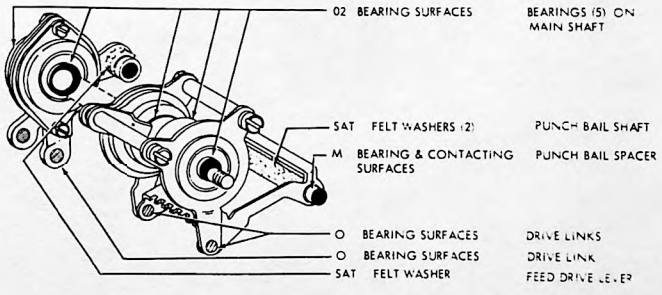
2.6 Feed Mechanism



2.7 Feed Mechanism

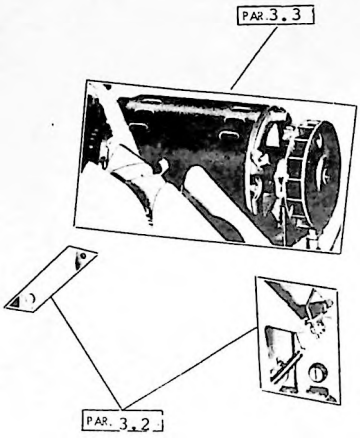


2.8 Drive Mechanism

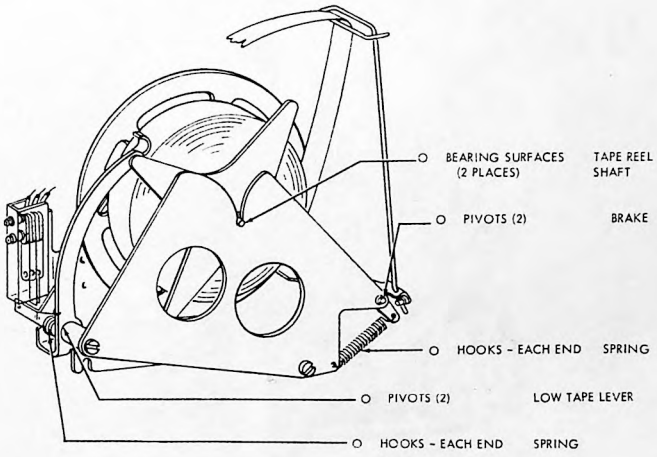


3. BASE AND MOTOR UNIT

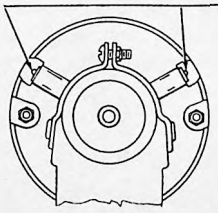
3.1 General Areas



3.2 Tape Reel and Brake Mechanism



3.3 Motor Unit



NOTE: DO NOT LUBRICATE SPROCKETS.

*APPLY OIL EVERY FOUR MONTHS. IF MOTOR IS DISASSEMBLED AT ANY TIME, REPACK BEARINGS WITH KS7471 GREASE. DO NOT REPACK BEARINGS OTHERWISE.

4. PUNCH UNIT - EARLY DESIGN

4.1 General

4.1.1 Paragraphs 1.1 through 1.3 apply to the early-design Punch. 1/32 inch coating of Mobilgrease should be applied to the places listed below unless other instructions are given. Oil both loops of all helical springs that exert a nominal tension of less than 2 1/2 pounds. Grease both loops of all helical springs that exert a nominal tension of 2 1/2 pounds or more.

4.2 Punch Unit

MAIN SHAFT - grease all unshielded ball bearings.

FEED LINK & LONG TOGGLE ARM JOINT.

TOGGLE JOINT OF LONG TOGGLE ARM FEED PAWL EXTENSION.

BLOCKING PAWL PIVOTS - 1 drop of oil.

TOGGLE ARM SHAFT - saturate felt washers with oil.

PUNCH BAIL SHAFT - saturate felt washers with oil.

TOGGLE JOINT OF LONG AND SHORT TOGGLE ARMS.

SOCKET JOINT OF SHORT TOGGLE ARMS AND DRAG LINKS.

DRAG LINK PIVOT POINTS - 1 drop of oil.

DRAG LINK AND PUNCH PIN JOINTS.

PUNCH AND FEED PIN HOLES.

DETENT ARM ROLLER.

DETENT ARM PIVOT - 2 drops of oil.

FEED LINK BEARING - fill oil holes with oil.

FEED PAWL PIVOT - 1 drop of oil.

FEED WHEEL BEARING - fill oil cup with oil.

FEED PAWL RATCHET.

4.2 BLOCKING PAWL - point of contact between blocking pawl and armature - wipe off excess Mobilgrease.

CONTACTOR MOUNTING PLATES - light film of Mobilgrease between plates and bearing housing.

4.3 Single Unit Base

MOTOR - two drops of oil at infrequent intervals in oilers at each end of motor.

TAPE REEL SHAFT - light film of grease at both bearings.

BRAKE SHAFT.

4.4 Multiple Unit Base

MOTOR - five to ten drops of oil at infrequent intervals in the oilers at each end of the motor housing

DRIVE CHAIN - oil frequently and adequately to provide a noticeable film of oil on the chain links at all times.

GEARS - medium film of grease, visible at all times.

MAIN SHAFT BEARINGS - grease center bearing.

4.5 Base with Gear Drive

GEARS - light coat of grease visible at all times.

TELECOMMUNICATIONS
ENGINEERING DEPARTMENT

PLANT MANUAL BK2.20.1
SUBSECTION 1 ISSUE 1
APRIL 1973

TI SILENT 700 DATATERMINAL

MODEL 720C

CONTENTS

TI SILENT 700 DATA TERMINAL

MODEL 720C

REFERENCES

CNT SYSTEM TRAINING TECHNICIANS MANUAL

BOOK 7	VOLUME I	ISSUE 1	DATED JUNE 1972
	VOLUME II	ISSUE 1	DATED JUNE 1972

NIB-003 Network Description: RCMP - CPIC Network

CN TELECOMMUNICATIONS ENGINEERING DEPARTMENT

PLANT MANUAL BK2.20.1
SUBSECTION 3 ISSUE 1
APRIL 1973

TI SILENT 700 DATA TERMINAL

MODEL 720C

TECHNICAL DESCRIPTION

CONTENTS

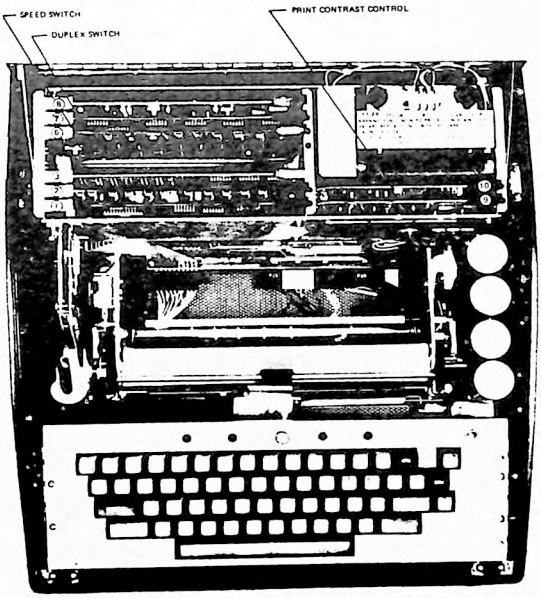
1. GENERAL

1.1 General Description

1.1.1 The 720C Data Terminal is an electronic printer which uses heat sensitive paper. This terminal combines the features of Texas Instrument Models 720 and 730. It is basically a Model 720KSR terminal which has been modified to meet CPIC Specification SP101, Issue 3.

These terminals are installed at various locations across Canada to provide a communication service for CPIC.

1.1.2 The Model 720C Electronic Data Terminal is an input/output data terminal utilizing the electronic printer technology. (Ref. Fig. 1)



1. ASCII Code Card
2. Printer Control Card
3. Answer-Back Memory Card
4. } Vacant
5. }
6. Terminal Control Receiver Card
7. Terminal Control Transmitter Card
8. Interface Card
9. Printer Driver Card
10. Regulator and Compensation Card

Figure 1. 720C Data Terminal

1.1.3 In general, the Model 720C consists of an enclosure, power supply, printer control electronics, keyboard, terminal control electronics, a moving 5x7 matrix printhead, and a friction - feed paper drive assembly.

1.1.4 The 720C Terminal has the capability of operating in either half or full duplex mode at 300, 150, or 110 baud speed. These modes are switch selectable to provide flexibility of high-speed transmission or compatability with slower terminals. Terminal capabilities are selected by choosing one of three interface cards for card position J8. The J8 card makes the terminal compatible with one of the following:

a) Frequency modulated internal modem
b) EIA voltage level
c) TTY (DC neutral keying)

1.1.5 Terminals equipped with modem interface will operate at 300 band whereas terminals equipped with D.C. interface will operate at 150 bauds. Normally, the DC terminals will operate on a $\pm$60V, 20mA loop but there are locations where the terminal will operate on a $\pm$130V, 60mA loop.

1.1.6 The terminal has an answer-back memory, an audible alarm device to indicate end of line, as switch to select operating speeds of 10, 15, or 30 characters per second, and a print contrast adjustment control. Circuitry is included parity checking and keyboard lockout functions.

1.1.7 The terminal provides and accepts serial data (serial by bit and character) at a maximum rate of 30 characters per second. By switch control, the terminal operates in a full- or half-duplex mode. Auxiliary connections are used to transfer data in parallel form to-and-from the terminal.

1.1.8 The information exchange code is seven level plus even parity, one start bit, one stop bit (two bits at 10 characters per second, 110 baud). The character set and coding are a modified 102 character subset of the USACII (Ref. Figure 2) Auxiliary input and output may be manually selected or controlled with the device control characters of the ASCII code. All alphabetic characters are printed as capitals.

Characters are printed on thermal paper by activating appropriate elements of a 5x7 dot matrix on the moving printhead. The printhead does not obscure any previously printed character.

b_4 b_3 b_2 b_1		b_7→0, b_6→0, b_5→0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0 0 0 0	0	NUL	DLE	SP	0	@	P	`	p
0 0 0 1	1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0	2	STX	DC2	"	2	B	R	b	r
0 0 1 1	3	ETX	DC3	#	3	C	S	c	s
0 1 0 0	4	EOT	DC4	$	4	D	T	d	t
0 1 0 1	5	ENQ	NAK	%	5	E	U	e	u
0 1 1 0	6	ACK	SYN	&	6	F	V	f	v
0 1 1 1	7	BEL	ETB	'	7	G	W	g	w
1 0 0 0	8	BS	CAN	(	8	H	X	h	x
1 0 0 1	9	HT	EM	)	9	I	Y	i	y
1 0 1 0	10	LF	SUB	*	:	J	Z	j	z
1 0 1 1	11	VT	ESC	+	;	K	[	k	{
1 1 0 0	12	FF	FS	,	<	L	\	l	¦
1 1 0 1	13	CR	GS	-	=	M	]	m	}
1 1 1 0	14	SO	RS	.	>	N	↑	n	~
1 1 1 1	15	SI	US	/	?	O	←	o	DEL

TERMINAL CONTROL CHARACTER

PRINTABLE CHARACTER REF: USAS x 3.4-1967

PRINTER CONTROL CHARACTER

AUXILIARY DEVICE OTHER THAN TERMINAL CONTROL CHARACTER

CODES GENERATED BY KEYBOARD, BUT NO ACTION TAKEN

Figure 2. Code System and Character Set

1.2 Physical Specifications

The unit may sit directly on any desk or table top. Special tables have been designed but are provided only when ordered by CPIC for a particular location.

Dimensions: 6.0 in high (15.24 cm)
18.0 in wide (45.07 cm)
20.0 in deep (50.80 cm)
Weight: 38 pounds (17.24 kg.)

1.3 Power Requirements

The terminal requires 120 VAC (±10%), 50 or 60 Hz power at 35 Watts average, 240 maximum. Power connection is a six-foot three-wire cord and a three-prong U-ground plug.

1.4 Environmental Specifications

See Table 1.

Table 1. Environmental Specifications

SPECIFICATION	VALUE
Ambient Temperature	Operating: 50° to 100°F Storage: -40° to 150°F (not including paper)
Shock and Vibrations	Vibration: 10 to 60Hz, 0.1g Storage and Handling: 10g
Humidity	Operating and storage humidity from 10 to 95 percent except that condensation must not be allowed to form.
Dissipation	Not more than 1000 BTU per hour.

2. FUNCTIONAL OPERATION

2.1 Modes

2.1.1 Local Operating Mode. The terminal does not receive or transmit data or answer back over the serial data line when in the Local mode. The data line is held in a mark condition. Data operation allowed is data transfer from keyboard to printed page. When the local mode is selected, the LOCAL lamp is illuminated, the PARITY lamp latch is reset, and parity checking circuitry is disabled. The keyboard lockout function is also reset and disabled.

2.1.2 On-Line Operating Mode. The terminal is enabled to transmit and receive serial data in this mode. The parity checking and keyboard lockout functions are enabled and the on-line lamp is illuminated.

The terminal has two sources of data: keyboard and answer-back memory. When the answer-back memory is started, keyboard data is inhibited.

2.2 Keyboard. The keyboard, consisting of 60 keys (Figure 3), has three modes of operation:

1. Unshifted character set shown in Figure 4.
2. Upper case (shift key depressed) character set shown in Figure 5.
3. Control (blue CONTROL key depressed) character set shown in Figure 6.

   Corresponding control keys have nomenclature in blue except DEL and ESC which are in white.

The specific codes generated by the keyboard are shown in Figure 3.

The EOM, ESC and DEL keys are enabled in all three modes of keyboard operation. In the control mode, the key marked "J" transmits the linefeed (LF) code.

Special function keys on the keyboard are:

ATN	Starts transmission of the answer-back memory after a 35 (±10) ms delay when in the on-line mode. This key, which is red with white print, is not disabled when the keyboard is locked out.
EOM	Generates the ETX code and is colored red with white print.
REPEAT	By holding REPEAT key down and then depressing any other key, the other-key character will be printed repeatedly until the REPEAT key is released.
ON LINE	Controls "local" and "on line" modes and indicators and is a yellow key with green print.
PAPER ADVANCE	Causes a carriage return and a repeated line feed until released. No characters are transmitted.

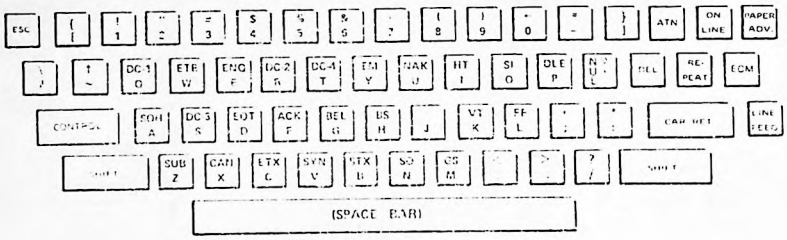


Figure 3. Keyboard Arrangement

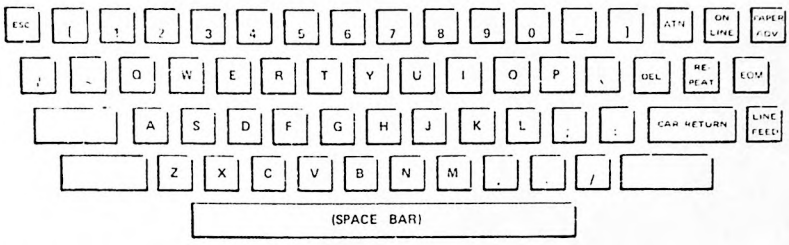


Figure 4. Keyboard Codes Generated when Shift and Control Keys are not Depressed

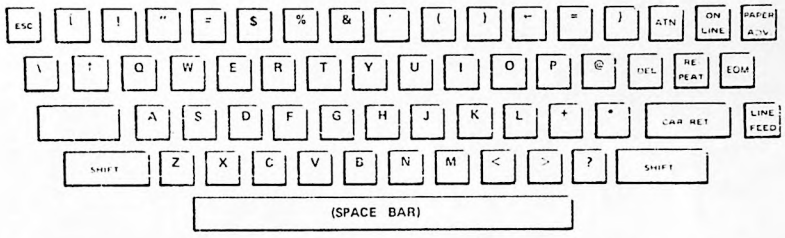
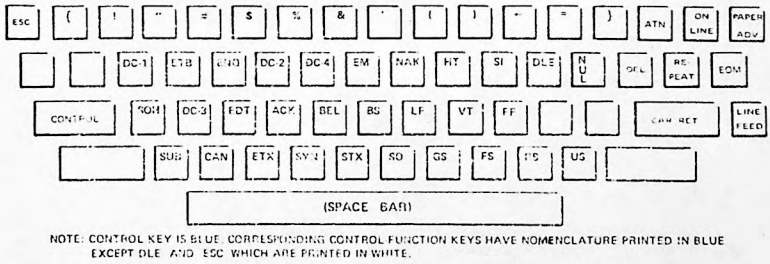


Figure 5. Keyboard Codes Generated when Shift Key is Depressed



NOTE: CONTROL KEY IS BLUE. CORRESPONDING CONTROL FUNCTION KEYS HAVE NOMENCLATURE PRINTED IN BLUE EXCEPT DLE AND ESC WHICH ARE PRINTED IN WHITE.

Figure 6. Keyboard Codes Generated when Control Key is Depressed

2.3 Control Characters. The terminal responds to eleven control characters. These characters are shown on Figure 2 and are listed in Table 2.

2.4 Indicator Lamps. The terminal has five indicator lamps arranged as shown in Fig. 1. The lamps, from left to right are as follows:

a. Parity (Red): Latched on when a parity error is detected.

b. Open Line (Red): Illuminates when a carrier detect signal is not received or when the receive data line remains in the space condition for a period of 150 (+50) ms. The lamp will extinguish when the mark condition or carrier detect is restored for 1 μs or longer. Open line detection is done on the receive line only.

c. Local (Yellow): This lamp is illuminated when the terminal is in the Local mode (explained in sub-paragraph 2.1.1).

d. On Line (Green): This lamp is illuminated when the terminal is in the On Line mode (explained in sub-paragraph 2.1.2).

e. Power (Green): This lamp is illiminated when power switch is ON.

Table 2. Control Characters

Character	Response When Received
BEL	The bell sounds.
CR	The printhead is returned to character column one.
LF	The paper is advanced one character line.
BS	The printhead is stepped to the left one character column.
DC1	Generated auxiliary input-device start pulse (AISTP J11-E) (100 μs minimum positive pulse to turn on input device.)

Table 2 (continued)

Character	Response When Received
DC2	Generates auxiliary input stop pulse (AOSTP J12-C) (100 μs minimum positive pulse to turn on output device).
DC3	Generates auxiliary input stop pulse AISPP J11-A) (100 μs minimum positive pulse to turn off input device.)
DC4	Generates auxiliary output stop pulse (AOSPP J-12-E) (100 μs minimum positive pulse to turn off output device).
ENQ	When received on the serial data line, the answer-back memory is transmitted after a 35 (±10) ms delay (see paragraph 2.7).
ETX	When received on the serial input data line, all keyboard functions except "ATN" (see paragraph 2.7) and paper advance are locked out. The auxiliary input data is also locked out. When in the half-duplex mode only, the ETX character from the answer-back memory, keyboard, or auxiliary input will also lock out the keyboard.
EOT	When received on the serial data line, the keyboard and auxiliary input data is enabled. In the half duplex mode, the lockout will be unlatched if the EOT code is transmitted from the answer-back memory.

2.5 Power Switch. A master reset for the terminal is generated in the terminal when the power switch is set to ON. To reset the terminal, turn off the power switch for one second and then turn on.

2.6 Parity. The terminal operates with even parity, and the keyboard always generates even parity. Data which is transmitted from the answer-back memory or the auxiliary input will have the parity that has been programmed. Data which is to be printed is checked for even parity, If a parity error occurs, the data character is blocked out and the "?" character is inserted on the data lines, a latch is set which illiminates the parity lamp. This lamp display may be reset by switching to Local mode and returning to

"On Line", or by cycling AC power. The parity checking circuit is disabled when in the local mode, or when "On Line" in Half-Duplex and the answer-back memory is transmitting.

2.7 Answer-Back Memory

2.7.1 The answer-back memory is a variable length (up to 20 characters) sequence that is transmitted by the "ATN" key or receipt of "ENQ" from the serial data line. The transmission of the answer-back memory is delayed a fixed 35(±10) ms from the time ATN or ENQ is initiated.

2.7.2 The response is programmed as desired by the user (eight bits per character, seven bits plus parity). Programming the response is done by removing factory installed diodes from the matrix on the answer-back card. (Ref. E.T. Training Manual 7 Volume I Paragraph 9.2.7 et seq. for Answer-back programming procedure). The presence of a diode corresponds to a "mark" condition in the character. The absence of a diode generates a "space" in the character. The "DEL" (all diodes present) character terminates the response and is not transmitted. For an "N" character response, the N+1 character must be "DEL". To allow a 20-character response, the memory actually contains 21 characters (character 21 must be the "DEL" character).

2.7.3 The characters generated by the Answer-Back Memory shall not be printed.

Note: If the Answer-Back Memory does not have at least one character programmed, the terminal will not print or transmit.

2.8 Printer Mechanism

2.8.1 The printer mechanism moves the head and paper in proper relation and speed to achieve serial line printing operation. The mechanism mounts to the inside base of the enclosure. See Table 3.

2.8.2 An 80-character (full line) carriage return requires 200 ms which compares to six character-times at 30 characters per second, three-character-times at 15 characters per second, or two character-times at 10 characters per second. While the carriage is returning, the "LF" character may be received and the paper advanced. The carriage is stepped from right to left one column on receipt of "BS" (backspace)

2.8.3 A bell is provided to give an audible alarm upon receipt of the "BEL" character. The bell sounds automatically after column 65 is printed.

2.8.4 To limit printhead travel, an automatic carriage return and line feed function is performed after the 80th character is printed on one line. Neither "CR" nor "LF" is transmitted by the terminal when this automatic function is performed.

Table 3 Printer Mechanism Specifications

Specification	Value
Maximum Printing Speed	30 characters per sec.
Character Spacing	10 per inch
Line Length	8.0 inches (80 charact.)
Paper Drive Type	Friction feed
Line Spacing	6 lines per inch
Paper Width	8.47(-0.00,+0.05) inches
Paper Length	300ft nominal,280ft min.
Maximum Paper Supply Roll Diameter	3.625 inches
Maximum Paper Line Advance Rate	30 lines per second

3. INTERFACE

3.1 Internal Modem Interface (Optional)

3.1.1 The Modem terminals will operate on a 2-wire loop which has no DC voltage applied to it. A bell Model 103F compatible modem may be provided within the terminal enclosure. This modem operates asynchronously up to a maximum speed of 300 baud in a full- or half-duplex mode over a two-wire unconditioned voice-grade telephone line. The internal modem uses frequency shift keying modulation with transmit carrier frequencies of 1270Hz (mark) and 1070Hz (space) and with receive carrier frequencies of 2225Hz (mark) and 2025Hz (space).

3.1.2 The modem transmission level is adjustable over the range from -15 dBm to 0 dBm.

The modem receiver is operational for input signal levels in the range from -35 dBm to +5 dBm.

3.1.3 Input and output impedances are 600 ohms. The user may change impedances to 900 ohms by following instructions on the modem schematic (958849). The transmission line is held in the mark condition unless data is being transmitted.

3.2 Neutral Keying DC Interface. The neutral dc interface is capable of operating on a two-, three-, or four-wire TTY system. The interface operates on currents of 20 or 60 mA with a 50% threshold.

3.3 EIA Line Interference (Optional). The signal interface shall comply with EIA Standard RS-232-C. Signal connections are provided at the rear of the printer through a recessed printed circuit board. A 16-pin, Amp Leaf edge connector to an Amp Leaf plug on the connecting cable. A 25-pin male connector (Cannon number DB-25P or equivalent) is at the other end of the connecting cable. Pin assignments are listed in Table 4.

Table 4. EIA Connector Pin Assignments

Cannon Pin Number	Amp Leaf Pin Number	Function
1	1	Protective Ground
2	2	Transmitted Data
3	3	Received Data
4	4	Request to Send (held to an "ON" status by terminal in On Line mode)
5	5	Clear to Send (should be held to an "ON" by the modem during transmissions)
6	6	Data Set Ready (held to an "ON" when modem is operational)
7	7	Signal Ground
8	8	Data Carrier Detector
9-19		Unused
20	A	Data Terminal Ready (held to an "ON" status by terminal)
21-25		Unused

CN TELECOMMUNICATIONS ENGINEERING DEPARTMENT

PLANT MANUAL BK2.20.1
SUBSECTION 5 ISSUE 1
APRIL 1973

TI SILENT 700 DATA TERMINAL

MODEL 720C

INSTALLATION AND TESTS

CONTENTS

1.0 GENERAL

1.1 This subsection covers an outline of the preliminary check-out, installation, outline tests, as well as corrective and preventative maintenance and adjustment procedures of the Texas Instrument 720C Data Terminal for the RCMP Canadian Police Information Centre (CPIC) Communications Network across Canada.

1.2 The details of the above noted information is contained in System Training Equipment Technicians Training Manual Book 7, Volume I and II and is not repeated herewith.

2.0 INSTALLATION

2.1 Installation procedures including preliminary checks and Answer Back programming are outlined in E.T. Training Manual Book 7, Volume I, Section 9 and associated illustrations in Volume II, Appendix C.

3.0 TESTS

3.1 The On-Line Test procedure is outlined in E.T. Training Manual Book 7, Volume II, Appendix B.

3.2 This On-Line Test enables the Equipment Technician to perform data terminal tests on-line with the data switcher (DSX).

4.0 MAINTENANCE

4.1 Preventative and corrective maintenance is covered in E.T. Training Manual Book 7, Volume I, Section 8 with additional details in Volume II, Appendix A.

4.2 Adjustments are covered in E.T. Training Manual Book 7, Volume I, Section 7 with details in Volume II, Appendix A.

TI 720C Ref: SILENT 700 DATA TERMINAL PLANT MANUAL BK2.20.1 SUBSECTION 5 | TEST RECORD FORM

TERMINAL_____

MODEL_____

SERIAL NO._____

INTERFACE_____

Test Equipment

For Terminals equipped with DC Interface

a) Generator - CDC TMG 301 or equivalent.

b) Analyser - CDC SDA 101 or equivalent.

c) Model 35 ASR Teletype teleprinter.

d) Spare Answerback card J3.

For Terminals equipped with Modem Interface

a) Transmission and Noise Measuring Set - Hewlett Packard Model 3555B.

b) Frequency counter - Hewlett Packard 521A.

c) Frequency generator - Hewlett Packard 200 CD.

d) Spare answerback card J3 (same as above).

KEYBOARD REQUIREMENTS

a) Keyboard layout (per Figure 1) _____

b) Codes generated (per Figure 2) _____

c) All keytops grey with matt finish and white legends except: _____

KEY	SHELL COLOUR	LEGEND COLOUR
ATN	Red	White
EOM	Red	White
Control	Blue Grey	White
On Line	Yellow	Green

d) The following characters have a blue grey lenend colour: _____

DC-1	HT	ACK	ETX
ETB	SI	BEL	SYN
ENQ	DLE	BS	STX
DC-2	NUL	VT	SO
DC-4	DC-3	SUB	GS
NAK	EOT	CAN	
EM	SOH	FF	

e) The EOM ESC and DEL keys shall be enabled in all three modes and have white legends. _____

f) In control mode, the key marked J shall transmit the line feed code. _____

g) Special functions -

ATN - starts answerback when in on line mode. _____
EOM - transmits ETX code _____
REPEAT _____
ON-LINE _____
PAPER ADVANCE _____

h) Keyboard unlocks on operation of power switch. _____

j) Keyboard unlocks on operation of on line/off line switch. _____

TI 720C Ref: SILENT 700 DATA TERMINAL PLANT MANUAL BK2.20.1 SUBSECTION 5 | TEST RECORD FORM

CONTROL CHARACTERS

a) BEL CR LF BS _____

b) ETX - locks keyboard _____

c) EOT - unlocks keyboard _____

d) ENQ - trips answerback when received _____

PARITY

a) Keyboard transmits even parity _____

b) Answerback (as coded) _____

c) Incoming traffic checked for even parity _____

d) Odd parity - "?" printed _____
- parity lamp on _____

e) Reset parity lamp by operating
- line/local switch _____
- AC switch _____

INDICATOR LAMPS

a) Parity lamp (red) latched on parity error _____

b) Open line (red) (on receive line only) lights when carrier detect not received or receive data line on space. Resets when normal conditions restored. _____

c) Local (yellow) _____

d) One line (green) _____

e) Power (green) _____

ON/OFF SWITCH _____

ANSWERBACK

a) sends up to 20 characters _____

b) operated by - ATN key _____

- receipt of ENQ _____

c) DEL terminates answerback and is not transmitted _____

d) characters generated will not be printed _____

PRINTER MECHANISM

a) speed 10, 15 and 30 CPS _____

b) line length - 80 columns _____

c) back space _____

d) audible alarm on BEL _____

e) audible alarm at end of line (65 columns) _____

f) automatic CR/LF after 80th column _____

g) Buffer characters

- 6 char at 30 CPS _____

- 3 char at 15 CPS _____

- 2 char at 10 CPS _____

TI720C Ref: SILENT 700 DATA TERMINAL PLANT MANUAL BK2.20.1 SUBSECTION 5 | TEST RECORD FORM

LOCAL MODE

a) Local light on _____

b) Data line in mark condition _____

c) Parity checking disabled _____

d) Keyboard lockout disabled _____

ON LINE MODE

a) On line light lit _____

b) Parity light off _____

PRINTER CHECKS

a) Printing contrast adjustment _____

b) Cooling fan operating satisfactorily _____

c) 35 dots printed using

- K backspace _____

- B backspace _____

->

d) CSA approval tag _____

e) Aux output and input ports _____

TI720C Ref: SILENT 700 DATA TERMINAL PLANT MANUAL BK2.20.1 SUBSECTION 5 | TEST RECORD FORM

MODEM INTERFACE

a) Transmit frequencies 10 70 Hz (space) & 1270 Hz (mark)	
b) Receive frequencies 2025 Hz & 2225 Hz	
c) Input/output impedance (600 ohms)	
d) Sensitivity of Receiver (-35 dbm)	
e) Variation of output level of transmitter (0-15 dbm)	

DC INTERFACE

a) Loop remains closed when AC power off.	
b) Receive signal - local battery	
±60 V 20 mA 10CPS Dist & BIAS	
15 CPS	
30CPS	
c) Send signal - local battery	
±60 V 20 mA 10CPS	
15CPS	
30CPS	

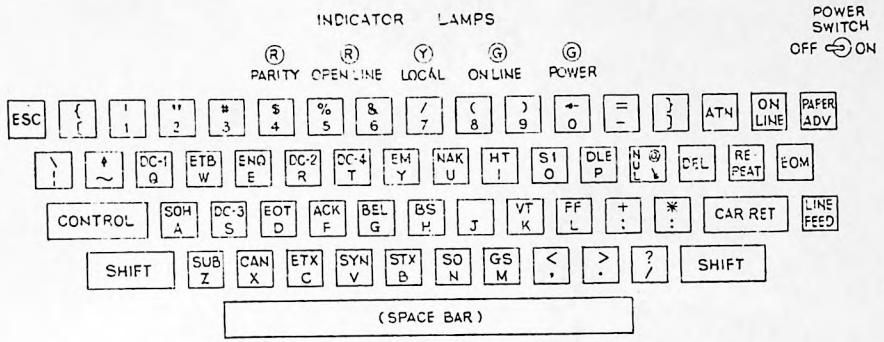


FIGURE 1

TI MODEL 720C CPIC KEYBOARD ARRANGEMENT

LEGEND

Ⓡ Indicates Red Jewel
Ⓨ Indicated Yellow Jewel
Ⓖ Indicates Green Jewel

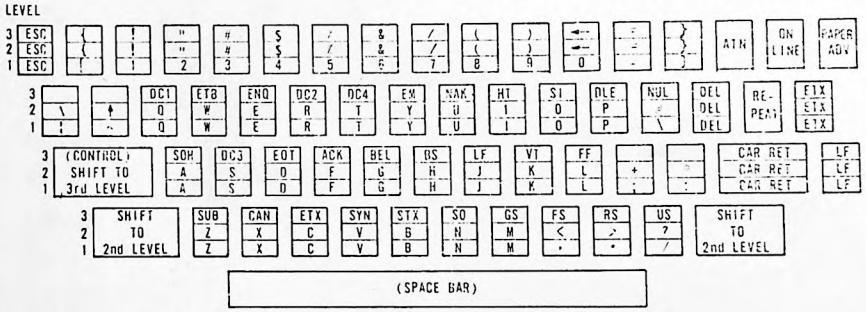


FIGURE 2

TI MODEL 720C CPIC KEYBOARD FUNCTION