

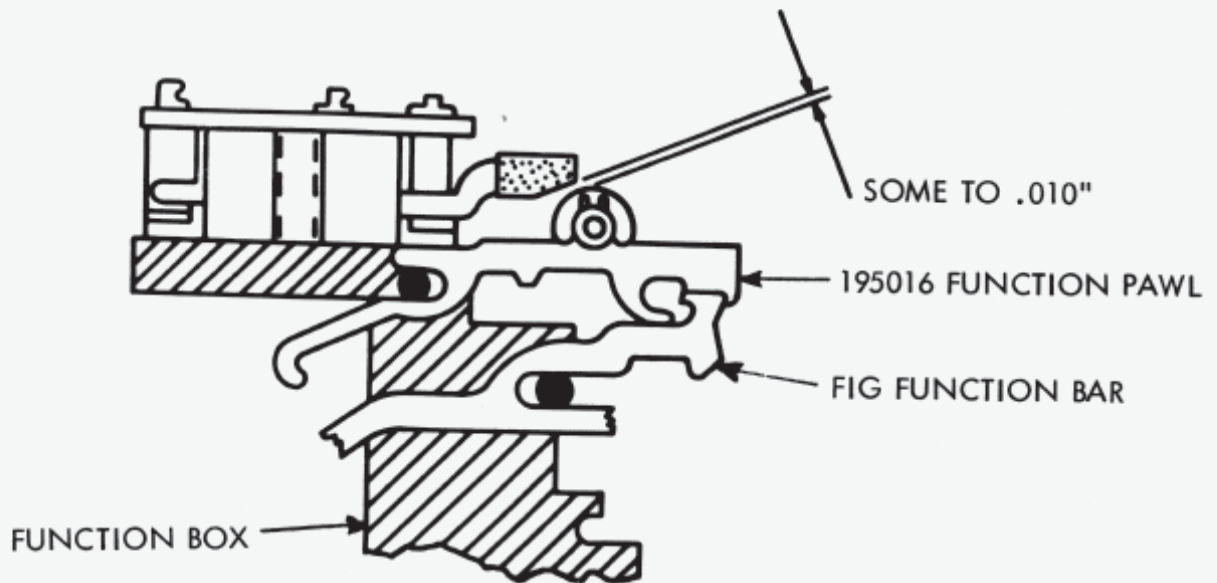
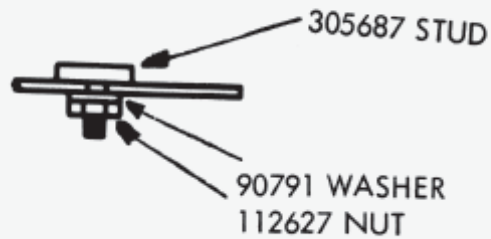
ADDENDUM TO SPECIFICATION 50039S, ISSUE 3, DATED  
APRIL, 1962 COVERING THE 174176 AND 176272 MODIFICATION  
KITS

1. Make the following changes:
  - a. On Page 4, Paragraph 2.i. change quantity of 152642 and 152660 Function Pawls from 2 to 1.
  - b. On Page 5, Paragraph 2.i. change part #174185 to part #195016. On Page 6, Paragraph 3.b.(4) change part #174185 to part #195016.
  - c. On Page 7, Paragraph 3.b.(9) is changed to read as follows: (9) Replace the stunt box in the printer. Make the Figures Contact Adjustment at this time. Do not replace the printer.
  - d. Make the Figures Contact Adjustment given in the addendum.
  - e. On Page 7, Paragraph (10) delete the entire Paragraph (10) and Reference to Figure 18, Cross out Figure 18.
  - f. On Page 7, Paragraph (15) change the 163797 Function Lever to the 163979 Function Lever.
  - g. On Page 9, Paragraph (33) change the 16497 Eccentric to the 164497 Eccentric.
  - k. On Page 15, Paragraph c.(1) change the 174185 Pawl to the 195016 Pawl. Also, delete the 152642 Lever, 90517 Spring and 152660 Plate.
  - i. On Page 16, change Paragraph (6) to read: (6) Install the 172539 Switch Assembly (part of 174187 Cable Assembly, across stunt box slots 31, 32, 33, and 34. Also, change Paragraph (7) to read: (7) Replace the stunt box in the printer. Make the Figures Contact Adjustment at this time. Do not replace the printer.
  - j. Make the Figures Contact Adjustment given in this addendum.
  - k. On Figure 1, delete the 151687 Screw, 93984 Washer, 151880 Nut, and 70314 Washer. Replace these parts with the 1178 Screw, 93117 Washer, and 112627 Nut.

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FIGURES CONTACT ADJUSTMENT  
REQUIREMENT

WITH STUNT BOX ON TYPING UNIT AND "LETTERS" COMBINATION MANUALLY SET UP ON TYPING UNIT SELECTOR MECHANISM, ROTATE TYPING MAIN SHAFT UNTIL FUNCTION PAWL IS IN EXTREME FORWARD (TOWARDS CONTACT INSULATOR) POSITION AS SHOWN.

SOME TO .010" CLEARANCE BETWEEN CONTACT INSULATOR AND THE ADJUSTING STUD.

TO ADJUST

LOOSEN THE ADJUSTING STUD MOUNTING NUT AND MOVE ADJUSTING STUD TO MEET REQUIREMENT. RETIGHTEN MOUNTING NUT.

**INSTRUCTIONS FOR INSTALLING THE 174176 MODIFICATION  
KIT TO PROVIDE MODEL 28 SEND-RECEIVE KEYBOARD (LK6  
AND UP) WITH AN UPPER CASE "D" ANSWER-BACK MECH-  
ANISM; ALSO, KIT 176272 TO GIVE ANSWER-BACK OPERATION  
ON SEQUENTIAL "FIGURES" - "C"**

**1. GENERAL**

a. The 174176 Modification Kit provides the Model 28 Send-Receive Page Printer Set (LK6 and up) with an upper case "D" answer-back mechanism. The kit is used on sets wired for half-duplex operation either containing or not containing an electrical service unit. The kit cannot be used with Receiving-Only (RO) sets.

b. The 176272 Modification Kit is identical to the 174176 Kit except that the identity of the called station is transmitted automatically on sequential "Figures" - "C" rather than upper case "D".

c. The answer-back mechanism is an electromechanical device which allows the identity of the called station to be transmitted automatically to the originating station upon receipt of "FIGS", upper case "D" from the signal line.

d. A control relay actuated by the originating station's signal generator prevents the originating station's own answer-back mechanism from operating when the distant station has been called.

e. Local answer-back may be operated from the local red "HERE IS" keylever.

f. The answer-back device has a total capacity of 21 characters. The first character transmitted is always a "LETTERS" combination; the remaining 20 may be any characters desired. However, the first LTRS combination is normally followed by CARRIAGE RETURN and LINE FEED while the coding also normally ends with CARRIAGE RETURN and LINE FEED. This arrangement insures that the answer-back message will appear at the beginning of a line on the distant station and that over-printing of the message will not occur. Transmission of the LTRS combinations at the beginning of the message also returns all stations in the circuit to the unshift position. Since five of the 21 available characters are thus used to perform these functions, only 16 are available for the answer-back identification. This procedure may be altered to suit a particular application of the answer-back mechanism.

g. Since the keyboard is not locked when the answer-back mechanism is triggered a station may accidentally interfere with its operation by holding its calling keylever depressed or by depressing any keylever during the operation of the answer-back mechanism. The station must not depress any keylevers during the answer-back operation.

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h. The trip magnet circuit of the answer-back mechanism is connected to the A. C. supply circuit of the keyboard and is operable from an input voltage of 115 volts + 10% A. C., 50 to 60 cycles. The operating current is approximately 0.065 amperes A. C. The answer-back mechanism operates on A. C. current.

i. The control relay is also connected to the A. C. supply circuit of the keyboard and is operable from an input voltage of 115 volts + 10% A. C., 50 to 60 cycles. The operating current is approximately .035 amperes A. C.

## 2. THEORY OF OPERATION

a. Called Station - The answer-back message is initiated at the called station by depressing the "FIGS", upper case "D" combination at the originating station. This action closes a normally open function box contact (upper case "D") which completes a circuit to the answer-back trip magnet.

b. The closure of this circuit energizes the answer-back trip magnet and results in the counter-clockwise rotation of the armature and associated stop lever latch thereby unblocking and releasing the stop lever. Under the bias of a spring attached to the code bar bail latch operating lever, which rests on the left extension of the stop lever, the stop lever rotates counter-clockwise until it comes to rest against the mechanism base plate. Before coming to rest the stop lever moves the blocking lever counter-clockwise, thereby unblocking the drive plate and releasing it to its spring action. The drive plate rotates counter-clockwise to a stop where the attached drive link is in a position to accept the feeding motion from the keyboard code bar bail. As the stop lever continues its counter-clockwise rotation, the code bar bail latch operating lever rotates clockwise, striking the code bar bail latch. The latch rotates clockwise and releases the code bar bail. The code bar bail releases the keyboard code bars and the clutch trip bar which move to the right under spring action. The clutch trip bar thereby trips the signal generator clutch and initiates an operating cycle.

c. While the code combination transmitted during the first cycle must be a "LETTERS" combination, the code combinations of the succeeding 20 cycles may be any arbitrary character determined by the detachable code blades fastened to the code drum. The code combination on each blade is read by five sensing levers which transfer the code selections to a vertical projection on each of the 5 code bars. Each code combination is thus transmitted in the normal manner by the keyboard signal generator. A spacing condition occurs whenever a code bar is prevented from moving to the right by its associated sensing lever; unrestricted movement of a code bar results in a marking condition. Since the sensing levers must be held away from the code bars in order to prevent their interference during normal keyboard operation, a stop code blade having a "LETTERS" combination must be employed. This necessity results in a "LETTERS" combination for the first character.

d. Once during each rotation ( $360^{\circ}$ ) of the signal generator cam assembly the code bar bail is pulled to the left by a cam eccentric causing it to rotate clockwise. The bail thereby resets the keyboard code bars and, with the character generator drive link now in its released position, rotates the drive plate clockwise. This action causes the stepping pawl to step the code drum one position clockwise.

e. With the stop lever in its released position, the code bar bail latch operating lever also maintains the code bar bail latch in a released position. The signal generator mechanism will cycle continuously until it rotates the code drum one full revolution or 21 characters. The first code blade, which is the stop code blade having a "LETTERS" combination, has an additional projection such that when it is being rotated into the sensing position it contacts the stop lever rotating it clockwise. The left extension of the stop lever rotates the code bar bail latch operating lever counter-clockwise which in turn releases the code bar bail latch to the action of its attached spring. Continued rotation of the stop lever brings it in a position where if released to the action of the spring attached to the code bar bail latch operating lever, it will reverse rotation and become latched on the stop lever attached to the trip magnet armature. Such a position is reached when the stop code blade passes its area of contact with the stop lever which is just prior to the complete movement of the stop code blade into the sensing position.

f. When the code bar bail latch is released to its spring action, it rotates counter-clockwise in contact with the code bar bail latch roller until it latches the code bar bail. At this point the blocking lever is also released to its spring action and it rotates counter-clockwise until it rests against a projection on the stop lever. In this position the blocking lever holds the drive plate in its extreme position and the attached drive link is once more unable to follow the feeding motion from the code bar bail. Further operation of the signal generator and character generator is thus prevented. At this point the keyboard is restored to its normal operating condition.

g. Originating Station - When the "FIGS" upper case "D" combination is depressed at the originating station, a cam on the signal generator shaft closes a normally open universal keyboard pulsing contact which operates the answer-back control relay. The opening of the "FIGS" stunt box contact may de-energize the control relay but the closing of the keyboard pulsing contact on the "D" combination will re-energize the control relay and disable the local answer-back via normally closed control relay contacts in series with the answer-back trip magnet. (The "FIGS" function box contact is in series with the control relay after the control relay is initially operated. This is a holding circuit for the control relay. The "FIGS" function pawl has been modified to engage the "FIGS" function bar at all times. This arrangement advances the timing of the "FIGS" function box contact in relation to the universal pulsing contact so the control relay will be energized during the entire signal generator cycle.)



h. The answer-back message may be changed by replacing the entire code drum of the mechanism. See paragraphs 3. d. (1) through 3. d. (9) for the necessary instructions.

i. The kits consist of:

<u>Qty.</u>	<u>Part No.</u>	<u>Description</u>	<u>174176</u>	<u>176272</u>
11	2191	Washer, Lock	X	X
1	3598	Nut	X	X
3	4703	Spring		X
2	4703	Spring	X	
7	7002	Washer, Flat	X	X
1	45815	Washer, Lock	X	X
1	70314	Washer, Flat	X	X
3	72522	Wick		X
2	72522	Wick	X	
3	90517	Spring		X
2	90517	Spring	X	
3	94693	Wick		X
2	94693	Wick	X	
1	112626	Nut	X	X
2	121473	Stud	X	X
4	151630	Screw	X	X
2	151631	Screw	X	X
1	151632	Screw	X	X
1	152121	Lever, Function		X
2	152642	Lever, Function	X	X
2	152653	Pawl, Function		X
1	152653	Pawl, Function	X	
2	152660	Plate, Spring	X	X
2	152666	Bar, Function		X
1	152666	Bar, Function	X	
1	153520	Bar, Function		X
1	153521	Bar, Function	X	
1	154125	Spring	X	X
1	154613	Latch		X
4	155753	Sleeve, Insulating	X	X
4	156740	Screw	X	X
3	157200	Spring		X
2	157200	Spring	X	
3	157240	Spring		X
2	157240	Spring	X	
1	157274	Clip	X	X
1	161649	Lever, Function	X	X
1	161650	Arm	X	X
2	162875	Bracket	X	X

<u>Qty.</u>	<u>Part No.</u>	<u>Description</u>	<u>174176</u>	<u>176272</u>
1	162876	Bar, Retainer	X	X
1	162878	Contact Assembly	X	X
1	162885	Cam, Segment	X	X
2	162886	Screw	X	X
1	163852	Keylever Assembly, "Here Is"	X	X
1	163979	Lever, Function	X	X
1	164129	Answer-Back Parts, Common	X	X
1	164457	Keylever Assembly, W-R-U Upper Case "C"		X
1	164496	Bail	X	X
1	164497	Eccentric	X	X
1	164499	Lockbar	X	X
1	174177	Contact Suppressor & Cable Assembly	X	X
1	174180	Cable Assembly w/Control Relay	X	X
1	174184	Plate, Cover	X	X
1	174185	Pawl, Function	X	X
1	174187	Cable Assembly, Function Box	X	X

j. For part numbers referred to, other than those in the kits, and for parts ordering information see Teletype Model 28 Parts Bulletin 1149B.

### 3. INSTALLATION

a. Refer to Teletype Model 28 Page Printer Set Bulletin 217B for instructions for removal of major components and assemblies.

#### NOTE

References in the text to left or right, up or down, front or rear, apply to the unit in its normal operating position as viewed from the front.

#### b. The 174176 Modification Kit

(1) Remove the typing unit from the cabinet in accordance with standard practice. Do not replace until so instructed.

(2) Remove the stunt box from the typing unit in accordance with standard practice.

(3) Loosen the two screws which fasten the stripper bail and lock lever bracket (152711 or 153314) to the 150894 Guide Bar. Replace the keyboard lock lever slide arm (150561 or 154649) with the 161650 Arm, furnished. Install the 161650 Arm with its small curved projection extending upward and to the left of the guide slot (as viewed from the rear of the printer). Tighten the mounting screws.

(4) Install the following parts in slot No. 32.

<u>Part No.</u>	<u>Description</u>
174185	Pawl, Function
157240	Spring
72522	Wick
157200	Spring
94693	Wick
152666	Bar, Function "Figs"
4703	Spring
152642	Lever, Function
90517	Spring
152660	Plate, Spring

(5) Install the following parts in slot No. 34.

<u>Part No.</u>	<u>Description</u>
152653	Pawl, Function
157240	Spring
72522	Wick
157200	Spring
94693	Wick
153521	Bar, Function "U. C. D."
4703	Spring
152642	Lever, Function
90517	Spring
152660	Plate, Spring

(6) Use the 157240 Spring and 72522 Wick on units having a one stop function clutch; use the 157200 and 94693 Wick on units have a two stop function clutch.

(7) If the printer stunt box is equipped with the blank-blank keyboard lock sequence parts, replace the 152121 function lever in slot No. 35 with the 161649 function lever, furnished. If the stunt box is also equipped with a 152127 clip to disable the blank-blank keyboard lock sequence, this clip must be removed and the 157274 clip, furnished, used when it is desired to disable this feature. The 157274 clip should be installed after the stunt box has been replaced in the printer following paragraph (9) below. Position the clip with its closed end under the function pawl in slot No. 35 so that it lifts the pawl out of engagement with the function bar when the hooks at the open end of the clip are placed over the 150544 handle.

(8) Install the 172502 and 172526 Switch Assemblies across stunt box slots 29, 30, 31, 32 and 33, 34, 35, 36 respectively.



(9) Replace the stunt box in the printer. Make certain that the 174185 Function Pawl engages the 152666 "Figs" Function Bar in Slot 32. Do not replace the printer.

(10) Make the "Figures" stunt box contact adjustment at this time. Refer to Figure 18.

(11) Route the stunt box contact cable assembly to the connector (right) side of the printer. Tie the cable to the 150544 handle at appropriate positions.

(12) Remove the keyboard, keyboard hood, and keylever guide plate in accordance with standard practice.

(13) Remove and discard the plastic plug and speed nut from the keytop hole, sixth from the left in top row.

(14) Maneuver the 163979 Function Lever into the 21st slot of the 154070 Code Lever Guide until it is fully seated on the 154016 Code Bar Lever Shaft.

(15) Install a 154125 Spring on the 163797 Function Lever and 154070 Code Lever Guide.

(16) Replace the keylever guide plate on the keyboard in accordance with standard practice. Re-adjust the space bar bail pivot. (Refer to Bulletin 217B). Do not replace the keyboard hood until so instructed.

(17) Remove the lock ball retainer clamp from its present position in the center of the 154175 Lock Ball Channel and install it in the position immediately to the right of center.

(18) Install the 163852 Keylever Assembly (Here Is) in the keytop guide hole previously unplugged, snapping onto the 163979 Function Lever previously installed in this position. See Figure 1.

(19) Remove the two screws, lock washers and flat washers (one at a time on each side), holding the lockball channel. Install two 121473 Studs with the lock washers and flat washers just removed (see Figure 1).

(20) Check and if necessary, make the lock ball channel adjustment.

(21) Place a 162875 Bracket on top of each 121473 Stud and assemble them only friction tight with two 156740 Screws, 2191 Lock Washers and 7002 Flat Washers. (See Figure 1).

(22) Install the 162876 Retainer Bar on top of the 162875 Brackets and assemble it only friction tight with two 156740 Screws, 2191 Lock Washers and 7002 Flat Washers. (See Figure 1).

#### NOTE

Use caution when handling the 162873 Contact to be installed according to next paragraph.

(23) Install the 162873 Contact Assembly (part of 174177 Cable Assembly) on the 162876 Retainer Bar and assemble it only friction tight with the 162874 Clamp Plate, 1178 Screw, 71073 Flat Washer, 93117 Lock Washer, 112627 Nut. Move the contact assembly along the retainer bar until it is beneath the 153979 Function Lever previously installed. Tighten the assembly. Route the white-brown (W-BR) and slate (S) wires through the keyboard base to the signal generator. Tie the cable assembly near the end of retainer bar on both sides of the contact assembly. (See Figure 1.)

(24) Install the resistor-suppressor assembly (part of 174177 Cable Assembly) on the 154175 Lock Ball Channel by means of the mounting hole on the right side of the channel. Use a 151632 Screw, 2191 Lock Washer, 7002 Flat Washer and 3598 Nut to secure the assembly (See Figure 2.)

(25) Route the purple (P) and slate (S) wires through the keyboard to the motor terminal block. Route the white-slate (W-S), green (G) and white-brown (W-BR) wires with terminals as far as possible toward the rear of the keyboard for later connection to the 174180 Control Relay Assembly. (See 4412WD.)

(26) Route the green (G) and white-green (W-G) wires toward the rear of the keyboard for later connection to the answer-back trip magnet. (See paragraph 57.)

(27) Remove the 151630 Screw and 2191 Lock Washer which fastens the front of the 154008 Code Bar Guide, and 154013 Bracket and 158230 Bracket to the 154068 Right Side Code Lever Guide Bracket. Loosen the rear 151630 Mounting Screw so that it is friction tight.

(28) Pivot the 154013 Bracket upward so that its attached 158228 Lever disengages the slot in the 154052 Lock Bar.

(29) Remove the 151630 Screw and 2191 Lock Washer which fastens the front of the 154008 Code Bar Guide and 154072 Stop Bracket to the 154069 Left Side Code Lever Guide Bracket. Loosen the rear 151630 Mounting Screw so that it is friction tight.

(30) Pivot the 154072 Bracket downward so that its stop clears only the 154052 Lock Bar.

(31) Slide the 154052 Lock Bar to the right until it clears the right side 154008 Code Bar Guide. Disengage the lock bar from the 154023 Lock Bar Latch and lift it upward and to the left so that it is removed from the code lever guide assembly. Discard the 154052 Lock Bar.

(32) Replace the 154052 Lock Bar with the 164499 Lock Bar by reversing the procedure outlined in paragraphs (27) through (31) above. Re-adjust the code bar guide clearance. (Refer to the Model 28 adjustment bulletin).



(33) Install the 16497 Eccentric on the 164496 Bail with a 45815 Lock Washer and 112626 Nut. Refer to Figure 19.

(34) Remove the three 139752 Screws and 110743 Lock Washers which fasten the 154184 Rear Blade to the 154179 Universal Bail.

(35) Remove the 3598 Nut, 2191 Lock Washer and 7002 Washer which fasten the 121242 Clamp to the 154149 Line Break Switch Cable. Also remove the two 153841 Screws and 2191 Lock Washers which fasten the 154039 Line Break Switch Bracket to the keyboard.

(36) Remove the two 119653 Retaining Rings from the left side of the 154092 Function Lever Shaft. Slide the shaft to the right until its left end is approximately in line with the roller on the 154239 Universal Extension mounted on the 154179 Universal Bail. Note the position of all function levers thus removed from the shaft so that they may be readily replaced.

(37) Rest the keyboard on its back side so that it is supported by the motor. From the bottom of the keyboard maneuver the 164496 Bail with 164497 Eccentric into its proper position on the 154059 Function Bail Bracket. Hold the bail with its long extension upward and its bearing holes at right angles to the 154092 Shaft. Insert the long extension of the bail upward through the base cutout in line with the previously installed 163979 Function Lever "HERE IS". Position the 164496 Bail Extension so that it engages the 163979 Function Lever in a similar manner as the 154099 Local Carriage Return Function Bail engages its associated function lever. Place the 164496 Bail in the function bail bracket slot immediately to the left of the 162979 Function Lever so that the 164497 Eccentric is atop the 154067 Keyboard Lock Function Lever. Slide the 154092 Shaft to the left into the bearing holes of the 164496 Bail and all original function levers previously disengaged. Secure the 154092 Shaft with the two 119653 Retaining Rings previously removed. Refer to Figure 19. Remount the line break switch and cable.

(38) To facilitate installation of the 174180 Control Relay Assembly in the right rear corner of the keyboard base, connect the white-slate (W-S) green and white-brown (W-BR) wires from the 174177 Keylever Contact Cable Assembly to the control relay terminal block. (See 4412WD).

(39) Route the purple (P) and slate (S) wires from the control relay assembly to the motor terminal block.

(40) Route the four point connector through the top of the keyboard. (See Figure 3).

(41) Install the 174180 Control Relay Assembly in the right rear of the keyboard with two 151630 Screws and two 2191 Lock Washers. Install the 174184 Control Relay Cover Plate as shown in Figure 3 with two 151630 Screws,



two 2191 Lock Washers and 70314 Flat Washer. (The entire control relay assembly is secured at the rear of the keyboard by the 70314 Flat Washer which overlaps onto the keyboard base.) (See Figure 3.)

(42) Connect the two purple (P) wires, previously routed, to terminal one of the motor terminal block. (See 4412WD).

(43) Connect the two slate (S) wires, previously routed, to terminal two of the motor terminal block. (See 4412WD).

(44) Remove the signal generator from the keyboard in accordance with standard practice.

(45) Remove and discard the two 151737 Screws which secure the cam sleeve assembly to the clutch cam disk. Retain the lock washers.

(46) Install the 162885 Cam Segment with the two 162886 Screws and the two lock washers previously removed. Refer to Figure 4. The 162885 Cam Segment and 162886 Mounting Screws can be maneuvered into place without removing any parts from the signal generator assembly.

(47) Install the 162878 Universal Pulsing or blinding contact assembly on the 154009 Signal Generator Front Plate as shown in Figure 4 using two 151631 Screws, two 2191 Lock Washers and two 7002 Flat Washers.

(48) Replace the 154017 Eccentric Stud with the 173096 Eccentric Stud. To do so it will be necessary to loosen the signal generator rear plate and code bar bail so the eccentric studs may be maneuvered into and out of the code bar bail. (See Figure 5.)

(49) The signal generator rear plate may be loosened by removing the nuts and lock washers which fasten the plate to the 151207 Code Bar Bail Stud, 154018 Locking Bail Post and 154014 Guide Post. Also remove the screw which fastens the signal generator frame by means of an "L" bracket. Remove the retaining ring from the rear of the 151207 Code Bar Bail Stud to loosen the code bar bail. Be sure to replace all parts after the 173096 Eccentric has been installed.

(50) Unhook the 154191 Code Bar Bail Latch Spring from the 154089 Spring Post. Remove the 154079 Stud and the 158268 Code Bar Bail Latch, 154191 Spring, 115122 Felt Washer and 119651 Retaining Ring from the signal generator 154102 Rear Plate. Remove the latch, spring, felt washer and retaining ring from the stud. Discard the stud, re-install the 158268 Latch, its spring and felt washer on the 164138 Stud. Also place the 173029 Latch on the stud so that its hub is adjacent to the latch with its right side projection overlapping the latch. Retain the parts on the stud with the original 119651 Retaining Ring. Re-assemble the 164138 Stud and its parts on the signal generator

rear plate by maneuvering the parts up from the bottom so that the 173029 Lever extends through the cut-out in the code bar bail. Fasten the stud with the original lock washer and nut. (Refer to Figure 5.)

(51) Unhook the 154215 Code Bar Bail Spring from the 154089 Spring Post. Remove the 154089 Spring Post from the 154102 Signal Generator Rear Plate and replace it with the 173028 Spring Post. Replace the 154215 Code Bar Bail Spring and 154191 Code Bar Latch Spring on the 173028 Post. Place the 76422 Latch Operating Lever Spring on the 173029 Lever only. The 76422 Spring should be replaced on the 173028 Post after the character generator mechanism has been installed on the keyboard. (Refer to Figure 5.)

(52) Install the 150089 Screw and 151880 Lock Nut in the tapped hole located on the right side of the 173029 Latch Operating Lever. (Refer to Figure 5.)

(53) Place two 155753 Plastic Tubing Insulators over the bare wires of the 174177 Keylever Cable Assembly previously routed to the signal generator. Solder the slate (S) wire to the contact spring and solder the white-brown (W-BR) wire to the contact stiffener of the 162878 Pulsing Contact. (Figure 16 and Paragraph (23).

#### NOTE

Make the 162878 Pulsing Contact Adjustment at this time. (Figure 16 and Paragraph 4. d. (1) to (3).

(54) Replace the signal generator on the keyboard in accordance with standard practice. Check, and if necessary, make the code bar and code lever clearance, the code bar bail, the code bar bail and non-repeat lever clearance, the universal bail latch lever, the universal bail extension, the ball wedgelock and ball track clearance and the lock ball end play adjustment. (Refer to the Model 28 Adjustment Bulletin 217B).

#### NOTE

The code bar clearance adjustment of some to .006 inch must be refined to .004 inch to .006 inch.

(55) Remove and retain the 151739 Keytop arrangement identification screw and its 2191 Lock Washer from the keyboard.

(56) Install the 164142 Mounting Bracket on the keyboard so that it is offset towards the top. Use the two mounting holes located on the left side of the 156574 Spring Post on the 154179 Universal Bail. Fasten the bracket with a 151722 Screw and 2191 Lock Washer and also the previously removed 151739 Identification Screw and 2191 Lock Washer. (Refer to Figure 6).



(57) Solder the white-green (W-G) and green (G) wires to the magnet as indicated in 4412WD. Use 155753 Plastic Tubing Insulators. Tie the wires to the rear of the magnet yoke making certain that they do not interfere with any moving parts on the answer-back mechanism or keyboard. (Refer to paragraph (18).

(58) Place the 164162 "O" Ring in the groove on the rim of the 164161 Message Drum which is furthest from the slot in the center portion of the drum. Install the 164163 Stop Blade in any slot position in the drum by first inserting the blade under the "O" ring and then rotating the blade toward the center of the drum until it is fully seated. (Refer to Figure 7).

(59) Code the drum in the following manner: (Refer to Figure 7).

(a) Almost any answer-back message desired may be selected which does not contain more than 21 characters including spaces. However, the coding of the message drum always begins with a LETTERS (stop blade) and is normally followed by CARRIAGE RETURN and LINE FEED. The coding also normally ends with CARRIAGE RETURN and LINE FEED. This arrangement insures that the message will appear at the beginning of a line on the distant station and that over-printing of the message will not occur. Transmission of the LETTERS code combination at the beginning of the message also returns all stations in the circuit to the unshift position. Since 5 of the 21 available characters are thus used to perform these functions, only 16 are available for the message itself. This procedure may be alternated to suit a particular application of the answer-back mechanism.

(b) Code the drum in a counter-clockwise direction beginning with the No. 2 164164 Code Blade adjacent to the 164163 Stop Blade. Each 164164 Code Blade is provided with removable tines for all levels of the transmission code (1, 2, 3, 4, 5). A "O" code level tine has been provided on each blade for future usage on six level keyboards and may be currently disregarded. A blade is coded by breaking off the unwanted tines at the scored line at the base of each tine. Figure 9 indicates which tines are to be removed for a particular character. To prevent distortion of a code blade, each blade should be held securely near the score mark of the tine to be removed. Although twenty code blades are sufficient to completely code the drum, twenty-five such blades have been provided to allow for possible errors in coding. Since each slot position in the drum must be occupied by a code blade, the unused characters under the twenty permitted for customer use shall be coded either for LETTERS or BLANKS or some such tolerable character.

(c) Install each coded 164164 Blade in the proper slot position in the drum by first inserting the blade under the "O" ring and then rotating the blade toward the center of the drum until it is fully seated. After filling the



code drum, encircle the code blades by placing another 164162 "O" Ring in the groove on the opposite rim of the 164161 Drum.

(60) Apply a thin film of grease on the shaft of the 164165 Drive Plate. Install the message drum complete with coded blades and "O" rings on the shaft of the drive plate. Depress the stepping pawl extension to raise the pawl sufficiently so that the drum bears against the hub of the drive plate and the pawl fully engages the projections on the code blades. Hold the assembled parts approximately as indicated in Figure 8 by means of the thumb and first two fingers of the left hand. Slide the drive plate shaft downward along the left sides of the curved slots in the 164144 Side Plates until the drum assembly is fully seated as indicated.

(61) To facilitate the adjustment of the character generator mechanism, the following adjustments should be made before the mechanism is installed on the keyboard: Magnet Yoke (Figure 9) Stop Lever Latch (Figure 10).

(62) After making the magnet yoke and stop lever latch adjustments, remove the message drum by reversing the procedure used in its installation. The answer-back mechanism may now be installed on the keyboard. With the parts assembled as indicated in Figure 6, maneuver the character generator mechanism so that the left side projection of the 164146 Stop Lever is under the 150089 Screw fastened to the 173029 Latch Operating Lever and the front portion of the 164143 Mounting Plate is resting on the keyboard base while the rear portion of the 164163 Plate is resting on the 164142 Mounting Bracket. Assemble the 164143 Mounting Plate only friction tight to the keyboard and bracket by means of 153537 Screws, 2191 Lock Washer and 7002 Washers placed in the rear and right front mounting slots of the plate. (See Figure 6).

(63) To facilitate the adjustment of the answer-back mechanism, the following adjustment should be made when the mechanism is being installed on the keyboard after the signal generator has been replaced. Mounting Plate (Figure 11).

(64) Assemble the 173095 and 164160 Drive Links together as indicated on Figure 8. Use two 151152 Screws, 3640 Lock Washers and 125011 Flat Washers to assemble the parts only friction tight. Install the assembled drive links on the appropriate shoulder of the 173096 Code Bar Reset Bail Eccentric Stud. Rest the 164160 Link along the rear side of the front 164144 Side Plate of the answer-back mechanism. Install the 90573 Spring in the spring eye or the 164160 Link.

(65) Install the drive plate assembly without the message drum on the character generator mechanism as previously described. Hook the 90573 Spring on the 164169 Eccentric Stud making certain that the slot in the 164160 Drive Link engages the stud on the drive plate.

(66) Make the following answer-back generator adjustment at this time:  
Drive Link (Figure 12).

(67) Unhook the 90573 Drive Link Spring from the 164169 Eccentric Stud. Disengage the slot in the 164160 Drive Link from the stud on the 164165 Drive Plate. Remove the drive plate assembly from the character mechanism. Install the message drum on the drive plate shaft and install the drum and drive plate assembly on the mechanism as previously described. Re-hook the 90573 Spring on the 164169 Stud. Make certain that the slot in the 164160 Drive Link engages the stud on the drive plate; if necessary turn the drive plate with its attached stepping pawl held out of the engagement with the code blades so that the parts are properly aligned.

(68) Make certain that the 164146 Stop Lever is latched on the 164158 Latch. Install the 76422 Spring for the code bar bail latch operating lever on the 173028 Post.

(69) Make the following final answer-back generator adjustments:  
Stepping Pawl (Figure 13) Latch Operating Lever Adjusting Screw (Figure 14)

(70) Again make certain that the 164146 Stop Lever is latched on the 164158 Latch and also that the signal generator clutch is disengaged. Turn the message code drum clockwise until it is in its fully detented position and the 164154 Sensing Levers are resting on the 164163 Stop Blade which is just below the pawl shaped surface on the upright projection of the 164146 Stop Lever. (Refer to Figure 8).

(71) Lubricate the answer-back mechanism in accordance with Paragraph 4. Make the "HERE IS" keylever switch adjustment in accordance with Paragraph 4.

(72) Replace the keyboard hood, keyboard and typing unit in accordance with standard practice.

c. The 176272 Modification Kit - Installation of the 176272 Kit is the same as kit 174176 except that Paragraphs 3. b. (4), through 3. b. (8) are replaced by 3. c. (1) through 3. c. (7) and 3. c. (8) is inserted between 3. b. (18) and (19).

(1) Install the following parts in slot No. 32:

NOTE

If slot 32 is not available install these parts in slot 26.

<u>Part No.</u>	<u>Description</u>
174185	Pawl, Function
157240	Spring
72522	Wick
157200	Spring
94693	Wick
152666	Bar, Function "Figs"
4703	Spring
152642	Lever, Function
90517	Spring
152660	Plate, Spring

(2) Install the following parts in slot No. 33:

<u>Part No.</u>	<u>Description</u>
152653	Pawl, Function
157240	Spring
72522	Wick
157200	Spring
94693	Wick
152666	Bar, Function "Figs"
4703	Spring
152121	Lever, Function
90517	Spring
154613	Latch

(3) Install the following parts in slot No. 34:

<u>Part No.</u>	<u>Description</u>
152653	Pawl, Function
157240	Spring
72522	Wick
157200	Spring
94693	Wick
153520	Bar, Function "C"
4703	Spring
152642	Lever, Function
90517	Spring
152660	Plate, Spring

(4) Use the 157240 Spring and 72522 Wick on units having a one stop function clutch; use the 157200 Spring and 94693 Wick on units having a two stop function clutch.



(5) If the printer stunt box is equipped with the blank-blank keyboard lock sequence parts, replace the 152121 Function Lever in slot 35 with the 161649 Function Lever, furnished. If the stunt box is also equipped with a 152127 Clip to disable the blank-blank keyboard lock sequence this clip must be removed and the 157274 Clip, furnished, used when it is desired to disable this feature. The 157274 Clip should be installed after the stunt box has been replaced in the printer. Position the clip with its closed end under the function pawl in slot No. 35 so that it lifts the pawl out of engagement with the function bar when the hooks at the open end of the clip are placed over the 150544 Handle.

(6) Install the 172502 Switch Assembly (part of 174187 Cable Assembly) across stunt box slots numbers 29, 30, 31 and 32. If slots 29 - 32 are not available, use slots 23 - 26; modify cable to fit.

(7) Install the 172526 switch across stunt box slots numbers 33, 34, 35, and 36.

(8) Remove the existing "C" keylever assembly and replace with the 164457 W-R-U upper case "C" Keylever Assembly.

d. Answer-Back Message Code Drum Change (See Paragraph 1. h. and Figure 8).

(1) Unhook the 90573 Drive Link Spring from the 164169 Eccentric Stud.

(2) Disengage the slot in the 164160 Drive Link from the stud on the 164165 Drive Plate.

(3) Grasp the code drum with the thumb and first two fingers of the left hand and while pushing the entire assembly to the right, lift the drum and its drive plate out of the mechanism. Slide the drum assembly from the shaft of the drive plate and replace it with the one desired.

(4) Depress the stepping pawl extension to raise the pawl sufficiently so that the new drum bears against the hub on the drive plate and the pawl fully engages the projections on the code blades.

(5) Hold the assembled parts as shown on Figure 8 and re-insert them in the answer-back mechanism by reversing the disassembly instructions.

(6) Hook the 90573 Spring on the 164169 Eccentric Stud.

(7) Make certain that the slot in the 164160 Drive Link engages the stud on the drive plate; if necessary, turn the drive plate with its attached stepping pawl held out of engagement with the code blades so that the parts are properly aligned.

(8) If the code bar bail latch has been released during the above procedure, relatch the 164146 Stop Lever on the 164158 Armature Latch and turn the motor hand-wheel or signal generator shaft until the signal generator clutch is disengaged.

(9) Turn the code drum clockwise until in its fully detented position the sensing levers are resting on the 164133 Stop Blade which is just below the pawl shaped surface of the upright projection of the 164146 Stop Lever.

#### 4. ADJUSTMENTS AND LUBRICATION

a. For standard adjustments and standard lubrication procedure refer to Teletype Model 28 Page Printer Set Bulletin 217B (Bell System refer to standardized information).

b. Make the subject kit adjustments and lubrication as given in the text and referring to the appropriate attached figures.

c. Make the following "HERE IS" keylever adjustments before the keyboard hood is reinstalled on the keyboard. (See Figure 1).

##### (1) Keylever Switch Position - Preliminary

The centerline of the insulated portion of the universal contact assembly should align with the centerline of the code bar lever. To adjust, loosen the screw holding the universal contact assembly to the retainer bar and adjust. Tighten the screw.

##### (2) Keylever Switch Horizontal Position

The centerline of the insulated portion of the universal contact assembly should align with the centerline of the lowermost portion of the code bar lever. To adjust, loosen the two screws holding the retainer bar to the brackets and adjust. Tighten the screws.

##### (3) Keylever Switch Vertical Position

###### (a) Requirement:

1. With the keylever in the unoperated position there should be 0.015" clearance between the center and lower contacts.
2. To Adjust: Bend upper contact spring to meet requirement.

(b) Requirement

1. Pull up 163979 Function Lever with a spring hook at rear of code bar basket alongside of upstop bar until the lobe on the front of the 163979 Function Lever touches the insulator of the center contact; there should be at least .010" between the center and lower contacts.
2. Center and lower contacts should close with some over-travel when keylever is depressed with 16 oz. pressure using a 32 oz. spring scale.
3. To adjust: Loosen the two 156740 Screws which fasten the two 162875 Brackets on the two 121473 Studs and position the complete mounting assembly.

d. Make the 162878 Pulsing Contact Adjustment referring to Figures 15, 16 and 17 (Note on page 10).

(1) With the pulsing contact installed on the signal generator, there should be at least .010" clearance between the contact guard and the rocker bail assembly. (Refer to Figure 18). To adjust - loosen the two contact assembly mounting screws and position the contact assembly.

(2) Rotate the main shaft until the lower extension of the cam follower arm rests on the high part of the cam. The clutch should now be in a latched position. There should be .015 to .025" clearance between the contact points. (Refer to Figure 15). To adjust - loosen the two mounting bracket screws, leaving the bottom screws friction tight and position the mounting bracket to meet this requirement. Tighten the mounting screws.

(3) There shall be at least .015" clearance between the lower extension of the cam follower arm and the inside surface of the clutch disk. To adjust - loosen the two mounting screws and position the cam follower hinge. (Refer to Figure 16).

NOTE

When checking this adjustment, rotate the main shaft several times and check the entire cycle. Make sure the lower extension of the follower arm does not come in contact with the adjusting disk mounting screws.



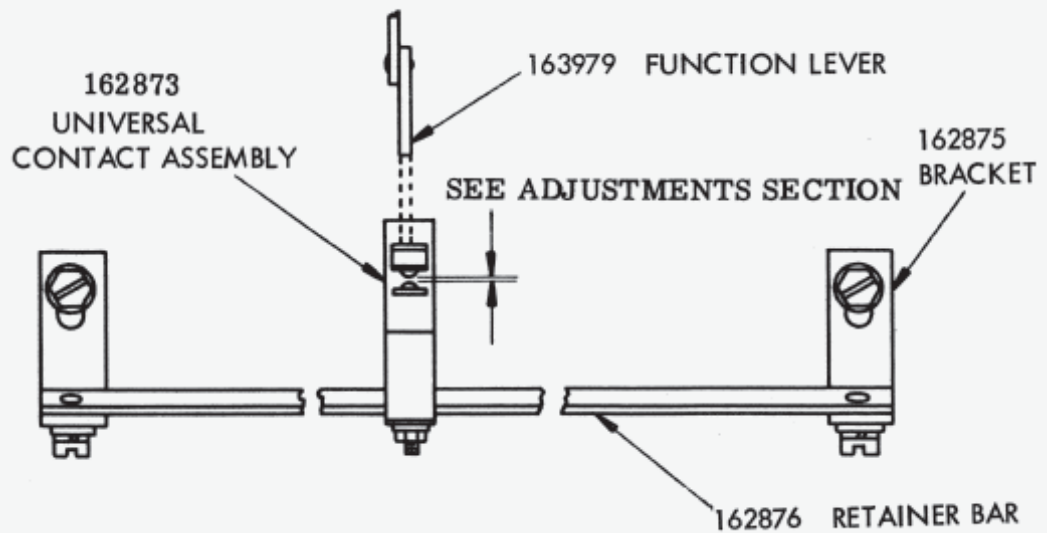
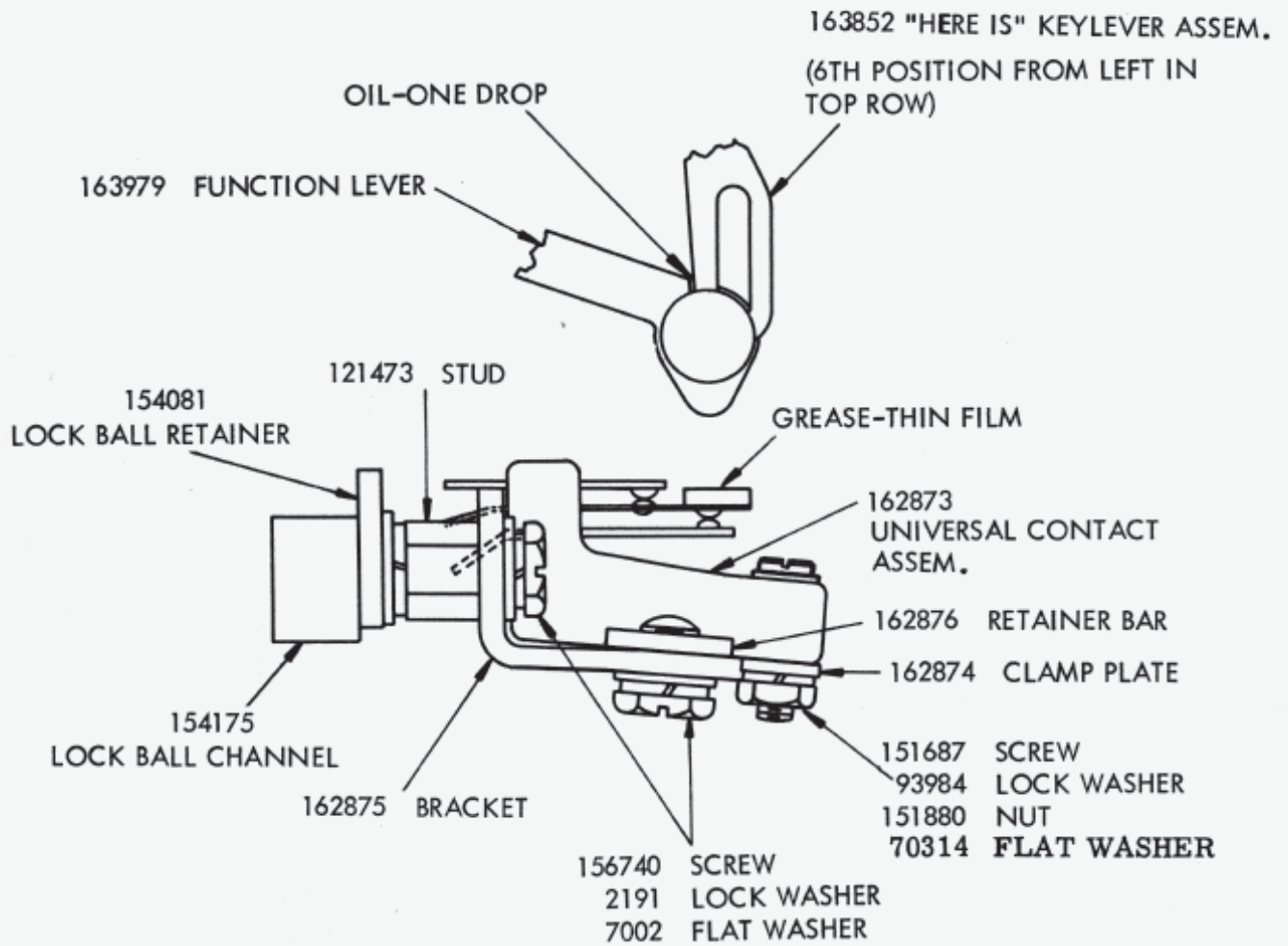


FIGURE 1.

RIGHT SIDE OF CHANNEL

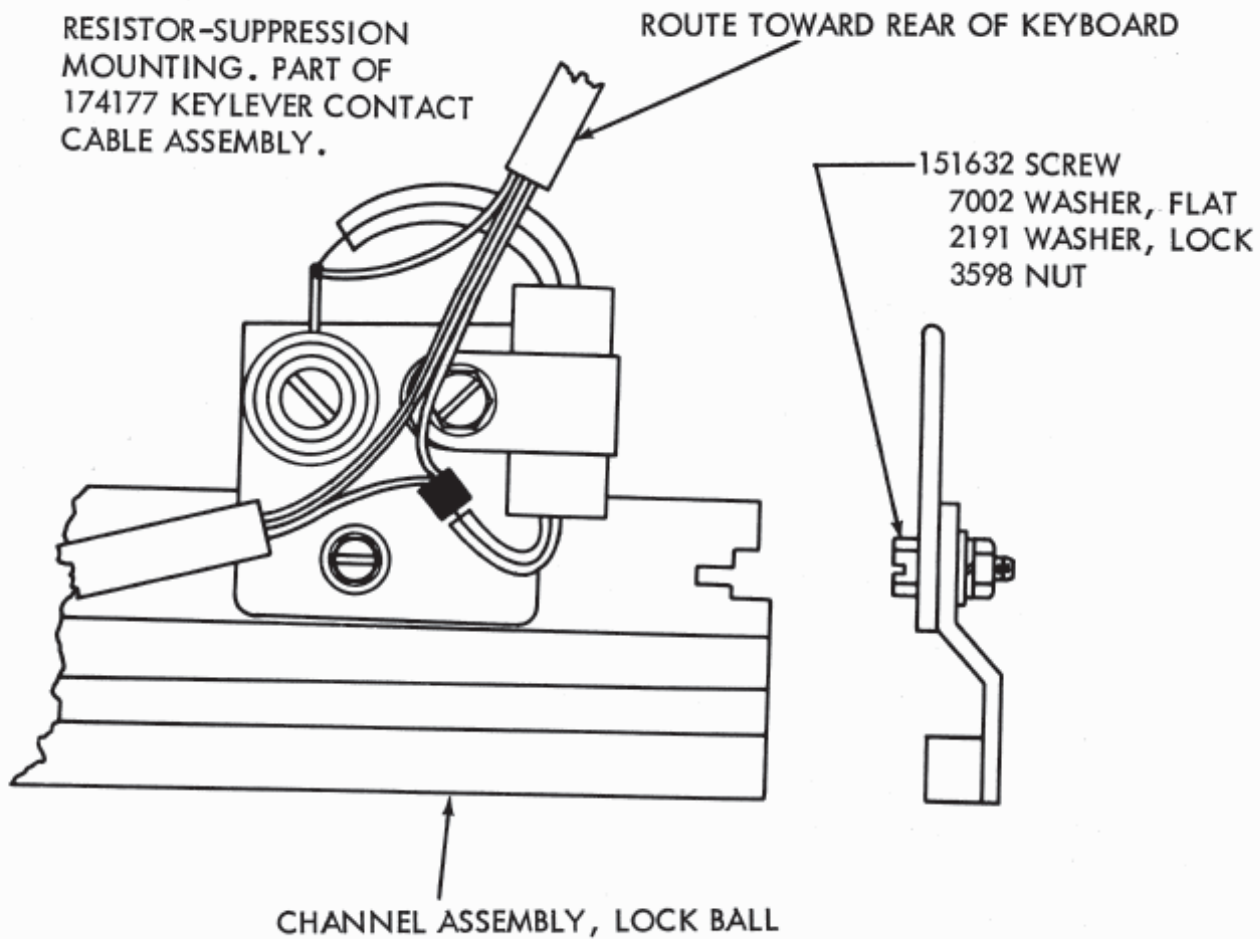
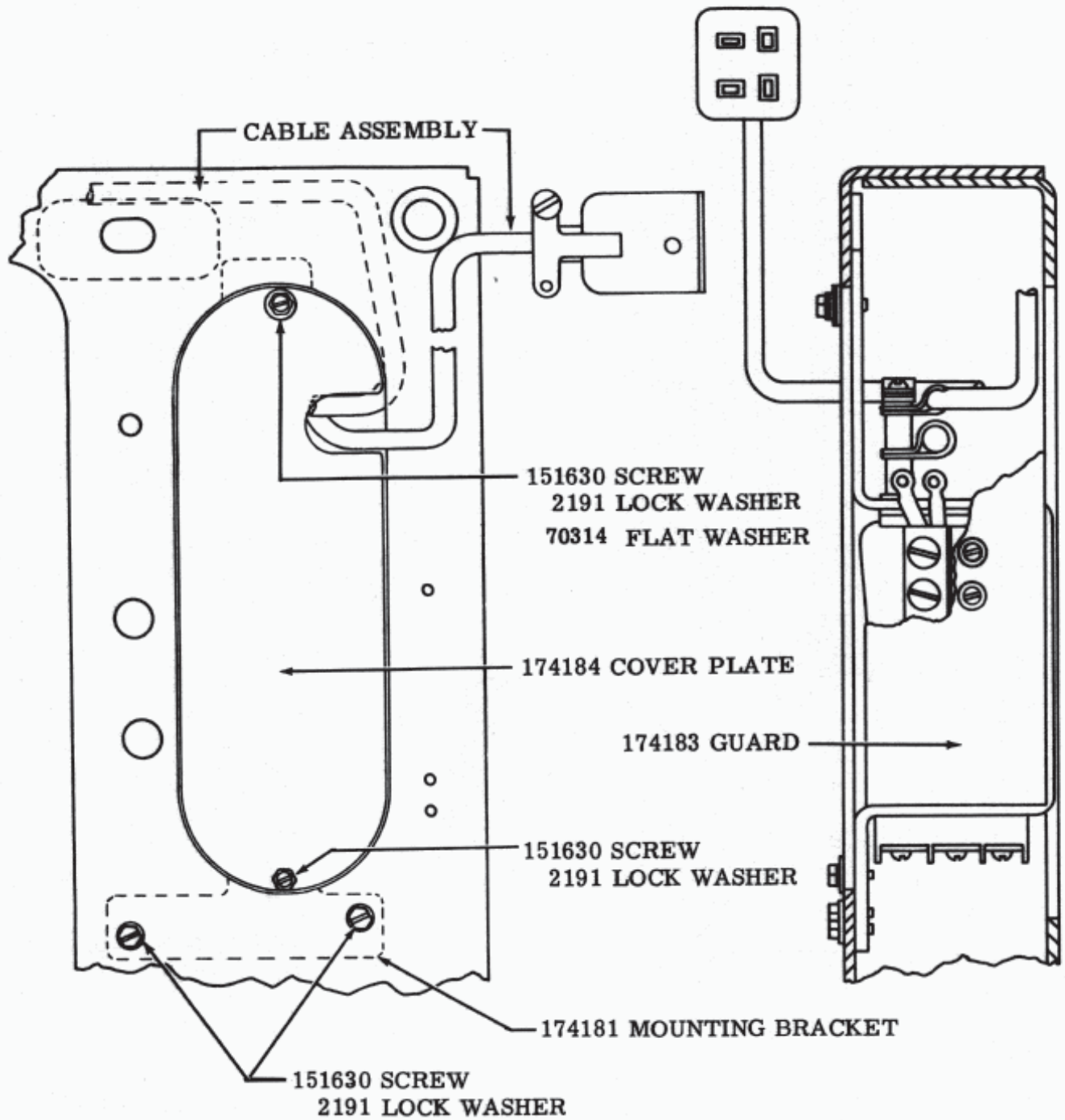


FIGURE 2.





KEYBOARD BASE  
(VIEW OF RIGHT REAR)

FIGURE 3.

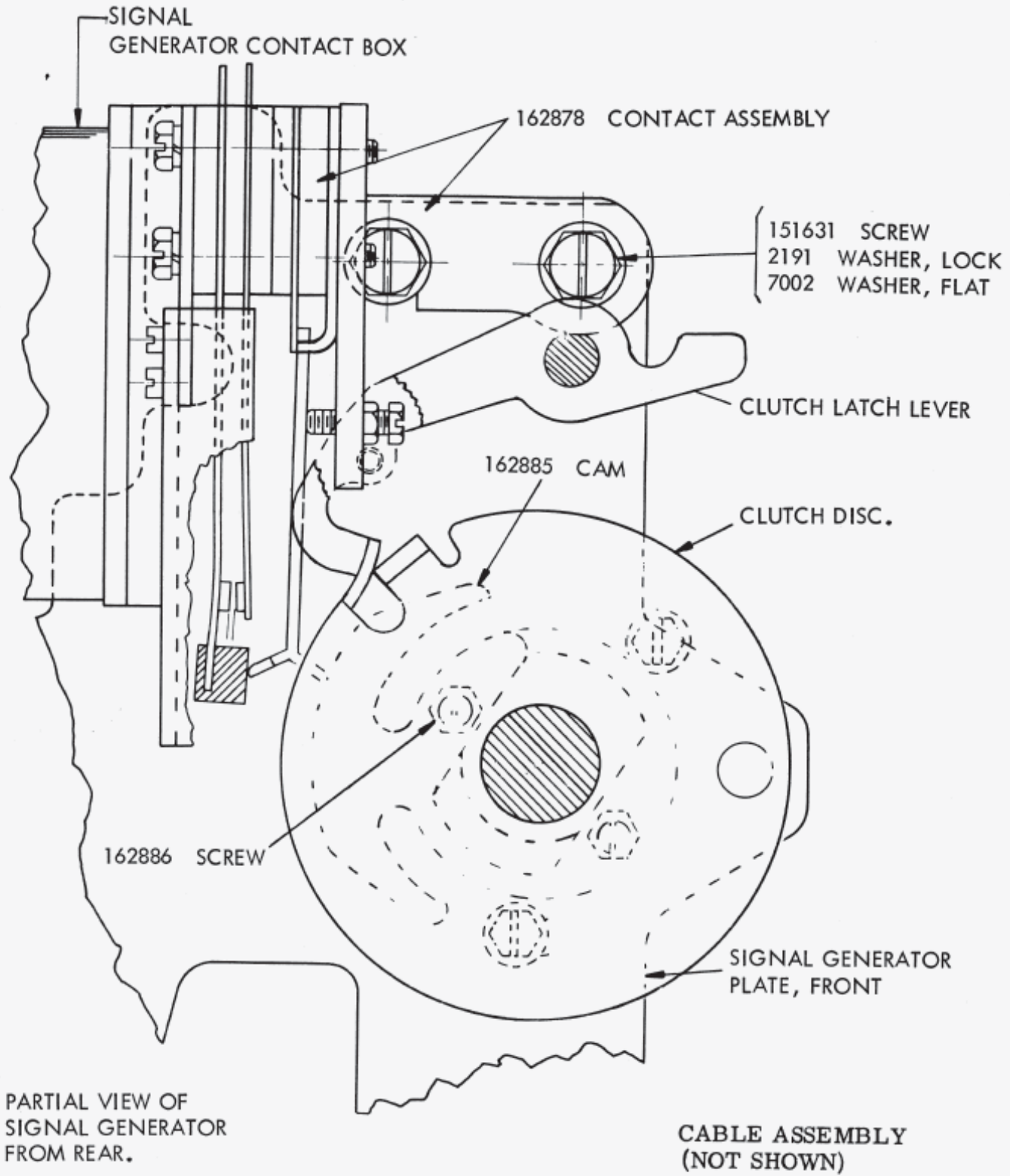


FIGURE 4.



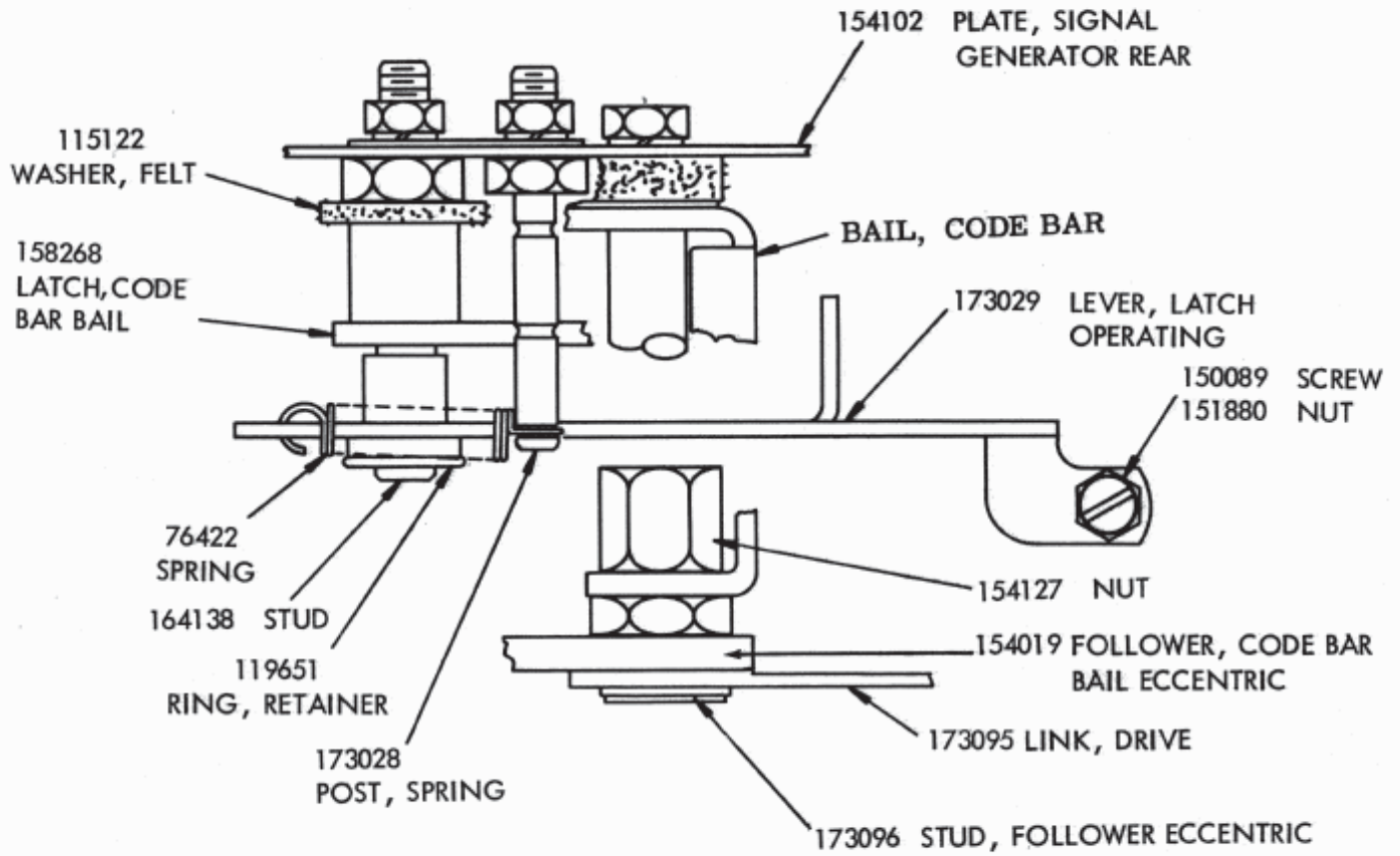


FIGURE 5.

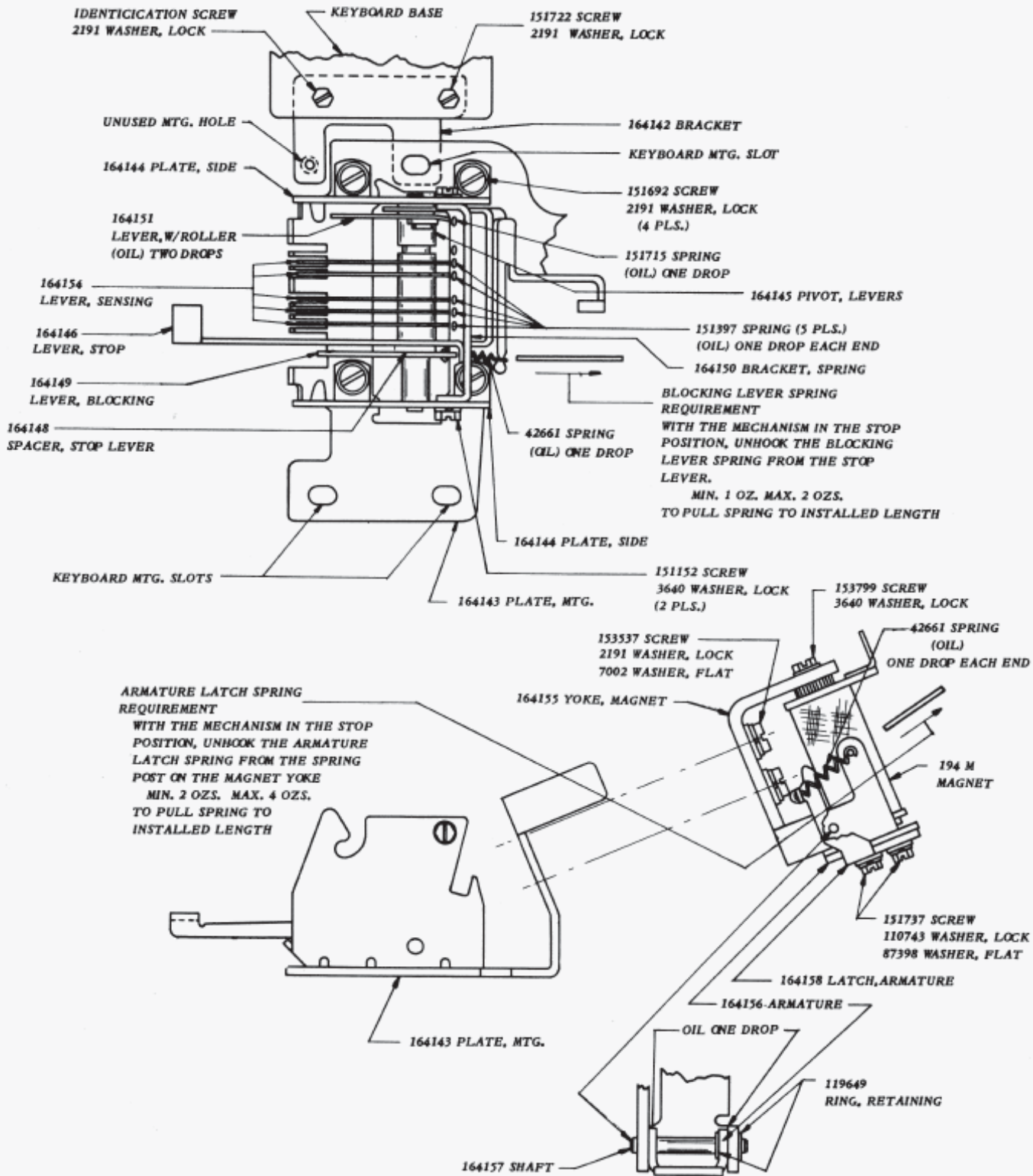
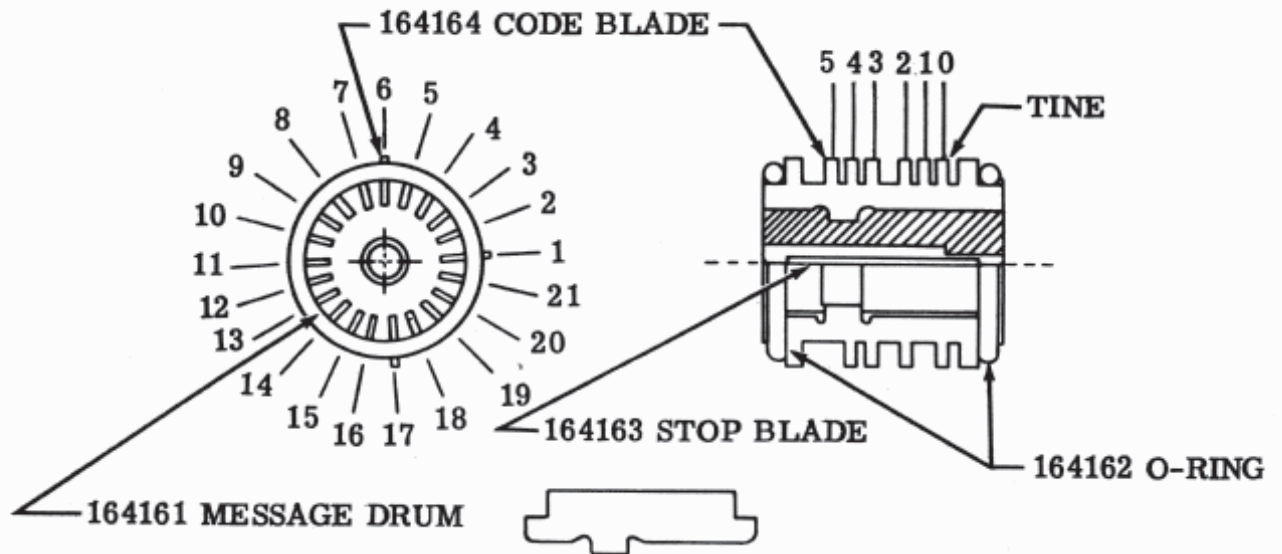


FIGURE 6.





LETTERS	TYPICAL FIG. ARRGT.	CODE				
		1	2	3	4	5
A	—	■	■	■	■	■
B	?	■	■	■	■	■
C	:	■	■	■	■	■
D	\$	■	■	■	■	■
E	3	■	■	■	■	■
F	!	■	■	■	■	■
G	&	■	■	■	■	■
H	#	■	■	■	■	■
I	8	■	■	■	■	■
J	'	■	■	■	■	■
K	(	■	■	■	■	■
L	)	■	■	■	■	■
M	.	■	■	■	■	■
N	,	■	■	■	■	■
O	9	■	■	■	■	■
P	0	■	■	■	■	■
Q		■	■	■	■	■
R	4	■	■	■	■	■
S	BELL	■	■	■	■	■
T	5	■	■	■	■	■
U	7	■	■	■	■	■
V	;	■	■	■	■	■
W	2	■	■	■	■	■
X	/	■	■	■	■	■
Y	6	■	■	■	■	■
Z	"	■	■	■	■	■
CARRIAGE RETURN		■	■	■	■	■
LINE FEED		■	■	■	■	■
LETTERS SHIFT		■	■	■	■	■
FIGURES SHIFT		■	■	■	■	■
SPACE		■	■	■	■	■
BLANK		■	■	■	■	■

■ — LEAVE TINE  
□ — REMOVE TINE

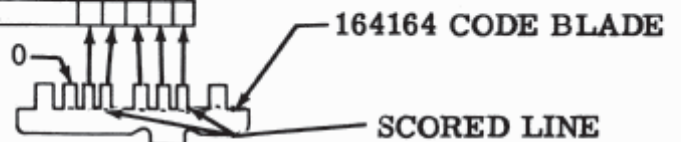


FIGURE 7.

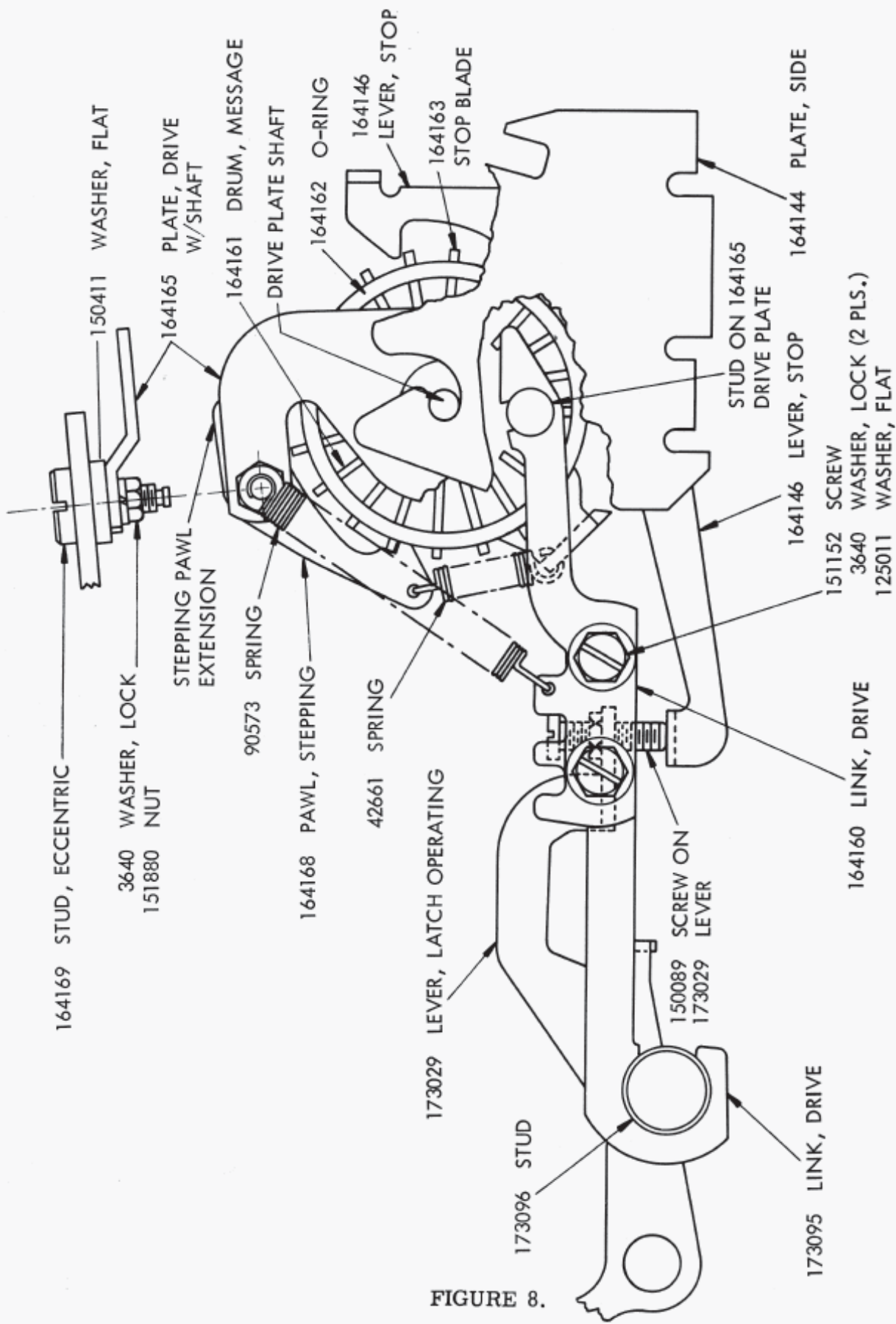
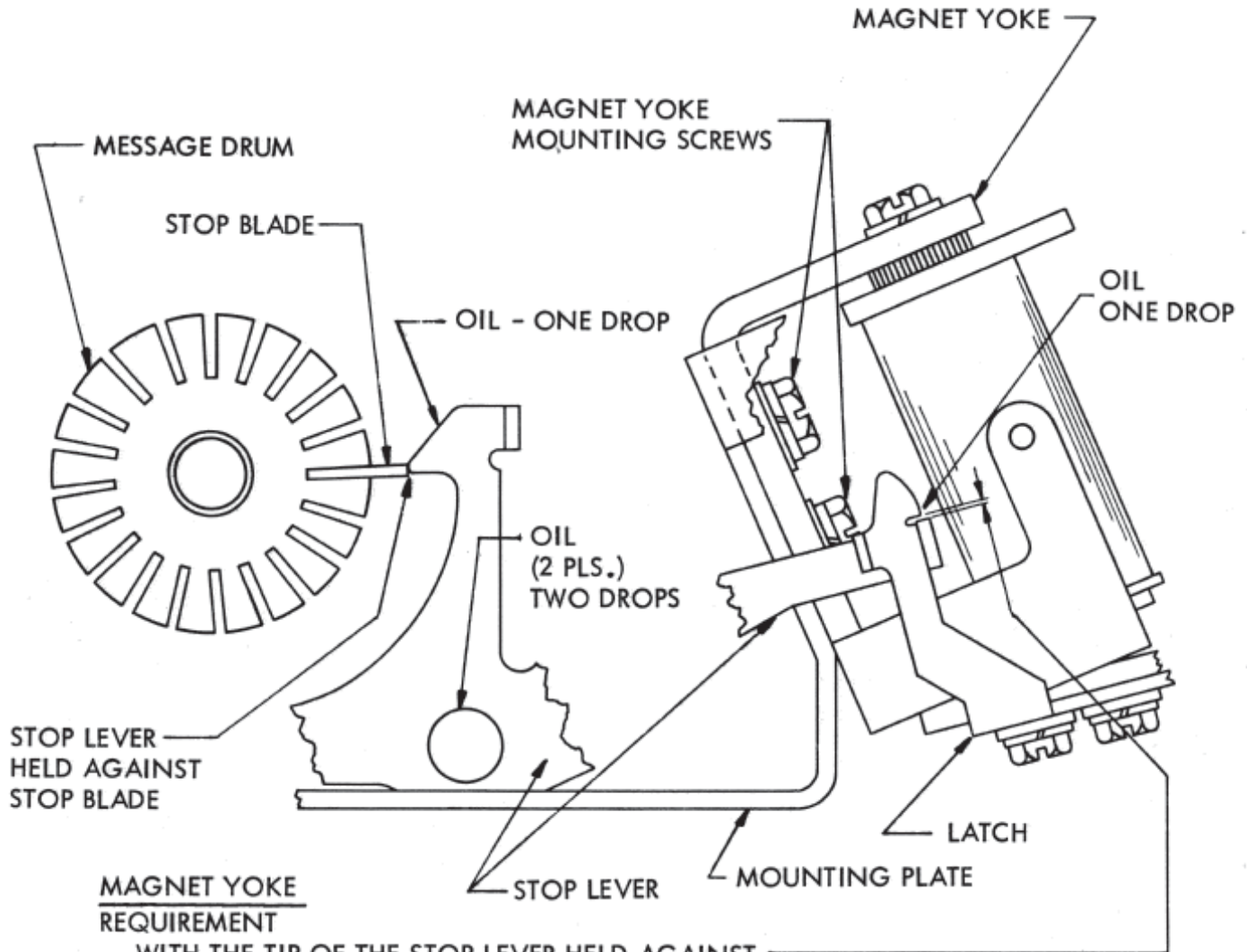


FIGURE 8.



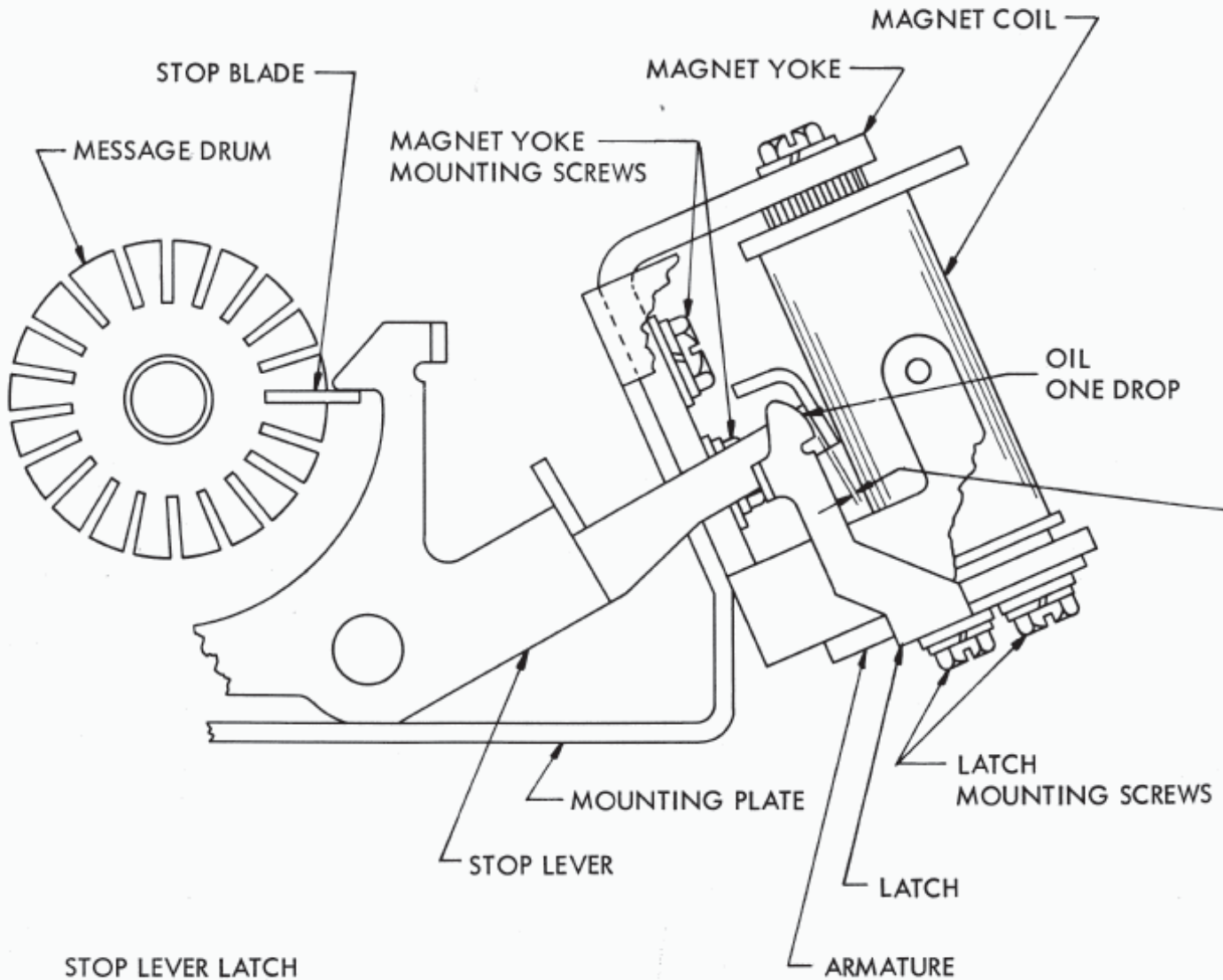


**MAGNET YOKE  
REQUIREMENT**

WITH THE TIP OF THE STOP LEVER HELD AGAINST THE STOP BLADE THERE SHOULD BE FROM .005" TO .015" CLEARANCE BETWEEN THE LATCHING SURFACES ON THE STOP LEVER EXTENSION AND ITS LATCH

TO ADJUST  
ROTATE THE MESSAGE DRUM TO MEET THE REQUIREMENT AND THEN POSITION THE MAGNET YOKE BY MEANS OF ITS TWO MOUNTING SCREWS.

FIGURE 9.



STOP LEVER LATCH  
REQUIREMENT

WITH THE ARMATURE HELD AGAINST THE MAGNET CORE AND THE STOP LEVER HELD IN ITS EXTREME COUNTER-CLOCKWISE POSITION THERE SHOULD BE .002" TO .007" CLEARANCE BETWEEN THE STOP LEVER AND ITS LATCH. THERE SHOULD ALSO BE A MINIMUM OF .002" CLEARANCE BETWEEN THE STOP LEVER AND ITS LATCH THROUGHOUT THE COMPLETE TRAVEL OF THE STOP LEVER.

TO ADJUST

POSITION THE LATCH BY MEANS OF ITS TWO MOUNTING SCREWS.

FIGURE 10.

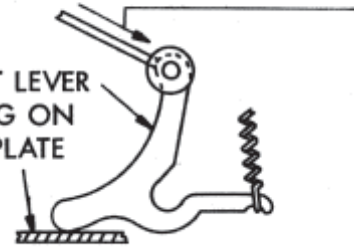
50039S

SENSING LEVER SPRINGS

REQUIREMENT

WITH THE MECH. IN STOP POSITION  
AND THE MESSAGE DRUM REMOVED  
MIN. 1/4 OZ. --- MAX. 1-1/4 OZS.  
TO START EACH LEVER MOVING

DETENT LEVER  
RESTING ON  
MTG. PLATE



DETENT LEVER SPRINGS

REQUIREMENT

WITH THE MECH. IN STOP POSITION  
AND THE MESSAGE DRUM REMOVED  
MIN. 22 OZS. --- MAX. 26 OZS.  
TO START LEVER MOVING

SENSING LEVERS RESTING  
ON MOUNTING PLATE

OIL - ONE DROP  
(5 PLS.)

CODE BARS

SENSING LEVERS

OIL - ONE DROP  
(BOTH SIDES)

OIL - TWO DROPS  
(5 PLACES)

1  
2  
3  
4  
5

OIL - ONE DROP  
(5 PLACES)

MOUNTING PLATE

MOUNTING SCREWS

CHARACTER GENERATOR MOUNTING PLATE

REQUIREMENT

SIGNAL GENERATOR CLUTCH DISENGAGED. (1) SENSING LEVERS CENTRALLY LOCATED ON CODE BARS SO THAT EACH LEVER RESTS ON THE FULL WIDTH OF ITS ASSOCIATED CODE BAR. (2) CLEARANCE BETWEEN SHOULDERS OF CODE BARS NO. 1 NO. 5 AND THEIR ASSOCIATED SENSING LEVERS.

MIN. .002 INCH

MAX. .012 INCH

TO ADJUST

POSITION THE MOUNTING PLATE WITH THE THREE MTG. SCREWS LOOSENED. THIS ADJUSTMENT IS FACILITATED BY REMOVING THE MESSAGE DRUM AND DRIVE PLATE ASSEMBLY FROM THE MECHANISM.

FIGURE 11.



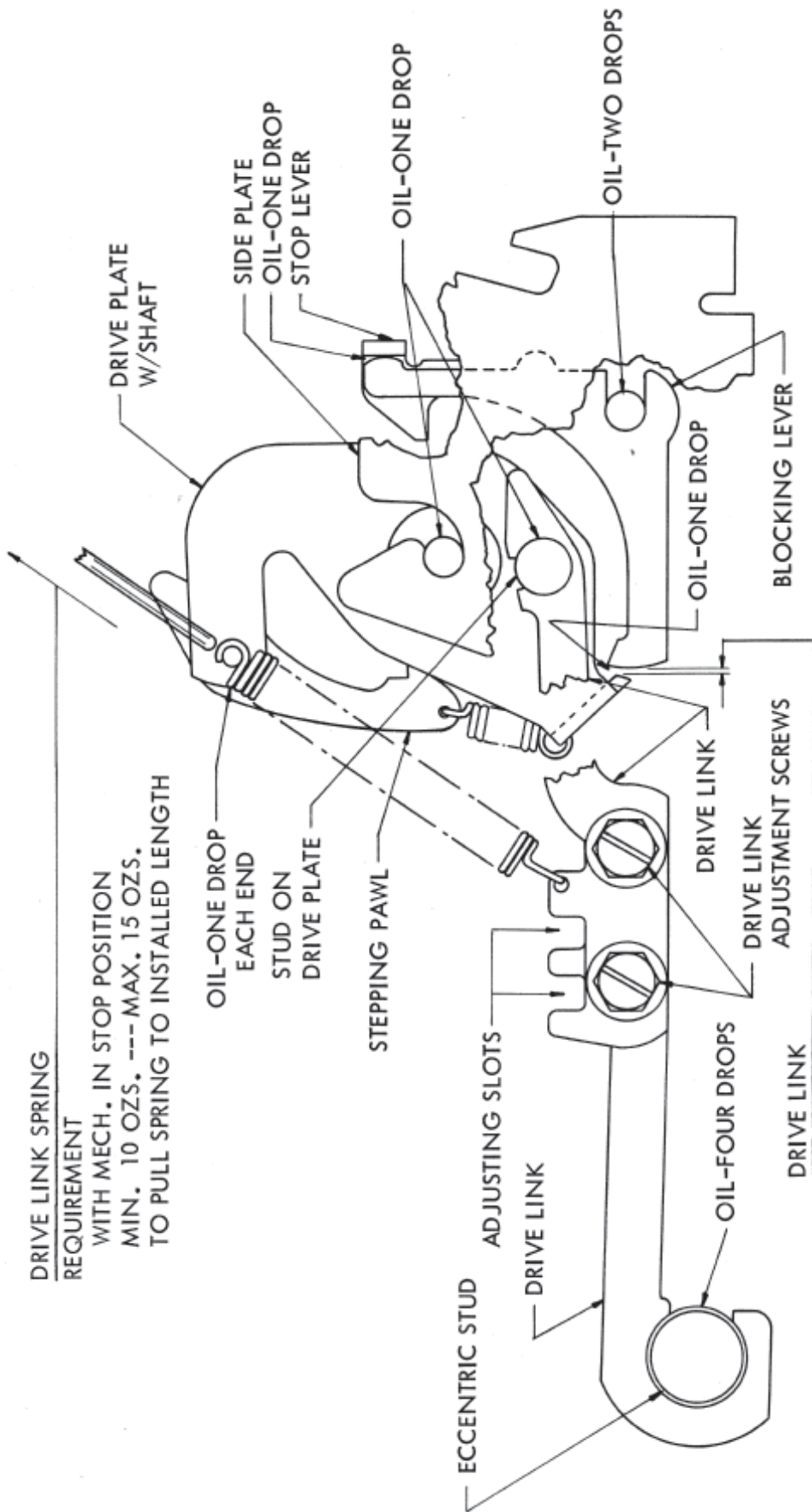


FIGURE 12.

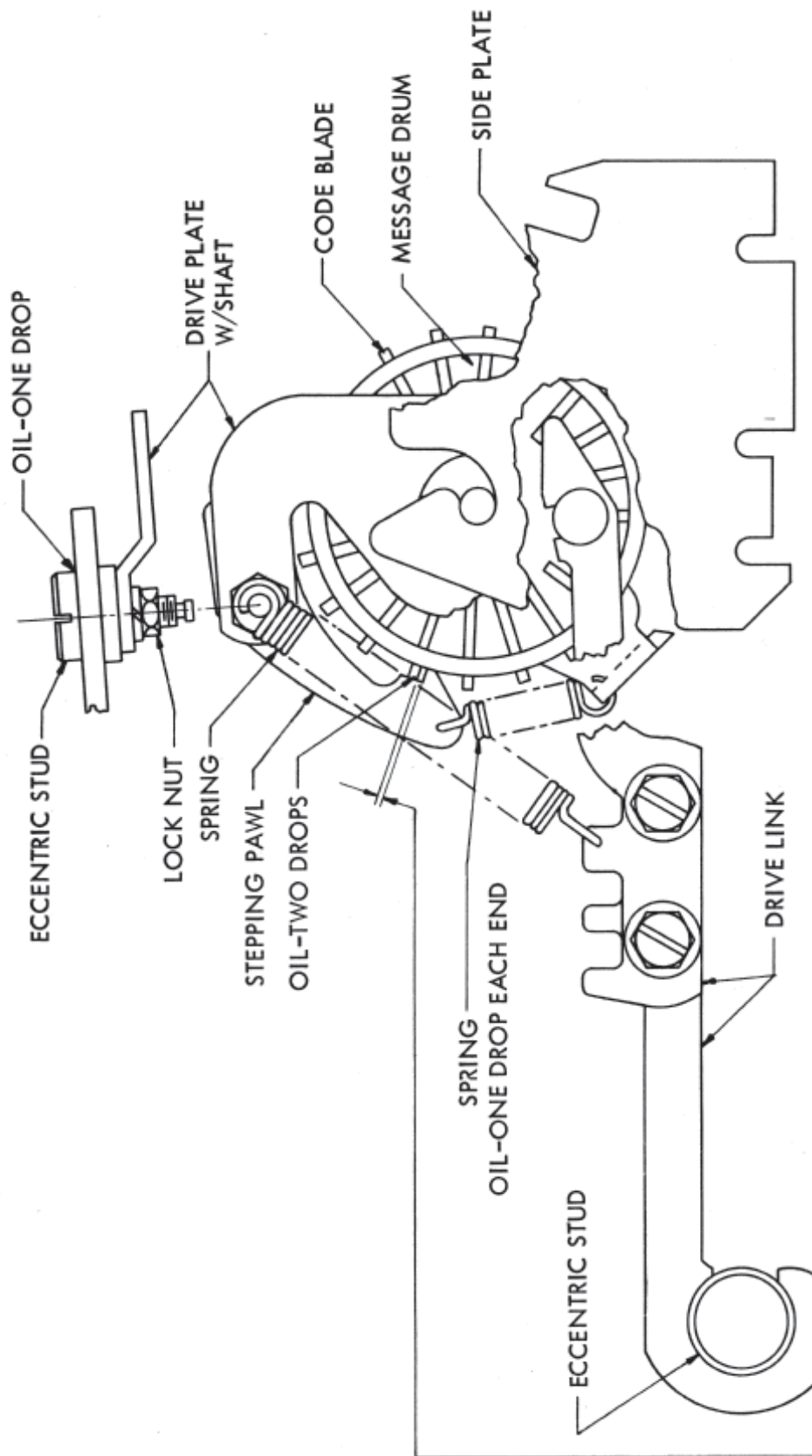
**DRIVE LINK SPRING REQUIREMENT**

WITH MECH. IN STOP POSITION  
MIN. 10 OZS. ---MAX. 15 OZS.  
TO PULL SPRING TO INSTALLED LENGTH

**DRIVE LINK REQUIREMENT**  
KEYBOARD MECHANISM:  
SIGNAL GENERATOR CAM ECCENTRIC AND ARM HOLDING CODE BAR  
BAIL IN EXTREME RESET POSITION TO THE LEFT.

THERE SHOULD BE .002" TO .007" CLEARANCE BETWEEN  
THE DRIVE PLATE EXTENSION AND THE BLOCKING  
LEVER.

**TO ADJUST:**  
POSITION THE TWO DRIVE LINKS RELATIVE TO EACH OTHER BY MEANS OF  
THE ADJUSTING SLOTS AND SCREWS.



**STEPPING PAWL  
REQUIREMENT**

MESSAGE DRUM IN FULLY DETENTED POSITION. SIGNAL GENERATOR CAM AND ARM HOLDING CODE BAR BAIL IN EXTREME RESET POSITION TO THE LEFT. THERE SHOULD BE .018" TO .030" CLEARANCE BETWEEN THE STEPPING PAWL AND ANY CODE BLADE.

TO ADJUST  
POSITION THE ECCENTRIC STUD WITH ITS LOCK NUT LOOSENED SO THAT ITS HIGH POINT IS TOWARD THE TOP.

FIGURE 13.

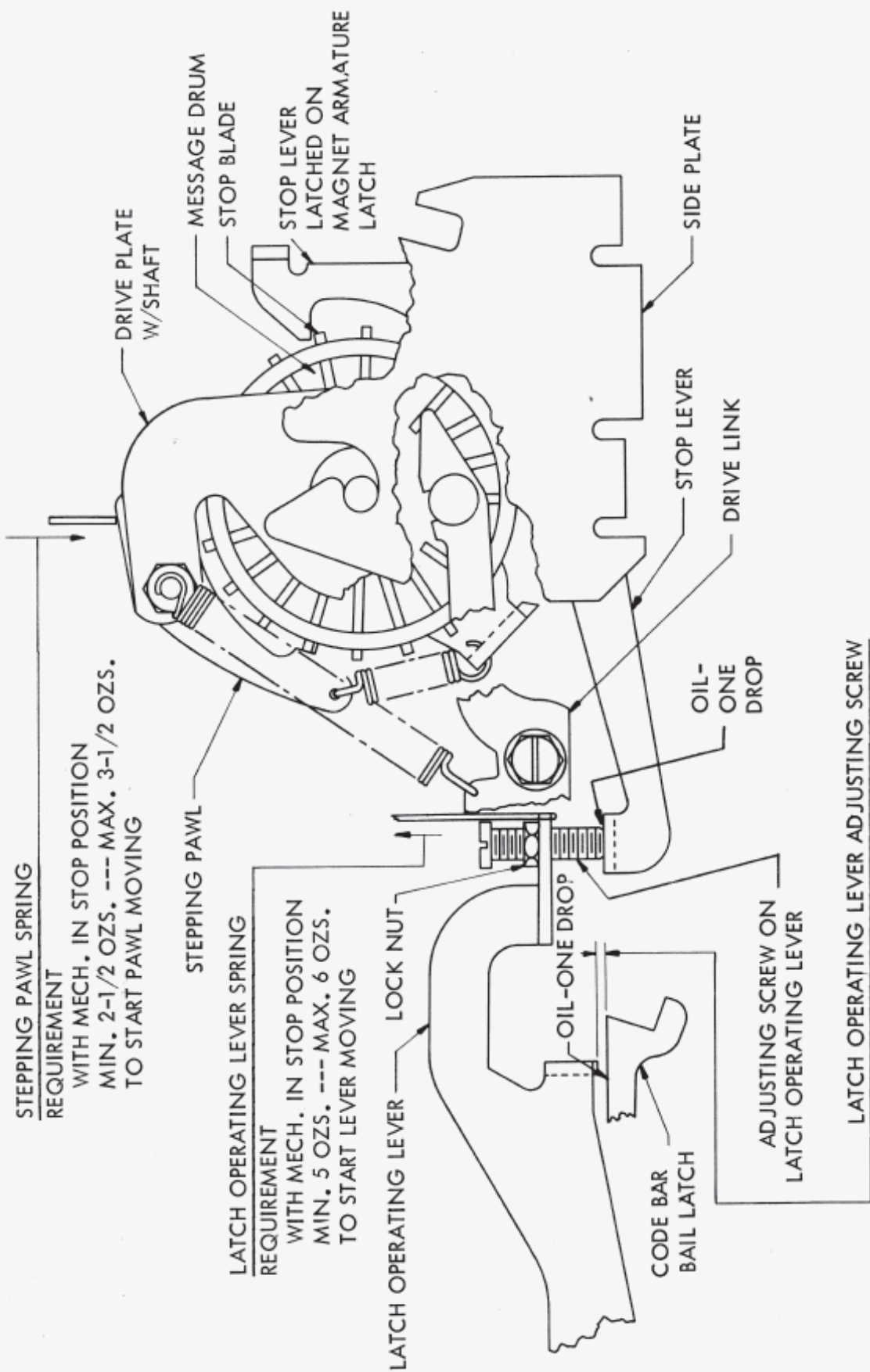


FIGURE 14.



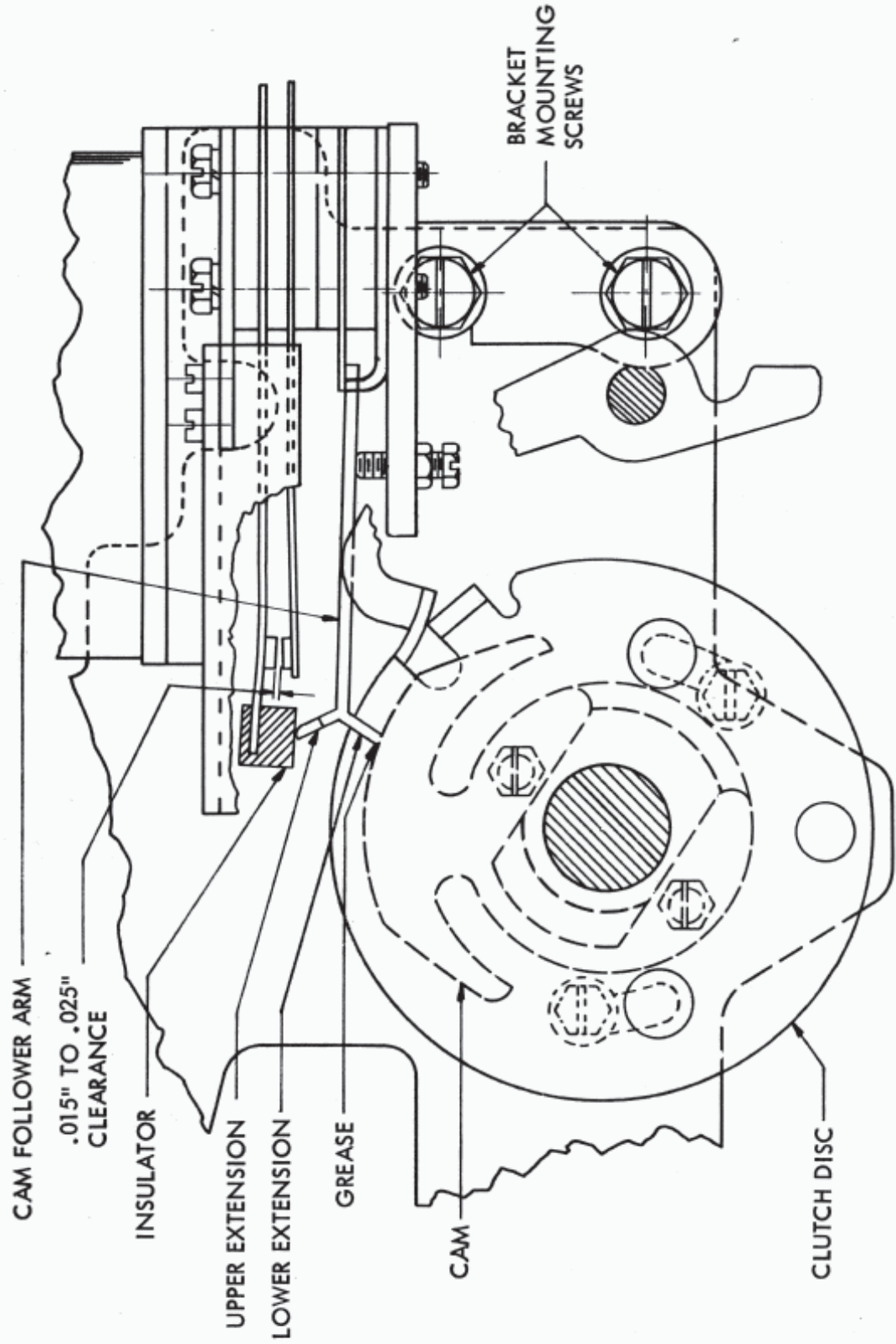


FIGURE 15.

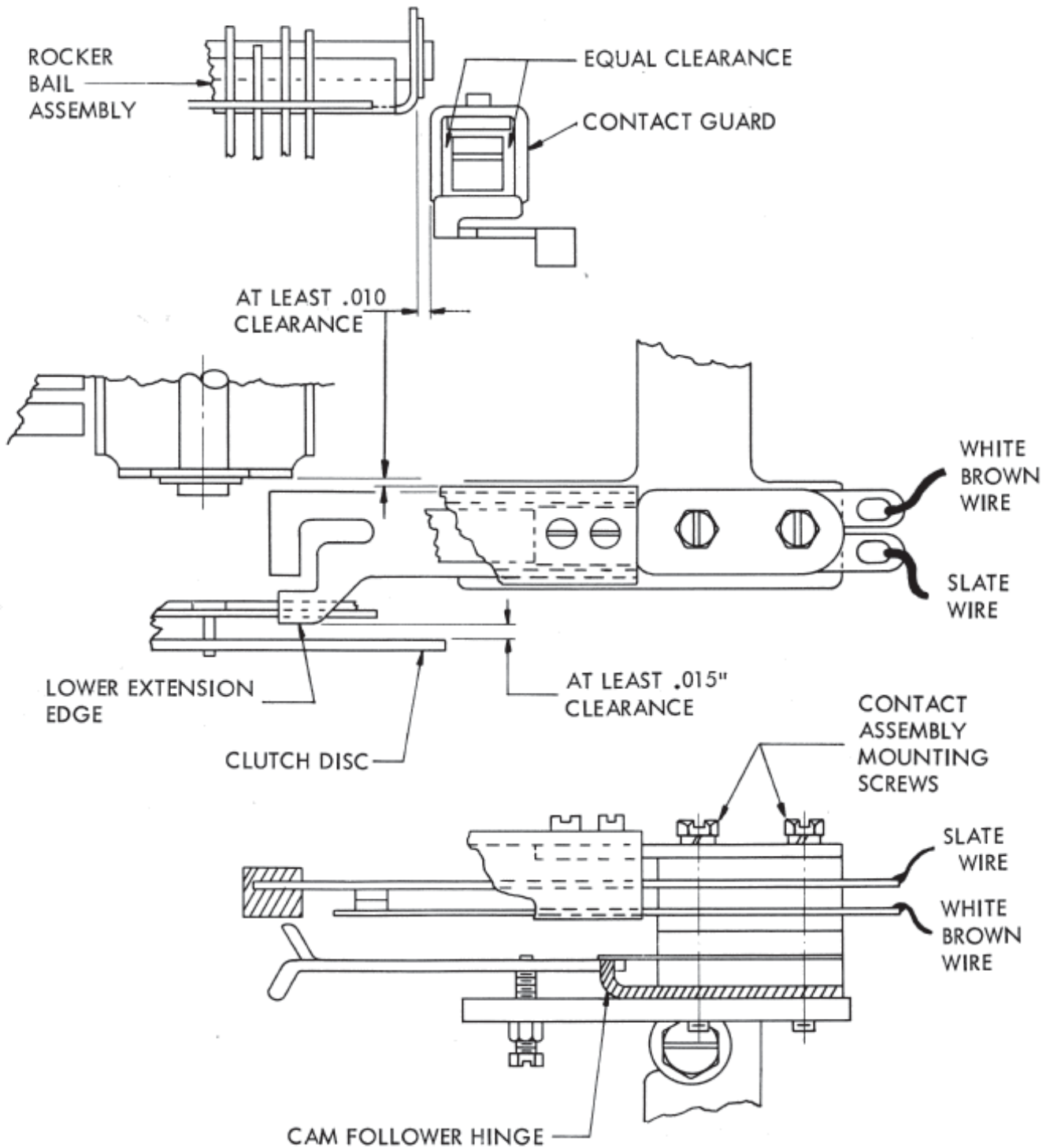


FIGURE 16.

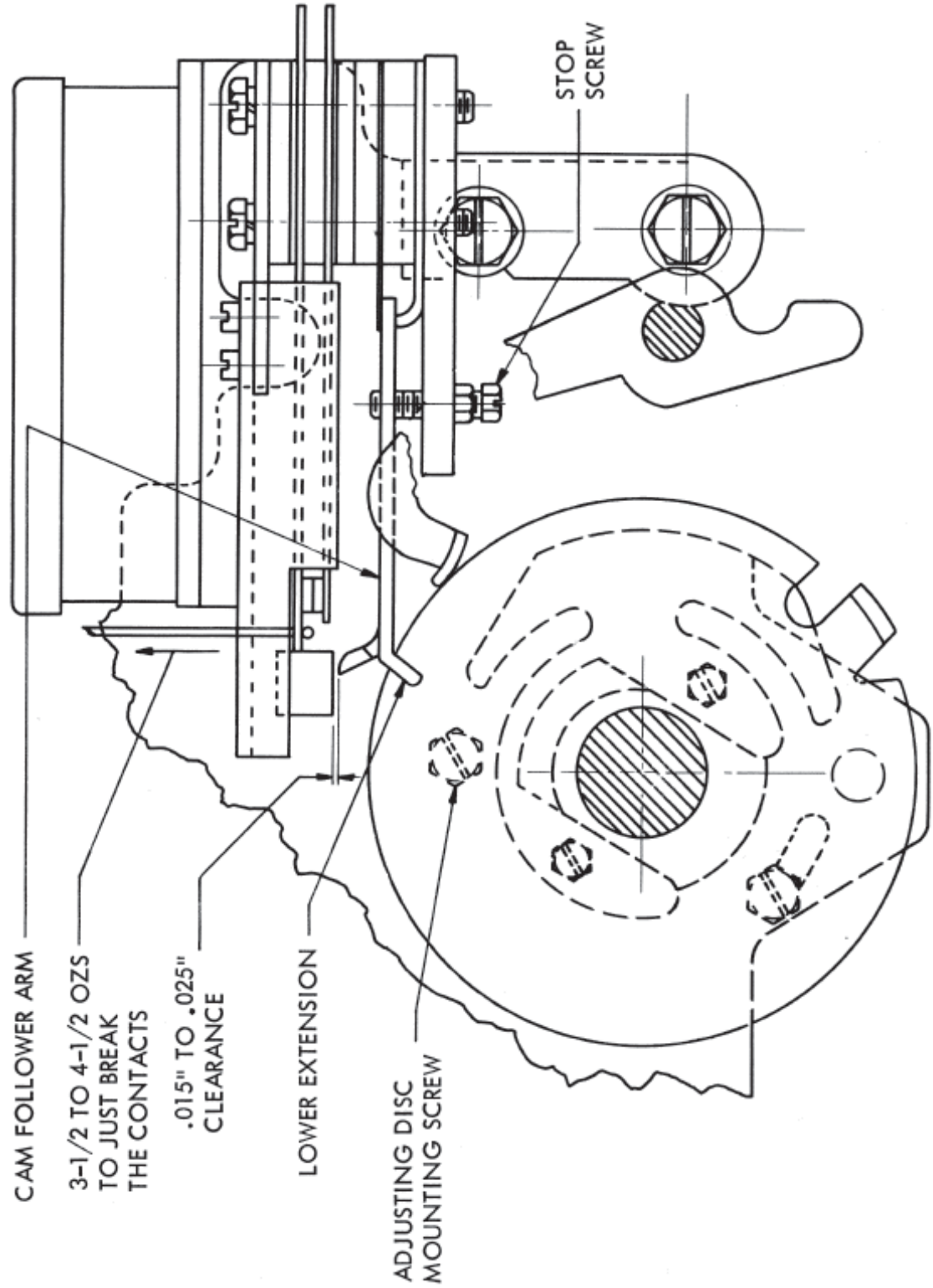
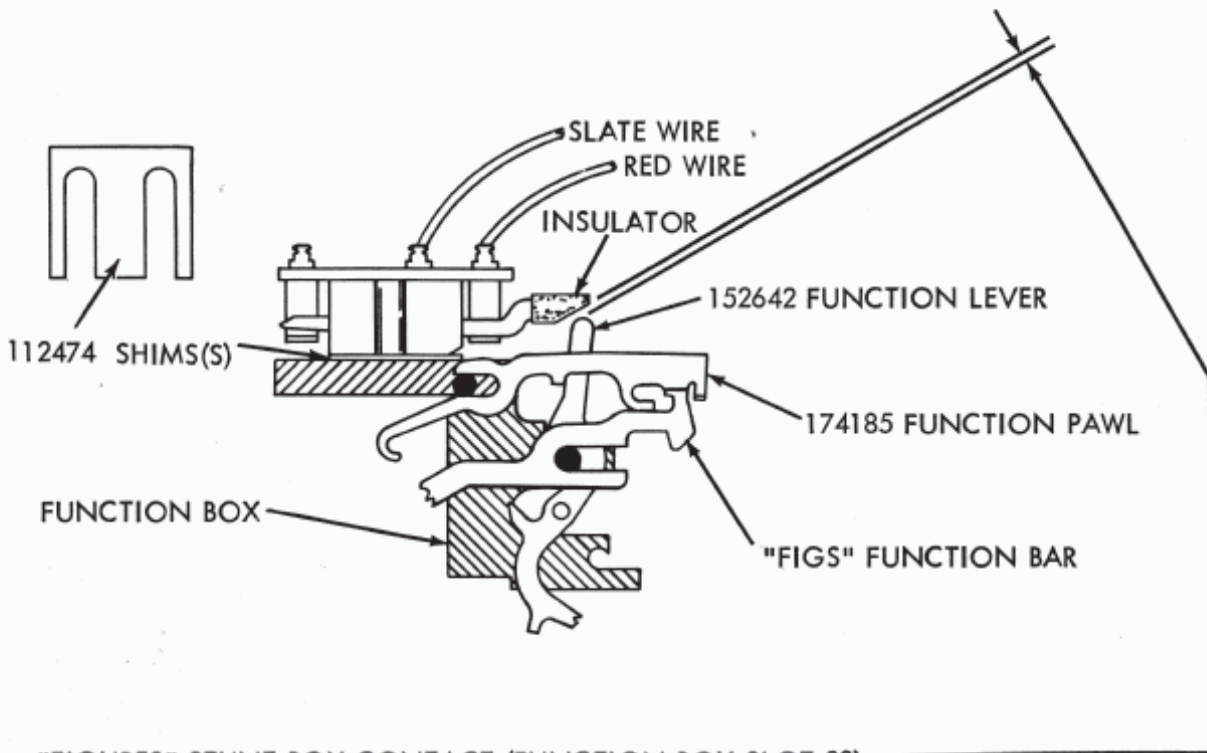


FIGURE 17.





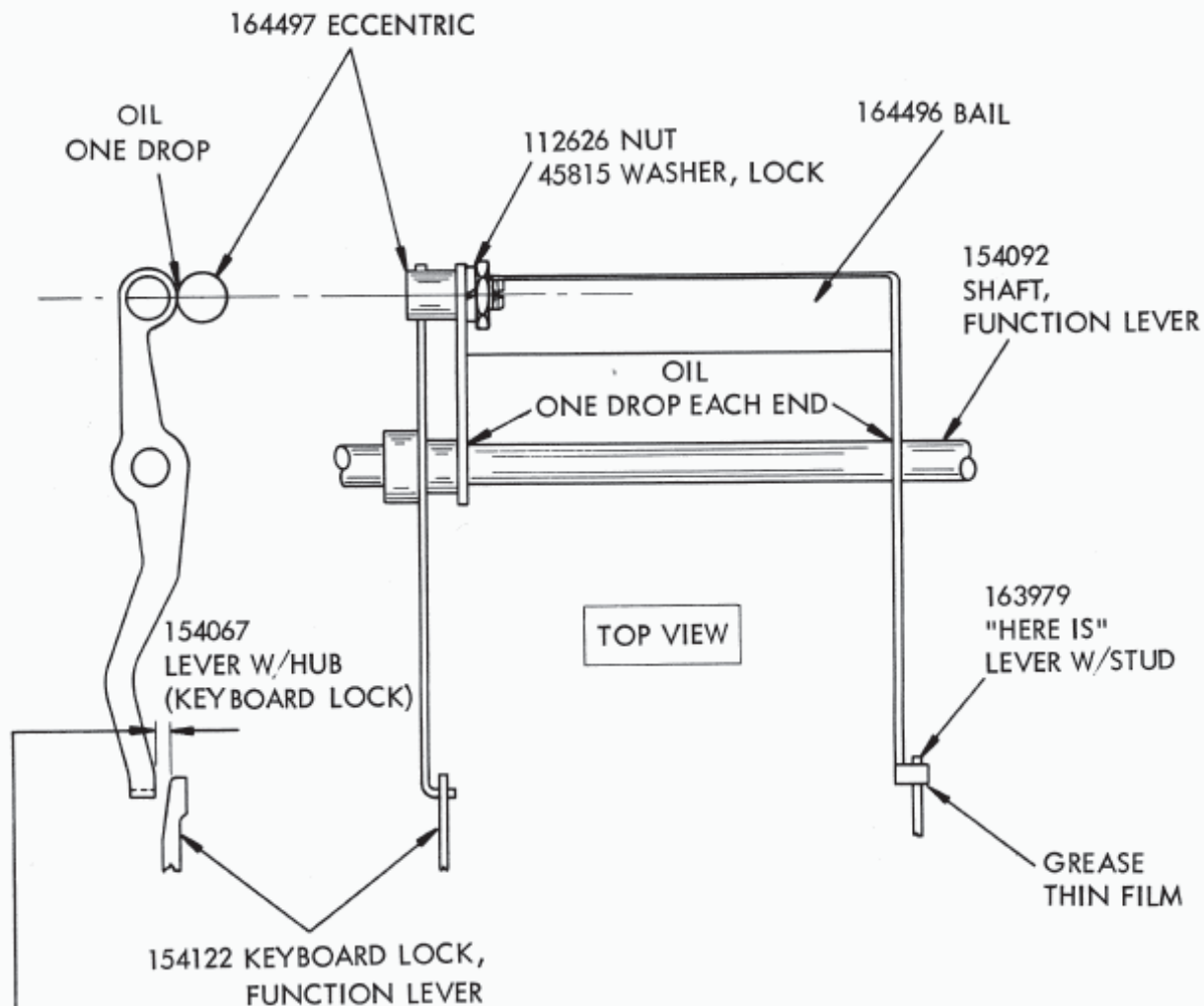
**"FIGURES" STUNT BOX CONTACT (FUNCTION BOX SLOT 32)  
REQUIREMENT**

WITH STUNT BOX ON TYPING UNIT AND "LETTERS" COMBINATION MANUALLY SET UP ON TYPING UNIT SELECTOR MECHANISM, ROTATE TYPING MAIN SHAFT UNTIL FUNCTION LEVER IS IN EXTREME FORWARD (TOWARD CONTACT INSULATOR) POSITION AS SHOWN --- SOME TO 0.008 INCH CLEARANCE BETWEEN CONTACT INSULATOR AND FUNCTION LEVER.

TO ADJUST

ADD OR REMOVE SHIMS UNTIL REQUIREMENT IS MET.

FIGURE 18.



**KEYBOARD LOCK BAIL ECCENTRIC ADJUSTMENT**

**REQUIREMENT**

WITH BOTH THE "KEYBOARD LOCK" AND "HERE IS" KEYPADS LIGHTLY HELD FULLY DEPRESSED, THERE SHOULD BE SOME TO .006" CLEARANCE BETWEEN THE KEYBOARD LOCK LEVER W/HUB AND THE KEYBOARD LOCK FUNCTION LEVER.

**TO ADJUST**

POSITION THE ECCENTRIC WITH ITS LOCK NUT LOOSENED SO THAT ITS HIGH POINT IS TOWARD THE FRONT OF THE KEYBOARD

**FIGURE 19.**