28 TELETYPEWRITER KEYBOARD AND BASE (KSR AND RO)

ADJUSTMENTS

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1. GENERAL

1.01 This section has been revised to include recent engineering changes and additions, and to make it a standard publication. It also contains the specific requirements and adjustments for the 28 keyboard and base. Since it is a general revision, marginal arrows ordinarily used to indicate changes and additions are omitted.

1.02 Maintenance procedures which apply only to mechanisms of a particular design, or to certain models of 28 keyboards and bases are so indicated in the titles of the paragraphs which contain these particular adjustment requirements.

Note: Remove power from unit before making adjustments.

1.03 The adjustments of each unit are arranged in a sequence that should be followed if a complete readjustment of the unit were undertaken. The tools and spring scales required to perform these adjustments are listed in the applicable section. After an adjustment is completed, be sure to tighten any nuts or screws that are loosened. The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions and the angles at which scales should be applied when measuring spring tensions. Where an illustration shows interrelated parts, the sequence that should be followed in checking the requirements and making the adjustments shown, is indicated by letters (A), (B), (C), etc.

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

1.05 When a requirement calls for a clutch to be disengaged, the clutch shoe lever must be fully latched between its trip lever and latchlever 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 the signal generator shaft is rotated by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve drag and permit the main shaft to rotate freely, apply pressure on the lug of the clutch disc with a screwdriver to cause it to engage its latchlever and fully disengage the clutch.

1.06 All electrical contact points should meet squarely. Contacts with the same diameter should not be out of alignment more than 25 percent of the contact diameter. Check contacts for pitting and corrosion and clean or burnish them before making specified adjustment or tolerance measurement. Avoid sharp kinks or bends in the contact spring.

CAUTION: KEEP ALL ELECTRICAL CONTACTS FREE OF OIL AND GREASE.

1.07 Units may have signal contacts made of either unplated or gold-plated tungsten. If in doubt as to the type of contacts, remove signal generator cover (Par. 2.04) and inspect contacts for gold plating.

A. Cleaning

1.08 Use twill jean cloth (KS2423) (TP107162) to clean gold-plated contacts.

1.09 Open contacts. Drop strip of twill jean between them. Close contacts. Draw twill jean part way through. Open contacts and withdraw twill jean.

1.10 This procedure prevents small fibers at edges of twill jean strip from becoming lodged between contacts.

1.11 Clean unplated tungsten contacts in accordance with standard procedures.

B. Servicing for Special Low-Voltage Applications.

1.12 For standard applications including those with data sets, observe standard maintenance procedures and intervals. Special low-voltage applications are covered below.

1.13 For optimum reliable operation in special low-voltage applications, clean gold-plated contacts with twill jean, as instructed above, at intervals of approximately 50 hours of

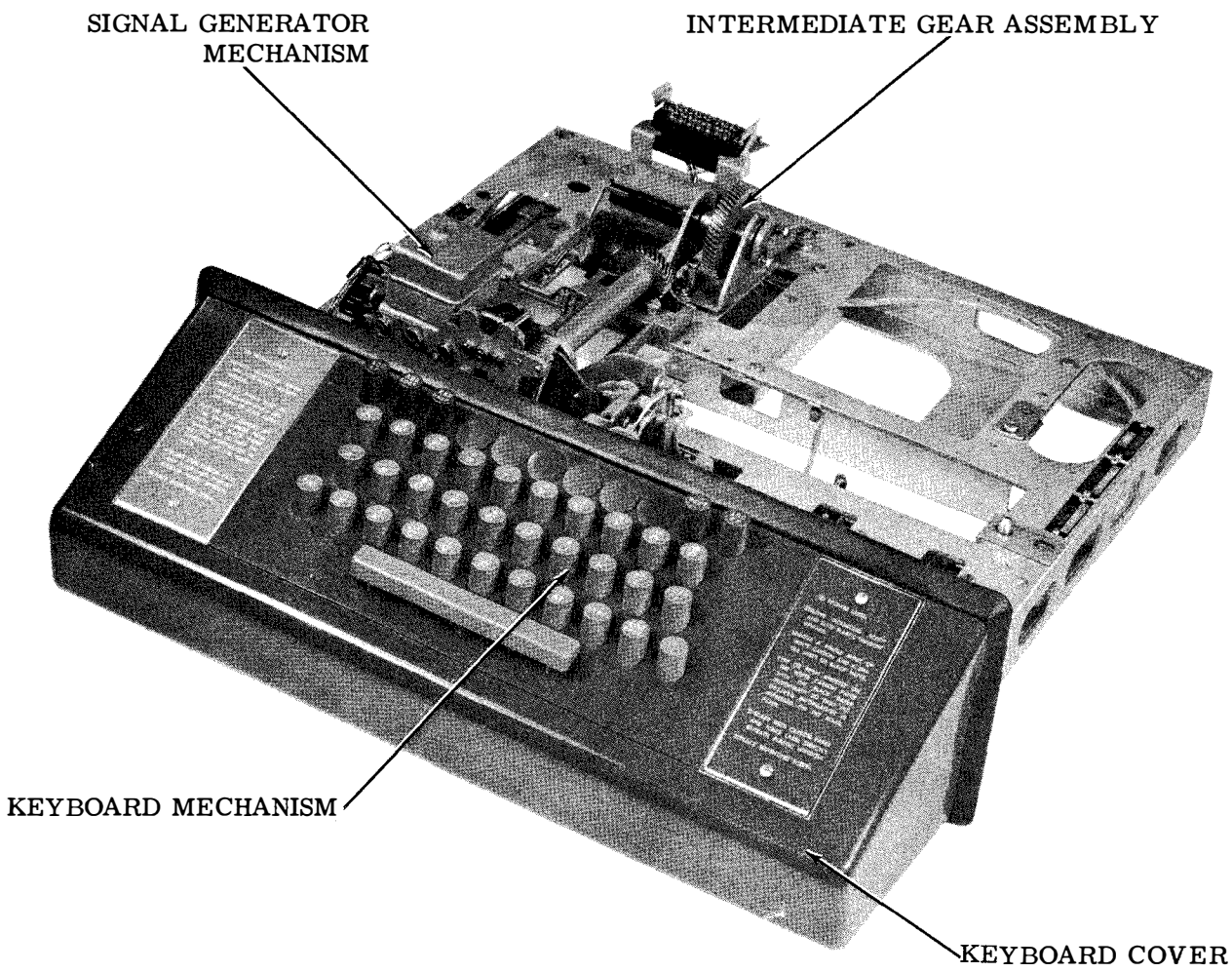


Figure 1 - 28 Teletypewriter Base (KSR)

actual contact operation. Since maintenance interval and life expectancy of the contacts are dependent on the signal circuit, maintenance interval may be lengthened for specific applications.

Note 1: Applying operating voltage of standard Distortion Test Set directly to contacts may damage gold-plating and impair special low-voltage operation. When electrically adjusting or testing contacts (Par. 2.21), use an intermediate device, keyed by the contacts to interrupt current to stroboscopic lamp of Test Set. This intermediate device must be capable of being keyed by a 3- to 20-volt change at maximum of 20 milliamperes.

Note 2: Normally for special low-voltage applications, contacts should be used in circuits operating between 3 and 20 volts dc at a current level not to exceed 60 milliamperes. Between 20 and 70 volts dc the current should be adjusted so as not to exceed a 120 milliwatt power level. The contacts are not normally intended for use with voltages above 70 volts dc. Exceeding this level for an appreciable length of time may result in damage to the gold plating and make them unfit for special low-voltage applications.

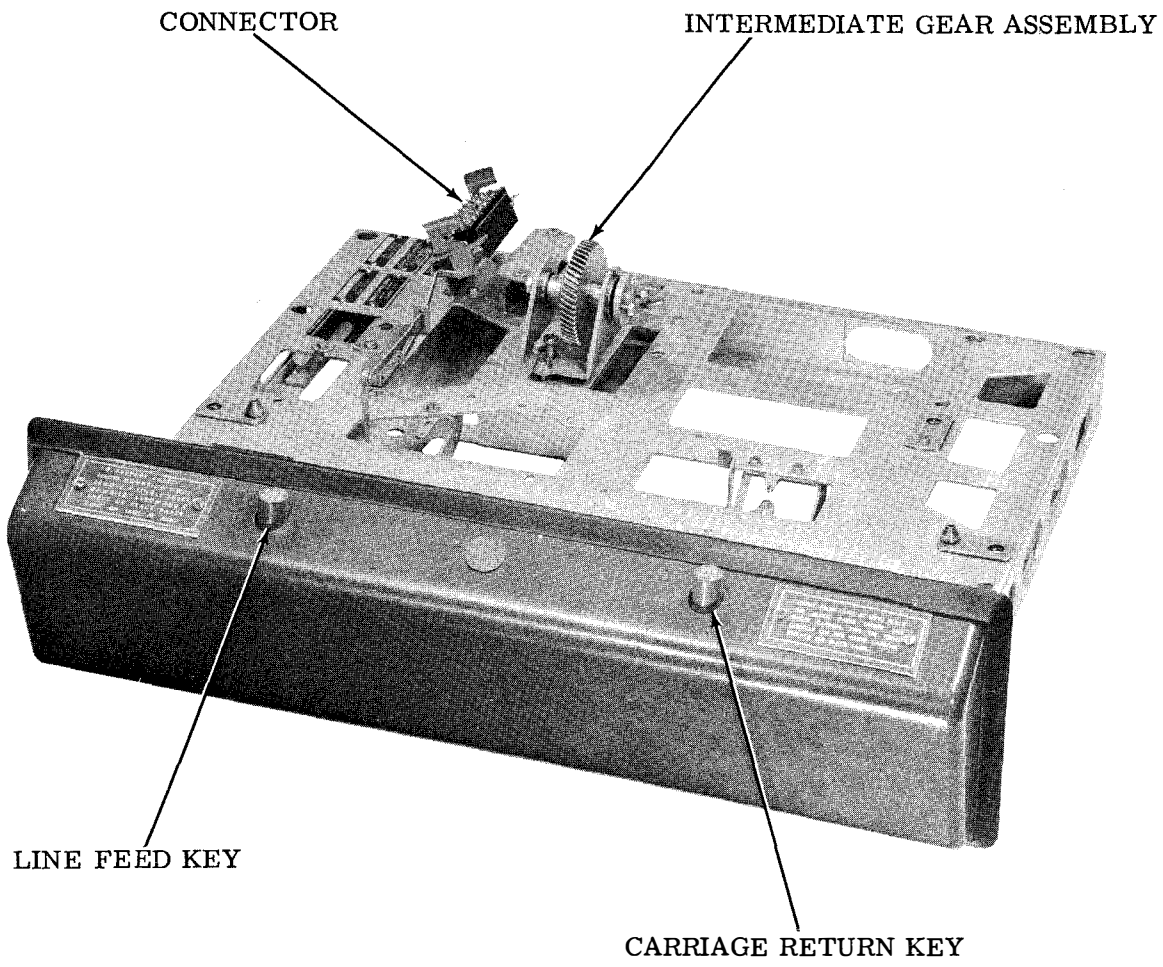


Figure 2 - 28 Teletypewriter Base (Receiving-Only)

2. BASIC UNIT

2.01 Codebar Assembly

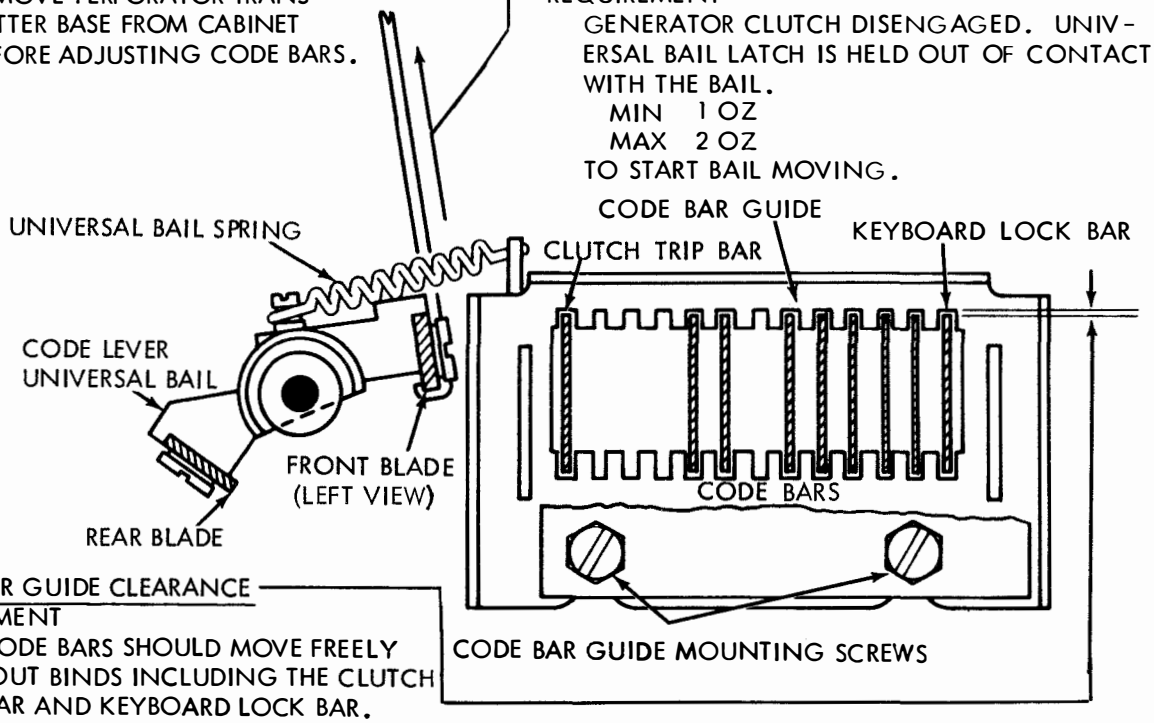
NOTE: REMOVE PERFORATOR TRANSMITTER BASE FROM CABINET BEFORE ADJUSTING CODE BARS.

(B) CODE LEVER UNIVERSAL BAIL SPRING REQUIREMENT

GENERATOR CLUTCH DISENGAGED. UNIVERSAL BAIL LATCH IS HELD OUT OF CONTACT WITH THE BAIL.

MIN 1 OZ
MAX 2 OZ

TO START BAIL MOVING.



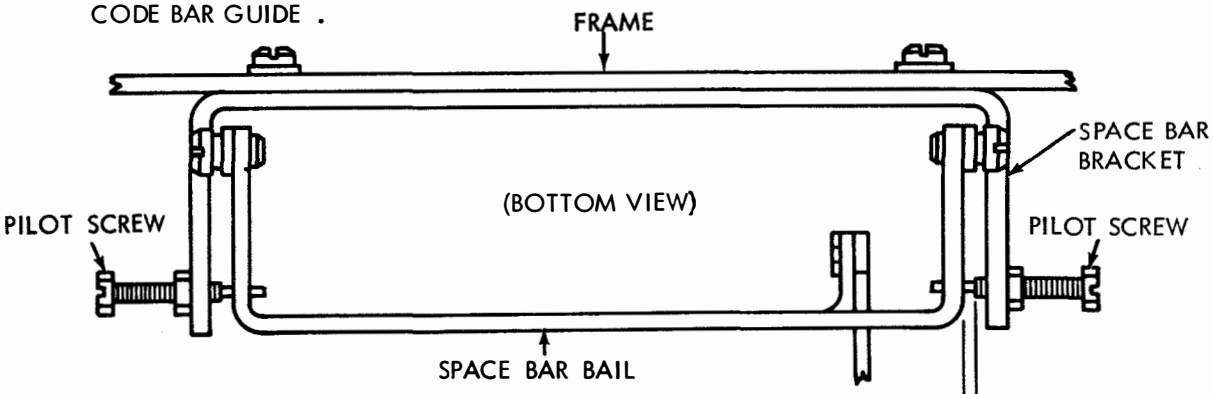
(A) CODE BAR GUIDE CLEARANCE REQUIREMENT

ALL CODE BARS SHOULD MOVE FREELY WITHOUT BINDS INCLUDING THE CLUTCH TRIP BAR AND KEYBOARD LOCK BAR.

MIN SOME
MAX 0.010 INCH

TO ADJUST

LOOSEN MOUNTING SCREWS AND POSITION CODE BAR GUIDE .



NOTE: KEYLEVER COVER MUST BE REMOVED. SEE DISASSEMBLY AND REASSEMBLY.

(C) SPACE BAR BAIL PIVOT REQUIREMENT

MIN SOME END PLAY
MAX 0.010 INCH

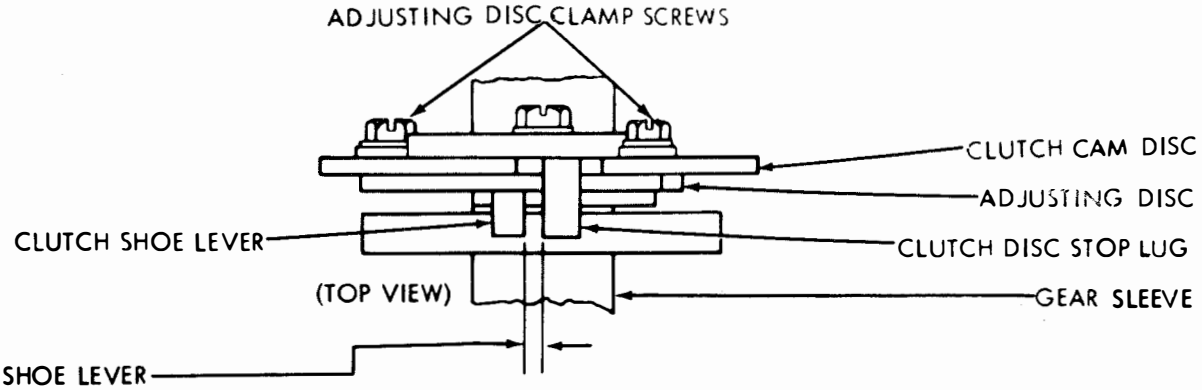
SPACE BAR FREE FROM BIND.

TO ADJUST

POSITION SPACE BAR WITH PILOT SCREWS LOOSENED.

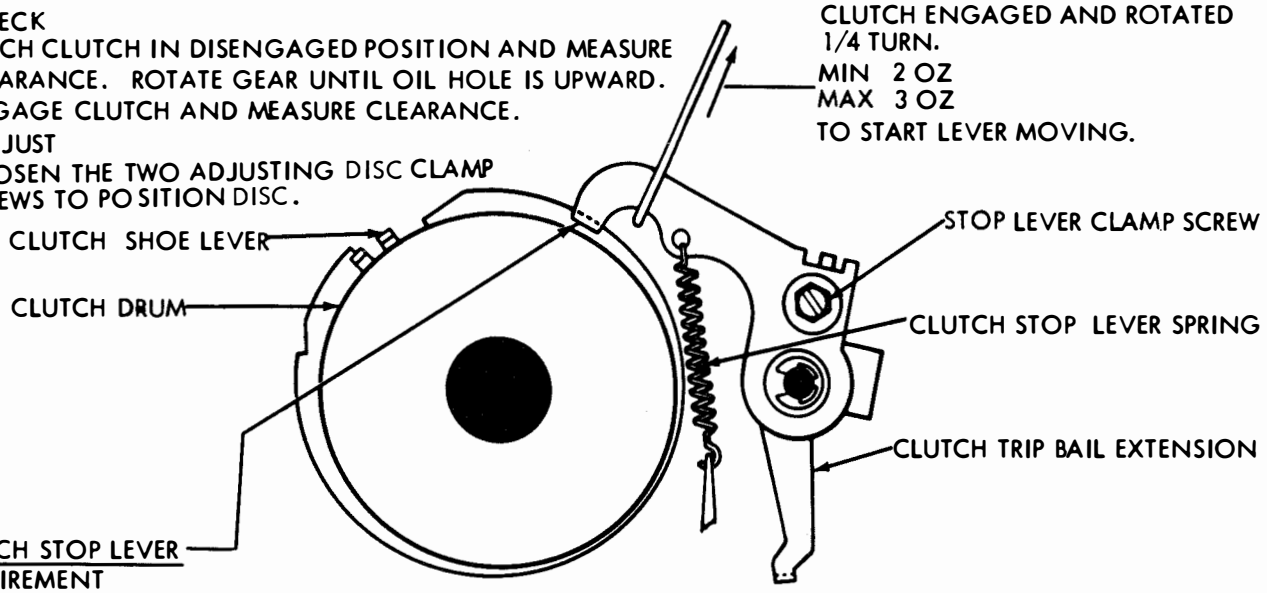
NOTE: THE BAIL SHOULD BE SO ADJUSTED THAT THE SPACE BAR CAN BE OPERATED WITHOUT BINDING IN THE HOLES IN THE GUIDE PLATE AND THE FRAME.

2.02 Signal Generator Mechanism



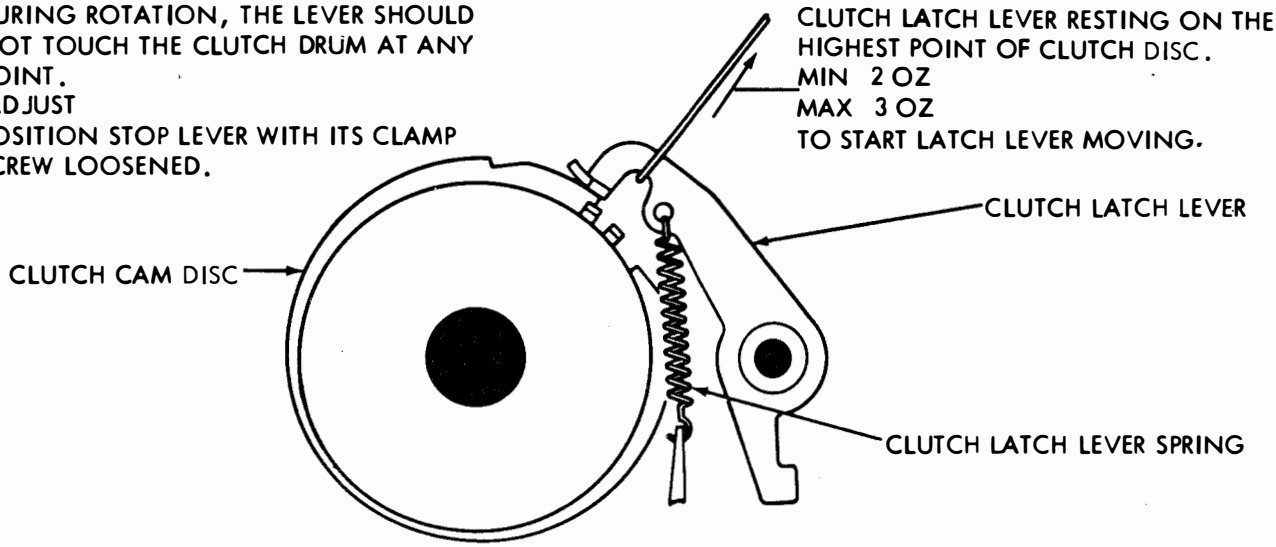
(A)
CLUTCH SHOE LEVER
REQUIREMENT
CLEARANCE WHEN CLUTCH IS DISENGAGED SHOULD BE 0.055 INCH TO 0.085 INCH LESS THAN WHEN CLUTCH IS ENGAGED.
TO CHECK
LATCH CLUTCH IN DISENGAGED POSITION AND MEASURE CLEARANCE. ROTATE GEAR UNTIL OIL HOLE IS UPWARD. ENGAGE CLUTCH AND MEASURE CLEARANCE.
TO ADJUST
LOOSEN THE TWO ADJUSTING DISC CLAMP SCREWS TO POSITION DISC.

(C)
CLUTCH STOP LEVER SPRING
REQUIREMENT
CLUTCH ENGAGED AND ROTATED 1/4 TURN.
MIN 2 OZ
MAX 3 OZ
TO START LEVER MOVING.



(B)
CLUTCH STOP LEVER
REQUIREMENT
SHOULD FULLY ENGAGE CLUTCH SHOE LEVER.
DURING ROTATION, THE LEVER SHOULD NOT TOUCH THE CLUTCH DRUM AT ANY POINT.
TO ADJUST
POSITION STOP LEVER WITH ITS CLAMP SCREW LOOSENED.

(D) CLUTCH LATCH LEVER SPRING
REQUIREMENT
CLUTCH LATCH LEVER RESTING ON THE HIGHEST POINT OF CLUTCH DISC.
MIN 2 OZ
MAX 3 OZ
TO START LATCH LEVER MOVING.

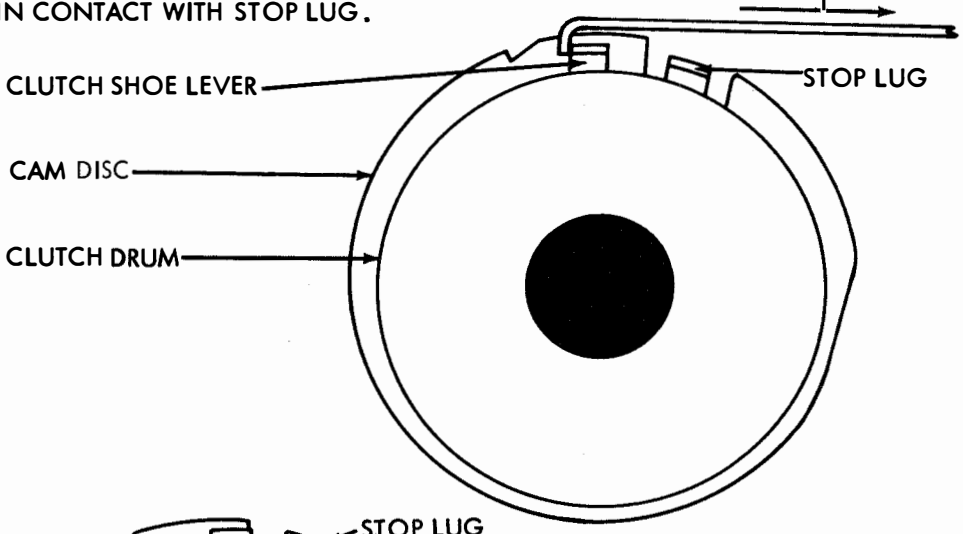


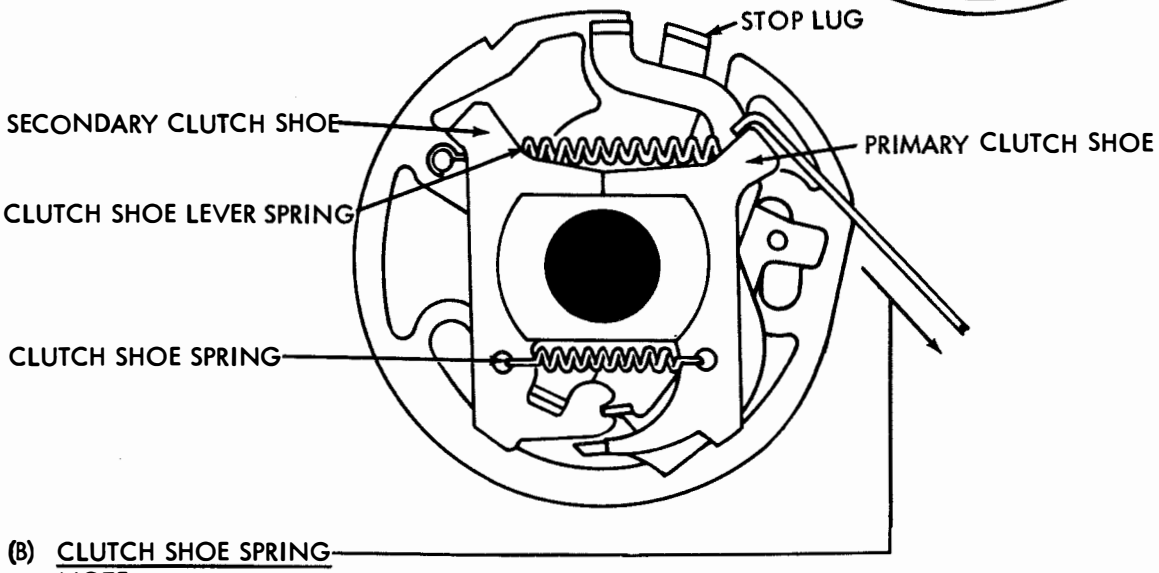
2.03 Signal Generator Mechanism continued

(A) CLUTCH SHOE LEVER SPRING

REQUIREMENT

CLUTCH ENGAGED.
CAM DISC HELD TO PREVENT TURNING.
MIN 15 OZ
MAX 20 OZ
TO MOVE SHOE LEVER IN CONTACT WITH STOP LUG.





(B) CLUTCH SHOE SPRING

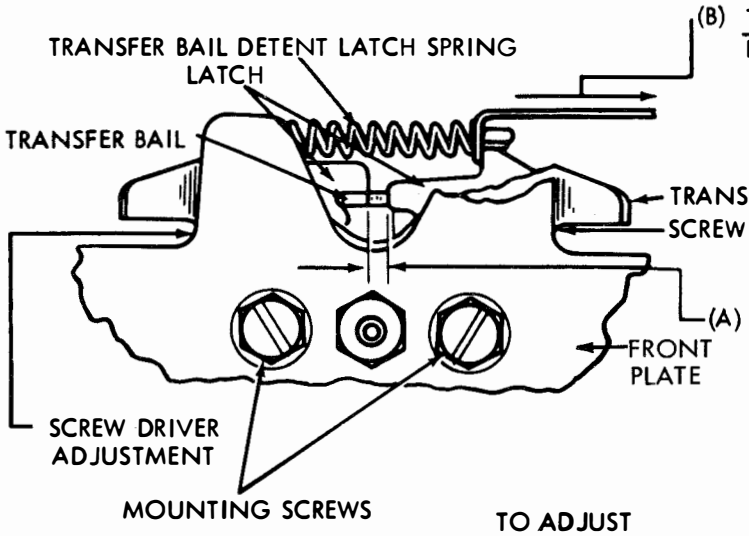
NOTE

IN ORDER TO CHECK THIS SPRING TENSION, IT IS NECESSARY TO REMOVE THE CLUTCH FROM THE MAIN SIGNAL GENERATOR DRIVE SHAFT. THEREFORE, IT SHOULD NOT BE CHECKED UNLESS THERE IS GOOD REASON TO BELIEVE THAT IT DOES NOT MEET ITS REQUIREMENT.

REQUIREMENT

CLUTCH DRUM REMOVED.
MIN 3 OZ
MAX 5 OZ
TO START PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE AT POINT OF CONTACT.

2.04 Signal Generator Mechanism continued



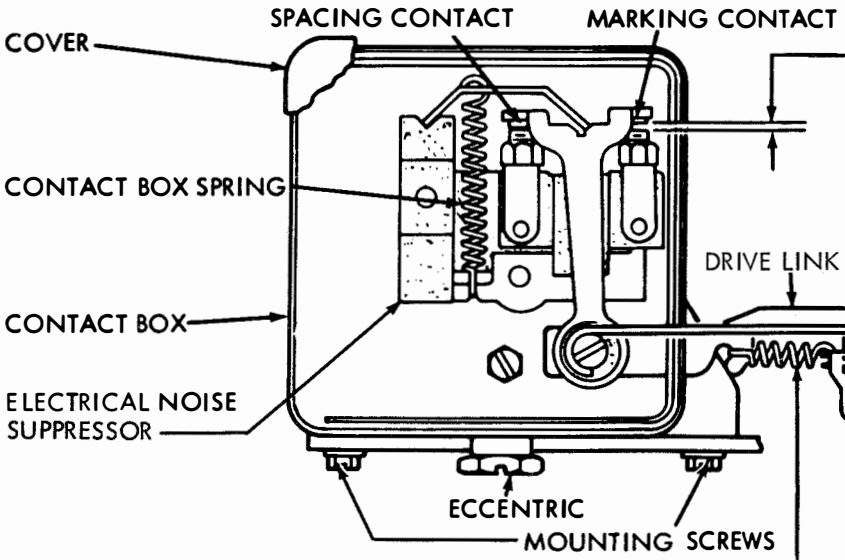
(B) TRANSFER BAIL DETENT LATCH SPRING
REQUIREMENT
MIN 2-3/4 OZ
MAX 4-1/4 OZ
TO START LATCH MOVING.
HOLD TRANSFER BAIL TO LEFT.

(A) TRANSFER BAIL DETENT PLATE
REQUIREMENT
EQUAL L H AND R H CLEARANCE WITHIN 0.002 INCH WHEN TRANSFER BAIL IS AT EXTREME L H OR R H POSITION AS THESE OCCUR IN A CHARACTER BETWEEN START AND NO. 1 PULSES ONLY.

TO ADJUST
ROTATE DETENT PLATE RIGHT OR LEFT BY MEANS OF SCREWDRIVER WITH DETENT PLATE MOUNTING SCREWS LOOSENED.

(C) SIGNAL CONTACT CLEARANCE
REQUIREMENT
MARKING AND SPACING GAPS SHOULD BE EQUAL WITHIN 0.001 INCH.
TO CHECK
DEPRESS Y KEYLEVER AND ROTATE SIGNAL GENERATOR CAM SLEEVE UNTIL EACH CONTACT HAS FULLY OPENED.
TO ADJUST
LOOSEN MOUNTING SCREWS AND MOVE CONTACT BOX BY MEANS OF ECCENTRIC.

NOTE: CHECK BY MEANS OF SIGNAL CHECKING DEVICE WHERE POSSIBLE, AND CAREFULLY REFINE THE ADJUSTMENT TO ELIMINATE ALL BIAS FROM THE SIGNALS BY EQUALIZING THE CURRENT-ON AND CURRENT-OFF INTERVALS

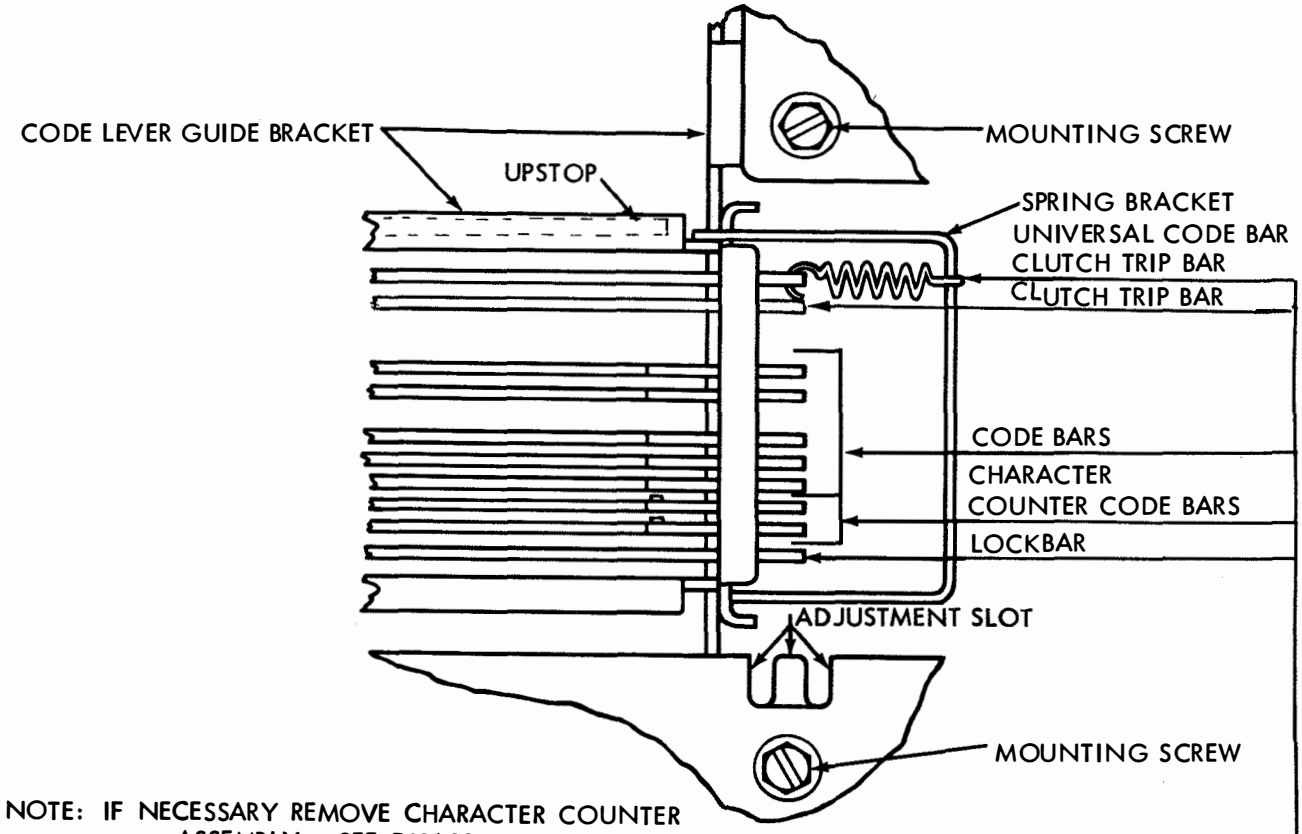


CAUTION: ON UNITS SO EQUIPPED - CLEAN GOLD CONTACTS BY PULLING TWILL JEAN HALF WAY THROUGH THE CLOSED CONTACTS, OPEN CONTACTS AND REMOVE TWILL JEAN. USE NO OTHER CLEANING OR BURNISHING METHODS. AVOID PITTING OR CHIPPING THE CONTACTS.

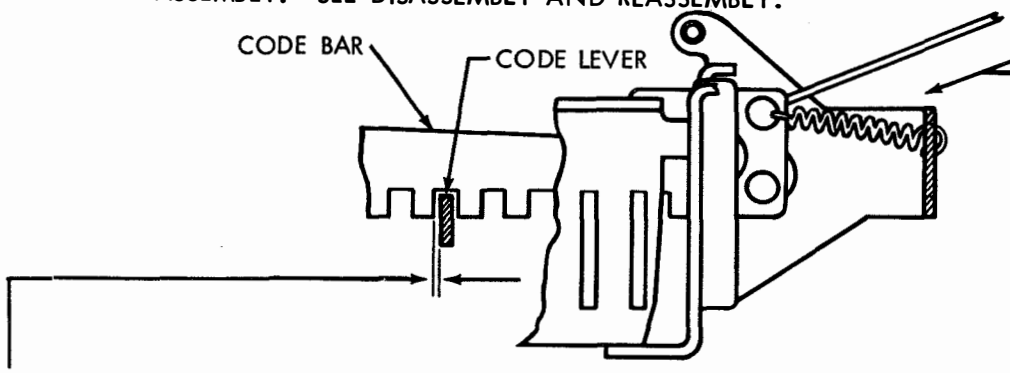
(E) SIGNAL CONTACT SPRING
REQUIREMENT
REMOVE DRIVE LINK SPRING TRANSFER BAIL HELD CLEAR OF DRIVE LINK.
MIN 2 OZ --- MAX 3 OZ
TO START LINK MOVING.

(D) SIGNAL CONTACT DRIVE LINK
REQUIREMENT
WITH MAINSHAFT IN STOP POSITION AND TRANSFER BAIL DETENT LATCH SPRING UN HOOKED (SEE FIG ABOVE), MOVE LATCHES AWAY FROM TRANSFER BAIL EXTENSION. HOLD THE TOGGLE FIRMLY AGAINST CONTACTS.
MIN 6 OZ ---MAX 9 OZ
TO START TRANSFER BAIL EXTENSION MOVING.

2.05 Codebar Assembly continued



NOTE: IF NECESSARY REMOVE CHARACTER COUNTER ASSEMBLY. SEE DISASSEMBLY AND REASSEMBLY.



(A) CODE BAR AND CODE LEVER CLEARANCE

REQUIREMENT

CARRIAGE RETURN KEY DEPRESSED BUT NOT ENOUGH TO TRIP OFF UNIVERSAL BAIL LATCH OR CLUTCH BAR.

MIN 0.006 INCH --- MAX 0.017 INCH

MEASURE AT CODE BAR #3

TO ADJUST

POSITION GUIDE BY ADJUSTING SLOT WITH FOUR MOUNTING SCREWS LOOSENED.

(B) CLUTCH TRIP BAR SPRING

REQUIREMENT

BLANK KEY DEPRESSED TO ALLOW THE CLUTCH TRIP BAR TO FALL TO RIGHT.

SPRING UNHOOKED FROM BRACKET

MIN 8 OZ --- MAX 12 OZ

TO PULL SPRING TO INSTALLED LENGTH.

NOTE: SEE FOLLOWING PAGE FOR ADJUSTMENTS (C),(D),(E) AND (F).

Codebar Assembly continued

NOTE: ADJUSTMENTS CONTINUED FROM PRECEDING PAGE.

(C) CLUTCH TRIP BAR (USED FOR SYNCHRONOUS PULSED TRANSMISSION)

REQUIREMENT

WITH THE CLUTCH DISENGAGED AND LATCHED, POWER OFF AND ARMATURE OF THE MAGNET ASSEMBLY HELD AWAY FROM THE CLUTCH TRIP BAR. PUSH AT THE RIGHT HAND END OF CLUTCH TRIP BAR.

MIN 9 OZ --- MAX 12 OZ

TO START CLUTCH TRIP BAR MOVING.

NOTE: HOLD THE SWINGER OF THE CONTACT ASSEMBLY AWAY FROM THE UNIVERSAL CODE BAR WHEN MEASURING THE CLUTCH TRIP SPRING TENSION.

(D) UNIVERSAL CODE BAR (USED FOR SYNCHRONOUS PULSED TRANSMISSION)

REQUIREMENT

WITH THE CLUTCH DISENGAGED AND LATCHED, DEPRESS THE BLANK KEY TO ALLOW THE UNIVERSAL CODE BAR TO FALL TO THE RIGHT. SPRING UNHOOKED FROM THE BRACKET.

MIN 8 OZ --- MAX 12 OZ

TO PULL SPRING TO INSTALLED LENGTH.

(E) CODE BAR SPRING

REQUIREMENT

LETTERS KEYLEVER DEPRESSED (POWER OFF) HOLD TRANSFER LEVERS TO THE RIGHT SO THEY DO NOT AFFECT THE CODE BARS.

MIN 3 OZ --- MAX 5 OZ

TO START CODE BAR MOVING.

(F) LOCK BAR SPRING

REQUIREMENT

CLUTCH DISENGAGED, KEYBOARD LOCK KEYLEVER DEPRESSED. APPLY PUSH END OF SCALE AGAINST R H END OF LOCK BAR.

MIN 2-1/2 OZ --- MAX 6 OZ

TO START LOCK BAR MOVING.

2.06 Codebar Assembly continued

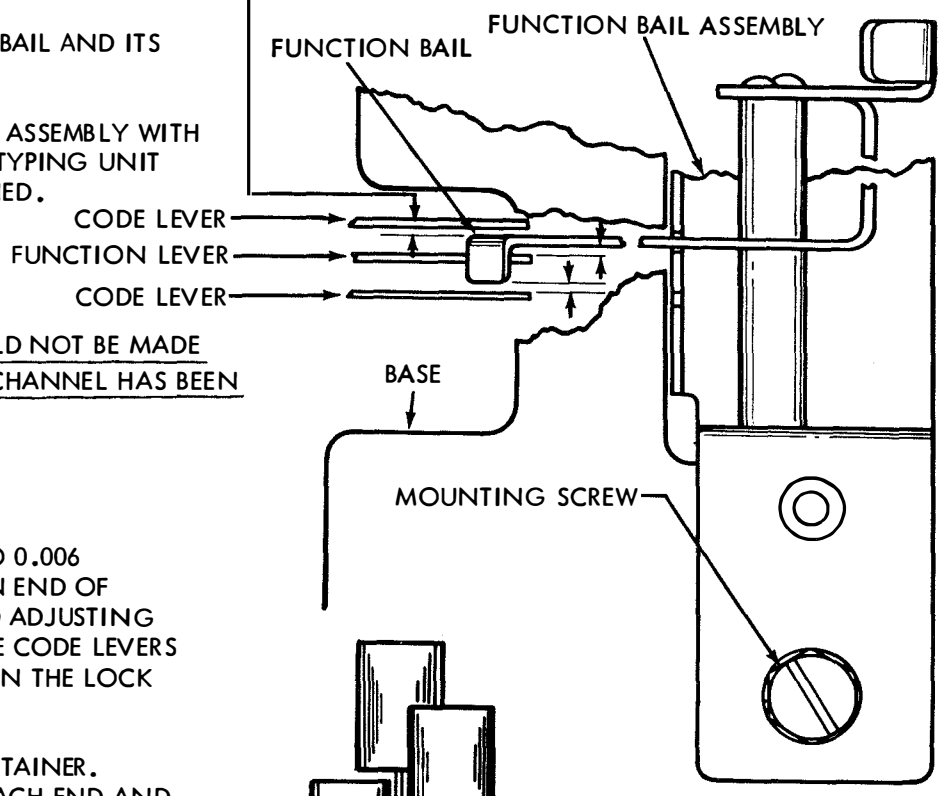
(A) FUNCTION BAIL AND CODE LEVER CLEARANCE

REQUIREMENT

MIN 0.015 INCH BETWEEN ANY FUNCTION BAIL AND ITS ADJACENT CODE LEVER.

TO ADJUST

POSITION FUNCTION BAIL ASSEMBLY WITH MOUNTING SCREWS AND TYPING UNIT LOCATING STUDS LOOSENED.



NOTE: THIS ADJUSTMENT SHOULD NOT BE MADE UNLESS THE LOCK BALL CHANNEL HAS BEEN DISASSEMBLED.

2.07 Keyboard Mechanism

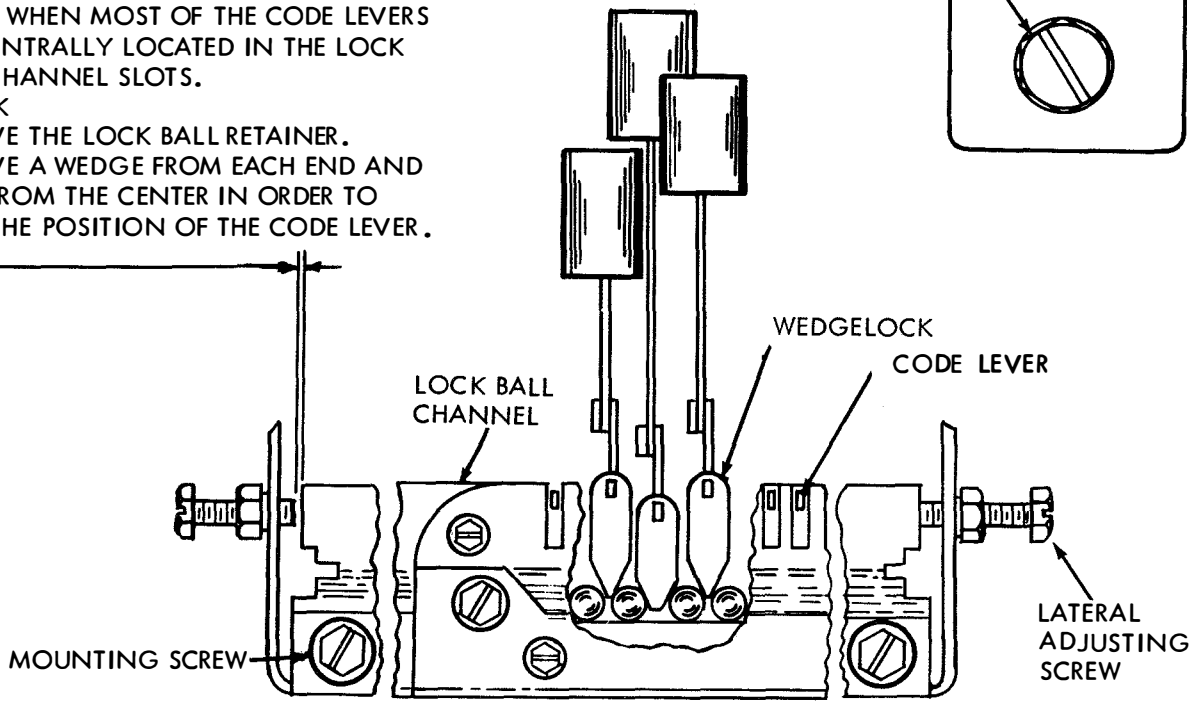
(B) LOCK BALL CHANNEL

REQUIREMENT

THERE SHOULD BE SOME TO 0.006 INCH CLEARANCE BETWEEN END OF LOCK BALL CHANNEL AND ADJUSTING SCREW WHEN MOST OF THE CODE LEVERS ARE CENTRALLY LOCATED IN THE LOCK BALL CHANNEL SLOTS.

TO CHECK

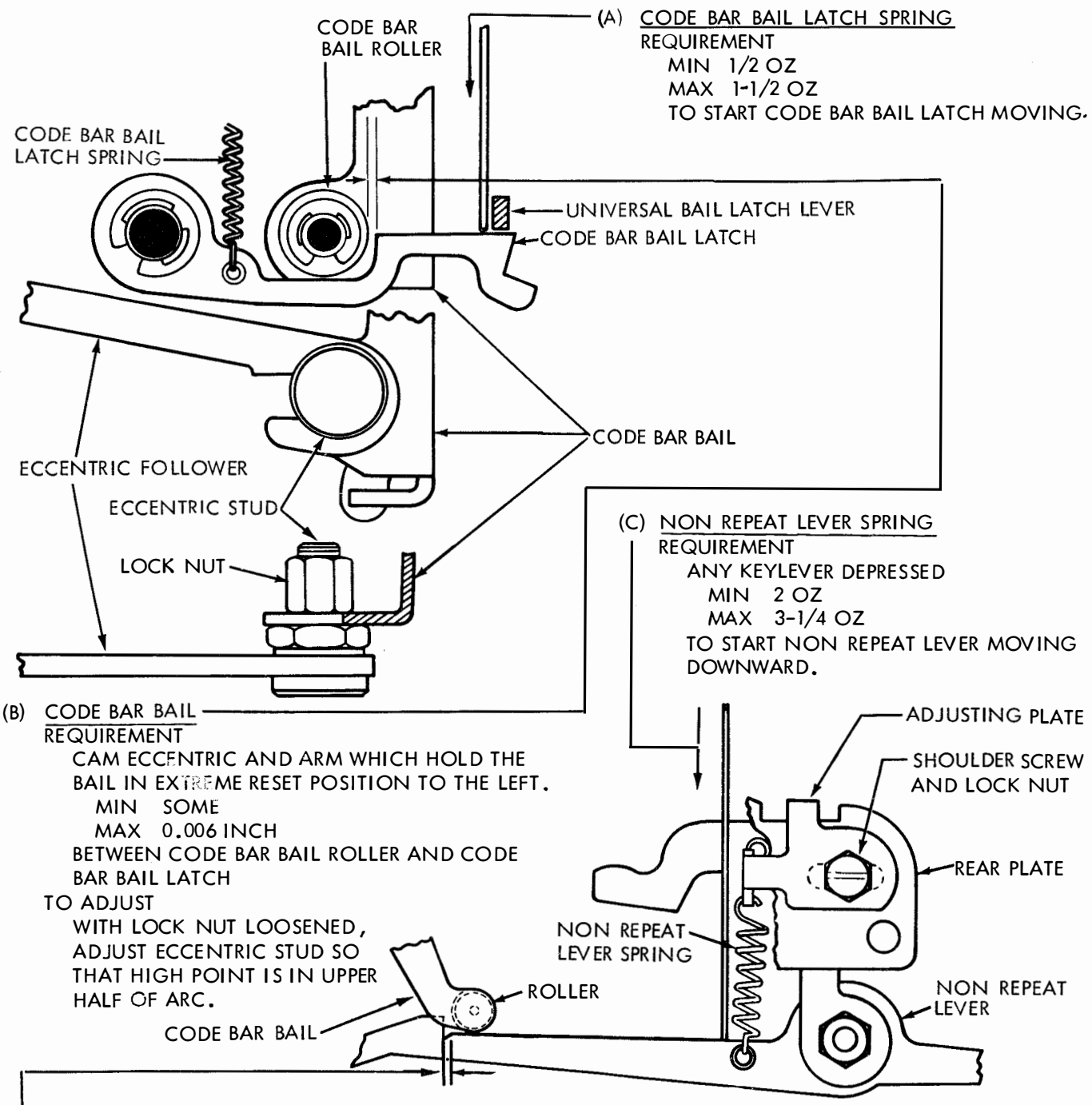
REMOVE THE LOCK BALL RETAINER. REMOVE A WEDGE FROM EACH END AND ONE FROM THE CENTER IN ORDER TO VIEW THE POSITION OF THE CODE LEVER.



TO ADJUST

LOOSEN THE LOCK BALL CHANNEL MOUNTING SCREWS. BACK OFF LATERAL ADJUSTING SCREWS AND POSITION CHANNEL. TURN ONE ADJUSTING SCREW IN AGAINST THE END OF THE CHANNEL AND LOCK IT. TURN THE OTHER ADJUSTING SCREW IN TO THE END OF THE CHANNEL AND BACK IT OFF 1/4 TURN. LOCK THE SCREW. REPLACE THE WEDGES AND CHECK THEIR POSITION WITH RESPECT TO THE BALLS. PULL CHANNEL ASSEMBLY DOWNWARD UNTIL ALL CODE LEVERS STRIKE THEIR UPSTOP WITHOUT WEDGES JUMPING OUT OF POSITION. REPLACE LOCK BALL RETAINER. BACK OFF BALL ENDPLAY ADJUSTING SCREW.

2.08 Codebar Assembly continued



(A) CODE BAR BAIL LATCH SPRING
REQUIREMENT
MIN 1/2 OZ
MAX 1-1/2 OZ
TO START CODE BAR BAIL LATCH MOVING.

(B) CODE BAR BAIL
REQUIREMENT
CAM ECCENTRIC AND ARM WHICH HOLD THE BAIL IN EXTREME RESET POSITION TO THE LEFT.
MIN SOME
MAX 0.006 INCH
BETWEEN CODE BAR BAIL ROLLER AND CODE BAR BAIL LATCH
TO ADJUST
WITH LOCK NUT LOOSENED, ADJUST ECCENTRIC STUD SO THAT HIGH POINT IS IN UPPER HALF OF ARC.

(C) NON REPEAT LEVER SPRING
REQUIREMENT
ANY KEYLEVER DEPRESSED
MIN 2 OZ
MAX 3-1/4 OZ
TO START NON REPEAT LEVER MOVING DOWNWARD.

(D) CODE BAR BAIL AND NON REPEAT LEVER CLEARANCE
REQUIREMENT
MECHANISM IN INITIAL TRIP-OFF POSITION, ANY KEY DEPRESSED, NO POWER.
MIN 0.010 INCH
MAX 0.020 INCH
BETWEEN ROLLER OF CODE BAR BAIL AND NON REPEAT LEVER PICK-UP STEP.
TO ADJUST
LOOSEN LOCK NUT AND SHOULDER SCREW AND MOVE MECHANISM LEFT OR RIGHT.

2.09 Keyboard Mechanism

(A) BALL WEDGELOCK AND BALL TRACK CLEARANCE

REQUIREMENT (PRELIMINARY)

ADJUSTMENT SCREW BACKED OUT TO PERMIT MAXIMUM BALL MOVEMENT WITHOUT THE BALLS ROLLING OUT OF TRACK. (FROM PREVIOUS LATERAL ADJUSTMENT)

APPLY 32 OZ OF PRESSURE TO THE "Q" OR THE "P" KEYLEVER

MIN 0.005 INCH

MAX 0.015 INCH

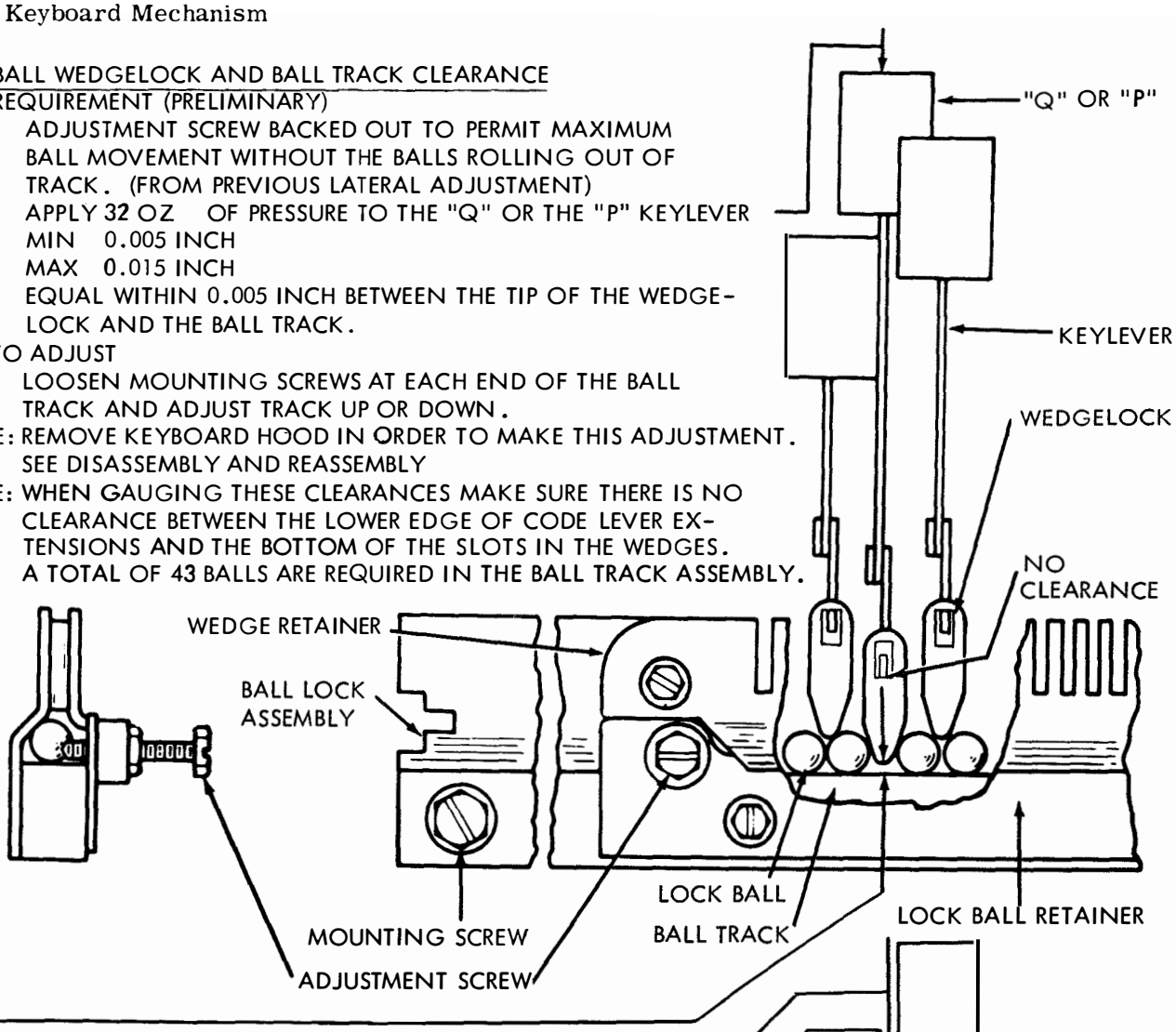
EQUAL WITHIN 0.005 INCH BETWEEN THE TIP OF THE WEDGE-LOCK AND THE BALL TRACK.

TO ADJUST

LOOSEN MOUNTING SCREWS AT EACH END OF THE BALL TRACK AND ADJUST TRACK UP OR DOWN.

NOTE: REMOVE KEYBOARD HOOD IN ORDER TO MAKE THIS ADJUSTMENT. SEE DISASSEMBLY AND REASSEMBLY

NOTE: WHEN GAUGING THESE CLEARANCES MAKE SURE THERE IS NO CLEARANCE BETWEEN THE LOWER EDGE OF CODE LEVER EX-TENSIONS AND THE BOTTOM OF THE SLOTS IN THE WEDGES. A TOTAL OF 43 BALLS ARE REQUIRED IN THE BALL TRACK ASSEMBLY.



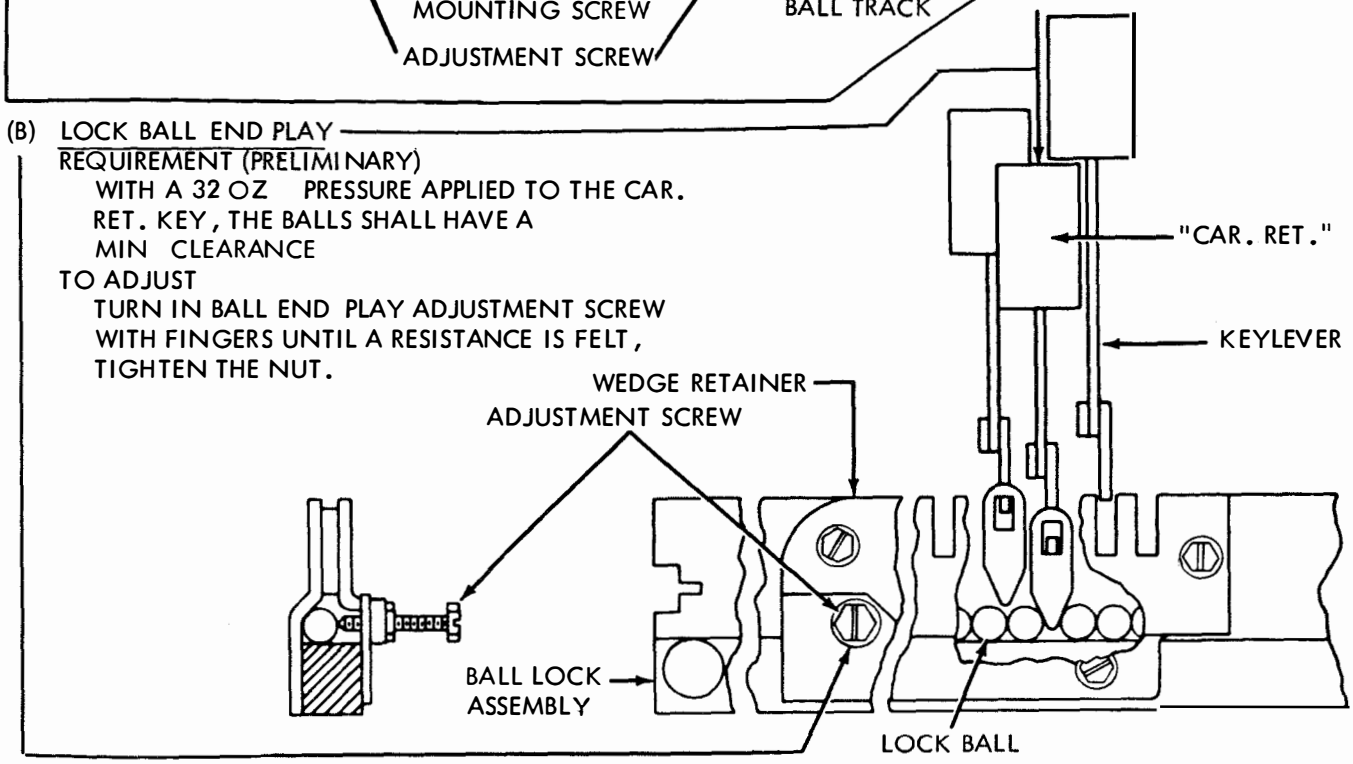
(B) LOCK BALL END PLAY

REQUIREMENT (PRELIMINARY)

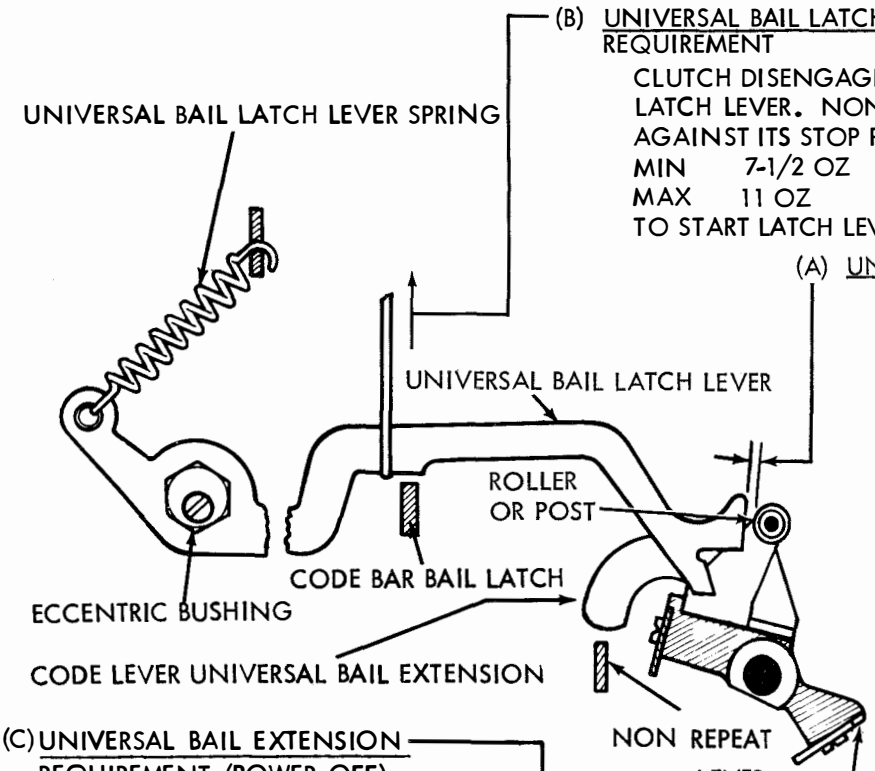
WITH A 32 OZ PRESSURE APPLIED TO THE CAR. RET. KEY, THE BALLS SHALL HAVE A MIN CLEARANCE

TO ADJUST

TURN IN BALL END PLAY ADJUSTMENT SCREW WITH FINGERS UNTIL A RESISTANCE IS FELT, TIGHTEN THE NUT.



2.10 Codebar Assembly continued

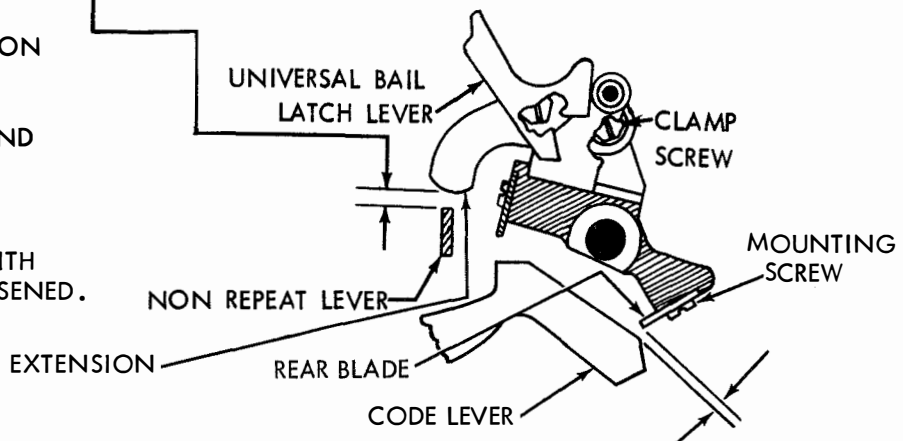


(B) UNIVERSAL BAIL LATCH SPRING
REQUIREMENT
CLUTCH DISENGAGED, UNIVERSAL BAIL HELD AWAY FROM LATCH LEVER. NON REPEAT LEVER BELL CRANK HELD DOWN AGAINST ITS STOP POST.
MIN 7-1/2 OZ
MAX 11 OZ
TO START LATCH LEVER MOVING.

(A) UNIVERSAL BAIL LATCH LEVER (PRELIMINARY)
NOTE: ON KEYBOARDS EQUIPPED FOR REPEAT SPACE OPERATION, UNHOOK THE SPRING FROM THE PLATE WITH STUD - SEE PAR. 3.01.

REQUIREMENT
CLEARANCE BETWEEN UNIVERSAL BAIL LATCH LEVER AND POST ON UNIVERSAL BAIL EXTENSION.
MIN 0.015 INCH
MAX 0.025 INCH
TO CHECK
DEPRESS SPACE BAR SLOWLY WITH 32 OZ PRESSURE. MANUALLY ROTATE UNIVERSAL BAIL BACKWARDS AND RELEASE QUICKLY.
TO ADJUST
LOOSEN THE THREE SCREWS THAT FASTEN THE UNIVERSAL BAIL REAR BLADE. ROTATE ECCENTRIC. KEEP HIGH PART OF ECCENTRIC UP.

(C) UNIVERSAL BAIL EXTENSION
REQUIREMENT (POWER OFF)
UNIVERSAL BAIL EXTENSION POST RESTING AGAINST END OF UNIVERSAL BAIL LATCH LEVER
MIN 0.050 INCH
MAX 0.080 INCH
BETWEEN EXTENSION AND NON REPEAT LEVER
TO CHECK
DEPRESS LETTERS KEYLEVER AND RELEASE IT. CHECK CLEARANCE.
TO ADJUST
POSITION THE EXTENSION WITH ITS TWO CLAMP SCREWS LOOSENED.



(D) UNIVERSAL BAIL - REAR BLADE
REQUIREMENT
UNIT IN INITIAL TRIP-OFF CONDITION, NO KEY DEPRESSED, NO POWER, EXTENSION POST OF UNIVERSAL BAIL RESTING AGAINST THE END OF LATCH. SOME TO 0.025 INCH BETWEEN UNIVERSAL BAIL REAR BLADE AND ANY CODE LEVER.
TO ADJUST
POSITION REAR BLADE WITH MOUNTING SCREWS LOOSENED.

2. 11 Keyboard Mechanism continued

BALL WEDGELOCK, BALL END PLAY AND UNIVERSAL BAIL LATCH ADJUSTMENTS - (FINAL)

CHECK UNDER POWER

(1) REQUIREMENT
MIN 2 OZ
MAX 6 OZ
TO TRIP ANY CENTER ROW KEY.

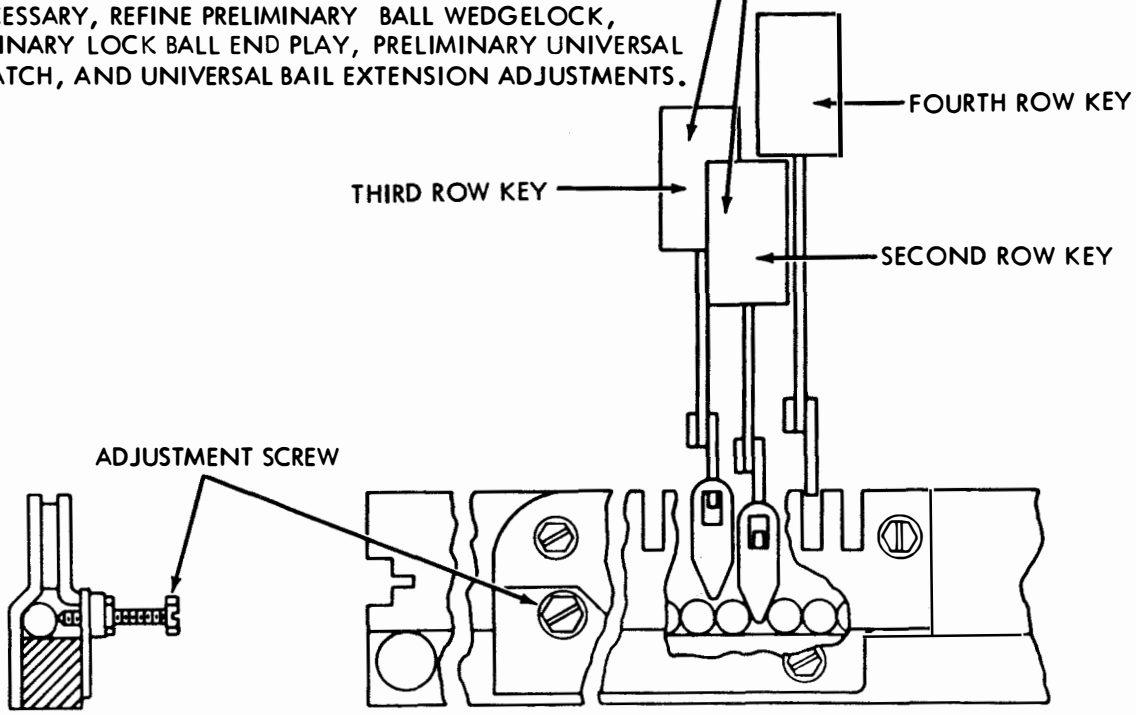
(2) REQUIREMENT
WITH 6-1/2 OZ PRESSURE APPLIED PERPENDICULAR TO THE "A" KEY, DEPRESS EACH KEY IN THE THIRD ROW. THE "A" KEY SHALL TRIP EACH TIME A KEY IS RELEASED. REPEAT THIS CHECK WITH THE 6-1/2 OZ PRESSURE ON THE "CAR. RET." KEY.

(3) REQUIREMENT
THE CLUTCH SHALL NOT TRIP WHEN ANY TWO KEYS ARE DEPRESSED SIMULTANEOUSLY.

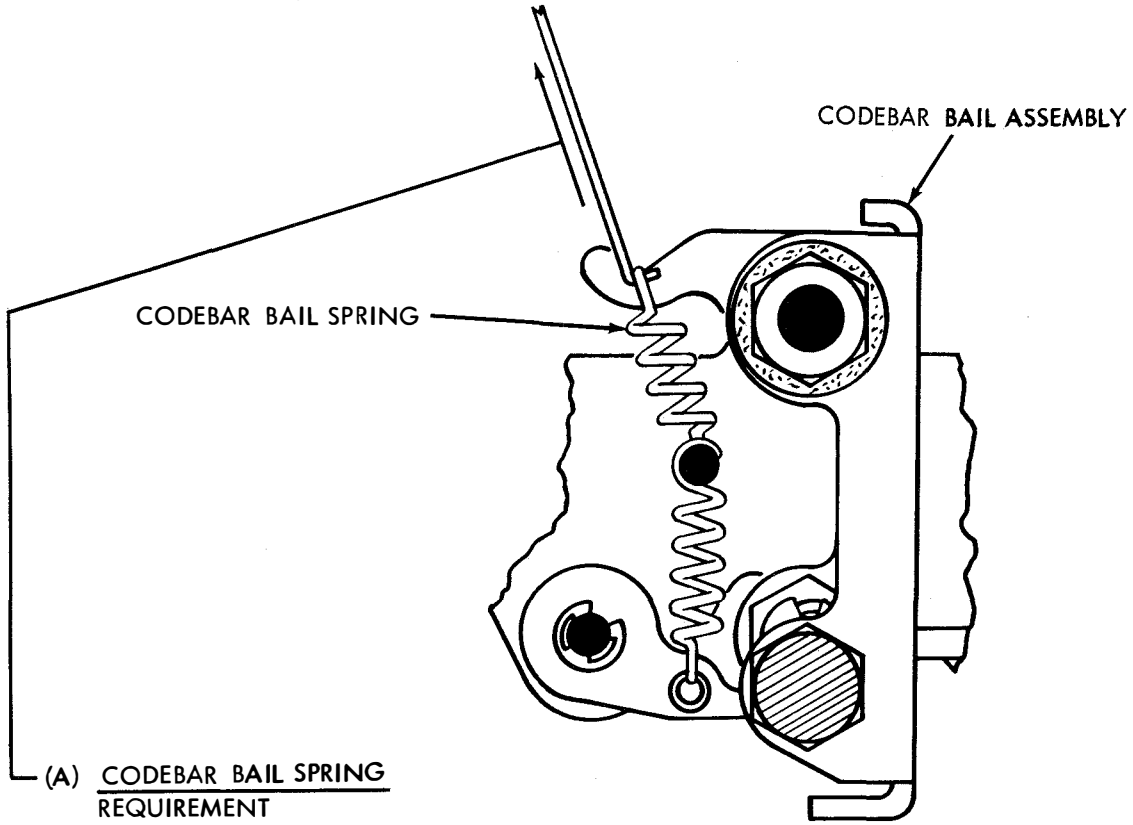
(4) REQUIREMENT
WITH 5-1/4 ± 1/4 OZ APPLIED TO THE "SPACE BAR," DEPRESS "CAR. RET." KEY. THE "SPACE BAR" SHALL TRIP EACH TIME THE "CAR. RET." KEY IS RELEASED BY MOVING THE FINGER OFF THE KEY IN A HORIZONTAL DIRECTION.

NOTE
DISREGARD MULTIPLE SPACE OPERATION IF UNIT IS EQUIPPED WITH 163775 MODIFICATION KIT FOR REPEAT-SPACE OPERATION.

TO ADJUST
IF NECESSARY, REFINE PRELIMINARY BALL WEDGELOCK, PRELIMINARY LOCK BALL END PLAY, PRELIMINARY UNIVERSAL BAIL LATCH, AND UNIVERSAL BAIL EXTENSION ADJUSTMENTS.

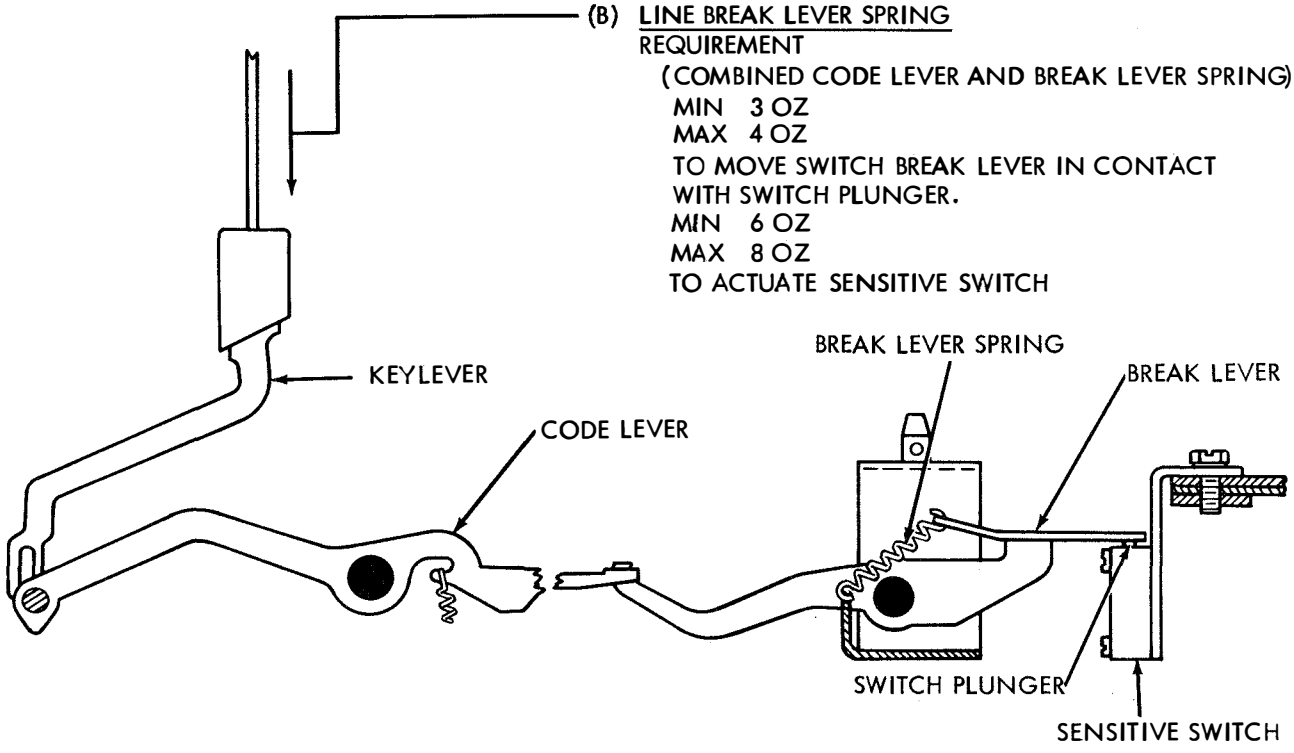


2. 12 Codebar Assembly continued



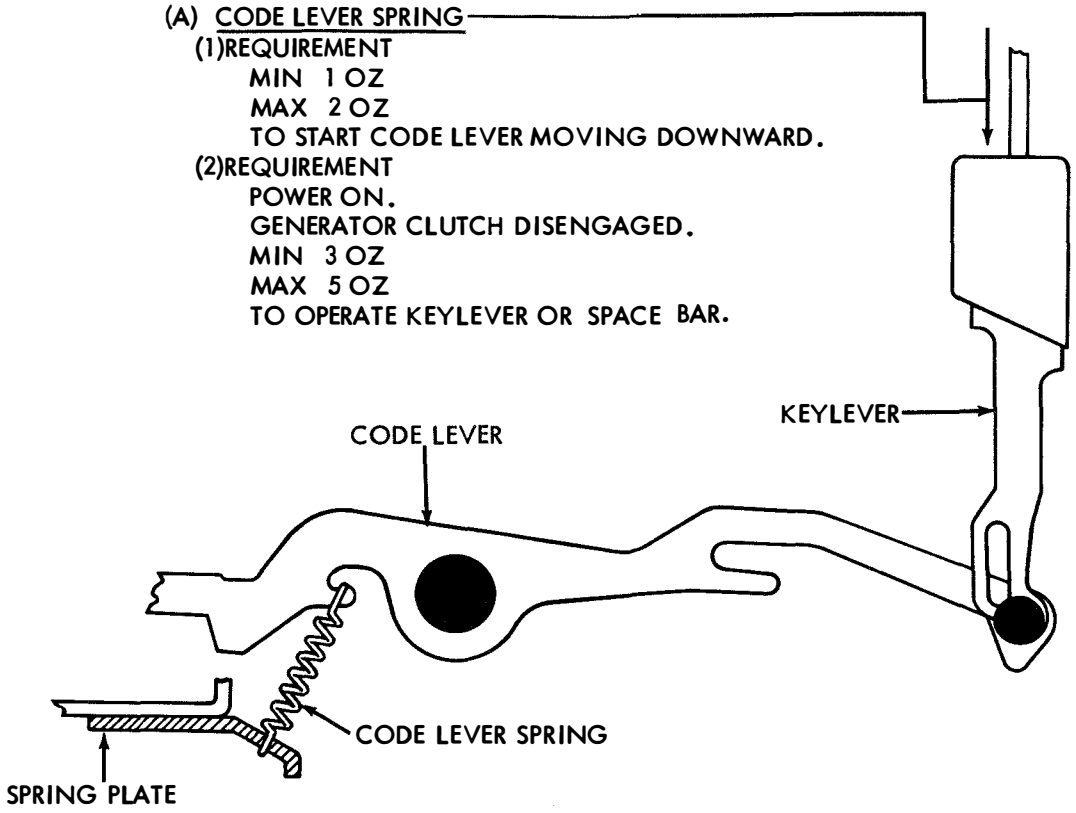
(A) CODEBAR BAIL SPRING
REQUIREMENT
CLUTCH DISENGAGED. SPRING UNHOOKED FROM ARM.
MIN 9 OZ
MAX 11 OZ
TO PULL TO INSTALLED LENGTH.

(B) LINE BREAK LEVER SPRING
REQUIREMENT
(COMBINED CODE LEVER AND BREAK LEVER SPRING)
MIN 3 OZ
MAX 4 OZ
TO MOVE SWITCH BREAK LEVER IN CONTACT WITH SWITCH PLUNGER.
MIN 6 OZ
MAX 8 OZ
TO ACTUATE SENSITIVE SWITCH

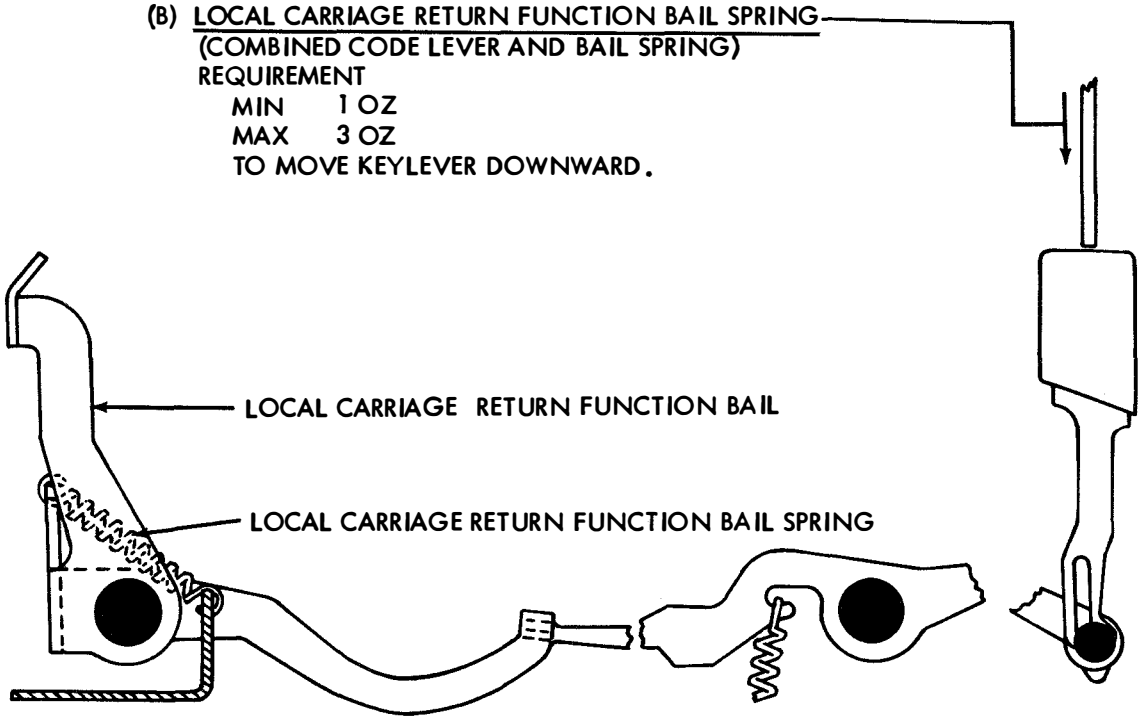


2.13 Keyboard Mechanism continued

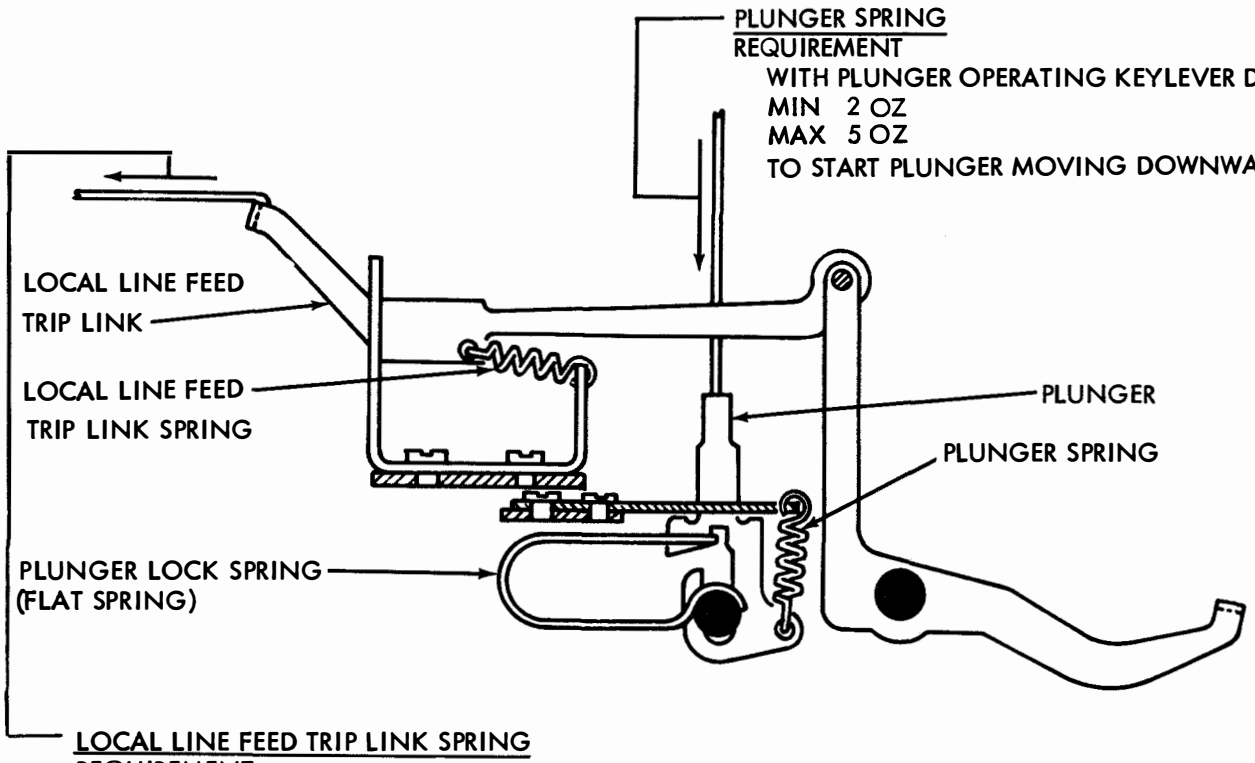
(A) CODE LEVER SPRING
(1)REQUIREMENT
MIN 1 OZ
MAX 2 OZ
TO START CODE LEVER MOVING DOWNWARD.
(2)REQUIREMENT
POWER ON.
GENERATOR CLUTCH DISENGAGED.
MIN 3 OZ
MAX 5 OZ
TO OPERATE KEYLEVER OR SPACE BAR.



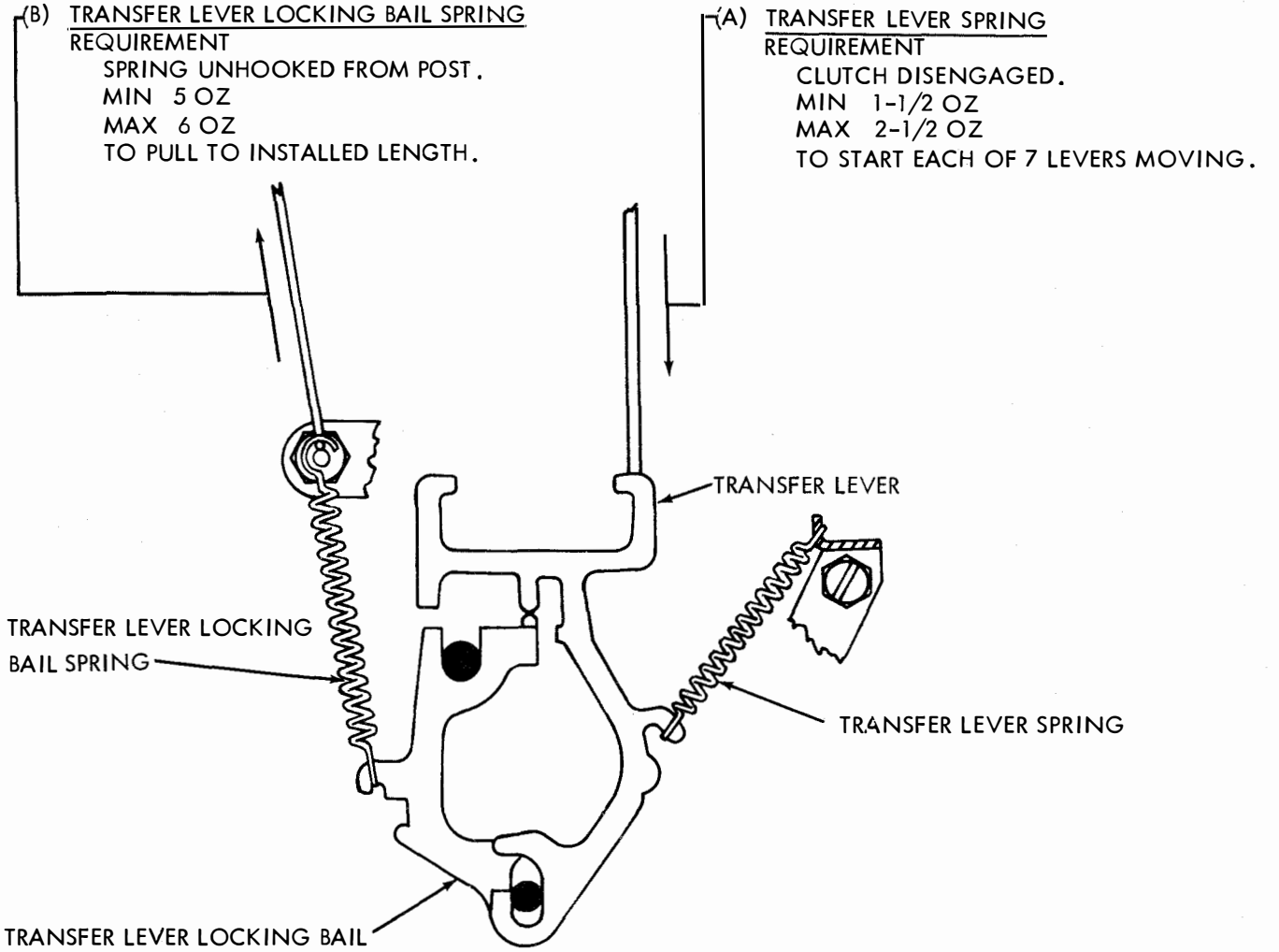
(B) LOCAL CARRIAGE RETURN FUNCTION BAIL SPRING
(COMBINED CODE LEVER AND BAIL SPRING)
REQUIREMENT
MIN 1 OZ
MAX 3 OZ
TO MOVE KEYLEVER DOWNWARD.



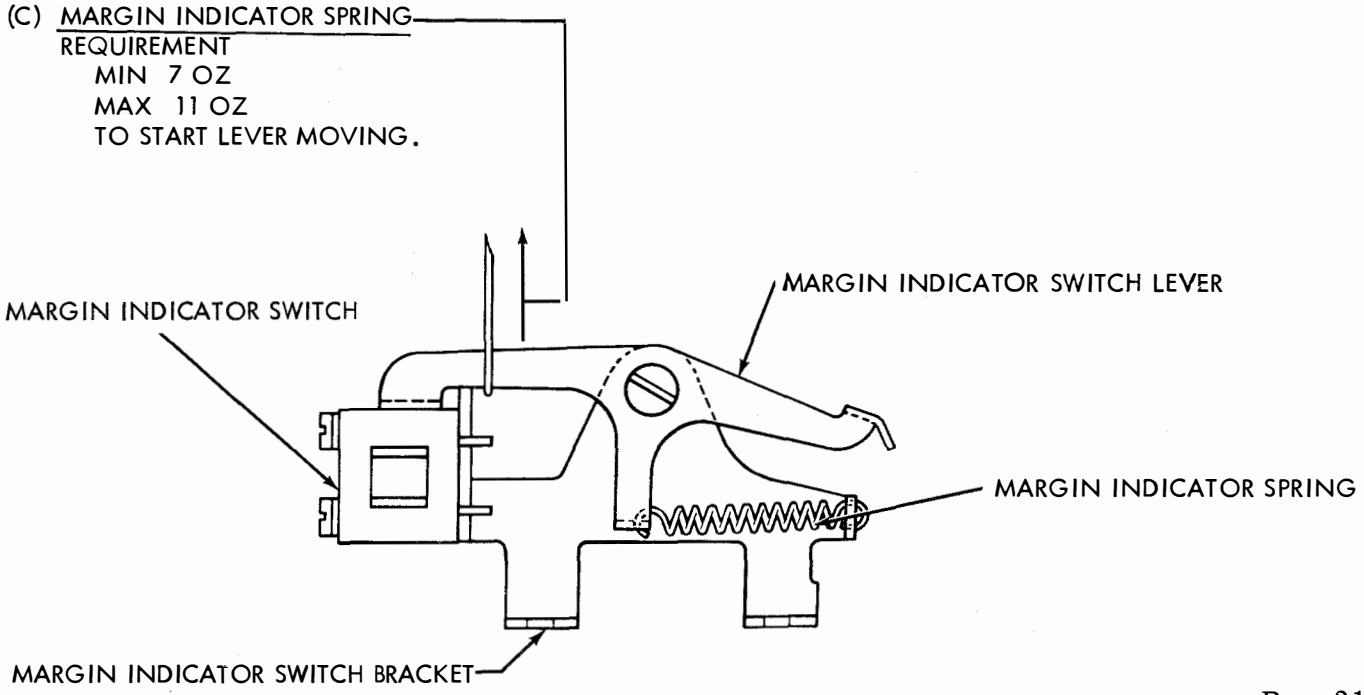
2.14 Keyboard Mechanism continued



2.15 Codebar Assembly and Signal Generator Mechanism continued



2.16 Interrelated Features

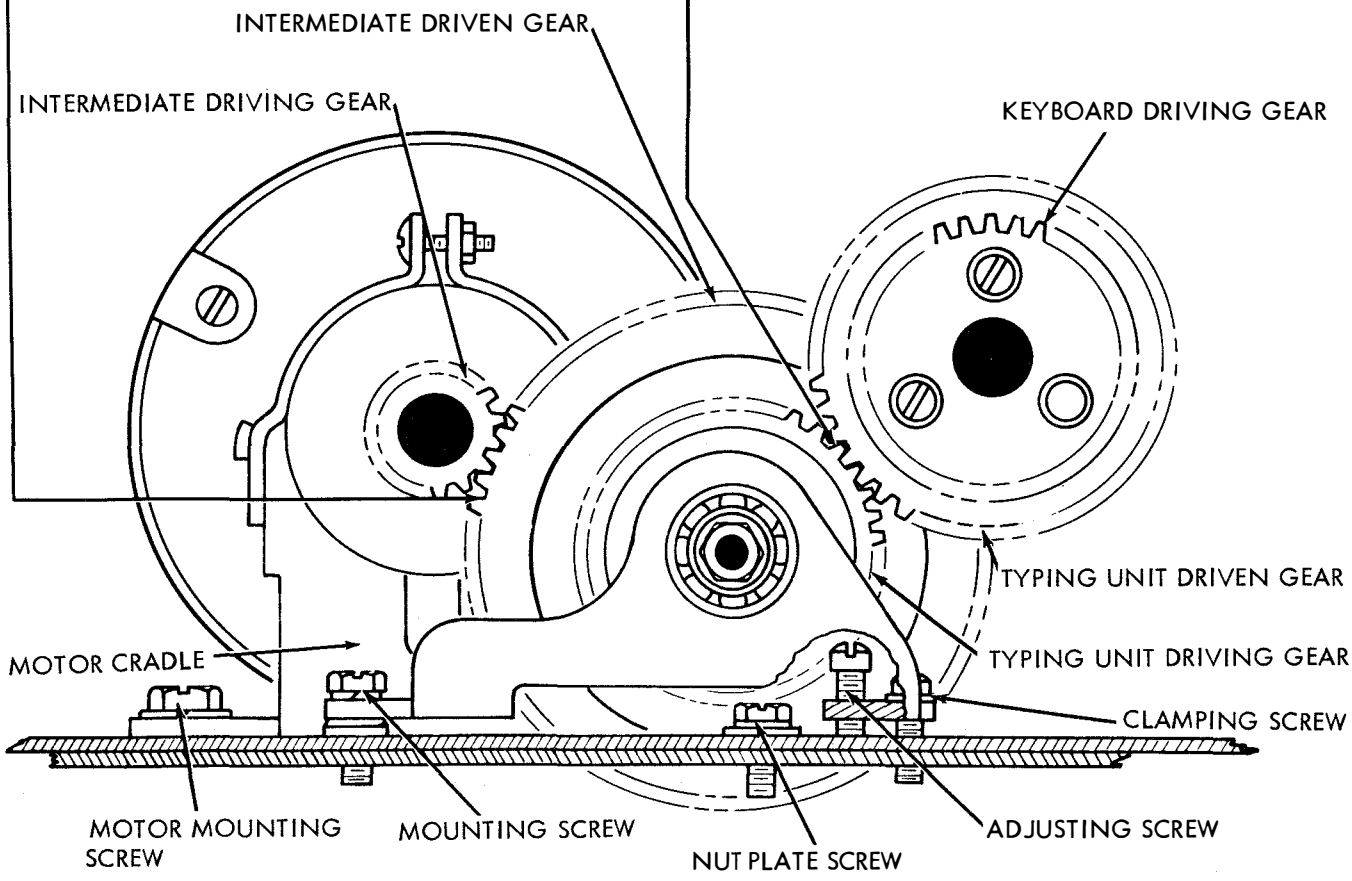


2.17 Interrelated Features continued

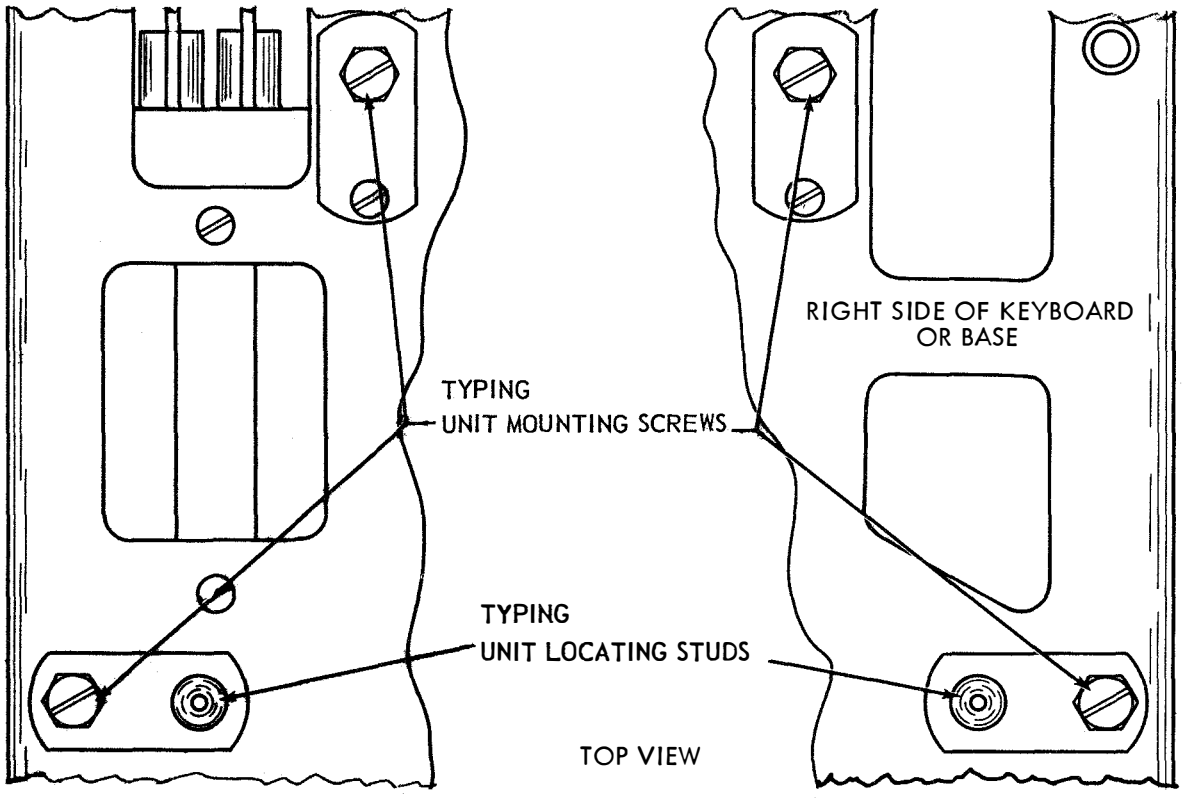
NOTE
NOT APPLICABLE TO WALL MOUNTED PRINTER
REFER TO PAR. 2.20

(2) REQUIREMENT
THERE SHOULD BE A BARELY PRECEPTIBLE AMOUNT OF BACKLASH BETWEEN THE INTERMEDIATE DRIVING GEAR AND THE INTERMEDIATE DRIVEN GEAR AT THE POINT WHERE THE BACKLASH IS THE LEAST.
TO ADJUST
RAISE OR LOWER THE FRONT END OF THE INTERMEDIATE GEAR BRACKET BY MEANS OF THE FILLISTER HEAD ADJUSTING AND CLAMPING SCREWS LOCATED AT THE FRONT END OF THE BRACKET. REFINE REQUIREMENTS IF NECESSARY.

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 AT THE POINT WHERE BACKLASH IS THE LEAST.
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.



2.18 Interrelated Features continued



SIMILAR REQUIREMENTS FOR WALL MOUNTED PRINTER SEE PAR. 2.09

(A) MOUNTING TYPING UNIT ON KEYBOARD OR BASE

REQUIREMENT

WHEN PLACING THE TYPING UNIT ON THE BASE HOLD IT TILTED SLIGHTLY TO THE RIGHT AND LOWER THE RIGHT END INTO ENGAGEMENT WITH THE RIGHT LOCATING STUD. WHILE EASING THE LEFT END DOWNWARD ROTATE THE MOTOR BY HAND TO PROPERLY MESH THE GEARS. SECURE BY FOUR MOUNTING SCREWS. ROTATE THE MOTOR BY HAND TO INSURE PROPER MESHING OF GEARS.

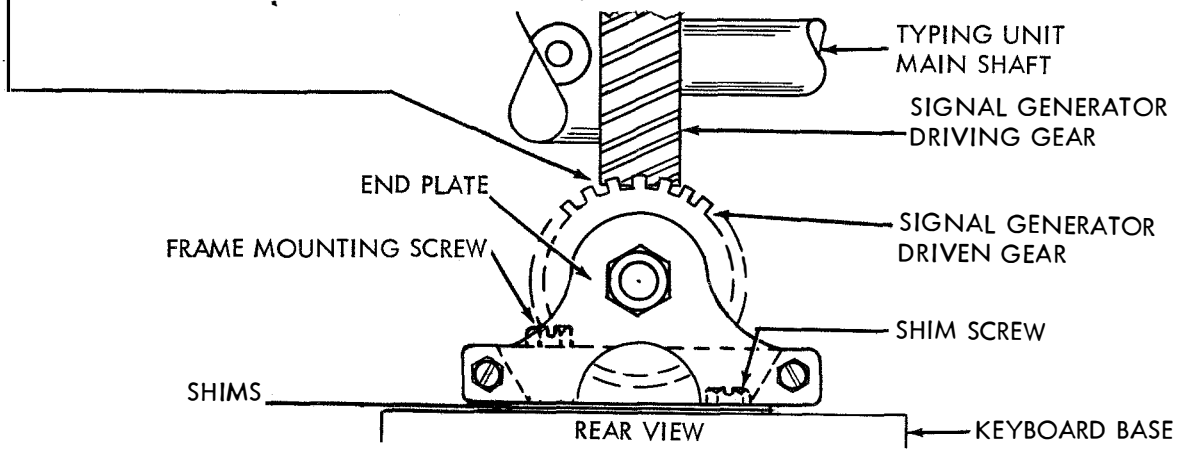
(B) SIGNAL GENERATOR FRAME

REQUIREMENT

WITH TYPING UNIT MOUNTED IN POSITION, THERE SHOULD BE A PERCEPTIBLE AMOUNT OF BACK-LASH BETWEEN THE SIGNAL GENERATOR DRIVEN GEAR AND THE SIGNAL GENERATOR DRIVING GEAR AT THE POINT WHERE BACKLASH IS THE LEAST.

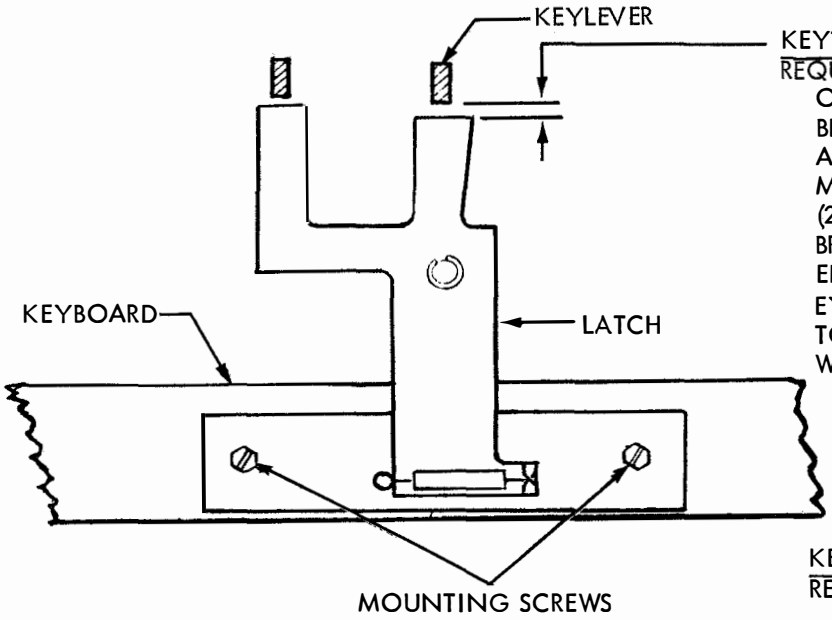
TO ADJUST

REMOVE THE SIGNAL GENERATOR FRAME REAR MOUNTING SCREW AND LOOSEN THE SHIM SCREW. ADD OR SUBTRACT SHIMS AS REQUIRED.



2.19 Wall Mounted Keyboard

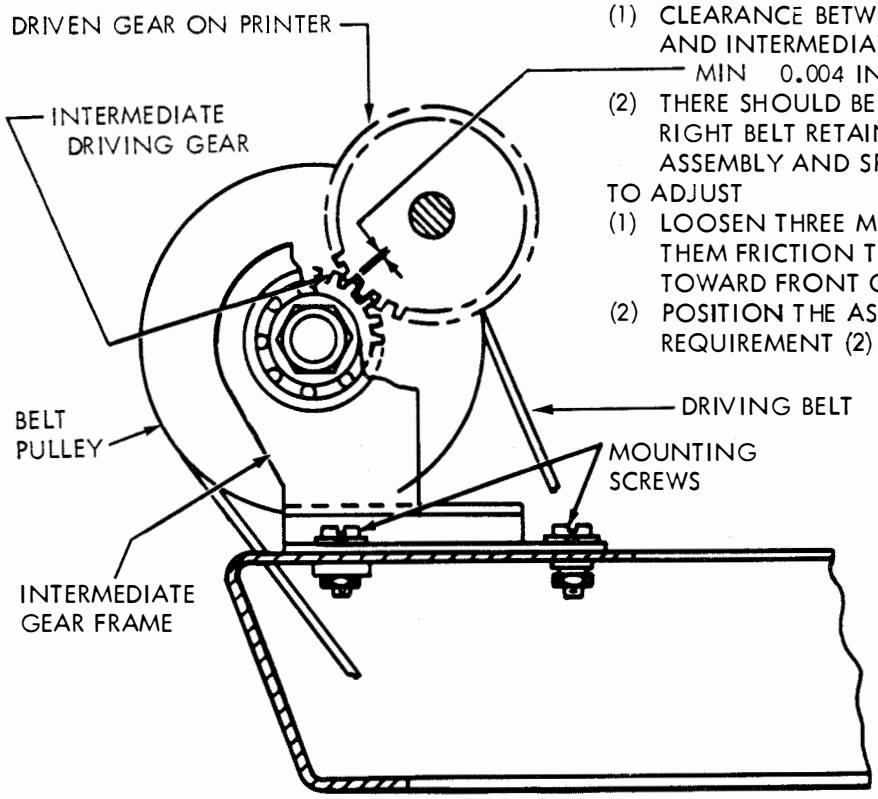
WALL MOUNTED PRINTER (28K, 28N TELETYPEWRITER BASES)



KEYTOP MECHANISM
REQUIREMENT --- WITH KEYBOARD IN UN-OPERATED POSITION. (1) CLEARANCE BETWEEN TOP OF RIGHT END OF LATCH AND BOTTOM OF ASSOCIATED KEYLEVER MIN 0.025 INCH --- MAX 0.045 INCH (2) BOTTOM OF LATCH MOUNTING BRACKET SHALL BE PARALLEL TO BOTTOM EDGE OF BALL LOCK CHANNEL (GAUGE BY EYE). SEE PAR. 2.09
TO ADJUST --- POSITION THE MECHANISM WITH ITS MOUNTING SCREWS LOOSENED.

KEYLOCK LATCH SPRING
REQUIREMENT --- WITH SPRING SCALE APPLIED TO TOP OF FUNCTION PERIOD KEYTOP, PUSH DOWNWARD UNTIL KEY-TOP IS FULLY DEPRESSED (PAR. 2.09). MIN 2-1/2 OZ --- MAX 5-1/2 OZ TO OPERATE KEYLEVER

2.20 Wall Mounted Keyboard continued



INTERMEDIATE GEAR ASSEMBLY

REQUIREMENTS

(1) CLEARANCE BETWEEN DRIVEN GEAR ON PRINTER AND INTERMEDIATE GEAR SHOULD BE MIN 0.004 INCH --- MAX 0.008 INCH

(2) THERE SHOULD BE SOME CLEARANCE BETWEEN RIGHT BELT RETAINER ON INTERMEDIATE GEAR ASSEMBLY AND SPACING CUTOUT LEVER ON PRINTER.

TO ADJUST

(1) LOOSEN THREE MOUNTING SCREWS AND MAKE THEM FRICTION TIGHT. POSITION THE ASSEMBLY TOWARD FRONT OR REAR TO MEET REQUIREMENT (1).

(2) POSITION THE ASSEMBLY TOWARD THE LEFT TO MEET REQUIREMENT (2). TIGHTEN SCREWS.

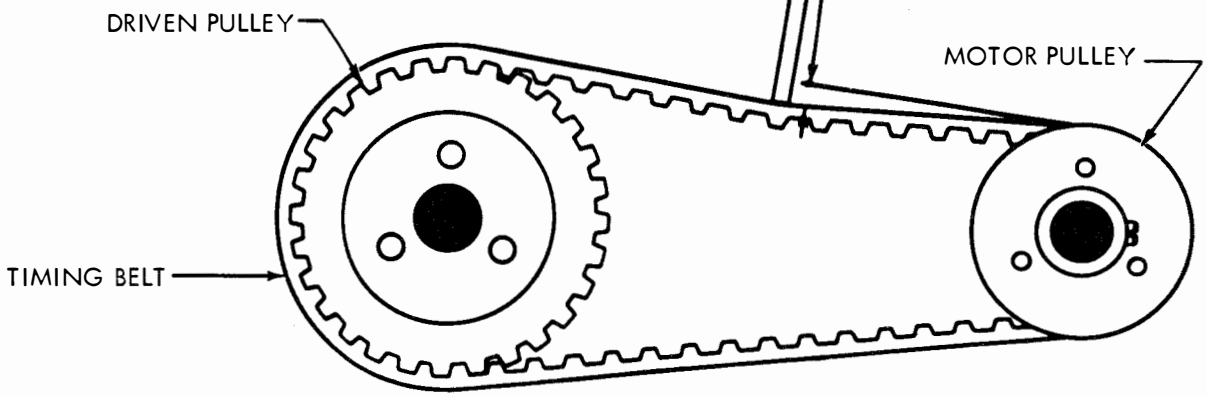
TIMING BELT

REQUIREMENT

FORCE OF 2 ± 1/2 OZ TO DEFLECT BELT 1/8 INCH WHEN MEASURED MIDWAY BETWEEN PULLEYS.

TO ADJUST

WITH MOTOR PLATE MOUNTING SCREWS LOOSENED, SLIDE MOTOR TOWARD FRONT OF BASE TO INCREASE TENSION OR TOWARD REAR OF BASE TO DECREASE TENSIONS. TIGHTEN SCREWS.



2.21 Signal Generator Mechanism continued

SIGNAL CONTACT CLEARANCE (USING SIGNAL TEST SET --- SUCH AS 1A OR 28-TYPE TELETYPEWRITER TEST SETS) PRELIMINARY --- WITH ELECTRICAL NOISE SUPPRESSOR DISCONNECTED FROM CIRCUIT, CONNECT SIGNAL CONTACTS SO AS TO INTERRUPT (KEY) CURRENT TO "STROBE" LAMP OF 1A OR 28-TYPE TELETYPEWRITER TEST SETS. TEST SET AND KEYBOARD MUST OPERATE AT SAME SPEED. (SEE TABLE 1-1).

REQUIREMENTS

(1) WITH BLANKS COMBINATION SELECTED, ORIENT SCALE OF TEST SET TO ALIGN ZERO MARK OF STOP SEGMENT WITH BEGINNING OF STOP PULSE IMAGE. LENGTH OF TRACE SHALL BE FROM THE ZERO MARK TO MIN 141-1/2 DIVISIONS -----MAX 142-1/2 DIVISIONS. (7.42 UNIT CODE ONLY) TO ADJUST - IF VARIATIONS OCCUR, POSITION SCALE SO THAT VARIATIONS EXTEND EQUALLY ON RIGHT & LEFT OF 142 MARK.

(2) NOMINAL LENGTH OF PULSES NO. 1, 2, 3, 4, & 5 IS 100 DIVISIONS. TO ADJUST - RECHECK CONTACT CLEARANCE REQUIREMENT PAR. 2.04. REFINE CLEARANCE, WHERE NECESSARY, TO FAVOR PULSES 1 THRU 5 BY ORIENTING BEGINNING OF STOP PULSE TRACE UP TO ± 5 DIVS. FROM ZERO MARK OF SEGMENT (REFER TO REQUIREMENTS "A" AND "B" BELOW)

(3) EACH PULSE TRACE (SEE "C" BELOW) TO BE FREE OF UNDERSIRABLE BREAKS. TO ADJUST - RECHECK TRANSFER BAIL DETENT PLATE REQUIREMENT. (PAR. 2.04) AND WHERE NECESSARY, REFINE ADJUSTMENT. NOTE --- DETENT PLATE MAY BE ROTATED EITHER LEFT OR RIGHT AS LONG AS DETENT TOGGLE LATCH CONTINUES TO CAM OFF PROJECTION OF TRANSFER BAIL.

A. BEGINNING OF EACH TRACE SHOULD FALL BETWEEN
   1. ZERO MARK AND 5TH DIV. OF SCALE SEGMENT
   2. 95TH DIV. (PREVIOUS SEGMENT) AND ZERO MARK.

B. END OF EACH TRACE (EXCEPT STOP PULSE)
   1. 95TH DIV. (PREVIOUS SEGMENT) & ZERO MARK
   2. ZERO MARK AND 5TH DIV. OF SCALE SEGMENT.

} SEE "R" & "Y" COMBINATION PAR. 2.22

C. EACH TRACE OF THE MARKING CODE PULSES MAY HAVE A BREAK WITHIN TOLERANCE LIMITS --- THE BREAK SHOULD NOT OCCUR PRIOR TO 95TH DIVISION OF OBSERVED PULSE (1 THROUGH 5) OR 137TH DIVISION OF STOP PULSE. SEE TABLE 1-1 FOR PERMISSIBLE WIDTH OF BREAK AT SPEED OF OPERATION.

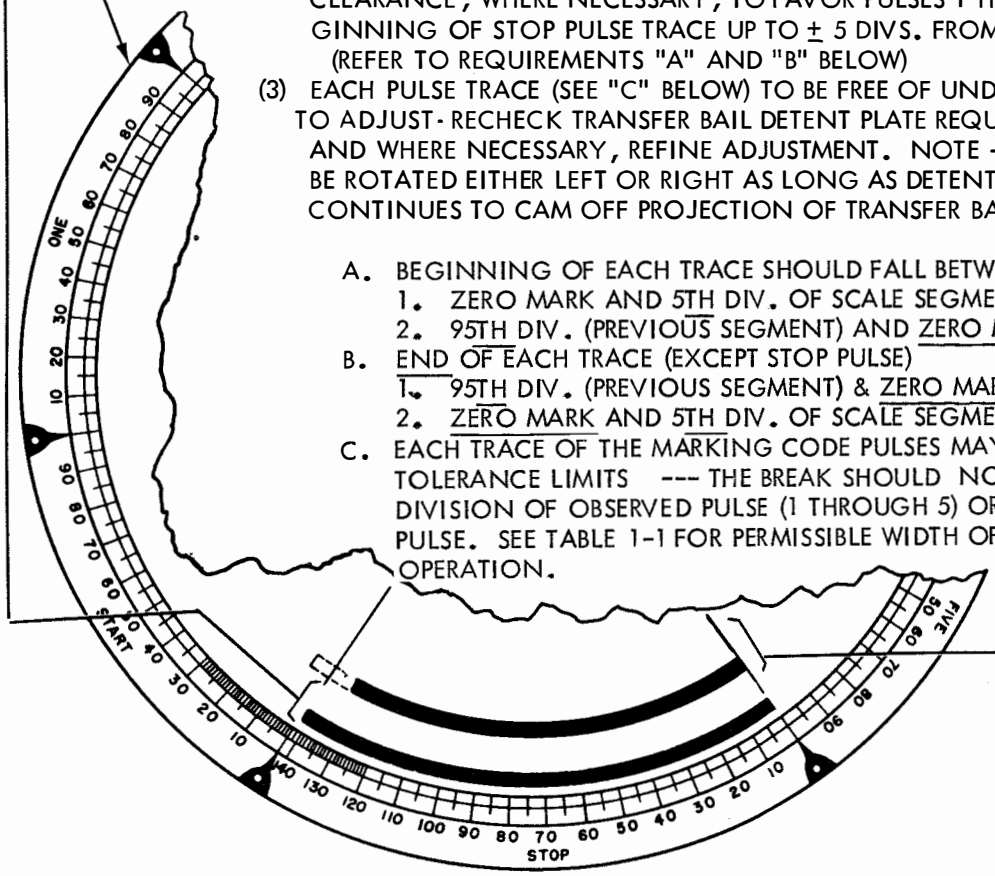
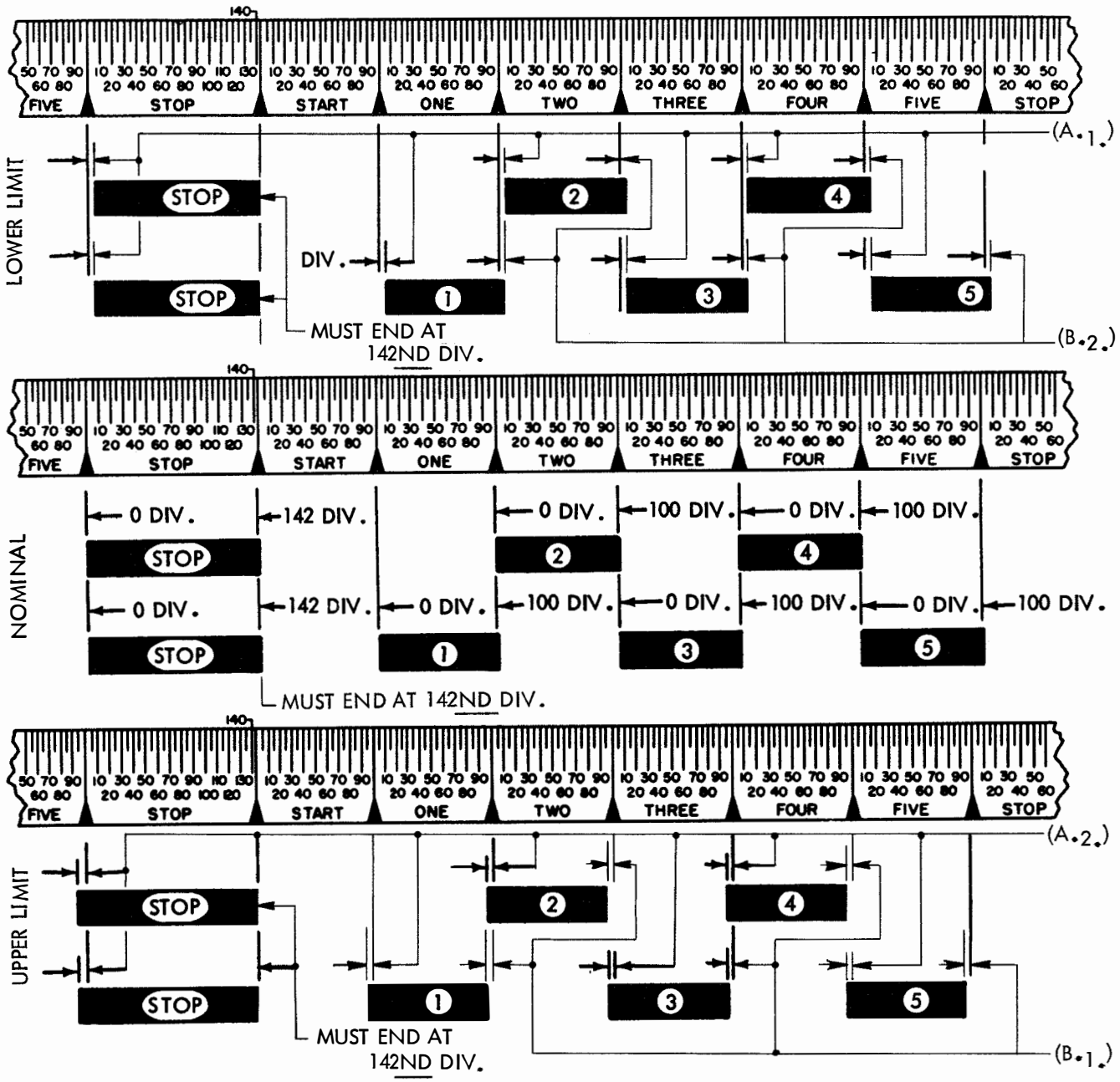


TABLE 1-1 SIGNALING PULSE SPEED AND PERMISSIBLE WIDTH OF BREAK

SPEED	OPERATIONS PER MINUTE	WIDTH OF BREAK NOT TO EXCEED	REMARKS
60 WPM	368.182	1 DIVISION	MARKING PULSES (1 THROUGH 5 & STOP)
75 WPM	460.00	1-1/2 DIVISIONS	MARKING PULSES (1 THROUGH 5 & STOP)
100 WPM	600.00	2 DIVISIONS	MARKING PULSES (1 THROUGH 5 & STOP)

2.22 Signal Generator Mechanism continued

"R" AND "Y" COMBINATION



"R" AND "Y" COMBINATION

FOR UNITS WITH SPACING CONTACTS OF SIGNAL GENERATOR WIRED FOR POLAR OPERATION

REQUIREMENTS ---

(1) SPACING PULSES SHALL START NO EARLIER THAN 94TH DIV. OF PREVIOUS SEGMENT AND NO LATER THAN 6TH DIV. OF PULSE UNDER OBSERVATION.

(2) TRACE OF SPACING PULSE SHALL END NO EARLIER THAN 94TH DIV. OF PULSE UNDER OBSERVATION AND END NO LATER THAN 6TH DIV. OF FOLLOWING PULSE.

(3) TRACE OF START PULSE SHALL BEGIN NO EARLIER THAN 136TH DIV. OF STOP SEGMENT AND NO LATER THAN 6TH DIV. OF START SEGMENT. START PULSE SHALL END NO EARLIER THAN 94TH DIV. OF START SEGMENT AND END NO LATER THAN 6TH DIV. OF NO. 1. SEGMENT.

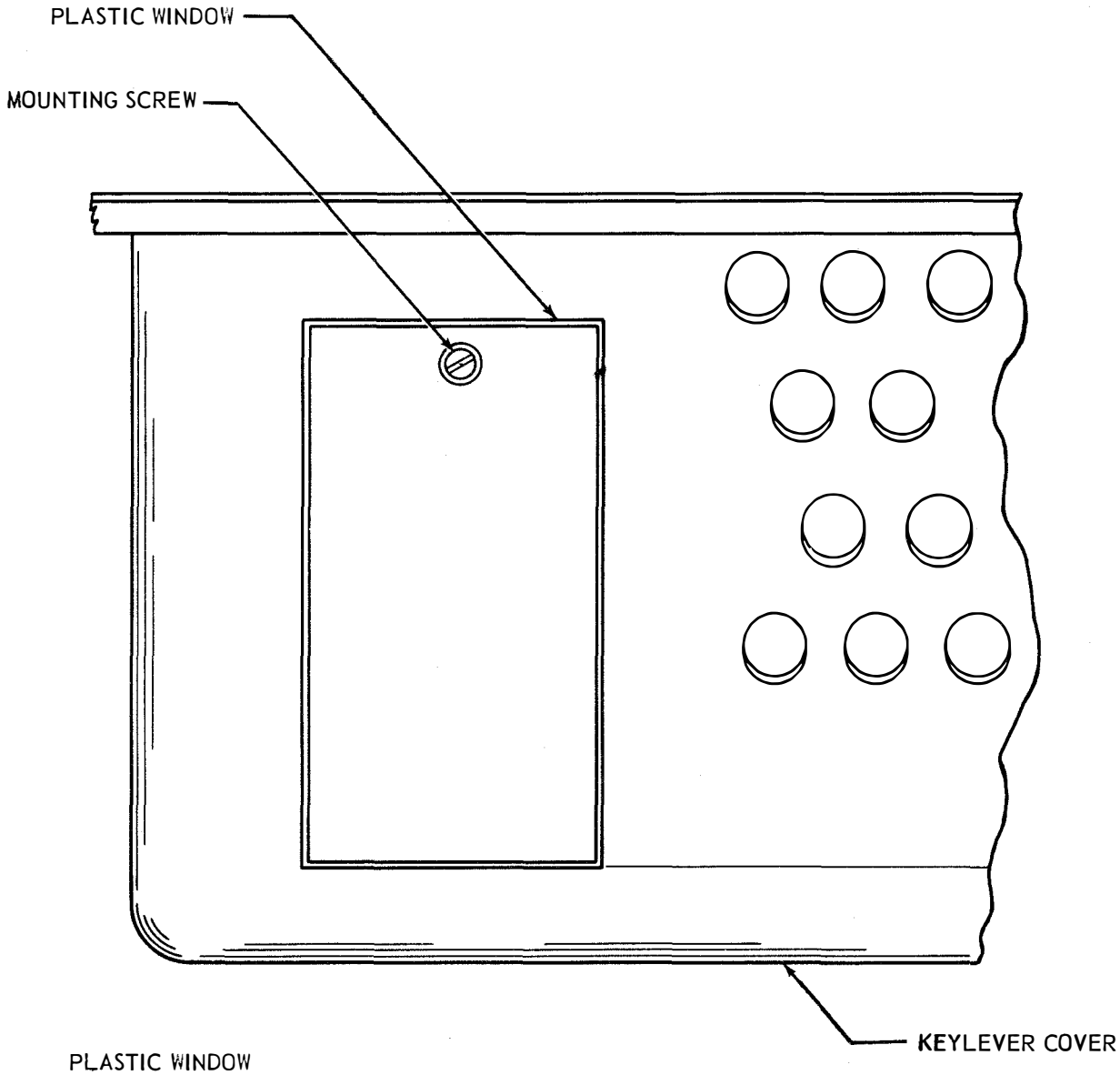
(4) SPACING PULSE MAY HAVE A BREAK PROVIDED THE BREAK IS NOT OVER ONE DIVISION WIDE AND IT DOES NOT OCCUR PRIOR TO 95TH DIV. OF PULSE UNDER OBSERVATION.

2.23 Signal Generator Mechanism continued

NOTE 1: FOR UNITS EQUIPPED WITH SIGNAL REGENERATORS, REMOVE REGENERATOR CIRCUIT CARD BEFORE APPLYING TEST SET PROBES TO SIGNAL CONTACTS.

NOTE 2: APPLYING OPERATING VOLTAGE OF SIGNAL DISTORTION TEST SET DIRECTLY TO GOLD-PLATED SIGNAL CONTACTS MAY MAKE THEM UNSUITABLE FOR SPECIAL LOW-VOLTAGE APPLICATIONS. SEE (PAR. REFERENCE 1.B 1.13) FOR SERVICING INSTRUCTIONS.

2.24 Keyboard Mechanism continued



PLASTIC WINDOW

REQUIREMENT

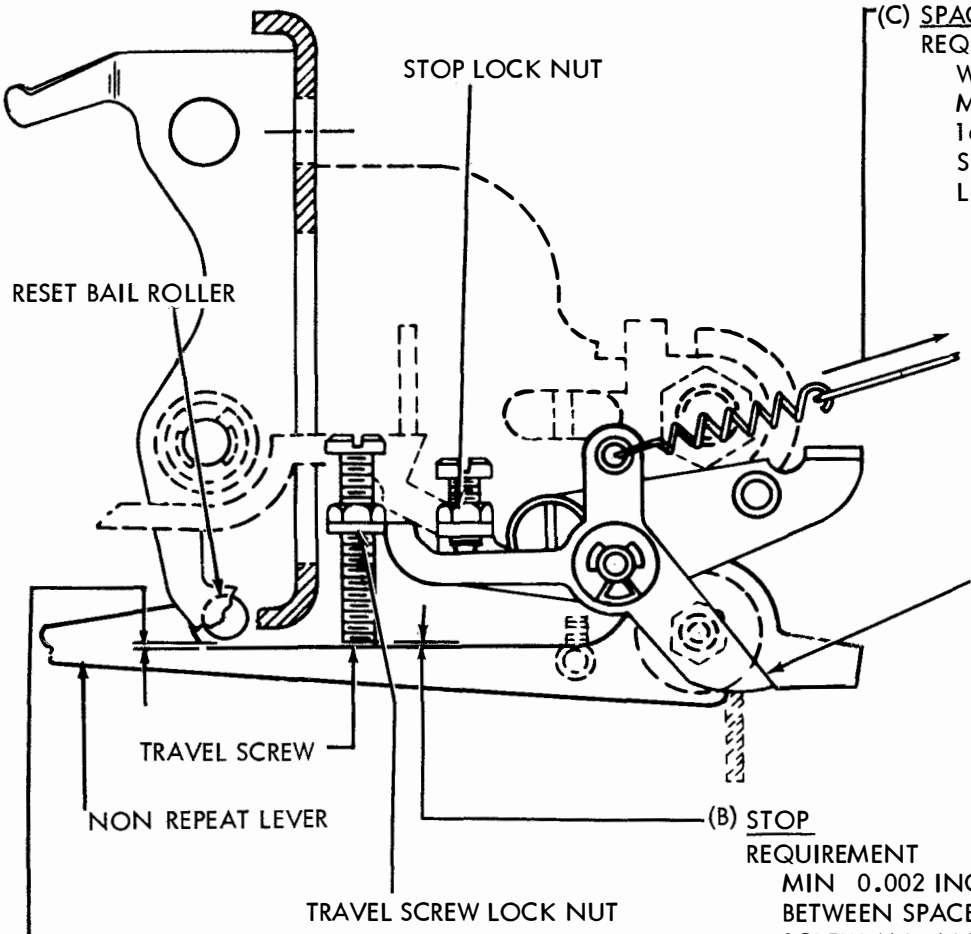
PLASTIC WINDOW SHOULD BE FULLY SEATED IN POSITION BEFORE TIGHTENING MOUNTING SCREW.

TO ADJUST

POSITION WINDOW WITH MOUNTING SCREW LOOSENED.

3. VARIABLE FEATURES

3.01 Repeat-On-Space Mechanism



(C) SPACE - REPEAT LEVER SPRING
REQUIREMENT
WITH SPRING UNHOOKED MIN 13-1/2 OZ --- MAX 16-1/2 OZ TO STRETCH SPRING TO INSTALLED LENGTH.

(B) STOP
REQUIREMENT
MIN 0.002 INCH --- MAX 0.020 INCH BETWEEN SPACE - REPEAT LEVER TRAVEL SCREW AND NON REPEAT LEVER.
TO ADJUST
DEPRESS "G" KEYLEVER TO TRIP KEYBOARD CLUTCH. POSITION STOP BY LOOSENING STOP LOCK NUT. RECHECK AFTER ADJUSTMENT.

(A) TRAVEL SCREW
REQUIREMENT
WITH SPACE KEY FULLY DEPRESSED: MIN 0.035 INCH --- MAX 0.080 INCH BETWEEN RESET BAIL ROLLER AND NON REPEAT LEVER.
TO ADJUST
WITH SPACE KEY FULLY DEPRESSED, ADJUST TRAVEL SCREW BY LOOSENING TRAVEL SCREW LOCK NUT. RECHECK AFTER ADJUSTMENT.

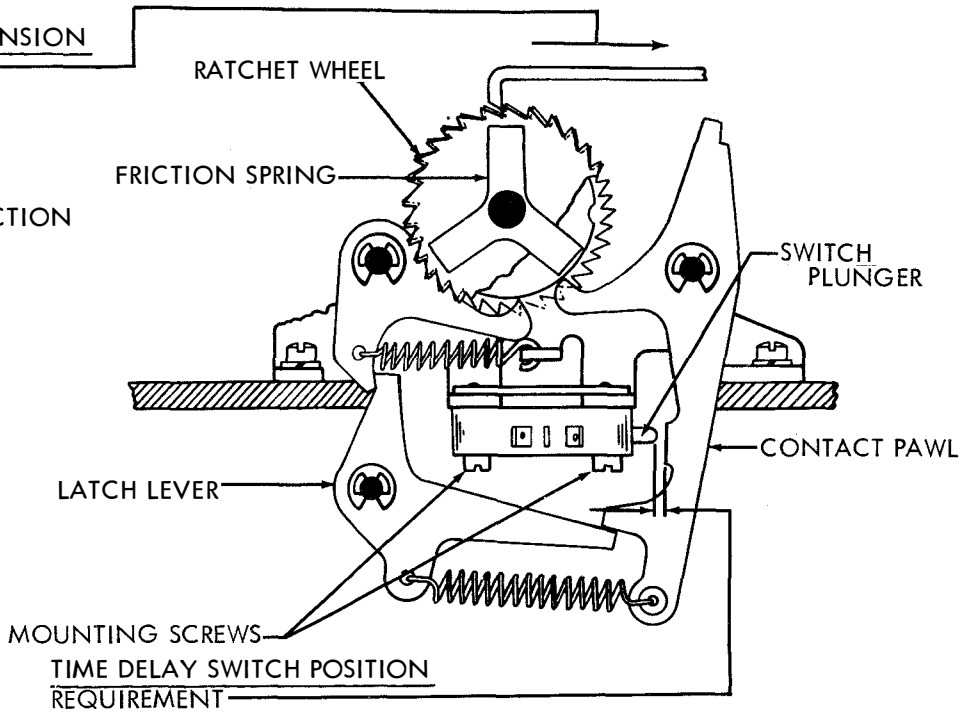
NOTE

SPACE BAR TOUCH TO OBTAIN A REPEAT IS AFFECTED BY THIS ADJUSTMENT. TO GET A LIGHTER TOUCH ADJUST TO UPPER LIMIT. TO OBTAIN A HEAVIER TOUCH ADJUST TO THE LOWER LIMIT.

(D) SPACE BAR
(1) REQUIREMENT (SINGLE SPACE)
NORMAL KEY TOP PRESSURE TO TRANSMIT SINGLE SPACE.
(2) REQUIREMENT (REPEAT SPACE)
SPACE BAR FULLY DEPRESSED AND HELD DOWN TO EFFECT CONTINUOUS SPACE TRANSMISSION.

3.02 Time Delay Mechanism

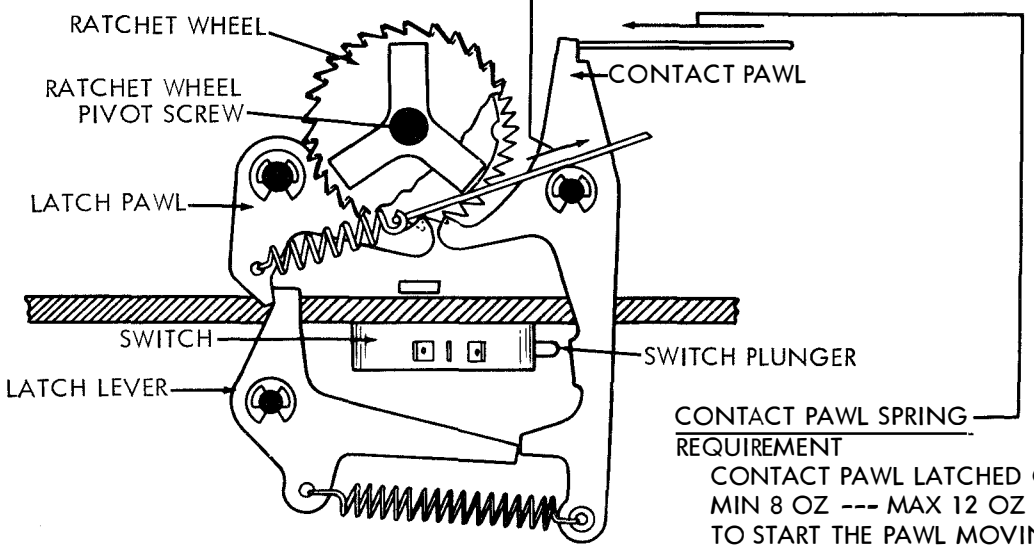
TIME DELAY RATCHET WHEEL TENSION
REQUIREMENT
HOLD OFF ALL PAWLS.
MIN 2 OZ --- MAX 8 OZ
TO MOVE RATCHET WHEEL
TO ADJUST
REMOVE AND BEND THE FRICTION SPRINGS.



TIME DELAY SWITCH POSITION
REQUIREMENT
CONTACT PAWL NOT BLOCKED BY LATCH LEVER AND ON HIGH PART OF THE RATCHET WHEEL. SOME CLEARANCE BETWEEN CONTACT PAWL AND SWITCH PLUNGER WHEN PLAY IN RATCHET WHEELS IS TAKEN UP IN DOWNWARD DIRECTION MAX 0.010 INCH
TO ADJUST
POSITION THE SWITCH WITH THE TWO SWITCH MOUNTING SCREWS LOOSENED.

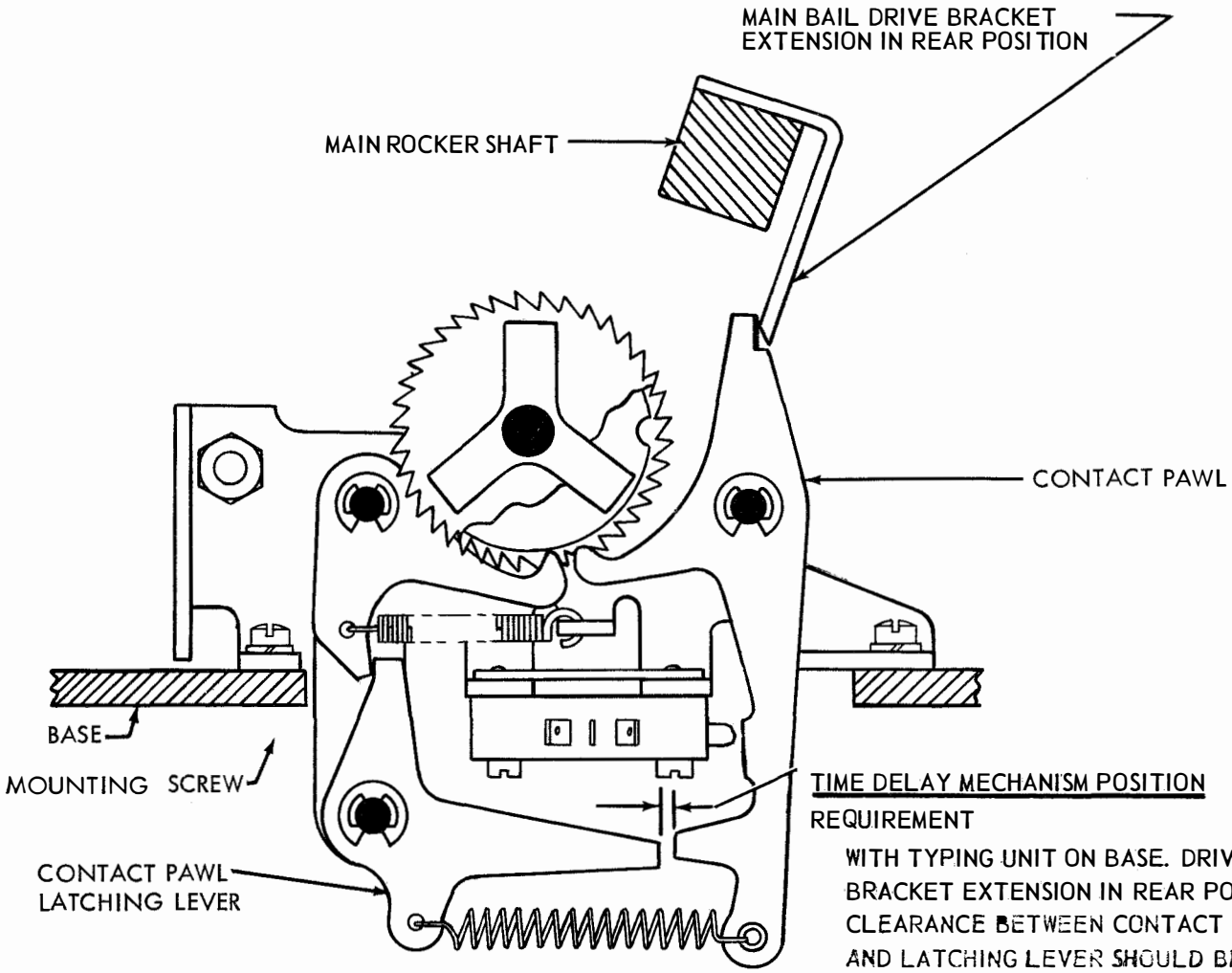
3.03 Time Delay Mechanism continued

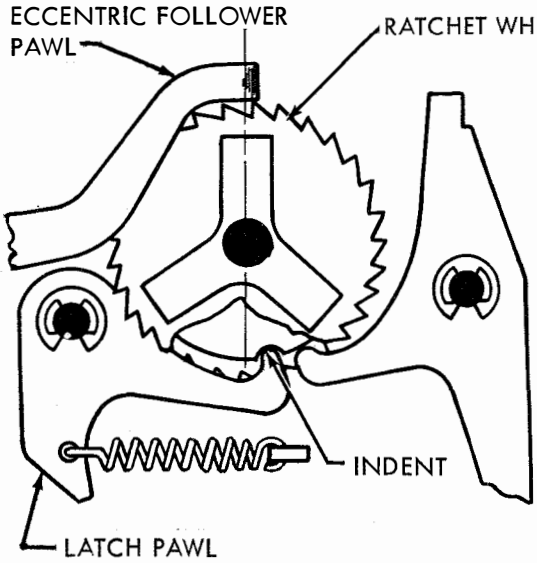
CONTACT LATCH PAWL SPRING
REQUIREMENT
LATCH PAWL SPRING UNHOOKED AT ANCHOR.
MIN 12 OZ --- MAX 15 OZ
TO STRETCH SPRING TO INSTALLED LENGTH AS SHOWN.



CONTACT PAWL SPRING
REQUIREMENT
CONTACT PAWL LATCHED ON END OF LATCH LEVER.
MIN 8 OZ --- MAX 12 OZ
TO START THE PAWL MOVING.

3.04 Time Delay Mechanism continued





TIME DELAY MECHANISM POSITION

REQUIREMENT

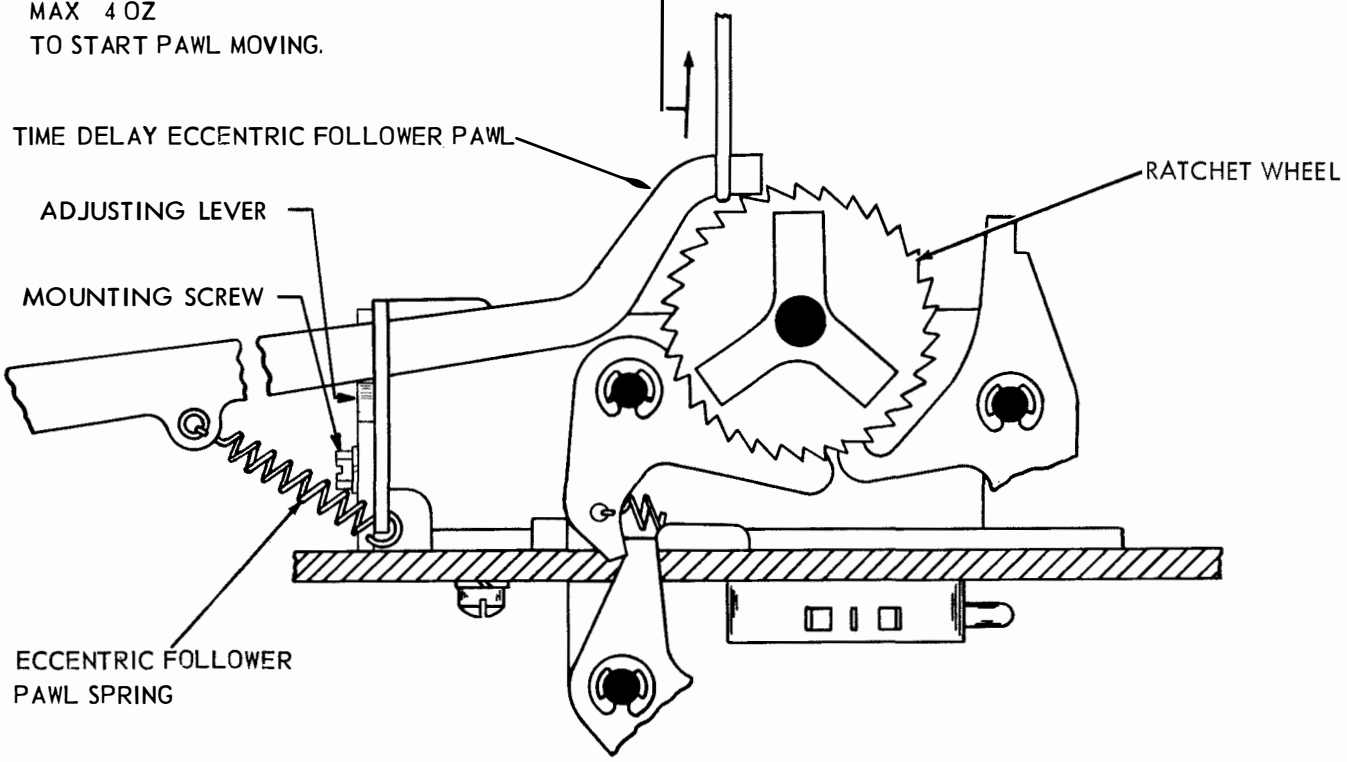
WITH TYPING UNIT ON BASE. DRIVE BRACKET EXTENSION IN REAR POSITION. CLEARANCE BETWEEN CONTACT PAWL AND LATCHING LEVER SHOULD BE MIN 0.020 INCH

TO ADJUST

REMOVE THE TYPING UNIT FROM THE BASE. LOOSEN THE TIME DELAY MOUNTING SCREWS. ROTATE THE RATCHET WHEELS UNTIL THE LATCH PAWL DROPS INTO THE INDENTS IN THE TWO RATCHET WHEELS. LIFT THE ECCENTRIC FOLLOWER PAWL UPWARD. TAKE UP THE PLAY BY PRESSING THE RATCHET WHEELS BACKWARD. WITH THE ECCENTRIC FOLLOWER PAWL AT THE END OF ITS EXTREME FORWARD TRAVEL, POSITION THE MECHANISM SO THAT THE POINT OF THE LOWER BEVELED EDGE OF THE FOLLOWER PAWL RESTS ON THE PEAK OF THE FIRST RATCHET-WHEEL TOOTH FORWARD OF A VERTICAL CENTERLINE THROUGH THE RATCHET WHEEL OR OVER TRAVELS THE PEAK BY NOT MORE THAN 0.010 INCH. RECHECK MINIMUM CLEARANCE OF 0.020 INCH WITH TYPING UNIT ON KEYBOARD BASE. IF NECESSARY, REFINE ADJUSTMENT.

3.05 Time Delay Mechanism continued

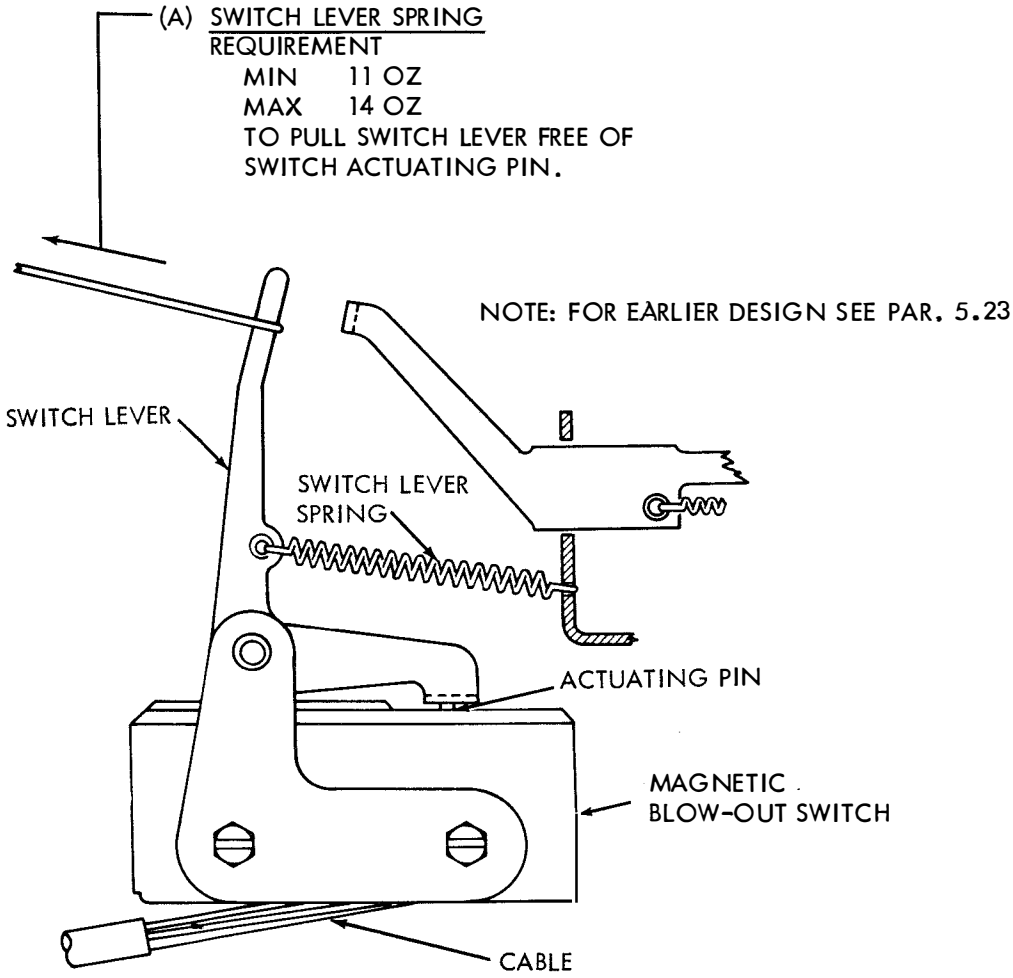
ECCENTRIC FOLLOWER PAWL SPRING
REQUIREMENT
ECCENTRIC FOLLOWER PAWL IN EXTREME FORWARD POSITION. 8 OZ SCALE APPLIED TO PAWL NEAR RATCHET WHEEL AND PULLED UPWARD
MIN 1-1/2 OZ
MAX 4 OZ
TO START PAWL MOVING.



TIME DELAY DISABLING DEVICE
REQUIREMENT
DISABLE THE TIME DELAY MECHANISM WHEN NOT REQUIRED.
TO ADJUST
LOOSEN THE ADJUSTING LEVER MOUNTING SCREW AND PRESS DOWNWARD ON THE LEVER TO RAISE ECCENTRIC FOLLOWER PAWL OUT OF ENGAGEMENT WITH ITS RATCHET WHEEL.

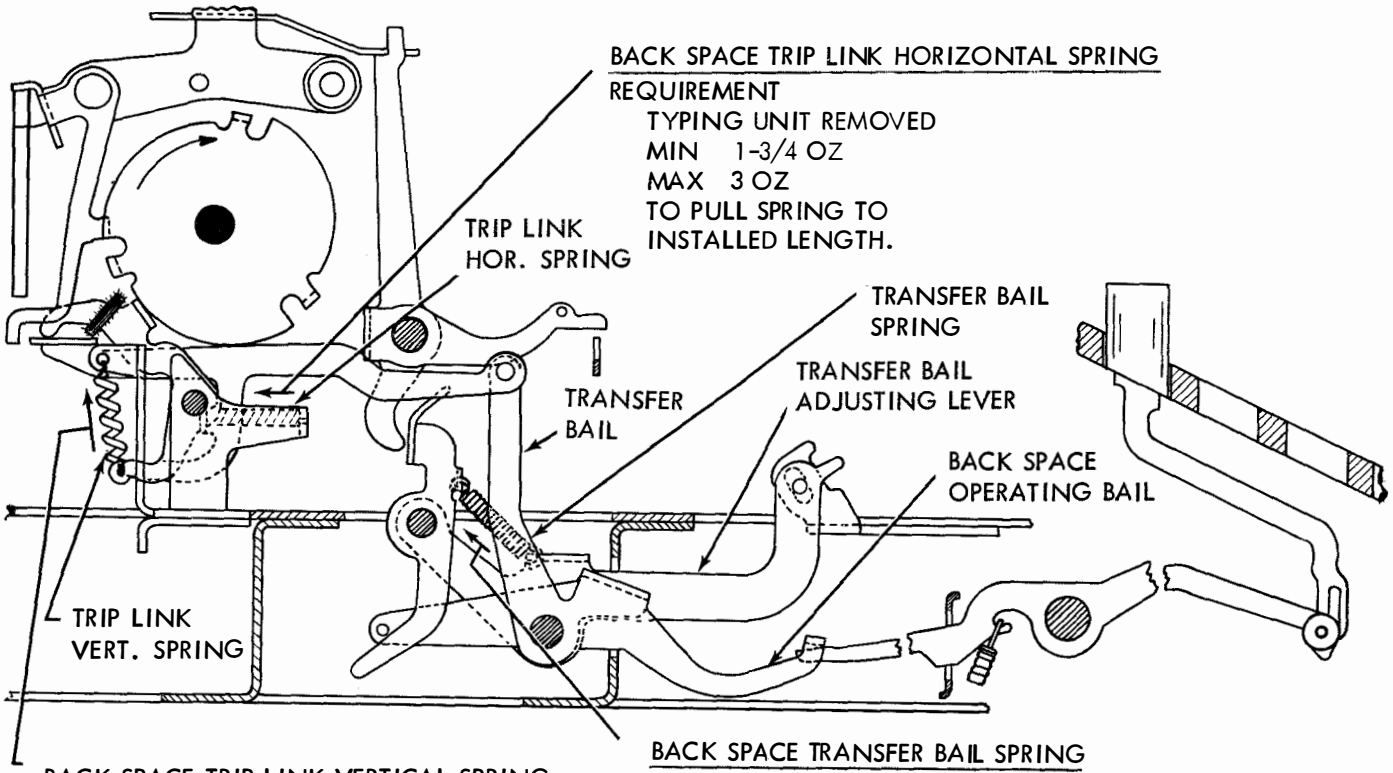
NOTE: FOR ADJUSTMENT OF EARLIER DESIGN MECHANISMS SEE PAR. 5.24

3.06 Local Paper Feed-Out Mechanism



3.07 Local Backspace Mechanism

NOTE: FOR EARLIER DESIGN SEE PAR. 5.27



3.08 Local Backspace Mechanism continued

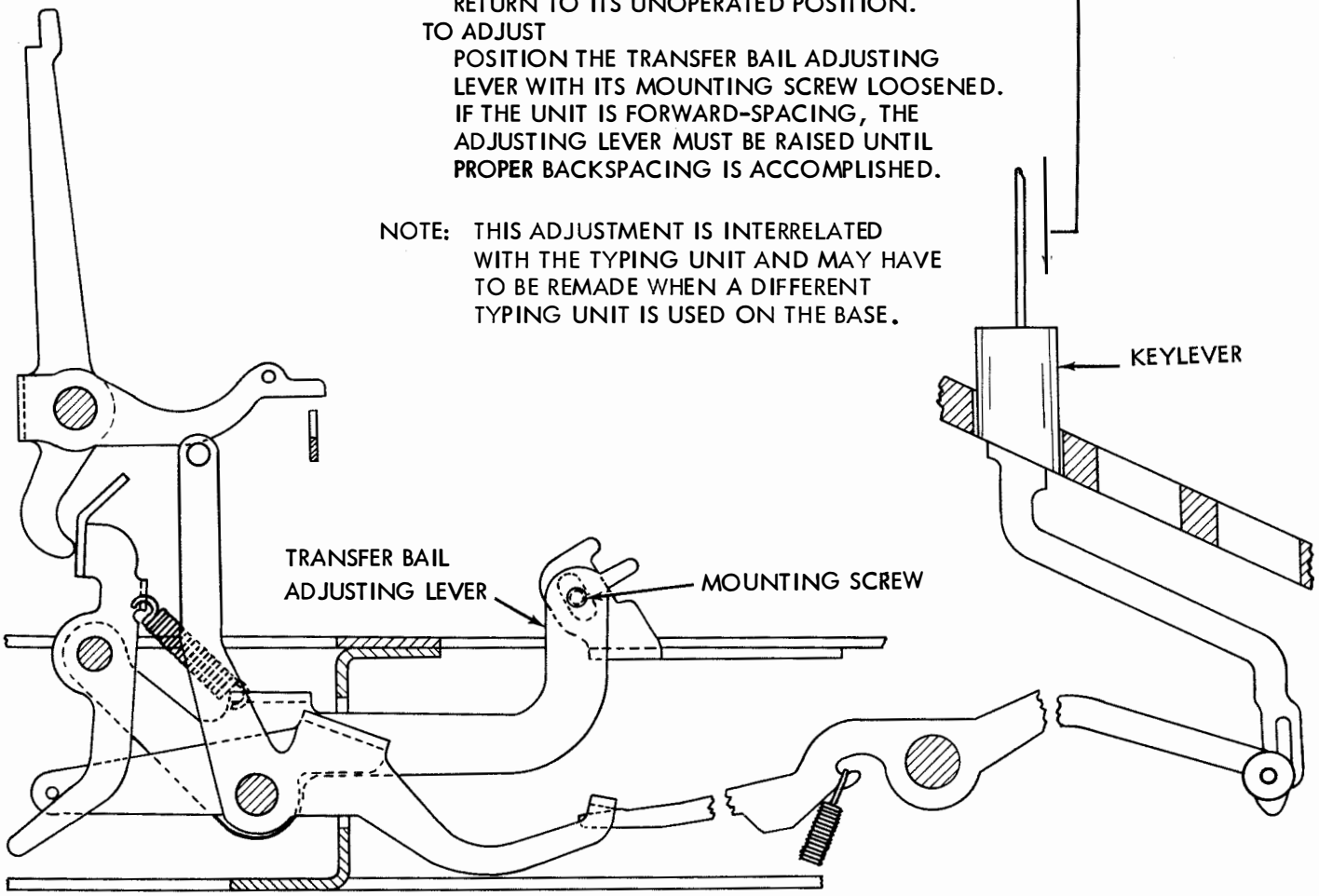
TRANSFER BAIL ADJUSTING LEVER

(1) REQUIREMENT
DOWNWARD PRESSURE OF
MIN 16 OZ
MAX 28 OZ
TO OPERATE THE BACKSPACE KEYLEVER

(2) REQUIREMENT
AFTER THE KEYLEVER IS DEPRESSED AND RELEASED THE CAMMING BAIL SHOULD RETURN TO ITS UNOPERATED POSITION.

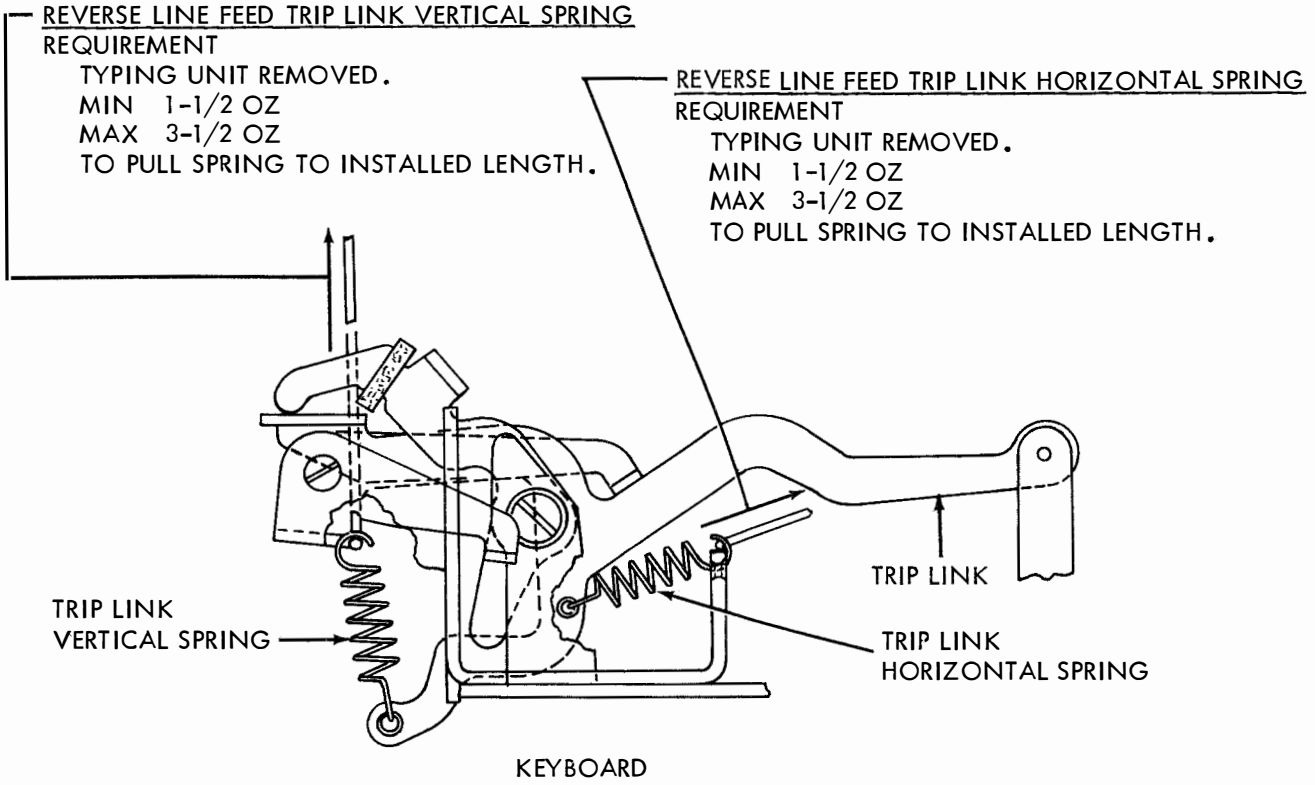
TO ADJUST
POSITION THE TRANSFER BAIL ADJUSTING LEVER WITH ITS MOUNTING SCREW LOOSENED. IF THE UNIT IS FORWARD-SPACING, THE ADJUSTING LEVER MUST BE RAISED UNTIL PROPER BACKSPACING IS ACCOMPLISHED.

NOTE: THIS ADJUSTMENT IS INTERRELATED WITH THE TYPING UNIT AND MAY HAVE TO BE REMADE WHEN A DIFFERENT TYPING UNIT IS USED ON THE BASE.

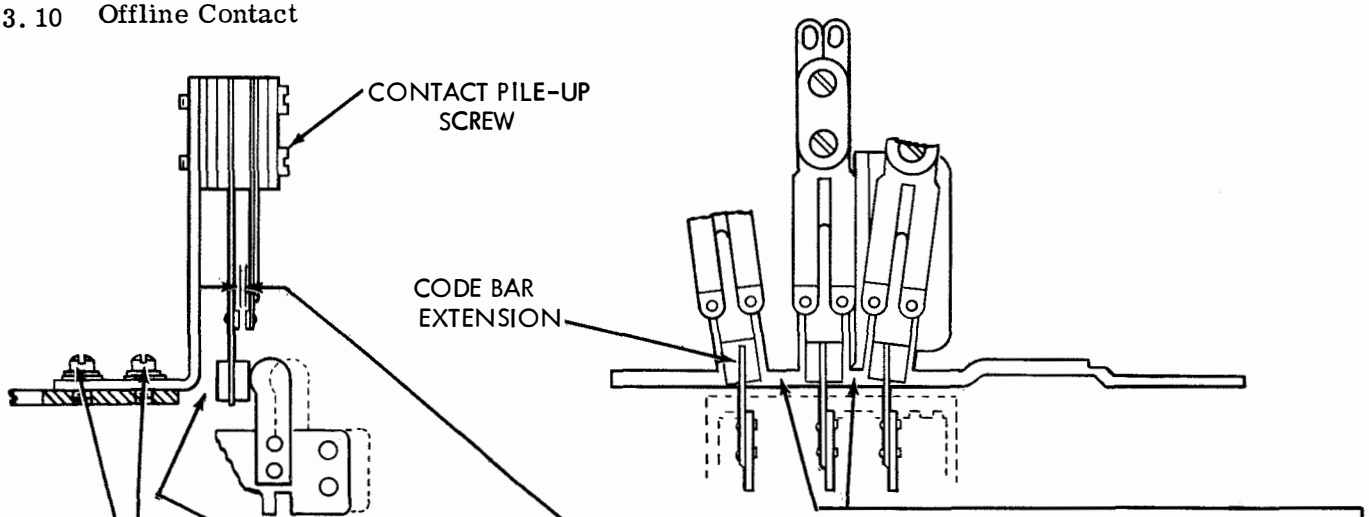


NOTE: FOR EARLIER DESIGN SEE PAR. 5.28

3.09 Reverse Line Feed Mechanism



3.10 Offline Contact



(A) CONTACT BRACKET

(1) REQUIREMENT

WITH THE GENERATOR CLUTCH LATCHED IN STOP POSITION EACH CONTACT GAP SHOULD BE

MIN 0.025 INCH
MAX 0.035 INCH

(2) REQUIREMENT

WITH THE CODE BAR RESET BAIL IN ITS EXTREME LEFT POSITION THE CLEARANCE BETWEEN THE BAKELITE INSULATOR AND CONTACT BRACKET SHOULD BE

MIN 0.015 INCH

(3) REQUIREMENT

CLEARANCE BETWEEN THE BAKELITE INSULATORS OF THE CONTACT ASSEMBLIES SHOULD BE

MIN 0.050 INCH

(4) REQUIREMENT

EACH BAKELITE INSULATOR SHOULD BE APPROXIMATELY CENTERED ON ITS RESPECTIVE CODE BAR EXTENSION

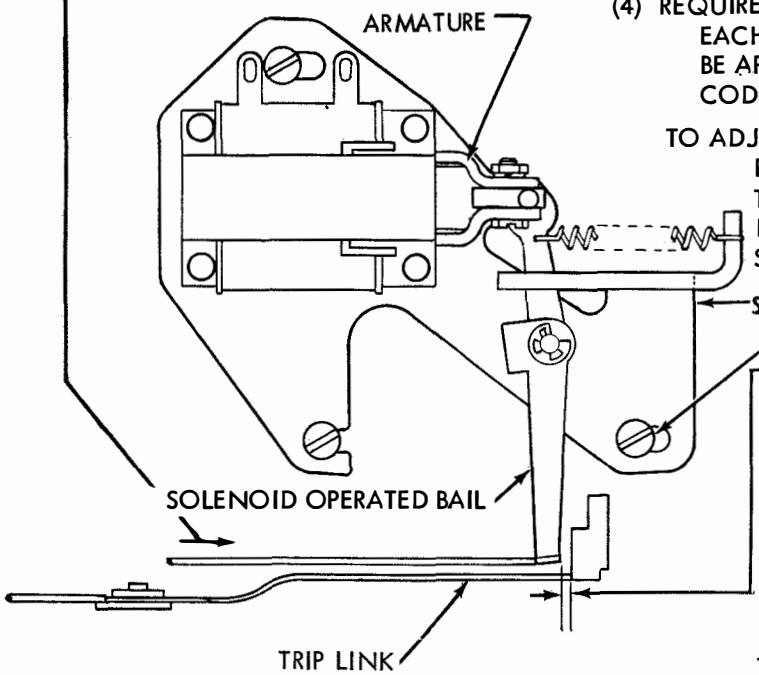
TO ADJUST

POSITION THE CONTACT BRACKETS WITH THEIR MOUNTING SCREWS LOOSENED. IF NECESSARY, LOOSEN CONTACT PILE-UP SCREWS OR BEND CONTACT SPRINGS.

(C) SOLENOID BAIL SPRING

REQUIREMENT

BACKSPACE LINK HELD AWAY
MIN 2 OZ MAX 3 OZ
TO MOVE SOLENOID ARMATURE AWAY FROM SWITCH PLUNGER.



(B)

SOLENOID MOUNTING BRACKET POSITION

REQUIREMENT

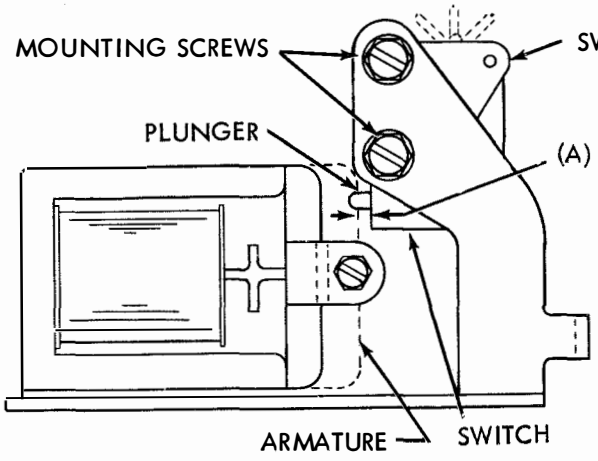
WITH THE SOLENOID ATTRACTED AND WITH 12 OZ OF PRESSURE APPLIED TO THE TRIP LINK IN A REARWARD DIRECTION THE CLEARANCE BETWEEN THE TRIP LINK AND THE SOLENOID OPERATED BAIL SHOULD BE

MIN SOME---MAX 0.010 INCH

TO ADJUST

POSITION THE SOLENOID MOUNTING BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

3. 11 Offline Contact continued



(A) SOLENOID OPERATED SWITCH PLATE POSITION

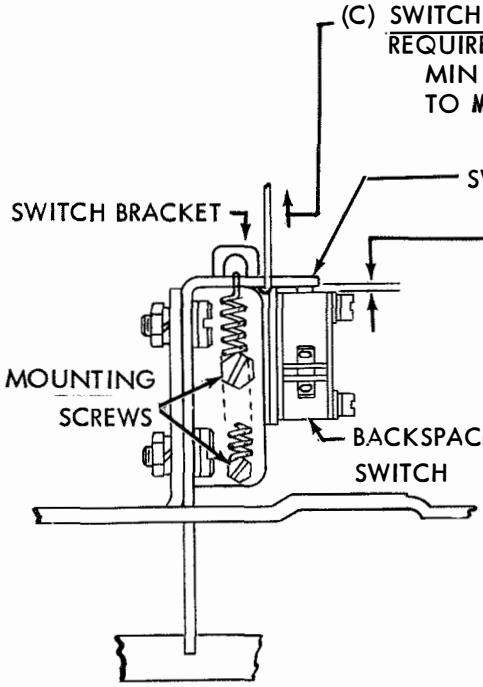
REQUIREMENT

WITH THE SOLENOID DE-ENERGIZED, THE CLEARANCE BETWEEN ARMATURE AND THE SWITCH (NOT THE PLUNGER) SHOULD BE

MIN 0.025 INCH
MAX 0.035 INCH

TO ADJUST

POSITION THE SWITCH PLATE WITH ITS MOUNTING SCREWS LOOSENED.



(C) SWITCH OPERATING LEVER SPRING

REQUIREMENT

MIN 7-1/2 OZ MAX 10-1/2 OZ
TO MOVE LEVER AWAY FROM PLUNGER.

SWITCH OPERATING LEVER

(B) BACKSPACE KEYLEVER OPERATED SWITCH POSITION

REQUIREMENT

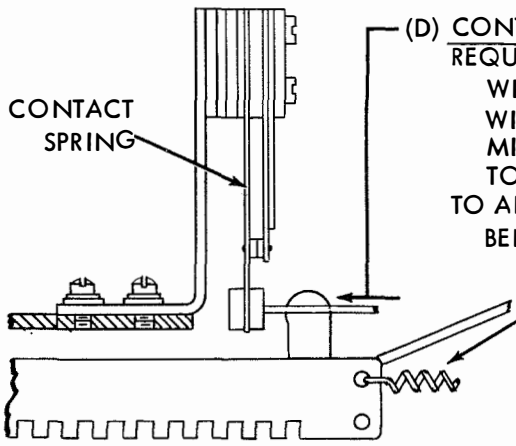
WITH THE BACKSPACE KEYLEVER IN ITS NORMAL UNOPERATED POSITION, THE CLEARANCE BETWEEN THE BACKSPACE KEYLEVER OPERATED SWITCH AND THE SWITCH OPERATING LEVER SHOULD BE

MAX 0.055 INCH

TO ADJUST

POSITION THE SWITCH BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

OPERATIONAL CHECK: WITH A TYPING UNIT ON THE BASE, AND AC POWER APPLIED (SELECTOR MAGNETS ENERGIZED), DEPRESS LOCAL BACKSPACE KEYLEVER. CUT OFF AC POWER. RELEASE THE LOCAL BACKSPACE KEYLEVER SO THAT THE BACKSPACE LINK CLEARS THE SOLENOID OPERATED BAIL EXTENSION AND LATCHES UP UNDER IT BY AT LEAST 0.010 INCH CLEARANCE. WITH AC POWER APPLIED THE BACKSPACE SOLENOID SHOULD BECOME ENERGIZED. IF NECESSARY, REFINE THE SOLENOID OPERATED SWITCH PLATE POSITION.



(D) CONTACT SPRING

REQUIREMENT

WITH CR KEYLEVER DEPRESSED CHECK FRONT CONTACT
WITH SPACE BAR DEPRESSED CHECK CENTER AND REAR CONTACTS
MIN 1 OZ MAX 2 OZ
TO OPEN CONTACTS

TO ADJUST

BEND CONTACT SPRING. IF NECESSARY REMOVE CONTACT ASSEMBLY.

(E) CODE BAR SPRING

REQUIREMENT

SPACE BAR DEPRESSED
MIN 3 OZ MAX 4 OZ
TO START EACH CODE BAR MOVING

3.12 Universal Keyboard Switch

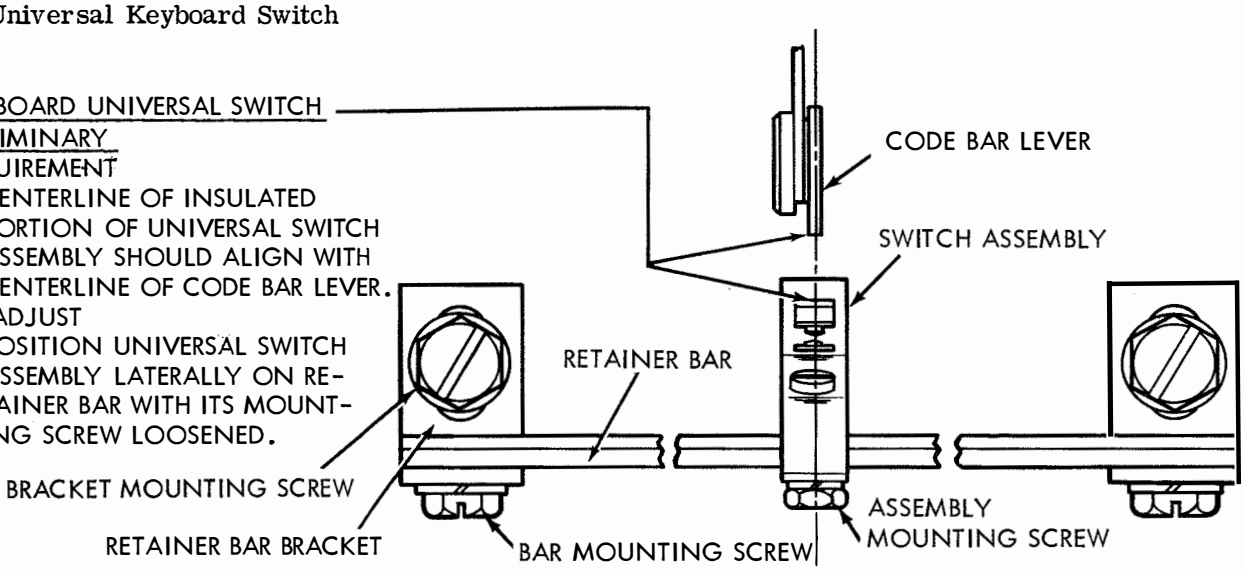
(A) KEYBOARD UNIVERSAL SWITCH

PRELIMINARY REQUIREMENT

CENTERLINE OF INSULATED PORTION OF UNIVERSAL SWITCH ASSEMBLY SHOULD ALIGN WITH CENTERLINE OF CODE BAR LEVER.

TO ADJUST

POSITION UNIVERSAL SWITCH ASSEMBLY LATERALLY ON RETAINER BAR WITH ITS MOUNTING SCREW LOOSENED.



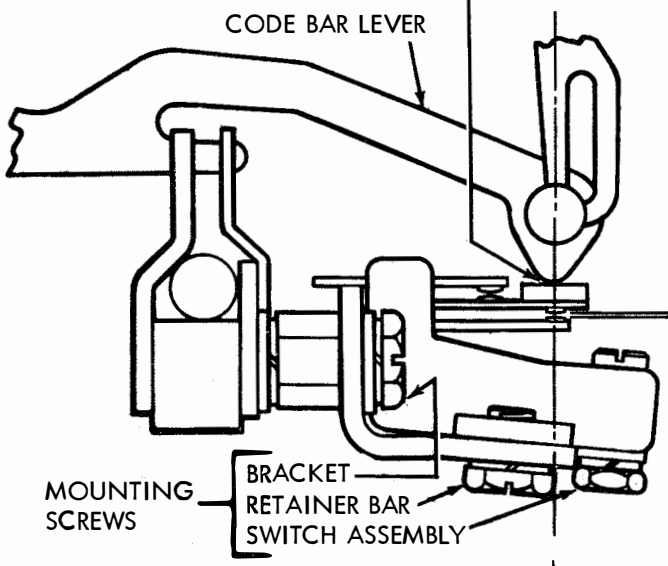
(B) KEYBOARD UNIVERSAL SWITCH - HORIZONTAL

REQUIREMENT

CENTERLINE OF INSULATED PORTION OF UNIVERSAL SWITCH ASSEMBLY SHOULD ALIGN WITH CENTERLINE OF LOWERMOST PORTION OF CODE BAR LEVER.

TO ADJUST

POSITION RETAINER BAR FORWARD OR REARWARD ON ITS BRACKETS WITH ITS MOUNTING SCREWS LOOSENED.



(C) KEYBOARD UNIVERSAL SWITCH - VERTICAL

REQUIREMENT

1. CLEARANCE BETWEEN CENTER AND LOWER CONTACT POINTS SHOULD BE MIN 0.015 INCH --- MAX 0.025 INCH

TO CHECK

PULL CONTACT FUNCTION LEVER DOWN AGAINST CODE BAR BASKET AT REAR OF BASKET AND FRONT OF CONTACT LEVER TOUCHING CENTER OF CONTACT INSULATOR

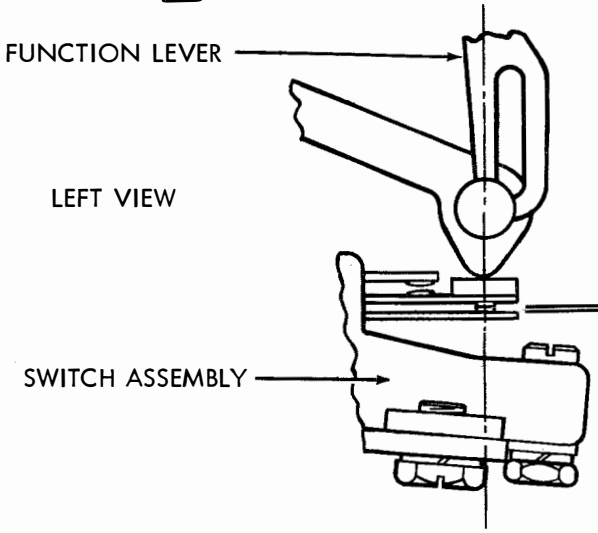
TO ADJUST

BEND UPPER CONTACT SPRING

2. CLEARANCE BETWEEN CENTER AND LOWER CONTACT POINTS SHOULD BE AT LEAST 0.010 INCH

TO CHECK

DEPRESS CONTACT OPERATING KEY WITH 16 OZ PRESSURE.



3. CENTER AND LOWER CONTACTS SHOULD CLOSE WITH SOME OVER-TRAVEL

TO CHECK

FULLY DEPRESS CONTACT OPERATING KEY

TO ADJUST

POSITION COMPLETE ASSEMBLY WITH RIGHT AND LEFT BRACKET MOUNTING SCREWS LOOSENED.

3.13 Blinding Contact (Pulsing Contact) Mechanism

NOTE: CHECK ADJUSTMENTS (A), (B), (C) BEFORE INSTALLING CONTACT ASSEMBLY ON SIGNAL GENERATOR

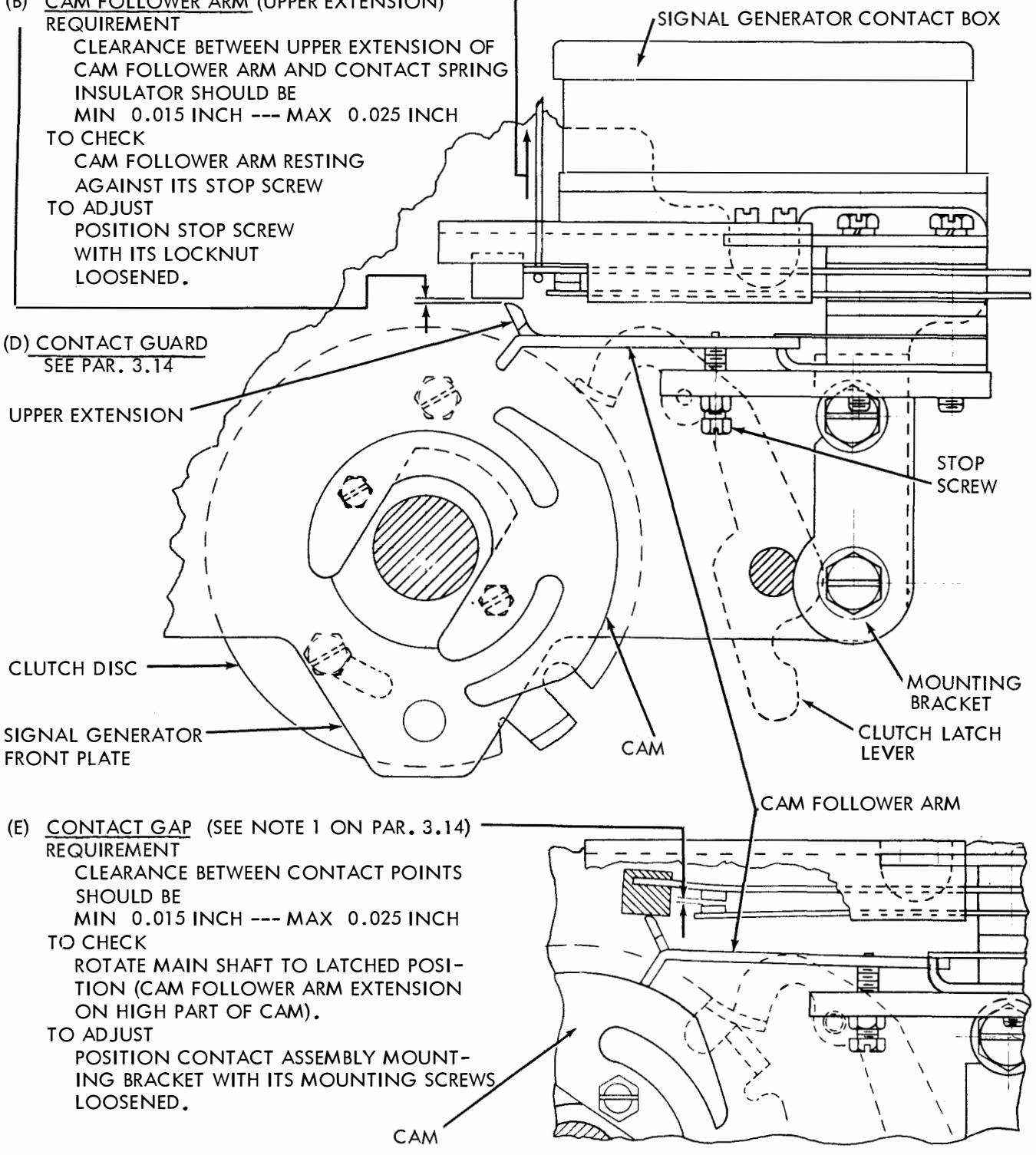
(A) CONTACT ALIGNMENT
REQUIREMENT
CONTACT SURFACES SHOULD BE REASONABLY PARALLEL TO EACH OTHER.
TO ADJUST
BEND LARGE CONTACT SPRING

(B) CAM FOLLOWER ARM (UPPER EXTENSION)
REQUIREMENT
CLEARANCE BETWEEN UPPER EXTENSION OF CAM FOLLOWER ARM AND CONTACT SPRING INSULATOR SHOULD BE
MIN 0.015 INCH --- MAX 0.025 INCH
TO CHECK
CAM FOLLOWER ARM RESTING AGAINST ITS STOP SCREW
TO ADJUST
POSITION STOP SCREW WITH ITS LOCKNUT LOOSENED.

(C) CONTACT SPRING
REQUIREMENT
MIN 3-1/2 OZ --- MAX 4-1/2 OZ
TO JUST SEPARATE THE CONTACTS
TO ADJUST
BEND LARGE CONTACT SPRING. RECHECK (A).

(D) CONTACT GUARD
SEE PAR. 3.14

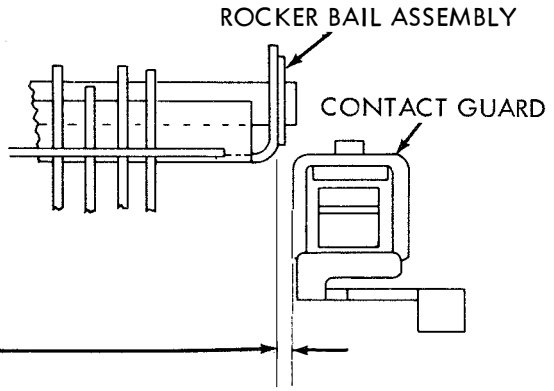
(E) CONTACT GAP (SEE NOTE 1 ON PAR. 3.14)
REQUIREMENT
CLEARANCE BETWEEN CONTACT POINTS SHOULD BE
MIN 0.015 INCH --- MAX 0.025 INCH
TO CHECK
ROTATE MAIN SHAFT TO LATCHED POSITION (CAM FOLLOWER ARM EXTENSION ON HIGH PART OF CAM).
TO ADJUST
POSITION CONTACT ASSEMBLY MOUNTING BRACKET WITH ITS MOUNTING SCREWS LOOSENED.



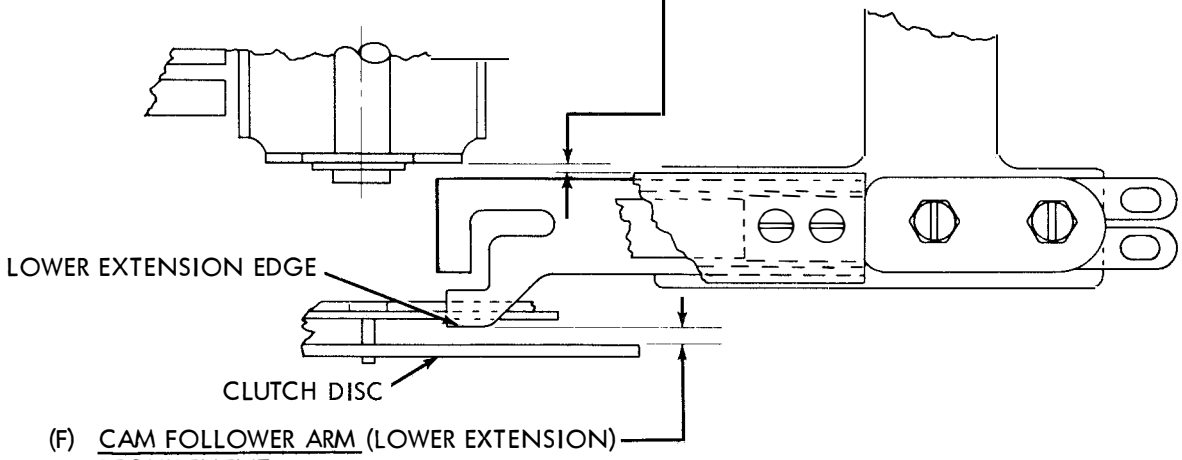
3.14 Blinding Contact (Pulsing Contact) Mechanism continued

NOTE: 1. CHECK ADJUSTMENTS (D), (E), (F) WITH CONTACT ASSEMBLY INSTALLED ON SIGNAL GENERATOR AND BEFORE INSTALLATION OF SIGNAL GENERATOR ON KEYBOARD.
2. THE BLINDING CONTACT IS NOT ADJUSTABLE TO OTHER THAN THE TIMING OF THE STOP PULSE OF THE SIGNAL GENERATOR.

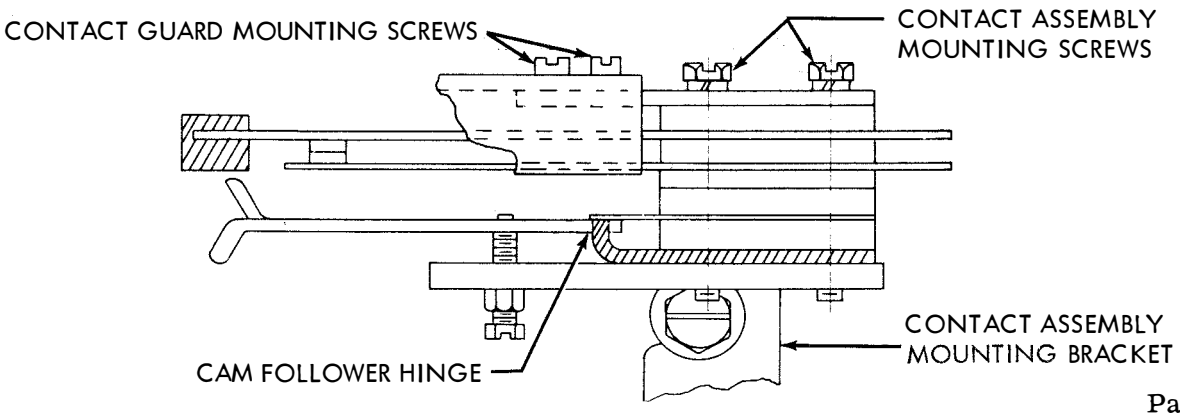
(D) CONTACT GUARD
REQUIREMENT
CLEARANCE BETWEEN CONTACT GUARD AND ROCKER BAIL ASSEMBLY SHOULD BE MIN 0.010 INCH
TO ADJUST
POSITION CONTACT ASSEMBLY WITH TWO MOUNTING SCREWS LOOSENED. MAINTAIN EQUAL CLEARANCE BETWEEN CONTACT SPRINGS AND CONTACT GUARD.



(E) CONTACT GAP
SEE PAR. 3.13



(F) CAM FOLLOWER ARM (LOWER EXTENSION)
REQUIREMENT
CLEARANCE BETWEEN LOWER EXTENSION EDGE OF CAM FOLLOWER ARM AND INSIDE SURFACE OF CLUTCH DISC SHOULD BE
MIN 0.015 INCH
TO ADJUST
POSITION CAM FOLLOWER HINGE WITH ITS TWO MOUNTING SCREWS LOOSENED.
NOTE --- ROTATE MAIN SHAFT SEVERAL TIMES AND CHECK THE ENTIRE CYCLE. MAKE SURE LOWER EXTENSION OF FOLLOWER ARM DOES NOT COME IN CONTACT WITH ADJUSTING DISC MOUNTING SCREWS.



3.15 Blinding Contact (Pulsing Contact) Mechanism continued

(G) SPECIAL REQUIREMENTS (FOLLOWING INSTALLATION OF SIGNAL GENERATOR) PROCEED TO (H) IF A DISTORTION TEST SET IS AVAILABLE

1. CONNECT INDICATOR LAMP ACROSS PULSING CONTACTS. ROTATE MAIN SHAFT UNTIL CLUTCH BECOMES LATCHED.
2. SET UP LETTERS COMBINATION AND ROTATE MAIN SHAFT SLOWLY. THE LAMP SHOULD LIGHT WHEN THE THIRD TRANSFER LEVER BEGINS TO MOVE DOWN ON THE TRANSFER BAIL (START PULSE) AND REMAIN LIT UNTIL JUST BEFORE THE SIXTH TRANSFER LEVER LATCHES UP ON THE TRANSFER BAIL (FIFTH PULSE).
3. REFINE THE ADJUSTMENTS, IF NECESSARY. CHECK THE BLINDING CYCLE WITH THE ASSOCIATED UNIT IN THE CIRCUIT WHILE OPERATING UNDER MOTOR POWER.

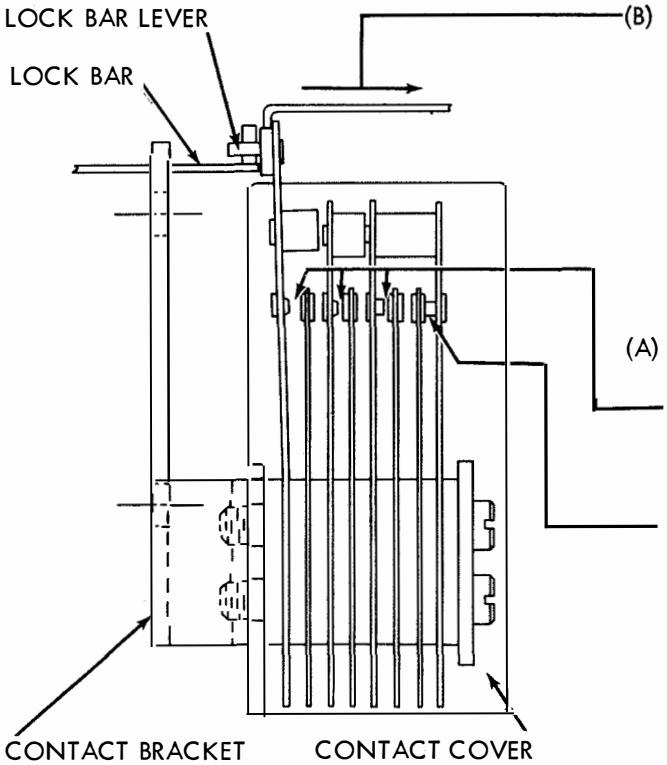
(H) STROBE REQUIREMENTS (FOLLOWING INSTALLATION OF SIGNAL GENERATOR) IF A DISTORTION TEST SET IS AVAILABLE.

SET UP "LETTERS" CODE COMBINATION AND ORIENT SCALE OF TEST SET WITH SIGNAL. INTRODUCE THE BLINDING CONTACT INTO THE CIRCUIT (CONTINUE TO TRANSMIT "LETTERS" CODE COMBINATION) AND ADJUST BLINDING CONTACT TO OBTAIN THE FOLLOWING RESULTS:

a. BLINDING CONTACT SHOULD CLOSE BEFORE BEGINNING OF START PULSE AND REMAIN CLOSED TILL AFTER END OF 5TH PULSE.

b. SLIGHT BREAKS (1 OR 2 DIVISIONS) ARE PERMISSIBLE AT EACH END OF BLINDING PULSE. NONE ARE PERMISSIBLE IN THE GENERAL BLINDING SCALE RANGE.

3.16 Lockbar Contacts (Electrical Send-Receive Break Mechanism)



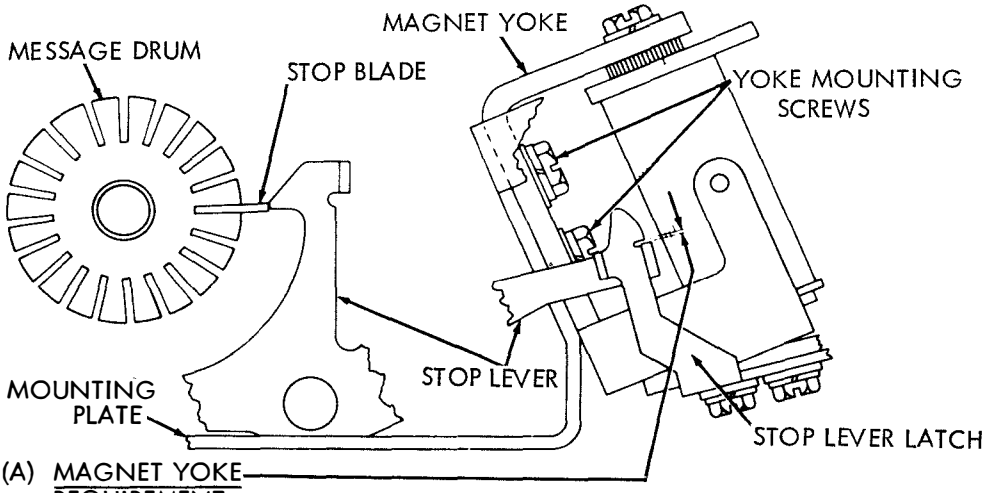
BOTTOM VIEW
(LOCK BAR IN "REC" POSITION)

(B) LOCK BAR CONTACT TENSION
REQUIREMENT
MIN 10 OZ --- MAX 15 OZ
TO START CONTACT SWINGER MOVING
TO CHECK ---
LATCH THE LOCK BAR ("SEND" KEY DEPRESSED AND RELEASED)
TO ADJUST
BEND CONTACT SPRINGS. RECHECK ADJUSTMENT (A)

(A) LOCK BAR CONTACTS
REQUIREMENT
1. GAP BETWEEN NORMALLY OPEN CONTACTS SHOULD BE
MIN 0.008 INCH --- MAX 0.012 INCH
TO CHECK --- DEPRESS "REC" KEY
2. GAP BETWEEN NORMALLY CLOSED CONTACTS SHOULD BE
MIN 0.008 INCH --- MAX 0.012 INCH
TO CHECK --- DEPRESS "SEND" KEY AND RELEASE
3. ALL CONTACTS SHOULD CLOSE WITH A SMALL AMOUNT OF OVERTRAVEL
TO ADJUST
BEND CONTACT SPRINGS USING CONTACT BENDING TOOL. AVOID DISTORTING THE CONTACT SPRINGS

3.17 Answer-Back Mechanism (Switched Circuit Network)
Keyboards LK6 and Up (Bell 28D and Up) "FIGS" "C"

NOTE: ADJUSTMENTS ON THIS PAGE SHOULD BE MADE WITH THE ANSWER-BACK MECHANISM REMOVED FROM THE KEYBOARD.

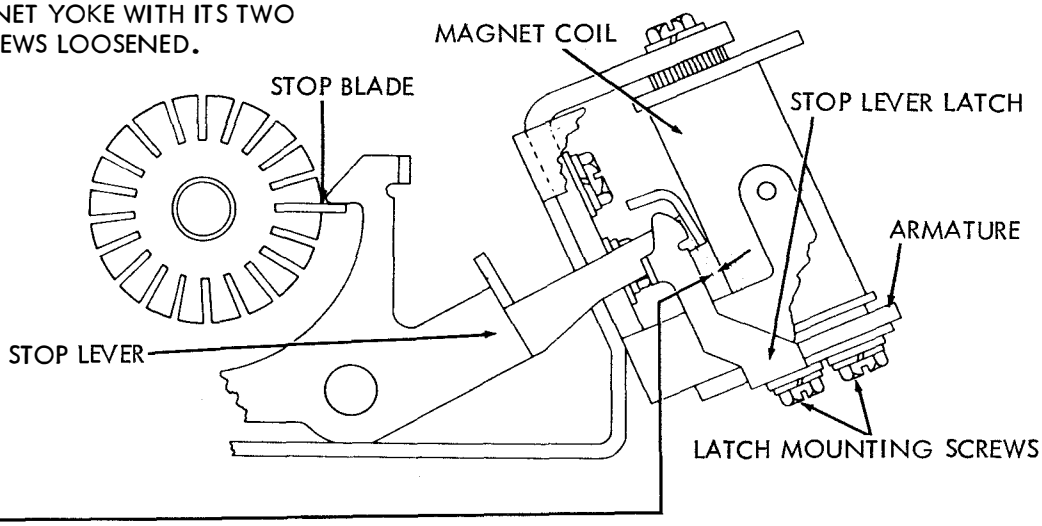


(A) MAGNET YOKE
REQUIREMENT
CLEARANCE BETWEEN LATCHING SURFACES OF STOP LEVER EXTENSION AND STOP LEVER LATCH SHOULD BE
MIN 0.005 INCH
MAX 0.015 INCH

TO CHECK
HOLD TIP OF STOP LEVER AGAINST STOP BLADE.

TO ADJUST
POSITION MAGNET YOKE WITH ITS TWO MOUNTING SCREWS LOOSENED.

FOR "HERE-IS" KEYLEVER SWITCH REQUIREMENTS SEE KEYBOARD UNIVERSAL SWITCH ADJUSTMENTS, PAR. 3.12. FOR PULSING CONTACT REQUIREMENT, SEE BLINDING CONTACT ADJUSTMENTS, PAR. 3.13 THROUGH 3.16.



(B) STOP LEVER LATCH
(1) REQUIREMENT
CLEARANCE BETWEEN STOP LEVER AND STOP LEVER LATCH SHOULD BE
MIN 0.002 INCH---MAX 0.007 INCH

TO CHECK
HOLD ARMATURE AGAINST THE MAGNET CORE AND THE STOP LEVER IN ITS MAXIMUM COUNTER-CLOCKWISE POSITION.

(2) REQUIREMENT
CLEARANCE BETWEEN STOP LEVER AND STOP LEVER LATCH THROUGHOUT A COMPLETE TRAVEL OF THE STOP LEVER---MIN 0.002 INCH

TO CHECK---HOLD ARMATURE AGAINST MAGNET CORE.

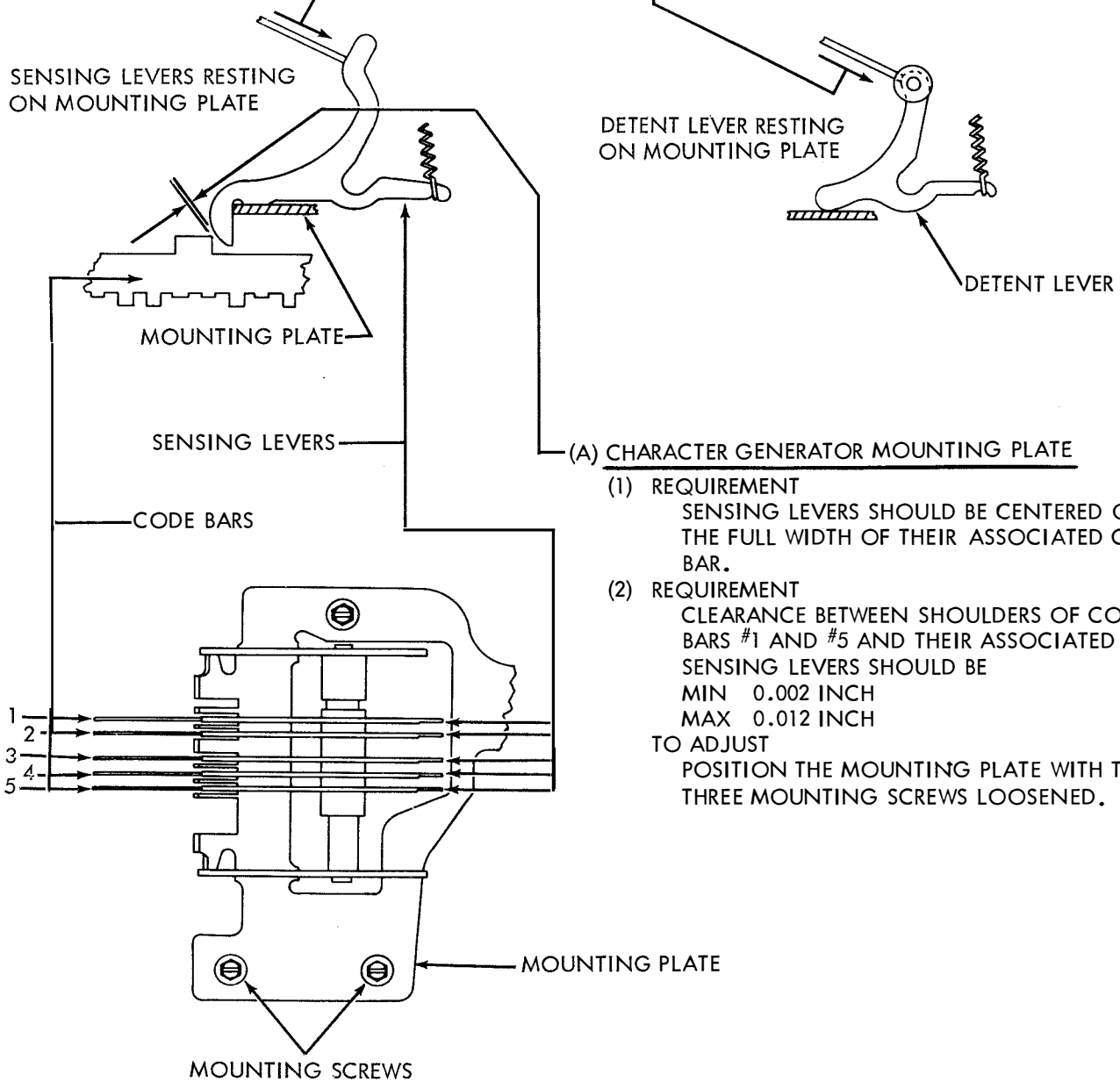
TO ADJUST---POSITION STOP LEVER LATCH WITH ITS TWO MOUNTING SCREWS LOOSENED.

3.18 Answer-Back Mechanism (Switched Circuit Network)
Keyboards LK6 and Up (Bell 28D and Up) "FIGS" "C" continued

NOTE: TO FACILITATE MAKING THIS ADJUSTMENT, REMOVE MESSAGE DRUM AND DRIVE PLATE ASSEMBLY FROM MECHANISM.

(B) SENSING LEVER SPRINGS
REQUIREMENT
WITH THE SIGNAL GENERATOR CLUTCH IN STOP POSITION AND THE MESSAGE DRUM REMOVED IT SHOULD REQUIRE
MIN 1/4 OUNCE
MAX 1-1/4 OUNCES
TO START EACH SENSING LEVER MOVING.

(C) DETENT LEVER SPRING
REQUIREMENT
WITH THE SIGNAL GENERATOR CLUTCH IN STOP POSITION AND THE MESSAGE DRUM REMOVED, IT SHOULD REQUIRE
MIN 22 OUNCES
MAX 26 OUNCES
TO START THE DETENT LEVER MOVING.



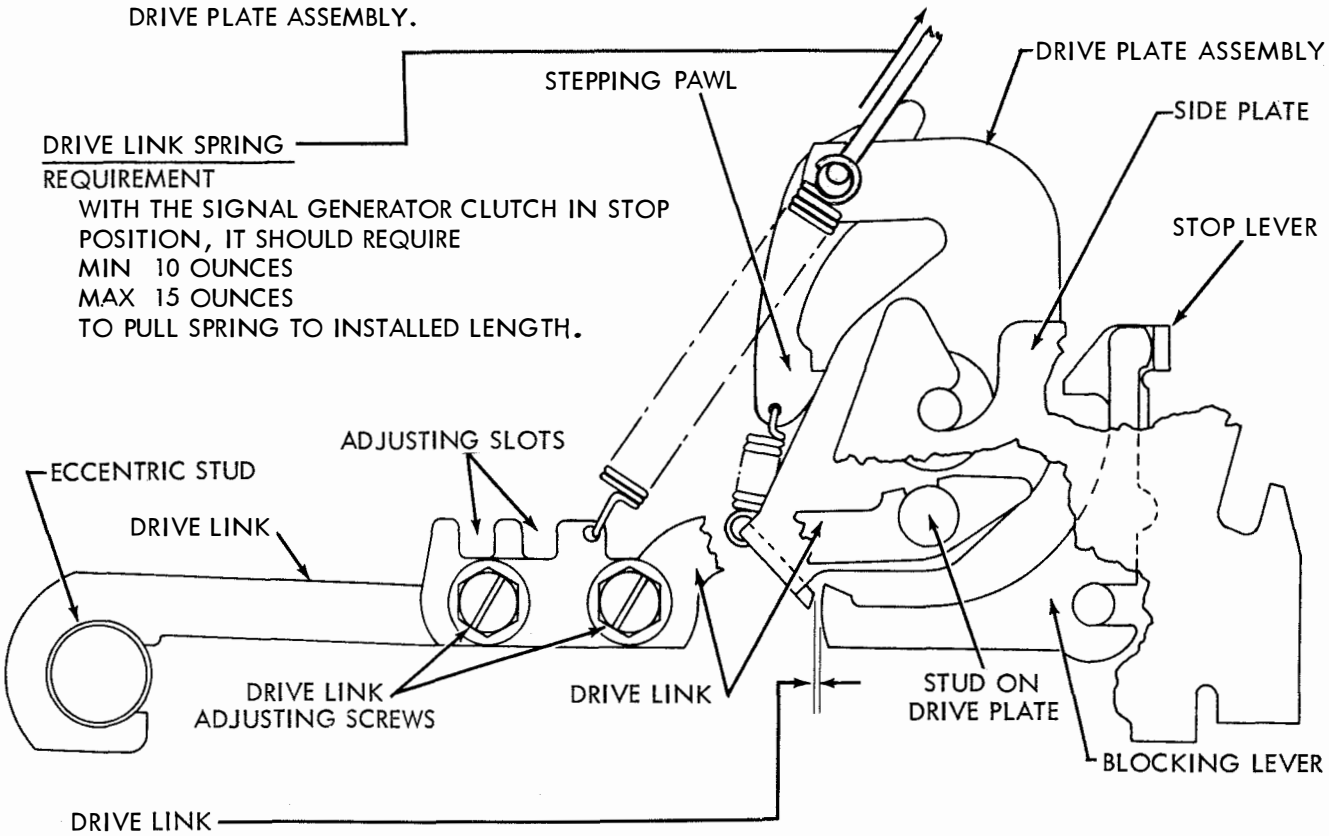
(A) CHARACTER GENERATOR MOUNTING PLATE

(1) REQUIREMENT
SENSING LEVERS SHOULD BE CENTERED ON THE FULL WIDTH OF THEIR ASSOCIATED CODE BAR.

(2) REQUIREMENT
CLEARANCE BETWEEN SHOULDERS OF CODE BARS #1 AND #5 AND THEIR ASSOCIATED SENSING LEVERS SHOULD BE
MIN 0.002 INCH
MAX 0.012 INCH
TO ADJUST
POSITION THE MOUNTING PLATE WITH THE THREE MOUNTING SCREWS LOOSENED.

3. 19 Answer-Back Mechanism (Switched Circuit Network)
Keyboards LK6 and Up (Bell 28D and Up) "FIGS" "C" continued

PERFORM THIS ADJUSTMENT BEFORE FINAL INSTALLATION OF MESSAGE DRUM AND DRIVE PLATE ASSEMBLY.



DRIVE LINK SPRING
REQUIREMENT
WITH THE SIGNAL GENERATOR CLUTCH IN STOP POSITION, IT SHOULD REQUIRE
MIN 10 OUNCES
MAX 15 OUNCES
TO PULL SPRING TO INSTALLED LENGTH.

DRIVE LINK
REQUIREMENT
CLEARANCE BETWEEN DRIVE PLATE EXTENSION AND BLOCKING LEVER SHOULD BE
MIN 0.002 INCH
MAX 0.007 INCH
TO CHECK
SIGNAL GENERATOR CAM ECCENTRIC AND ARM HOLDING CODE BAR BAIL IN EXTREME RESET POSITION TO THE LEFT.
TO ADJUST
LOOSEN THE TWO ADJUSTING SCREWS AND POSITION THE TWO DRIVE LINKS BY MEANS OF THE ADJUSTING SLOTS.

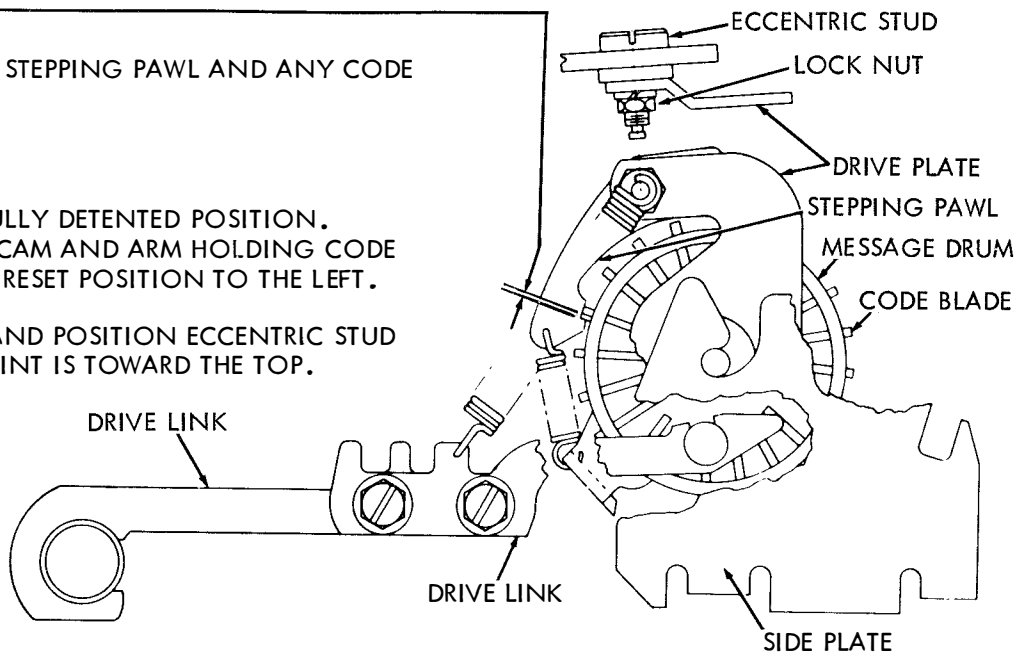
NOTE THE STANDARD KEYBOARD ADJUSTMENTS LISTED BELOW SHOULD BE CHECKED DURING INSTALLATION OF THE ANSWER-BACK MECHANISM.

A. CODE BAR AND CODE LEVER CLEARANCE, PAR. 2.05 .
B. CODE BAR BAIL - PAR. 2.08 . REFINE THIS ADJUSTMENT TO 0.004 TO 0.006 INCH.
C. CODE BAR BAIL AND NON REPEAT LEVER CLEARANCE, PAR. 2.08.
D. UNIVERSAL BAIL LATCH LEVER, PAR. 2.10.
E. UNIVERSAL BAIL EXTENSION, PAR. 2.10.

3.20 Answer-Back Mechanism (Switched Circuit Network)
Keyboards LK6 and Up (Bell 28D and Up) "FIGS" "C" continued

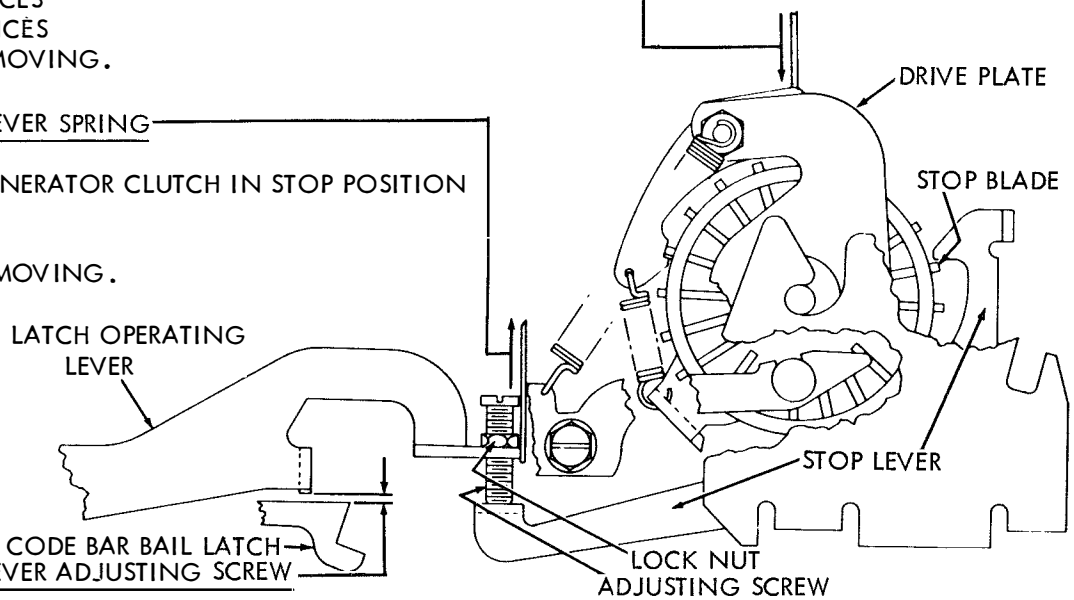
THE FOLLOWING FINAL ADJUSTMENTS FOR ANSWER-BACK MECHANISM SHOULD BE MADE AFTER INSTALLATION OF THE MECHANISM ON THE KEYBOARD.

STEPPING PAWL
REQUIREMENT
CLEARANCE BETWEEN STEPPING PAWL AND ANY CODE BLADE SHOULD BE
MIN 0.018 INCH
MAX 0.030 INCH
TO CHECK
MESSAGE DRUM IN FULLY DETENTED POSITION. SIGNAL GENERATOR CAM AND ARM HOLDING CODE BAR BAIL IN EXTREME RESET POSITION TO THE LEFT.
TO ADJUST
LOOSEN LOCK NUT AND POSITION ECCENTRIC STUD SO THAT ITS HIGH POINT IS TOWARD THE TOP.



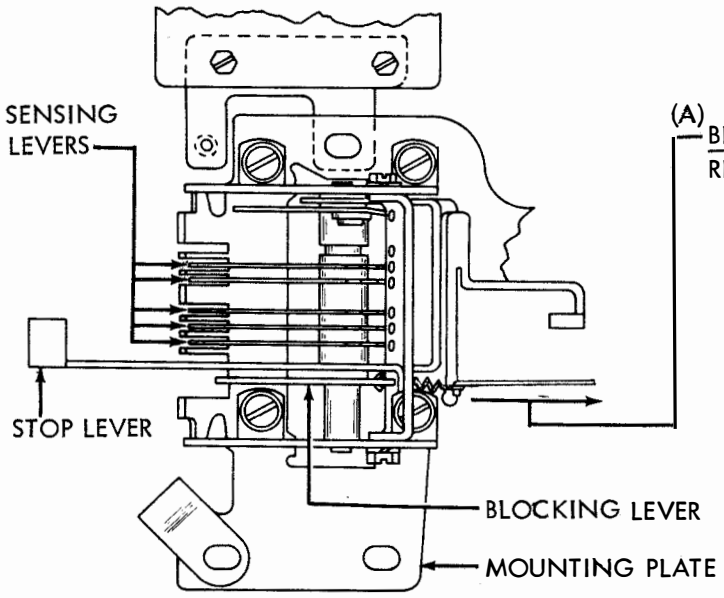
STEPPING PAWL SPRING
REQUIREMENT
WITH SIGNAL GENERATOR CLUTCH IN STOP POSITION
MIN 2-1/2 OUNCES
MAX 3-1/2 OUNCES
TO START PAWL MOVING.

LATCH OPERATING LEVER SPRING
REQUIREMENT
WITH SIGNAL GENERATOR CLUTCH IN STOP POSITION
MIN 5 OUNCES
MAX 6 OUNCES
TO START LEVER MOVING.



LATCH OPERATING LEVER ADJUSTING SCREW
REQUIREMENT
CLEARANCE BETWEEN EXTENSION ON LATCH OPERATING LEVER AND CODE BAR BAIL LATCH SHOULD BE
MIN 0.005 INCH --- MAX 0.015 INCH
TO CHECK
SIGNAL GENERATOR CLUTCH FULLY DISENGAGED. STOP LEVER LATCHED ON MAGNET ARMATURE LATCH.
TO ADJUST
WITH LOCK NUT LOOSENED, POSITION LATCH OPERATING ADJUSTING SCREW.

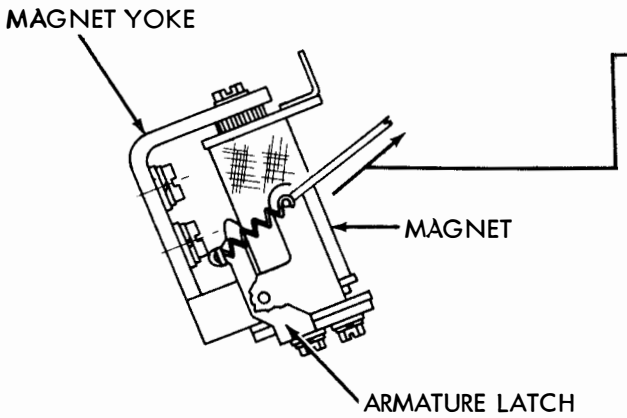
3.21 Answer-Back Mechanism (Switched Circuit Network)
Keyboards LK6 and Up (Bell 28D and Up) "FIGS" "C" continued



(A) BLOCKING LEVER SPRING

REQUIREMENT

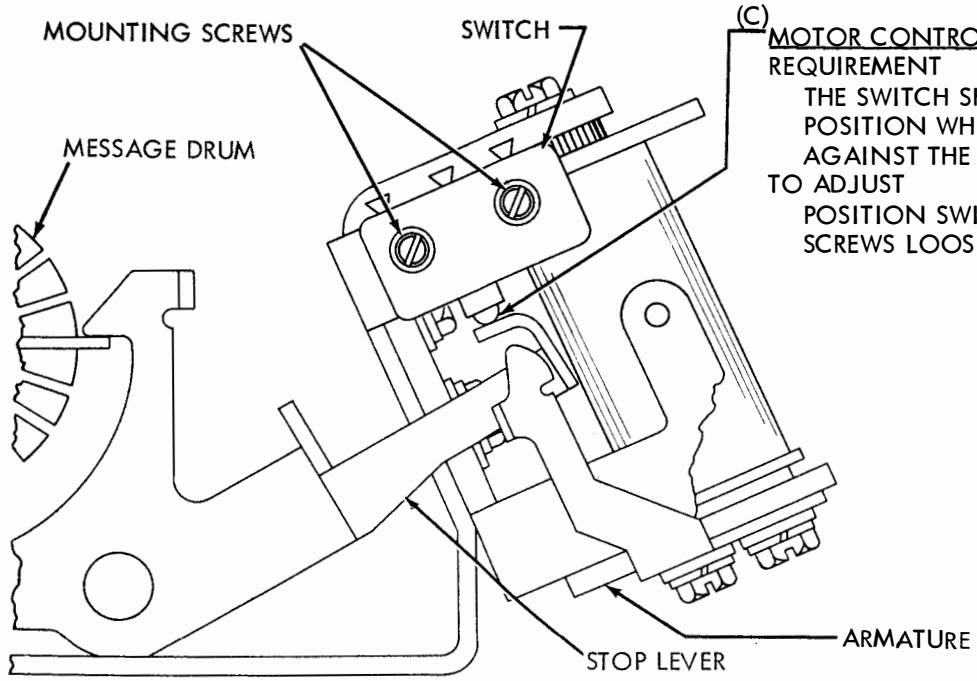
WITH SIGNAL GENERATOR CLUTCH IN STOP POSITION, UNHOOK BLOCKING LEVER SPRING FROM STOP LEVER.
MIN 1 OUNCE
MAX 2 OUNCES
TO PULL SPRING TO INSTALLED LENGTH



(B) ARMATURE LATCH SPRING

REQUIREMENT

WITH SIGNAL GENERATOR CLUTCH IN STOP POSITION, UNHOOK ARMATURE LATCH SPRING FROM SPRING POST ON MAGNET YOKE.
MIN 2 OUNCES
MAX 4 OUNCES
TO PULL SPRING TO INSTALLED LENGTH.



(C) MOTOR CONTROL RELAY SWITCH

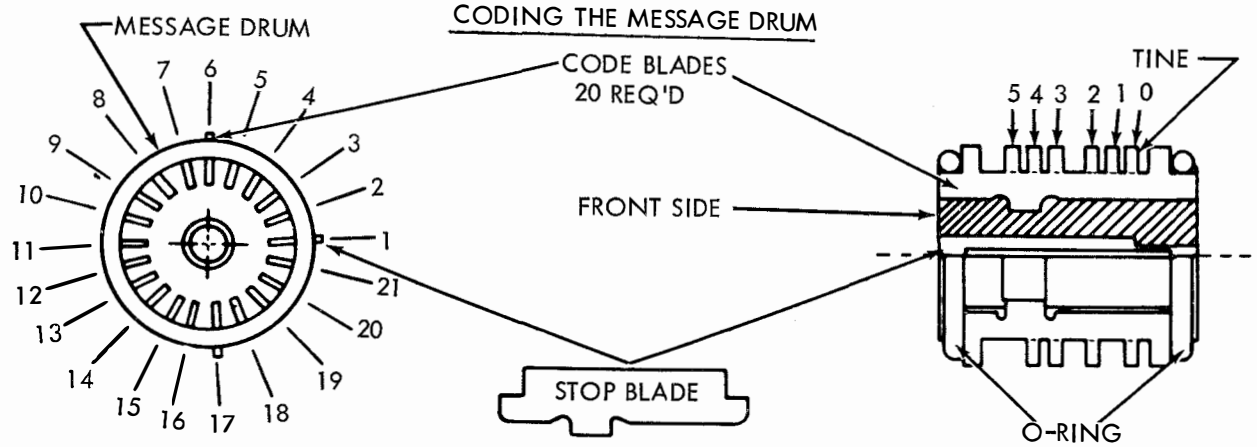
REQUIREMENT

THE SWITCH SHOULD BE IN ITS OPERATED POSITION WHEN THE ARMATURE IS HELD AGAINST THE MAGNET CORE.

TO ADJUST

POSITION SWITCH WITH ITS MOUNTING SCREWS LOOSENED.

3.22 Answer-Back Mechanism (Switched Circuit Network)
Keyboards LK6 and Up (Bell 28D and Up) "FIGS" "C" continued



1. REMOVE MESSAGE DRUM FROM ANSWER-BACK ASSEMBLY AND TAKE OUT CODE BLADES AS FOLLOWS: REMOVE DRIVE LINK SPRING ALLOWING DRIVE LINK TO DROP OUT OF ENGAGEMENT WITH STUD ON DRIVE PLATE. LIFT MESSAGE DRUM FROM NOTCHES. DEPRESS STEPPING PAWL EXTENSION AND PULL DRUM OFF SHAFT. REMOVE "O" RING FROM ONE END OF DRUM AND TAKE OUT TWENTY CODE BLADES. IT IS NOT NECESSARY TO TAKE OUT STOP BLADE. (REFER TO PARTS BULLETIN 1149B).
2. CODE A BLADE BY BREAKING OFF UNWANTED TINES AT SCORED LINE AT BASE OF EACH TINE. THE FIGURE BELOW INDICATES TINES TO BE REMOVED FOR A PARTICULAR CHARACTER. HOLD EACH BLADE SECURELY NEAR SCORE MARK OF TINE TO BE REMOVED. IN STANDARD 5 LEVEL OPERATION, THE O CODE LEVEL TINE IS DISREGARDED.

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	1	■	■	□	□	□
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		□	□	□	□	□

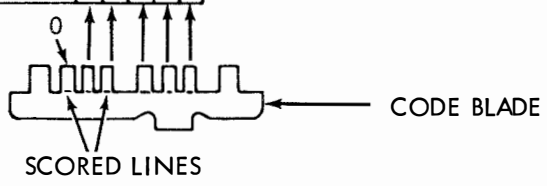
3. CODE THE DRUM IN A COUNTER-CLOCKWISE DIRECTION STARTING WITH NO. 2 CODE BLADE (ADJACENT TO STOP BLADE). BEGIN MESSAGE WITH "LETTERS" (STOP BLADE) FOLLOWED BY "CARRIAGE RETURN" AND "LINE FEED". END MESSAGE WITH "CARRIAGE RETURN" AND "LINE FEED". THIS LEAVES 16 CHARACTERS AVAILABLE FOR MESSAGE PROPER. CODE ANY UNUSED CHARACTERS WITH "LETTERS" OR "BLANKS", SINCE EACH SLOT POSITION IN DRUM MUST BE OCCUPIED BY A CODE BLADE.

4. INSTALL CODED BLADES IN PROPER SLOTS IN DRUM - INSERT END OF BLADE UNDER REMAINING "O" RING AND ROTATE THE BLADE TOWARD CENTER OF DRUM UNTIL IT IS FULLY SEATED. WHEN ALL THE SLOTS ARE FILLED REPLACE "O" RING REMOVED IN 1. ABOVE

5. APPLY GREASE TO SHAFT OF MESSAGE DRUM. REASSEMBLE MECHANISM REVERSING PROCEDURE OF STEP 1. BE SURE PARTS ARE PROPERLY SEATED. LUBRICATE PER INSTRUCTION IN APPROPRIATE SECTION.

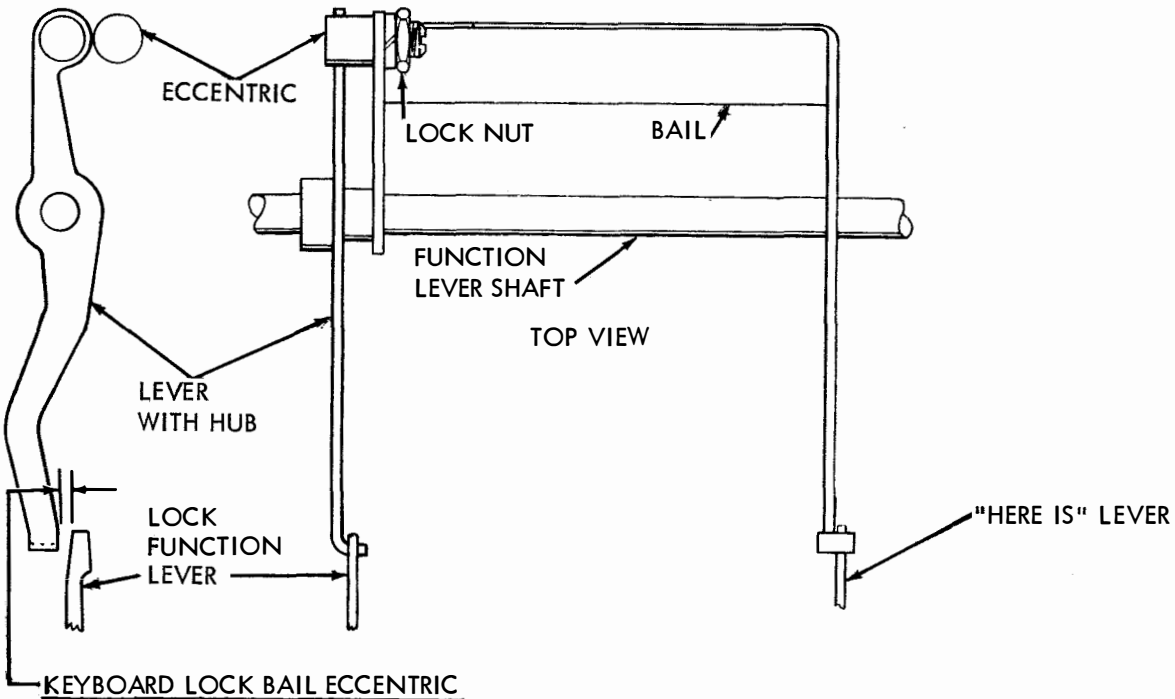
■ — LEAVE TINE

□ — REMOVE TINE



3.23 Answer-Back Mechanism Keyboards LK6 and Up (Bell 28D and Up) "FIGS" "D"

NOTE: ADJUSTMENT REQUIREMENTS FOR "FIGS" "D" ANSWER-BACK OPERATION ARE IDENTICAL TO REQUIREMENTS FOR "FIG" "C" OPERATION (SEE PAR. 3.17 THROUGH 3.23) EXCEPT FOR THE ADDITIONAL ADJUSTMENT GIVEN BELOW.



KEYBOARD LOCK BAIL ECCENTRIC

REQUIREMENT

CLEARANCE BETWEEN KEYBOARD LOCK LEVER W/HUB AND KEYBOARD LOCK FUNCTION LEVER SHOULD BE

MIN SOME --- MAX 0.006 INCH

TO CHECK

FULLY DEPRESS BOTH "KYBD LOCK" AND "HERE IS" KEYS (HOLD LIGHTLY).

TO ADJUST

LOOSEN LOCK NUT AND POSITION ECCENTRIC WITH ITS HIGH POINT TOWARD FRONT OF KEYBOARD.

3.24 Variable Speed Drive Mechanism

(C) GEAR BRACKET

1. REQUIREMENT

BACKLASH BETWEEN TYPING UNIT DRIVEN GEAR AND TYPING UNIT DRIVING GEAR SHOULD BE MIN 0.002 INCH---MAX 0.006 INCH AT POINT WHERE BACKLASH IS LEAST.

TO CHECK

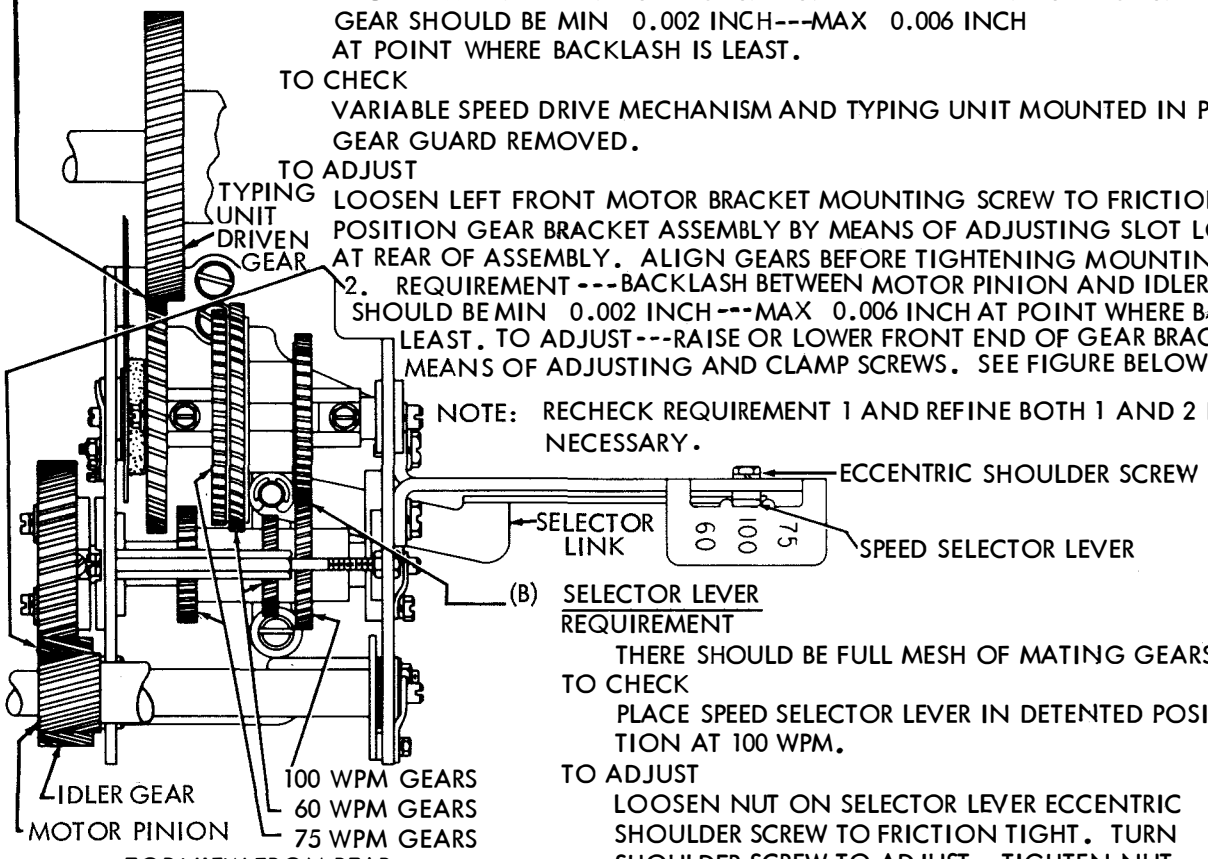
VARIABLE SPEED DRIVE MECHANISM AND TYPING UNIT MOUNTED IN PLACE AND GEAR GUARD REMOVED.

TO ADJUST

LOOSEN LEFT FRONT MOTOR BRACKET MOUNTING SCREW TO FRICTION TIGHT. POSITION GEAR BRACKET ASSEMBLY BY MEANS OF ADJUSTING SLOT LOCATED AT REAR OF ASSEMBLY. ALIGN GEARS BEFORE TIGHTENING MOUNTING SCREWS.

2. REQUIREMENT---BACKLASH BETWEEN MOTOR PINION AND IDLER GEAR SHOULD BE MIN 0.002 INCH---MAX 0.006 INCH AT POINT WHERE BACKLASH IS LEAST. TO ADJUST---RAISE OR LOWER FRONT END OF GEAR BRACKET BY MEANS OF ADJUSTING AND CLAMP SCREWS. SEE FIGURE BELOW

NOTE: RECHECK REQUIREMENT 1 AND REFINE BOTH 1 AND 2 IF NECESSARY.



(B) SELECTOR LEVER

REQUIREMENT

THERE SHOULD BE FULL MESH OF MATING GEARS.

TO CHECK

PLACE SPEED SELECTOR LEVER IN DETENTED POSITION AT 100 WPM.

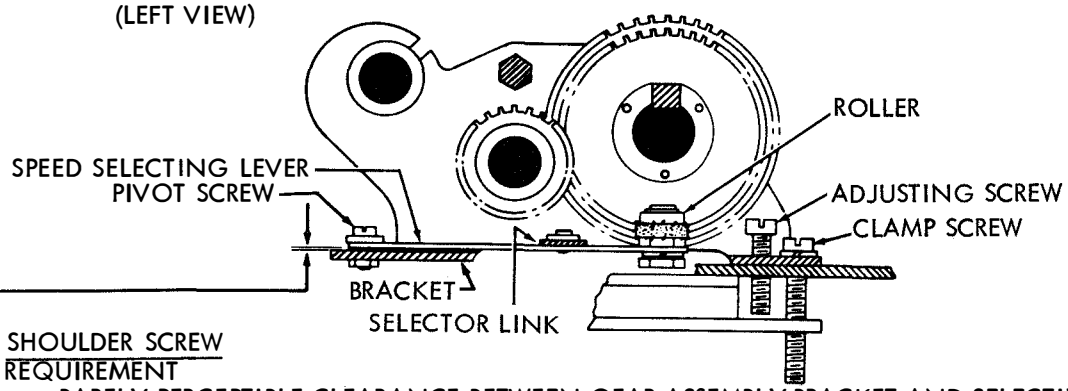
TO ADJUST

LOOSEN NUT ON SELECTOR LEVER ECCENTRIC SHOULDER SCREW TO FRICTION TIGHT. TURN SHOULDER SCREW TO ADJUST. TIGHTEN NUT AND RE-CHECK ALIGNMENT.

NOTE - KEEP ECCENTRIC PART OF SCREW BELOW HORIZONTAL CENTER LINE.

PERFORM ADJUSTMENT (A) AND (B) BEFORE INSTALLATION OF DRIVE ASSEMBLY.

SECTION THROUGH SPEED SELECTING LEVER (LEFT VIEW)



(A) SHOULDER SCREW

REQUIREMENT

BARELY PERCEPTIBLE CLEARANCE BETWEEN GEAR ASSEMBLY BRACKET AND SELECTING LEVER AT SHOULDER SCREW PIVOT.

TO ADJUST

TIGHTEN SHOULDER SCREW TO FRICTION TIGHT AND THEN LOOSEN 1/8 TURN. TIGHTEN THE LOCK NUT.

3.25 Variable Speed Drive Mechanism continued

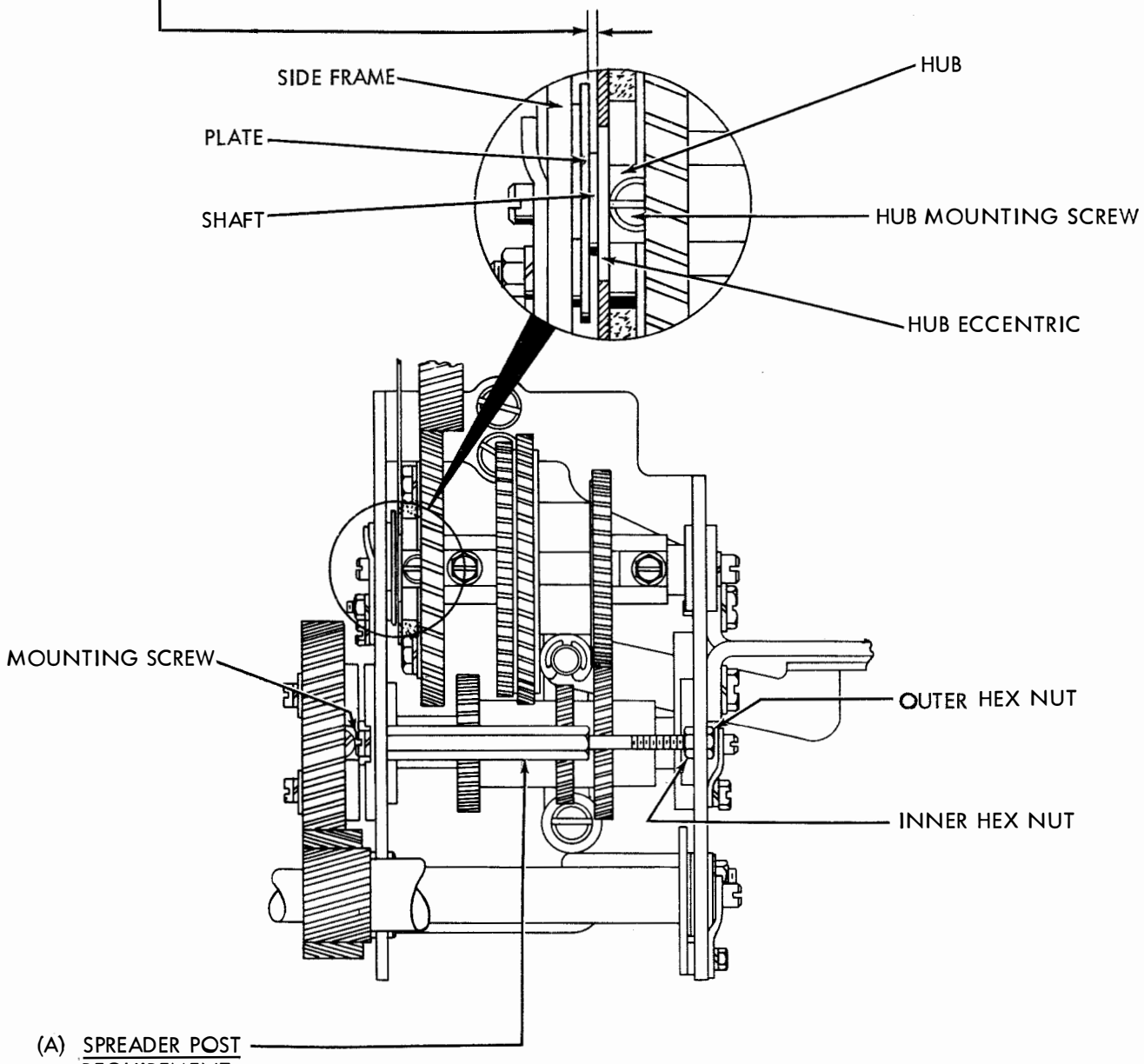
(B) HUB POSITION

REQUIREMENT

CLEARANCE BETWEEN HUB ECCENTRIC AND PLATE SHOULD BE MIN 0.005 INCH

TO ADJUST

POSITION HUB ON SHAFT WITH ITS MOUNTING SCREW LOOSENED.



(A) SPREADER POST

REQUIREMENT

THE SPREADER POST SHOULD NOT SPREAD OR COMPRESS SIDES OF VARIABLE SPEED DRIVE ASSEMBLY.

TO ADJUST

LOOSEN BOTH SPREADER POST HEX NUTS. TIGHTEN POST MOUNTING SCREW. TURN INNER HEX NUT UNTIL IT TOUCHES INNER SIDE OF BRACKET. TIGHTEN OUTER HEX NUT TO LOCK POST IN POSITION.

CAUTION: IMPROPER ASSEMBLY MAY CAUSE MISALIGNMENT RESULTING IN SHORTENED BEARING LIFE.

3.26 Remote Control Gear Shift Mechanism

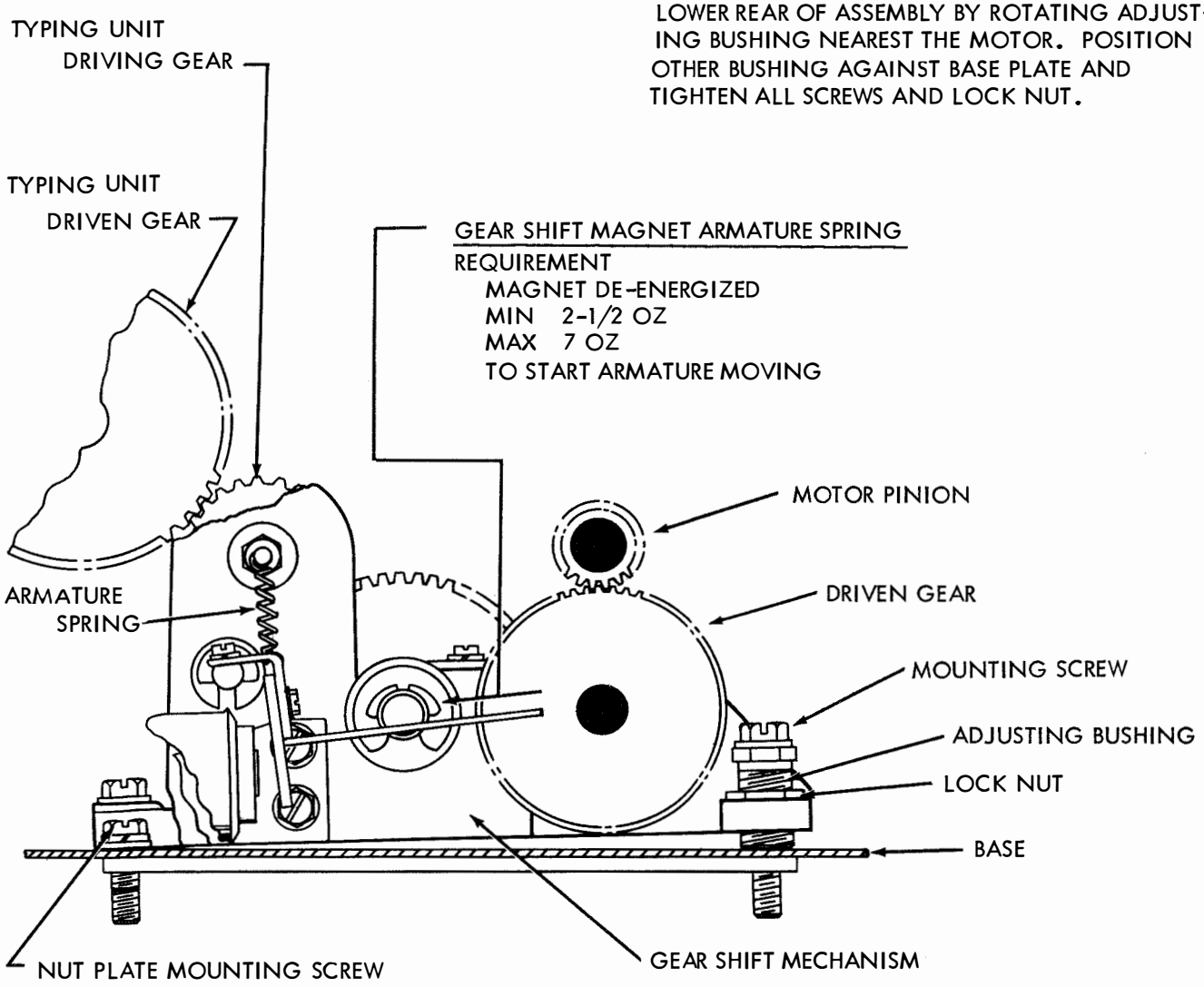
GEAR SHIFT MECHANISM

REQUIREMENT

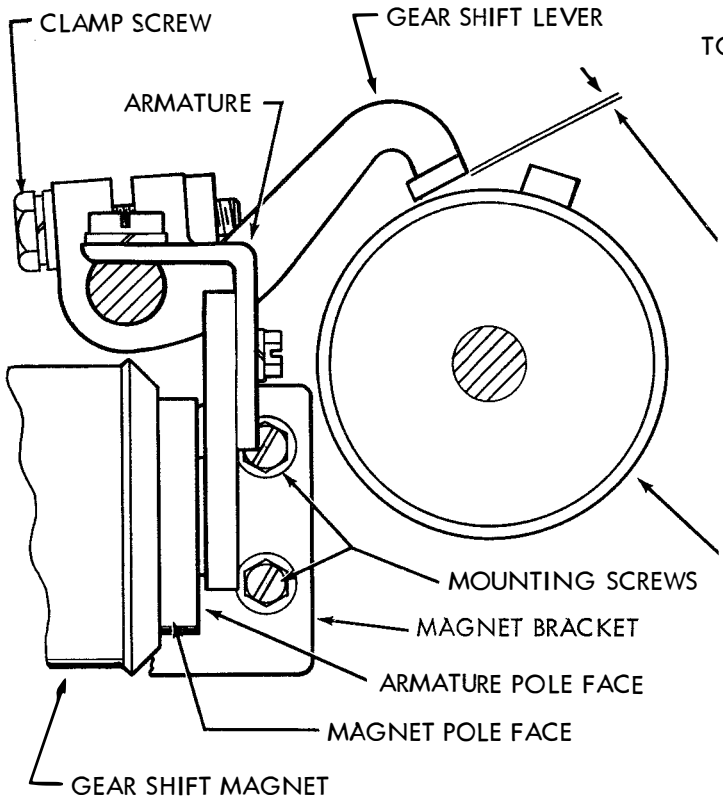
THE BACKLASH BETWEEN THE MOTOR PINION AND ITS DRIVEN GEAR AND BETWEEN THE TYPING UNIT DRIVEN GEAR AND ITS DRIVING GEAR SHOULD BE MIN 0.004 INCH --- MAX 0.008 INCH AT POINT OF MINIMUM BACKLASH.

TO ADJUST

LOOSEN THE FOUR SCREWS WHICH MOUNT THE ASSEMBLY BRACKET TO BASE. LOOSEN THE NUT-PLATE MOUNTING SCREW AT FRONT OF ASSEMBLY BRACKET. LOOSEN LOCK NUTS ON ADJUSTING BUSHINGS. POSITION GEAR SHIFT BRACKET ASSEMBLY FRONT TO REAR. RAISE OR LOWER REAR OF ASSEMBLY BY ROTATING ADJUSTING BUSHING NEAREST THE MOTOR. POSITION OTHER BUSHING AGAINST BASE PLATE AND TIGHTEN ALL SCREWS AND LOCK NUT.



3.27 Remote Control Gear Shift Mechanism continued



GEAR SHIFT MAGNET

REQUIREMENT

THE POLE FACE OF THE ARMATURE SHOULD MEET THE POLE FACE OF THE MAGNET SQUARELY

TO ADJUST

POSITION ARMATURE WITH GEAR SHIFT LEVER CLAMP SCREW LOOSENED AND POSITION MAGNET BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

CLUTCH STOP LEVER

REQUIREMENT

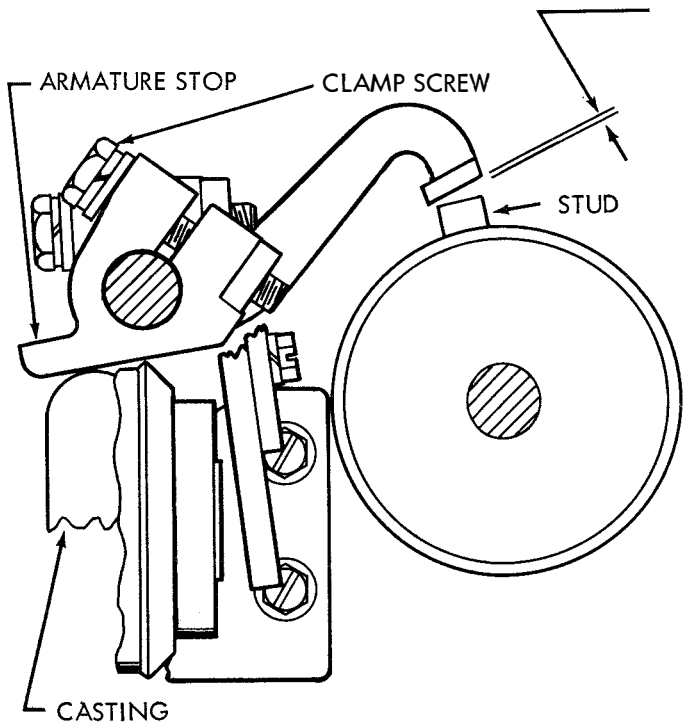
ARMATURE RESTING AGAINST MAGNET POLE FACE, CLEARANCE BETWEEN GEAR SHIFT LEVER AND THE SLEEVE

MIN 0.002 INCH

MAX 0.010 INCH

TO ADJUST

POSITION GEAR SHIFT LEVER WITH ITS CLAMP SCREW LOOSENED.



ARMATURE STOP

REQUIREMENT

WITH ARMATURE IN ITS OPEN POSITION AND THE ARMATURE STOP AGAINST THE CASTING, CLEARANCE BETWEEN GEAR SHIFT LEVER AND STUD ON SLEEVE

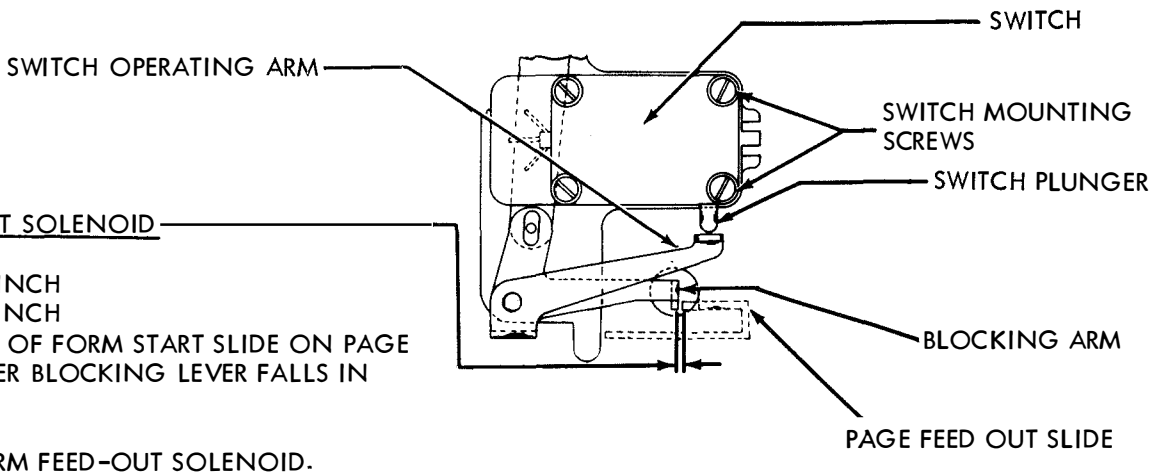
MIN 0.010 INCH

MAX 0.020 INCH

TO ADJUST

HOLD GEAR SHIFT LEVER IN POSITION AND POSITION ARMATURE STOP WITH ITS CLAMP SCREW LOOSENED UNTIL REQUIREMENT IS MET.

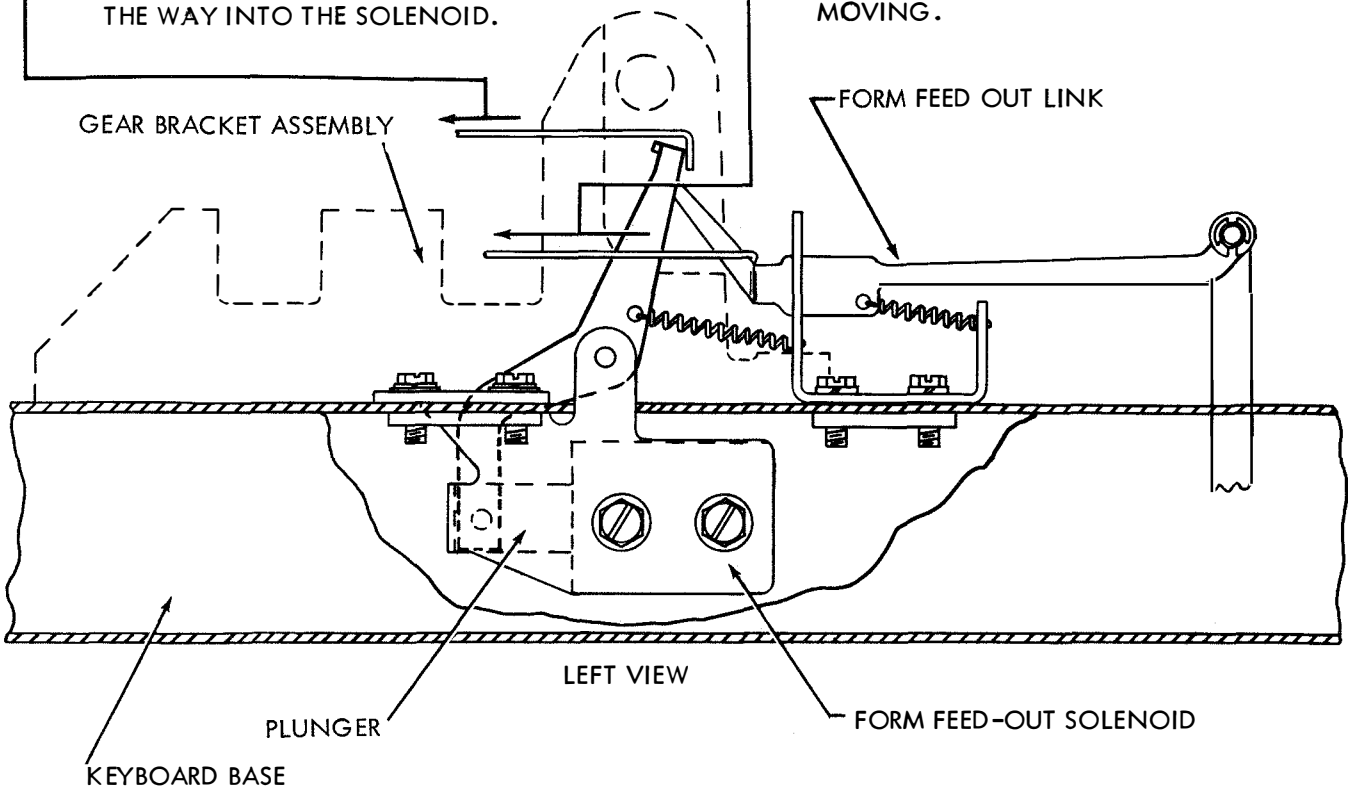
3.28 Form Feed-Out Mechanism



FORM FEED-OUT SOLENOID
REQUIREMENT
MIN 0.005 INCH
MAX 0.035 INCH
OVERTRAVEL OF FORM START SLIDE ON PAGE PRINTER AFTER BLOCKING LEVER FALLS IN PLACE.
TO CHECK
OPERATE FORM FEED-OUT SOLENOID.
TO ADJUST
POSITION FORM FEED-OUT SOLENOID ASSEMBLY WITH ITS MOUNTING SCREWS LOOSENED. (SEE FIGURE BELOW)

SOLENOID SPRING
REQUIREMENT
MIN 1/2 OZ
MAX 2 OZ
TO PUSH SOLENOID PLUNGER ALL THE WAY INTO THE SOLENOID.

FORM FEED-OUT LINK SPRING
REQUIREMENT
MIN 3-1/2 OZ
MAX 6-1/2 OZ
TO START FORM FEED-OUT LINK MOVING.



3.29 Synchronous Pulse Mechanism

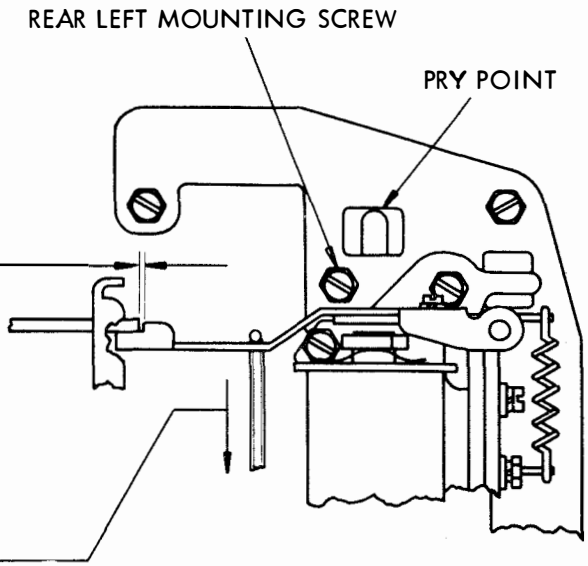
MOUNTING BRACKET

TO CHECK
WITH MAGNET NOT ATTRACTED AND CLUTCH TRIP BAR IN FURTHEST LEFT POSITION.

REQUIREMENT
MIN 0.005 INCH --- MAX 0.015 INCH BETWEEN CLUTCH TRIP BAR AND ARMATURE LEVER.

TO ADJUST
POSITION MOUNTING BRACKET WITH THREE MOUNTING SCREWS LOOSE BY MEANS OF PRY POINT.

NOTE
TIGHTEN REAR LEFT MOUNTING SCREW AND MAKE MOUNTING BRACKET ADJUSTMENT



MAGNET ARMATURE

TO CHECK
CLUTCH TRIP BAR IN EXTREME LEFT POSITION. HOOK 32 OZ SCALE TO ARMATURE LEVER AS SHOWN. MEASURE AT RIGHT ANGLE TO ARMATURE LEVER AS INDICATED.

REQUIREMENT
MIN 3 OZ --- MAX 5 OZ
TO PULL ARMATURE LEVER FROM CLUTCH TRIP BAR.

MOUNTING BRACKET

TO CHECK
WITH ARMATURE LEVER HELD AGAINST MAGNET POLE FACE AND CLUTCH TRIP BAR IN FURTHEST RIGHT POSITION.

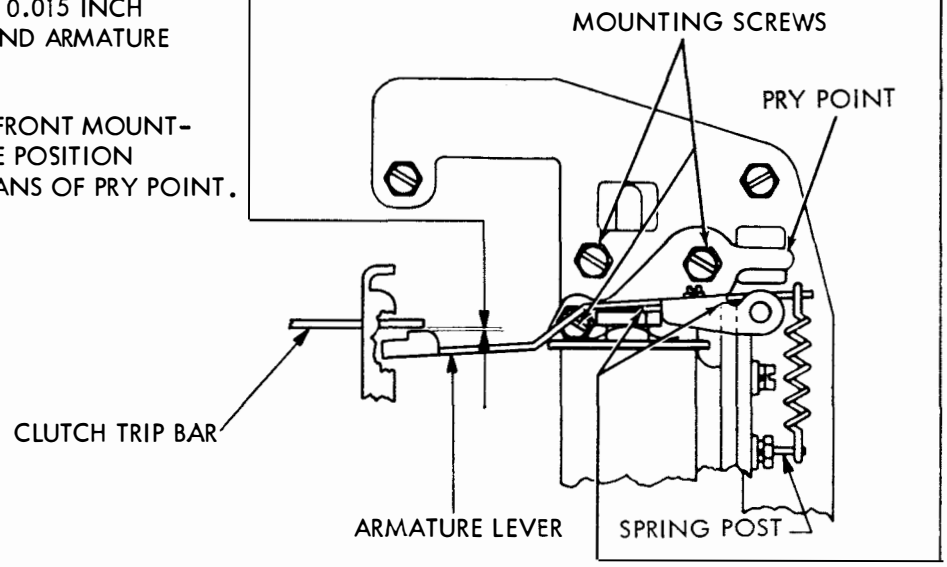
REQUIREMENT
MIN 0.005 INCH --- MAX 0.015 INCH BETWEEN CLUTCH TRIP BAR AND ARMATURE LEVER.

TO ADJUST
WITH RIGHT REAR AND LEFT FRONT MOUNTING BRACKET SCREWS LOOSE POSITION MOUNTING BRACKET BY MEANS OF PRY POINT.

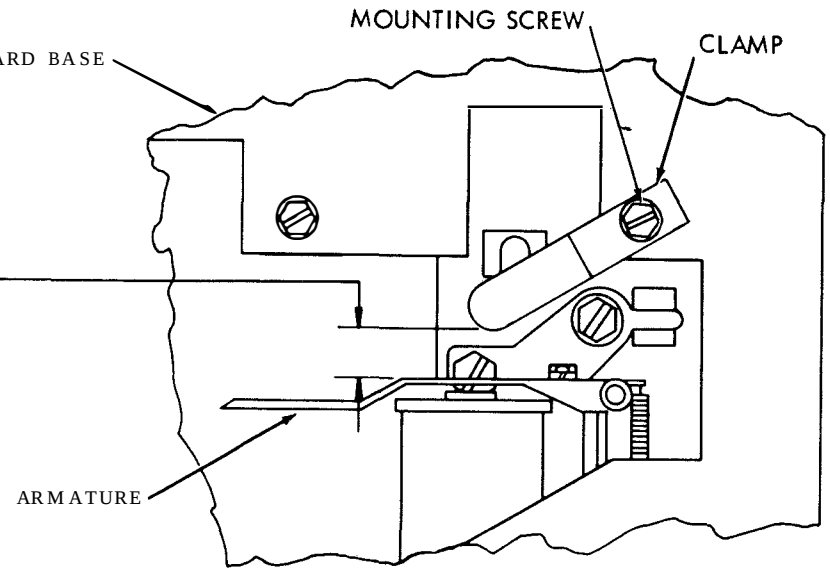
ARMATURE HINGE

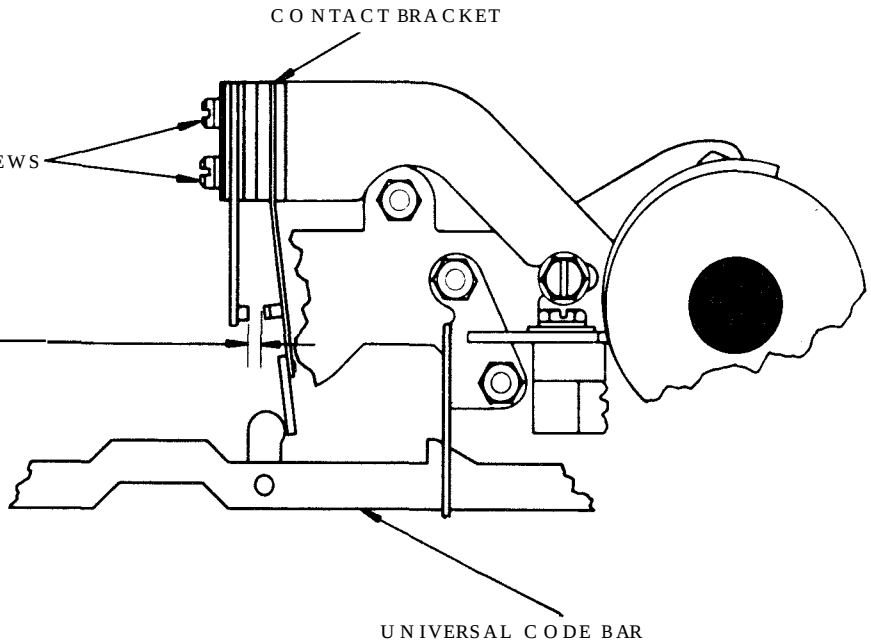
REQUIREMENT
WITH ARMATURE IN ATTRACTED POSITION ARMATURE FLUSH WITH POLE FACE AND MAGNET BRACKET EXTENSION.

TO ADJUST
POSITION ARMATURE WITH HINGE BRACKET MOUNTING SCREW AND SPRING POST LOOSE.

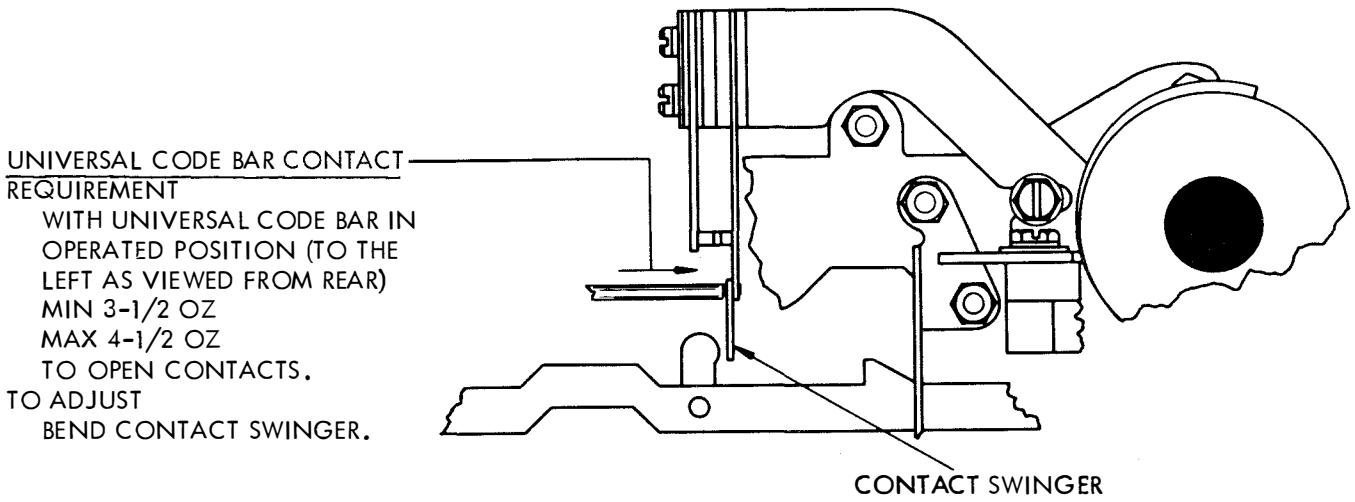


3.30 Synchronous Pulse Mechanism continued



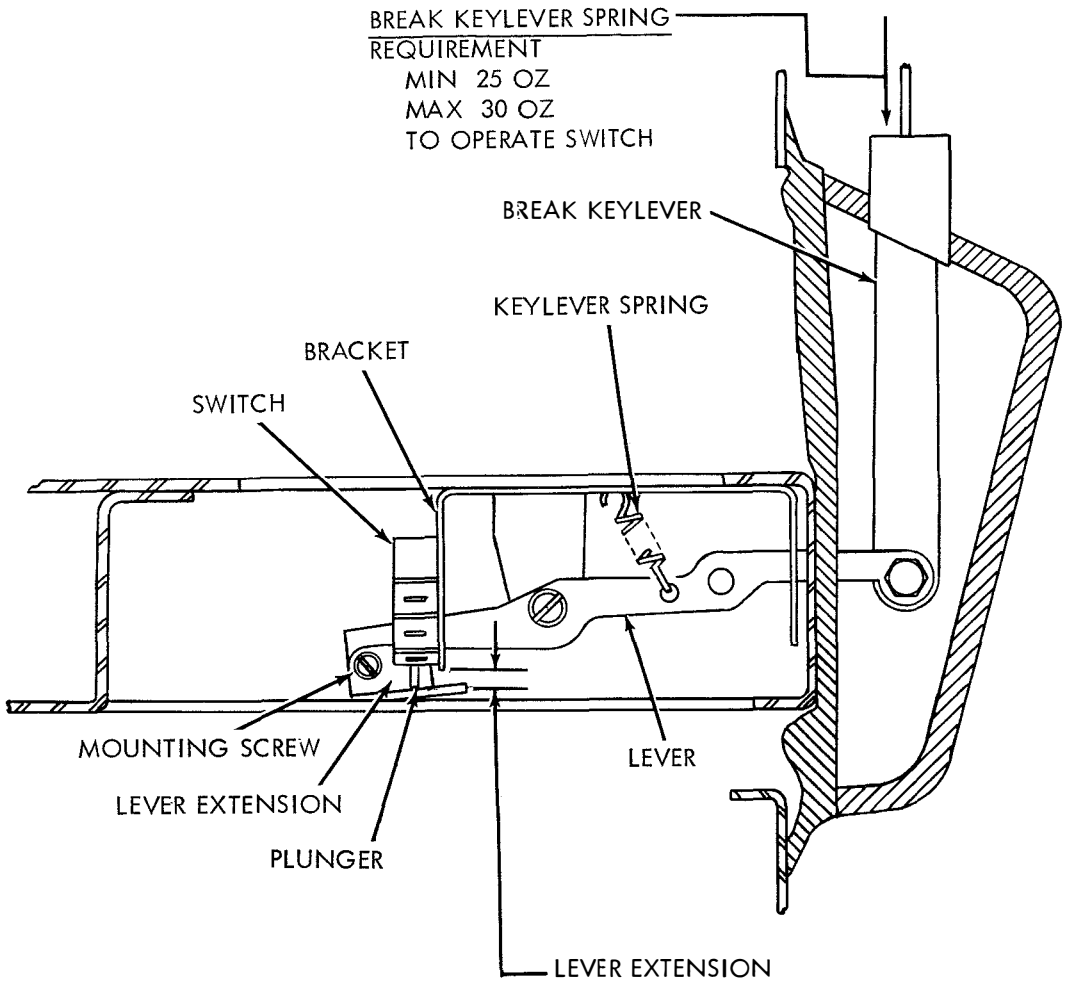


3.31 Synchronous Pulse Mechanism continued



4. BASE (RECEIVE-ONLY)

4.01 Signal Line Break Mechanism



4.02 The following requirement should be met:

(a) INTERMEDIATE GEAR BRACKET (PAR. 2.17)
(b) MOUNTING TYPING UNIT ON KEYBOARD OR BASE (PAR. 2.18)
(c) LOCAL LINE FEED TRIP LINK SPRING (PAR. 2.14)
(d) LOCAL CARRIAGE RETURN BAIL SPRING (PAR. 2.13)
(e) MARGIN INDICATOR SPRING (PAR. 2.15)

5. EARLIER DESIGN

5.01 Signal Generator Mechanism

NOTE: IN ORDER TO PERFORM ALL SIGNAL GENERATOR ADJUSTMENTS, IT WILL BE NECESSARY TO REMOVE GENERATOR FROM THE KEYBOARD. SEE APPROPRIATE SECTION.

SELECTOR LEVER SPRING

REQUIREMENT
SELECTOR LEVER ON LOW PART OF CAM.

MIN 1 OZ
MAX 2-1/2 OZ

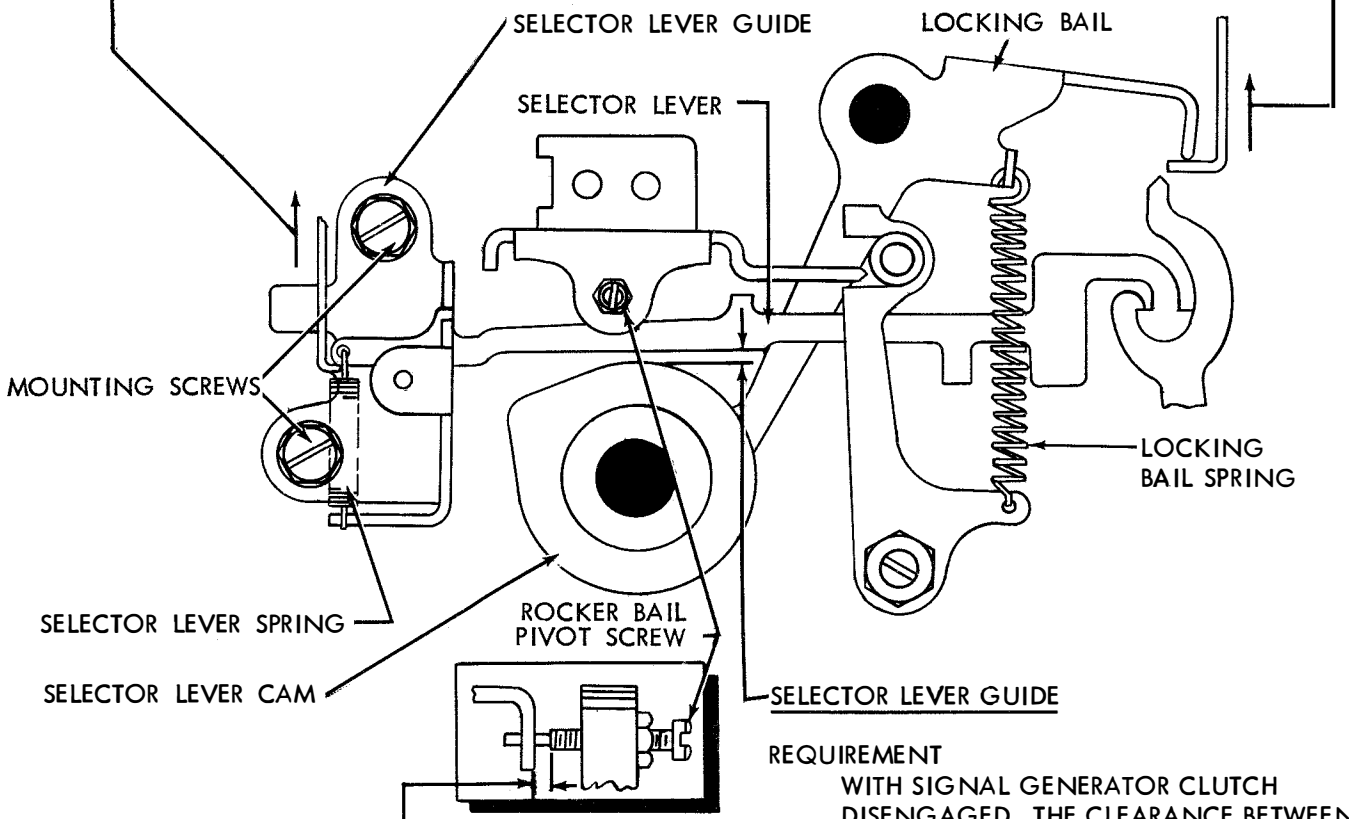
TO START LEVER MOVING.
CHECK EACH SELECTOR LEVER SPRING.

LOCKING BAIL SPRING

REQUIREMENT
GENERATOR CLUTCH DISENGAGED.

MIN 2 OZ
MAX 4 OZ

TO START LOCKING BAIL MOVING.



ROCKER BAIL PIVOT SCREW

REQUIREMENT
ROCKER BAIL FREE ON PIVOT WITH SOME END PLAY

MAX 0.010 INCH

TO ADJUST
ROTATE PIVOT SCREW.

SELECTOR LEVER GUIDE

REQUIREMENT
WITH SIGNAL GENERATOR CLUTCH DISENGAGED, THE CLEARANCE BETWEEN FRONT SELECTOR LEVER AND THE LOW PART OF ITS CAM SHOULD BE

MIN 0.004 INCH
MAX 0.010 INCH

TO ADJUST
POSITION THE SELECTOR LEVER GUIDE WITH ITS MOUNTING SCREWS LOOSENED.

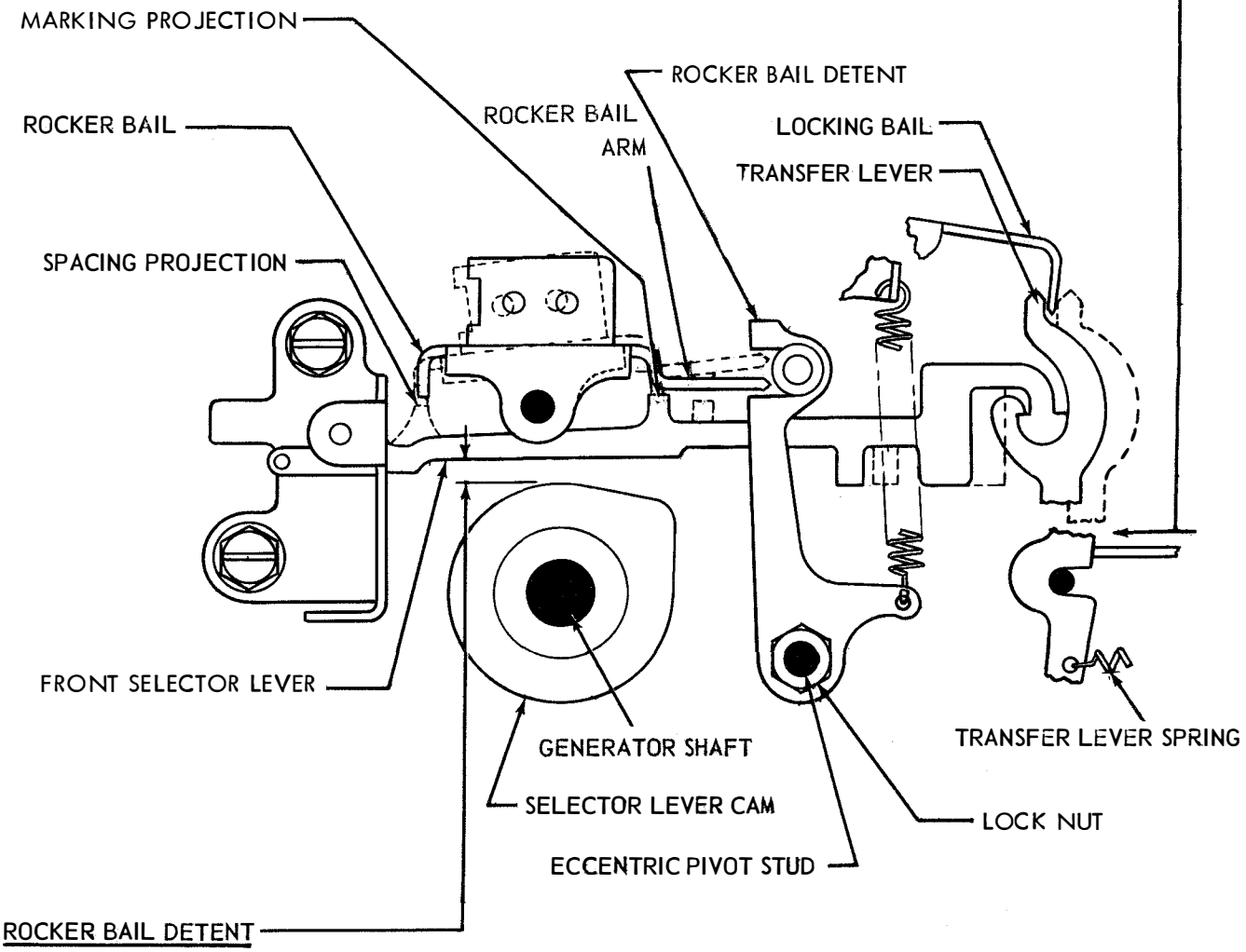
5.02 Signal Generator Mechanism continued

TRANSFER LEVER SPRING

REQUIREMENT

TRANSFER LEVERS IN MARKING POSITION. CODE BAR BAIL LATCH SPRING REMOVED START TRANSFER LEVER (5TH FROM FRONT) MANUALLY MOVED TO MARKING POSITION.

	TRANSFER LEVERS	START LEVER
MIN	5-1/2 OZ	7-1/2 OZ
MAX	8 OZ	10 OZ TO START LEVER MOVING.



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 0.005 INCH

TO CHECK

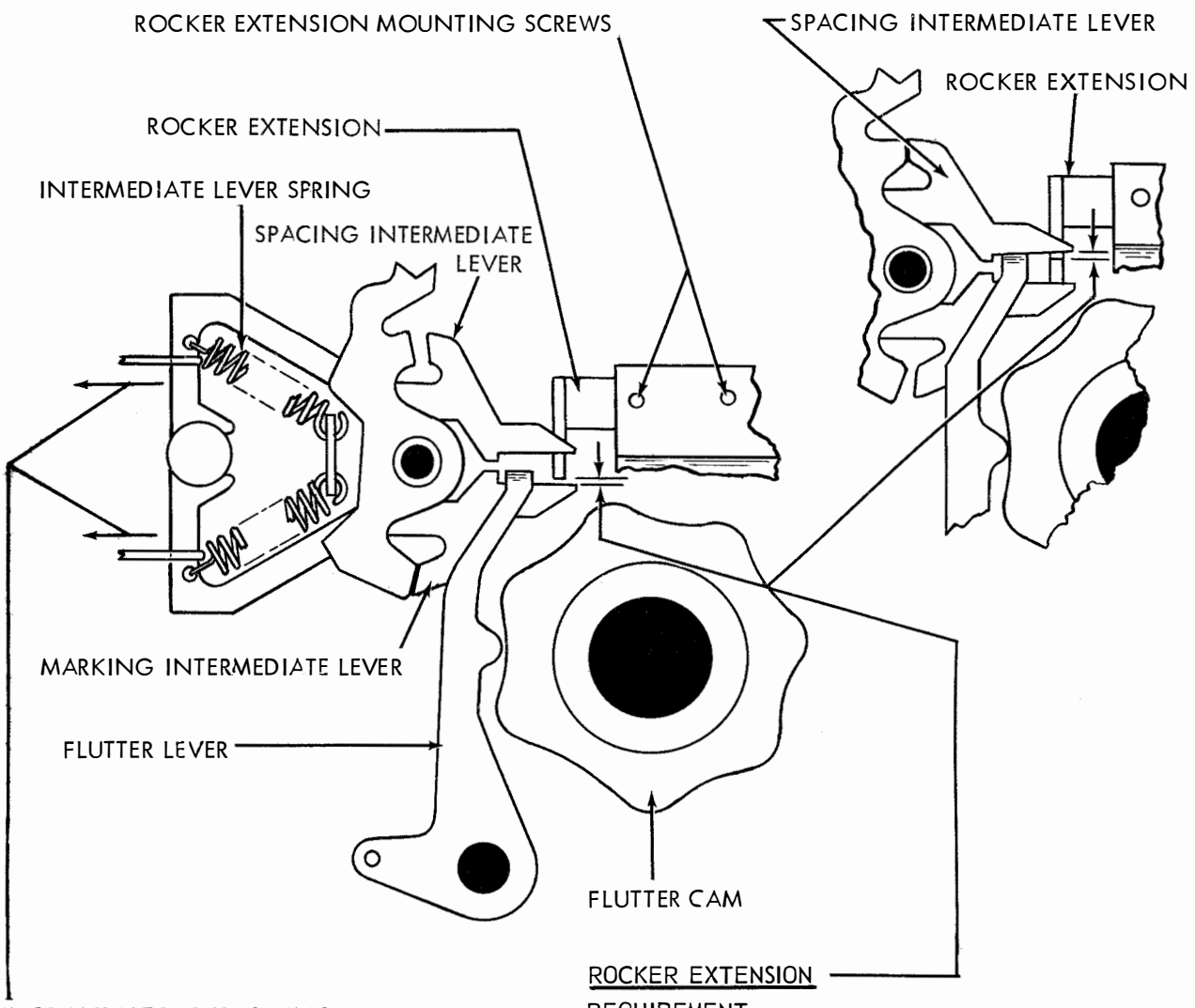
ROTATE THE CAM SLEEVE UNTIL THE FRONT SELECTOR LEVER HAS COME DOWN OFF THE PEAK OF ITS CAM AND IS OPPOSITE THE LOW PART OF ITS CAM. WITH THE FRONT SELECTOR LEVER IN THE MARKING (LEFT) POSITION, AND THE ROCKER BAIL ARM AGAINST THE LOWER STOP OF ITS DETENT, HOLD THE SELECTOR LEVER LIGHTLY UP AGAINST THE 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 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 0.005 INCH.

TO ADJUST

EQUALIZE CLEARANCES 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.

5.03 Signal Generator Mechanism continued

NOTE: REMOVE MECHANICAL BREAK LEVER AND SPRING OR ELECTRICAL BREAK LEVER, SPRING AND SWITCH, IF EQUIPPED. SEE PAR. 5.26.



INTERMEDIATE LEVER SPRING

REQUIREMENT

CLUTCH DISENGAGED. PULL HORIZONTALLY, PARALLEL TO INTERMEDIATE LEVER'S PATH
MIN 2 OZ
MAX 4 OZ
TO START LEVER MOVING. CHECK SPACING AND MARKING LEVERS.

ROCKER EXTENSION

REQUIREMENT

EQUAL CLEARANCE (WITHIN 0.005 INCH) 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 IN LEFT FIGURE REPEAT PROCEDURE FOR SPACING INTERMEDIATE LEVER. GAUGE CLEARANCE IN RIGHT FIGURE.

TO ADJUST

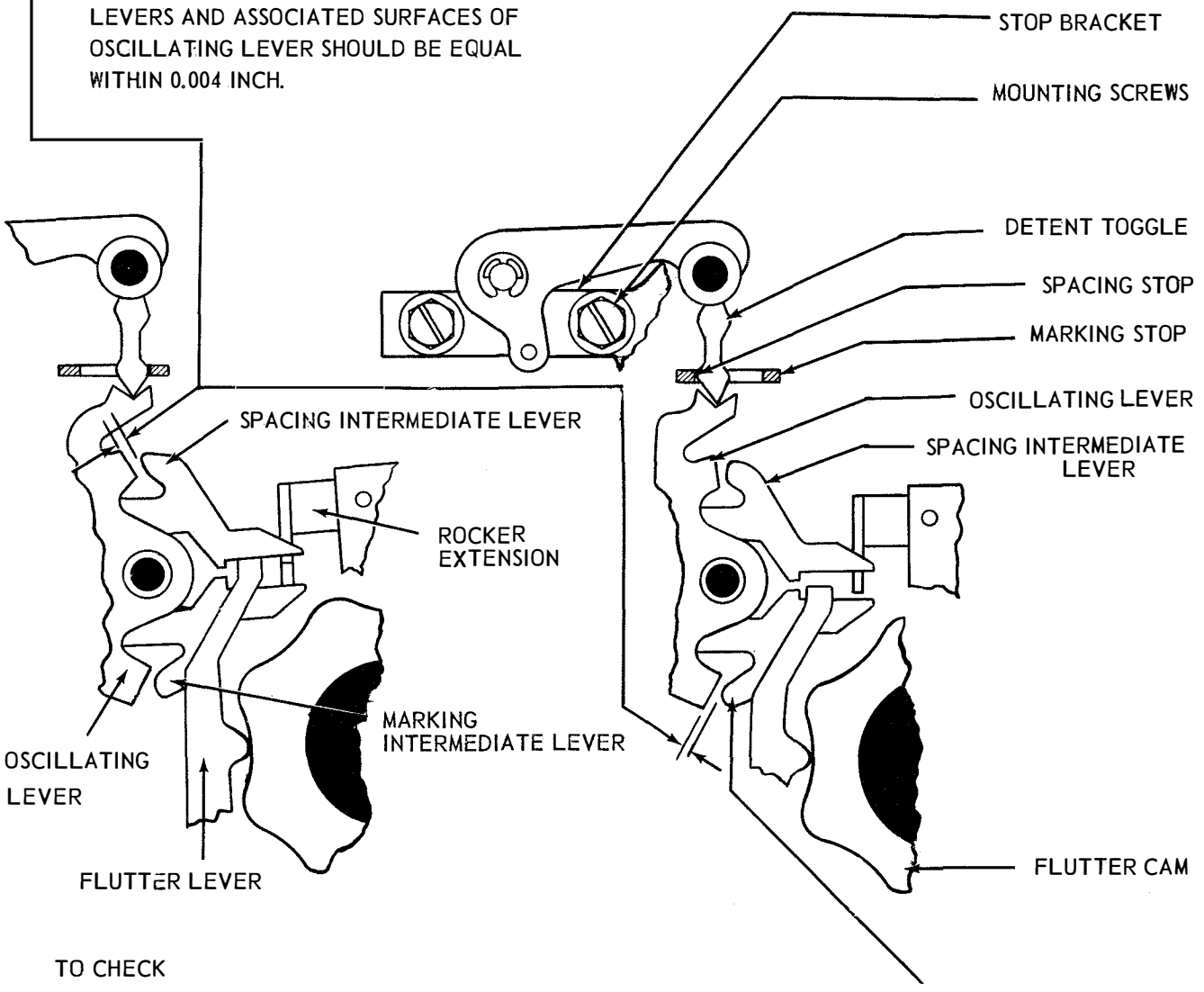
EQUALIZE CLEARANCES BY POSITIONING THE ROCKER EXTENSION WITH ITS MOUNTING SCREWS LOOSENED.

5.04 Signal Generator Mechanism continued

DETENT TOGGLE STOP BRACKET

REQUIREMENT

CLEARANCE BETWEEN ENGAGING SURFACES OF SPACING AND MARKING INTERMEDIATE LEVERS AND ASSOCIATED SURFACES OF OSCILLATING LEVER SHOULD BE EQUAL WITHIN 0.004 INCH.



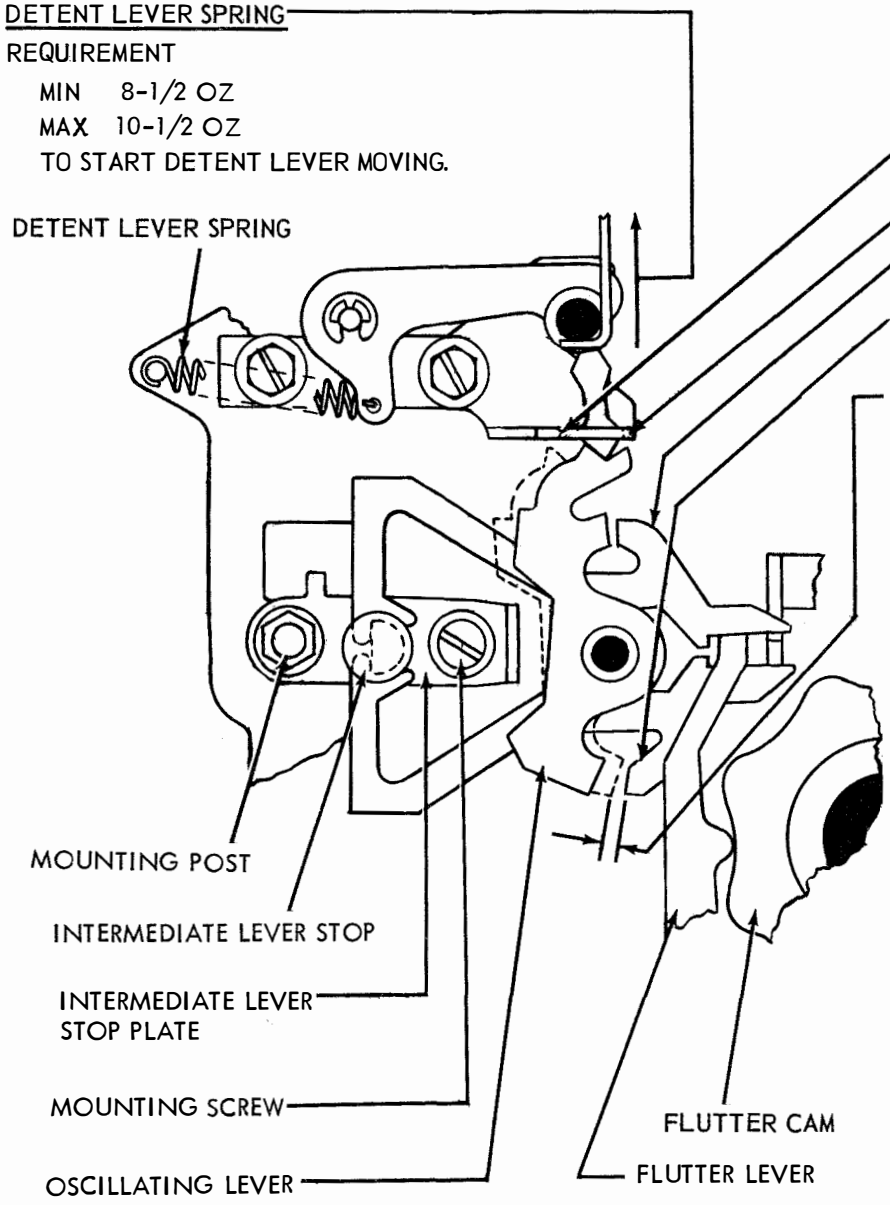
TO CHECK

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

EQUALIZE THE CLEARANCES BY POSITIONING THE STOP BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

5.05 Signal Generator Mechanism continued



NOTE: REPLACE THE BREAK LEVER AND ASSOCIATED PARTS

5.06 Signal Generator Mechanism continued

(A) FLUTTER LEVER SPRING

REQUIREMENT

WITH SIGNAL GENERATOR CLUTCH DISENGAGED AND SPACING INTERMEDIATE LEVER HELD AWAY FROM FLUTTER LEVER, INSERT SCALE BETWEEN CASTING AND BREAK ROD.
MIN 1 OZ
MAX 2-1/4 OZ
TO START FLUTTER LEVER MOVING.

(B) FLUTTER LEVER

(1) REQUIREMENT

WITH THE FLUTTER LEVER ON EACH LOW PORTION OF ITS CAM AND THE MARKING AND SPACING INTERMEDIATE LEVERS ALTERNATELY SELECTED, THE CLEARANCE BETWEEN THE FLUTTER LEVER AND LATCHING SURFACE OF SELECTED INTERMEDIATE LEVER SHOULD BE
MIN 0.005 INCH
MAX 0.018 INCH

WITH THE CLUTCH ENGAGED AND THE SELECTOR LEVERS 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

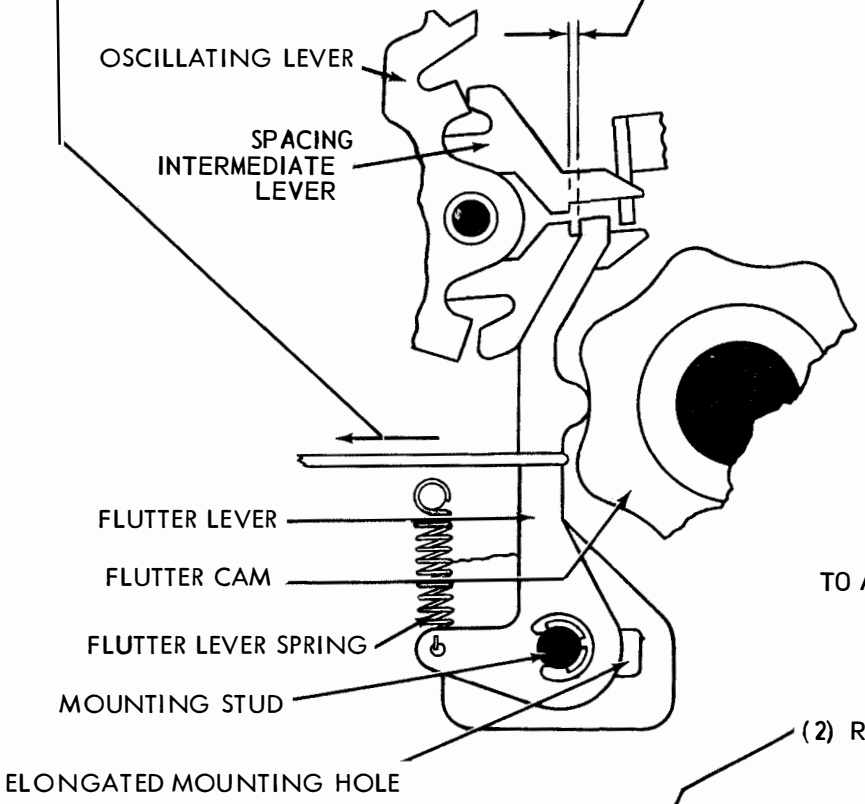
POSITION THE FLUTTER LEVER MOUNTING STUD IN THE ELONGATED MOUNTING HOLE WITH THE LOCK NUT LOOSENED.

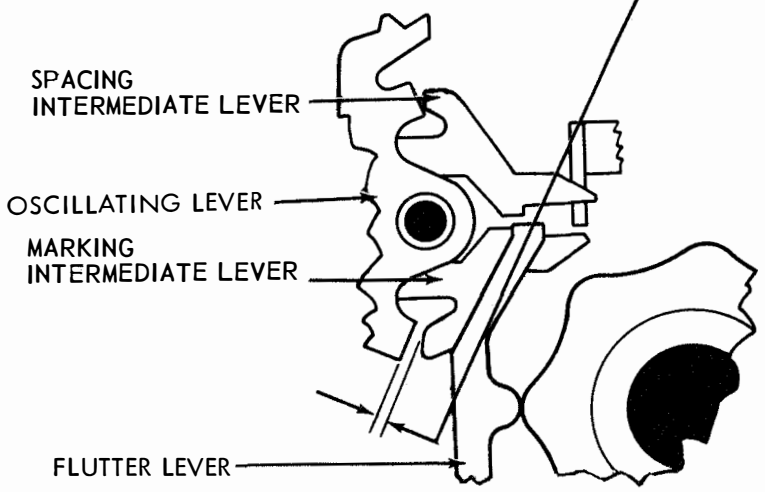
(2) REQUIREMENT

AFTER REQUIREMENT (1) HAS BEEN MET, SELECT THE MARKING AND SPACING INTERMEDIATE LEVERS ALTERNATELY AND ROTATE THE GENERATOR SHAFT UNTIL THE FLUTTER LEVER IS ON SUCCESSIVE HIGH PORTIONS OF ITS CAM. UNDER THESE CONDITIONS THERE SHOULD BE SOME CLEARANCE BETWEEN THE OSCILLATOR AND THE SELECTED INTERMEDIATE LEVER.

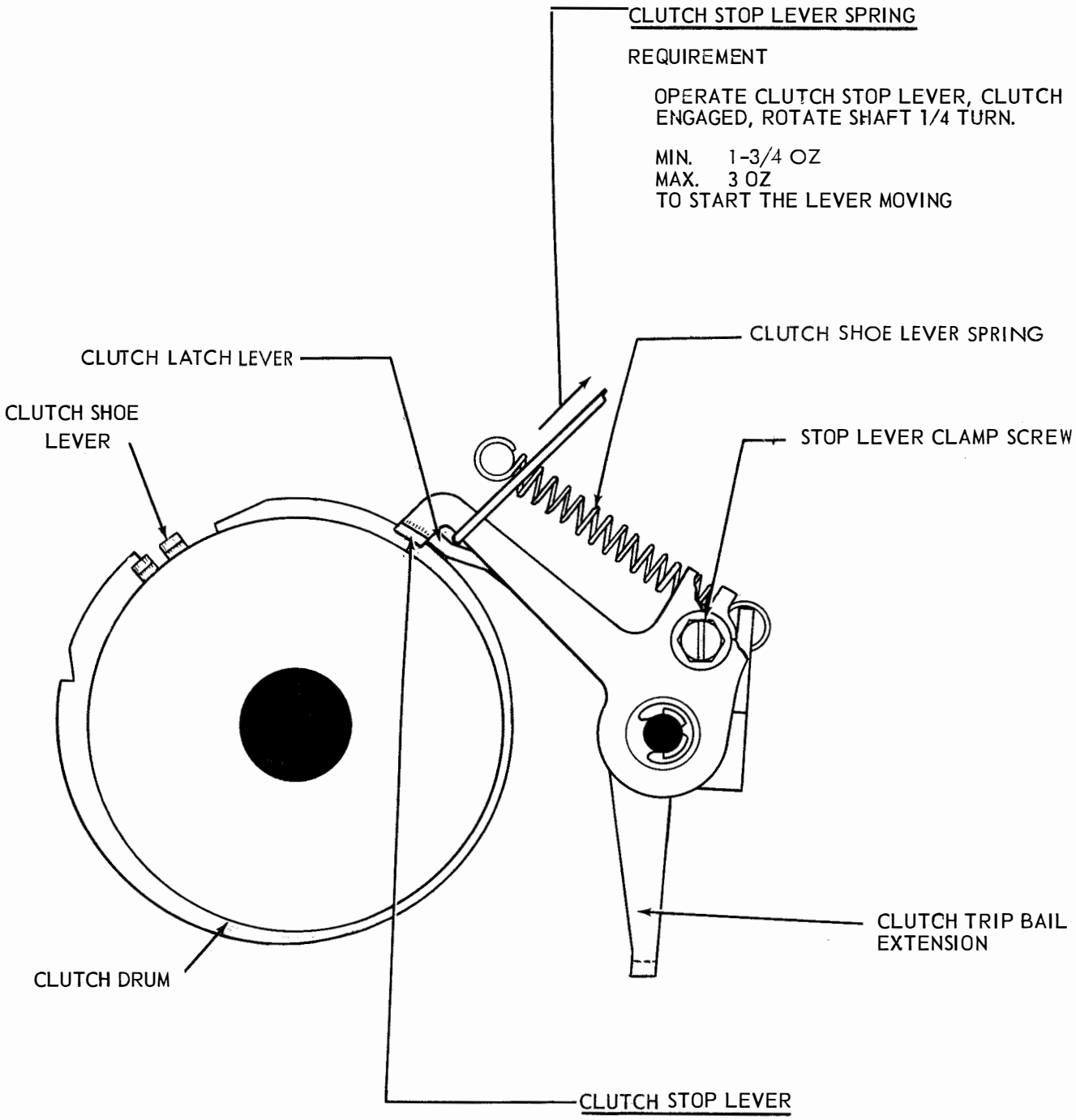
TO ADJUST

REFINE THE FLUTTER LEVER ADJUSTMENT AND RECHECK REQUIREMENT (1).





5.07 Signal Generator Mechanism continued



CLUTCH STOP LEVER SPRING

REQUIREMENT

OPERATE CLUTCH STOP LEVER, CLUTCH ENGAGED, ROTATE SHAFT 1/4 TURN.

MIN. 1-3/4 OZ
MAX. 3 OZ
TO START THE LEVER MOVING

CLUTCH STOP LEVER

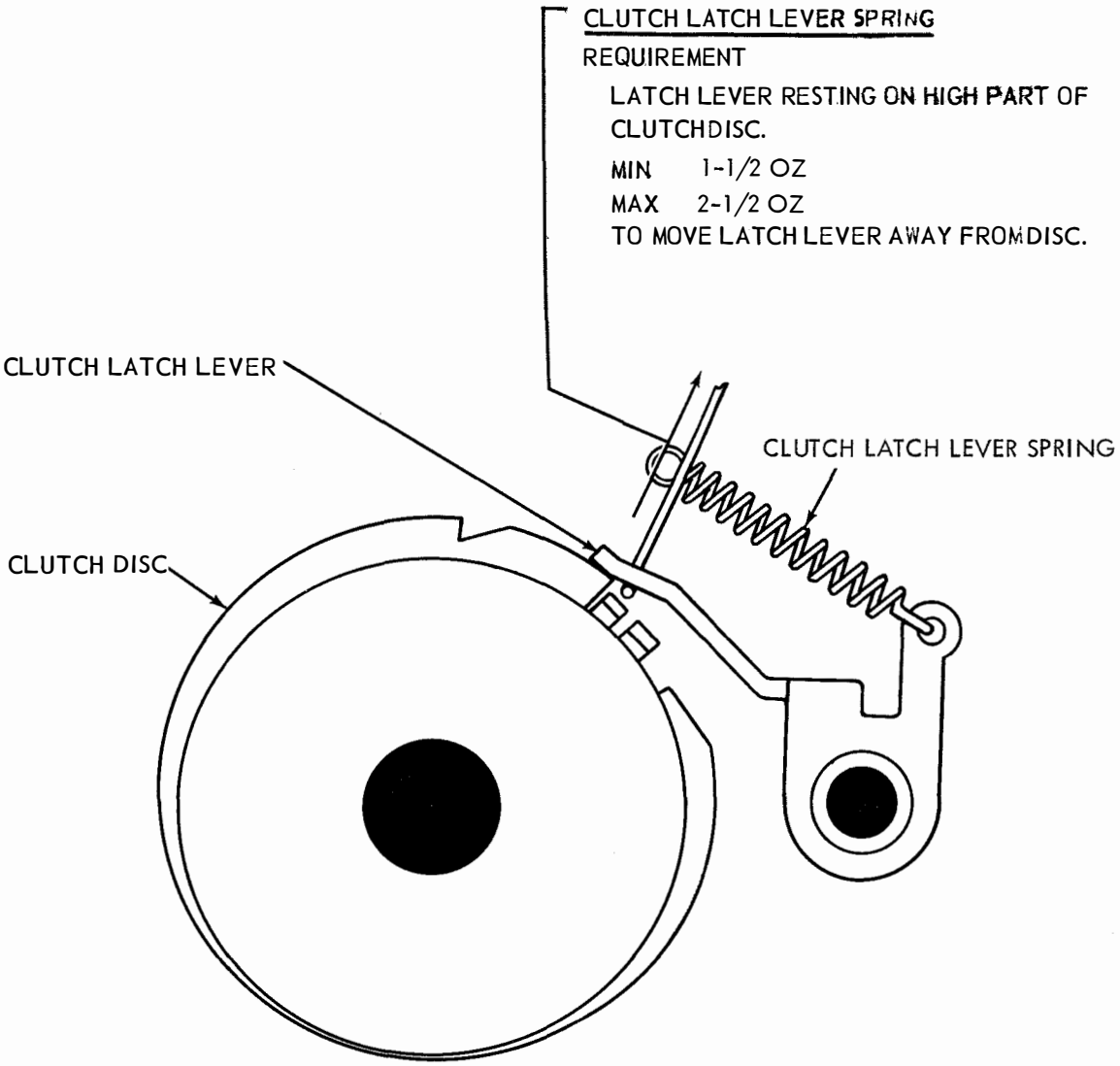
REQUIREMENT

CLUTCH STOP LEVER SHOULD FULLY ENGAGE THE CLUTCH SHOE LEVER VERTICALLY.

TO ADJUST

POSITION THE STOP LEVER WITH ITS CLAMP SCREW LOOSENED.

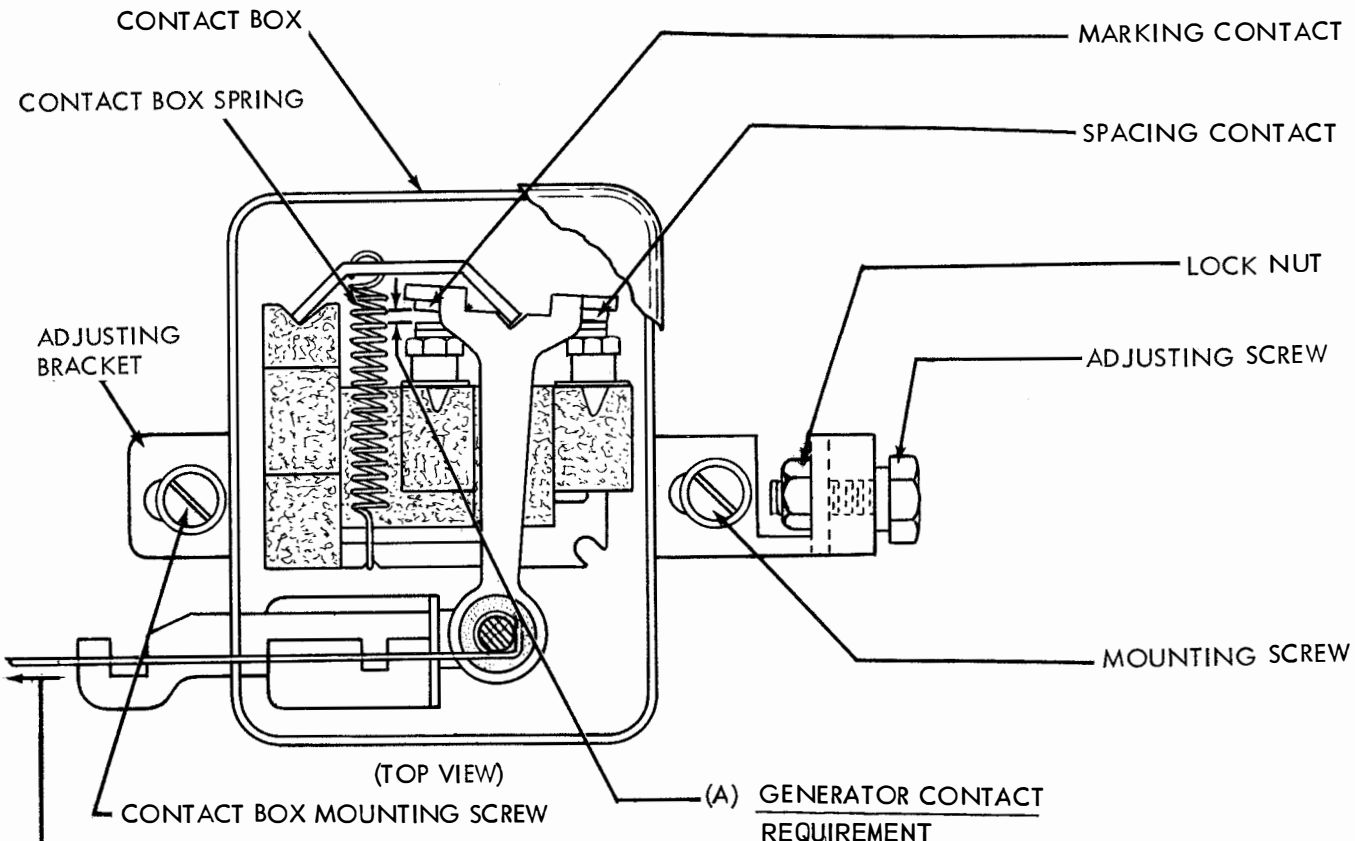
5.08 Signal Generator Mechanism continued



NOTE

REPLACE SIGNAL GENERATOR ON THE KEYBOARD. MAKE CERTAIN THAT THE CODE BAR BAIL LATCH LEVER (PAR. 5.10) IS UNDER CODE LEVER BAIL LATCH LEVER (PAR. 5.12) THAT (IF EQUIPPED) BREAK KEY ROD, ATTACHED TO BREAK LEVER (PAR. 5.26) IS IN ITS GUIDE HOLE IN CODE LEVER GUIDE, AND THAT THE CLUTCH TRIP BAIL EXTENSION (PAR. 5.07) IS IN THE NOTCH PROVIDED IN THE CLUTCH TRIP BAR (REAR) AND THAT THE CODE BAR BAIL (PAR. 5.10) IS RESTING IN THE NOTCHES OF THE FIVE CODE BARS, THE CLUTCH TRIP BAR AND THE KEYLEVER UPSTOP BAR. SEE APPROPRIATE SECTION.

5.09 Signal Generator Mechanism continued



REQUIREMENT

THE MARKING AND SPACING CONTACT GAPS SHOULD BE EQUAL

TO CHECK

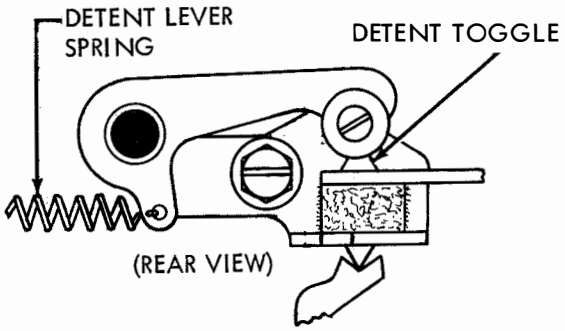
REMOVE THE COVER FROM THE CONTACT BOX. FIRST, MOVE THE DETENT TOGGLE AGAINST ITS SPACING STOP AND GAUGE THE MARKING CONTACT GAP. THEN MOVE THE DETENT TOGGLE AGAINST ITS MARKING STOP AND GAUGE SPACING CONTACT GAP.

TO ADJUST

ROTATE THE CONTACT BOX ADJUSTING SCREW WITH ITS LOCK NUT LOOSENED AND WITH THE CONTACT BOX MOUNTING SCREWS FRICTION TIGHT. REPLACE CONTACT BOX COVER.

NOTE

CHECK BY MEANS OF A SIGNAL CHECKING DEVICE WHERE POSSIBLE AND CAREFULLY REFINE THE ADJUSTMENT TO ELIMINATE ALL BIAS FROM THE SIGNALS BY EQUALIZING THE CURRENT-ON AND CURRENT-OFF INTERVALS.



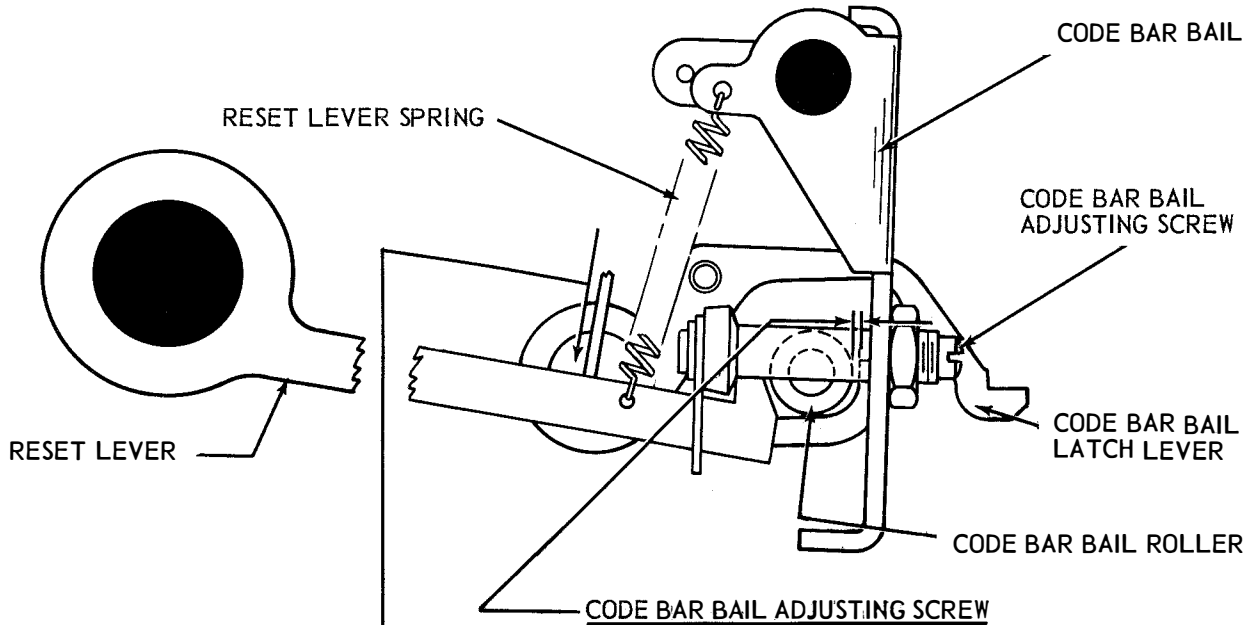
(B) CONTACT BOX SPRING

REQUIREMENT

CONTACT BOX COVER REMOVED. DETENT LEVER SPRING DISCONNECTED.

MIN · 2 OZ
MAX 4 OZ
TO BREAK CONTACT

5.10 Codebar Assembly



CODE BAR BAIL ADJUSTING SCREW

REQUIREMENT

CLUTCH ENGAGED. LTRS. COMBINATION SELECTED CLUTCH ROTATED 1/2 TURN UNTIL RESET LEVER IS IN EXTREME LEFT HAND POSITION.

CLEARANCE BETWEEN THE CODE BAR BAIL LATCH LEVER AND CODE BAR BAIL ROLLER.

MIN 0.004 INCH
MAX 0.008 INCH

TO ADJUST

POSITION THE CODE BAR BAIL ADJUSTING SCREW WITH ITS LOCK NUT LOOSENED.

RESET LEVER SPRING

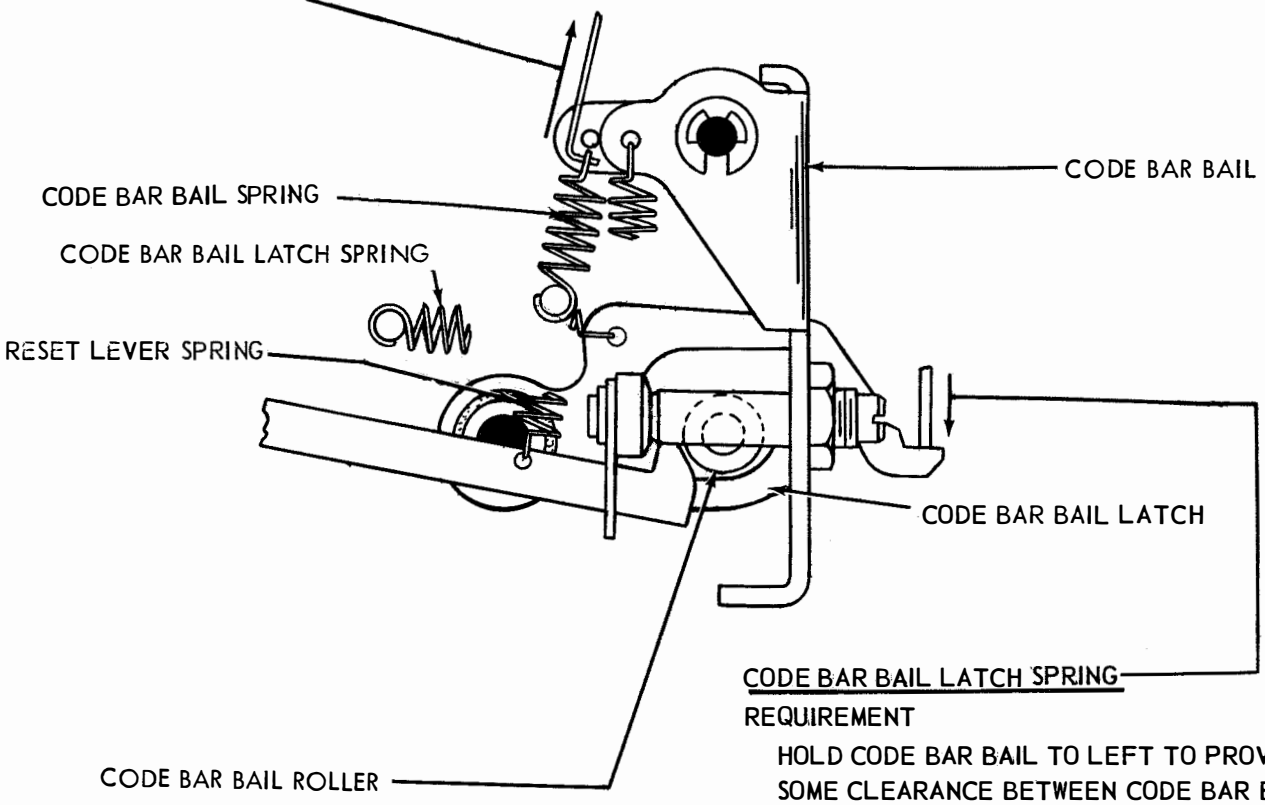
REQUIREMENT

CLUTCH DISENGAGED.

MIN 2 OZ
MAX 4 OZ

TO START THE RESET LEVER MOVING.

5.11 Codebar Assembly continued



CODE BAR BAIL SPRING

REQUIREMENT

GENERATOR CLUTCH DISENGAGED
SPRING UNHOOKED.
MIN 6 OZ
MAX 8 OZ
TO PULL SPRING TO INSTALLED POSITION.

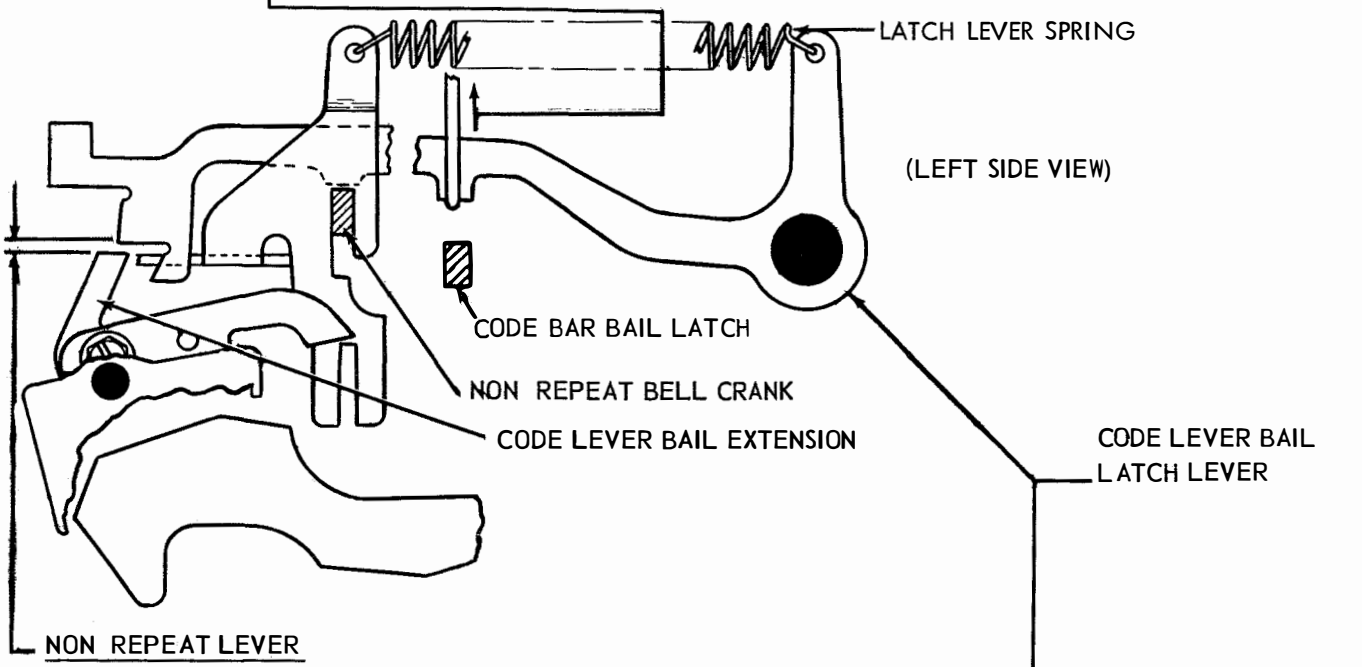
CODE BAR BAIL LATCH SPRING

REQUIREMENT

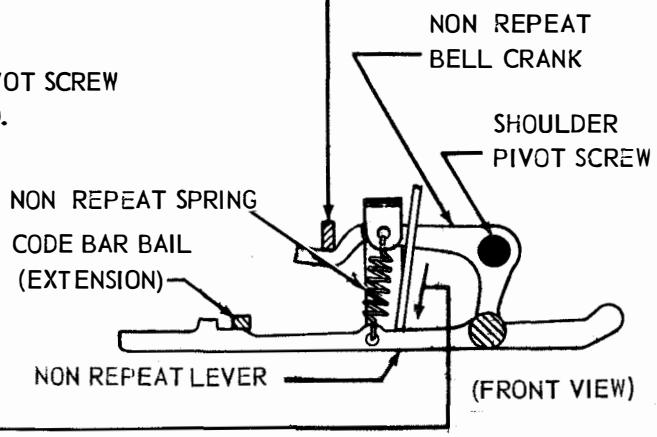
HOLD CODE BAR BAIL TO LEFT TO PROVIDE SOME CLEARANCE BETWEEN CODE BAR BAIL ROLLER AND LATCHING SURFACE OF THE CODE BAR BAIL LATCH
MIN 1/2 OZ
MAX 1-1/2 OZ
TO START THE LATCH MOVING.

5. 12 Codebar Assembly continued

CODE LEVER BAIL LATCH LEVER SPRING
REQUIREMENT
SIGNAL GENERATOR CLUTCH DISENGAGED CODE BAR BAIL LATCH TRIPPED. CODE LEVER BAIL EXTENSION HELD AWAY FROM LATCHING SURFACE OF CODE LEVER BAIL LATCH LEVER.
MIN 3 OZ ---MAX 5 OZ
TO START CODE LEVER BAIL LATCH LEVER MOVING.



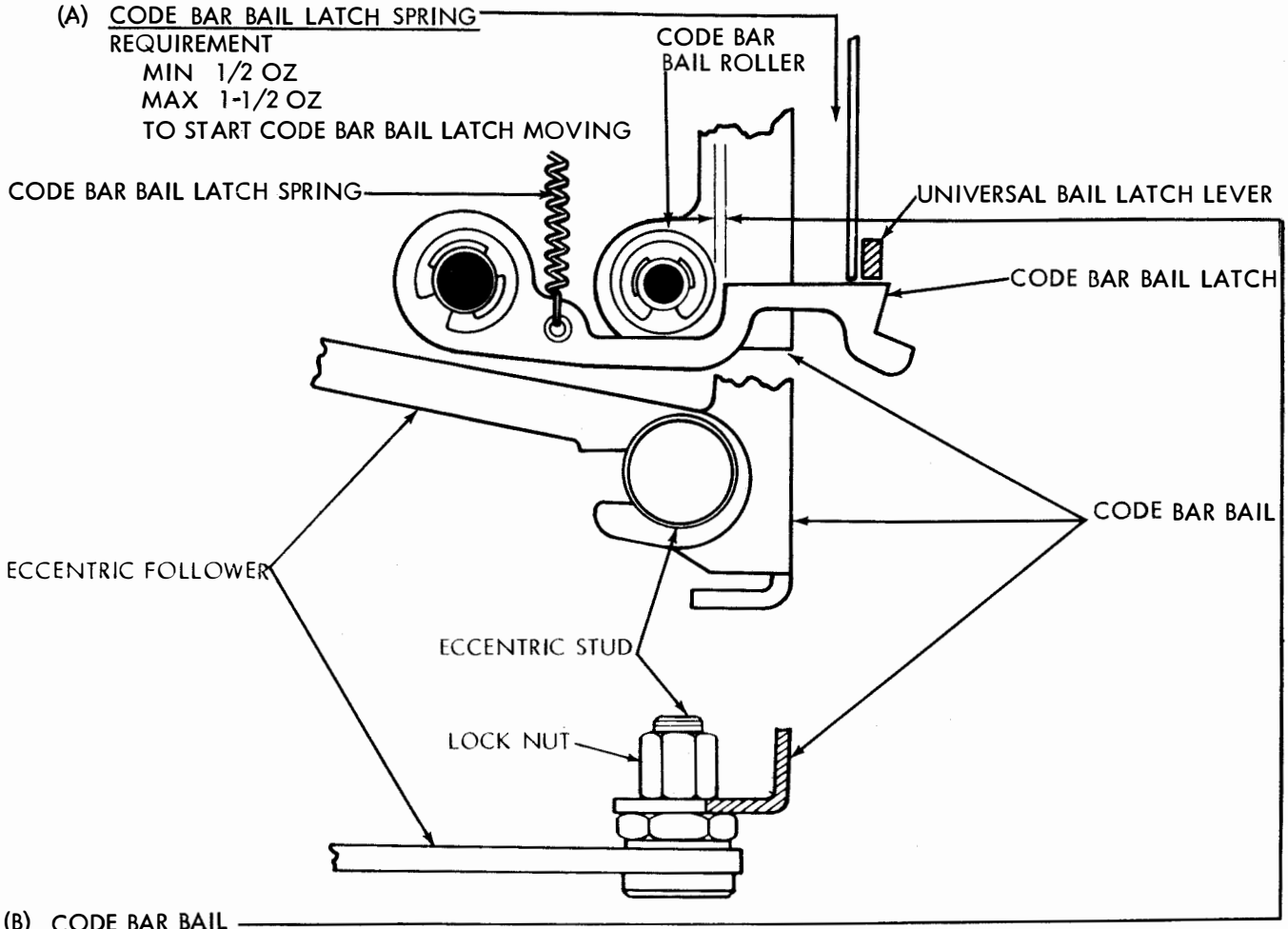
NON REPEAT LEVER
REQUIREMENT
ANY KEYLEVER DEPRESSED, SIGNAL GENERATOR SHAFT ROTATED UNTIL CLUTCH IS DISENGAGED. CLEARANCE BETWEEN CODE LEVER BAIL EXTENSION AND CODE LEVER BAIL LATCH LEVER
MIN 0.020 INCH
MAX 0.030 INCH
LET UP ON KEYLEVER UNTIL SURFACES TO BE MEASURED ARE IN LINE.
TO ADJUST
POSITION NON REPEAT BELL CRANK SHOULDER PIVOT SCREW IN ITS ELONGATED HOLE WITH LOCK NUT LOOSENED.



NON REPEAT SPRING
REQUIREMENT
GENERATOR CLUTCH DISENGAGED. ANY KEYLEVER DEPRESSED.
MIN 1/2 OZ ---MAX 1-1/2 OZ
TO START NON REPEAT LEVER MOVING DOWNWARD.

5. 13 Codebar Assembly continued

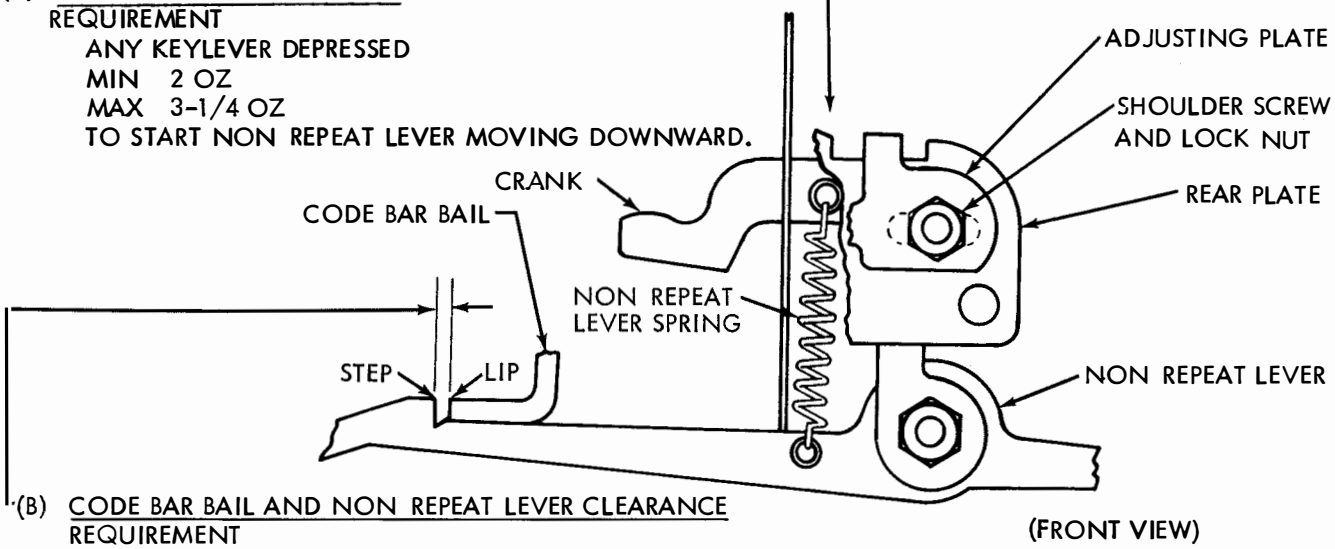
(A) CODE BAR BAIL LATCH SPRING
REQUIREMENT
MIN 1/2 OZ
MAX 1-1/2 OZ
TO START CODE BAR BAIL LATCH MOVING



(B) CODE BAR BAIL
REQUIREMENT
CAM ECCENTRIC AND ARM WHICH HOLD THE BAIL IN EXTREME RESET POSITION TO THE LEFT.
MIN 0.004 INCH
MAX 0.012 INCH
BETWEEN CODE BAR BAIL ROLLER AND CODE BAR BAIL LATCH
TO ADJUST
ADJUST ECCENTRIC STUD WITH LOCK NUT LOOSENED.

5. 14 Nonrepeat Lever Mechanism

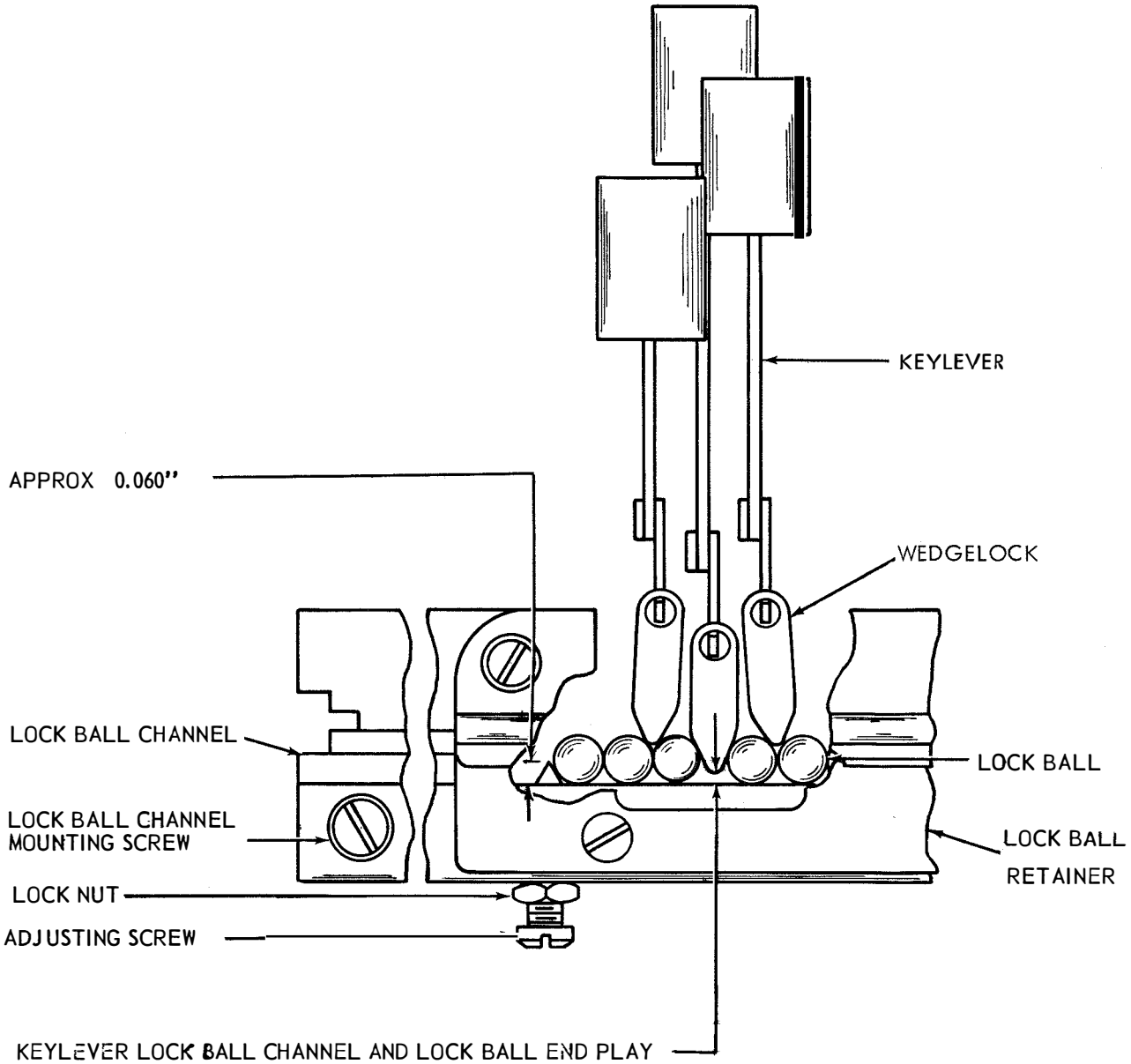
(A) NON REPEAT LEVER SPRING
REQUIREMENT
ANY KEYLEVER DEPRESSED
MIN 2 OZ
MAX 3-1/4 OZ
TO START NON REPEAT LEVER MOVING DOWNWARD.



(FRONT VIEW)

(B) CODE BAR BAIL AND NON REPEAT LEVER CLEARANCE
REQUIREMENT
MECHANISM IN INITIAL TRIP-OFF POSITION, ANY KEY DEPRESSED, NO POWER.
MIN 0.010 INCH
MAX 0.020 INCH
BETWEEN LIP OF CODE BAR BAIL AND NON REPEAT LEVER PICK-UP STEP
TO ADJUST
LOOSEN LOCK NUT AND SHOULDER SCREW AND MOVE MECHANISM LEFT OR RIGHT

5.15 Keyboard Mechanism



KEYLEVER LOCK BALL CHANNEL AND LOCK BALL END PLAY

REQUIREMENT

GENERATOR SHAFT ROTATING, CLUTCH SHOULD TRIP CONSISTENTLY WHEN TWO KEYLEVERS ARE DEPRESSED ALTERNATELY. CLUTCH SHOULD NOT TRIP WHEN TWO KEYLEVERS ARE DEPRESSED SIMULTANEOUSLY. WHEN EITHER Q OR P KEYLEVER IS FULLY DEPRESSED, CLEARANCE SHOULD BE

MIN SOME CLEARANCE

MAX 0.020 INCH

BETWEEN TIP OF WEDGELOCK AND BOTTOM OF CHANNEL.

TO ADJUST

POSITION CHANNEL WITH MOUNTING SCREWS LOOSENED. POSITION LOCK BALL ADJUSTING SCREW APPROXIMATELY 0.060 INCH ABOVE BOTTOM OF BALL CHANNEL.

5. 16 Codebar Assembly continued

CODE LEVER BAIL LATCH LEVER ECCENTRIC

(1) REQUIREMENT

KEYLEVER WITH SHORTEST DOWNWARD STROKE FULLY DEPRESSED. CLEARANCE BETWEEN FRONT VERTICAL SURFACE OF THE CODE LEVER BAIL EXTENSION AND THE STOP ON THE REAR END OF THE CODE LEVER BAIL LATCH LEVER.

MIN 0.025 INCH
MAX 0.040 INCH

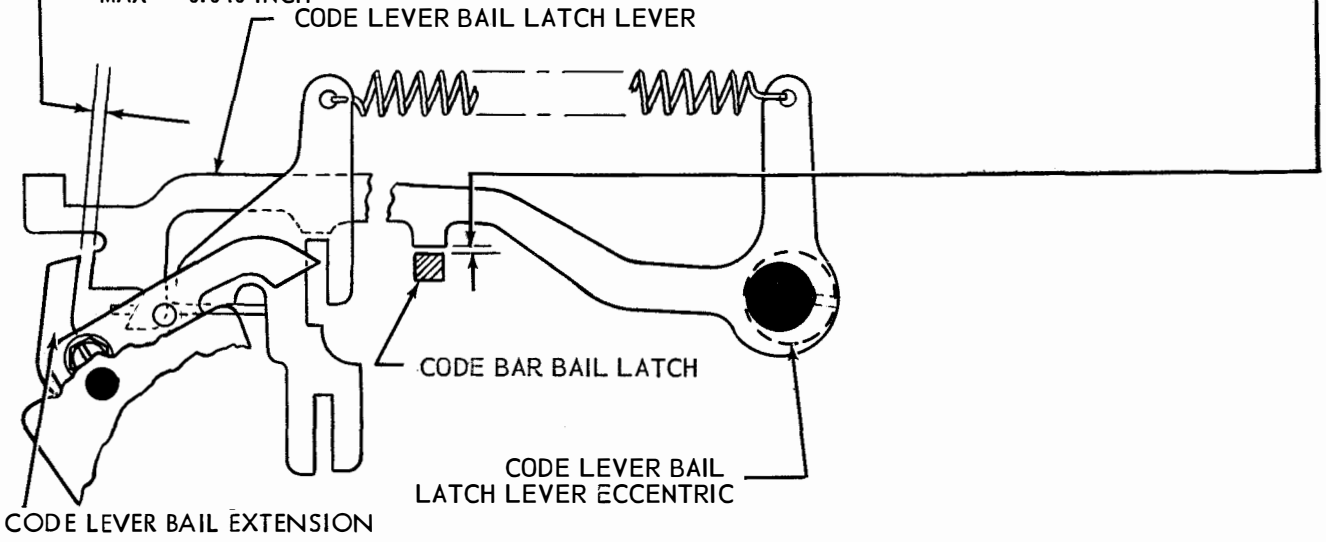
(2) REQUIREMENT

GENERATOR CLUTCH DISENGAGED. CLEARANCE BETWEEN CODE LEVER BAIL LATCH LEVER AND THE CODE BAR BAIL LATCH

MIN 0.005 INCH
MAX 0.035 INCH

TO ADJUST

ROTATE THE CODE LEVER BAIL LATCH LEVER ECCENTRIC.



CODE LEVER BAIL SPRING

REQUIREMENT

GENERATOR CLUTCH DISENGAGED. NON REPEAT LEVER HELD AWAY.

MIN 1-3/4 OZ
MAX 3 OZ

TO START THE BAIL MOVING.

CODE BAR GUIDES

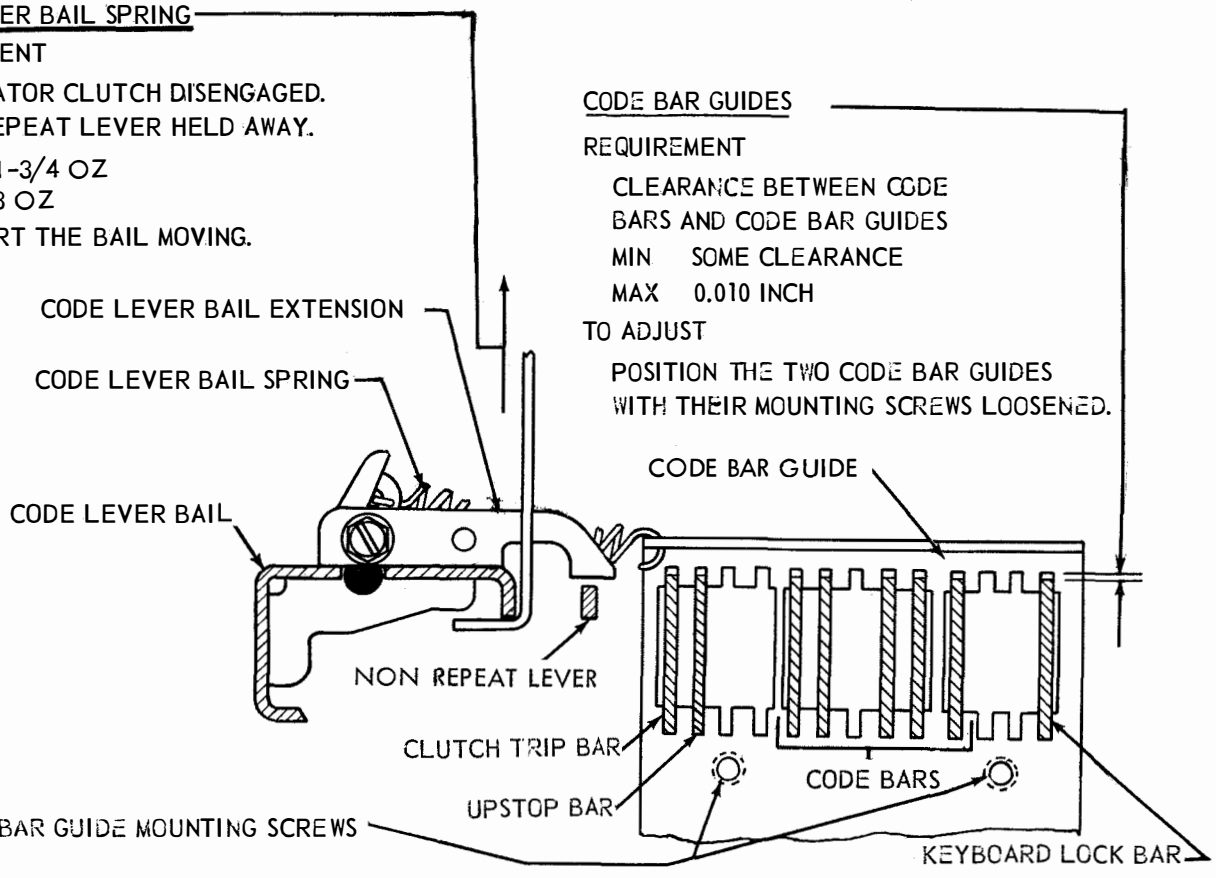
REQUIREMENT

CLEARANCE BETWEEN CODE BARS AND CODE BAR GUIDES

MIN SOME CLEARANCE
MAX 0.010 INCH

TO ADJUST

POSITION THE TWO CODE BAR GUIDES WITH THEIR MOUNTING SCREWS LOOSENED.



5. 17 Codebar Assembly continued

CODE LEVER BAIL NON REPEAT EXTENSION

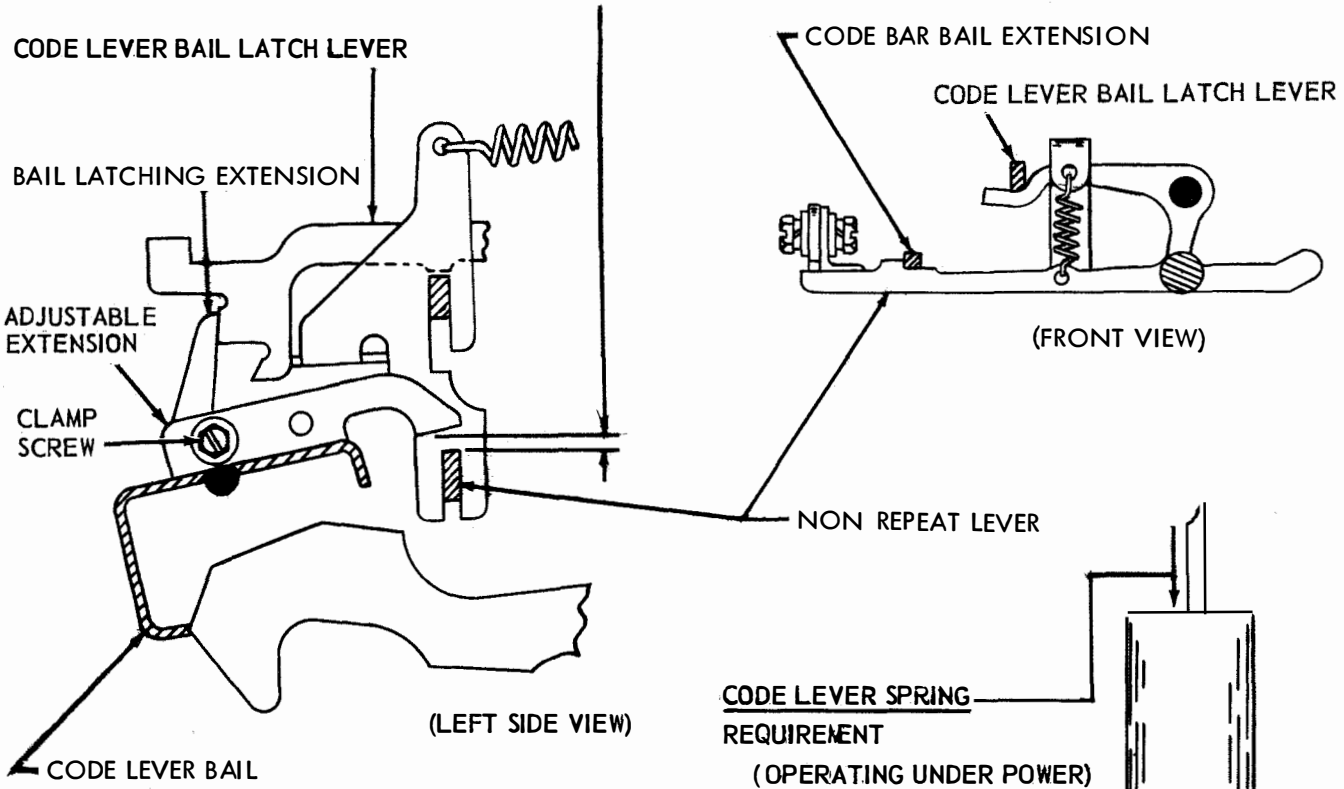
REQUIREMENT

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

MIN SOME CLEARANCE---MAX 0.015 INCH BETWEEN ADJUSTABLE EXTENSION AND NON REPEAT LEVER.

TO ADJUST

POSITION ADJUSTABLE EXTENSION WITH CLAMP SCREW LOOSENED.



CODE LEVER SPRING

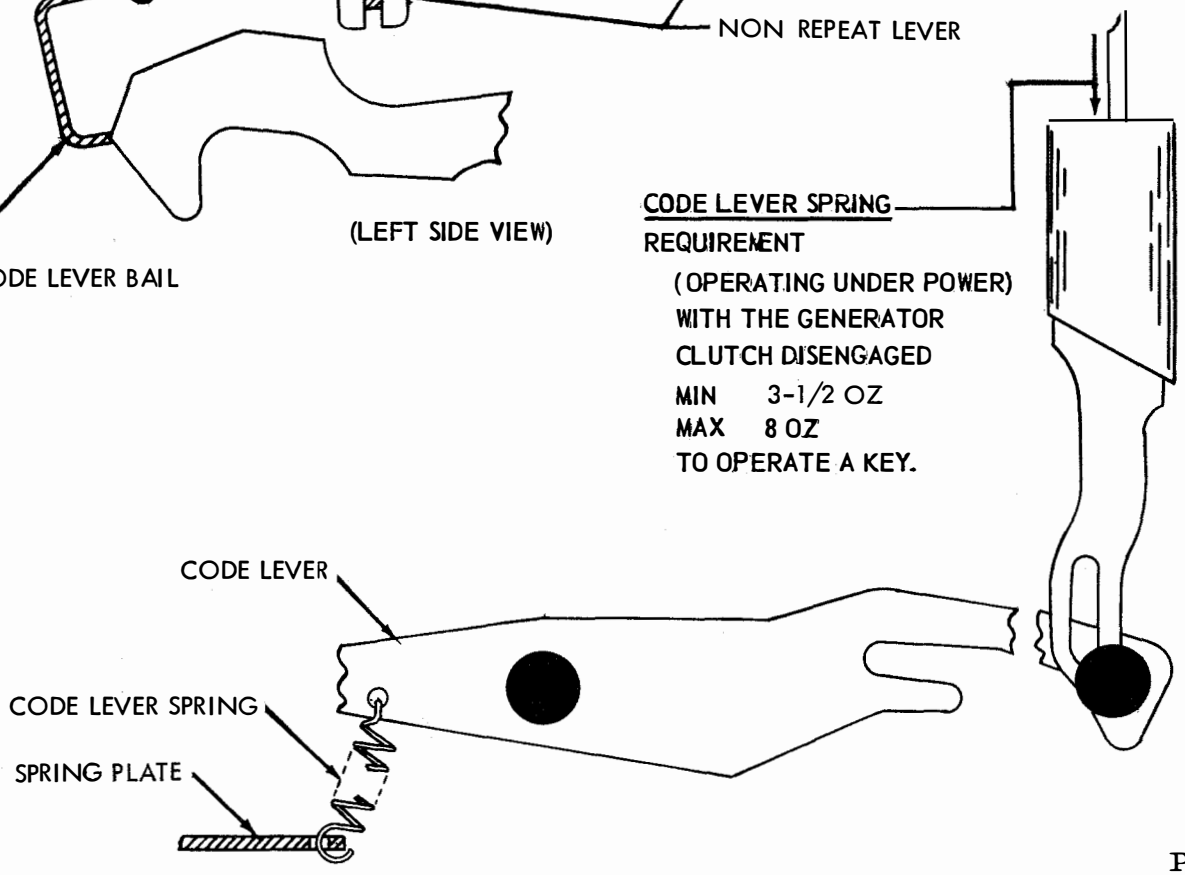
REQUIREMENT

(OPERATING UNDER POWER) WITH THE GENERATOR CLUTCH DISENGAGED

MIN 3-1/2 OZ

MAX 8 OZ

TO OPERATE A KEY.



5. 18 Codebar Assembly continued

LOCK BAR SPRING

REQUIREMENT

GENERATOR CLUTCH DISENGAGED.
KEYBOARD LOCK KEY HELD DEPRESSED.
MIN 5 OZ
MAX 9 OZ
TO START LOCK BAR MOVING.

CODE BAR SPRING

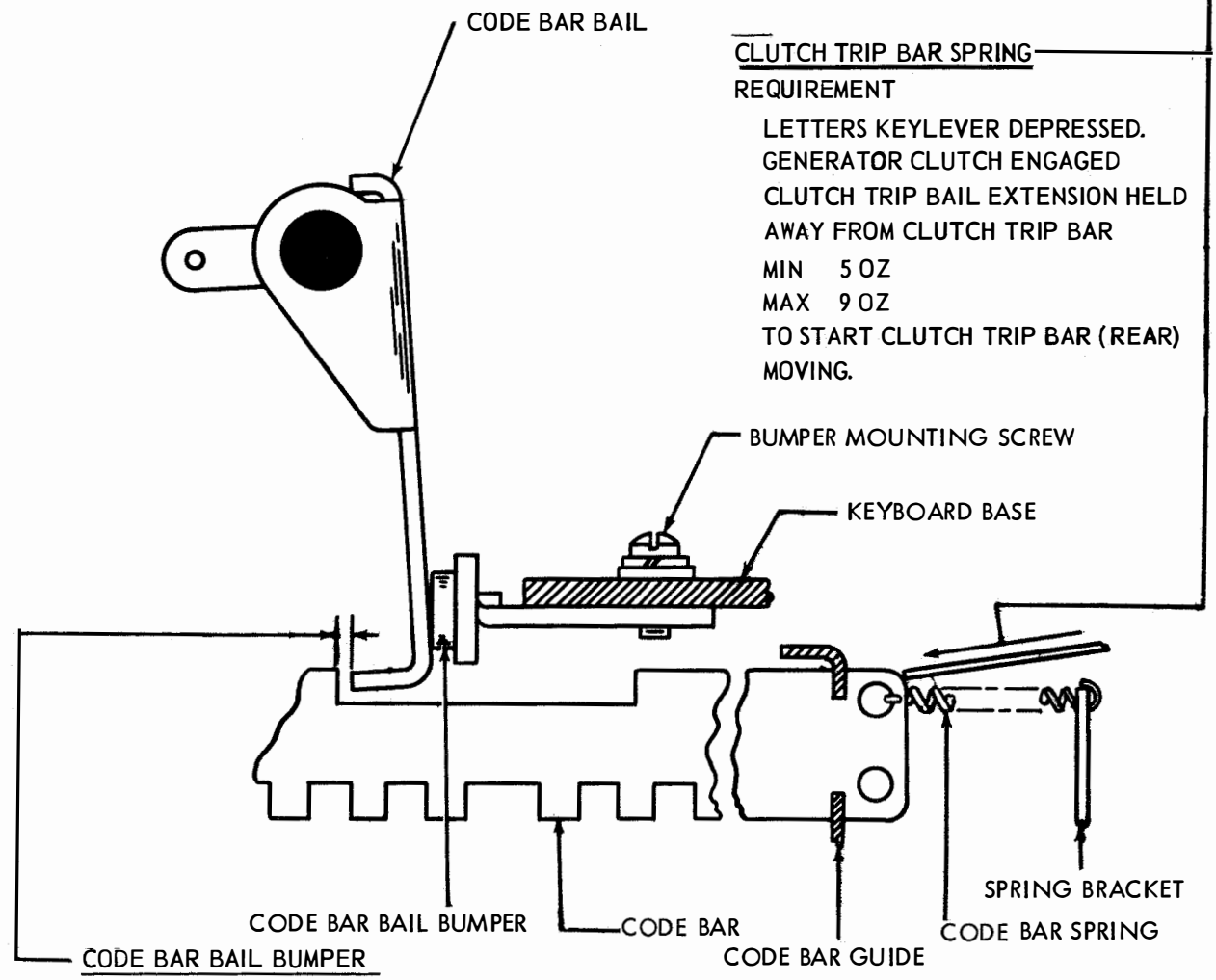
REQUIREMENT

LETTERS KEYLEVER DEPRESSED.
GENERATOR CLUTCH ENGAGED.
MIN 3 OZ
MAX 4 OZ
TO START A CODE BAR MOVING.

CLUTCH TRIP BAR SPRING

REQUIREMENT

LETTERS KEYLEVER DEPRESSED.
GENERATOR CLUTCH ENGAGED
CLUTCH TRIP BAIL EXTENSION HELD AWAY FROM CLUTCH TRIP BAR
MIN 5 OZ
MAX 9 OZ
TO START CLUTCH TRIP BAR (REAR) MOVING.



REQUIREMENT

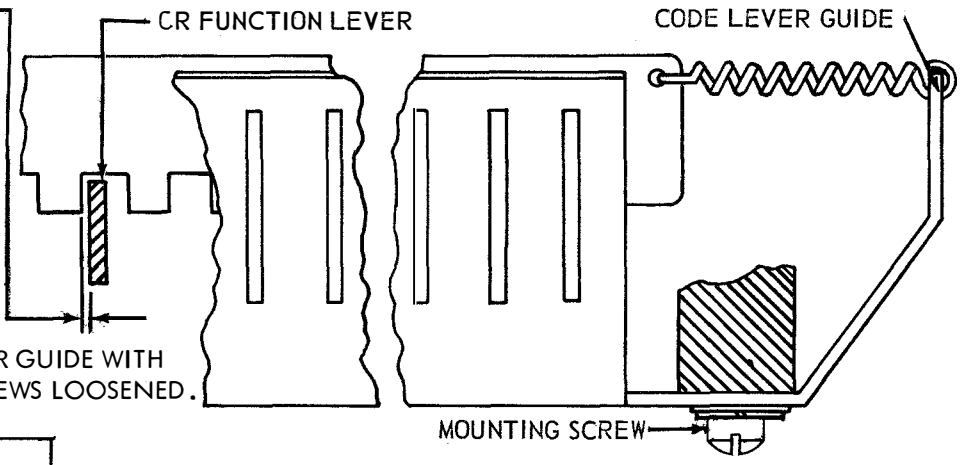
LETTERS SELECTION APPLIED TO CODE BAR.
CLEARANCE BETWEEN SHOULDER ON CLOSEST CODE BAR AND ENGAGING FACE OF CODE BAR BAIL.
MIN 0.010 INCH
MAX 0.020 INCH

TO ADJUST

POSITION BUMPER WITH MOUNTING SCREWS.
LOOSENED.

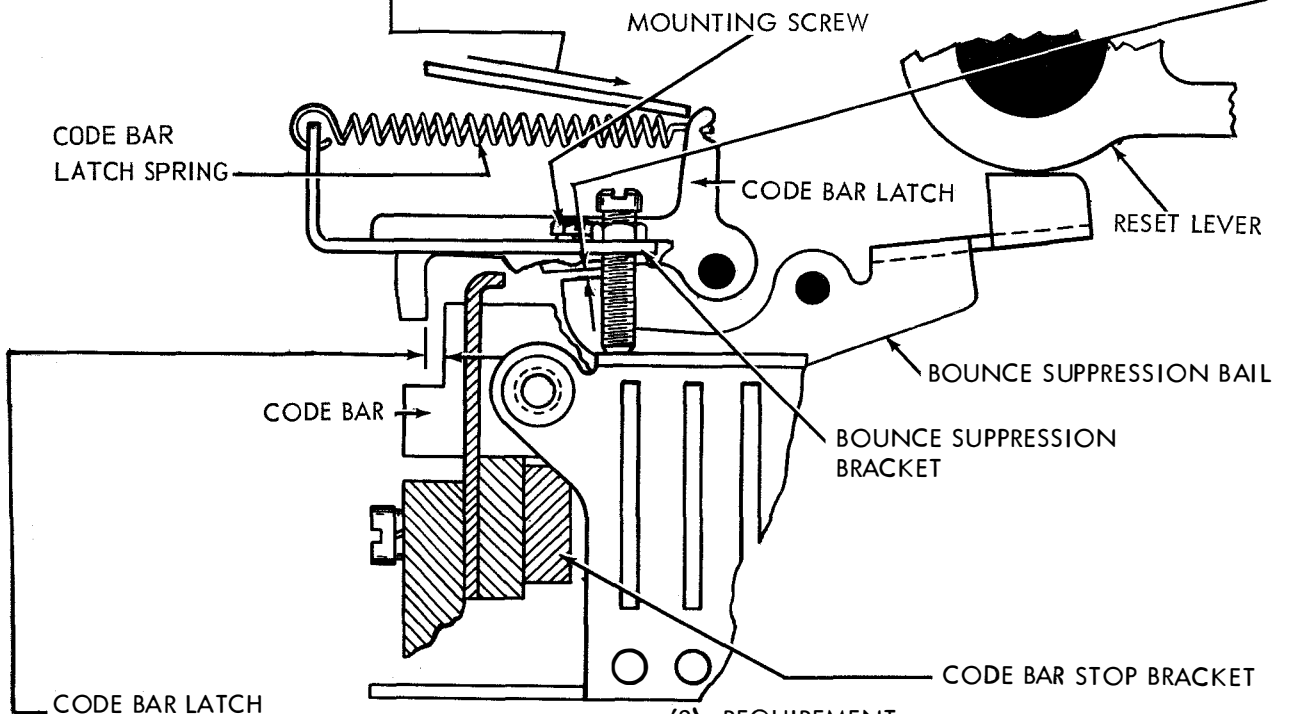
5. 19 Codebar Assembly continued

CODE LEVER GUIDE
REQUIREMENT
CR KEYLEVER HELD DEPRESSED WHILE DISENGAGING CLUTCH. CLEARANCE BETWEEN CR FUNCTION LEVER AND STOPPING EDGE OF NUMBER 5 CODEBAR
MIN 0.005 INCH
MAX 0.015 INCH
TO ADJUST
POSITION THE CODE LEVER GUIDE WITH ITS FOUR MOUNTING SCREWS LOOSENED.



CODE BAR LATCH SPRING
REQUIREMENT
GENERATOR CLUTCH COMPLETELY DISENGAGED
MIN 1/4 OZ
MAX 1-1/4 OZ
TO START LATCH MOVING.

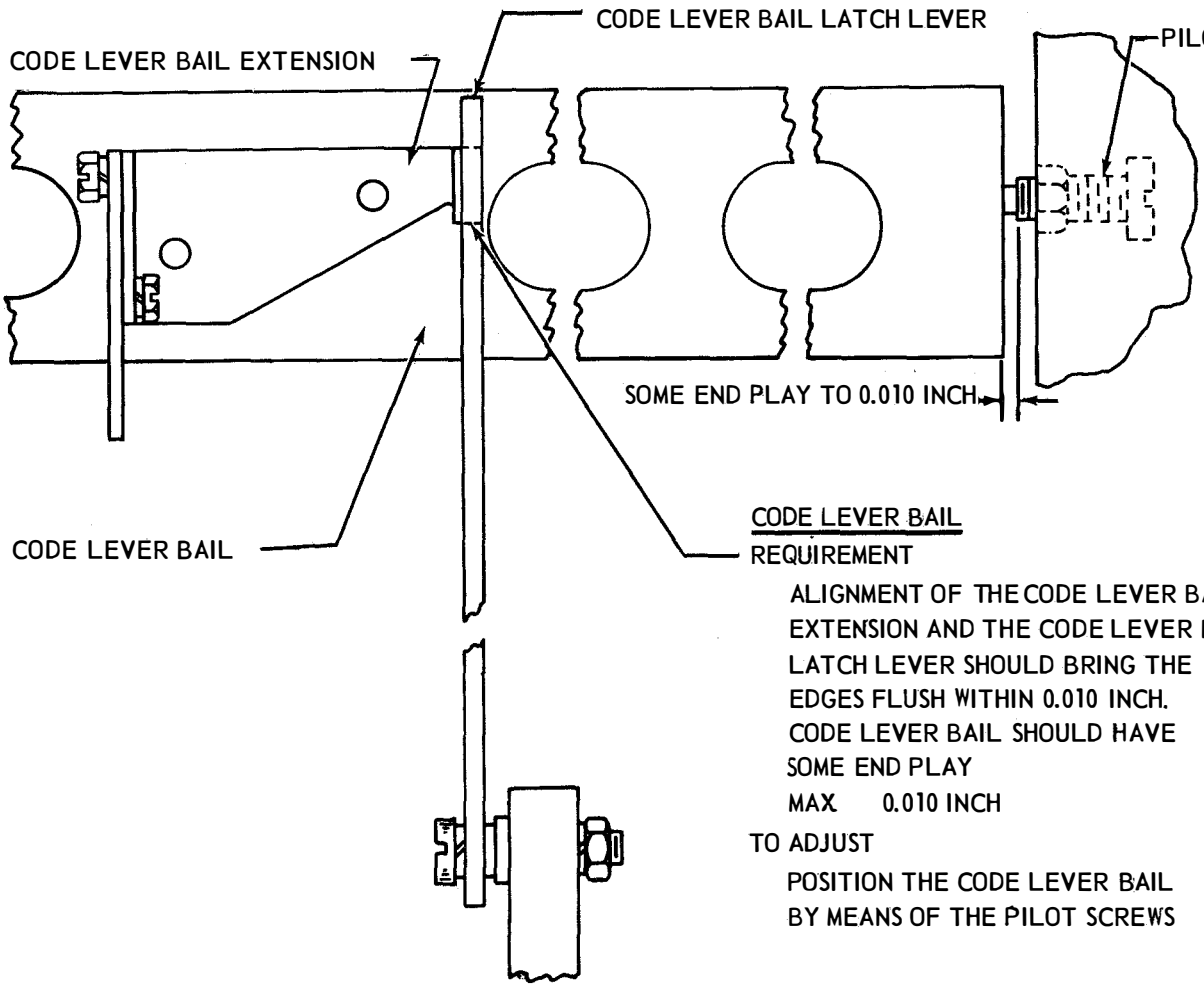
CODE BAR BOUNCE SUPPRESSOR BRACKET SUPPORT SCREW
REQUIREMENT
GENERATOR CLUTCH DISENGAGED, LETTERS SELECTION APPLIED TO CODE BARS, BOUNCE SUPPRESSOR BAIL HELD AGAINST RESET LEVER WITH PRESSURE OF 3 OUNCES APPLIED VERTICALLY TO BAIL BETWEEN NO. 2 AND NO. 3 CODE BAR LATCH, CLEARANCE BETWEEN BOUNCE SUPPRESSOR BAIL AND NO. 5 CODE BAR LATCH SHOULD BE
MIN SOME CLEARANCE---MAX 0.015 INCH
TO ADJUST
POSITION SUPPORT SCREW WITH ITS LOCK NUT LOOSENED.



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
MIN 0.010 INCH---MAX 0.025 INCH

(2) REQUIREMENT
BOUNCE SUPPRESSOR BAIL SHOULD RIDE CENTRALLY ON RESET LEVER.
TO ADJUST
POSITION BOUNCE SUPPRESSOR BRACKET WITH MOUNTING SCREWS LOOSENED.

5. 20 Keyboard Assembly



CODE LEVER BAIL

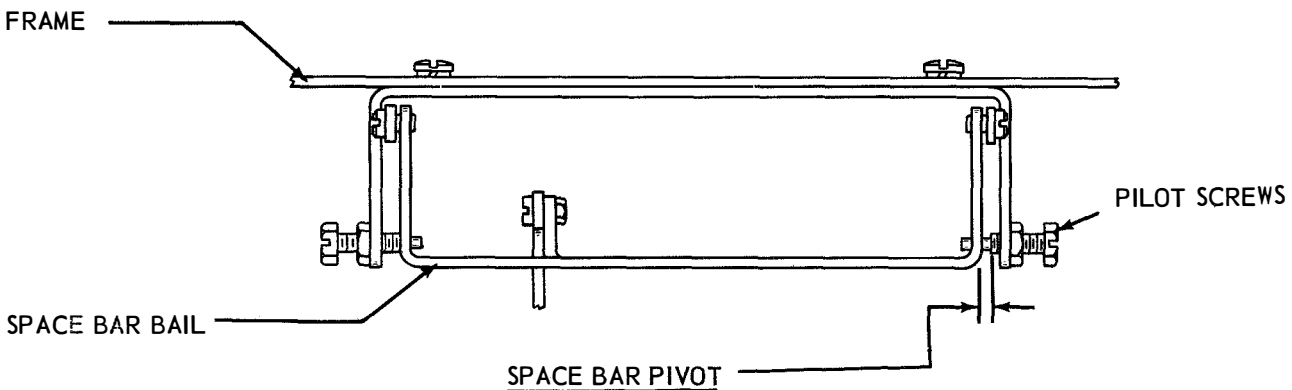
REQUIREMENT

ALIGNMENT OF THE CODE LEVER BAIL EXTENSION AND THE CODE LEVER BAIL LATCH LEVER SHOULD BRING THE EDGES FLUSH WITHIN 0.010 INCH. CODE LEVER BAIL SHOULD HAVE SOME END PLAY

MAX 0.010 INCH

TO ADJUST

POSITION THE CODE LEVER BAIL BY MEANS OF THE PILOT SCREWS



SPACE BAR PIVOT

REQUIREMENT

THE SPACE BAR SHOULD BE FREE ON ITS PIVOTS AND HAVE SOME END PLAY

MAX 0.010 INCH

TO ADJUST

POSITION THE SPACE BAR BAIL PILOT SCREWS.

5.21 Interrelated Features

(1) REQUIREMENT

THERE SHOULD BE A BARELY PERCEPTIBLE AMOUNT OF BACKLASH BETWEEN THE INTERMEDIATE DRIVING GEAR AND THE INTERMEDIATE DRIVEN GEAR AT THE POINT WHERE THE BACKLASH IS THE LEAST.

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

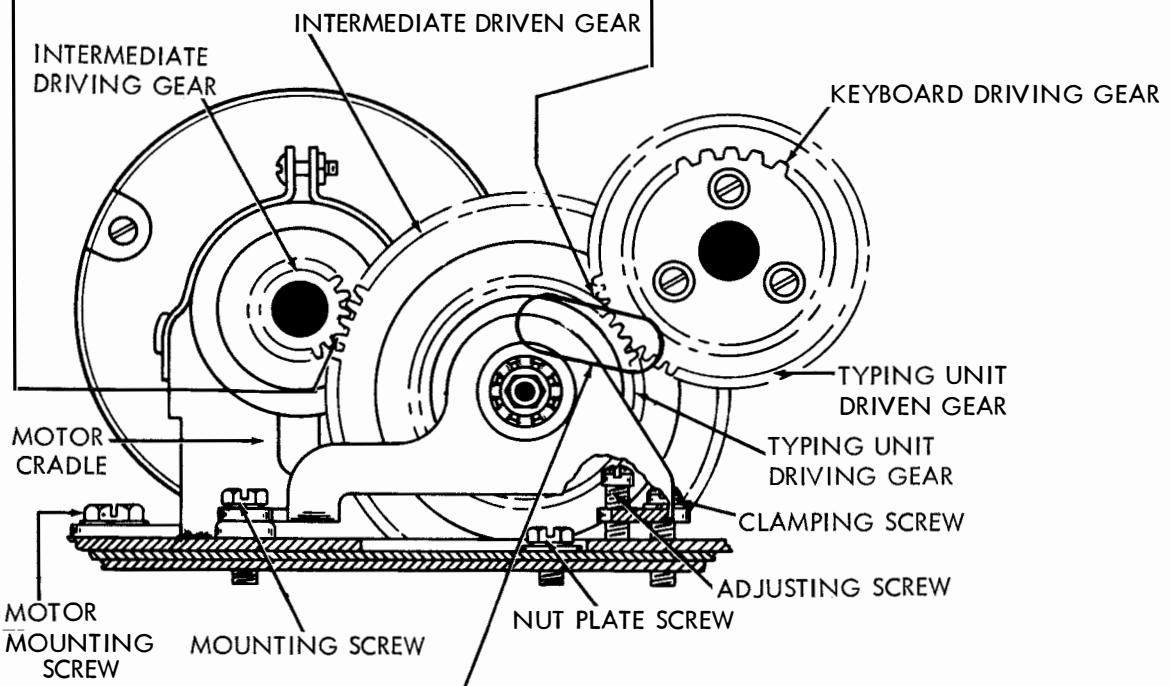
(A) INTERMEDIATE GEAR BRACKET

(1) REQUIREMENT

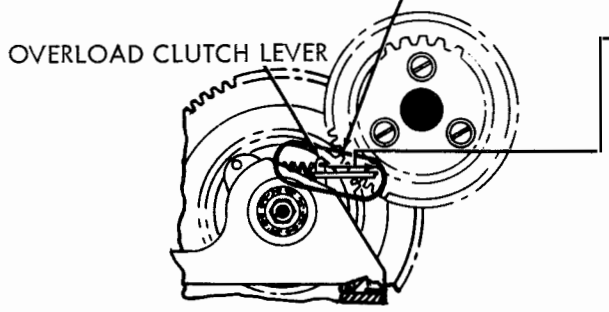
THERE SHOULD BE A BARELY PERCEPTIBLE AMOUNT OF BACKLASH BETWEEN THE TYPING UNIT DRIVEN GEAR AND THE TYPING UNIT DRIVING GEAR AT THE POINT WHERE BACKLASH IS THE LEAST.

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.



NOTE: OVERLOAD MECHANISM SPRING ADJUSTMENT APPLIES ONLY TO UNITS SO EQUIPPED



(B) OVERLOAD MECHANISM SPRING

REQUIREMENT

OVERLOAD CLUTCH LEVER IN ITS NOTCH

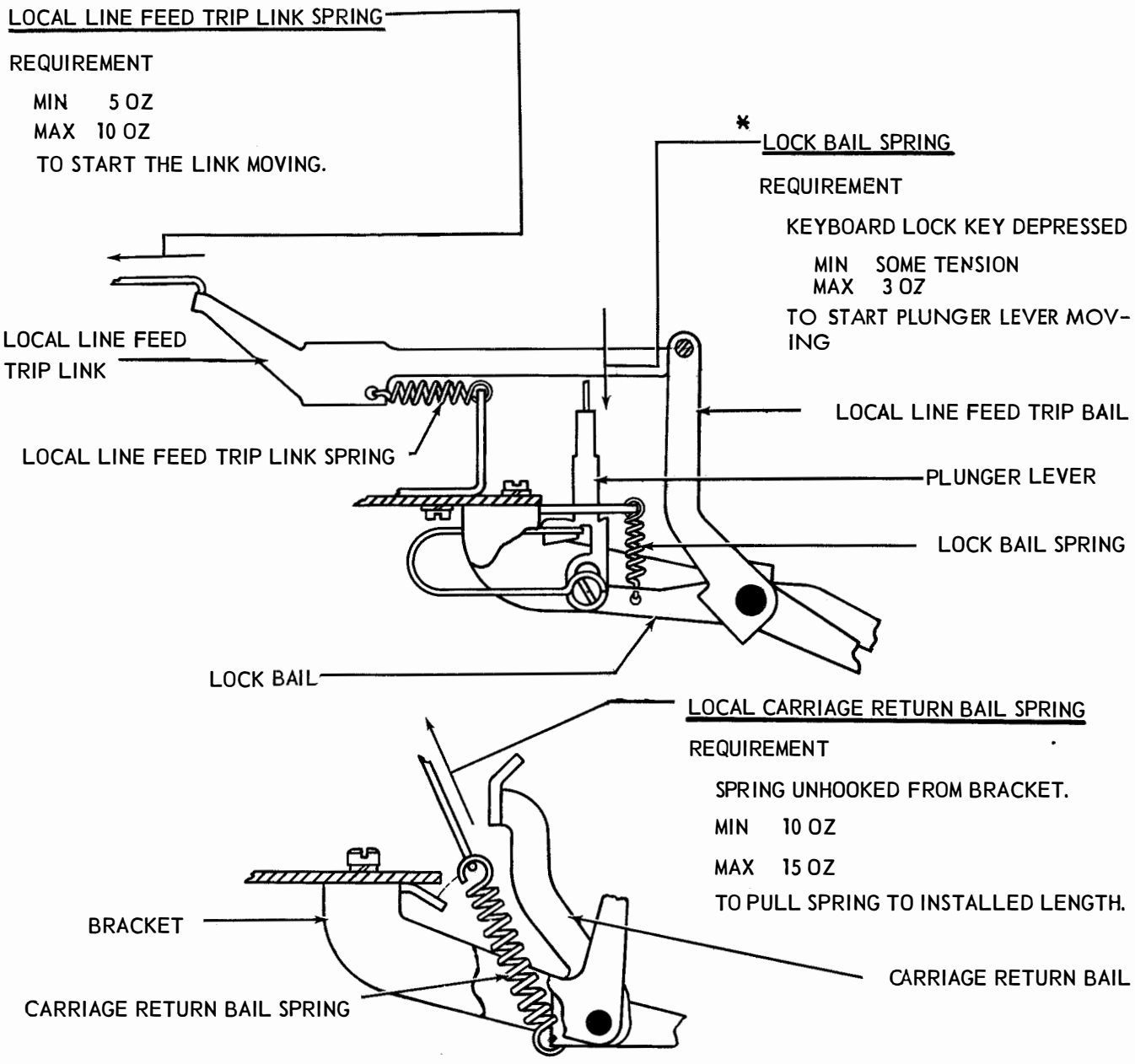
MIN 40 OZ

MAX 64 OZ

TO START LEVER MOVING

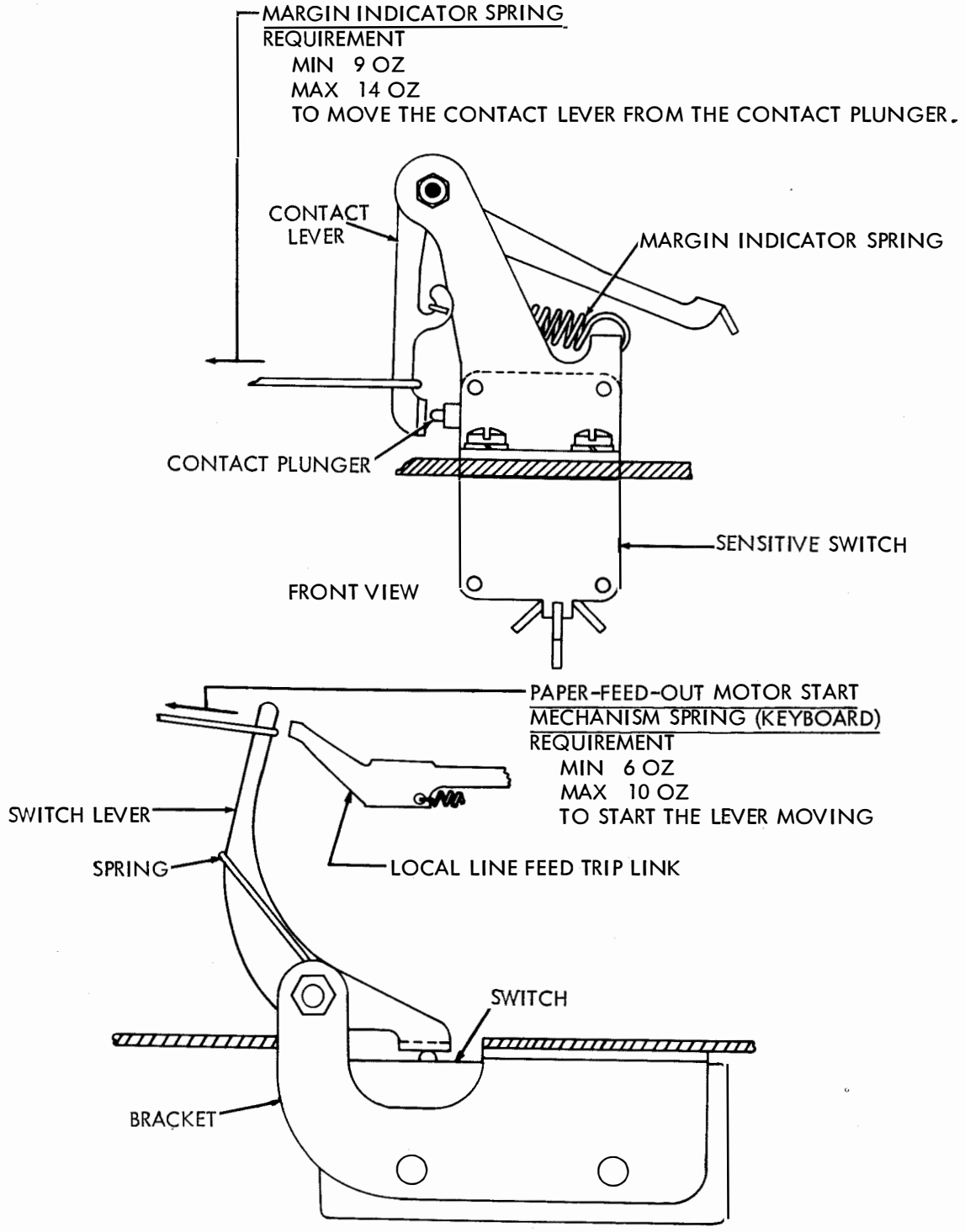
LEVER MUST NOT JUMP FROM NOTCH WITH LESS THAN 64 OUNCES.

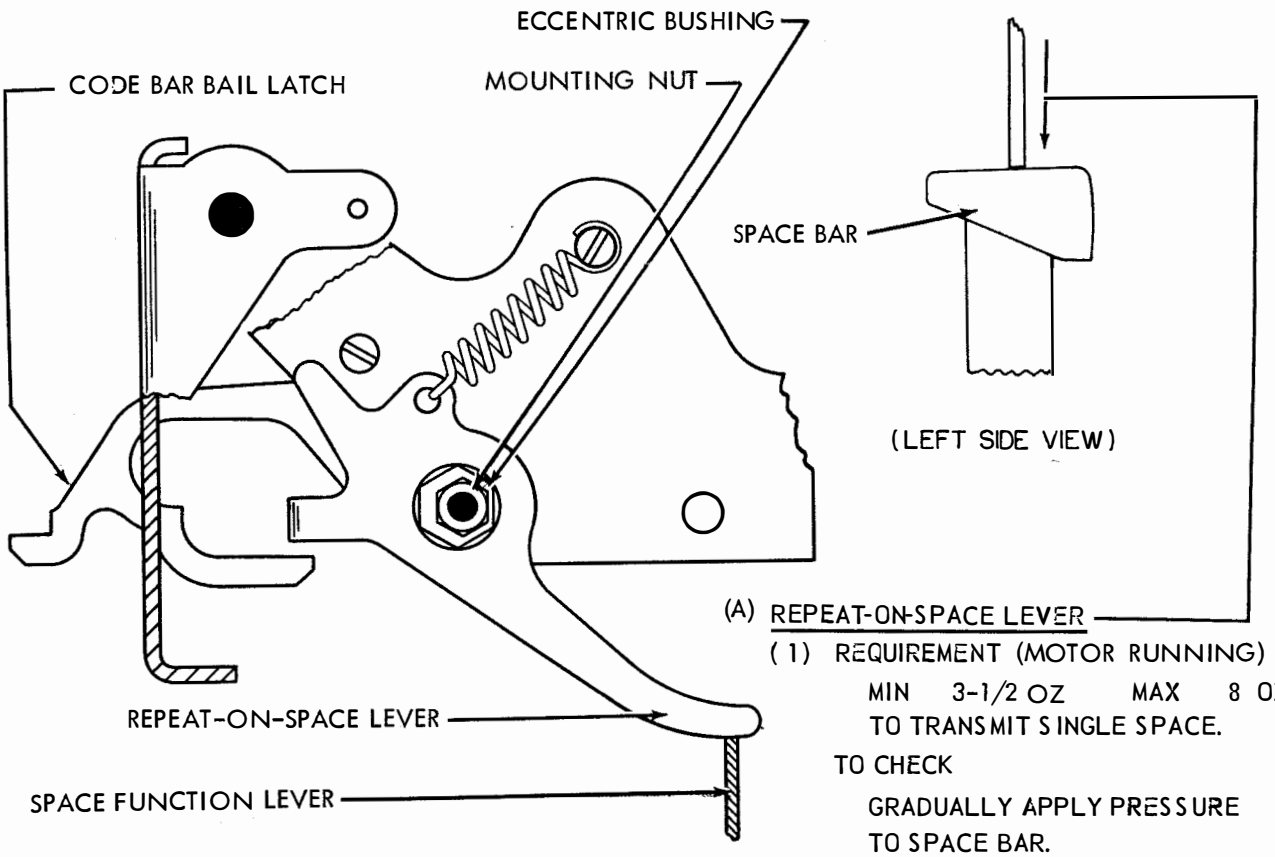
5.22 Keyboard Assembly continued



* APPLIES TO KEYBOARD ONLY

5.23 Keyboard Assembly continued





(A) REPEAT-ON-SPACE LEVER

(1) REQUIREMENT (MOTOR RUNNING)
MIN 3-1/2 OZ MAX 8 OZ
TO TRANSMIT SINGLE SPACE.

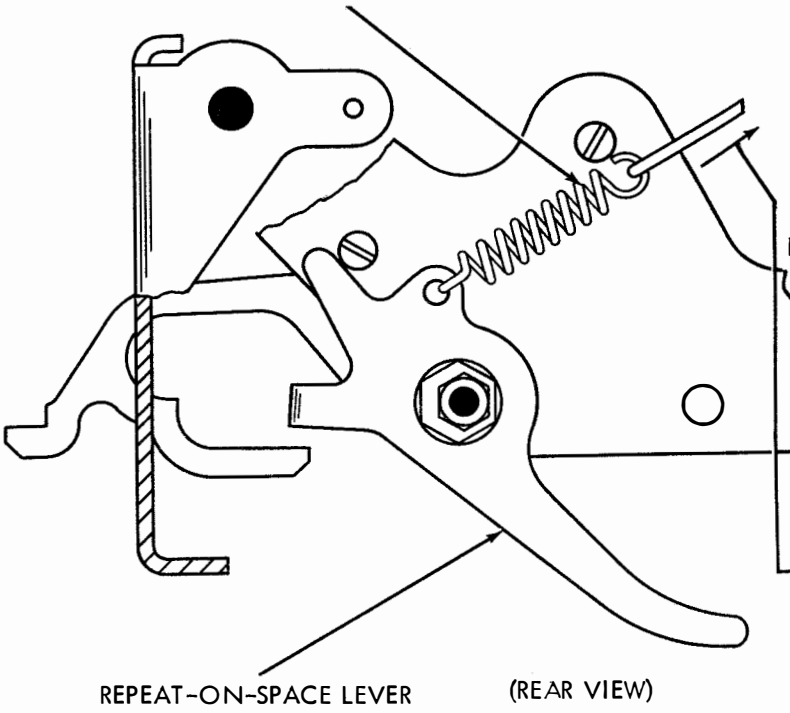
TO CHECK
GRADUALLY APPLY PRESSURE TO SPACE BAR.

(2) REQUIREMENT (MOTOR RUNNING)
MAX 10 OZ
TO EFFECT CONTINUOUS SPACE TRANSMISSION.

TO CHECK
ABRUPTLY APPLY PRESSURE TO SPACE BAR AND HOLD IT DOWN.

NOTE: ABRUPT OPERATION IS NECESSARY TO DISABLE CODE BAR BAIL LATCH WITHIN THE 10 OZ MAX. REQUIREMENT.

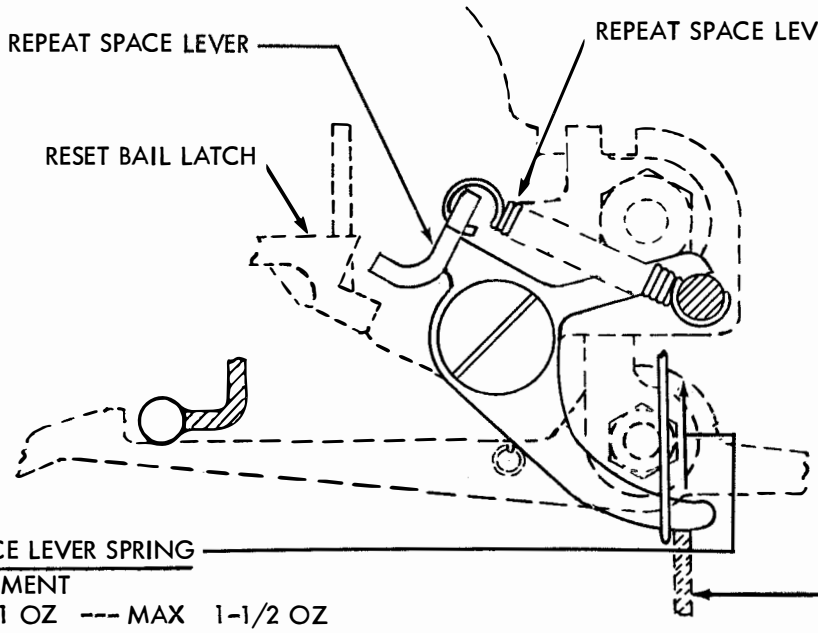
TO ADJUST
FULLY DEPRESS SPACE BAR. POSITION ECCENTRIC BUSHING WITH MOUNTING NUT FRICTION TIGHT, GENERATOR SHAFT ROTATING UNDER POWER.



(B) REPEAT-ON-SPACE LEVER SPRING

REQUIREMENT
GENERATOR CLUTCH DISENGAGED
SPRING UNHOOKED FROM POST
MIN 1/2 OZ
MAX 1-1/2 OZ
TO PULL SPRING TO POSITION LENGTH.

5.25 Variable Features continued



REPEAT SPACE LEVER SPRING

(1) REQUIREMENT
MIN 1 OZ --- MAX 1-1/2 OZ
TO PULL REPEAT SPACE LEVER IN ENGAGEMENT WITH RESET BAIL LATCH.

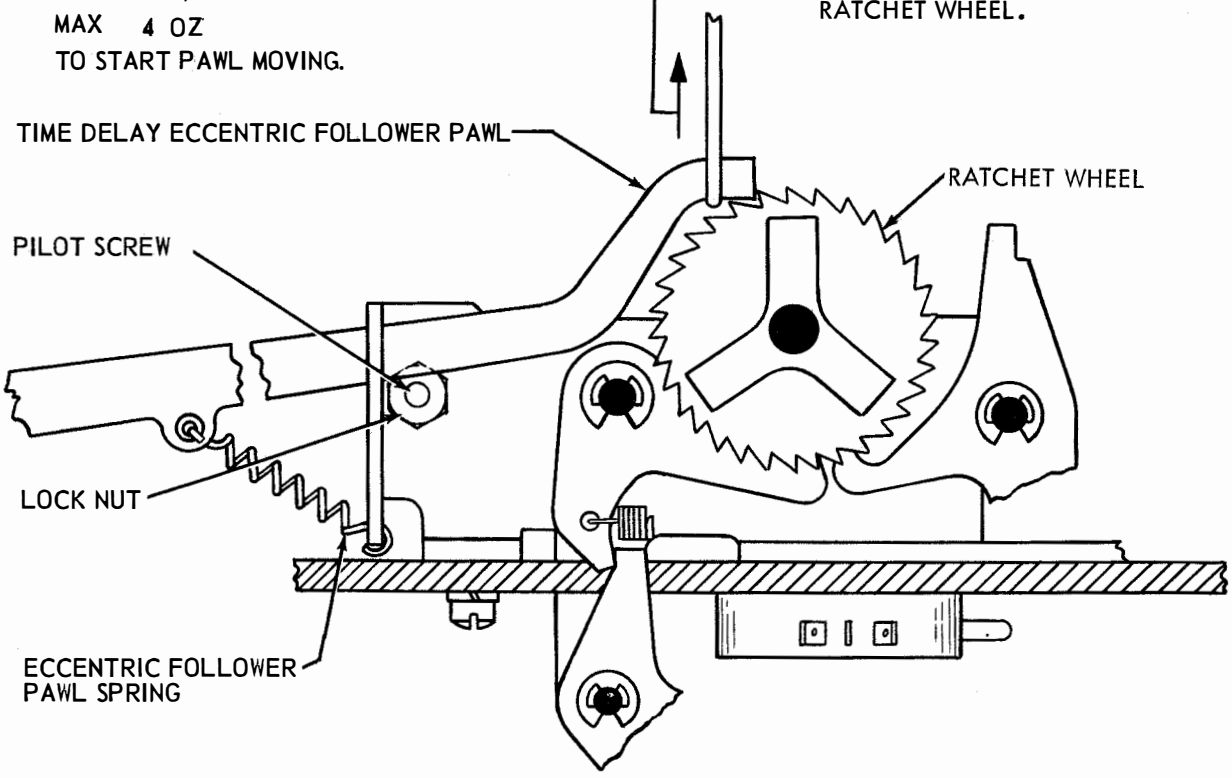
(2) REQUIREMENT
WITH POWER APPLIED AND THE SPACE BAR FULLY DEPRESSED, THE SPACE CHARACTER SHOULD BE REPEATED AS LONG AS THE SPACE BAR IS HELD DEPRESSED.

ECCENTRIC FOLLOWER PAWL SPRING

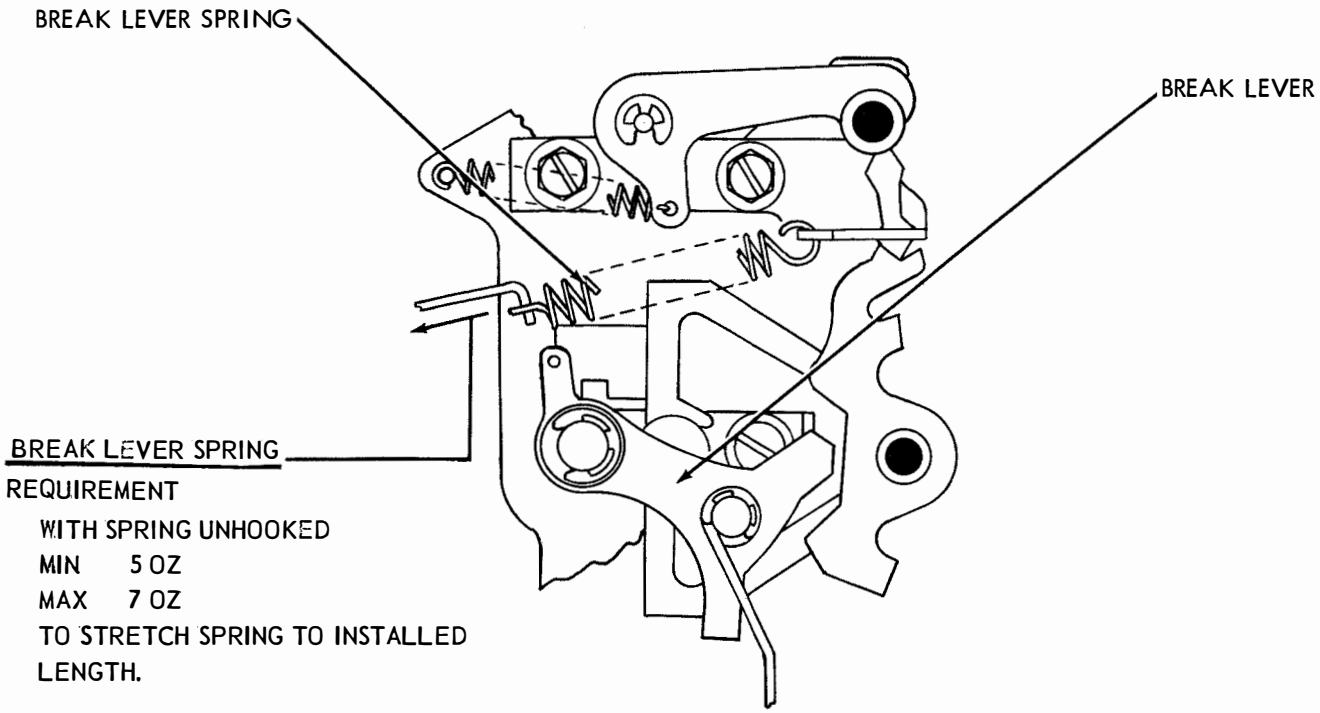
REQUIREMENT
ECCENTRIC FOLLOWER PAWL IN EXTREME FORWARD POSITION. 8 OZ SCALE APPLIED TO PAWL NEAR RATCHET WHEEL AND PULLED UPWARD
MIN 1-1/2 OZ
MAX 4 OZ
TO START PAWL MOVING.

TIME DELAY DISABLING DEVICE

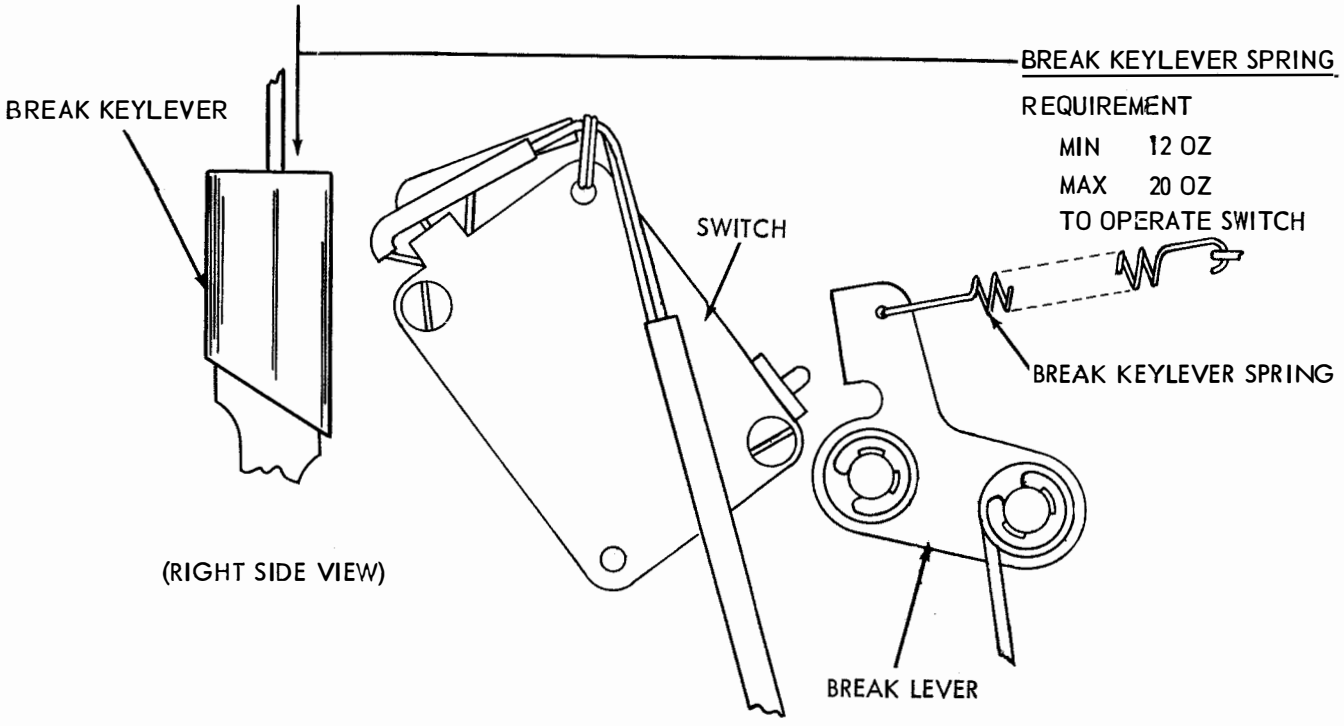
REQUIREMENT
DISABLE THE TIME DELAY MECHANISM WHEN NOT REQUIRED
TO ADJUST
RAISE THE PILOT SCREW (LOCK NUT LOOSENED) AND ECCENTRIC FOLLOWER PAWL UNTIL THE PAWL CLEARS THE RATCHET WHEEL.



5. 26 Variable Features continued



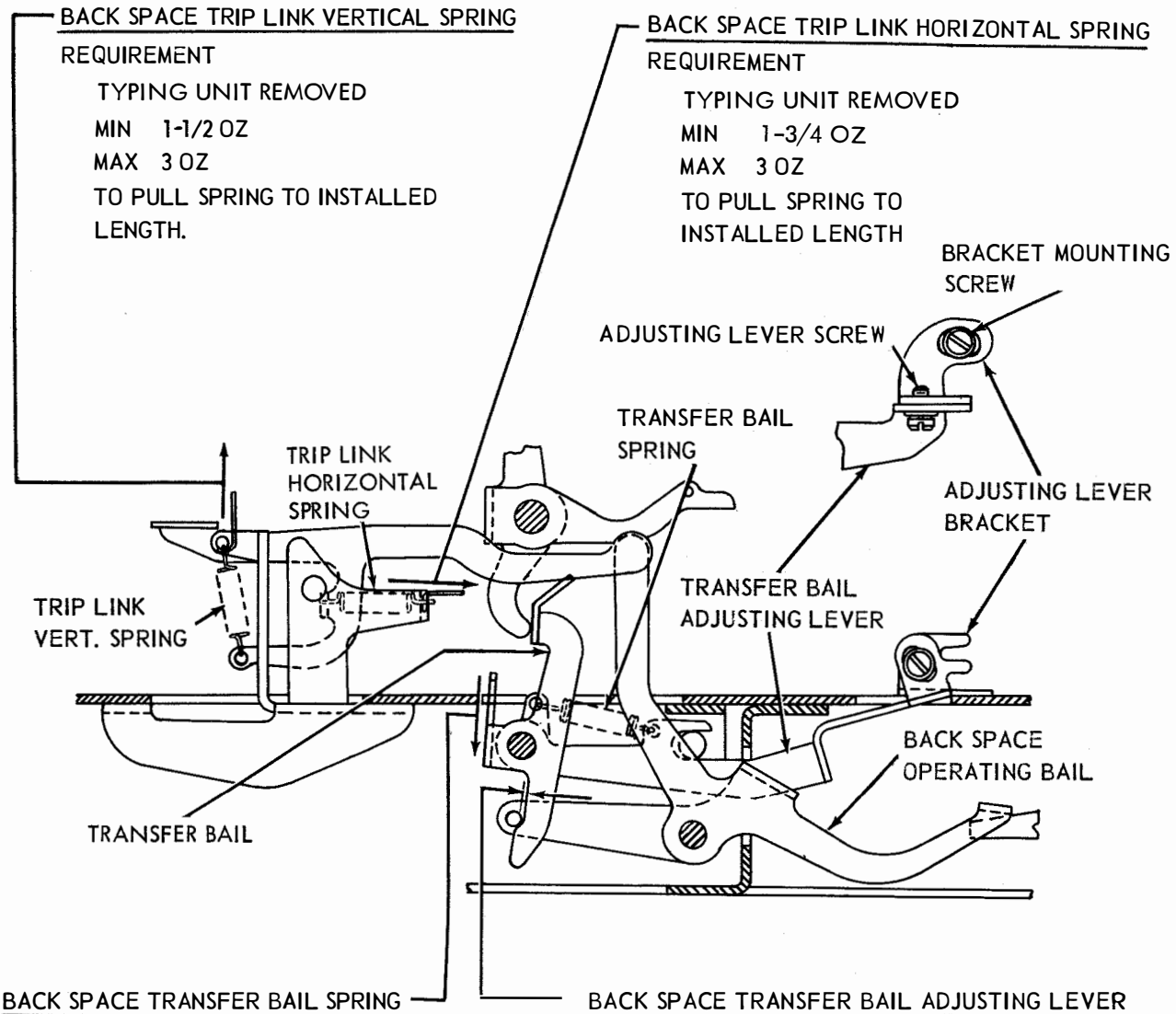
MECHANICAL
(REAR VIEW)



(RIGHT SIDE VIEW)

ELECTRICAL
(REAR VIEW)

5.27 Variable Features continued



BACK SPACE TRANSFER BAIL SPRING

REQUIREMENT

MIN 1/4 OZ

MAX 1-1/4 OZ

TO START BAIL MOVING

NOTE

IN ORDER TO PUSH VERTICALLY DOWNWARD ON THE BAIL, THE ADJUSTING LEVER MAY HAVE TO BE MOVED TOWARD FRONT OF UNIT. REMAKE TRANSFER BAIL ADJUSTING LEVER HORIZONTAL ADJUSTMENT.

BACK SPACE TRANSFER BAIL ADJUSTING LEVER

REQUIREMENT (VERTICAL ADJUSTMENT)

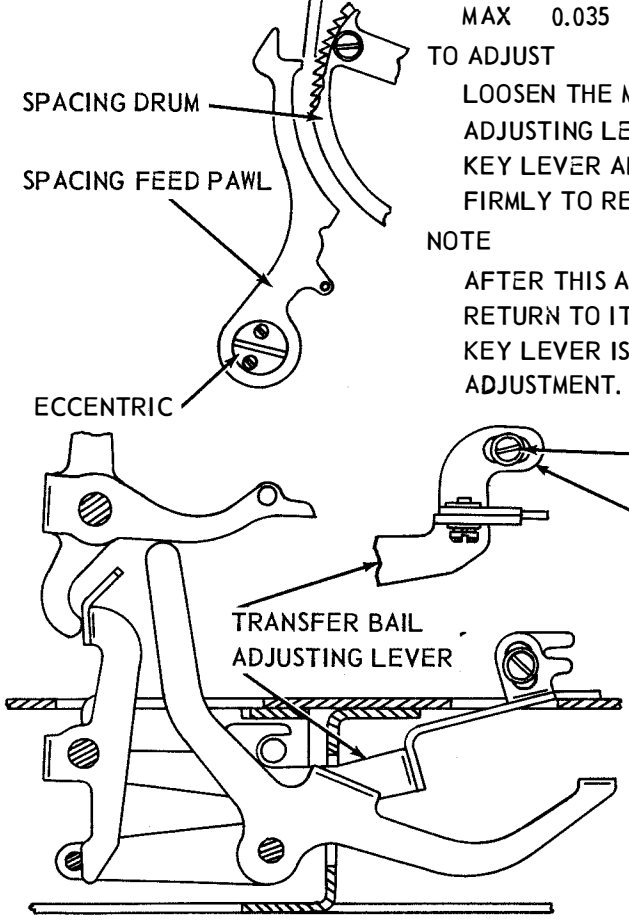
WITH THE TYPING UNIT REMOVED, THERE SHOULD BE SOME CLEARANCE BETWEEN THE TRANSFER BAIL AND THE STUD ON THE BACK SPACE OPERATING BAIL.

MAX 0.006 INCH

TO ADJUST

POSITION THE ADJUSTING LEVER BRACKET NEAR THE CENTER OF ITS ADJUSTING RANGE. POSITION THE ADJUSTING LEVER UP OR DOWN WITH ITS ADJUSTING LEVER SCREW FRICTION TIGHT TO MEET THE REQUIREMENT.

5.28 Variable Features continued



BACK SPACE TRANSFER BAIL ADJUSTING LEVER HORIZONTAL

REQUIREMENT

TYPING UNIT INSTALLED, SPACING CLUTCH DISENGAGED, FRONT FEED PAWL IN LOWER POSITION. BACK SPACE KEY LEVER HELD DEPRESSED, MAIN SHAFT ROTATED UNTIL FRONT FEED PAWL IS OPPOSITE THE PEAK OF THE FIRST RATCHET WHEEL TOOTH THAT MOVES DOWNWARD PAST THE PAWL TOOTH. CLEARANCE SHOULD BE:

MIN 0.020
MAX 0.035

TO ADJUST

LOOSEN THE MOUNTING SCREW ON THE TRANSFER BAIL ADJUSTING LEVER BRACKET. DEPRESS THE BACK SPACE KEY LEVER AND PUSH THE ADJUSTING LEVER AND BRACKET FIRMLY TO REAR. TIGHTEN THE BRACKET MOUNTING SCREW.

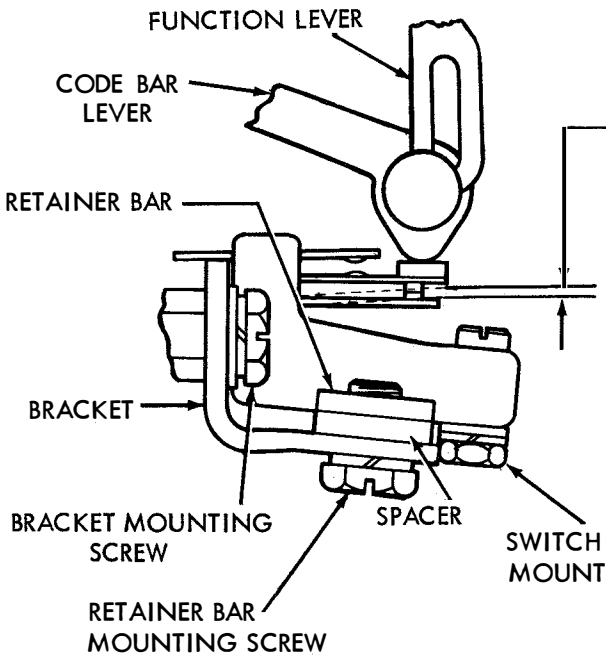
NOTE

AFTER THIS ADJUSTMENT THE CAMMING BAIL SHOULD RETURN TO ITS UNOPERATED POSITION WHEN THE KEY LEVER IS RELEASED. IF IT DOES NOT RETURN REFINE THE ADJUSTMENT. RECHECK THE TRANSFER BAIL VERTICAL ADJUSTMENT

NOTE: IF A NEW TYPING UNIT IS INSTALLED ON THE BASE, THIS ADJUSTMENT SHOULD BE CHECKED.

5.29 Answer-Back Mechanism (Switched Circuit Network)
For Keyboards LK3, LK4 and LK5 (Bell 28A and 28C) "FIGS" "C"

"HERE-IS" KEYLEVER ADJUSTMENTS



(A) KEYBOARD UNIVERSAL SWITCH - (PRELIMINARY)
SEE PAR. 3.12 (A)

(B) KEYBOARD UNIVERSAL SWITCH - (HORIZONTAL)
SEE PAR. 3.12 (B)

(C) KEYBOARD UNIVERSAL SWITCH - VERTICAL
REQUIREMENT
CENTER AND LOWER CONTACTS SHOULD CLOSE WITH
MIN SOME
MAX 0.005 INCH
OF OVER-TRAVEL
TO ADJUST
POSITION RETAINER BAR ASSEMBLY WITH BRACKET MOUNTING SCREWS LOOSENED.

NOTE: KEEP CONTACTS FREE OF OIL AND GREASE

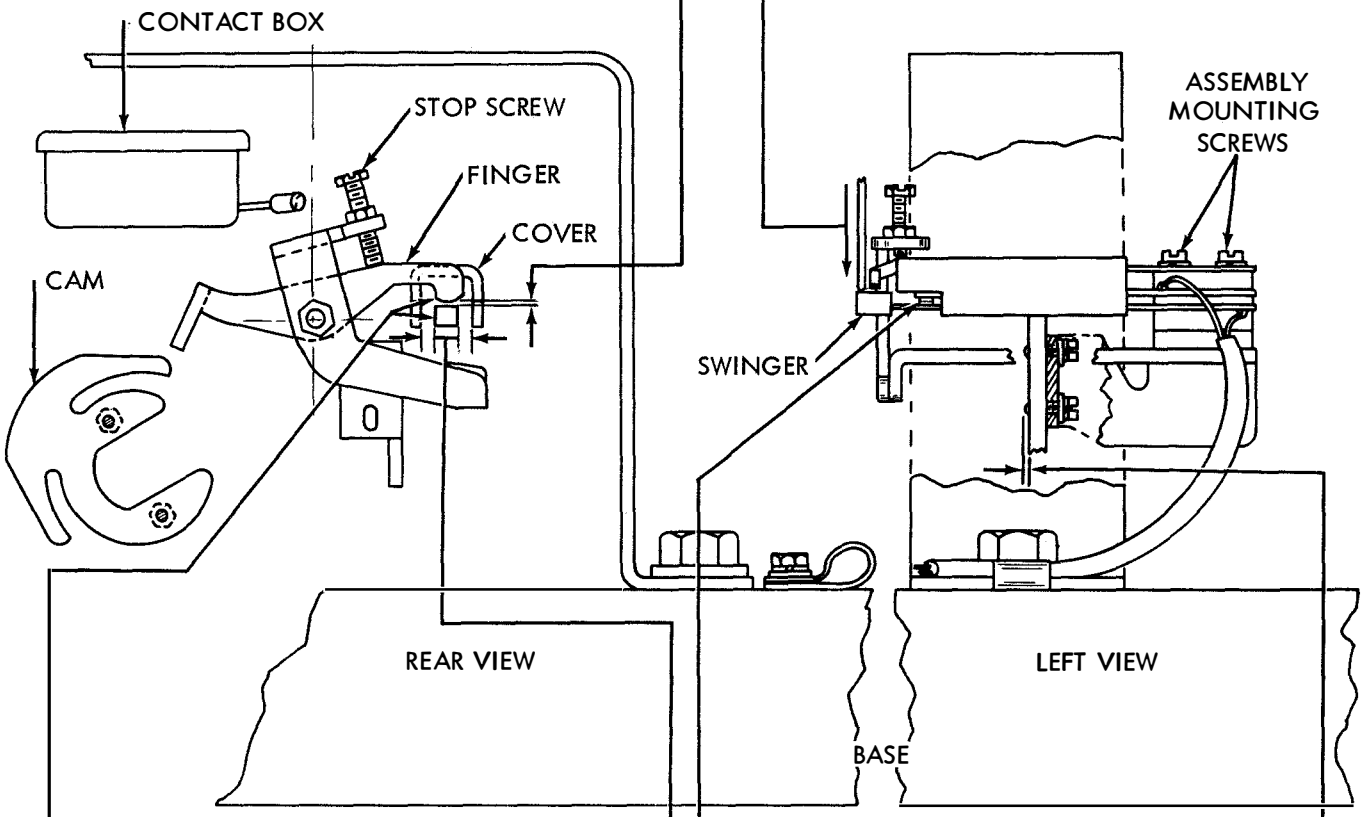
5.30 Answer-Back Mechanism (Switched Circuit Network)
For Keyboards LK3, LK4 and LK5 (Bell 28A and 28C) "FIGS" "C" continued

PERFORM ADJUSTMENTS ON THIS PAGE DURING INSTALLATION OF PULSING CONTACT ASSEMBLY.

NOTE: KEEP CONTACTS FREE OF GREASE AND OIL.

(C) STOP SCREW
REQUIREMENT
CLEARANCE BETWEEN FINGER AND SWINGER INSULATOR SHOULD BE
MIN 0.010 INCH --- MAX 0.020 INCH
TO CHECK
TRIP CLUTCH AND ROTATE MAIN SHAFT UNTIL FINGER EXTENSION DROPS OFF OF CAM.
TO ADJUST
POSITION STOP SCREW WITH LOCK NUT LOOSENED.

(B) SWINGER CONTACT LEAF
REQUIREMENT
WITH CONTACTS CLOSED
MIN 3-1/2 OZ
MAX 4-1/2 OZ
TO JUST SEPARATE THE CONTACTS
TO ADJUST
BEND SWINGER CONTACT LEAF. RECHECK (A).

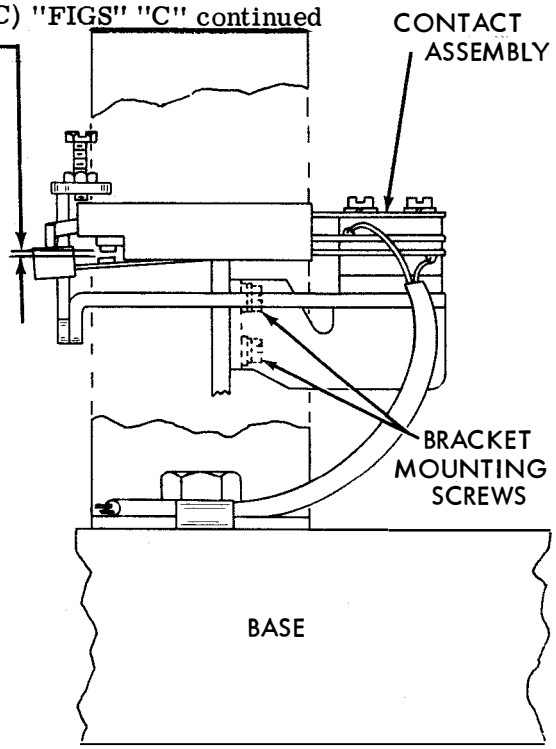


(A) CONTACT ASSEMBLY
REQUIREMENT
1. CLEARANCE BETWEEN CONTACT SWINGER INSULATOR AND SIDES OF CONTACT COVER SHOULD BE EQUAL WITHIN 0.015 INCH. GAUGE BY EYE.
2. SWINGER AND SWINGER OPERATING FINGER SHOULD ALIGN WITHIN 0.015 INCH GAUGE BY EYE.
3. CONTACTS ON CONTACT ASSEMBLY SHOULD ALIGN WITHIN 0.015 INCH
TO ADJUST
POSITION THE CONTACT ASSEMBLY PILE-UP WITH TWO MOUNTING SCREWS LOOSENED.

(D) CONTACT ASSEMBLY BRACKET MOUNTING SCREWS
REQUIREMENT
BRACKET MOUNTING SCREWS SHOULD NOT PROTRUDE MORE THAN 0.031 INCH BEYOND REAR SURFACE OF MOUNTING PLATE.
TO ADJUST
ADD FLAT WASHERS AS NECESSARY.

5.31 Answer-Back Mechanism (Switched Circuit Network)
For Keyboards LK3, LK4 and LK5 (Bell 28A and 28C) "FIGS" "C" continued

(A) PULSING CONTACTS
REQUIREMENT
(PERFORM THIS ADJUSTMENT DURING INSTALLATION OF CONTACTS)
CLEARANCE BETWEEN CONTACT POINTS SHOULD BE
MIN 0.015 INCH
MAX 0.025 INCH
TO CHECK
TRIP CLUTCH AND ROTATE MAIN SHAFT UNTIL FINGER EXTENSION IS ON PEAK OF CAM.
TO ADJUST
POSITION THE CONTACT ASSEMBLY BRACKET WITH BRACKET MOUNTING SCREWS LOOSENED.



LEFT VIEW

KEEP CONTACTS FREE OF OIL AND GREASE

MAKE THE FOLLOWING ADJUSTMENTS BEFORE INSTALLING CHARACTER GENERATOR MECHANISM ON KEYBOARD.

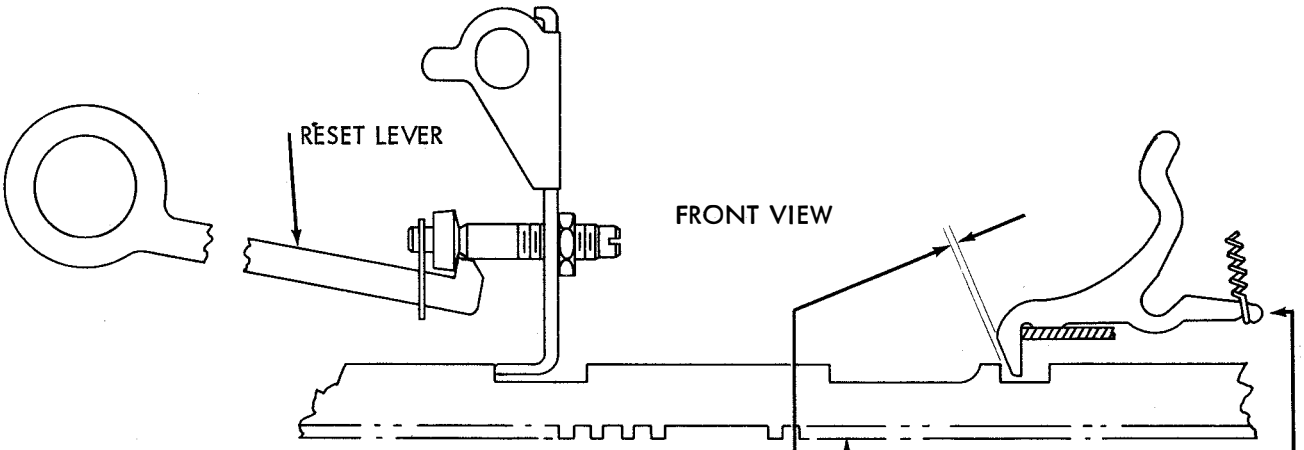
(B) MAGNET YOKE
SEE PAR. 3.17 (A)

(C) STOP LEVER LATCH
SEE PAR. 3.17 (B)

MAKE THE FOLLOWING ADJUSTMENTS DURING INSTALLATION OF ANSWER-BACK MECHANISM.

(D) SENSING LEVER SPRINGS
SEE PAR. 3.18 (B)

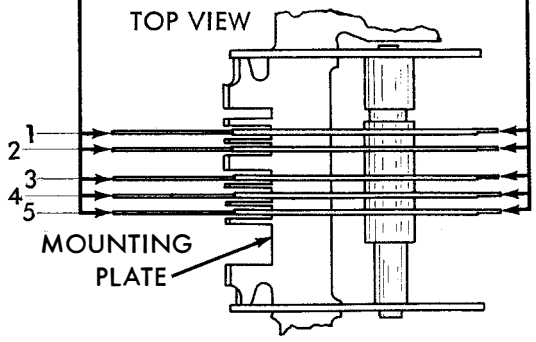
(E) DETENT LEVER SPRING
SEE PAR. 3.18 (C)



(F) CHARACTER GENERATOR MOUNTING PLATE
REQUIREMENT
1. CLEARANCE BETWEEN SHOULDERS OF CODE BARS #1 AND #5 AND THEIR ASSOCIATED SENSING LEVERS SHOULD BE MIN 0.008 INCH --- MAX 0.018 INCH
2. SENSING LEVERS SHOULD BE ALIGNED WITH THEIR ASSOCIATED CODE BARS.

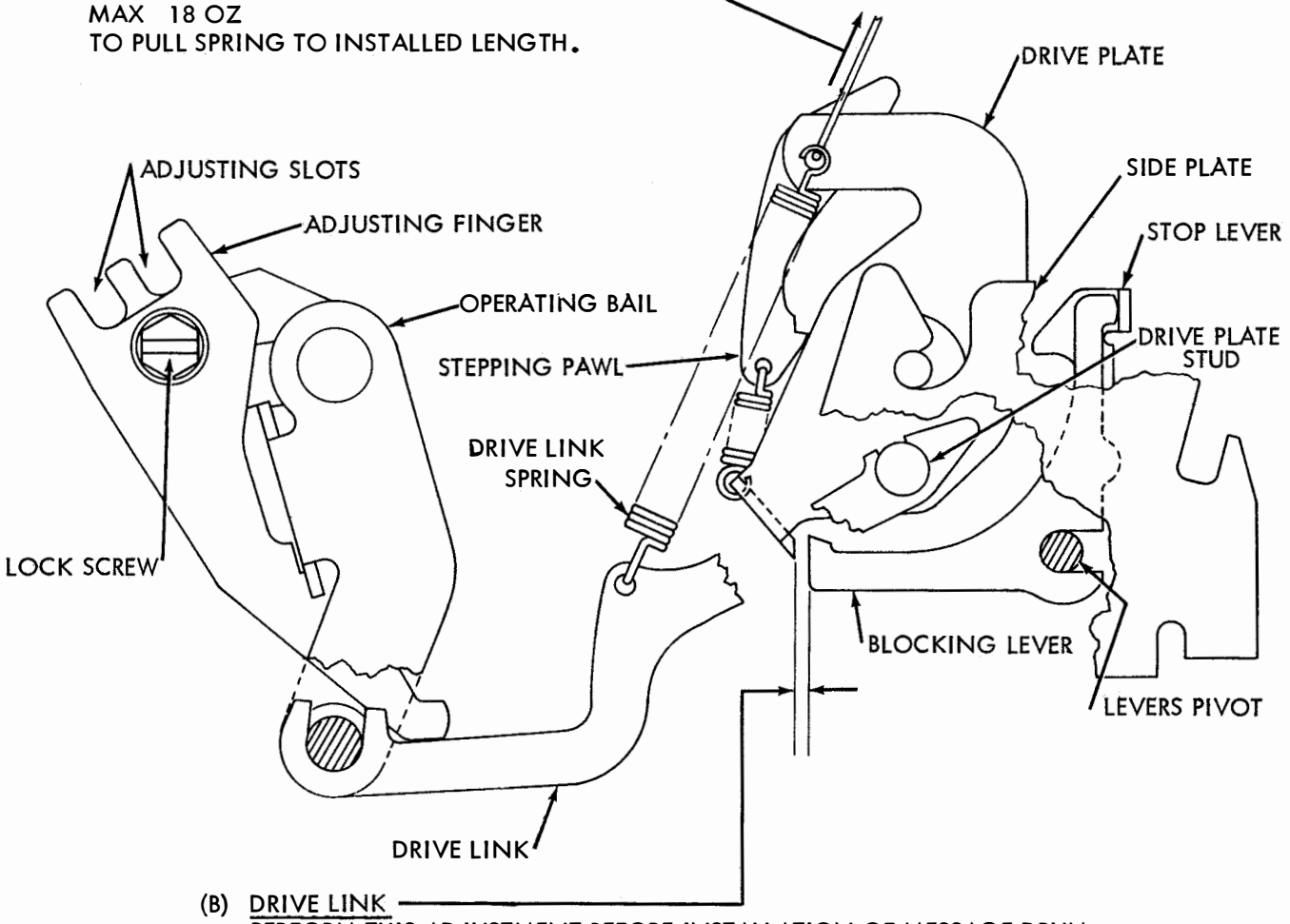
TO CHECK
WITH THE CLUTCH ENGAGED AND LETTERS COMBINATION SELECTED ROTATE MAIN SHAFT UNTIL RESET LEVER IS IN EXTREME LEFT POSITION.

TO ADJUST
POSITION MOUNTING PLATE WITH THE THREE MOUNTING SCREWS LOOSENED.



5.32 Answer-Back Mechanism (Switched Circuit Network)
For Keyboards LK3, LK4 and LK5 (Bell 28A and 28C) "FIGS" "C" continued

(A) DRIVE LINK SPRING
REQUIREMENT
WITH SIGNAL GENERATOR CLUTCH IN STOP POSITION
MIN 12 OZ
MAX 18 OZ
TO PULL SPRING TO INSTALLED LENGTH.



(B) DRIVE LINK
PERFORM THIS ADJUSTMENT BEFORE INSTALLATION OF MESSAGE DRUM AND DRIVE PLATE ASSEMBLY.
REQUIREMENT
CLEARANCE BETWEEN DRIVE PLATE EXTENSION AND BLOCKING LEVER SHOULD BE
MIN 0.002 INCH
MAX 0.007 INCH
TO CHECK
CODE BAR BAIL RESET LEVER IN EXTREME LEFT POSITION.
TO ADJUST
POSITION ADJUSTING FINGER AT ADJUSTING SLOTS WITH ADJUSTING FINGER LOCK-SCREW LOOSENED.

NOTE

THE STANDARD KEYBOARD ADJUSTMENTS LISTED BELOW SHOULD BE CHECKED DURING INSTALLATION OF THE ANSWER-BACK MECHANISM:
CODE BAR AND CODE LEVER CLEARANCE, PAR. 2.05 (D)
CODE BAR BAIL, PAR. 2.08 (B)
CODE BAR BAIL AND NON REPEAT LEVER CLEARANCE, PAR. 2.08 (D)
UNIVERSAL BAIL LATCH LEVER, PAR. 2.10
UNIVERSAL BAIL EXTENSION, PAR. 2.10

5.33 Answer-Back Mechanism (Switched Circuit Network)
For Keyboards LK3, LK4 and LK5 (Bell 28A and 28C) "FIGS" "C" continued

(A) STEPPING PAWL

MAKE THIS ADJUSTMENT AFTER INSTALLATION OF THE MECHANISM ON KEYBOARD.

REQUIREMENT

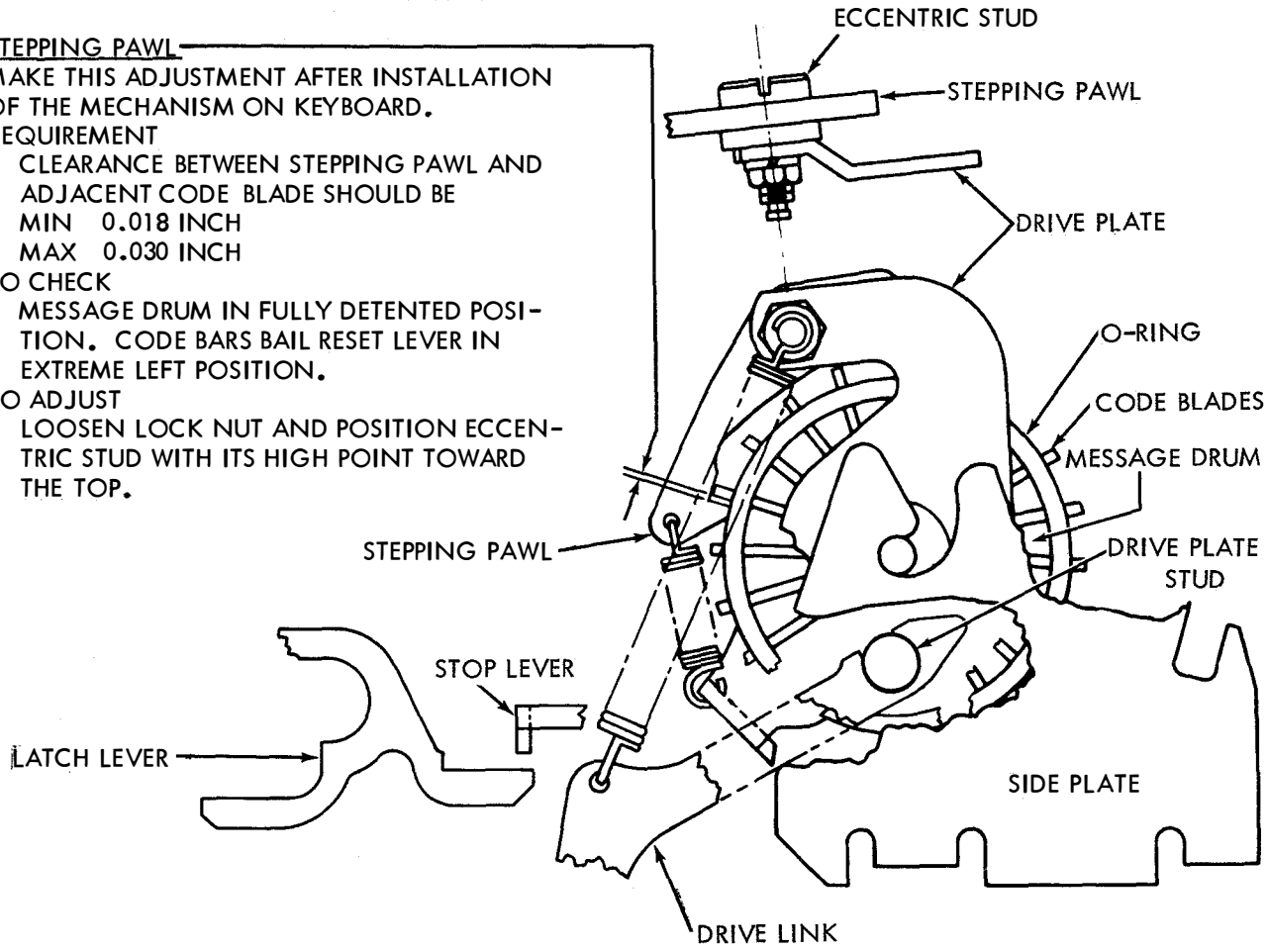
CLEARANCE BETWEEN STEPPING PAWL AND ADJACENT CODE BLADE SHOULD BE
MIN 0.018 INCH
MAX 0.030 INCH

TO CHECK

MESSAGE DRUM IN FULLY DETENTED POSITION. CODE BARS BAIL RESET LEVER IN EXTREME LEFT POSITION.

TO ADJUST

LOOSEN LOCK NUT AND POSITION ECCENTRIC STUD WITH ITS HIGH POINT TOWARD THE TOP.



(B) STEPPING PAWL SPRING

REQUIREMENT

MECHANISM IN STOP POSITION
MIN 2-1/2 OZ --- MAX 3-1/2 OZ
TO START PAWL MOVING.

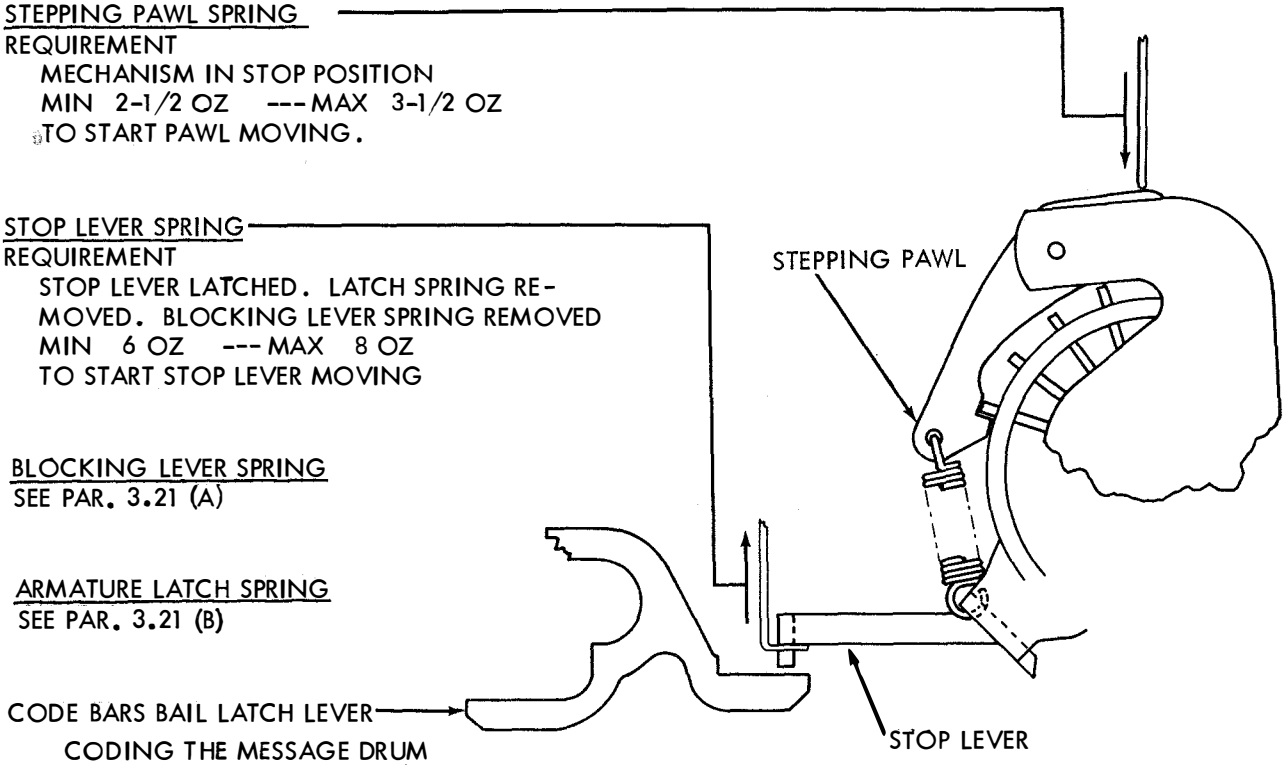
(C) STOP LEVER SPRING

REQUIREMENT

STOP LEVER LATCHED. LATCH SPRING REMOVED. BLOCKING LEVER SPRING REMOVED
MIN 6 OZ --- MAX 8 OZ
TO START STOP LEVER MOVING

BLOCKING LEVER SPRING
SEE PAR. 3.21 (A)

ARMATURE LATCH SPRING
SEE PAR. 3.21 (B)



CODING THE MESSAGE DRUM
SEE PAR. 3.22