BELL SYSTEM PRACTICES
Teletypewriter and Data Stations

SECTION P34.613
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AT&TCo Standard

28 SEQUENCE SELECTOR UNIT AND BASE

REQUIREMENTS AND ADJUSTMENTS

CONTENTS **PAR. NO.**

CONTENTS (Contd) **PAR. NO.**

1. GENERAL

1.01 This section contains the specific requirements and adjustments for the 28 sequence selector unit, base, gears, and motor and the assembled sequence selector. The material herein, together with the section containing the general requirements on teletypewriter apparatus, provides the complete adjusting information for maintenance.

1.02 This section is reissued to revise various adjustment requirements in accordance with changes authorized for this apparatus by P98 series Bell System Practices listed at the end of this section and to include other authorized revisions and additions so as to bring the section generally up to date. In the process of this revision, the title was changed and the lubrication and disassembly instructions, formerly contained herein, were transferred to individual sections. Since this is a general revision, the arrows ordinarily used to indicate changes have been omitted.

1.03 In this practice, all references to direction are indicated viewing the apparatus from the front. The sequence selector unit, removed from its base, can be placed safely in the following positions.

(1) Upright on its four feet.

(2) Tilted backward on its rear feet and the rear points of the side frames.

(3) Bottom upward, resting on the two upper points of each side frame.

1.04 When a requirement calls for the clutch to be **disengaged,** the clutch-shoe lever must be fully latched between its triplever 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 main shaft is rotated by hand, the clutches do not fully **disengage** upon reaching their stop positions. In order to relieve drag on the clutches and permit the main shaft to rotate freely, use a screwdriver to apply pressure on the stop lug of each clutch disc to cause it to engage its latchlever and thus fully **disengage** the internal-expanison clutch. This procedure should always be followed before placing the sequence selector unit on the base and switching on the power.

1.05 **Manual Selection of Characters or Functions:** To manually operate the sequence selector unit while it is removed from its base, proceed as follows:

(1) Attach the armature clip to the selector magnet armature by carefully inserting the flat-formed end of the armature clip over the top of the armature between the pole pieces and then hooking the projection under the edge of the armature. Finally, hook the top end of the armature clip over the top of the bakelite guard of the selector coil terminal. The spring tension of the armature clip will hold the selector magnet armature in the marking (attracted) position.

(2) While holding the selector magnet armature operated by means of the armature clip, use the handwheel included with the special tools for servicing the 28 sequence selector unit to manually rotate the main shaft in a counterclockwise direction until all the clutches are brought to their disengaged position.

(3) Fully disengage all clutches in accordance with 1.04, Note.

(4) Rclease selector magnet armature momentarily to permit selector clutch to engage.

(5) Turn main shaft slowly until selector lever No. 5 just reaches the peak of its cam.

(6) Strip the pushlevers from the selector levers, which are spacing in the code combination of the character function that is being selected. The selector levers move in succession starting with the inner lever No. 1.

(7) Continue to rotate main shaft until all operations initiated by the selector action clear through the unit.

1.06 **Conditioning Operations for the Sequence Selector Unit (Primarily Intended for Shop Use):** In some cases it may be necessary to completely readjust the unit. Before performing this operation, proceed as follows:

(1) Loosen the shift-lever-drive-arm clamp screw.

(2) Loosen function-reset-bail-blade mounting screws.

(3) Loosen the shift-codebar-guide clamp nuts.

2. REQUIREMENTS AND ADJUSTMENTS

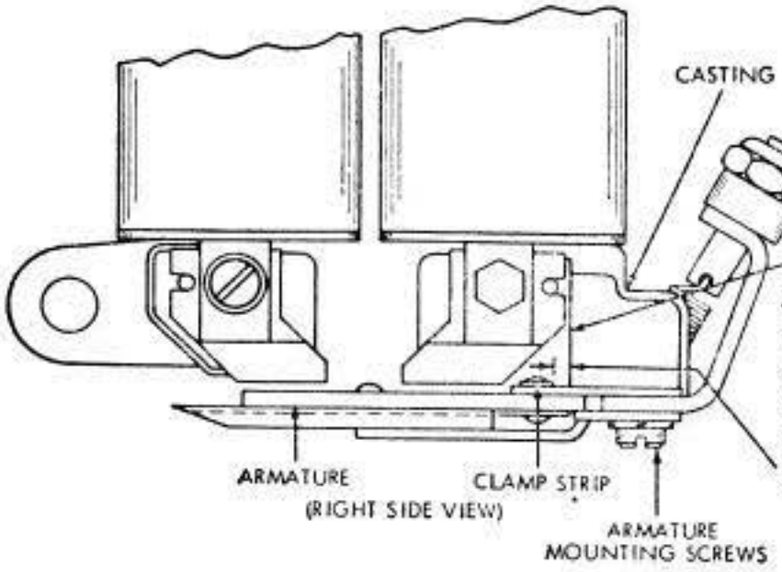
2.01 The following figures show the adjusting tolerances, positions of moving parts, and spring tensions. The illustrations are arranged so that the adjustments are in the sequence that would be followed if a complete readjustment of the apparatus were being made. In some cases where an illustration shows interrelated parts, the sequence that should be followed in checking the requirements and making the adjustments is indicated by the letters (A), (B), (C), etc.

A. Sequence Selector Unit

2.02 Selector Mechanism

NOTE

TO FACILITATE MAKING THE FOLLOWING ADJUSTMENTS, REMOVE THE RANGE FINDER AND SELECTOR MAGNET ASSEMBLIES. TO INSURE BETTER OPERATION, PULL A PIECE OF KS BOND PAPER BETWEEN THE ARMATURE AND THE POLE PIECES TO REMOVE ANY OIL OR FOREIGN MATTER THAT MAY BE PRESENT. MAKE CERTAIN THAT NO LINT OR PIECES OF PAPER REMAIN BETWEEN THE POLE PIECES AND ARMATURE.

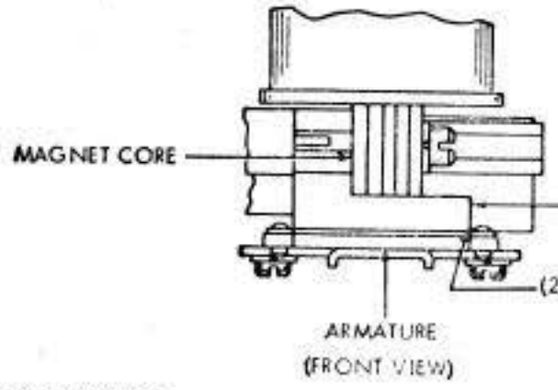


SELECTOR ARMATURE

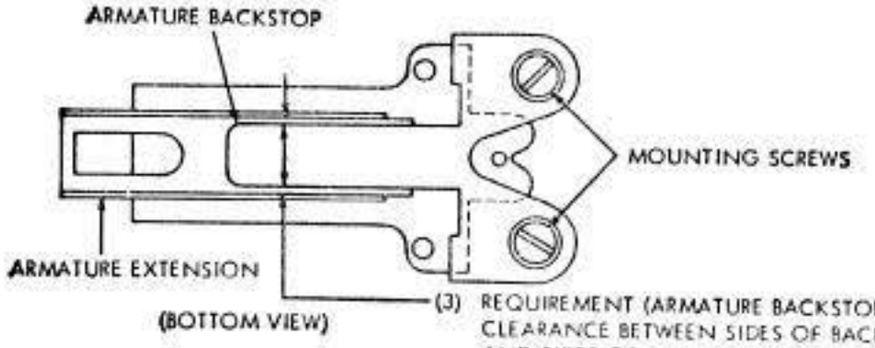
NOTE

THIS REQUIREMENT NEED NOT BE MADE NOR CHECKED IF THE SELECTOR MAGNET BRACKET AND RECEIVING MAGAZIN REQUIREMENTS ARE MET.

(1) REQUIREMENT (ARMATURE CLAMP STRIP)
CLEARANCE BETWEEN ARMATURE CLAMP STRIP AND CASTING.
MIN. 0.025 INCH
MAX. 0.045 INCH



(2) REQUIREMENT (ARMATURE ALIGNMENT)
OUTER EDGE OF ARMATURE SHOULD BE FLUSH WITHIN 0.015 INCH WITH OUTER EDGE OF POLE PIECES.

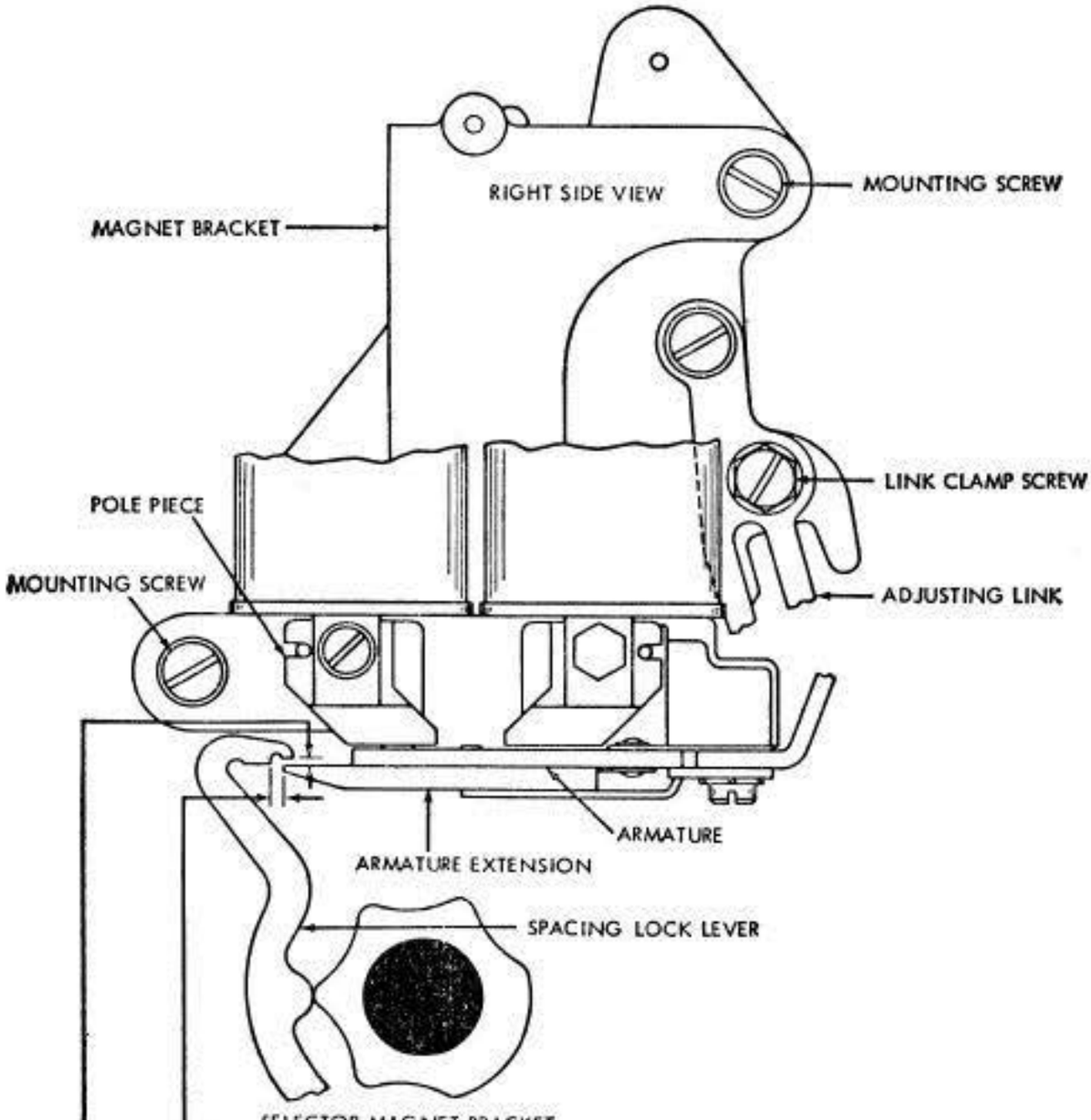


(3) REQUIREMENT (ARMATURE BACKSTOP ALIGNMENT)
CLEARANCE BETWEEN SIDES OF BACKSTOP AND SIDES OF ARMATURE EXTENSION.
MIN. 0.010 INCH

TO ADJUST

1. POSITION ARMATURE SPRING ADJUSTING NUT TO HOLD ARMATURE FIRMLY AGAINST PIVOT EDGE OF CASTING.
2. POSITION ARMATURE AND BACKSTOP WITH MOUNTING SCREWS LOOSENED.

2.03 Selector Mechanism



SELECTOR MAGNET BRACKET

(1) REQUIREMENT

SPACING LOCK LEVER ON EACH HIGH PART OF CAM. ARMATURE IN CONTACT WITH POLE PIECE. CLEARANCE BETWEEN END OF ARMATURE EXTENSION AND SHOULDER ON SPACING LOCK LEVER.
MIN. 0.020 INCH
MAX. 0.035 INCH

TO ADJUST

LOOSEN TWO MAGNET BRACKET MOUNTING SCREWS AND ADJUSTING LINK CLAMP SCREW. POSITION MAGNET BRACKET BY MEANS OF ADJUSTING LINK AND TIGHTEN LINK CLAMP SCREW ONLY.

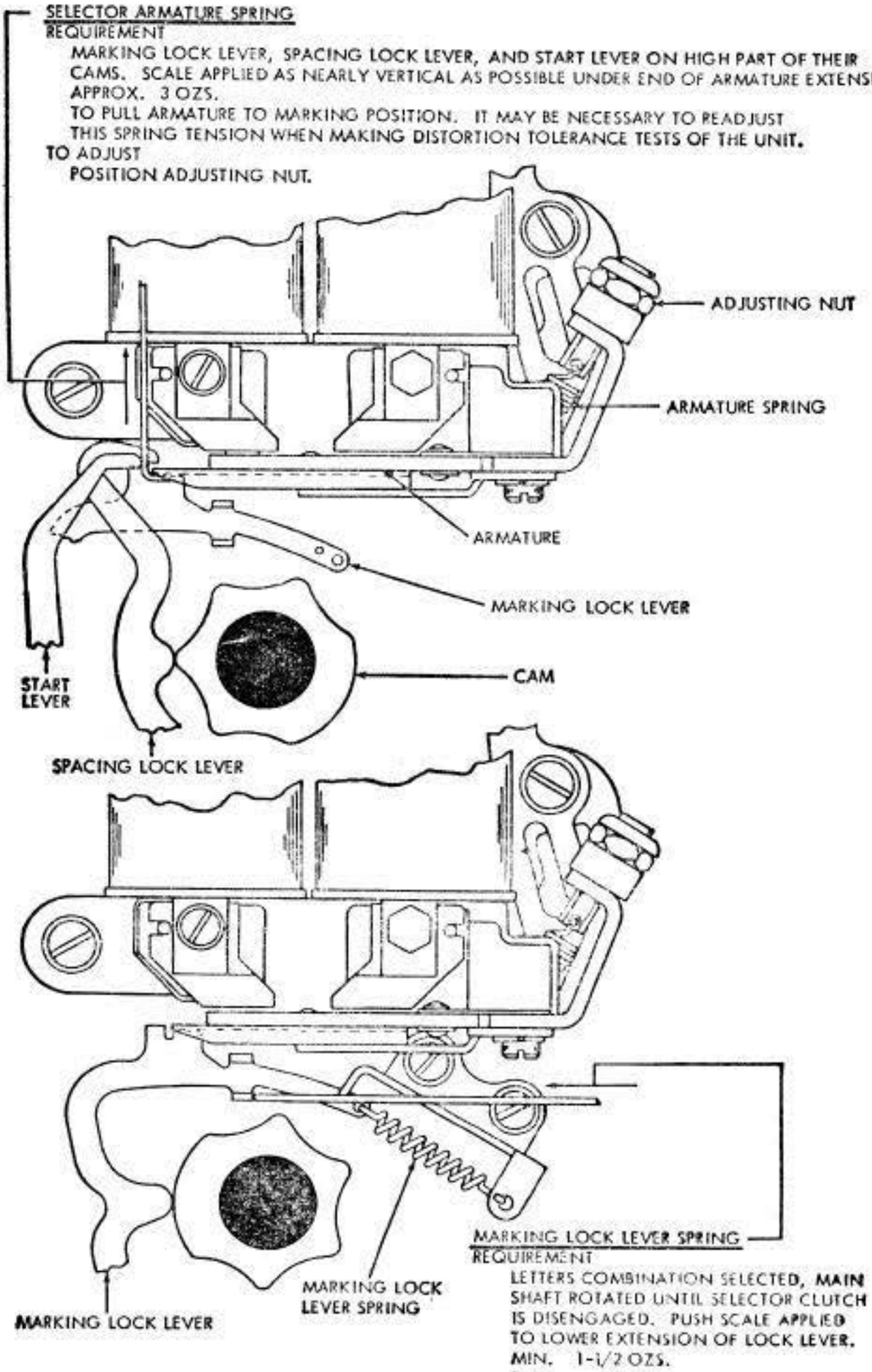
(2) REQUIREMENT

SPACING LOCK LEVER ON EACH HIGH PART OF CAM. ARMATURE IN CONTACT WITH POLE PIECE. SOME CLEARANCE BETWEEN UPPER SURFACE OF ARMATURE EXTENSION AND LOWER SURFACE OF SPACING LOCK LEVER WHEN LOCK LEVER IS HELD DOWNWARD.
MAX. 0.003 INCH

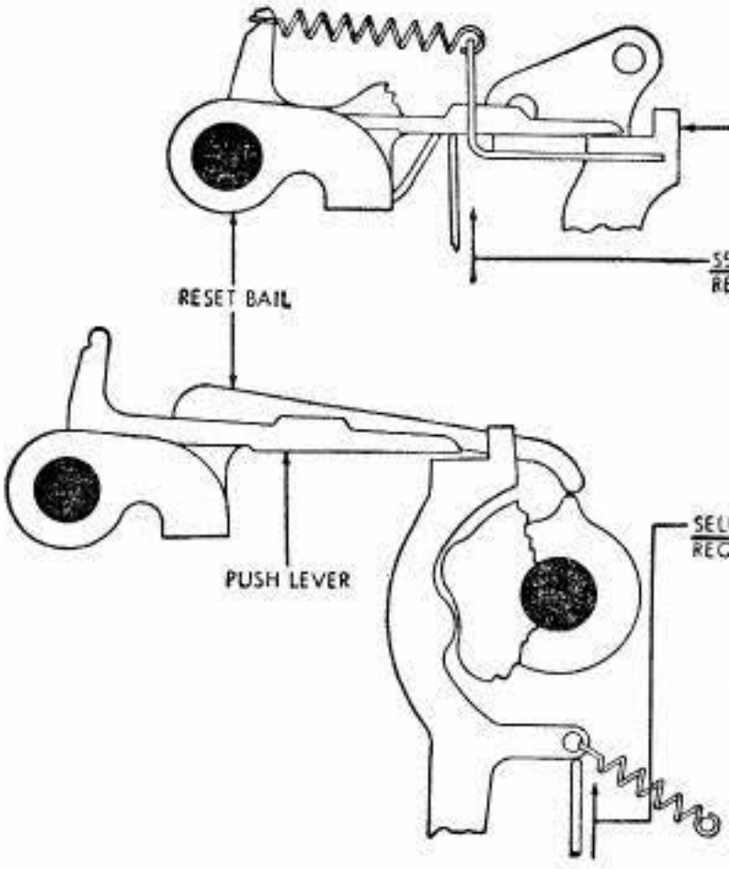
TO ADJUST

POSITION UPPER END OF MAGNET BRACKET. TIGHTEN TWO MAGNET BRACKET MOUNTING SCREWS. RECHECK REQUIREMENT (1).

2.04 Selector Mechanism

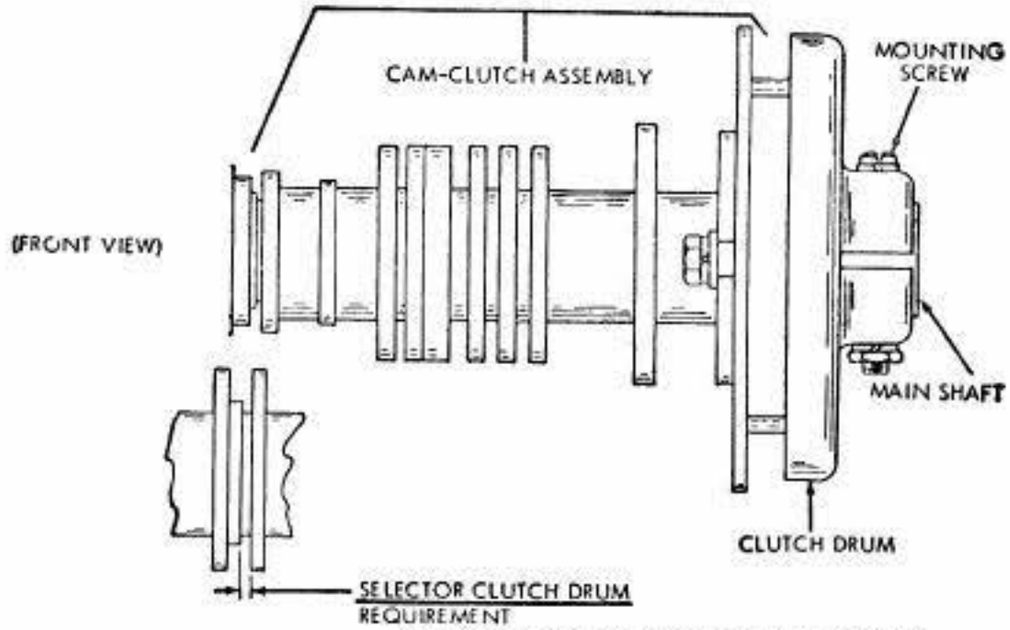


2.05 **Selector Mechanism**



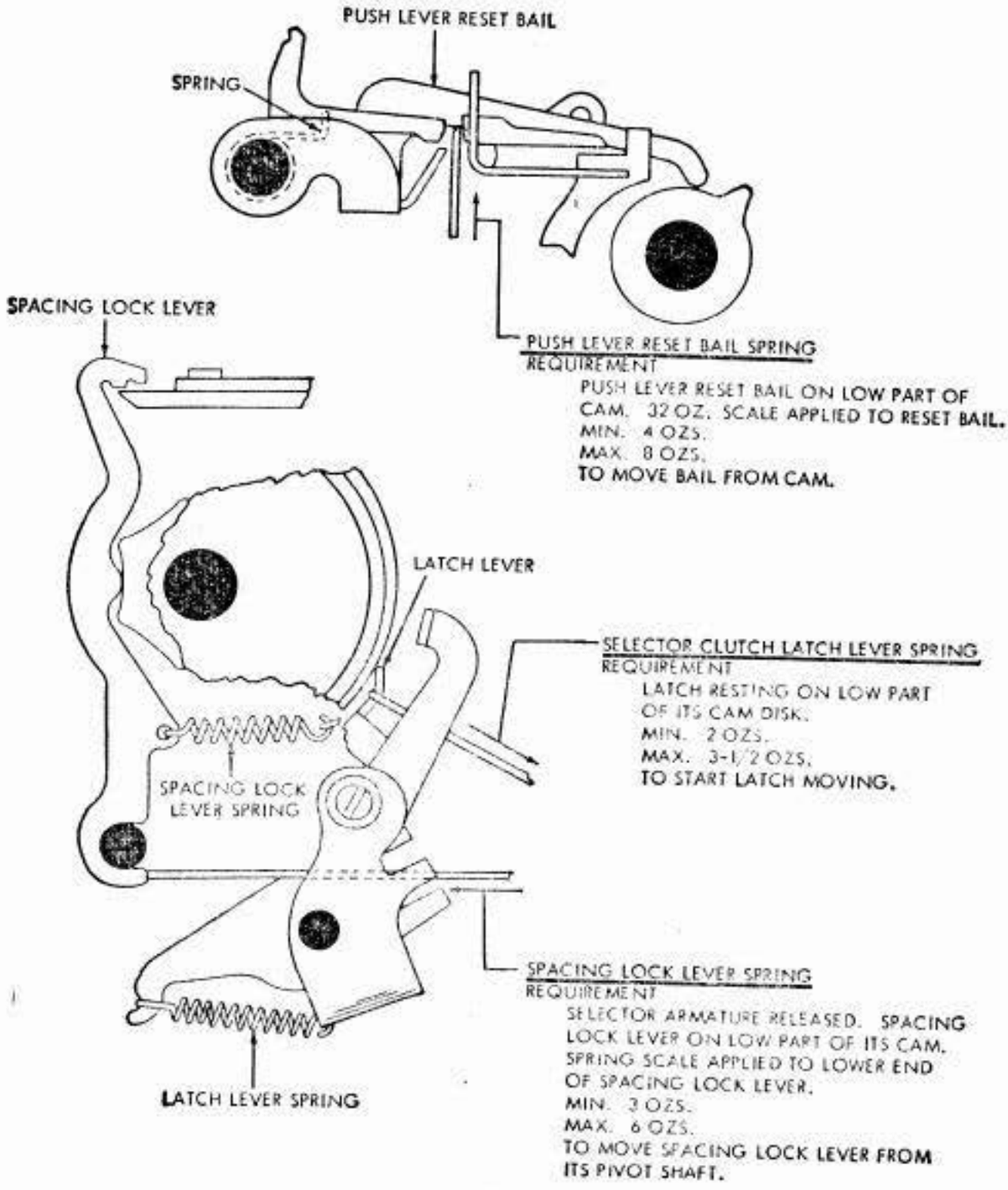
SELECTOR PUSH LEVER SPRING
REQUIREMENT
PUSH LEVER IN SPACING POSITION.
MIN. 3/4 OZ.
MAX. 1-1/2 OZS.
TO MOVE PUSH LEVER FROM SELECTOR LEVER. CHECK FIVE SPRINGS.

SELECTOR LEVER SPRING
REQUIREMENT
TYPING UNIT UPSIDE DOWN.
RESET BAIL ON PEAK OF ITS CAM.
MIN. 1-1/4 OZS.
MAX. 2-1/2 OZS.
TO START EACH LEVER MOVING.
CHECK FIVE SPRINGS. IF NECESSARY, UNHOOK START LEVER SPRING TO CHECK NO. 4 SELECTOR LEVER SPRING.



SELECTOR CLUTCH DRUM
REQUIREMENT
CLUTCH LATCHED IN STOP POSITION. CLUTCH DRUM AGAINST SHOULDER ON MAIN SHAFT. CAM-CLUTCH ASSEMBLY SHOULD HAVE SOME END PLAY.
MAX. 0.010 INCH
TO ADJUST
POSITION CLUTCH DRUM WITH MOUNTING SCREW LOOSENED.

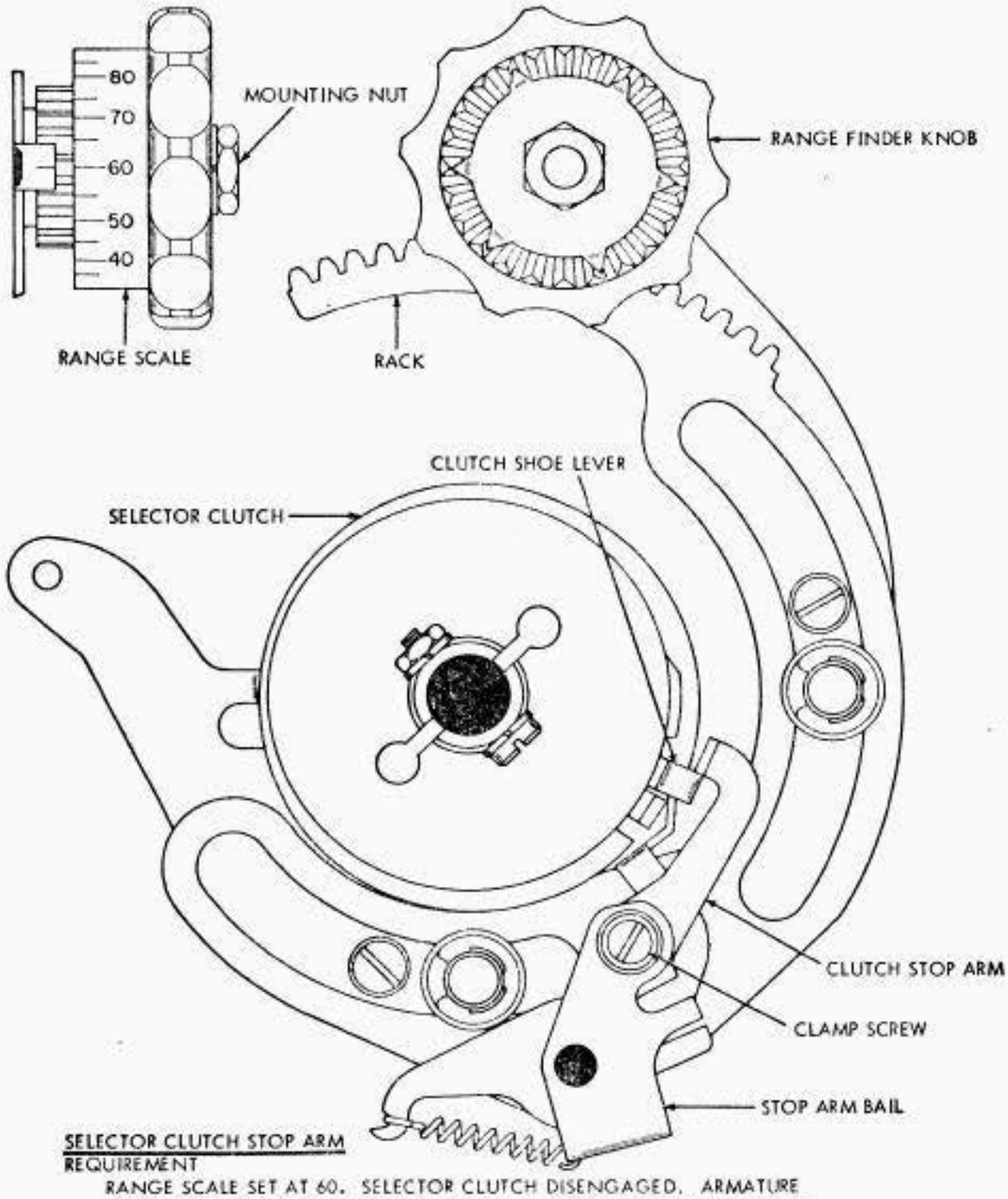
2.06 Selector Mechanism



2.07 Selector Mechanism

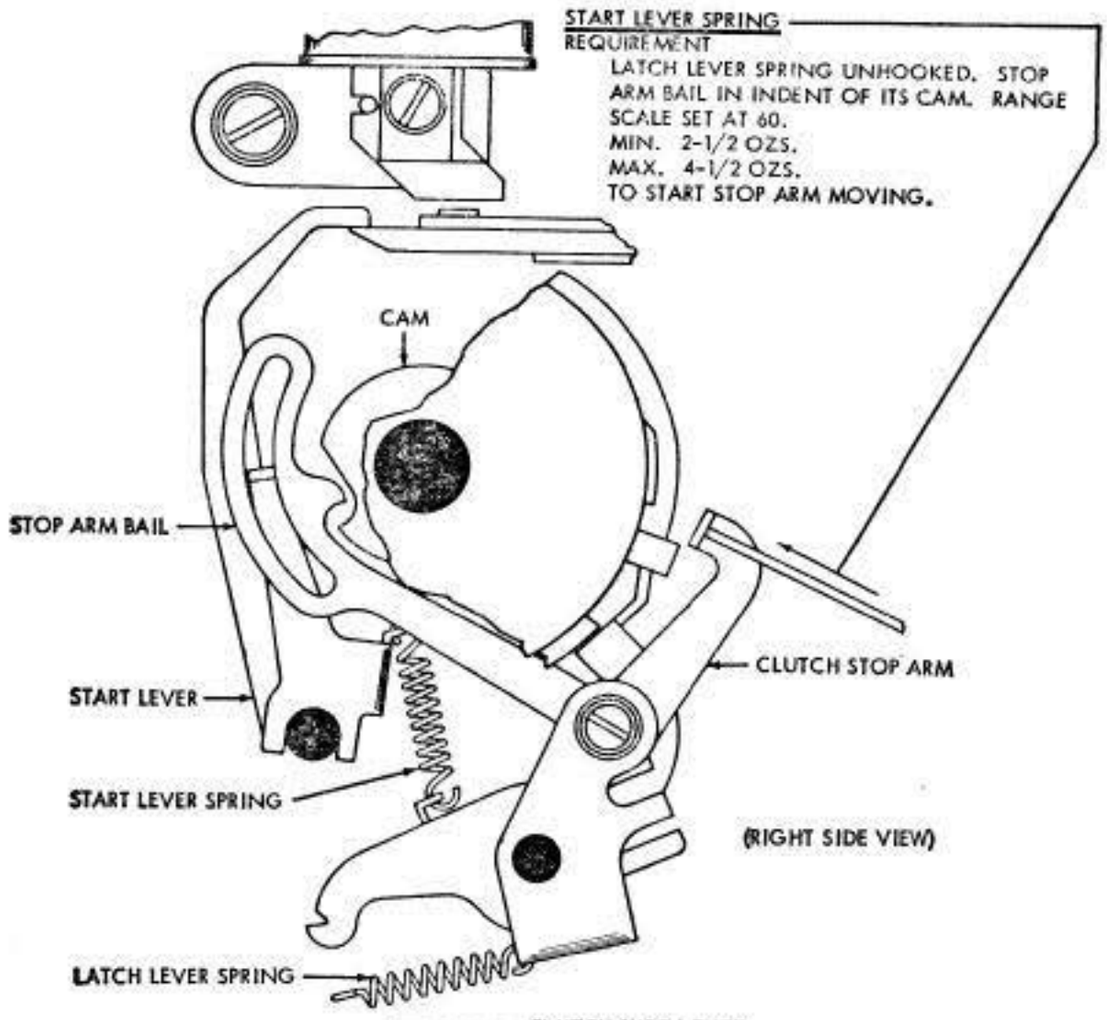
NOTE: REPLACE RANGE FINDER AND SELECTOR MAGNET ASSEMBLY.

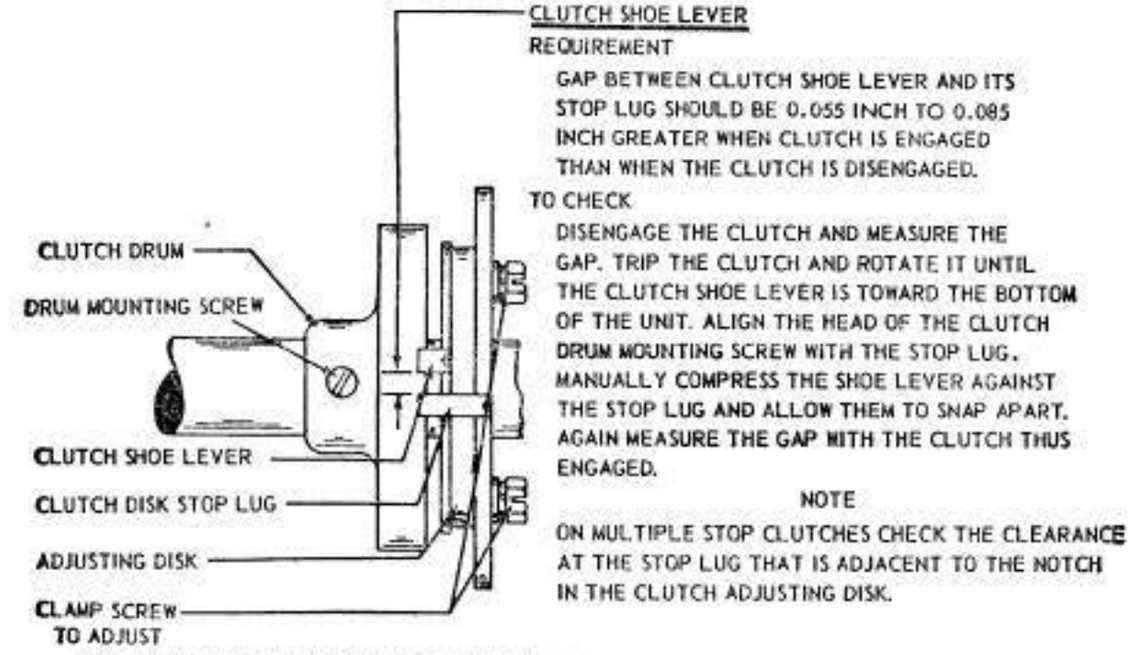
RANGE FINDER KNOB PHASING
REQUIREMENT
WITH RANGE FINDER KNOB TURNED TO EITHER END OF RACK, ZERO MARK ON SCALE SHOULD BE WITHIN 3 POINTS OF SCRIBED LINE ON RANGE FINDER PLATE.
TO ADJUST
REMOVE MOUNTING NUT, DISENGAGE KNOB FROM RACK AND POSITION KNOB. RE-ENGAGE KNOB WITH RACK AND REPLACE MOUNTING NUT.



SELECTOR CLUTCH STOP ARM
REQUIREMENT
RANGE SCALE SET AT 60. SELECTOR CLUTCH DISENGAGED. ARMATURE IN MARKING POSITION. CLUTCH STOP ARM SHOULD ENGAGE CLUTCH SHOE LEVER BY APPROXIMATELY FULL THICKNESS OF SHOE LEVER.
TO ADJUST
POSITION STOP ARM ON STOP ARM BAIL WITH CLAMP SCREW LOOSENED.

2.08 Selector Mechanism





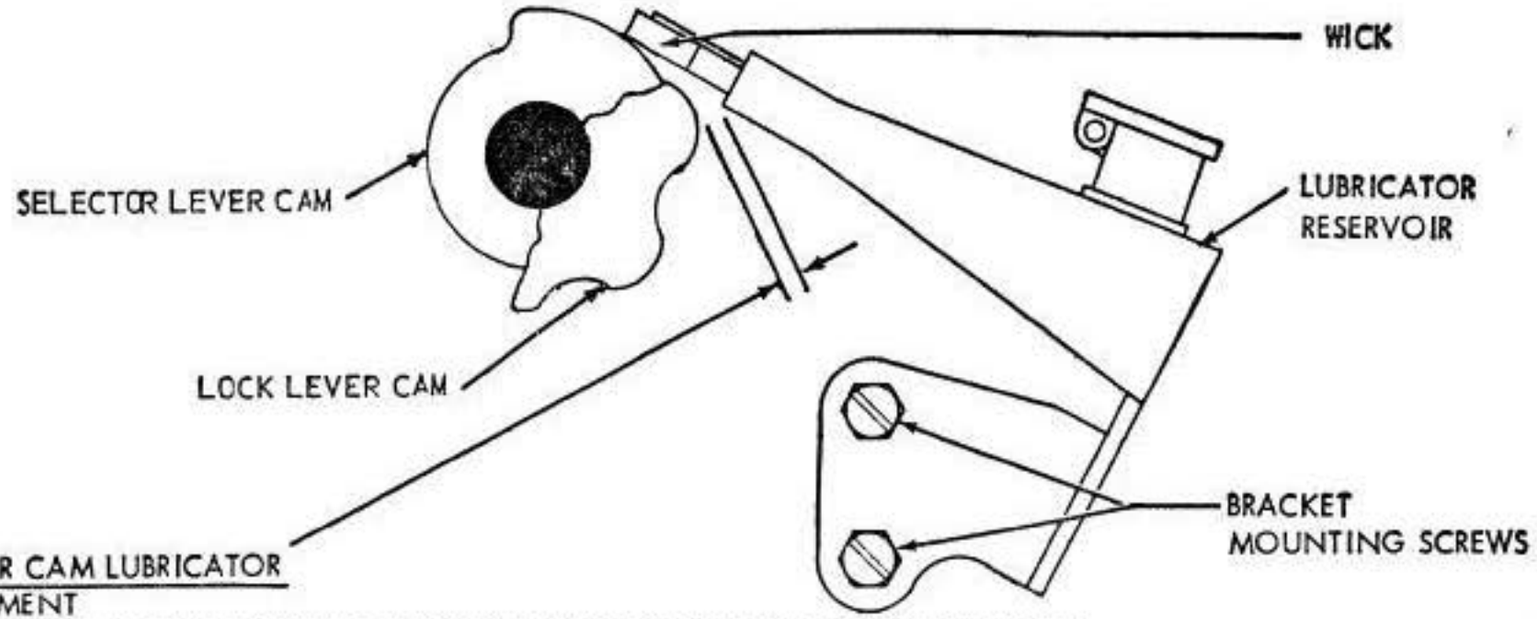
TO ADJUST

LOOSEN THE TWO CLAMP SCREWS ON THE CLUTCH DISK. ENGAGE A WRENCH OR SCREWDRIVER ON THE LUG OF THE ADJUSTING DISK AND ROTATE THE DISK.

NOTE

AFTER THE ABOVE ADJUSTMENT IS MADE, DISENGAGE THE CLUTCH, REMOVE THE DRUM MOUNTING SCREW AND ROTATE THE DRUM IN ITS NORMAL DIRECTION OF ROTATION TO MAKE CERTAIN THAT IT DOES NOT DRAG ON THE SHOE. IF THE DRUM DRAGS, REFINE THE ABOVE ADJUSTMENT.

2.09 Selector Mechanism



SELECTOR CAM LUBRICATOR

REQUIREMENT

THE LUBRICATOR TUBE SHOULD CLEAR THE HIGH PART OF THE LOCK LEVER CAM.
MIN. 0.020 INCH

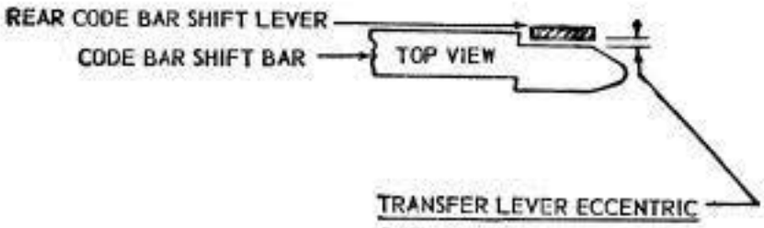
THE HIGH PART OF THE SELECTOR LEVER CAMS SHOULD TOUCH THE LUBRICATOR WICK, BUT SHOULD NOT RAISE IT MORE THAN 1/32 INCH.

NOTE: THERE SHOULD BE SOME CLEARANCE BETWEEN THE MARKING LOCK LEVER SPRING AND THE RESERVOIR.

TO ADJUST

POSITION THE LUBRICATOR BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

2.10 Codebar-positioning Mechanism



TRANSFER LEVER ECCENTRIC

REQUIREMENT

PUSH LEVERS POSITIONED FOR E OR LF OR LETTERS, SELECTOR CLUTCH DISENGAGED. CODE BAR SHIFT LEVER LINK IN UPPERMOST POSITION. CLEARANCE BETWEEN REAR CODE BAR SHIFT LEVER AND CODE BAR SHIFT BAR FARTHEST FROM THE SHIFT LEVER

MIN. 0.010 INCH

MAX. 0.025 INCH

WHEN PLAY IN SHIFT BAR IS TAKEN FOR MAXIMUM CLEARANCE.

TO ADJUST

ROTATE ECCENTRIC BUSHING WITH CLAMP SCREW LOOSENED. KEEP BOTH HOLES IN BUSHING ABOVE HORIZONTAL CENTER.

NOTE

ONE OR MORE CODE BAR SHIFT BARS CAN TOUCH SHIFT LEVERS.

COMMON TRANSFER LEVER SPRING

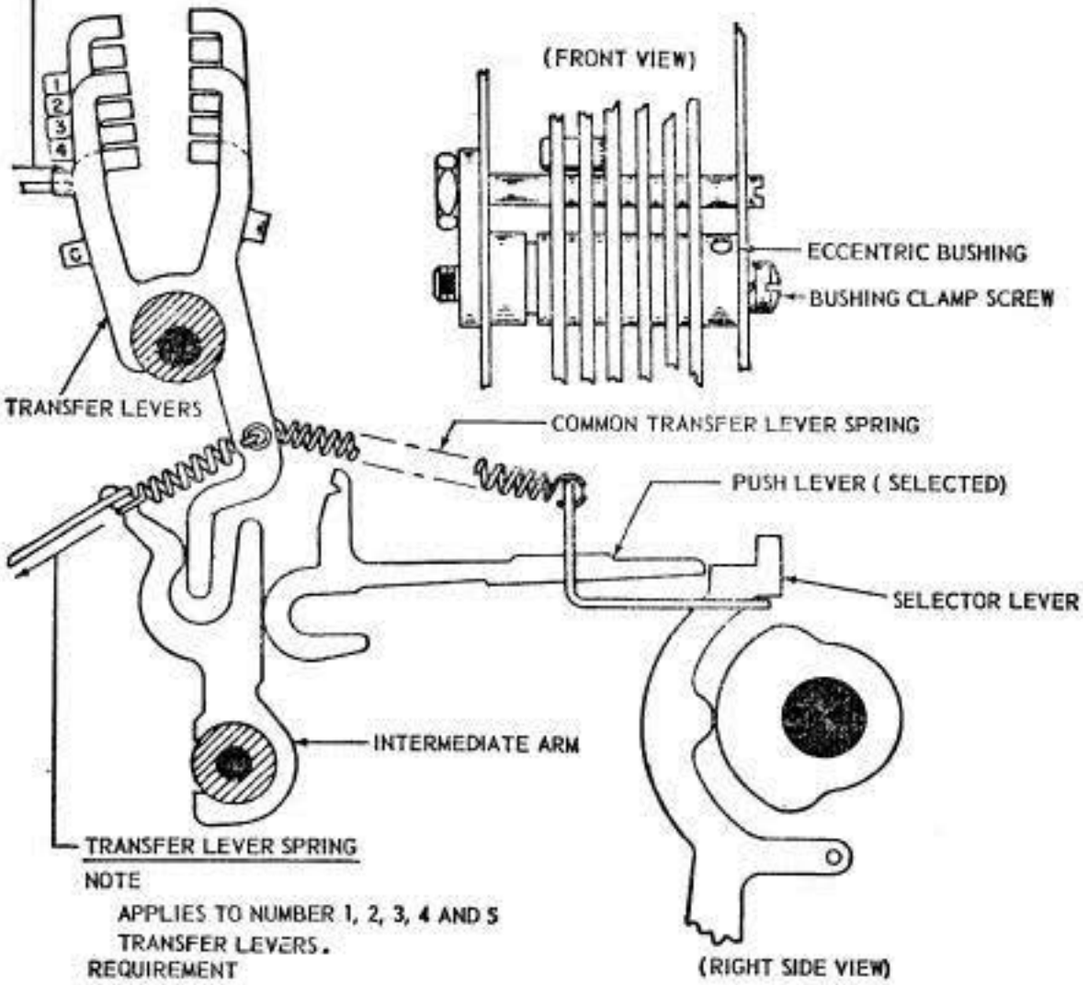
REQUIREMENT

TRANSFER LEVERS IN SPACING POSITION.

MIN. 1/2 OZ.

MAX. 1-1/4 OZS.

TO START COMMON TRANSFER LEVER MOVING.



TRANSFER LEVER SPRING

NOTE

APPLIES TO NUMBER 1, 2, 3, 4 AND 5 TRANSFER LEVERS.

REQUIREMENT

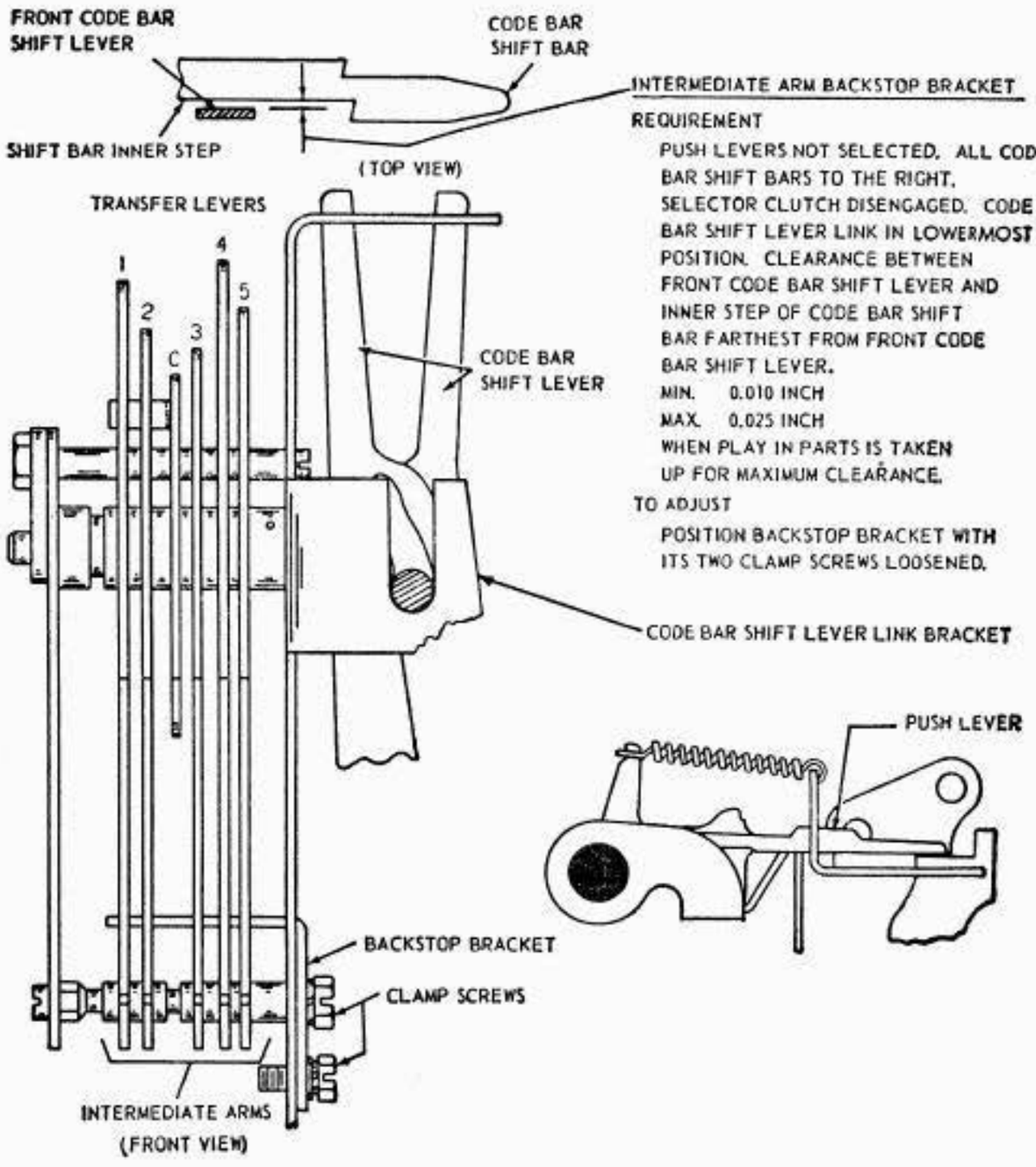
TRANSFER LEVERS HELD IN SPACING POSITION.

MIN. 1 1/2 OZS.

MAX. 2-1/2 OZS.

TO START INTERMEDIATE ARM MOVING.

2.11 Codebar-positioning Mechanism



INTERMEDIATE ARM BACKSTOP BRACKET

REQUIREMENT

PUSH LEVERS NOT SELECTED. ALL CODE BAR SHIFT BARS TO THE RIGHT, SELECTOR CLUTCH DISENGAGED. CODE BAR SHIFT LEVER LINK IN LOWERMOST POSITION. CLEARANCE BETWEEN FRONT CODE BAR SHIFT LEVER AND INNER STEP OF CODE BAR SHIFT BAR FARTHEST FROM FRONT CODE BAR SHIFT LEVER.

MIN. 0.010 INCH

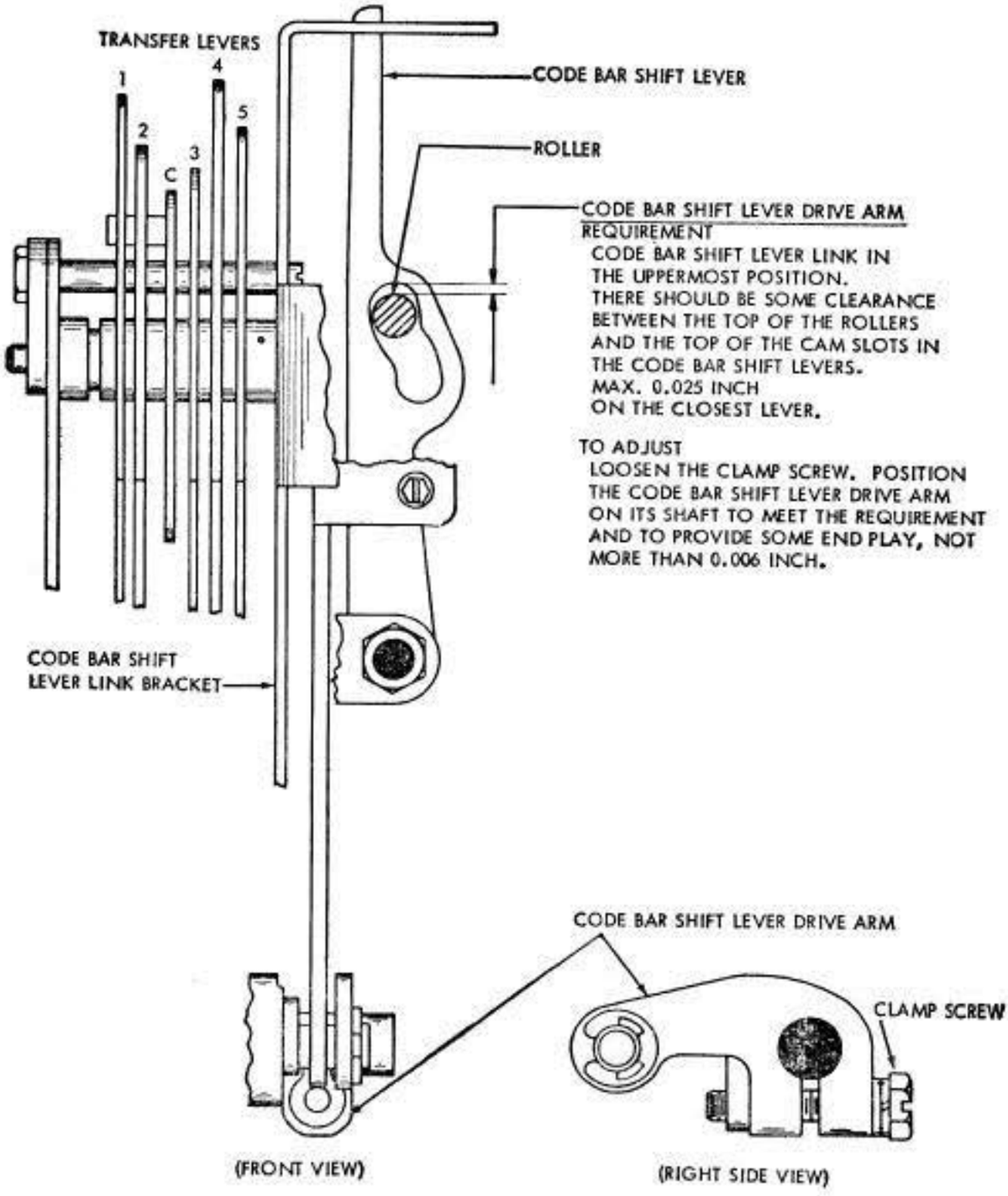
MAX. 0.025 INCH

WHEN PLAY IN PARTS IS TAKEN UP FOR MAXIMUM CLEARANCE.

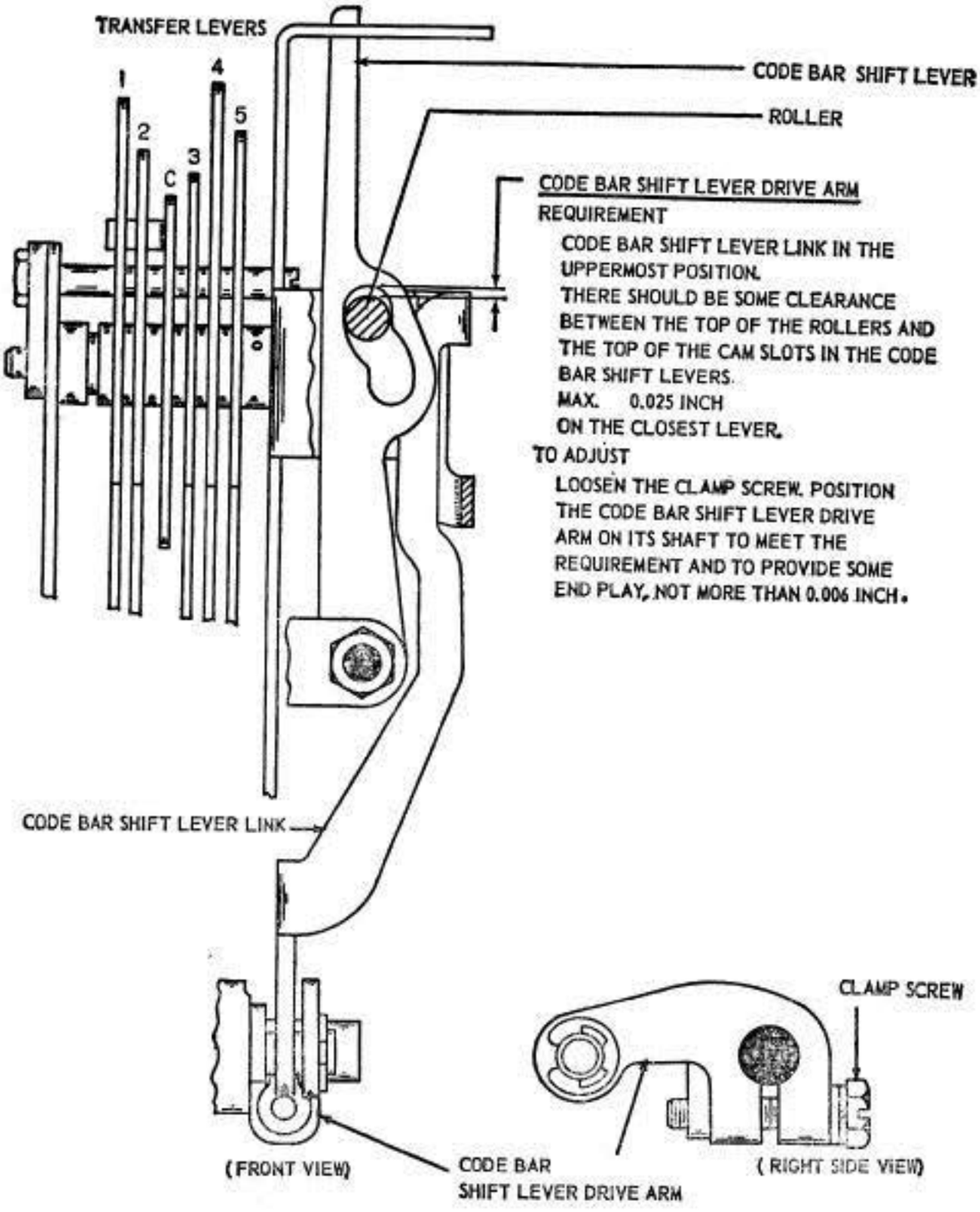
TO ADJUST

POSITION BACKSTOP BRACKET WITH ITS TWO CLAMP SCREWS LOOSENED.

2.12 Codebar-positioning Mechanism With Independently Adjustable Codebar Shift Levers



2.13 Codebar-positioning Mechanism With Separate, Adjustable Shift-lever-link Guide Bracket



2.14 Codebar-positioning Mechanism With Independently Adjustable Codebar Shift Levers

CODE BAR SHIFT LEVER LINK BRACKET

REQUIREMENT

MOTION OF FRONT AND REAR CODE BAR SHIFT LEVERS SHOULD BE EQUALIZED WITH RESPECT TO CODE BAR TRAVEL.

TO CHECK (FRONT)

SELECT BLANK COMBINATION AND ROTATE MAINSHAFT UNTIL CODE BAR SHIFT LEVER LINK REACHES HIGHEST TRAVEL. TAKE UP PLAY FOR MAXIMUM CLEARANCE. CLEARANCE BETWEEN FRONT CODE BAR SHIFT LEVER AND SHOULDER ON NEAREST CODE BAR SHIFT BAR.

MIN. 0.002 INCH
MAX. 0.025 INCH

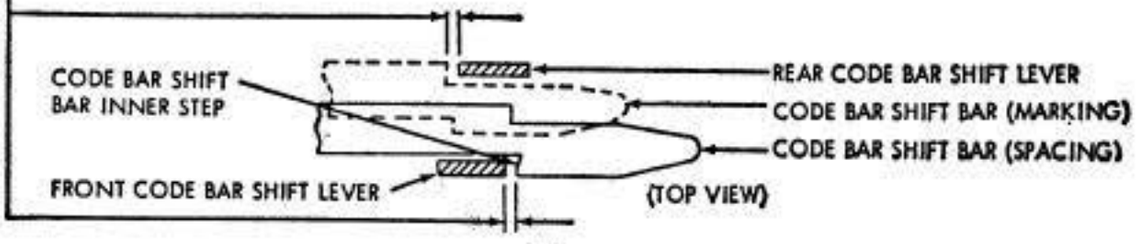
TO CHECK (REAR)

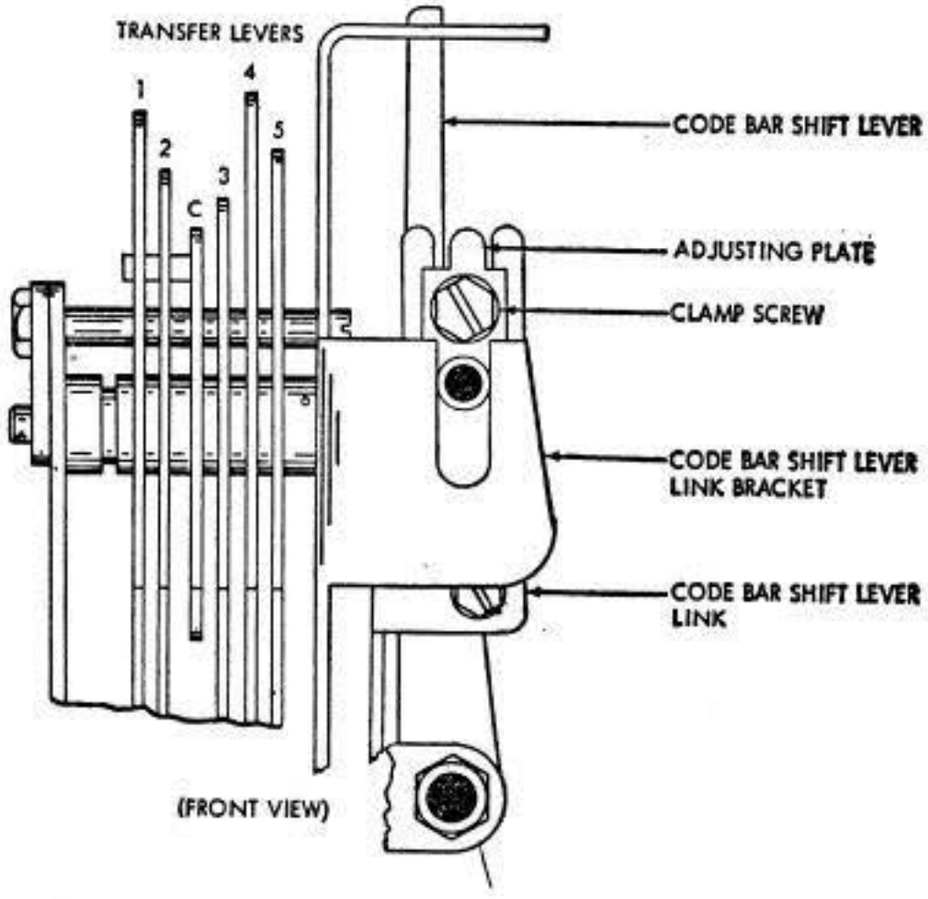
SELECT LETTERS COMBINATION. CHECK CLEARANCE BETWEEN REAR CODE BAR SHIFT LEVER AND SHOULDER OF CODE BAR SHIFT BAR IN SAME WAY.

MIN. 0.002 INCH
MAX. 0.025 INCH

TO ADJUST

POSITION ADJUSTING PLATES (FRONT AND REAR) WITH CLAMP SCREWS LOOSENED.





2.15 Codebar-positioning Mechanism With Separate, Adjustable Shift-lever-link Guide Bracket

CODE BAR SHIFT LEVER LINK BRACKET

REQUIREMENT

MOTION OF FRONT AND REAR CODE BAR SHIFT LEVERS SHOULD BE EQUALIZED WITH RESPECT TO CODE BAR TRAVEL.

TO CHECK (FRONT)

BLANK COMBINATION SELECTED. ROTATE MAIN SHAFT UNTIL CODE BAR SHIFT LEVER LINK REACHES ITS HIGHEST POSITION. CLEARANCE BETWEEN FRONT CODE BAR SHIFT LEVER AND NEAREST CODE BAR SHIFT BAR.

MIN. 0.002 INCH
MAX. 0.025 INCH
WHEN PLAY IS TAKEN FOR MAXIMUM CLEARANCE.

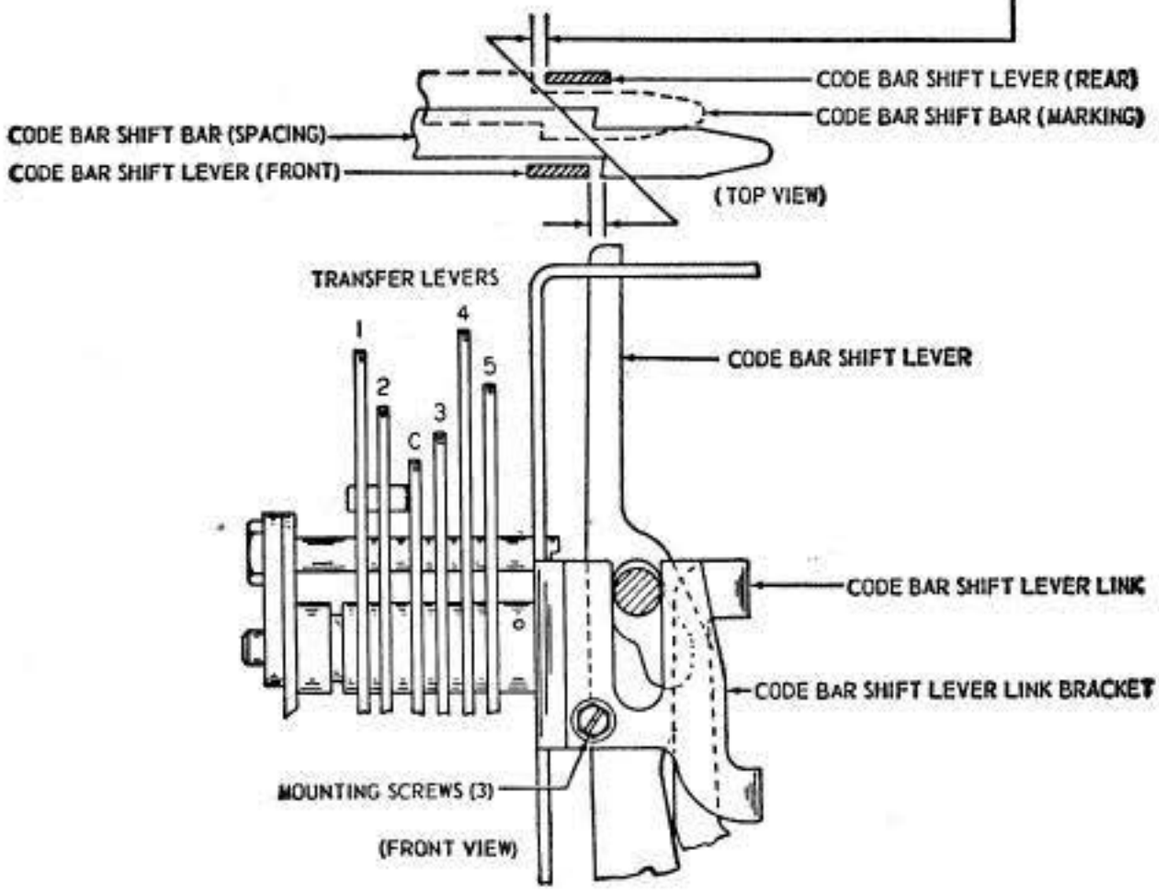
TO CHECK (REAR)

WITH LETTERS COMBINATION SELECTED, CLEARANCE BETWEEN REAR CODE BAR SHIFT LEVER AND NEAREST CODE BAR SHIFT BAR, IS CHECKED IN SAME MANNER.

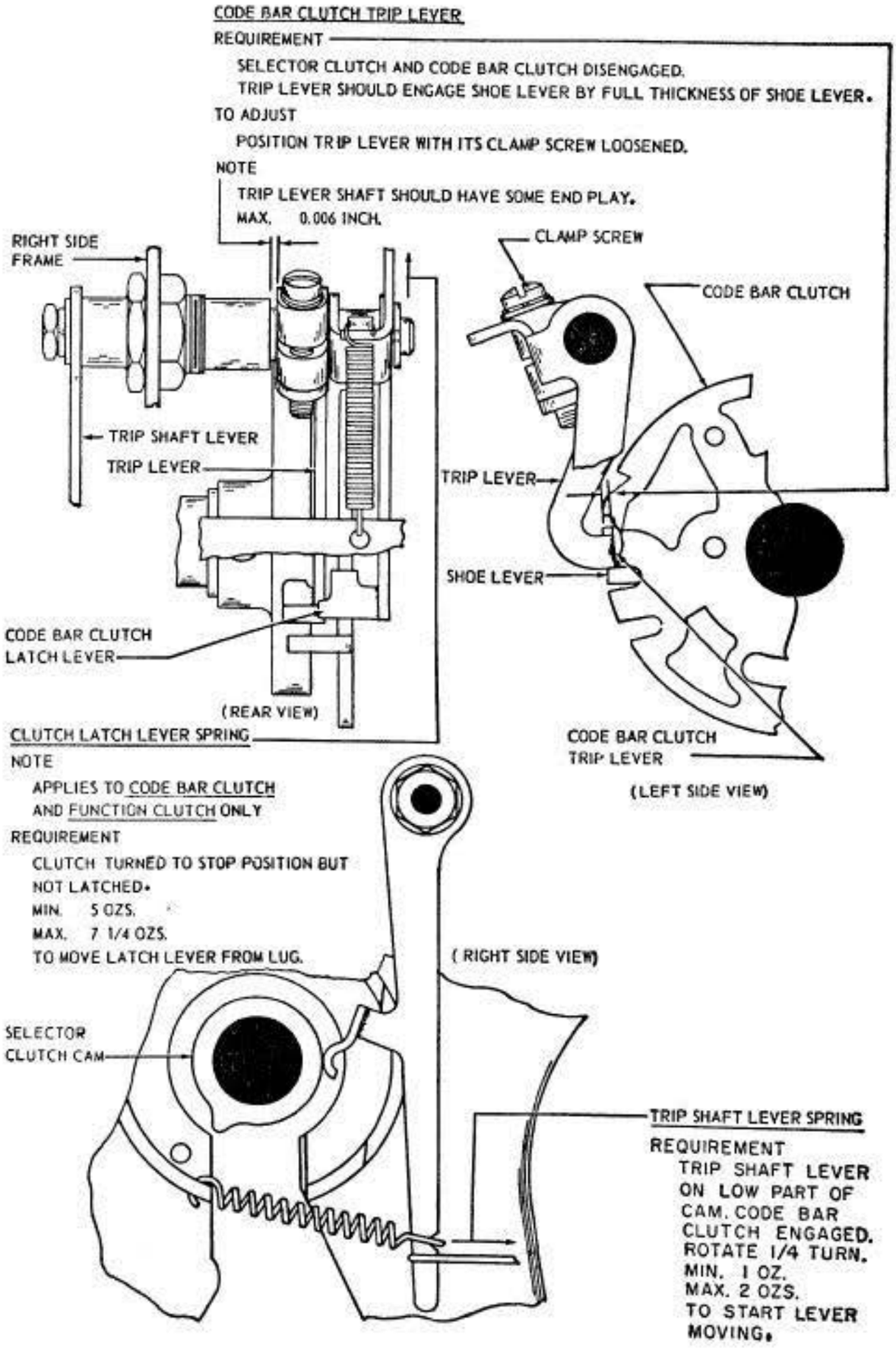
MIN. 0.002 INCH
MAX. 0.025 INCH

TO ADJUST

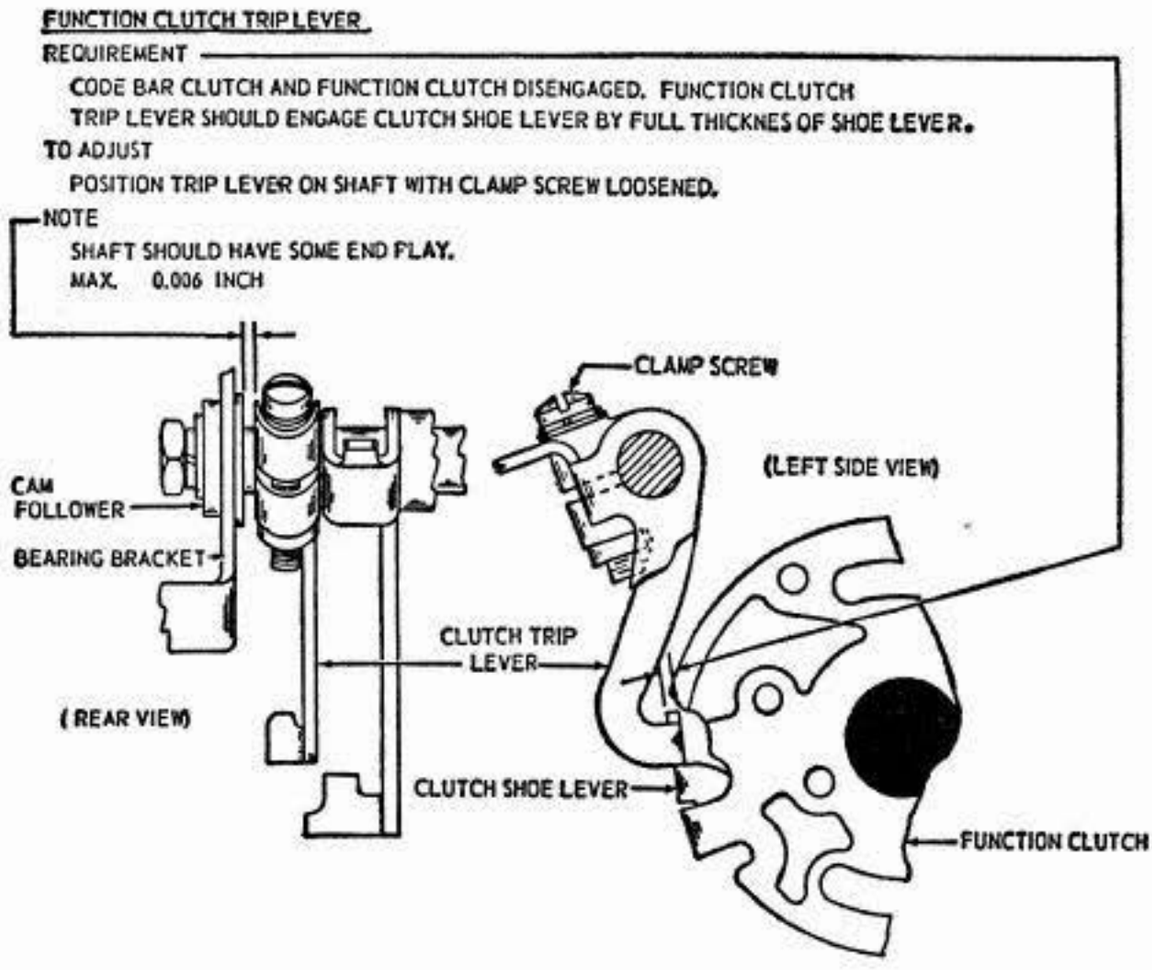
POSITION CODE BAR SHIFT LEVER LINK BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

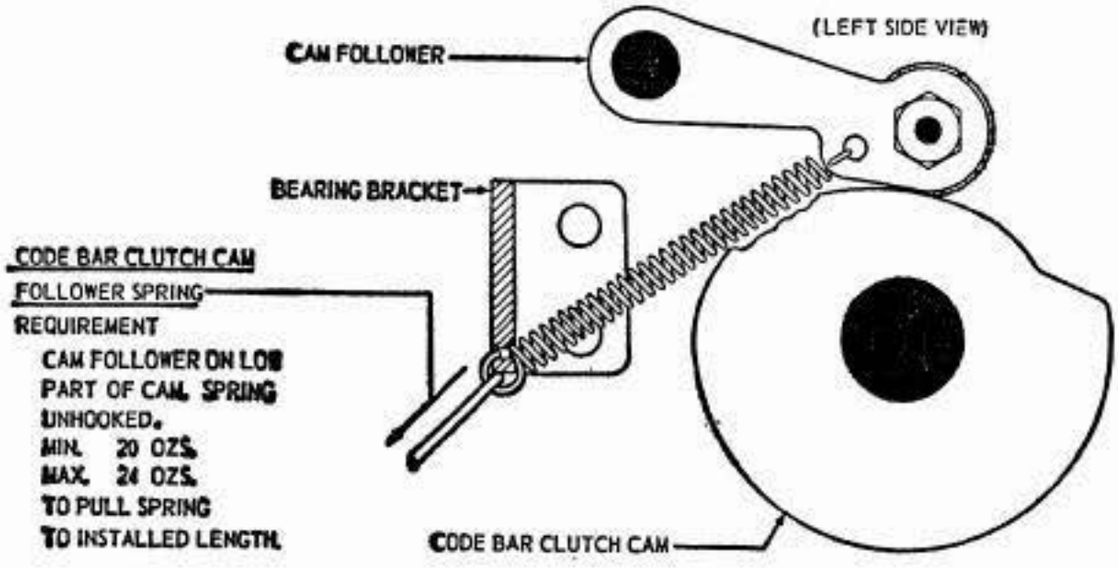


2.16 Codebar Clutch Tripshaft



2.17 Function Clutch Tripshaft





2.18 Clutch Mechanism

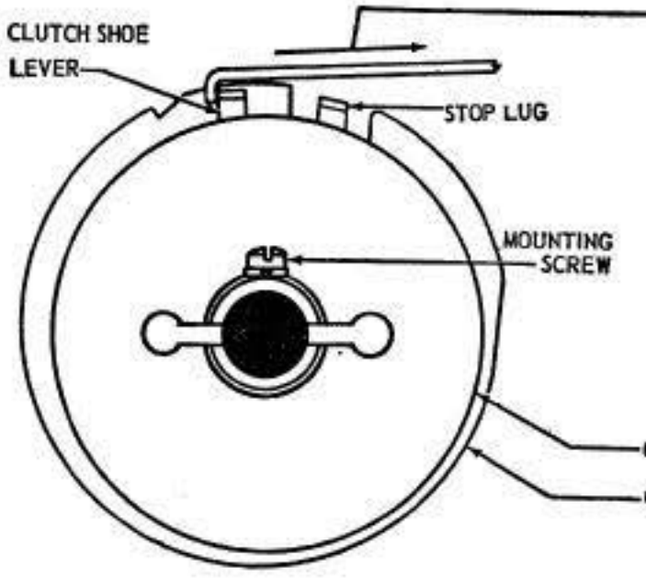
CLUTCH DRUM POSITION (CODE BAR AND FUNCTION CLUTCHES)

REQUIREMENT

CLUTCH SHOE LEVER HELD DISENGAGED. CLUTCH SHOULD HAVE SOME END PLAY.
MAX. 0.015 INCH

TO ADJUST

POSITION EACH DRUM WITH MOUNTING SCREW LOOSENED.



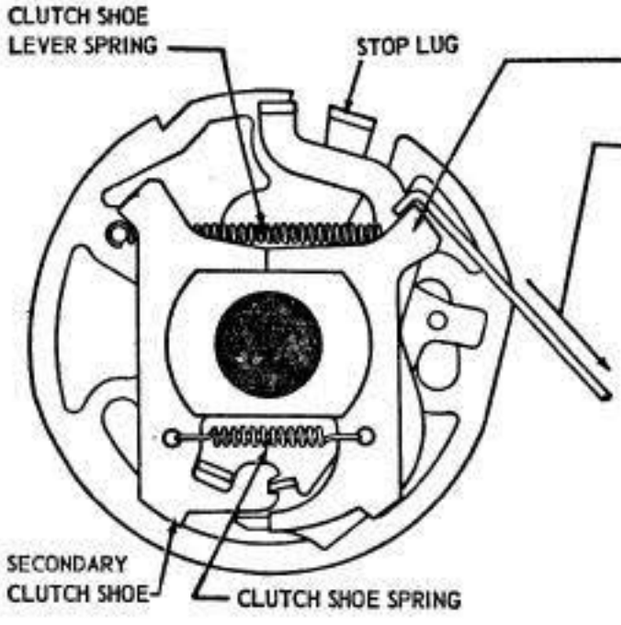
CLUTCH SHOE LEVER SPRING

REQUIREMENT

CLUTCH ENGAGED. HOLD CAM DISK TO PREVENT TURNING. SPRING SCALE PULLED AT TANGENT TO CLUTCH.
MIN. 15 OZS.
MAX. 20 OZS.
TO MOVE SHOE LEVER IN CONTACT WITH STOP LUG.

NOTE

APPLIES TO ALL CLUTCHES.



CLUTCH SHOE SPRING

NOTE

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

REQUIREMENT

CLUTCH DRUM REMOVED. SPRING SCALE APPLIED TO PRIMARY SHOE AT A TANGENT TO THE FRICTION SURFACE.
MIN. 3 OZS.
MAX. 5 OZS.
TO START THE PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE AT POINT OF CONTACT.

NOTE

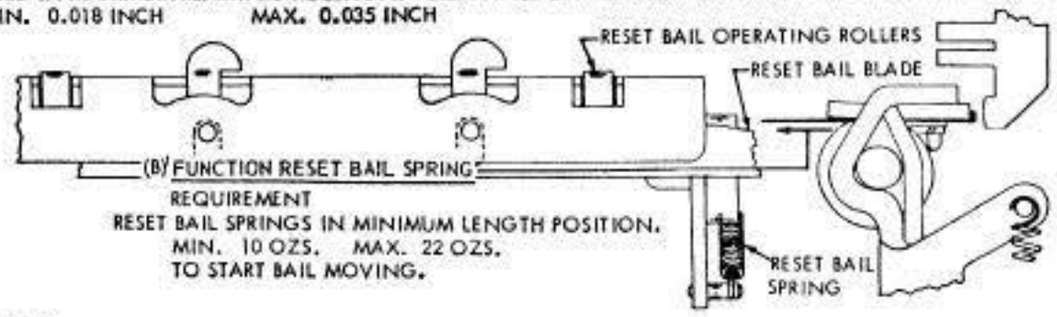
APPLIES TO ALL CLUTCHES.

2.19 Function-reset Bail Blade

(A) FUNCTION RESET BAIL BLADE

(1) REQUIREMENT

FUNCTION AND TYPE BOX CLUTCHES DISENGAGED. FUNCTION PAWLS UNLATCHED. FUNCTION BAR HELD IN MAXIMUM REARWARD POSITION. CLEARANCE BETWEEN FUNCTION BAR AND RESET BAIL BLADE: MIN. 0.018 INCH MAX. 0.035 INCH



(B) FUNCTION RESET BAIL SPRING

REQUIREMENT

RESET BAIL SPRINGS IN MINIMUM LENGTH POSITION. MIN. 10 OZS. MAX. 22 OZS. TO START BAIL MOVING.

TO CHECK

MEASURE CLEARANCE AT BARS LOCATED IN STUNT BOX SLOTS 1, 4, 11, 18, 23, 33, 38 AND 41. IF THERE IS NO BAR IN A DESIGNATED SLOT, USE NEAREST BAR. IF THERE IS A BAR ON EACH SIDE OF A DESIGNATED VACANT SLOT, USE BAR IN HIGHEST NUMBERED SLOT. (NOTE: FACING REAR OF UNIT, SLOTS ARE NUMBERED FROM LEFT TO RIGHT).

TO ADJUST

POSITION BLADE ON RESET BAIL WITH ITS MOUNTING SCREWS FRICTION TIGHT.

(2) REQUIREMENT

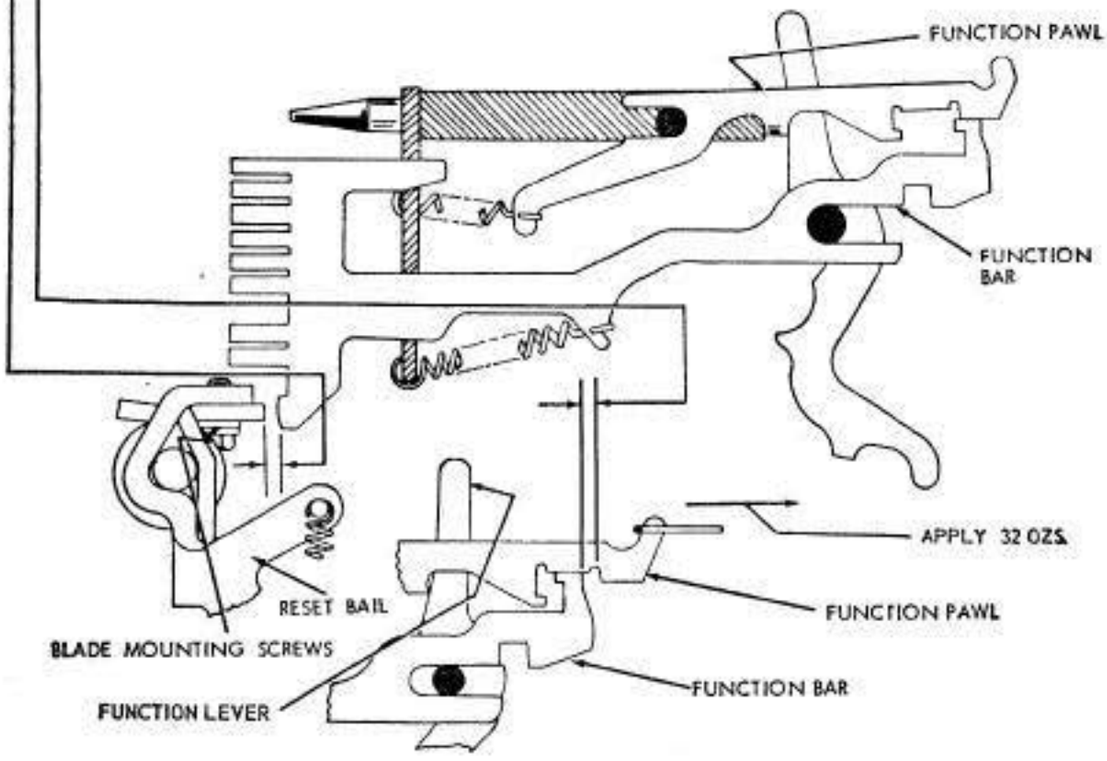
FUNCTION PAWL SHOULD OVER TRAVEL FUNCTION BAR BY A MIN. OF 0.002 INCH.

TO CHECK

IF CARRIAGE RETURN LEVER ADJUSTMENT HAS NOT BEEN MADE, ITS CLAMP SCREW SHOULD BE LOOSENED. POSITION FUNCTION CLUTCH SO THAT LUG ON CLUTCH DISK IS TOWARD BOTTOM OF UNIT. STRIP OFF ANY SELECTED FUNCTION PAWLS. HOLD FUNCTION LEVER IN MAXIMUM REARWARD POSITION (DO NOT PUT OVER 2 LBS. OF TENSION ON LEVER) AND HOLD FUNCTION PAWL TO REAR WITH A TENSION OF 32 OZS. (AS LOAD ON RESET BAIL AFFECTS OVER TRAVEL, DO NOT LATCH MORE THAN ONE PAWL AT A TIME). MEASURE CLEARANCE. REPEAT FOR EACH FUNCTION PAWL ON STUNT BOX.

TO ADJUST

IF NECESSARY, REFINE REQUIREMENT (1) WITHIN ITS LIMITS OF 0.018 INCH TO 0.035 INCH.



2.20 Function Mechanism

(A) FUNCTION LEVER SPRING

NOTE

IF A FUNCTION LEVER OPERATES A CONTACT, HOLD OFF CONTACT WHEN CHECKING SPRING TENSION.

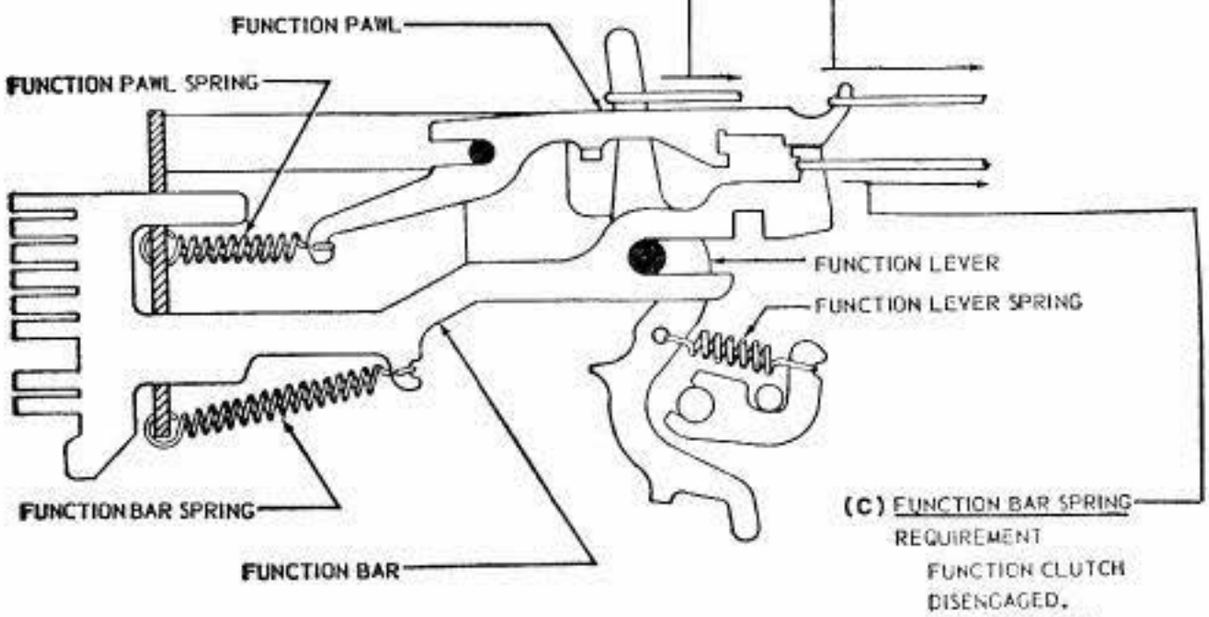
REQUIREMENT

FUNCTION LEVER IN UNOPERATED POSITION.
MIN. 1-1/2 OZS.
MAX. 2-3/4 OZS.
TO START LEVER MOVING
CHECK EACH SPRING.

(B) FUNCTION PAWL SPRING

REQUIREMENT

REAR END OF FUNCTION PAWL RESTING ON FUNCTION BAR.
MIN. 3 OZS.
MAX. 5 OZS.
TO START PAWL MOVING.
CHECK EACH SPRING.



(RIGHT SIDE VIEW)

(C) FUNCTION BAR SPRING

REQUIREMENT

FUNCTION CLUTCH DISENGAGED.
FUNCTION PAWL HELD AWAY.
MIN. 2-1/2 OZS.
MAX. 3-1/2 OZS.
TO START FUNCTION BAR MOVING.
CHECK EACH SPRING.

CAUTION

SEVERE WEAR TO THE POINT OF OPERATIONAL FAILURE WILL RESULT IF THE TELETYPEWRITER IS OPERATED WITHOUT EACH FUNCTION PAWL HAVING EITHER A RELATED FUNCTION BAR OR, WHERE A FUNCTION BAR IS MISSING, A RELATED FUNCTION PAWL CLIP TO HOLD THE FUNCTION PAWL AWAY FROM THE STRIPPER BLADE.

2.21 Function Pawl Stripper

STRIPPER BLADE DRIVE CAM POSITION

REQUIREMENT

STRIPPER BLADE DRIVE CAM SHOULD MOVE EACH STRIPPER BLADE CAM ARM AN EQUAL DISTANCE ABOVE AND BELOW CENTER LINE OF ITS PIVOT (GAUGE BY EYE).

A. UPWARD DIRECTION

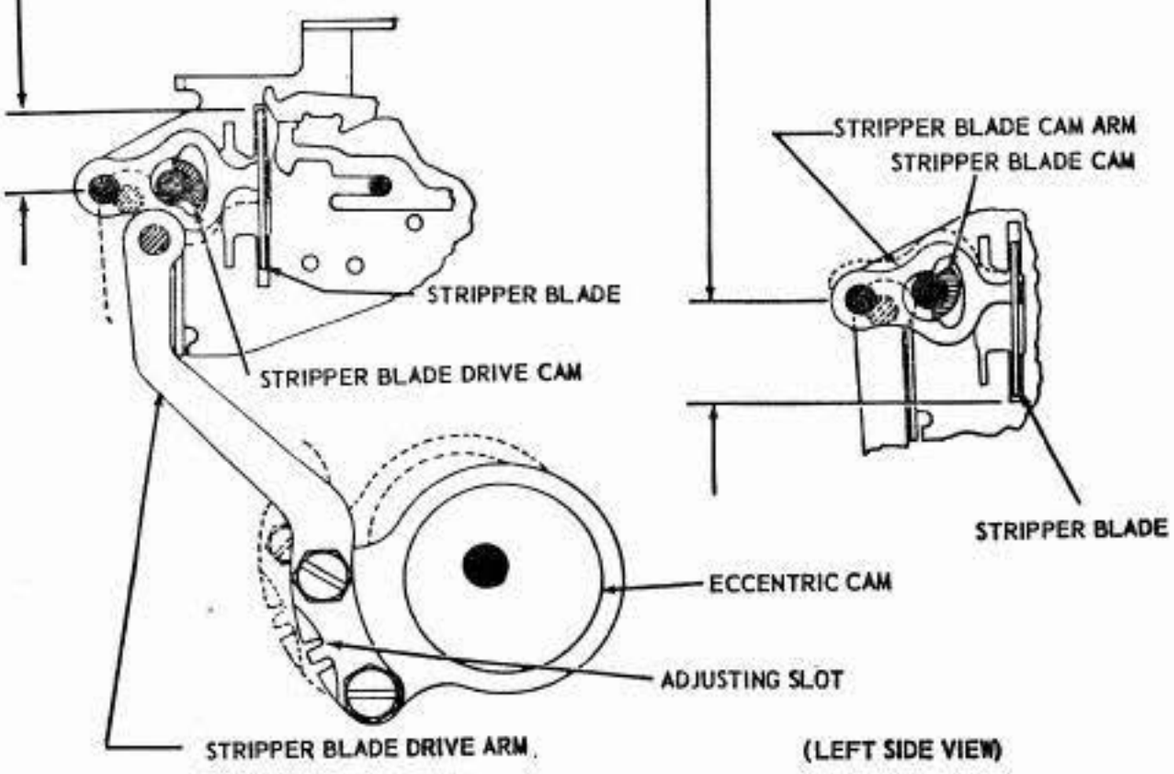
B. DOWNWARD DIRECTION

TO CHECK

WITH FUNCTION CLUTCH DISENGAGED OBSERVE ENGAGEMENT OF STRIPPER BLADE DRIVE CAM (UPPER PEAK) WITH STRIPPER BLADE CAM ARM. THEN ROTATE CLUTCH TO TURN CAM TO ITS EXTREME DOWNWARD POSITION AND OBSERVE ENGAGEMENT OF LOWER CAM PEAK.

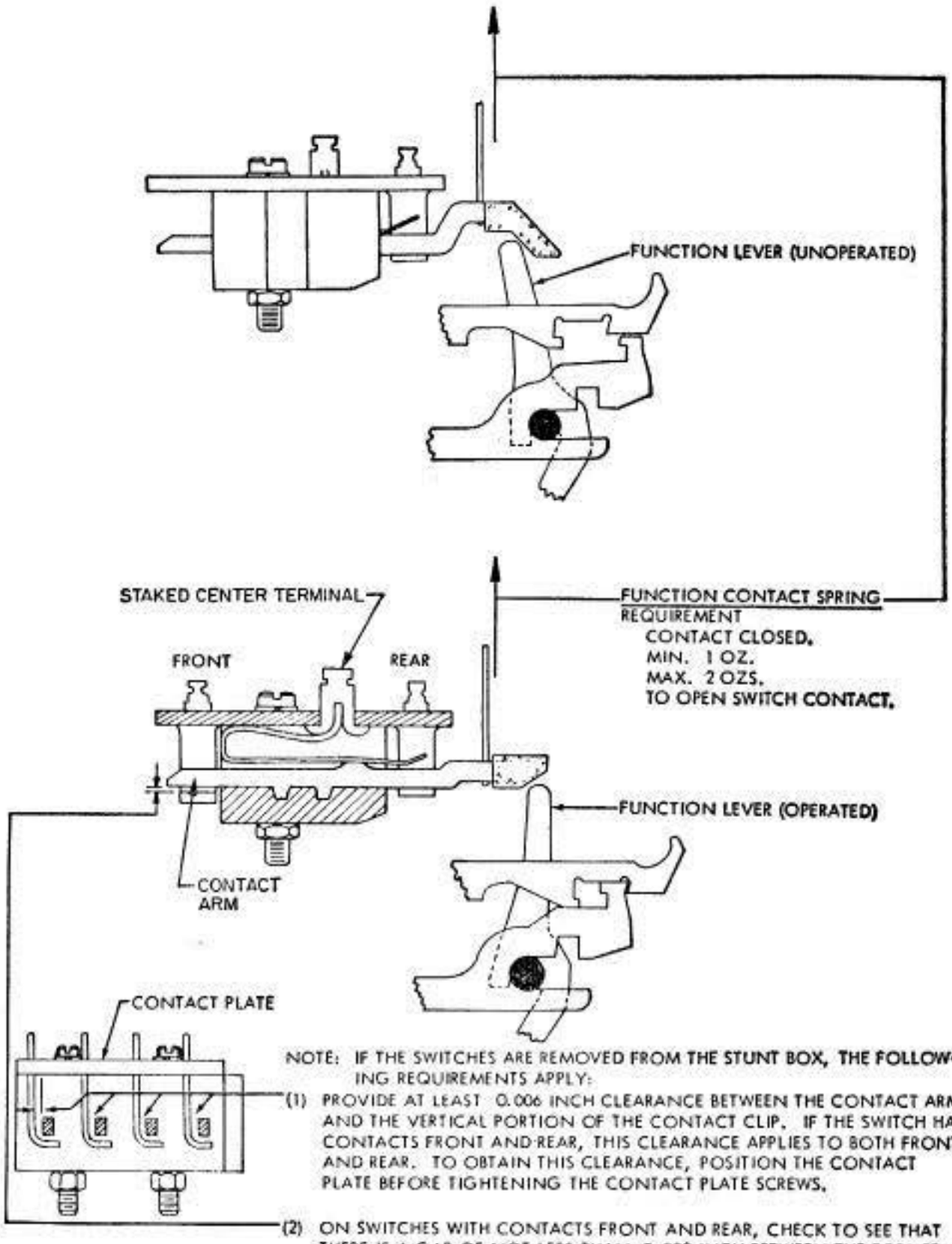
TO ADJUST

WITH STRIPPER BLADE DRIVE ARM MOUNTING SCREWS LOOSENED, EQUALIZE THE OVERTRAVEL OF EACH CAM PEAK.



(LEFT SIDE VIEW)

2.22 Function Contact Assembly Having Staked Center Terminal Above the Separate Contact Plate

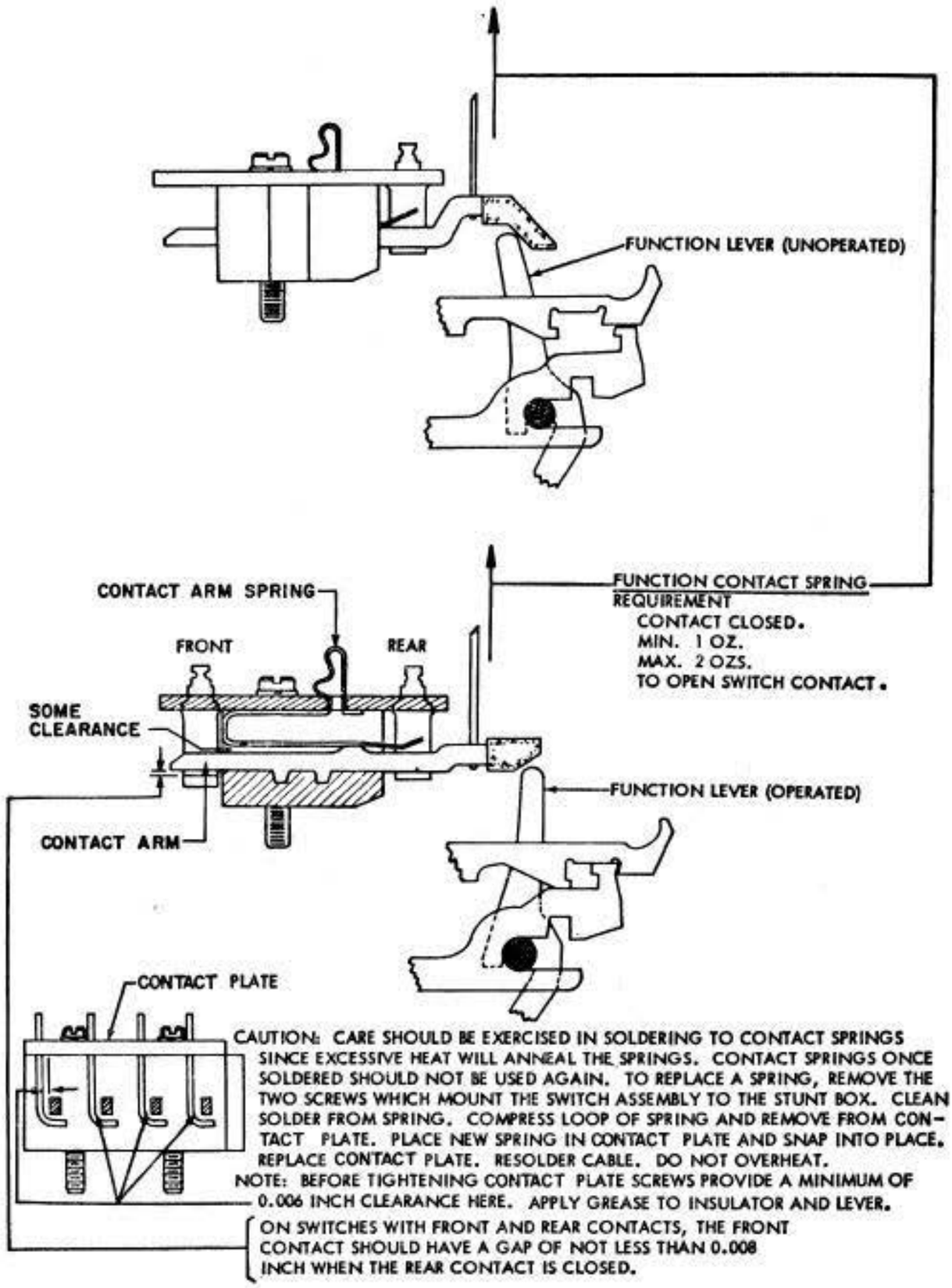


NOTE: IF THE SWITCHES ARE REMOVED FROM THE STUNT BOX, THE FOLLOWING REQUIREMENTS APPLY:

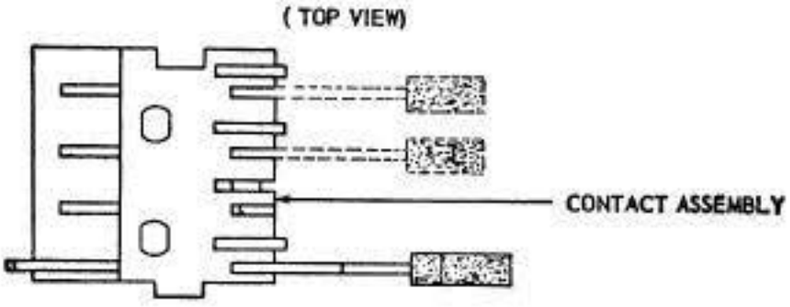
(1) PROVIDE AT LEAST 0.006 INCH CLEARANCE BETWEEN THE CONTACT ARM AND THE VERTICAL PORTION OF THE CONTACT CLIP. IF THE SWITCH HAS CONTACTS FRONT AND REAR, THIS CLEARANCE APPLIES TO BOTH FRONT AND REAR. TO OBTAIN THIS CLEARANCE, POSITION THE CONTACT PLATE BEFORE TIGHTENING THE CONTACT PLATE SCREWS.

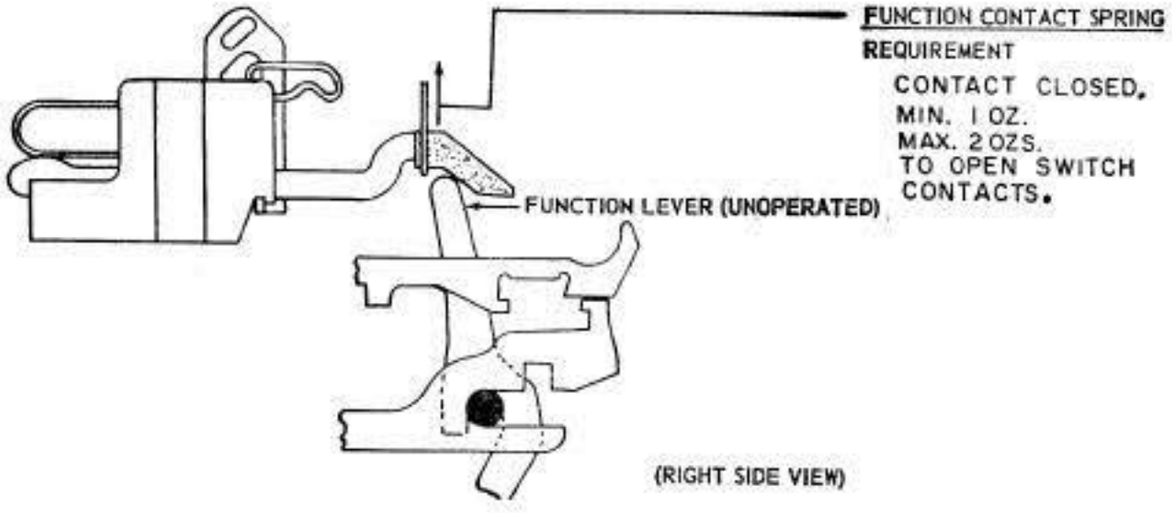
(2) ON SWITCHES WITH CONTACTS FRONT AND REAR, CHECK TO SEE THAT THERE IS A GAP OF NOT LESS THAN 0.008 INCH BETWEEN THE FORMED-OVER END OF THE FRONT CONTACT CLIP AND THE BOTTOM OF THE CONTACT ARM WHEN THE REAR CONTACT IS CLOSED.

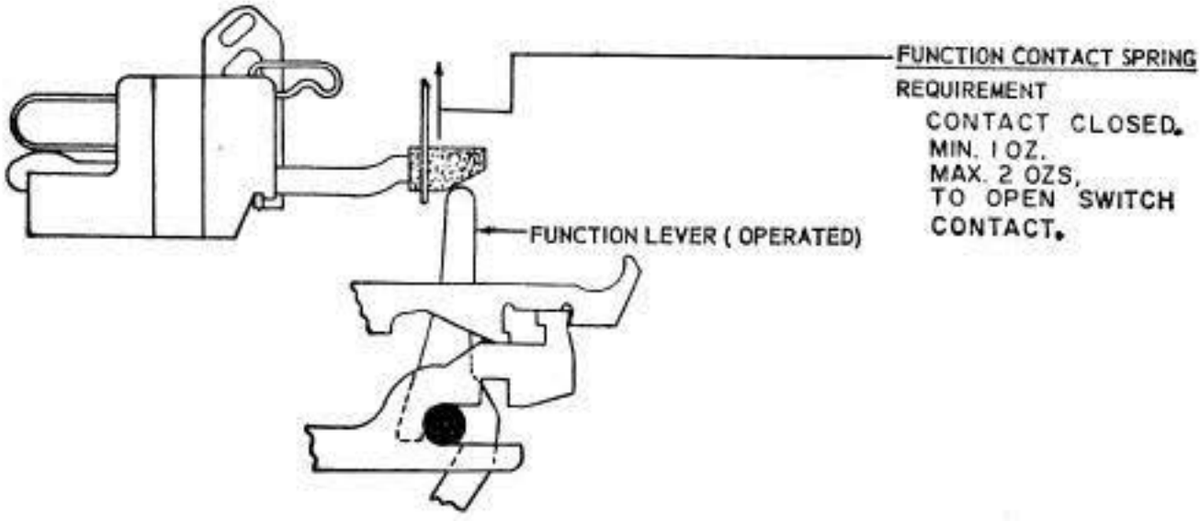
2.23 Function Contact Assembly Having the Function Spring Loop Projecting Above the Separate Contact Plate



2.24 Function Contact Assembly With One-piece Contact Block







2.25 Codebar-detent Mechanism

CODE BAR DETENT

REQUIREMENT

FRONT PLATE REMOVED. ALL CLUTCHES DISENGAGED SUPPRESSION AND SHIFT CODE BARS SHOULD DETENT EQUALLY (GAUGED BY EYE).

TO ADJUST

EQUALIZE THE DETENTING OF THE CODE BARS BY ADDING OR REMOVING SHIMS BETWEEN THE CASTING AND THE CODE BAR BRACKET.

CODE BAR DETENT SPRING TENSION

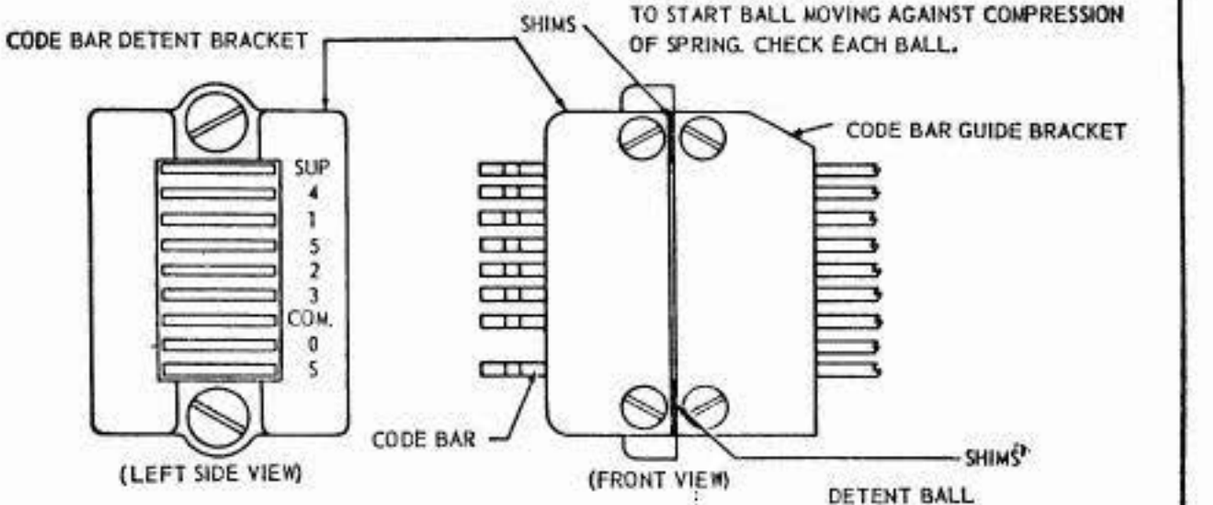
NOTE

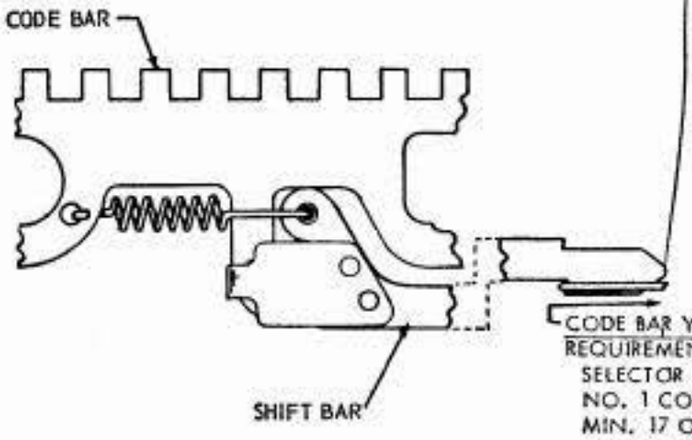
UNLESS THERE IS REASON TO BELIEVE THAT THESE SPRINGS ARE CAUSING OPERATING FAILURE DO NOT CHECK THIS REQUIREMENT.

REQUIREMENT

CODE BAR DETENT BRACKET CAREFULLY REMOVED AND CODE BARS REMOVED FROM DETENT BRACKET. SCALE APPLIED TO DETENT BALL AND PULLED IN DIRECTION OF BALL TRAVEL.

MIN. 1-1/2 OZS.
MAX. 3-1/2 OZS.
TO START BALL MOVING AGAINST COMPRESSION OF SPRING. CHECK EACH BALL.



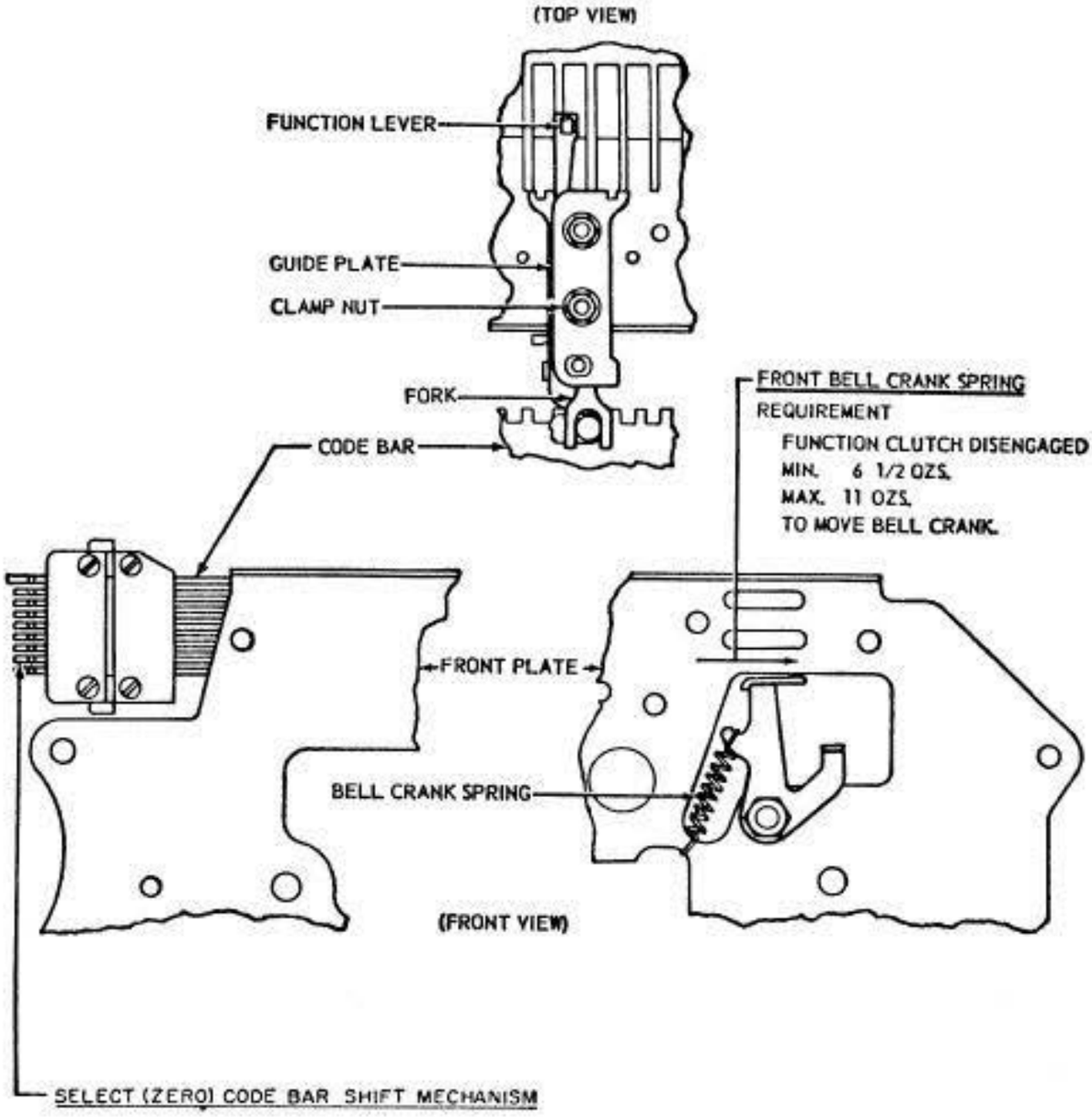


CODE BAR YIELD SPRING

REQUIREMENT

SELECTOR CLUTCH AND CODE BAR CLUTCH DISENGAGED. NO. 1 CODE BAR IN SPACING POSITION.
MIN. 17 OZS.
MAX. 23 OZS.
TO START CODE BAR SHIFT BAR PIVOT MOVING AWAY FROM CODE BAR. CHECK NO. 2 AND COMMON CODE BAR SHIFT BAR IN THE SAME MANNER.

2.26 Codebar-positioning Mechanism



REQUIREMENT.

WITH FUNCTION CLUTCH IN STOP POSITION, LATCH FUNCTION LEVER (SHIFT MECHANISM). THE NOTCH IN SELECT CODE BAR SHOULD ALIGN WITH NOTCHES IN OTHER CODE BARS WHEN ALL CODE BARS ARE SHIFTED TO THE RIGHT.

TO ADJUST

POSITION THE UPPER OR LOWER GUIDE PLATE WITH ITS CLAMP NUTS LOOSENED.

NOTE

POSITION THE ASSOCIATED GUIDE PLATE SO THAT THE MOVEMENT OF THE FORK IS NOT RESTRICTED WITHIN THE RANGE OF ADJUSTMENT.

B. Sequence Selector Base, Gearing, and Motor

2.27 Intermediate- and Unit-gear Mechanism

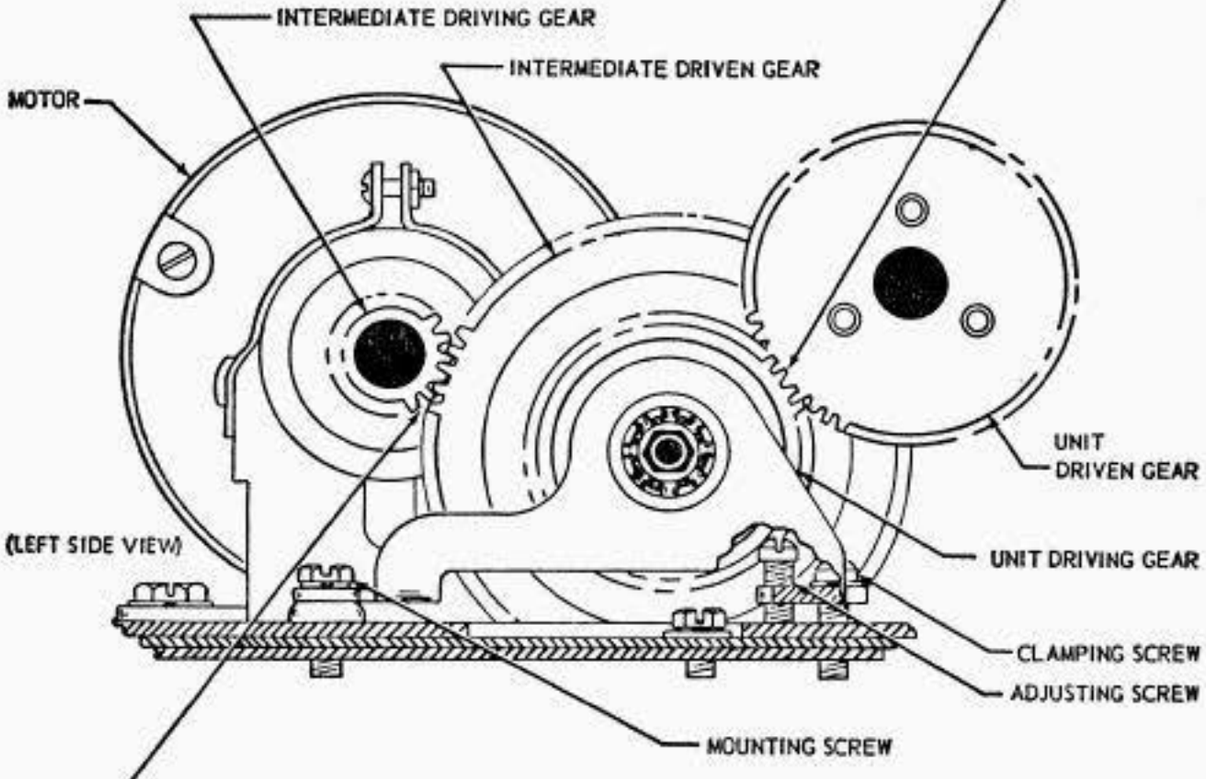
INTERMEDIATE GEAR BRACKET

(1) REQUIREMENT

BARELY PERCEPTIBLE BACKLASH BETWEEN UNIT DRIVEN GEAR AND UNIT DRIVING GEAR AT THEIR CLOSEST POINT.

TO ADJUST

POSITION THE COMPLETE INTERMEDIATE GEAR MECHANISM BRACKET WITH THE THREE SLOTTED HEX HEAD MOUNTING SCREWS LOOSENED. ALIGN THE GEARS AT THIS TIME.



(2) REQUIREMENT

BARELY PERCEPTIBLE BACKLASH BETWEEN INTERMEDIATE DRIVING GEAR AND INTERMEDIATE DRIVEN GEAR AT THEIR CLOSEST POINT.

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.

NOTE

WHEN A 28 DISTRIBUTOR IS USED WITH THE SEQUENCE SELECTOR, THE FOLLOWING APPLIES:

REQUIREMENT

BARELY PERCEPTIBLE BACKLASH BETWEEN THE DISTRIBUTOR DRIVEN AND DRIVING GEARS AT THEIR CLOSEST POINT.

TO ADJUST

POSITION DISTRIBUTOR WITH ITS MOUNTING NUTS LOOSENED.

2.28 **Motor Unit:** Refer to the section containing the requirements and adjustments for the 28 motor unit.

C. Assembled Sequence Selector

2.29 **Receiving-margin Mechanism:** The receiving margins should be checked by using the RY mechanism.

2.30 **RY Mechanism for Checking Receiving Margins**

Note: The RY mechanism is operable only when the unit is in the select condition (with the select codebar shifted to the left).

(a) The R and Y function bars are located in slots 41 and 42 together with associated mechanisms and single-cycle latches.

(b) A select universal function bar and associated mechanism are located in slot 40. The lever latch when operated holds the lever in the operated position until manually released.

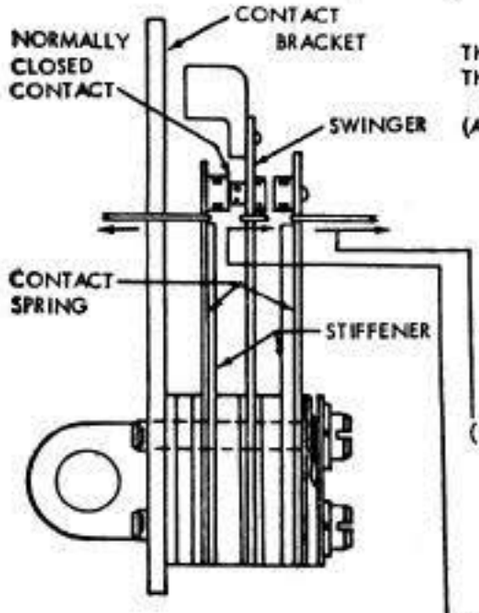
(c) A slide operated by levers in slots 41 and 42 prevents the universal function bar in slot 40 from being selected if one of the levers is in the operated position. A second slide operated by the lever in slot 40 serves as a readily visible indicator of an error.

(d) To determine selector margins, a continuous RY sequence is transmitted to the unit. When correct selection is being made, the indicating slide can be seen. When errors are received, the upper indicating slide moves to the rear and latches, and is hidden from sight. It must be released manually by depressing the plunger.

(e) To detect an error when the unit is to be operated unattended for an extended period of time, press the plunger at the left-hand stuntbox mounting screw. This will cause the upper slide to protrude from below the mechanism cover plate. If a selection error occurs, the slide will be withdrawn beneath the cover plate. To reset the slide, depress the plunger.

D. Variable Features

2.31 Universal Contact Assembly (Make-Break) Mounted on Stuntbox (Prel)

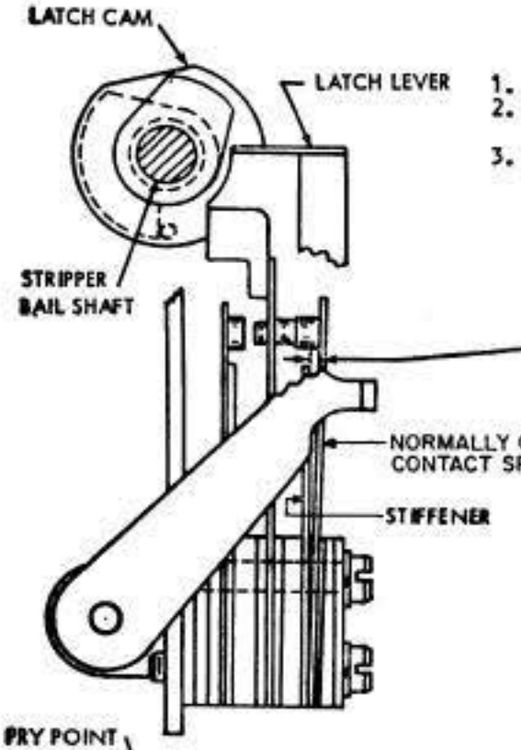


NOTE
THESE ADJUSTMENTS SHOULD BE MADE WITH THE CONTACT BRACKET ASSEMBLY REMOVED.

(A) CONTACT
(1) REQUIREMENT
THE STIFFENER SHOULD BE PARALLEL WITH THE CONTACT BRACKET.
TO ADJUST
BEND THE STIFFENER.
(2) REQUIREMENT
EACH CONTACT SPRING SHOULD REST AGAINST TIP OF ITS STIFFENER THROUGHOUT ITS WIDTH.
TO ADJUST
BEND THE CONTACT SPRING.

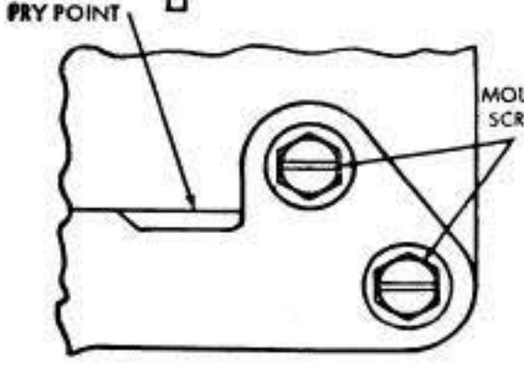
(B) CONTACT SPRING TENSION (TWO SPRINGS)
REQUIREMENT
WITH THE SWINGER HELD AWAY
MIN. 2 OZS.
MAX. 3 OZS.
TO MOVE EACH SPRING AWAY FROM STIFFENER.
TO ADJUST
BEND THE CONTACT SPRING.

(C) SWINGER SPRING
REQUIREMENT
MIN. 4 OZS.
MAX. 6 OZS.
TO MOVE SWINGER FROM NORMALLY CLOSED CONTACT.
TO ADJUST
BEND SWINGER.



NOTES
1. CHECK TO SEE THAT CONTACT POINTS MEET SQUARELY.
2. THE FOLLOWING ADJUSTMENTS ARE TO BE MADE WITH CONTACT ASSEMBLY INSTALLED ON STUNT BOX.
3. IF CONTACT ASSEMBLY HAS BEEN REMOVED, A CHECK SHOULD BE MADE TO INSURE THAT CAM HAS NOT BEEN INSTALLED 180 DEGREES OUT OF PHASE. ROTATE MAIN SHAFT SO THAT STRIPPER-SHAFT DRIVELINK MOVES UPWARD. LATCHLEVER SHOULD THEN REST AGAINST LATCH CAM.

(D) LATCH
REQUIREMENT
WITH THE MAIN SHAFT ROTATED UNTIL THE STRIPPER BAIL SHAFT HAS REACHED ITS EXTREME COUNTERCLOCKWISE POSITION AND THE LATCH CAM LATCHED BY THE LATCH LEVER, CLEARANCE BETWEEN NORMALLY OPEN CONTACT SPRING AND UPPER END OF ITS STIFFENER.
MIN. 0.003 INCH
MAX. 0.008 INCH
TO ADJUST
LOOSEN CONTACT BRACKET MOUNTING SCREWS. MOVE BRACKET TO ITS HIGHEST POSITION. WITH SCREWDRIVER IN PRY POINT MOVE BRACKET DOWNWARD UNTIL REQUIREMENT IS MET. THE LATCH LEVER SHOULD ENGAGE BOTH CAMS BY THEIR FULL THICKNESS.



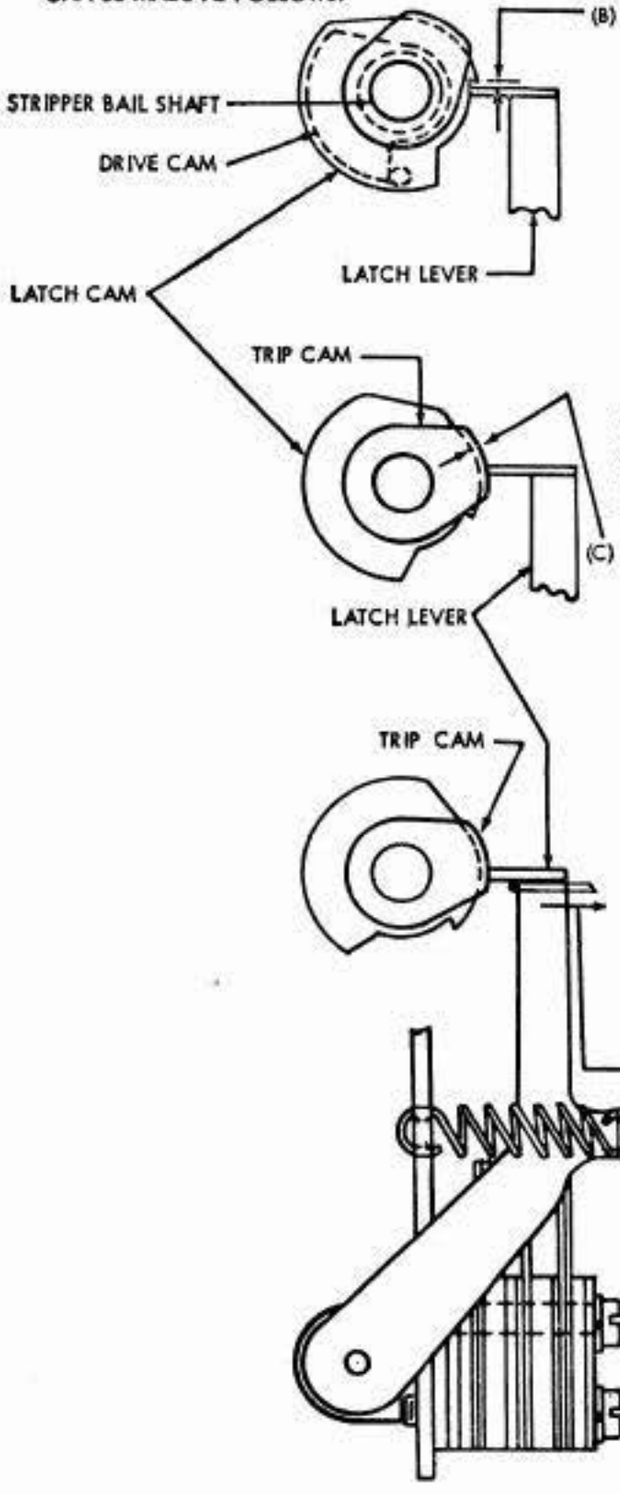
NOTE
THIS UNIVERSAL CONTACT SHOULD BE ADJUSTED SO THAT THE NORMALLY OPEN CONTACT SHALL CLOSE WITHIN ±6 MILLISECONDS OF THE STUNT BOX CONTACT CLOSURE AND SHOULD OPEN WITHIN ±5 MILLISECONDS OF THE NORMALLY OPEN STUNT BOX CONTACT OPENING. THE "BLANK" CHARACTER STUNT BOX CONTACT IN SLOT 36 SHOULD BE USED AS THE REFERENCE FOR THIS ADJUSTMENT.

2.32 Universal Contact Assembly (Make-Break) Mounted on Stuntbox (Prel)

(A) TIMING

NOTE

SINCE THE CONTACTS CAN BE ADJUSTED FOR VARIED TIMING, THE BEST PROCEDURE IS TO UTILIZE A DISTORTION TEST SET OR AN INDICATOR LAMP TO CHECK FOR PROPER ADJUSTMENT. IF THIS TEST EQUIPMENT IS NOT AVAILABLE, ADJUSTMENT CAN BE MADE AS FOLLOWS:



(B) DRIVE CAM (TIMING)

REQUIREMENT

WITH THE MAIN SHAFT ROTATED UNTIL THE STRIPPER BAIL SHAFT HAS REACHED ITS EXTREME COUNTERCLOCKWISE POSITION THERE SHOULD BE

MIN. 0.003 INCH
MAX. 0.008 INCH

BETWEEN THE TOP OF THE LATCH LEVER AND THE NOTCH OF THE LATCH CAM AT THE CLOSEST POINT WHEN PLAY IN STRIPPER BAIL SHAFT IS TAKEN UP FOR MINIMUM.

TO ADJUST

TURN DRIVE CAM ON SHAFT WITH ITS MOUNTING SCREW LOOSENED.

NOTE

THIS PROCEDURE PROVIDES THE LATEST POSSIBLE CLOSURE TIME. IF AN EARLIER CLOSURE TIME IS DESIRABLE, VARY POSITION OF CAM OR USE TEST SET.

(C) TRIP CAM (TIMING)

REQUIREMENT

WITH MAIN SHAFT ROTATED UNTIL THE STRIPPER BAIL SHAFT HAS REACHED ITS EXTREME CLOCKWISE POSITION, THE LATCH LEVER SHOULD BE RESTING ON THE TRIP CAM AND THE CLEARANCE BETWEEN THE LATCH LEVER AND THE LATCH CAM SHOULD BE

MIN. 0.003 INCH
MAX. 0.008 INCH

TO ADJUST

ROTATE TRIP CAM ON ITS SHAFT WITH ITS MOUNTING SCREW LOOSENED.

NOTE

THIS PROCEDURE PROVIDES THE LATEST POSSIBLE OPENING TIME FOR THE DRIVE CAM ADJUSTMENT. IF AN EARLIER OPENING TIME IS DESIRABLE, VARY THE POSITION OF CAM, OR USE A TEST SET.

(D) LATCH LEVER SPRING

REQUIREMENT

LATCH LEVER RESTING ON TRIP CAM

MIN. 1/2 OZ.
MAX. 2 OZS.

TO MOVE LEVER AWAY FROM TRIP CAM.

2.33 **Universal Contact Assembly (Make-Break) Mounted on Stuntbox (Final):** The following adjustments should be applied to the cams that operate the universal contacts to meet the timing requirements of the stripper-blade universal contact. Using a 1A teletypewriter test set, a 28A stroboscopic test set, or equivalent, proceed as shown in TABLE A.

TABLE A

Procedure	For 83B2 Selective Calling System	For Line Switching Using 154A1 Automatic DATA-PHONE Set
1. Arrange test set to send into selector magnet of 28 sequence selector and connect stroboscope in series with 120-volt battery and normally closed universal contact.	Applies	Does not apply
2. Send repeated LTRS characters from test set and view LTRS characters on stroboscope, adjusting scale to viewed unbiased character.	Applies	Applies
3. View normally closed universal contact on stroboscope while sending repeated LTRS characters from test set (unbiased signal).	Applies	Applies
4. Adjust cam on right side of universal-contact mechanism until contact closes between 50 to 80 divisions into stop pulse, as viewed on stroboscope.	Applies	Does not apply
5. Adjust cam on right side of universal-contact mechanism until contact opens for a maximum of 371 divisions ±15 divisions.	Does not apply	Applies

TABLE A (Contd)

Procedure	For 83B2 Selective Calling System	For Line Switching Using 154A1 Automatic DATA-PHONE Set
6. Change stroboscope connections from normally closed contact to normally open contact and observe that contact remains closed for at least 2.38 unit length. Also note that it opens prior to end of third selective pulse.	Applies	Does not apply

2.34 After completing the adjustments of variable features, recheck the receiving margin mechanism in accordance with 2.29 and 2.30.

3. ASSOCIATED BELL SYSTEM PRACTICES

3.01 The following Bell System Practices provide additional information that may be required in connection with this section.

Subject	Section
Teletypewriter Apparatus, General Requirements and Procedures	P30.012
Teletypewriter Apparatus, Lubrication, General Information and Routines	P30.011
Teletypewriter Apparatus, Disassembly and Reassembly, General Information and Routines..	P30.013
Teletypewriter Apparatus, Preparation of Apparatus for Installation	P33.014
Teletypewriter Tools and Maintenance Supplies...	P30.301
Alphabetical Index of 28-type Equipment, Bell System Practices, and Associated 28 ASR Station Drawings	P34.001

CHANGES AUTHORIZED BY P98. SERIES BELL SYSTEM PRACTICES

Par. No.	Adjustment Requirement	Includes Change As Authorized by Section
2.08	Clutch Shoe Lever	P98.585
2.09	Selector Cam Lubricator	P98.547
2.22	Function Contact Spring	P98.446 P98.686