BELL SYSTEM PRACTICES
Teletypewriter and Data Stations

SECTION P34.612
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AT&TCo Standard

28 TYPING UNIT

REQUIREMENTS AND ADJUSTMENTS

CONTENTS — PARAGRAPH

CONTENTS (Cont'd) PARAGRAPH

1. GENERAL

1.01 This section contains the requirements and adjustments for the 28 typing unit. The material herein, together with that in the general requirement section and the sections giving the requirements for auxiliary features, horizontal tabulation, and sprocket feed, provides the complete adjusting information for the maintenance of the 28 typing unit.

1.02 The section is reissued to revise various adjustment requirements in accordance with the changes authorized for this apparatus by the 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 up to date. Since this reissue presents a general revision and rearrangement of material, marginal arrows ordinarily used to indicate changes have been omitted.

1.03 The 28 typing unit may be safely placed in any of the three following positions for servicing: (1) in an upright position on its four feet, (2) tilted backward so that it rests on its rear feet and the rear points of the side frames, (3) bottom upward so that it rests on the two upper points of each side frame. In addition, the typing unit may be placed on its end for servicing by use of a TP159358 modification kit.

1.04 Where 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 (as shown in 2.26) 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 of the typing unit is rotated by hand, the clutches do not fully disengage upon reach-

ing their stop positions. In order to relieve the 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 (as shown in 2.26) to cause it to engage its latchlever, and thus fully disengage the internal expansion clutch. This procedure should always be followed before placing the typing unit on the base and switching on the power.

1.05 **Manual Selection of Characters or Functions:** The selection of characters or functions for checking the performance of a 28 typing unit while it is removed from its associated base may be obtained by manually operating the typing unit by one of the following methods, whichever is preferred.

(a) Method in Which Selected Character or Function **Does Not Remain Set Up** on the Codebars:

(1) Attach the armature clip, which is provided in the maintenance tool kit, to the selector-magnet armature, 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 is sufficient to 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 a 28 typing unit to manually rotate the main shaft in a counterclockwise direction until all the clutches are brought to the stop position.

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

(4) Release the selector-magnet armature momentarily to permit the selector clutch to engage.

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

(6) From the selector levers, strip the pushlevers that are spacing in the code combination of the character or function that is being selected. (The selector levers, shown in 2.10, move in succession, starting with the inner lever, No. 1.)

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

(8) The selected character or function can be repeated as often as desired by operating the codebar clutch tripshaft lever and manually rotating the main shaft.

(b) Method in Which Selected Character or Function **Remains Set Up** on the Codebars:

(1) Follow the procedures previously given in (a) (1) through (a) (2).

(2) Momentarily release the selector-magnet armature and again rotate the main shaft to insure that all pushlevers are in the marking position.

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

(4) From the selected levers, strip the pushlevers that are spacing in the code combination of the character or function that is being selected. (The selector levers, shown in 2.10, move in succession, starting with the inner lever, No. 1.)

(5) Engage the codebar clutch by operating the codebar clutch tripshaft lever.

(6) Continue to manually rotate the main shaft until the selection clears through the unit.

(7) Since the selected character or function remains set up on the codebars, the selection may be repeated as often as desired by operating the codebar-clutch tripshaft lever and rotating the main shaft.

(c) If it is necessary to operate the 28 typing unit **under power,** proceed as follows.

Caution: Where the unit must be checked with power connected, appropriate precautionary measures should be taken to avoid accident.

(1) Turn off the power.

(2) Follow the procedures previously given in (b) (1) through (b) (4).

(3) Manually operate the codebar clutch tripshaft lever to engage the codebar clutch.

(4) Turn on the power until the selection clears through the unit.

(5) Since the selected character or function remains set up on the codebars, the selection may be repeated as often as desired by manually operating the codebar clutch tripshaft lever and then operating the unit under power.

Caution: Because the codebar clutch tripshaft lever is mounted extremely close to moving parts, it should never be manually operated when the power is on.

1.06 **Parts Requiring Routine Check:** To prevent undue wear of the print hammer and type pallets, each time the 28 typing unit is given routine servicing, the following adjustments should be checked, and remade if necessary, in accordance with this section.

Lower draw wire rope: 2.45.
Printing-carriage position: 2.59.
Printing-hammer bearing stud: 2.59.
Printing track: 2.63.
Printing-hammer stop bracket: 2.64, and Note; 2.65, and Note.
Dashpot-vent screw: 2.49, and check transfer slide for binds.

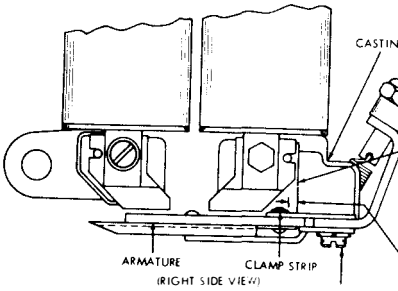
2. REQUIREMENTS AND ADJUSTMENTS

2.01 The following figures show the adjusting tolerances, positions of 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 a 28 typing unit 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.

2.02 **Selector Magnet Mechanism**

NOTE

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

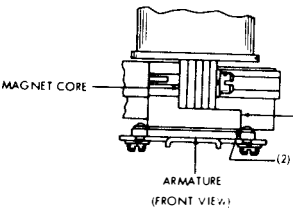


SELECTOR ARMATURE

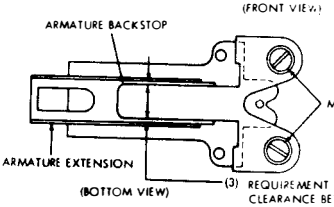
NOTE

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

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



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

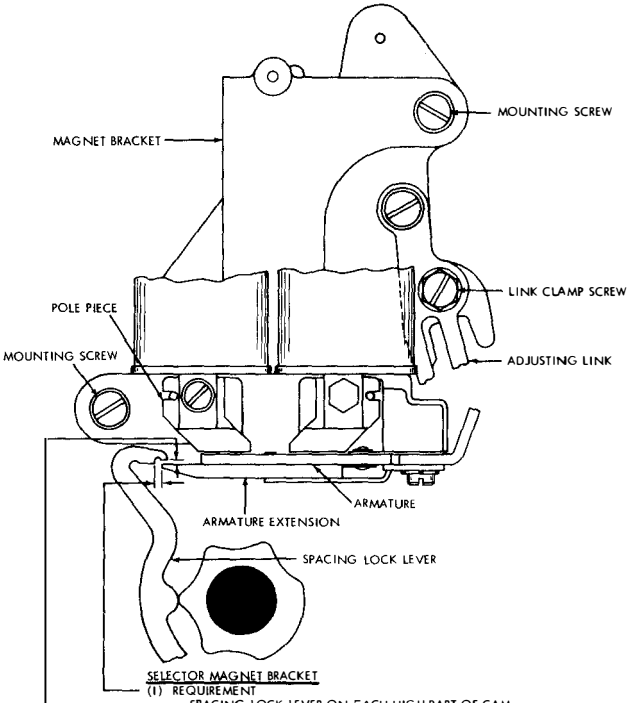


(3) REQUIREMENT (ARMATURE BACKSTOP ALIGNMENT)
CLEARANCE BETWEEN SIDES OF BACKSTOP AND SIDES OF ARMATURE EXTENSION.
MIN. 0.010 INCH

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 Magnet 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.

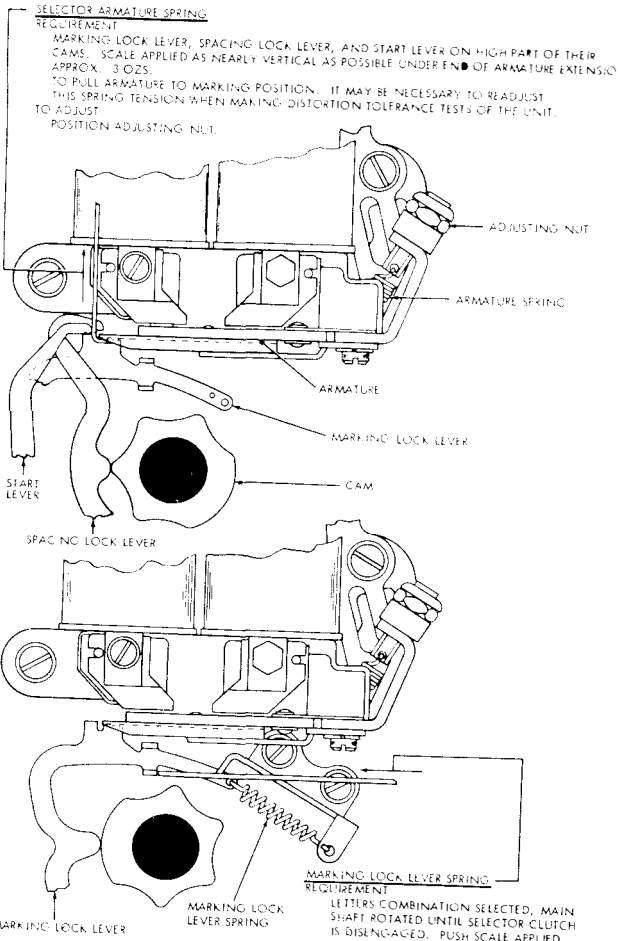
(2) REQUIREMENT

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

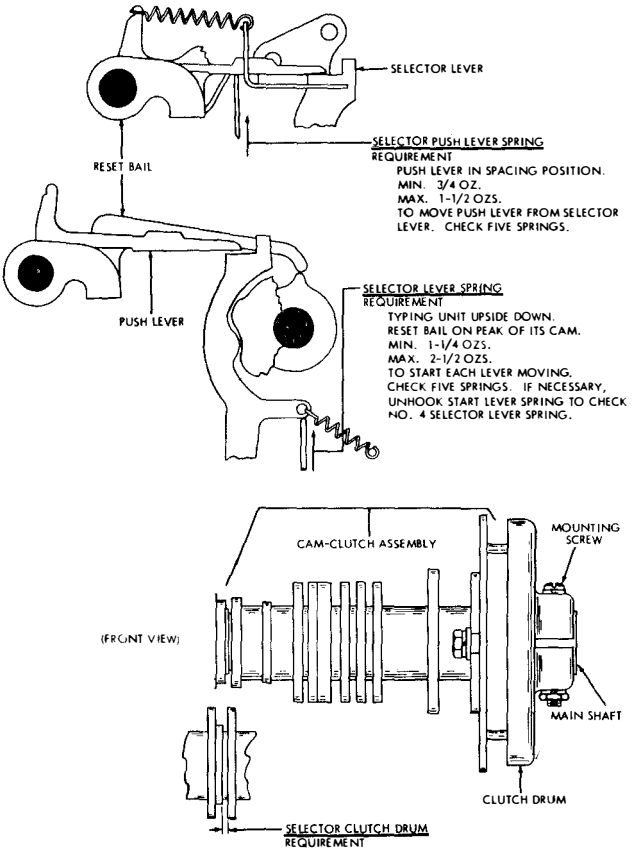
TO ADJUST

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

2.04 Selector Magnet and Selector Clutch Mechanisms



2.05 **Selector Clutch Mechanism**

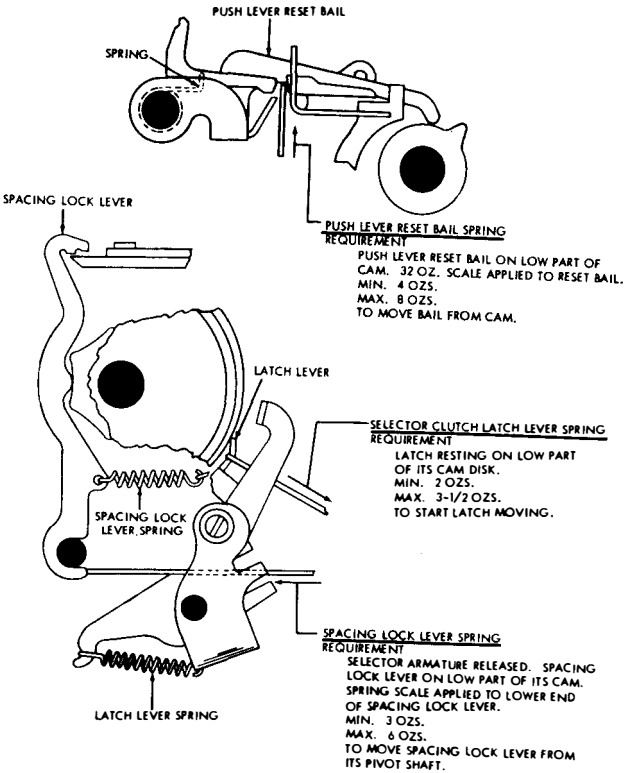


SELECTOR PUSH LEVER SPRING
REQUIREMENT
PUSH LEVER IN SPACING POSITION.
MIN. 3/4 OZ.
MAX. 1-1/2 OZS.
TO MOVE PUSH LEVER FROM SELECTOR LEVER. CHECK FIVE SPRINGS.

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 SHALL HAVE SOME END PLAY.
MAX. 0.010 INCH
TO ADJUST
POSITION CLUTCH DRUM WITH MOUNTING SCREW LOOSENED.

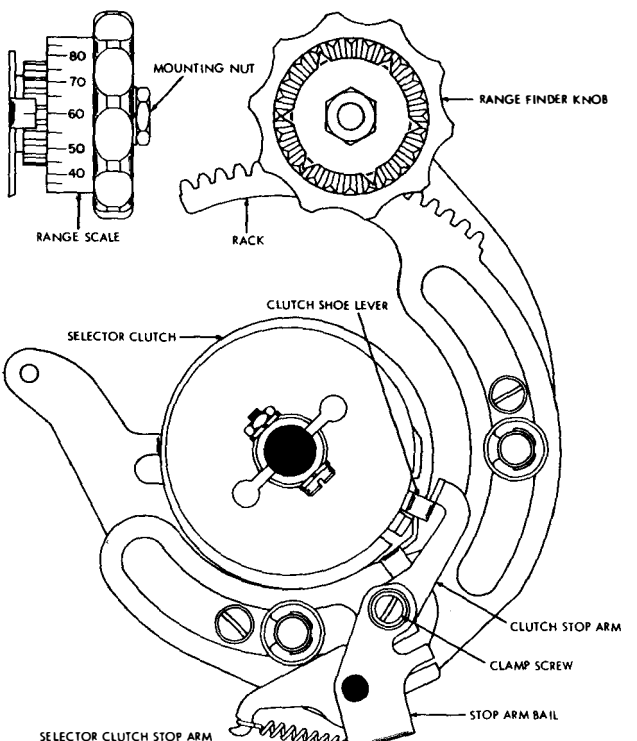
2.06 **Selector Clutch Mechanism**



2.07 Range Finder Mechanism (Later Design)

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 SHALL 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 SHALL 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 **Range Finder Mechanism (Earlier Design)**

(A) RANGE FINDER KNOB PHASING

REQUIREMENT

WITH RANGE FINDER KNOB TURNED TO EITHER END OF RACK, ZERO MARK ON SCALE SHALL BE IN LINE WITH SCRIBED LINE ON RANGE FINDER PLATE ± 3 POINTS.

TO PHASE

REMOVE PLATE AND POSITION KNOB WITH MOUNTING NUT LOOSENED

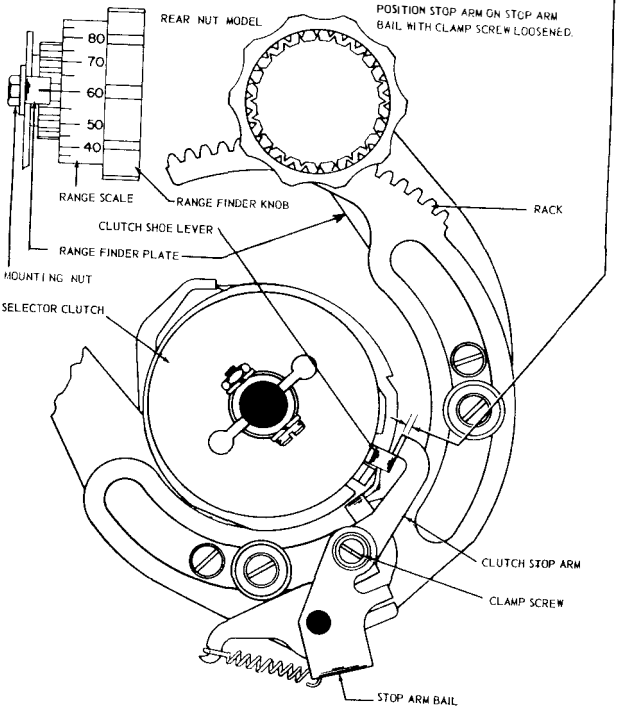
(B) SELECTOR CLUTCH STOP ARM

REQUIREMENT

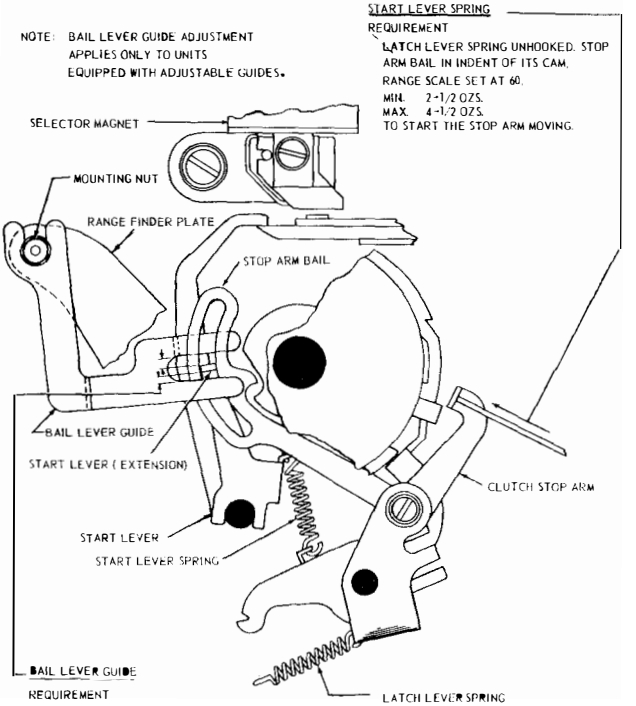
RANGE SCALE SET AT 60, SELECTOR CLUTCH DISENGAGED, ARMATURE IN MARKING POSITION. CLUTCH STOP ARM SHALL ENGAGE CLUTCH SHOE LEVER BY APPROXIMATELY FULL THICKNESS OF SHOE LEVER.

TO ADJUST

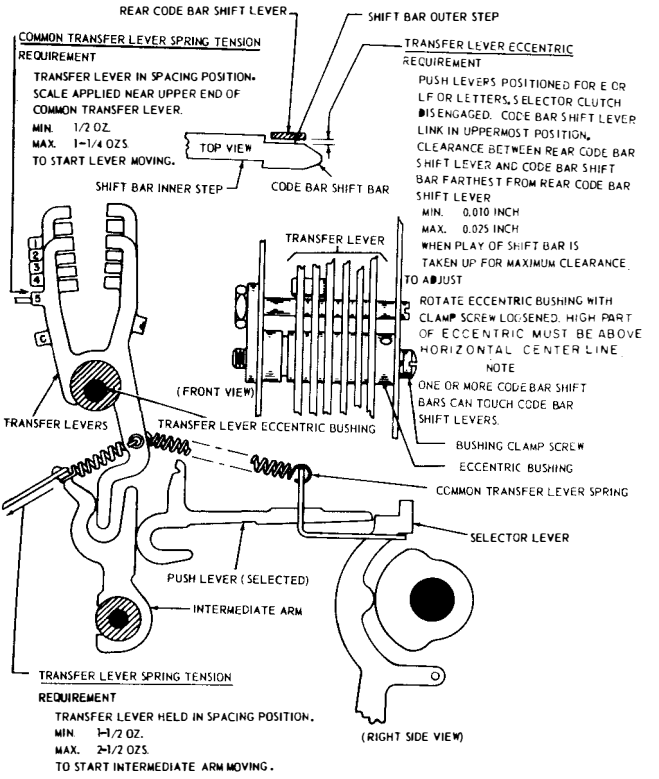
POSITION STOP ARM ON STOP ARM BAIL WITH CLAMP SCREW LOOSENED.



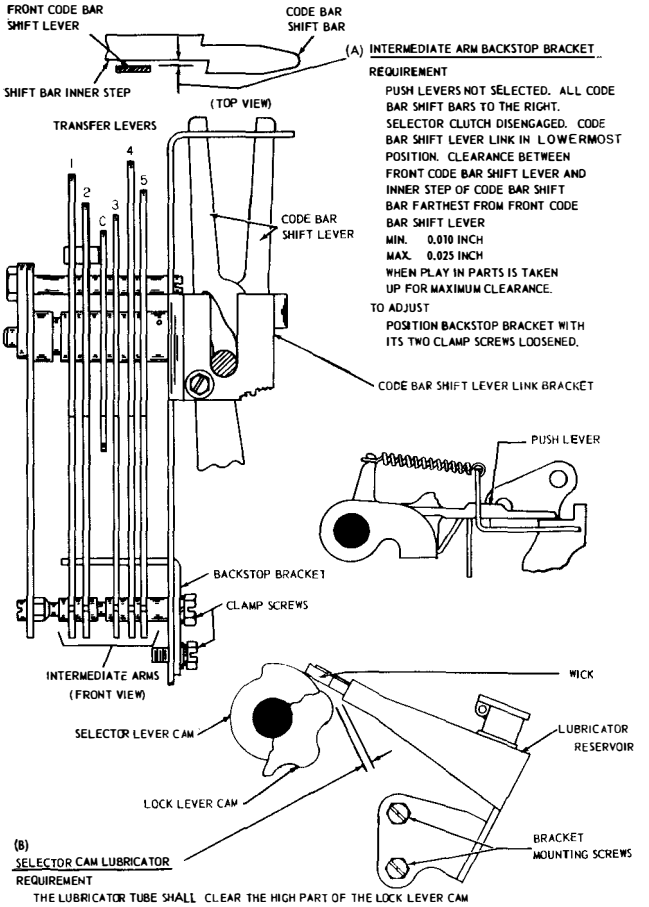
2.09 **Selector Clutch Mechanism**



2.10 **Codebar Shift Mechanism**



2.11 Codebar Shift Mechanism



(A) 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.

(B)

SELECTOR CAM LUBRICATOR

REQUIREMENT

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

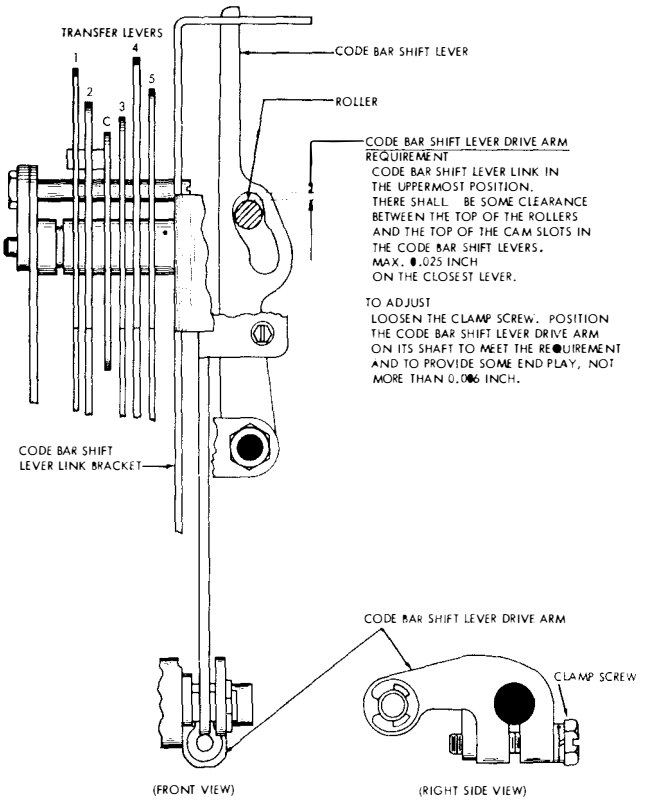
THE HIGH PART OF THE SELECTOR LEVER CAMS SHALL TOUCH THE LUBRICATOR WICK, BUT SHALL NOT RAISE IT MORE THAN 1/32 INCH.

TO ADJUST

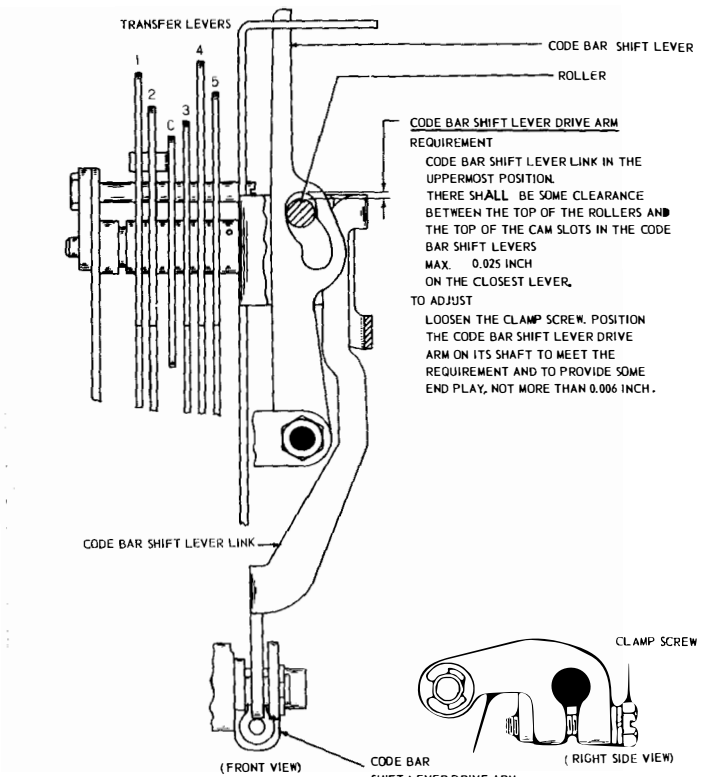
POSITION THE LUBRICATOR BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

NOTE: THERE SHALL BE SOME CLEARANCE BETWEEN THE MARKING LOCK LEVER SPRING AND THE LUBRICATOR RESERVOIR

2.12 **Codebar Shift Mechanism (Later Design)**



2.13 Codebar Shift Mechanism (Earlier Design)



2.14 Codebar Shift Mechanism (Later Design)

CODE BAR SHIFT LEVER LINK BRACKET

REQUIREMENT

MOTION OF FRONT AND REAR CODE BAR SHIFT LEVERS SHALL 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)

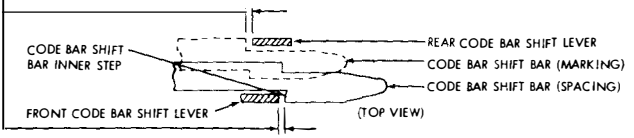
SELECT LETTERS COMBINATION. CHECK CLEARANCE BETWEEN REAR CODE BAR SHIFT LEVER AND SHOULDER ON NEAREST CODE BAR SHIFT BAR IN SAME WAY.

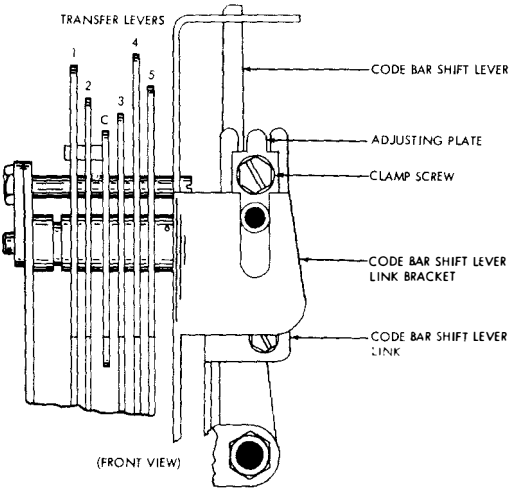
MIN. 0.002 INCH

MAX. 0.025 INCH

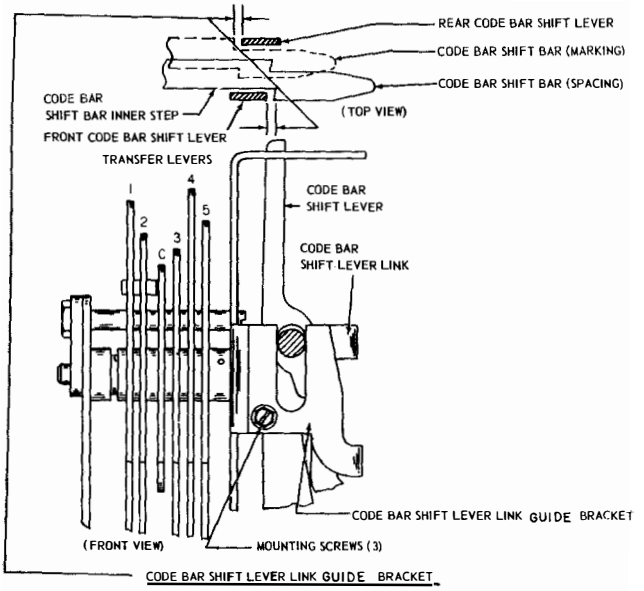
TO ADJUST

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





2.15 Codebar Shift Mechanism (Earlier Design)



CODE BAR SHIFT LEVER LINK GUIDE BRACKET

REQUIREMENT

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

TO CHECK (FRONT)

SELECT BLANK COMBINATION AND ROTATE MAIN SHAFT 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)

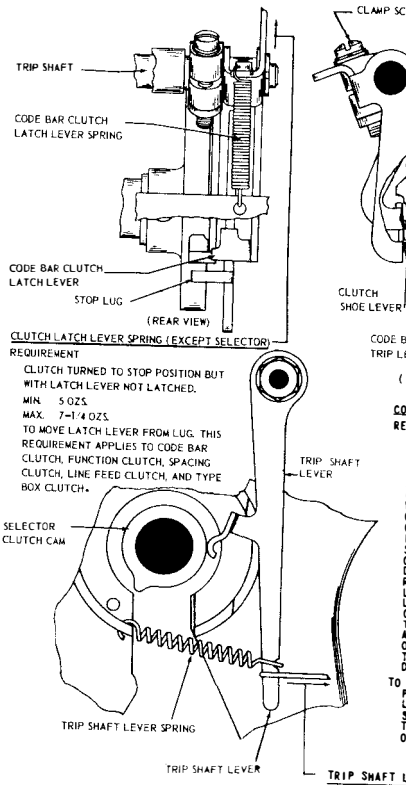
SELECT LETTERS COMBINATION. CHECK CLEARANCE BETWEEN REAR CODE BAR SHIFT LEVER AND SHOULDER ON NEAREST CODE BAR SHIFT BAR IN SAME WAY.

MIN. 0.002 INCH
MAX. 0.025 INCH

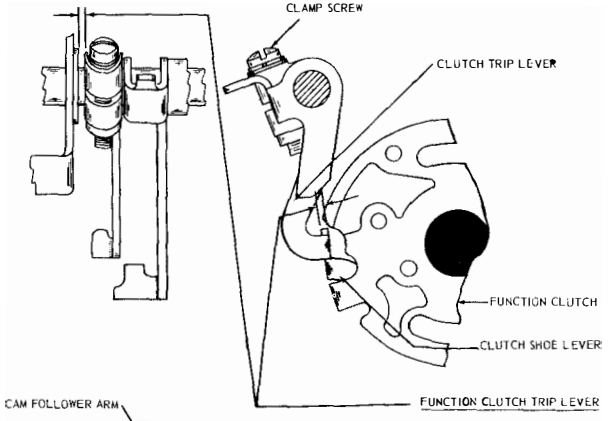
TO ADJUST

POSITION CODE BAR SHIFT LEVER LINK GUIDE BRACKET BY MEANS OF MOUNTING SCREWS (3).

2.16 Clutch Mechanism and Codebar Clutch Tripshaft Mechanism



2.17 Function Clutch Mechanism



FUNCTION CLUTCH TRIP LEVER

REQUIREMENT

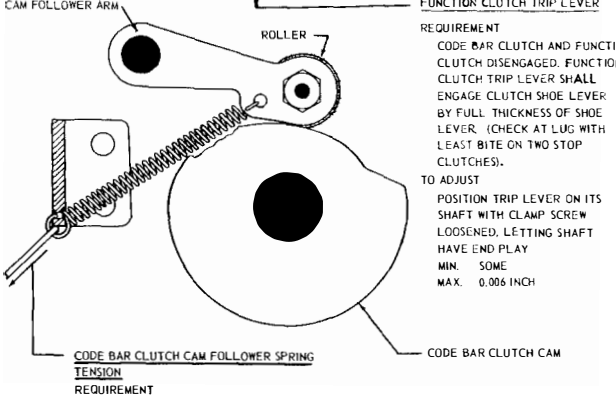
CODE BAR CLUTCH AND FUNCTION CLUTCH DISENGAGED. FUNCTION CLUTCH TRIP LEVER SHALL ENGAGE CLUTCH SHOE LEVER BY FULL THICKNESS OF SHOE LEVER. (CHECK AT LUG WITH LEAST BITE ON TWO STOP CLUTCHES).

TO ADJUST

POSITION TRIP LEVER ON ITS SHAFT WITH CLAMP SCREW LOOSENED, LETTING SHAFT HAVE END PLAY

MIN. SOME

MAX. 0.006 INCH



CODE BAR CLUTCH CAM FOLLOWER SPRING TENSION

REQUIREMENT

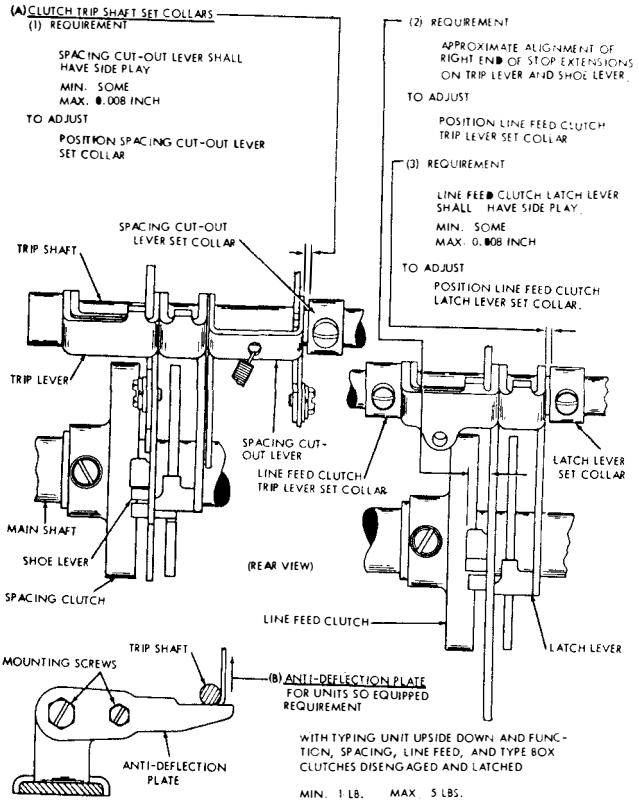
CAM FOLLOWER ROLLER ON THE LOW PART OF CAM.
THE SPRING UNHOOKED FROM SPRING BRACKET.

MIN. 20 OZS.

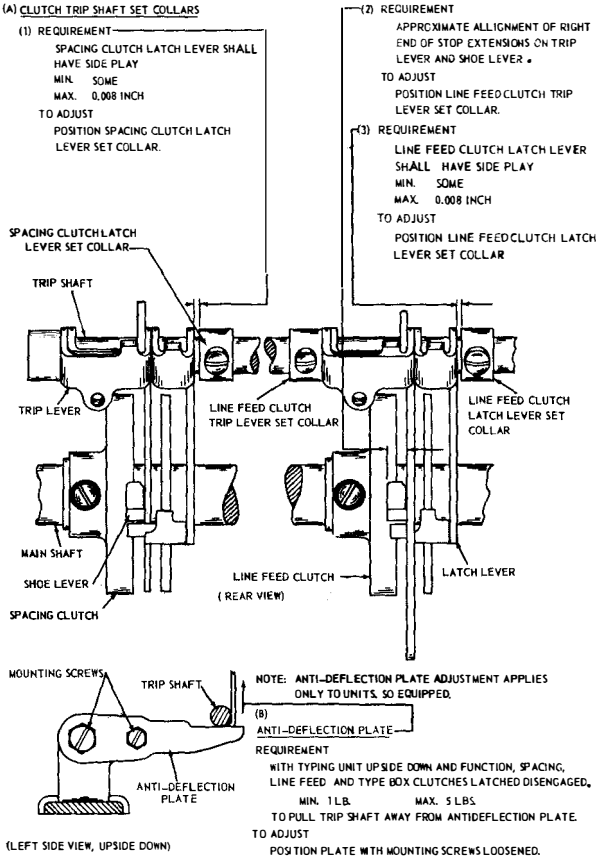
MAX. 24 OZS.

TO PULL SPRING TO INSTALLED LENGTH.

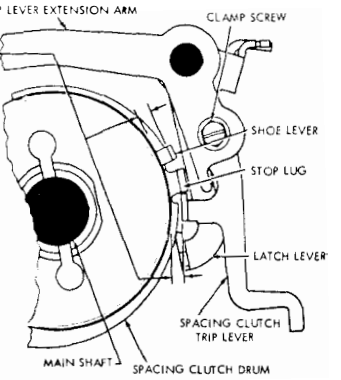
218 Tripshaft Mechanism (Later Design)



2.19 Tripshaft Mechanism (Earlier Design)



2.20 **Spacing Clutch Mechanism (Later Design)**



(RIGHT SIDE VIEW)

SPACING CLUTCH TRIP LEVER

REQUIREMENT

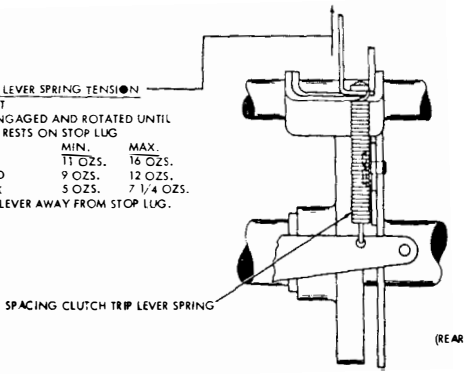
CLEARANCE BETWEEN TRIP LEVER AND CLUTCH DRUM SHALL BE 0.018 TO 0.035 INCH LESS THAN CLEARANCE BETWEEN SHOE LEVER AND DRUM AT STOP SHOWING GREATEST CLEARANCE. THERE SHALL BE SOME OVERBITE ON ALL STOP LUGS. GAUGE BY EYE.

TO CHECK

DISENGAGE THE CLUTCH. TRIP CLUTCH TRIP LEVER AND ROTATE MAIN SHAFT UNTIL TRIP LEVER IS OVER THE SHOE LEVER. TAKE UP PLAY OF SHOE LEVER INWARD BY SNAPPING THE TRIP LEVER OVER THE SHOE LEVER. CHECK CLEARANCE BETWEEN SHOE LEVER AND DRUM AT EACH STOP POSITION. WITH THE TRIP LEVER AT THE STOP POSITION WHICH YIELDS GREATEST CLEARANCE, ROTATE MAIN SHAFT SLOWLY UNTIL THE TRIP LEVER JUST FALLS OFF THE STOP LUG. CHECK CLEARANCE BETWEEN TRIP LEVER AND DRUM.

TO ADJUST

POSITION THE TRIP LEVER BY MEANS OF ITS CLAMP SCREW



(REAR VIEW)

CLUTCH TRIP LEVER SPRING TENSION

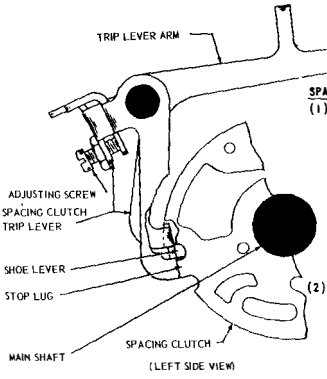
REQUIREMENT

CLUTCH ENGAGED AND ROTATED UNTIL TRIP LEVER RESTS ON STOP LUG

CLUTCH SPACING	MIN.	MAX.
LINE FEED	9 OZS.	12 OZS.
TYPE BOX	5 OZS.	7 1/4 OZS.

TO MOVE LEVER AWAY FROM STOP LUG.

2.21 Spacing Clutch Mechanism (Earlier Design)



SPACING CLUTCH TRIP LEVER

(1) REQUIREMENT (NOT ILLUSTRATED)

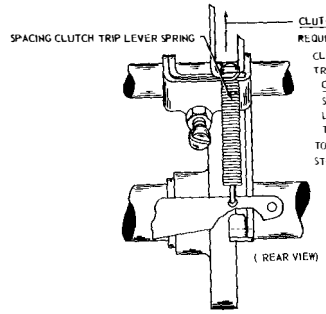
SPACING CLUTCH IN STOP BOSITION. TRIP THE SPACING CLUTCH TRIP LEVER. SLOWLY ROTATE MAIN SHAFT UNTIL STOP LUG OF SPACING CLUTCH TRIP LEVER IS ALIGNED WITH CLUTCH SHOE LEVER. TAKE UP CLUTCH SHOE LEVER PLAY INWARD BY SNAPPING THE TRIP LEVER OVER SHOE LEVER. MEASURE AND RECORD CLEARANCE BETWEEN CLUTCH DRUM AND SHOE LEVER. REPEAT FOR EACH OF OTHER TWO STOPS. PLACE SPACING CLUTCH IN STOP POSITION AT SHOE LEVER FARTHEST FROM CLUTCH DRUM. CLEARANCE BETWEEN TRIP LEVER AND CLUTCH DRUM SHALL BE MIN. 0.018 INCH, MAX. 0.035 INCH LESS THAN CLEARANCE BETWEEN DRUM AND SHOE LEVER.

(2) REQUIREMENT (NOT ILLUSTRATED)

THERE SHALL BE FULL ENGAGEMENT OF SHOE LEVER STOP LUG BY TRIP LEVER STOP LUG AND INSIDE SURFACE OF TRIP LEVER SHALL BE CLOSER TO CLUTCH DRUM THAN INSIDE SURFACE OF SHOE LEVER STOP LUG. CHECK ALL THREE STOP LUGS OF SHOE LEVER.

TO ADJUST

ADJUST BY MEANS OF TRIP LEVER CLAMP SCREW (OR ADJUSTING SCREW AND LOCKNUT ON UNITS SO EQUIPPED).



CLUTCH TRIP LEVER SPRING TENSION

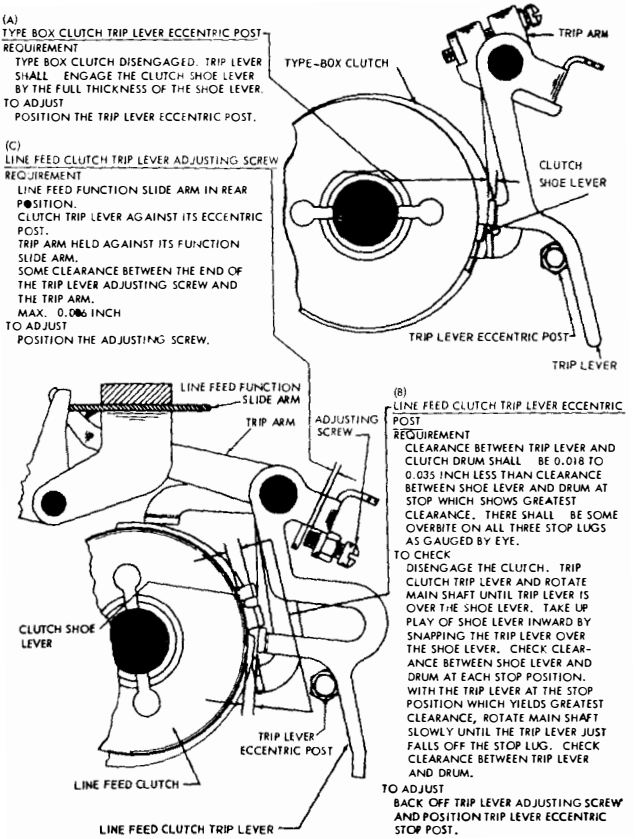
REQUIREMENT

CLUTCH ENGAGED AND ROTATED UNTIL TRIP LEVER RESTS ON STOP LUG.

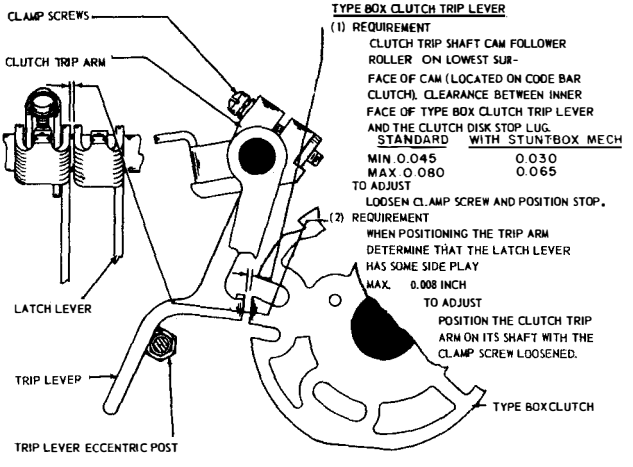
CLUTCH:	MIN.	MAX.
SPACING	11 OZS.	16 OZS.
LINE FEED	9 OZS.	12 OZS.
TYPE BOX	5 OZS.	7-1/4 OZS.

TO MOVE LEVER AWAY FROM STOP LUG.

2.22 Typebox Clutch and Line-feed Clutch Mechanisms

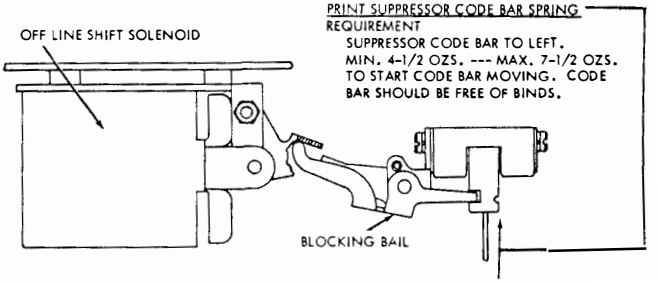


2.23 Typebox Clutch Mechanism

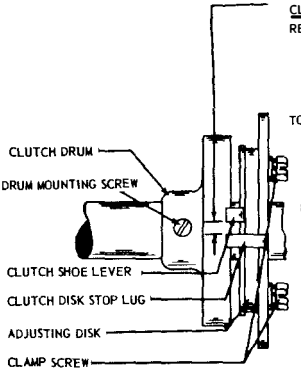


2.24 Typebox Clutch Mechanism (Selective Calling)

TYPE BOX CLUTCH TRIP LEVER
(SELECTIVE - CALLING UNITS WITH OR WITHOUT OFF-LINE SHIFT SOLENOID)
USE STANDARD ADJUSTMENTS.



2.25 Clutch Shoe Mechanism (All Clutches)



CLUTCH SHOE LEVER

REQUIREMENT

GAP BETWEEN CLUTCH SHOE LEVER AND ITS STOP LUG SHALL BE 0.055 INCH TO 0.085 INCH GREATER WHEN CLUTCH IS ENGAGED THAN WHEN THE CLUTCH IS DISENGAGED.

TO CHECK

DISENGAGE THE CLUTCH AND MEASURE THE GAP. TRIP THE CLUTCH AND ROTATE IT UNTIL THE CLUTCH SHOE LEVER IS TOWARD THE BOTTOM OF THE UNIT. ALIGN THE HEAD OF THE CLUTCH DRUM MOUNTING SCREW WITH THE STOP LUG. MANUALLY COMPRESS THE SHOE LEVER AGAINST THE STOP LUG AND ALLOW THEM TO SNAP APART. AGAIN MEASURE THE GAP WITH THE CLUTCH THUS ENGAGED.

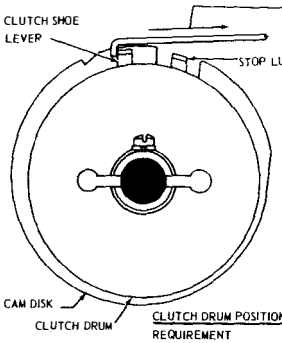
NOTE

ON MULTIPLE STOP CLUTCHES CHECK THE CLEARANCE AT THE STOP LUG THAT IS ADJACENT TO THE NOTCH IN THE CLUTCH ADJUSTING DISK.

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.

2.26 **Clutch Mechanism (Left View)**



CLUTCH SHOE LEVER SPRING TENSIONS

REQUIREMENT

CLUTCH ENGAGED. HOLD CAM DISK TO PREVENT TURNING. SPRING SCALE PULLED AT TANGENT TO CLUTCH.

MIN. 15 OZS. ONE-STOP CLUTCHES
MAX. 20 OZS.

MIN. 16 OZS. MULTIPLE-STOP CLUTCHES
MAX. 22 OZS.

TO MOVE THE SHOE LEVER IN CONTACT WITH THE STOP LUG.

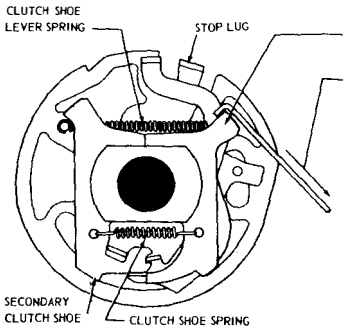
CLUTCH DRUM POSITION (EXCEPT SELECTOR)

REQUIREMENT

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

TO ADJUST.

POSITION EACH DRUM AND SPACING CLUTCH SET COLLAR WITH MOUNTING SCREWS LOOSENED.



CLUTCH SHOE SPRING TENSION

NOTE

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

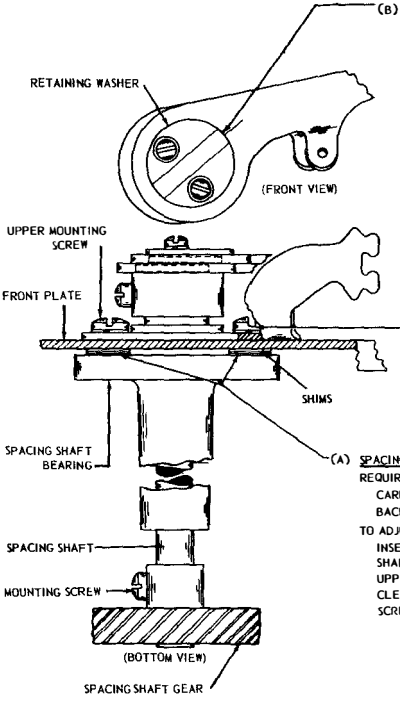
REQUIREMENT

CLUTCH DRUM REMOVED. SPRING SCALE APPLIED TO PRIMARY SHOE AT A TANGENT TO THE FRICTION SURFACE

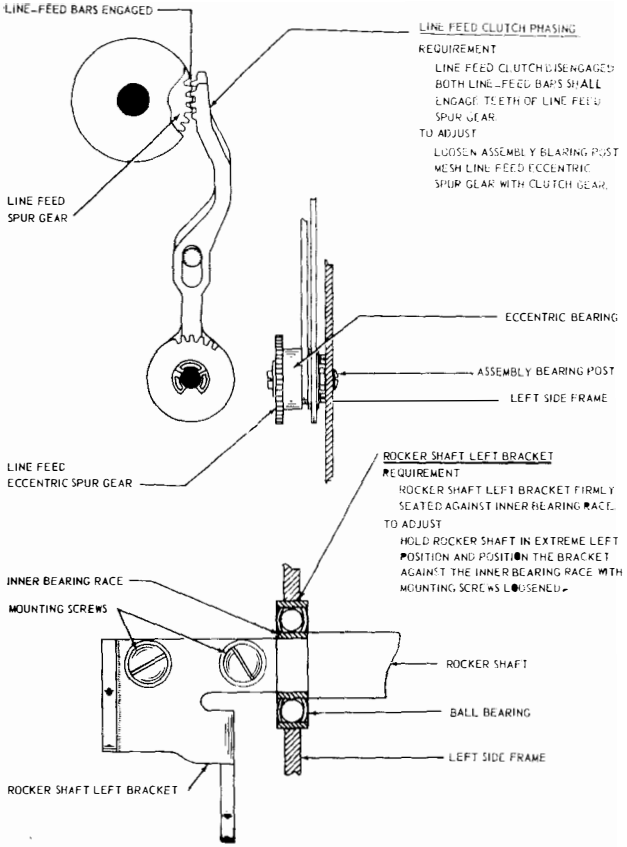
MIN. 3 OZS.
MAX. 5 OZS.

TO START THE PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE AT POINT OF CONTACT.

2.27 Spacing Mechanism



2.28 **Line-feed and Rocker Shaft Mechanisms**



2.29 Typebox Shift and Positioning Mechanisms

ROCKER SHAFT BRACKET ECCENTRIC STUD

REQUIREMENT

TYPE BOX CLUTCH DISENGAGED. PLAY IN LOCKING ARM TAKEN TOWARDS FRONT. GAP BETWEEN LOWER SIDE OF LOCK LEVER ROLLER AND TOP EDGE OF SHOULDER ON HORIZONTAL POSITIONING LOCK LEVER

MIN. 0.055 INCH

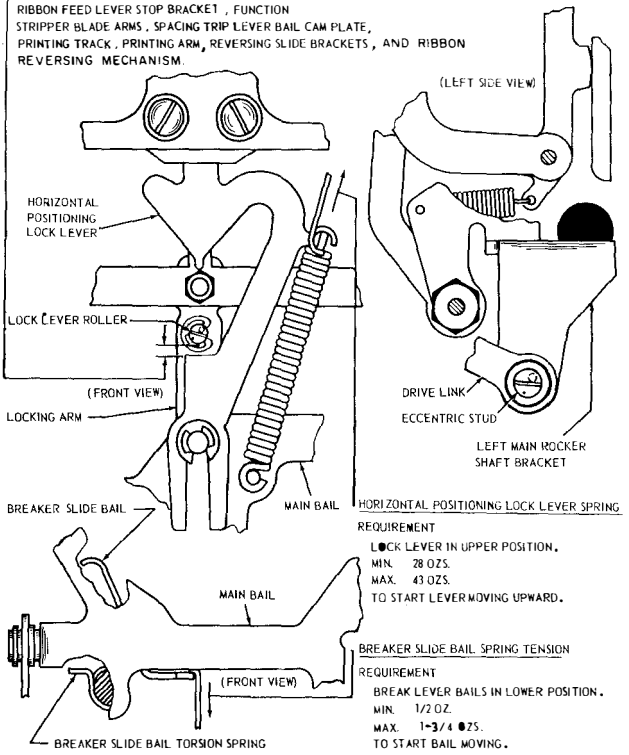
MAX. 0.090 INCH

TO ADJUST

POSITION ECCENTRIC STUD IN LOWER END OF ROCKER SHAFT LEFT BRACKET. KEEP HIGH PART OF ECCENTRIC (MARKED WITH DOT) BELOW CENTER LINE OF DRIVE LINK.

NOTE

ANY CHANGE IN THIS ADJUSTMENT WILL REQUIRE A RECHECKING OF THE FOLLOWING ADJUSTMENTS: HORIZONTAL POSITIONING DRIVE LINKAGE, RIGHT VERTICAL POSITIONING LEVER ECCENTRIC STUD, LEFT VERTICAL POSITIONING LEVER ECCENTRIC STUD, VERTICAL POSITIONING LOCK LEVER, RIBBON FEED LEVER STOP BRACKET, FUNCTION STRIPPER BLADE ARMS, SPACING TRIP LEVER BAIL CAM PLATE, PRINTING TRACK, PRINTING ARM, REVERSING SLIDE BRACKETS, AND RIBBON REVERSING MECHANISM.



HORIZONTAL POSITIONING LOCK LEVER SPRING

REQUIREMENT

LOCK LEVER IN UPPER POSITION.

MIN. 28 OZS.

MAX. 43 OZS.

TO START LEVER MOVING UPWARD.

BREAKER SLIDE BAIL SPRING TENSION

REQUIREMENT

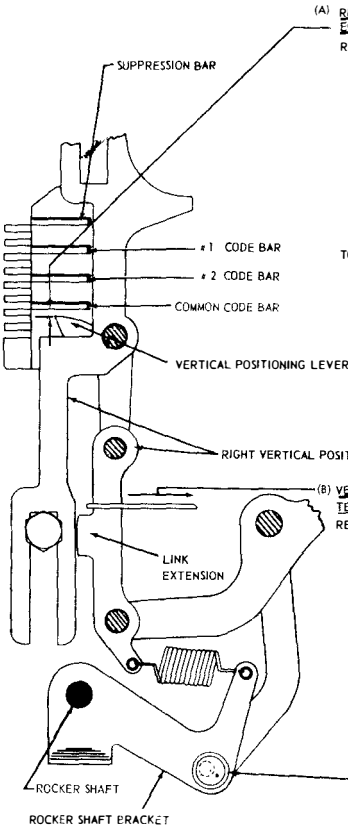
BREAK LEVER BAILS IN LOWER POSITION.

MIN. 1/2 OZ.

MAX. 1-3/4 OZS.

TO START BAIL MOVING.

2.30 Vertical Positioning Mechanism (Right View)



(A) RIGHT VERTICAL POSITIONING LEVER ECCENTRIC STUD

REQUIREMENT

TYPE BOX CLUTCH DISENGAGED, COMMON CODE BAR IN SPACING POSITION. PLAY TAKEN UP BY PRESSING DOWNWARD ON COMMON CODE BAR AT GUIDE BLOCK.

MIN. 0.030 INCH
MAX. 0.050 INCH

CLEARANCE BETWEEN THE TOE OF VERTICAL POSITIONING LEVER AND THE BOTTOM OF THE COMMON CODE BAR WHEN PLAY IS TAKEN UP TO MAKE CLEARANCE A MINIMUM.

TO ADJUST

POSITION THE ECCENTRIC STUD IN THE RIGHT ROCKER SHAFT BRACKET. POSITION HIGH PART OF ECCENTRIC (MARKED WITH DOT) TOWARD THE REAR.

(B) VERTICAL POSITIONING LEVER SPRING TENSION

REQUIREMENT

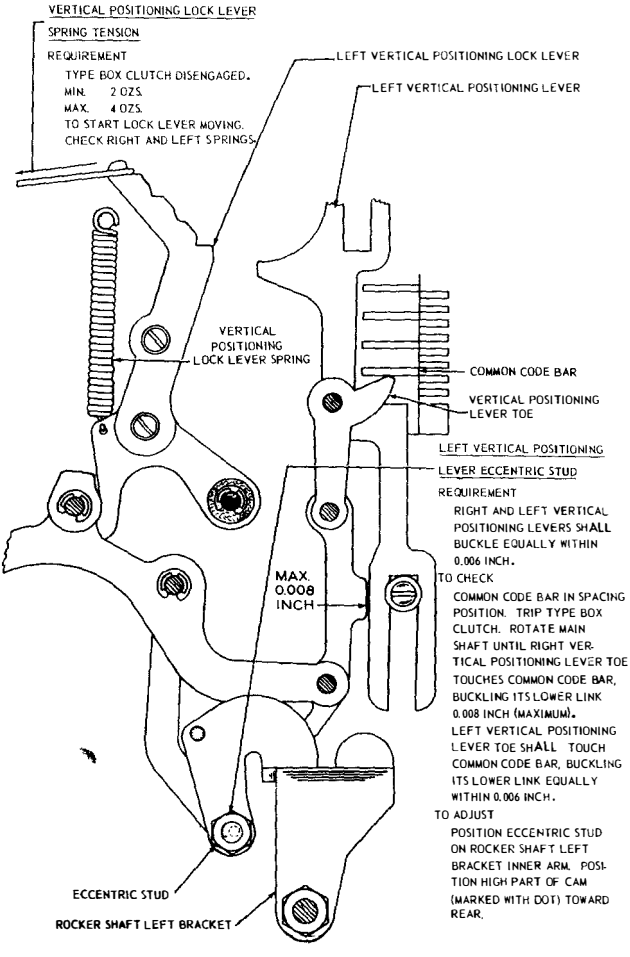
VERTICAL POSITIONING LEVER TOES (RIGHT AND LEFT) IN CONTACT WITH THE SUPPRESSION CODE BAR, LEVERS NOT BUCKLED.

MIN. 4 OZS.
MAX. 12 OZS.

TO MOVE THE LINK EXTENSION AWAY FROM THE VERTICAL POSITIONING LEVER.

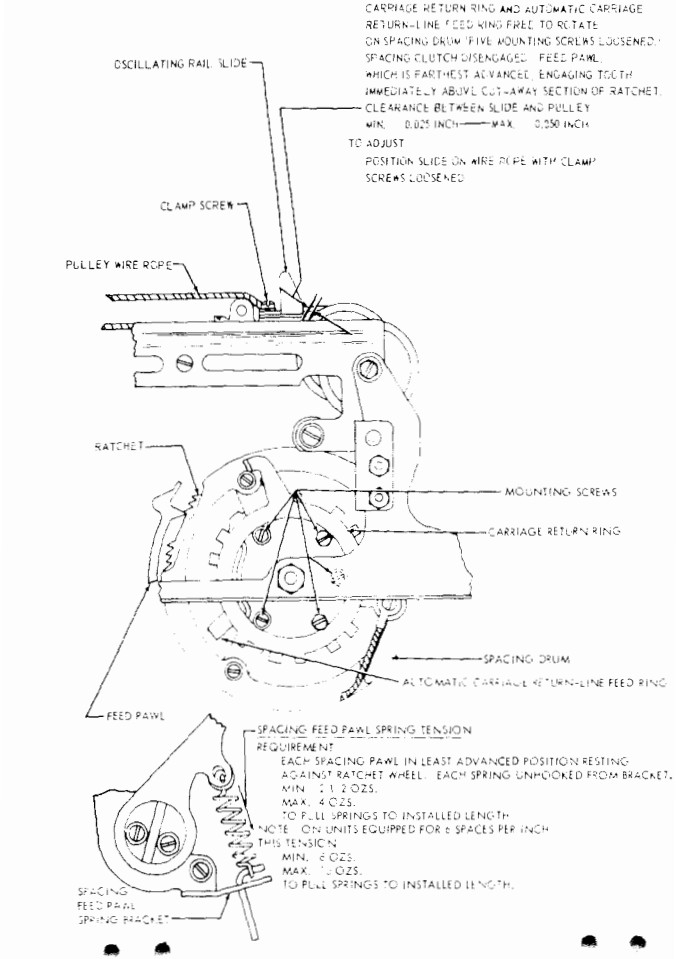
CHECK BOTH RIGHT AND LEFT SPRINGS.

2.31 **Vertical Positioning Mechanism (Left View)**



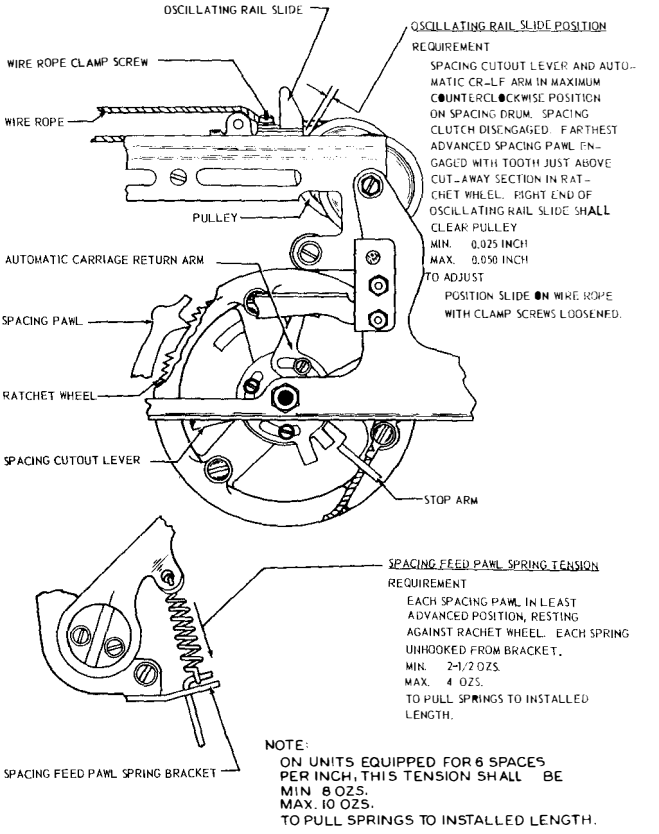
2.32 **Spacing Mechanism (Later Design)**

Note: If the following adjustments are remade, check the related adjustments in 2.50, 2.52, and 2.59.



2.33 **Spacing Mechanism (Earlier Design)**

Note: If the following adjustments are remade, check the related adjustments in 2.51, 2.53, and 2.59.



2.34 **Spacing Unit**

(A) SPACING TRIP LEVER BAIL CAM PLATE

REQUIREMENT

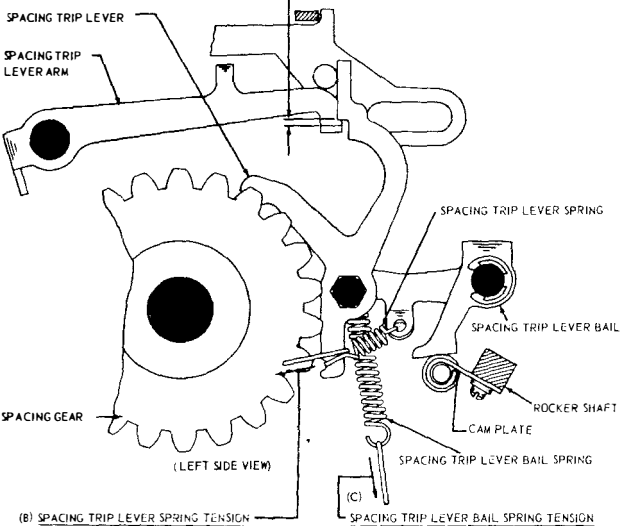
SPACING TRIP LEVER ARM IN UPWARD POSITION. TYPE BOX CLUTCH ROTATED THROUGH APPROXIMATELY ONE-HALF OF ITS CYCLE. ALL FUNCTION PAWLS DISENGAGED FROM FUNCTION BAR. CLEARANCE BETWEEN TOP SURFACE OF TRIP LEVER ARM EXTENSION AND SPACING TRIP LEVER SHOULDER

MIN. 0.010 INCH

MAX. 0.040 INCH

TO ADJUST

POSITION CAM PLATE ON ROCKER SHAFT WITH MOUNTING SCREWS LOOSENED. POSITION FORWARD EDGE OF CAM PLATE PARALLEL TO SHAFT.



(B) SPACING TRIP LEVER SPRING TENSION

REQUIREMENT

TYPE BOX CLUTCH DISENGAGED.

MIN. 2-1/2 OZS.

MAX. 5 OZS.

TO START LEVER MOVING.

(C) SPACING TRIP LEVER BAIL SPRING TENSION

REQUIREMENT

SPACING TRIP LEVER BAIL AGAINST STOP.

SPACING TRIP LEVER BAIL SPRING UNHOOKED.

MIN. 8 OZS.

MAX. 12 OZS.

TO PULL SPRING TO INSTALLED LENGTH.

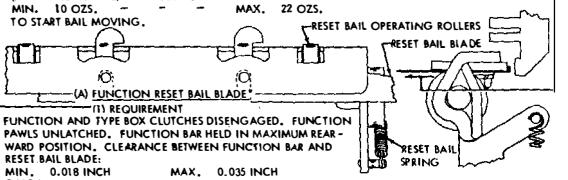
2.35 Function-bar Reset Bail Mechanism (Later Design)

(B) FUNCTION RESET BAIL SPRING TENSION

WITH TYPING UNIT UPSIDE DOWN, HOLD "1 CODEBAR IN ITS MARKING POSITION SO THAT NO FUNCTION BAR IS SELECTED. ROTATE THE MAIN SHAFT UNTIL THE FUNCTION RESET BAIL SPRINGS ARE IN THEIR MINIMUM LENGTH POSITION. PLACE PULL ROD OF 32 OUNCE SCALE BETWEEN CLUTCH TRIP SHAFT AND SPACE SUPPRESSION BAIL, HOOK SCALE ON FRONT EDGE OF RESET BAIL (AT MIDDLE OF BAIL) AND PULL TOWARD REAR.

MIN. 10 OZS. – – – MAX. 22 OZS.

TO START BAIL MOVING.



(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

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 SHALL OVER TRAVEL FUNCTION BAR BY A MIN. OF 0.002 INCH

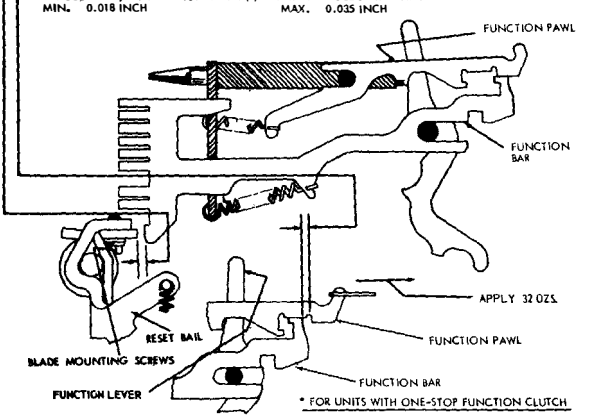
TO CHECK

IF CARRIAGE RETURN LEVER ADJUSTMENT HAS NOT BEEN MADE, ITS CLAMP SCREW SHALL 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 THE FOLLOWING LIMITS:

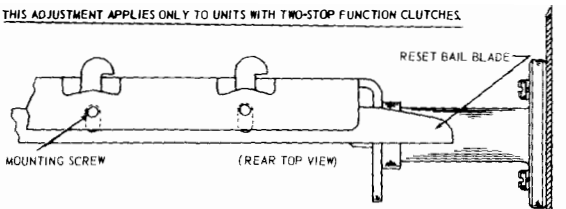
MIN. 0.018 INCH MAX. 0.035 INCH



* FOR UNITS WITH ONE-STOP FUNCTION CLUTCH

2.36 Function-bar Reset Bail Mechanism (Earlier Design)

THIS ADJUSTMENT APPLIES ONLY TO UNITS WITH TWO-STOP FUNCTION CLUTCHES.



FUNCTION RESET BAIL BLADE

(1) REQUIREMENT

FUNCTION CLUTCH DISENGAGED AT STOP POSITION GIVING LEAST CLEARANCE. TYPE BOX CLUTCH DISENGAGED. ALL FUNCTION PAWLS UNLATCHED FROM THEIR FUNCTION BARS. FUNCTION BAR HELD IN MAXIMUM REARWARD POSITION. CLEARANCE BETWEEN FUNCTION BAR AND RESET BAIL BLADE

MIN. 0.018 INCH MAX. 0.035 INCH

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

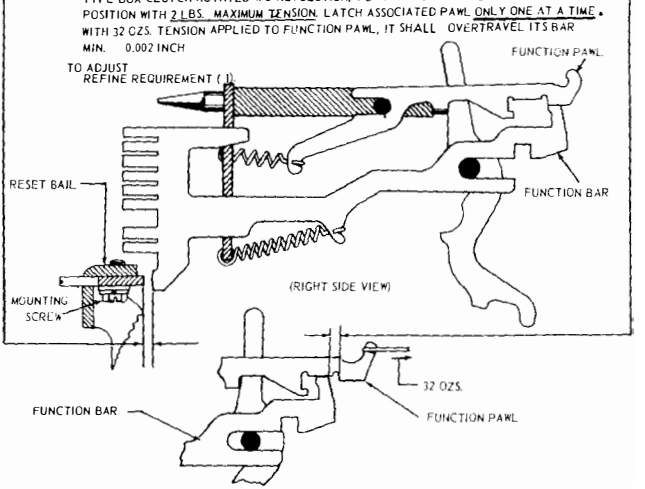
POSITION BLADE ON RESET BAIL WITH BLADE MOUNTING SCREWS FRICTION TIGHT.

(2) REQUIREMENT

TYPE BOX CLUTCH ROTATED 1/2 REVOLUTION, FUNCTION LEVER HELD IN REARMOST POSITION WITH 2 LBS. MAXIMUM TENSION, LATCH ASSOCIATED PAWL ONLY ONE AT A TIME, WITH 32 OZS. TENSION APPLIED TO FUNCTION PAWL, IT SHALL OVERTRAVEL ITS BAR

MIN. 0.002 INCH

TO ADJUST
REFINE REQUIREMENT (1)



2.37 FIGS-LTRS Shift Mechanism (Later Design)

NOTE 1.
FOR UNITS WITH ADJUSTABLE GUIDE PLATES AND ONE-STOP FUNCTION CLUTCHES, PROCEED AS SPECIFIED.

NOTE 2.
FOR UNITS WITH ADJUSTABLE GUIDE PLATES AND TWO-STOP FUNCTION CLUTCHES, CHANGE FIRST SENTENCE IN REQUIREMENT (1) TO "DISENGAGE FUNCTION CLUTCH AT STOP GIVING LEAST CLEARANCE." THEN PROCEED AS SPECIFIED.

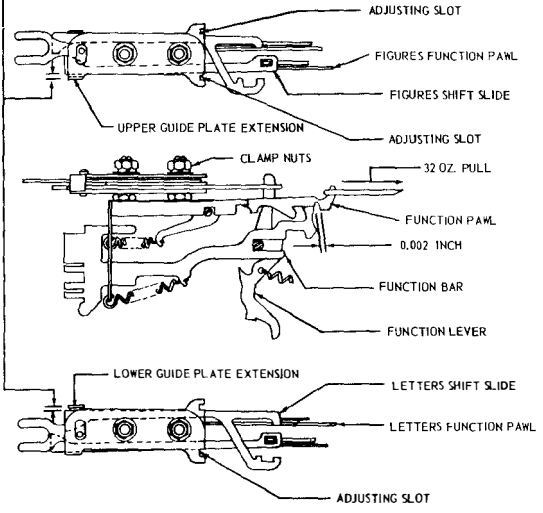
FIGS-LTRS SHIFT CODE BAR OPERATING MECHANISM

(1) REQUIREMENT
WITH FUNCTION CLUTCH ROTATED UNTIL CLUTCH DISK STOP LUG IS TOWARD BOTTOM OF UNIT, HOOK FIGURES FUNCTION PAWL OVER THE END OF THE FUNCTION BAR. CLEARANCE BETWEEN UPPER GUIDE PLATE EXTENSION AND SHIFT SLIDE.
MAX. 0.020 WHEN PLAY IS TAKEN UP FOR MAXIMUM.

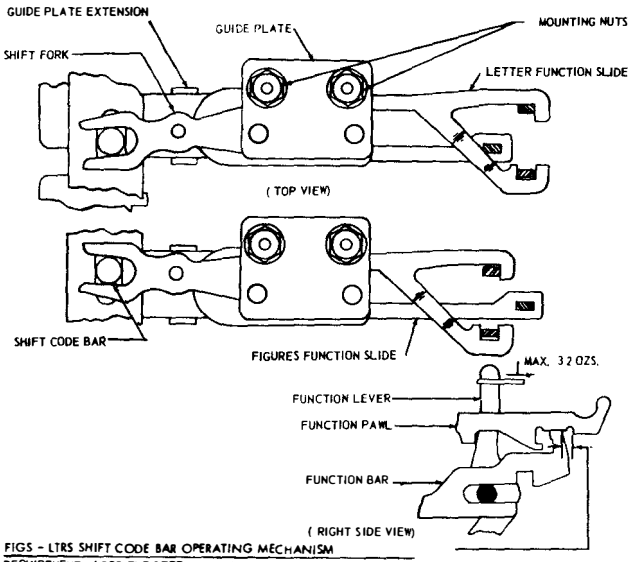
(2) REQUIREMENT
WITH 32 OZ. PULL APPLIED TO FUNCTION PAWL
MIN. 0.002 INCH
BETWEEN SHOULDER OF FIGURES FUNCTION PAWL AND FACE OF FUNCTION BAR.

(3) REQUIREMENT
REPEAT THE PROCEDURE FOR THE LETTERS FUNCTION PAWL CHECK MAX. CLEARANCE BETWEEN LOWER GUIDE PLATE EXTENSION AND SHIFT SLIDE. CHECK MIN. CLEARANCE BETWEEN SHOULDER OF LETTER FUNCTION PAWL AND FACE OF FUNCTION BAR.

TO ADJUST
POSITION UPPER AND/OR LOWER GUIDE PLATE BY THE ADJUSTING SLOT WITH THE CLAMP NUTS LOOSENED.



NOTE: 1. THIS ADJUSTMENT APPLIES ONLY TO UNITS WITH NON-ADJUSTABLE GUIDE PLATES



FIGS - LTRS SHIFT CODE BAR OPERATING MECHANISM

REQUIREMENT: (FOR TWO-STOP FUNCTION CLUTCH)

DISENGAGE FUNCTION CLUTCH AT POSITION GIVING LEAST CLEARANCE. ROTATE TYPE BOX CLUTCH 1/2 REVOLUTION. HOLD FIGURES FUNCTION LEVER IN REARWARD POSITION WITH TENSION OF 3.2 OZS. CLEARANCE BETWEEN THE FUNCTION PAWL SHOULDER AND FACE OF FUNCTION BAR

MIN. 0.002 INCH

MAX. 0.015 INCH

WHEN PLAY IN PAWL IS TAKEN FOR MAXIMUM CLEARANCE.

DISENGAGE FIGURES FUNCTION PAWL, CHECK LETTERS FUNCTION PAWL IN SAME MANNER.

REQUIREMENT: (FOR ONE-STOP FUNCTION CLUTCH)

CHANGE FIRST SENTENCE IN ABOVE REQUIREMENT TO: "ROTATE FUNCTION CLUTCH UNTIL TRIP LEVER JUST TOUCHES SHOE LEVER." THEN PROCEED AS SPECIFIED.

TO ADJUST

POSITION SHIFT ASSEMBLY WITH CLAMP SCREWS LOOSENED TAKE UP PLAY IN MOUNTING HOLES TO REAR.

CAUTION: MANUALLY OPERATE LETTERS AND FIGURES FUNCTION LEVER ALTERNATELY. LEVERS SHALL BE FREE OF BINDS.

2.39 Shift Mechanism (Selective Calling)

NOTE: TO CHECK REQUIREMENTS (A, B, AND D), SET FUNCTION CLUTCH IN STOP POSITION AND ALL CODE BARS TO THE RIGHT.

(A)

CDC SHIFT SLIDE (CODE BAR SHIFT MECHANISM)

REQUIREMENTS

1. WITH FUNCTION CLUTCH IN STOP POSITION, LATCH FUNCTION LEVER (SHIFT MECH.) ON ITS LOWER RELEASING LATCH. NOTCH IN SUPP. CODE BAR SHALL ALIGN WITH NOTCHES IN OTHER CODE BARS WHEN ALL CODE BARS ARE SHIFTED TO THE RIGHT.

TO ADJUST

POSITION UPPER OR LOWER GUIDE PLATE (2.37) WITH ITS CLAMP NUTS LOOSENED

2. REPEAT FOR EACH STUNT CASE CODE BAR SHIFT MECHANISM.

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

(C) TYPE BOX CLUTCH SUPPRESSION ARM
SEE 2.40

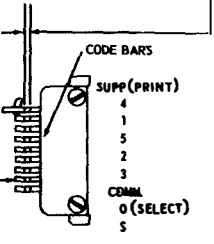
(D) OFF LINE SHIFT SOLENOID BRACKET ASSEMBLY (OFF LINE ONLY)

REQUIREMENT

NOTCH IN SUPPRESSION CODE BAR SHALL ALIGN WITH NOTCHES IN OTHER CODE BARS WHEN ALL CODE BARS ARE SHIFTED TO THE RIGHT.

TO ADJUST

POSITION THE SOLENOID BRACKET ASSEMBLY WITH ITS MOUNTING SCREWS LOOSENED.



(B)

LOCKOUT SHIFT SLIDE (CODE BAR SHIFT MECHANISM)

REQUIREMENT

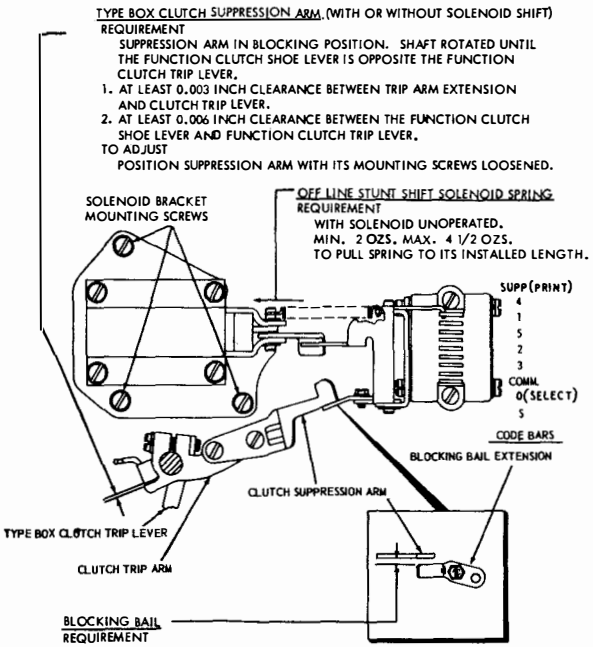
WITH FUNCTION CLUTCH IN STOP POSITION, LATCH LOCKOUT SLIDE FUNCTION LEVER. THE NOTCH IN SELECT CODE (ZERO) CODE BAR SHALL ALIGN WITH NOTCHES IN OTHER CODE BARS WHEN ALL CODE BARS ARE SHIFTED TO THE RIGHT.

TO ADJUST

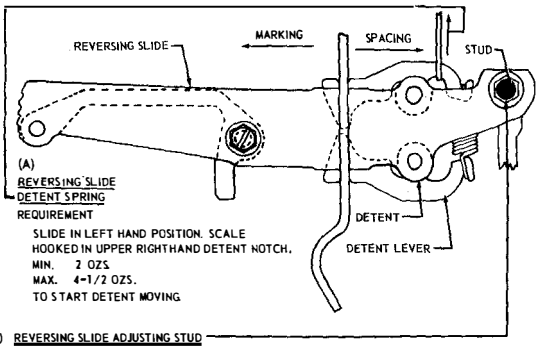
POSITION THE UPPER OR LOWER GUIDE PLATE (2.37) WITH ITS CLAMP NUTS LOOSENED

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

2.40 **Shift Mechanism (Selective Calling)**

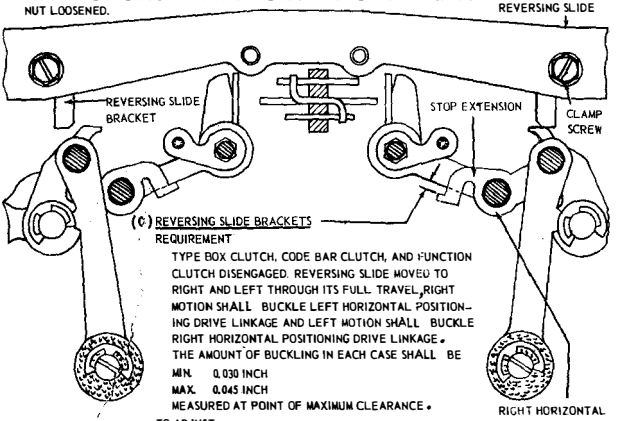


2.41 Horizontal-motion-reversing Mechanism (Front View)



(A)
REVERSING SLIDE DETENT SPRING
REQUIREMENT
SLIDE IN LEFT HAND POSITION. SCALE HOOKED IN UPPER RIGHTHAND DETENT NOTCH.
MIN. 2 OZS.
MAX. 4-1/2 OZS.
TO START DETENT MOVING.

(B) REVERSING SLIDE ADJUSTING STUD
REQUIREMENT
TYPE BOX CLUTCH DISENGAGED.
WITH NO. 3 CODE BAR IN SPACING POSITION (RIGHT), THE REVERSING SLIDE DETENT ROLLERS SHALL BE FULLY SEATED IN THE RIGHT-HAND NOTCHES OF THE DETENT LEVER.
WITH NO. 3 CODE BAR IN MARKING POSITION (LEFT), THE REVERSING SLIDE DETENT ROLLERS SHALL BE FULLY SEATED IN THE LEFT-HAND NOTCHES OF THE DETENT LEVER.
TO ADJUST
POSITION THE REVERSING SLIDE STUD IN ITS ELONGATED HOLE WITH ITS MOUNTING NUT LOOSENED.



(C) REVERSING SLIDE BRACKETS
REQUIREMENT
TYPE BOX CLUTCH, CODE BAR CLUTCH, AND FUNCTION CLUTCH DISENGAGED. REVERSING SLIDE MOVED TO RIGHT AND LEFT THROUGH ITS FULL TRAVEL, RIGHT MOTION SHALL BUCKLE LEFT HORIZONTAL POSITIONING DRIVE LINKAGE AND LEFT MOTION SHALL BUCKLE RIGHT HORIZONTAL POSITIONING DRIVE LINKAGE. THE AMOUNT OF BUCKLING IN EACH CASE SHALL BE
MIN. 0.030 INCH
MAX. 0.045 INCH
MEASURED AT POINT OF MAXIMUM CLEARANCE.
TO ADJUST
POSITION EACH REVERSING SLIDE BRACKET WITH THEIR CLAMP SCREWS LOOSENED.

TYPING

2.42 Horizontal Positioning Drive Mechanism (Later Design) (Front View)

HORIZONTAL POSITIONING DRIVE LINKAGE

(1) REQUIREMENT

TYPE BOX CLUTCH DISENGAGED.

CODE BARS 4 AND 5 TO SPACING (RIGHT).

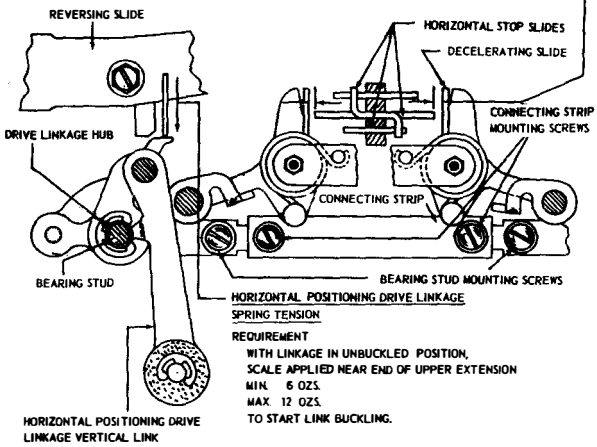
CLEARANCE BETWEEN EACH SIDE OF CENTER HORIZONTAL STOP SLIDE AND DECELERATING SLIDES, ON SIDE WHERE KNEE LINK IS STRAIGHT SHALL BE EQUAL (WITHIN 0.008 INCH)

MIN. 0.015 INCH

MAX. 0.040 INCH

TO ADJUST

LOOSEN BEARING STUD MOUNTING SCREWS AND CONNECTING STRIP MOUNTING SCREWS FRICTION TIGHT. POSITION ONE OR BOTH BEARING STUDS ON THE CONNECTING STRIP TO PROVIDE 0.025 INCH TO 0.035 INCH BETWEEN THE CENTER HORIZONTAL SLIDE AND THE DECELERATING SLIDE ON THE SIDE WHERE THE LINKAGE IS NOT BUCKLED. TIGHTEN THE TWO INNER MOUNTING SCREWS. CHANGE POSITION OF REVERSING SLIDE AND CHECK OPPOSITE CLEARANCE. EQUALIZE BY SHIFTING BOTH STUDS AND CONNECTING STRIP AS A UNIT. HOLD THE DRIVE LINKAGE HUB AGAINST THE LOWER VERTICAL LINK OF THE DRIVE LINKAGE. TIGHTEN THE TWO OUTER BEARING STUD MOUNTING SCREWS. CHECK THE LINKAGE FOR FREENESS THROUGHOUT A COMPLETE CYCLE.



(2) REQUIREMENT

THE HORIZONTAL POSITIONING MECHANISM MUST BE FREE OF JAMS OR BINDS.

TO CHECK

TYPE BOX CLUTCH LATCHED IN STOP POSITION. ROTATE CLUTCH DISK BY HAND IN DIRECTION OF NORMAL ROTATION UNTIL CLUTCH DISK STOP ARM IS IN CONTACT WITH CLUTCH SHOE LEVER. THE REQUIREMENT IS MET IF SHOE LEVER SPRING RETURNS DISK TO ITS NORMAL POSITION.

TO ADJUST

REPOSITION ROCKER SHAFT BRACKET ECCENTRIC STUD.

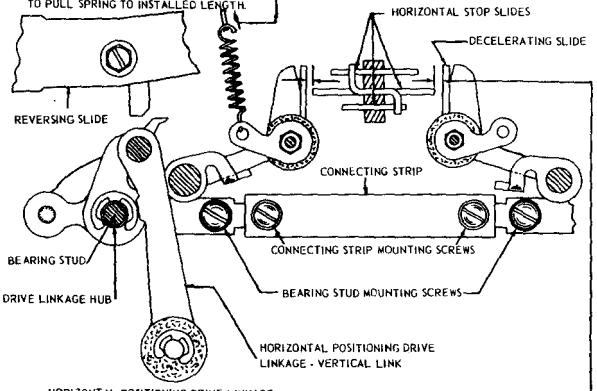
sitioning Drive Mechanism (Earlier Design) (Front View)

NOTE: THE LOOPS OF THIS SPRING ARE OFF-SET FROM CENTER IN THE SAME DIRECTION. THE SPRING MUST BE HOOKED ON ITS ANCHORS SO THAT THE SIDE OF THE SPRING, ON WHICH THE LOOPS ARE LOCATED, IS TOWARD THE REAR OF THE MACHINE. WHEN REMOVING EITHER SPRING, EXERCISE CARE TO AVOID KINKS IN LOOPS.

HORIZONTAL POSITIONING DRIVE LINKAGE SPRING TENSION

REQUIREMENT

SPRING UNHOOKED FROM ITS POST, LINKAGE IN ITS UNBUCKLED POSITION.
MIN. 14 OZS.
MAX. 18 OZS.
TO PULL SPRING TO INSTALLED LENGTH.



HORIZONTAL POSITIONING DRIVE LINKAGE

(1) REQUIREMENT

TYPE BOX CLUTCH DISENGAGED. CODE BARS 4 AND 5 TO SPACING (RIGHT). CLEARANCE BETWEEN EACH SIDE OF CENTER HORIZONTAL STOP SLIDE AND DECELERATING SLIDES ON SIDE WHERE KNEE LINK IS STRAIGHT, SHALL BE EQUAL (WITHIN 0.005 INCH)

MIN. 0.020 INCH
MAX. 0.040 INCH

TO ADJUST

LOOSEN BEARING STUD MOUNTING SCREWS AND CONNECTING STRIP MOUNTING SCREWS FRICTION TIGHT. POSITION ONE OR BOTH BEARING STUDS ON THE CONNECTING STRIP TO PROVIDE 0.025 INCH TO 0.035 INCH BETWEEN THE CENTER HORIZONTAL SLIDE AND THE DECELERATING SLIDE ON THE SIDE WHERE THE LINKAGE IS NOT BUCKLED. TIGHTEN THE TWO INNER MOUNTING SCREWS. CHANGE POSITION OF REVERSING SLIDE AND CHECK OPPOSITE CLEARANCE. EQUALIZE BY SHIFTING BOTH STUDS AND CONNECTING STRIP AS A UNIT. HOLD THE DRIVE LINKAGE HUB AGAINST THE LOWER VERTICAL LINK OF THE DRIVE LINKAGE. TIGHTEN THE TWO OUTER BEARING STUD MOUNTING SCREWS. CHECK THE LINKAGE FOR FREENESS THROUGHOUT A COMPLETE CYCLE.

(2) REQUIREMENT

THE HORIZONTAL POSITIONING MECHANISM MUST BE FREE OF JAMS OR BINDS.

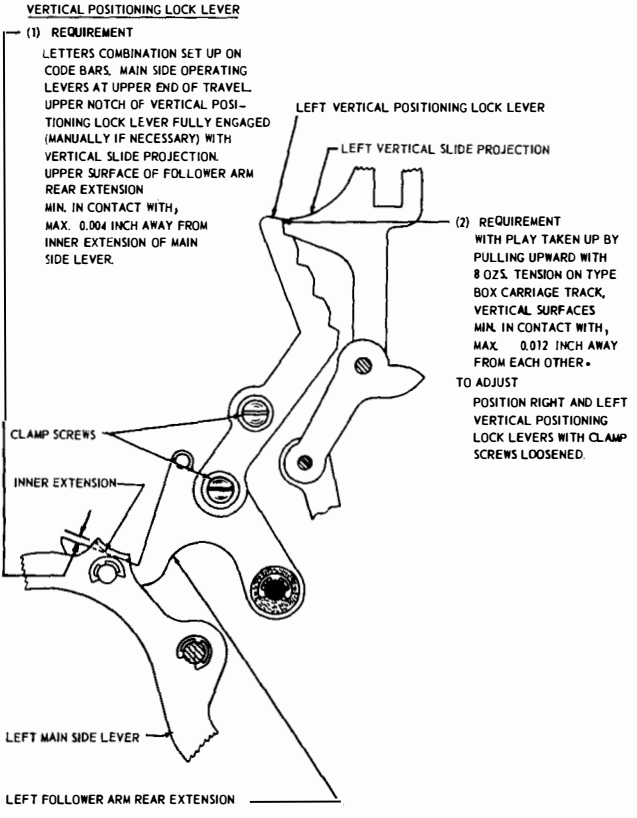
TO CHECK

TYPE BOX CLUTCH LATCHED IN STOP POSITION. ROTATE CLUTCH DISK BY HAND IN DIRECTION OF NORMAL ROTATION UNTIL CLUTCH DISK STOP ARM IS IN CONTACT WITH CLUTCH SHOE LEVER. THE REQUIREMENT IS MET IF SHOE LEVER SPRING RETURNS DISK TO ITS NORMAL POSITION.

TO ADJUST

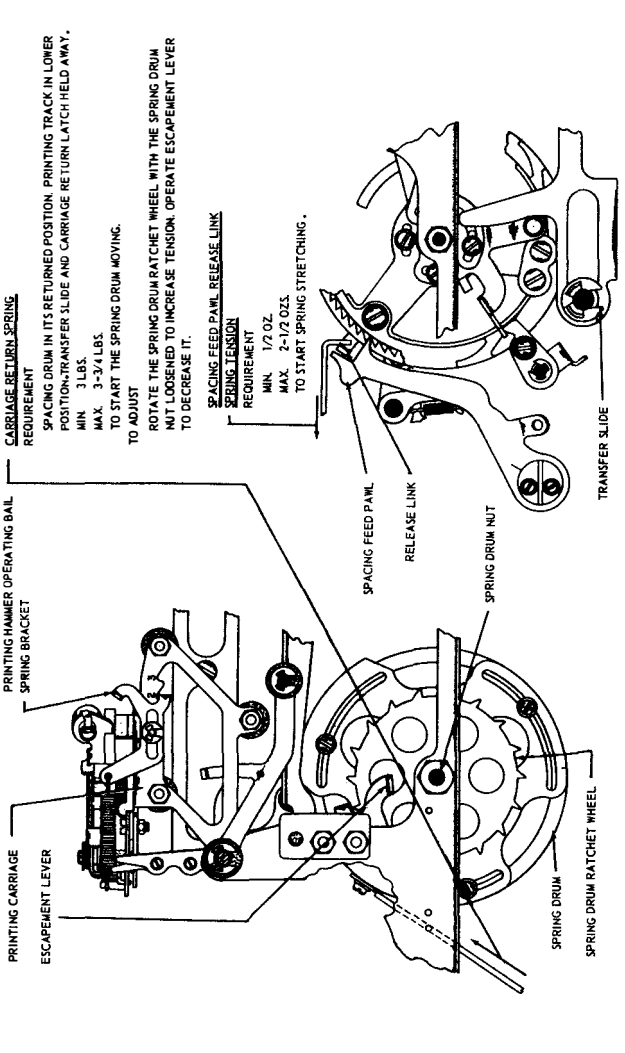
REPOSITION ROCKER SHAFT BRACKET ECCENTRIC STUD.

2.44 Vertical Positioning Mechanism (Left View)

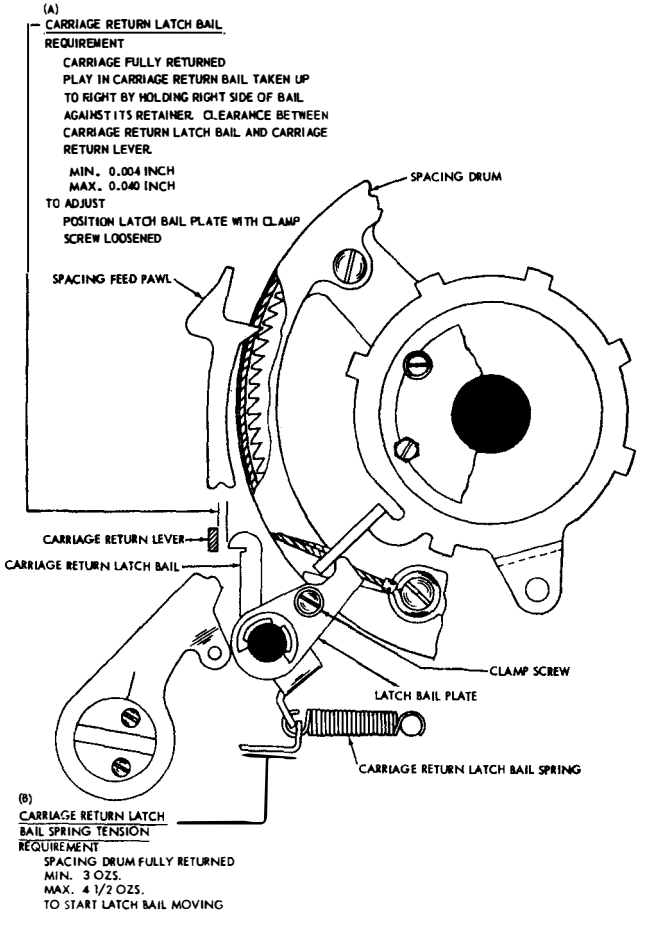


2.45 Spacing Mechanism (Front View)

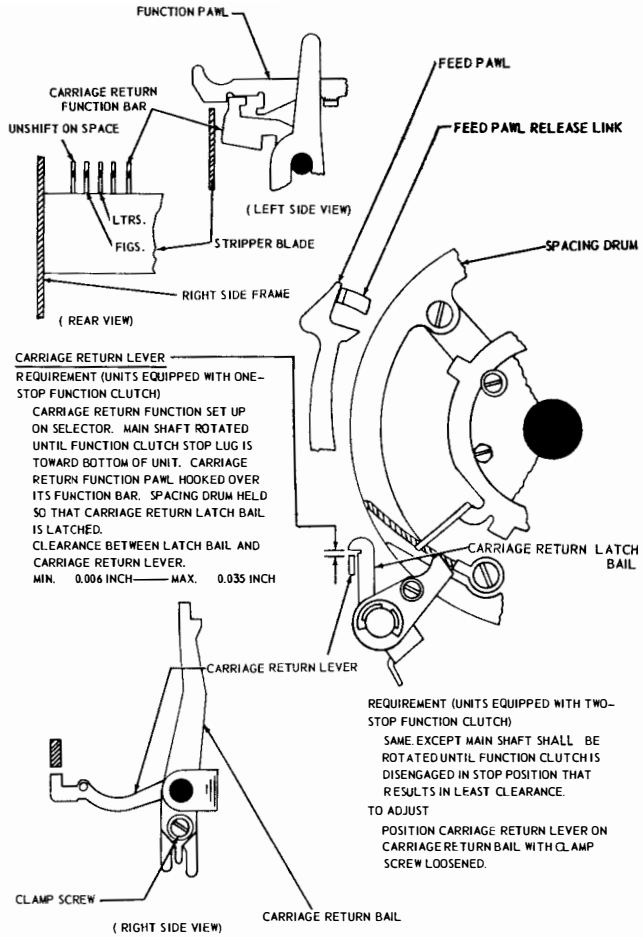
2.46 Carriage-return Mechanism (Front View)



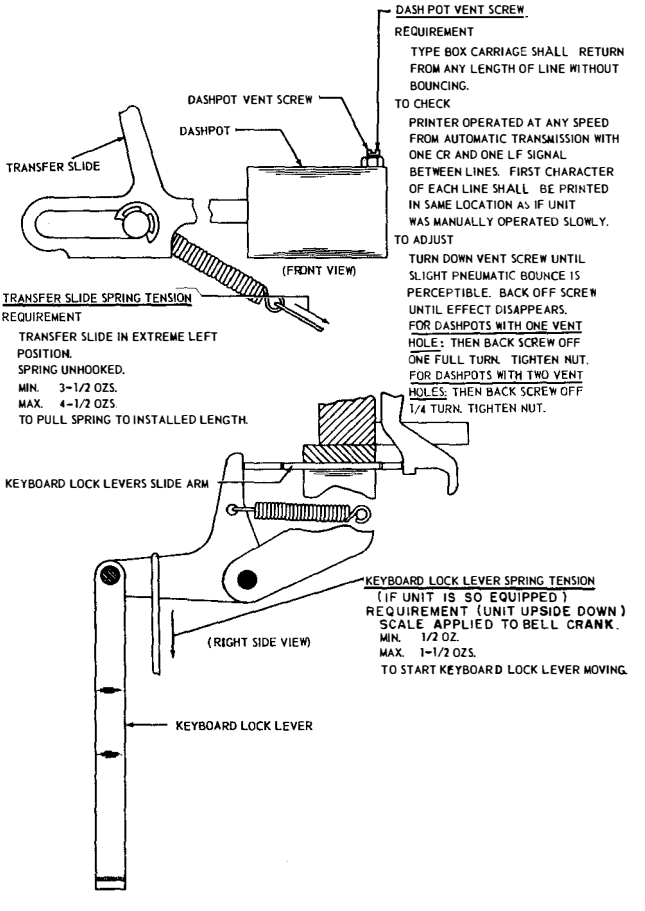
2.47 Carriage-return Mechanism (Front View)



2.48 **Carriage-return Mechanism**



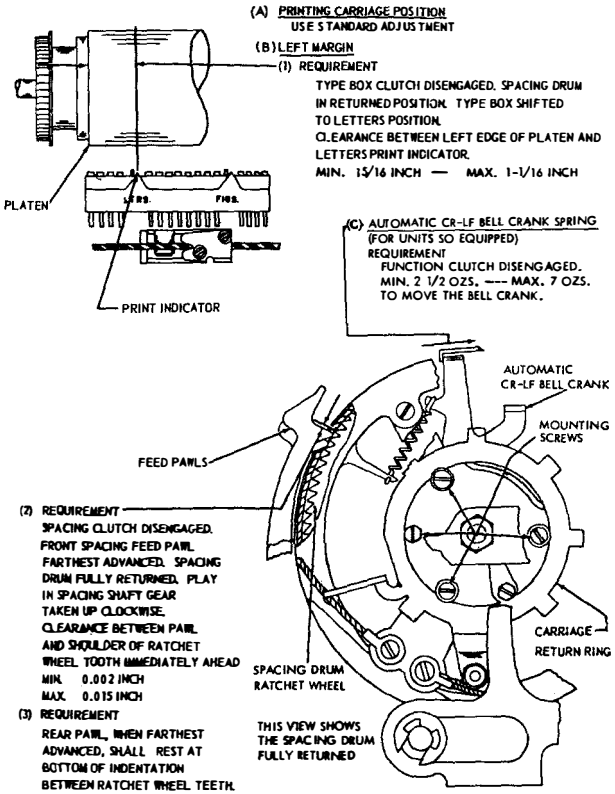
2.49 **Dashpot and Keyboard-lock Mechanisms**



2.50 **Carriage-return Mechanism (Later Design)**

Note 1: For Sprocket-feed Mechanism, see BSP under that title.

Note 2: If the following adjustments are remade, check the related adjustments in 2.32, 2.52, and 2.59.



TO ADJUST

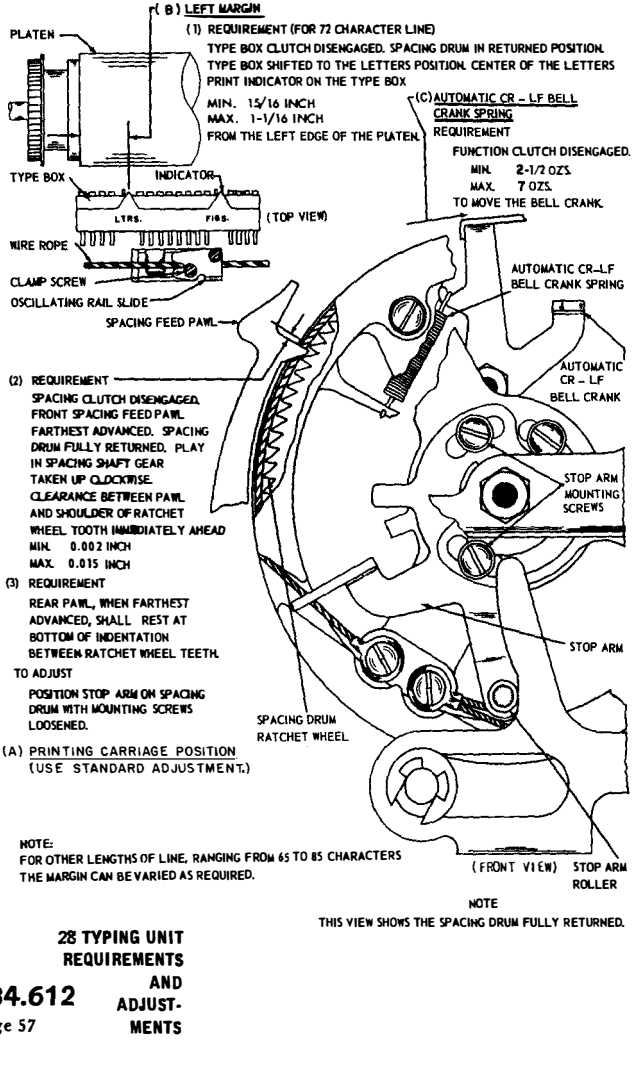
SHIFT TYPE BOX TO LETTERS POSITION. RETURN PRINT CARRIAGE TO ITS LEFT POSITION. LOOSEN FOUR INDICATED CARRIAGE RETURN RING MOUNTING SCREWS. HOLD CARRIAGE RETURN RING IN ITS COUNTER-CLOCKWISE POSITION. LOCATE TYPE BOX SO ITS LTRS. INDICATOR IS IN THE REQUIRED POSITION. TIGHTEN THE FOUR MOUNTING SCREWS.

NOTE: FOR LINES OTHER THAN 72 CHARACTERS IN LENGTH, THE LEFT MARGIN MAY BE VARIED AS REQUIRED. THIS WILL PERMIT LINES UP TO 85 CHARACTERS IN LENGTH.

2.51 Carriage-return Mechanism (Earlier Design)

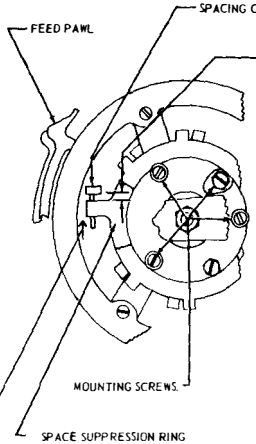
Note 1: For Sprocket-feed Mechanism, see BSP under that title.

Note 2: If the following adjustments are remade, check the related adjustments in 2.33, 2.53, and 2.59.



2.52 **Space Suppression Mechanism (Later Design)**

Note 1: If the following adjustments are remade, check the related adjustments in 2.32, 2.50, and 2.59.



RIGHT MARGIN

REQUIREMENT

TYPE BOX CLUTCH DISENGAGED. CARRIAGE IN POSITION TO PRINT CHARACTER ON WHICH SPACING CUTOUT IS TO OCCUR. FRONT FEED PAWL FARTHEST ADVANCED. SPACING CUTOUT TRANSFER BAIL HELD IN ITS UPPERMOST POSITION. ON UNITS HAVING TWO PIECE SPACING CUTOUT BAIL PUSH THE CUTOUT BAIL TOWARDS REAR OF UNIT THROUGH HOLE IN FRONT PLATE. CLEARANCE BETWEEN EXTENSION ON SPACE SUPPRESSION RING AND TRANSFER BAIL MIN. 0.006 INCH — MAX. 0.025 INCH

TO ADJUST

POSITION SPACE SUPPRESSION RING WITH FOUR INDICATED MOUNTING SCREWS LOOSENED.

NOTE

(1) RANGE OF ADJUSTMENT IS FROM 0 TO 85 CHARACTERS.

(2) ON UNITS EQUIPPED WITH AUTOMATIC CARRIAGE RETURN - LINE FEED RING, THIS ADJUSTMENT IS NOT APPLICABLE.

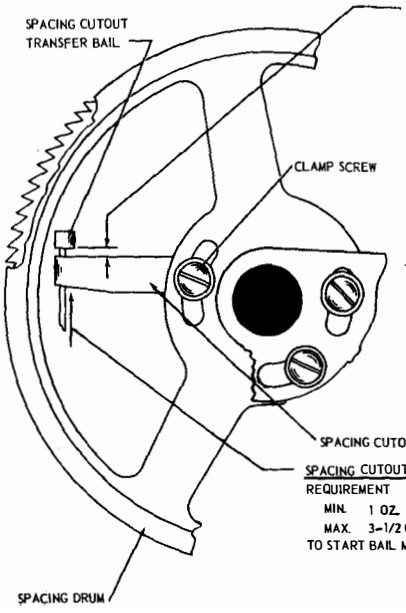
SPACING CUTOUT TRANSFER BAIL SPRING TENSION

REQUIREMENT

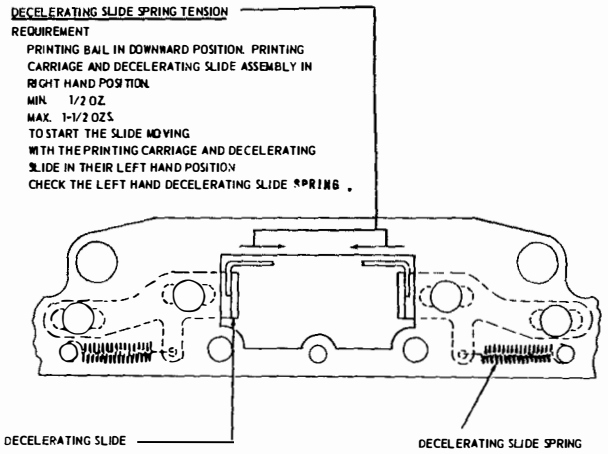
MIN. 1 OZ.
MAX. 3-1/2 OZS.
TO START BAIL MOVING.

2.53 **Space Suppression Mechanism (Earlier Design)**

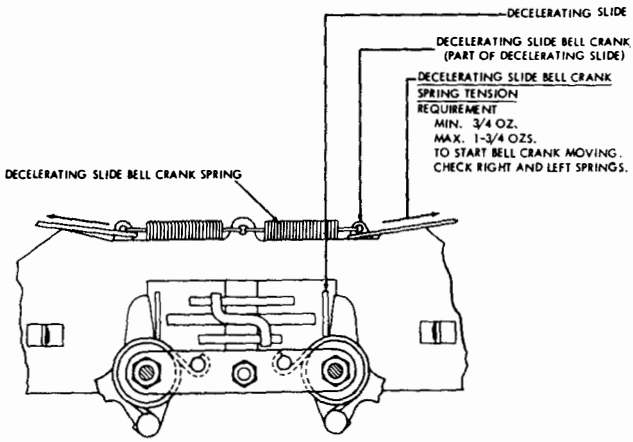
Note 1: If the following adjustmnets are remade, check the related adjustments in 2.33, 2.46, and 2.59.



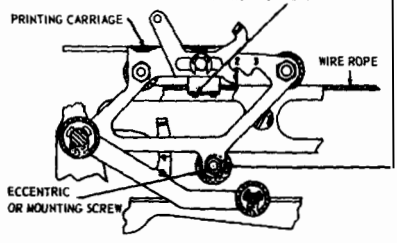
2.54 Decelerating Slide (Later Design)



2.55 Decelerating Slide (Earlier Design)



2.56 **Printing Carriage**



PRINTING CARRIAGE LOWER ROLLER

REQUIREMENT

CARRIAGE WIRE ROPE CLAMP SCREWS LOOSENED. PLAY OF CARRIAGE ON TRACK MIN. WITHOUT BIND, THROUGHOUT TRACK'S FULL LENGTH.

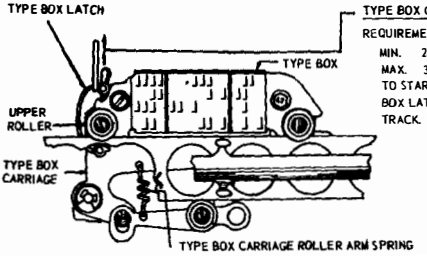
TO ADJUST (ECCENTRIC BUSHING)

POSITION LOWER ROLLER WITH SCREW NUT LOOSENED. KEEP HIGH PART OF ECCENTRIC (CHAMFERED CORNER) TOWARD THE RIGHT.

TO ADJUST (SLIDING SCREW)

POSITION LOWER ROLLER WITH MOUNTING SCREW LOOSENED.

2.57 **Typebox Carriage (Later Design)**



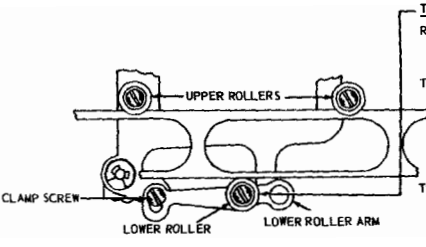
TYPE BOX CARRIAGE ROLLER ARM SPRING

REQUIREMENT

MIN. 28 OZS.
MAX. 36 OZS.

TO START UPPER ROLLER, NEAREST TYPE BOX LATCH, MOVING AWAY FROM CARRIAGE TRACK.

2.58 **Typebox Carriage (Earlier Design)**



TYPE BOX CARRIAGE ROLLER

REQUIREMENT

MINIMUM VERTICAL PLAY WITHOUT BIND IN TYPE BOX CARRIAGE.

TO CHECK

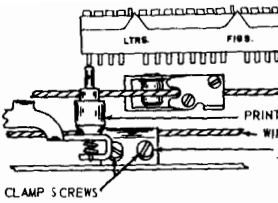
MOVE CARRIAGE TO RIGHT END OF TRACK. PLACE IN UPPER POSITION. REMOVE DRIVE LINK. CHECK THROUGHOUT ENTIRE TRAVEL OF CARRIAGE.

TO ADJUST

POSITION LOWER ROLLER ARM WITH CLAMP SCREW LOOSENED.

2.59 **Printing Carriage**

Note: If the following adjustments are remade, check related adjustments 2.32, 2.46, and 2.52. For units of earlier design, check 2.33, 2.46, 2.47, and 2.53.



(TOP VIEW)

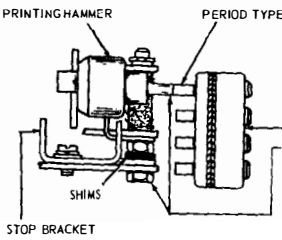
PRINTING CARRIAGE POSITION

REQUIREMENT

TYPE BOX IN LETTERS POSITION. M TYPE PALLET SELECTED. TYPE BOX IN PRINTING POSITION. M TYPE PALLET SHALL BE APPROXIMATELY IN CENTER OF PRINTING HAMMER WHEN HAMMER IS JUST TOUCHING M TYPE PALLET. TAKE UP PLAY IN TYPE BOX CARRIAGE IN EACH DIRECTION AND SET HAMMER IN CENTER OF PLAY.

TO ADJUST

POSITION PRINTING CARRIAGE ON WIRE ROPE WITH CLAMP SCREWS LOOSENED.



(RIGHT SIDE VIEW)

PRINTING HAMMER BEARING STUD

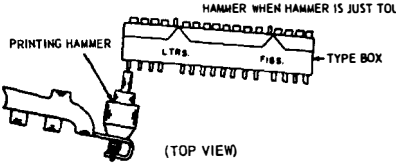
REQUIREMENT

TYPE BOX AT MIDPOINT OF PLATEN AND IN POSITION TO PRINT PERIOD. PRINTING HAMMER IN CONTACT WITH TYPE PALLET AND PRESSED DOWNWARD AT BEARING POST. FACE OF HAMMER SHALL BE FULLY ON END OF TYPE PALLET.

TO ADJUST

ADD OR REMOVE SHIMS BETWEEN SHOULDER ON BEARING POST AND STOP BRACKET

2.60 Typebox Shift Mechanism



SHIFT LINKAGE

REQUIREMENT

CARRIAGE NEAR MIDPOINT OF PLATEN. TYPE BOX IN POSITION TO PRINT M. MANUALLY BUCKLE RIGHT SHIFT LINKAGE. SHIFT TYPE BOX TO LEFT. PERIOD TYPE PALLET SHALL BE APPROXIMATELY IN CENTER OF PRINT HAMMER WHEN HAMMER IS JUST TOUCHING PERIOD TYPE PALLET.

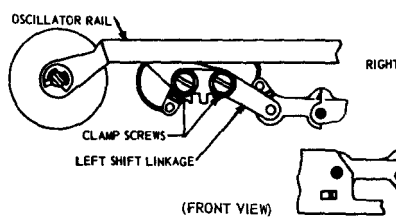
TO ADJUST

POSITION LEFT SHIFT LINKAGE ON OSCILLATOR RAIL WITH TWO CLAMP SCREWS LOOSENED

TO RECHECK

SHIFT ALTERNATELY FROM M TO PERIOD. TAKE UP PLAY IN EACH DIRECTION. REFINE ADJUSTMENT IF NECESSARY.

2.61 Typebox Shift Mechanism (Later Design)



SHIFT LINKAGE SPRING TENSION

REQUIREMENT

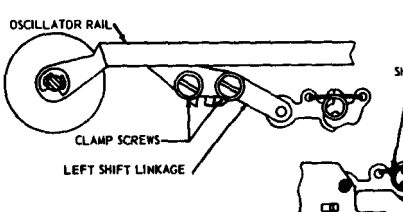
LINK IN STRAIGHT POSITION

MIN. 6 OZS.

MAX. 14 OZS.

TO START EACH LINK MOVING.

2.62 Typebox Shift Mechanism (Earlier Design)



SHIFT LINKAGE SPRING TENSION

REQUIREMENT

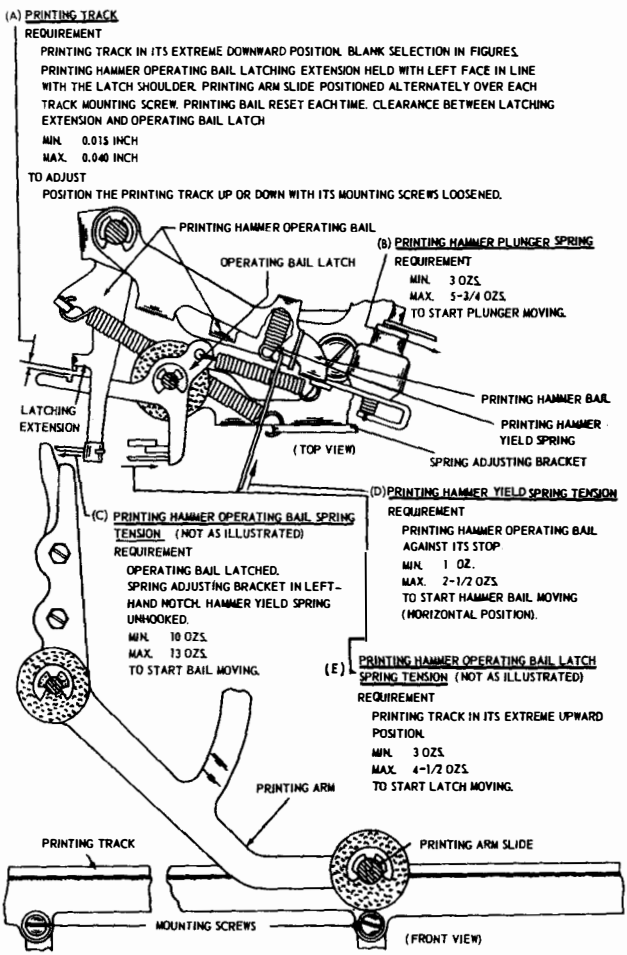
LINK IN STRAIGHT POSITION.

MIN. 7 OZS.

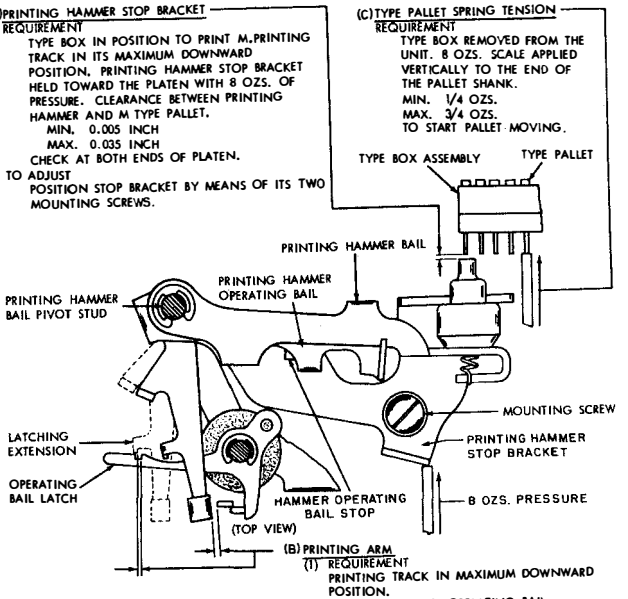
MAX. 16 OZS.

TO START EACH LINK MOVING.

2.63 Printing Mechanism



2.64 Printing Mechanism (Later Design)



(A) PRINTING HAMMER STOP BRACKET

REQUIREMENT

TYPE BOX IN POSITION TO PRINT M. PRINTING TRACK IN ITS MAXIMUM DOWNWARD POSITION. PRINTING HAMMER STOP BRACKET HELD TOWARD THE PLATEN WITH 8 OZS. OF PRESSURE. CLEARANCE BETWEEN PRINTING HAMMER AND M TYPE PALLET.

MIN. 0.005 INCH

MAX. 0.035 INCH

CHECK AT BOTH ENDS OF PLATEN.

TO ADJUST

POSITION STOP BRACKET BY MEANS OF ITS TWO MOUNTING SCREWS.

(C) TYPE PALLET SPRING TENSION

REQUIREMENT

TYPE BOX REMOVED FROM THE UNIT. 8 OZS. SCALE APPLIED VERTICALLY TO THE END OF THE PALLET SHANK.

MIN. 1/4 OZS.

MAX. 3/4 OZS.

TO START PALLET MOVING.

(B) PRINTING ARM

(1) REQUIREMENT

PRINTING TRACK IN MAXIMUM DOWNWARD POSITION.

PRINTING HAMMER OPERATING BAIL AGAINST ITS STOP.

SOME CLEARANCE BETWEEN SECONDARY PRINTING ARM AND FORWARD EXTENSION OF HAMMER OPERATING BAIL.

MAX. 0.015 INCH

WHEN PRINTING ARM SLIDE IS HELD DOWNWARD OVER EACH PRINTING TRACK MOUNTING SCREW FOR MAXIMUM CLEARANCE.

(2) REQUIREMENT

PRINTING TRACK IN UPPERMOST POSITION. LATCHING EXTENSION OF PRINTING HAMMER OPERATING BAIL SHALL OVERTRAVEL LATCHING SURFACE OF OPERATING BAIL LATCH BY

MIN. 0.006 INCH

CHECK RIGHT AND LEFT POSITIONS.

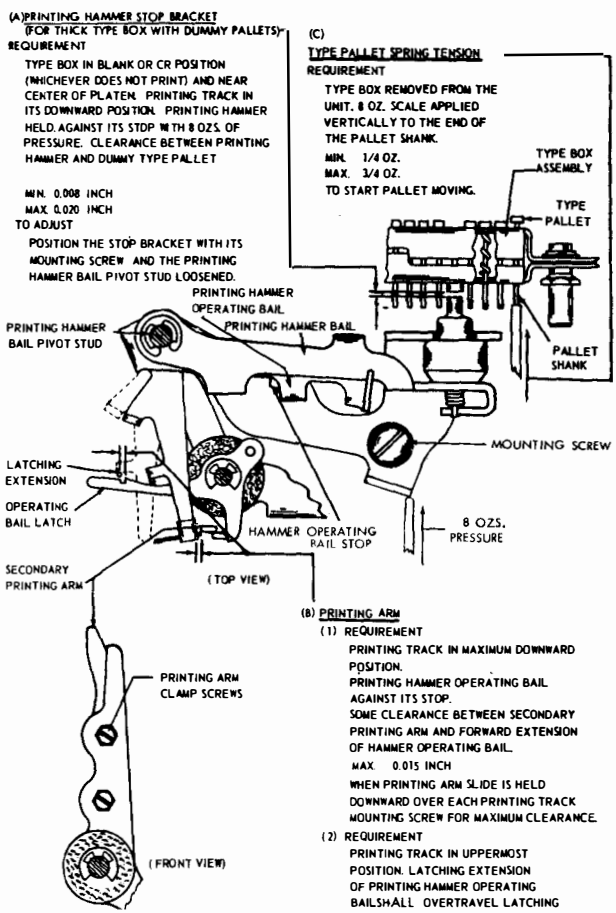
TO ADJUST

POSITION SECONDARY PRINTING ARM WITH CLAMP SCREWS LOOSENED.

NOTE

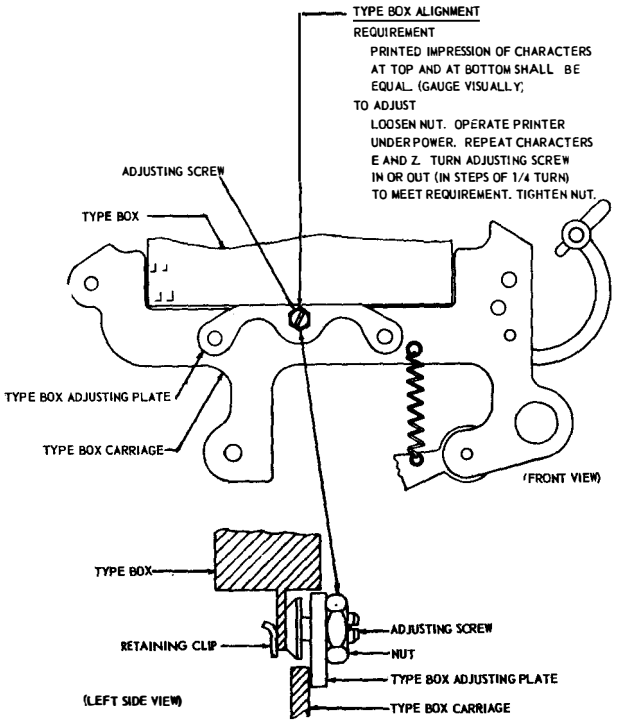
THE PRINTING ARM ADJUSTMENT SHALL ALWAYS BE MADE WITH THE PRINTING HAMMER OPERATING BAIL SPRING BRACKET IN THE NO. 1 POSITION. POSITIONS NO. 2 AND 3 ARE TO BE USED ONLY FOR MAKING MULTIPLE COPIES.

2.65 Printing Mechanism (Earlier Design)



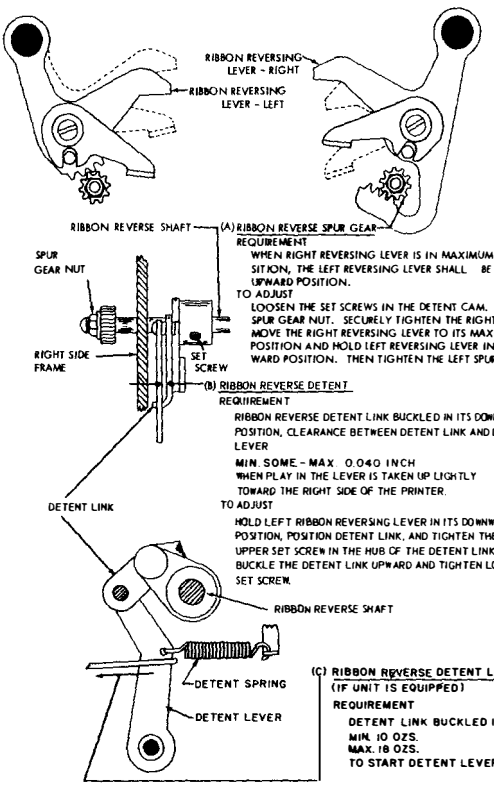
2.66 Typebox Alignment Mechanism

NOTE: THIS ADJUSTMENT APPLIES ONLY TO UNITS SO EQUIPPED AND SHALL BE MADE WITH THE TYPEBOX IN ITS UPPER POSITION.



NOTE: SOME TYPING UNITS ARE EQUIPPED WITH A RIBBON GUIDE WHICH HAS A TYPE BOX RETAINING CLIP WITH A LIMITED YIELD. IN CASES WHERE IT IS NECESSARY TO BACK THE ADJUSTING SCREW OUT TO PROVIDE HEAVIER PRINTING AT THE TOP OF A CHARACTER, IT MAY BE NECESSARY TO BEND THE SPRING CLIP ON THE RIBBON GUIDE TOWARD THE FRONT SO THAT THE TAB AT THE BOTTOM OF THE TYPE BOX IS HELD AGAINST THE HEAD OF THE ADJUSTING SCREW.

2.67 Ribbon-reverse Mechanism with Toggle-link Detent (Later Design)



(A) RIBBON REVERSE SPUR GEAR

REQUIREMENT

WHEN RIGHT REVERSING LEVER IS IN MAXIMUM DOWNWARD POSITION, THE LEFT REVERSING LEVER SHALL BE IN ITS MAXIMUM UPWARD POSITION.

TO ADJUST

LOOSEN THE SET SCREWS IN THE DETENT CAM. LOOSEN THE LEFT SPUR GEAR NUT. SECURELY TIGHTEN THE RIGHT SPUR GEAR NUT. MOVE THE RIGHT REVERSING LEVER TO ITS MAXIMUM DOWNWARD POSITION AND HOLD LEFT REVERSING LEVER IN ITS MAXIMUM UPWARD POSITION. THEN TIGHTEN THE LEFT SPUR GEAR NUT.

(B) RIBBON REVERSE DETENT

REQUIREMENT

RIBBON REVERSE DETENT LINK BUCKLED IN ITS DOWNWARD POSITION, CLEARANCE BETWEEN DETENT LINK AND DETENT LEVER

MIN. SOME - MAX. 0.040 INCH

WHEN PLAY IN THE LEVER IS TAKEN UP LIGHTLY TOWARD THE RIGHT SIDE OF THE PRINTER.

TO ADJUST

HOLD LEFT RIBBON REVERSING LEVER IN ITS DOWNWARD POSITION, POSITION DETENT LINK, AND TIGHTEN THE UPPER SET SCREW IN THE HUB OF THE DETENT LINK. BUCKLE THE DETENT LINK UPWARD AND TIGHTEN LOWER SET SCREW.

(C) RIBBON REVERSE DETENT LEVER SPRING TENSION (IF UNIT IS EQUIPPED)

REQUIREMENT

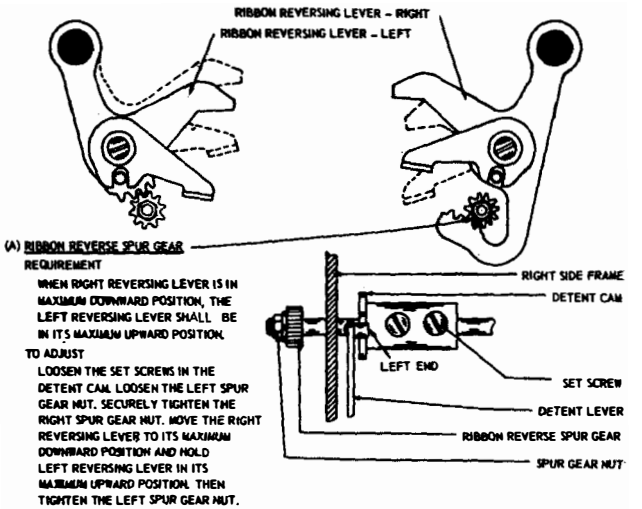
DETENT LINK BUCKLED IN UPWARD POSITION

MIN. 10 OZS.

MAX. 18 OZS.

TO START DETENT LEVER MOVING TOWARD REAR.

2.68 Ribbon-reverse Mechanism with Cam Detent (Earlier Design)



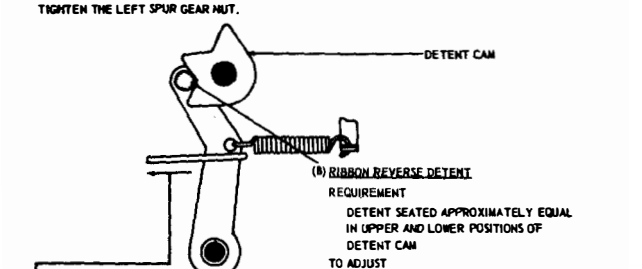
(A) RIBBON REVERSE SPUR GEAR

REQUIREMENT

WHEN RIGHT REVERSING LEVER IS IN MAXIMUM DOWNWARD POSITION, THE LEFT REVERSING LEVER SHALL BE IN ITS MAXIMUM UPWARD POSITION.

TO ADJUST

LOOSEN THE SET SCREWS IN THE DETENT CAM. LOOSEN THE LEFT SPUR GEAR NUT. SECURELY TIGHTEN THE RIGHT SPUR GEAR NUT. MOVE THE RIGHT REVERSING LEVER TO ITS MAXIMUM DOWNWARD POSITION AND HOLD LEFT REVERSING LEVER IN ITS MAXIMUM UPWARD POSITION. THEN TIGHTEN THE LEFT SPUR GEAR NUT.



(B) RIBBON REVERSE DETENT

REQUIREMENT

DETENT SEATED APPROXIMATELY EQUAL IN UPPER AND LOWER POSITIONS OF DETENT CAM

TO ADJUST

POSITION CAM ON SHAFT WITH SET SCREWS LOOSENED. LET LEFT END OF DETENT STUD BE APPROXIMATELY FLUSH WITH LEFT FACE OF CAM (PLAY IN DETENT TAKEN TO RIGHT OF PRINTER)

(C) RIBBON REVERSE DETENT LEVER SPRING TENSION

REQUIREMENT

DETENT SEATED IN NOTCH OF CAM. RIGHT RIBBON REVERSING LEVER HELD DOWNWARD.

MIN. 6–1/2 OZS.

MAX. 9 OZS.

TO START THE DETENT LEVER MOVING.

2.69 Ribbon-feed Mechanism (Left View)

RIBBON FEED LEVER BRACKET

(1) REQUIREMENT (LEFT-HAND MECHANISM)

LEFT REVERSING LEVER IN UPWARD POSITION.
RIBBON MECHANISM IN UPPER POSITION.
RATCHET WHEEL HELD AGAINST THE DETENT LEVER.
CLEARANCE BETWEEN THE FRONT FACE OF THE FEED LEVER AND THE SHOULDER OF A TOOTH ON THE RATCHET WHEEL

MIN. 0.015 INCH
MAX. 0.035 INCH

TO ADJUST

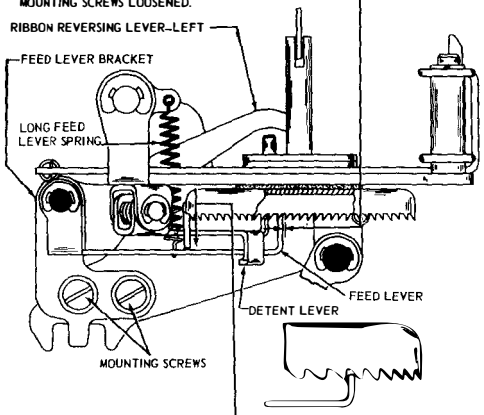
POSITION THE FEED LEVER BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

(2) REQUIREMENT (RIGHT-HAND MECHANISM)

RIGHT REVERSING LEVER AND RIBBON MECHANISM IN UPWARD POSITION.
ADJUST FEED LEVER BRACKET IN THE SAME MANNER.

NOTE

ROTATE THE MAIN SHAFT. THE RATCHET WHEEL SHALL STEP ONE TOOTH ONLY WITH EACH OPERATION.



RIBBON FEED LEVER SPRING TENSION

REQUIREMENT

RIBBON FEED LEVERS IN UPPERMOST POSITION.
FOR LONG LEVER, PUSH DOWNWARD NEAR ITS SPRING.
FOR SHORT LEVER, PUSH DOWNWARD AT POINT NEAR LONG LEVER SPRING.

MIN. 3/4 OZ.
MAX. 2 OZS.
TO START FEED LEVERS MOVING.
MEASURE ALL FOUR PAWLS.

NOTE: IF MINIMUM REQUIREMENT OF SHORT LEVER IS NOT MET, PULL LOWER END OF TORSION SPRING TO REAR.

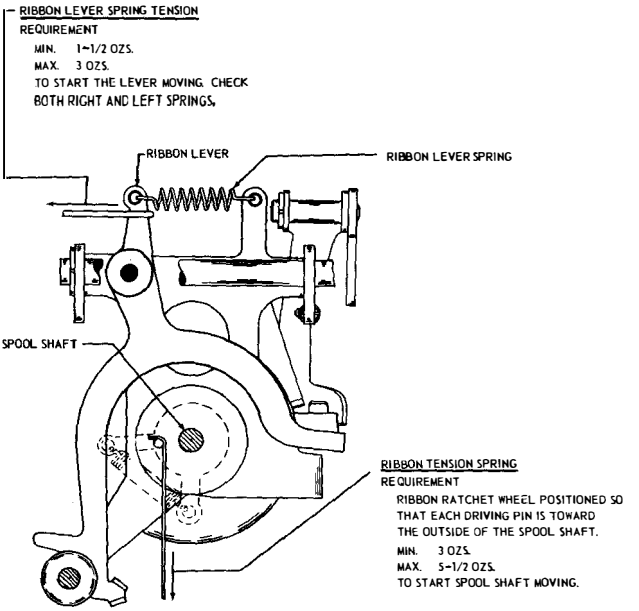
RIBBON RATCHET WHEEL FRICTION SPRING TENSION

REQUIREMENT

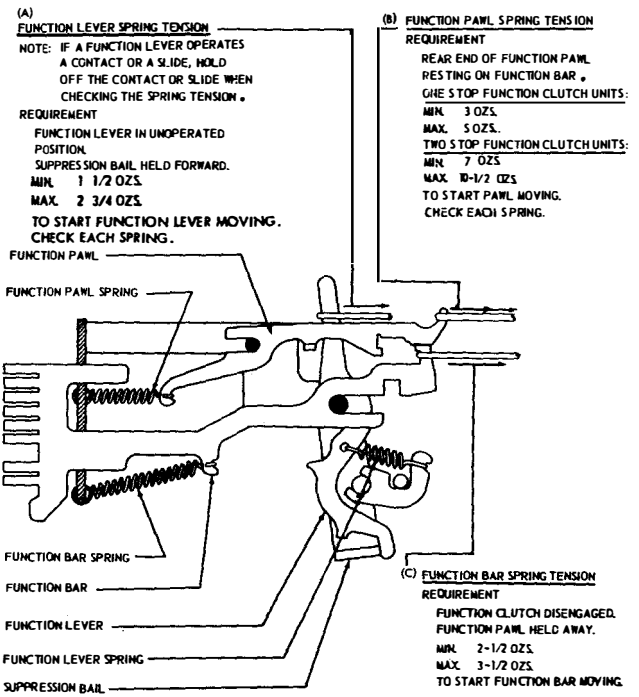
FEED LEVERS DISENGAGED.

MIN. 3 OZS.
MAX. 7-1/2 OZS.
TO START THE RATCHET WHEEL MOVING.

2.70 Ribbon-reverse Mechanism (Top View)

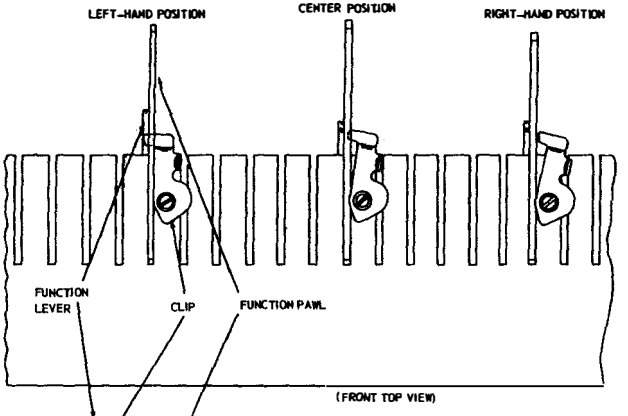


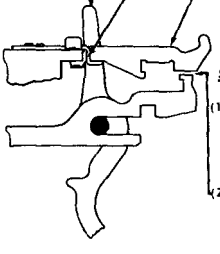
2.71 Stuntbox Mechanism



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.

2.72 Stuntbox Clip



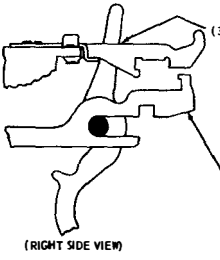


STUNTBOX CLIP (FOR UNITS EQUIPPED WITH CLIPS ONLY)

(1) REQUIREMENT (RIGHT-HAND POSITION)
THE CLIP SHALL NOT PREVENT THE ASSOCIATED FUNCTION PAWL FROM ENGAGING ITS FUNCTION BAR.
TO ADJUST
POSITION THE CLIP TO ITS EXTREME RIGHT-HAND POSITION.

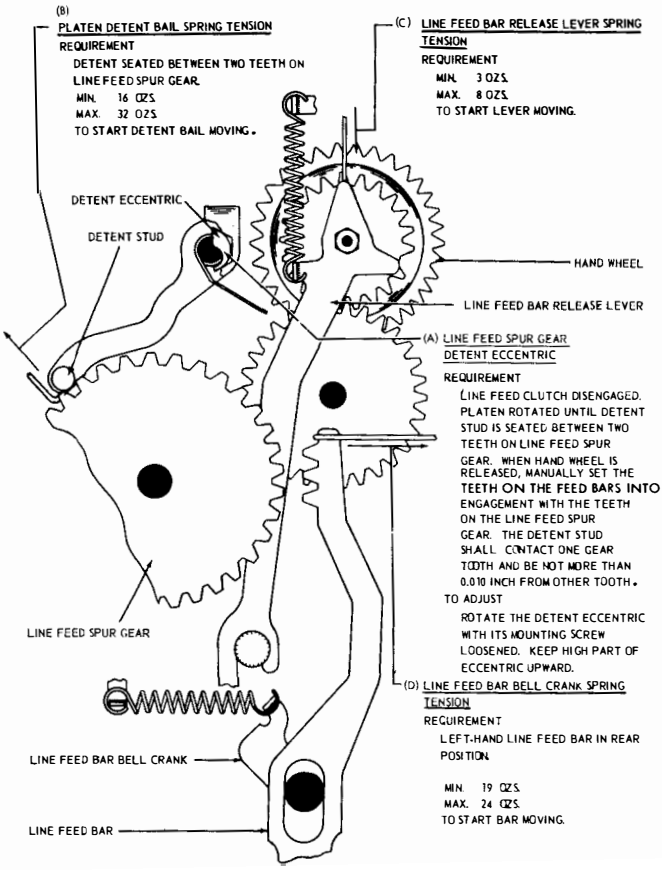
(2) REQUIREMENT (CENTER POSITION)
THE CLIP SHALL HOLD THE FUNCTION PAWL OUT OF ENGAGEMENT WITH ITS FUNCTION BAR BUT SHALL NOT INTERFERE WITH THE FUNCTION LEVER.
TO ADJUST
POSITION THE CLIP WITH ITS MOUNTING SCREW LOOSENED.

(3) REQUIREMENT (LEFT-HAND POSITION)
THE CLIP SHALL HOLD THE FUNCTION PAWL UPWARD OUT OF ENGAGEMENT WITH ITS FUNCTION BAR. IT SHALL ALSO HOLD THE TOP END OF THE FUNCTION LEVER IN ITS REAR POSITION.
TO ADJUST
POSITION THE CLIP TO ITS EXTREME LEFT-HAND POSITION.



2.73 Line-feed Mechanism (Right View)

Note: For Sprocket-feed Mechanism, see BSP under that title.



2.74 Function-pawl Stripper Mechanism (Later Design)

STRIPPER BLADE DRIVE CAM POSITION

REQUIREMENT

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

A. UPWARD DIRECTION

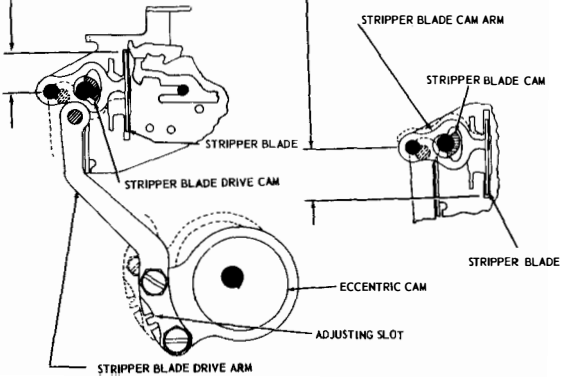
B. DOWNWARD DIRECTION

TO CHECK

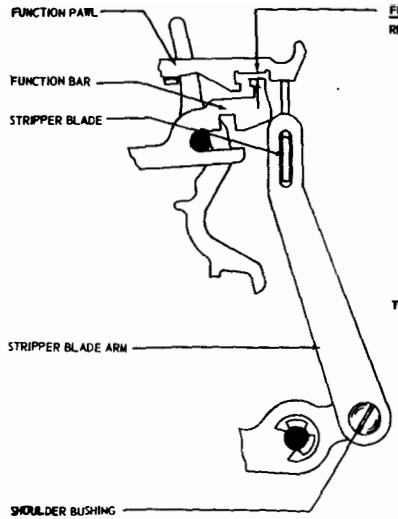
WITH FUNCTION CLUTCH DISENGAGED OBSERVE ENGAGEMENT OF STRIPPER BLADE DRIVE CAM (UPPER PEAK) WITH STRIPPER BLADE CAM ARM. THEN ROTATE CLUTCH TO TURN CAM TO ITS EXTREME DOWNWARD POSITION AND OBSERVE ENGAGEMENT OF LOWER CAM PEAK.

TO ADJUST

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



2.75 Function-pawl Stripper Mechanism (Earlier Design)



FUNCTION STRIPPER BLADE ARMS

REQUIREMENT

TYPE BOX CLUTCH AND FUNCTION CLUTCH DISENGAGED. LEFT LINE FEED FUNCTION PAWL HELD IN ITS REAR POSITION AND RESTING ON THE UPPER EDGE OF THE STRIPPER BLADE. CLEARANCE BETWEEN UPPER EDGE OF FUNCTION BAR AND LOWER SURFACE OF NOTCHED SECTION OF FUNCTION PAWL.

MIN. 0.055 INCH
MAX. 0.065 INCH

THE LETTERS FUNCTION PAWL NEAR THE OPPOSITE END OF THE STRIPPER BLADE SHOULD HAVE THE SAME CLEARANCE.

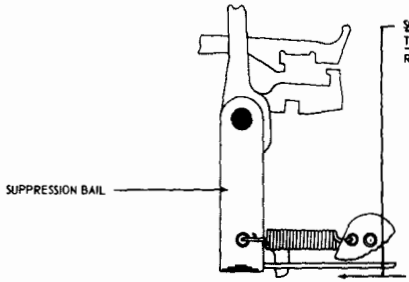
TO ADJUST

POSITION THE SHOULDER BUSHING AT THE LOWER END OF THE RIGHT AND LEFT STRIPPER BLADE ARM WITH THE LOCK NUT LOOSENED.

NOTE

WHEN CHECKING THIS ADJUSTMENT SINGLE-DOUBLE LINEFEED LEVER MUST BE IN DOUBLE LINEFEED POSITION.

2.76 Spacing Suppression Mechanism



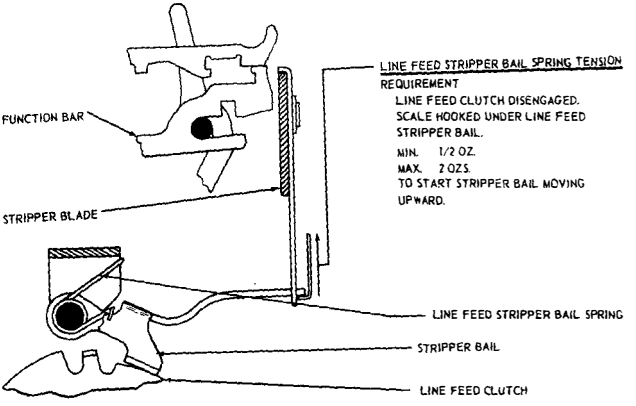
SPACING SUPPRESSION BAIL SPRING TENSION

REQUIREMENT

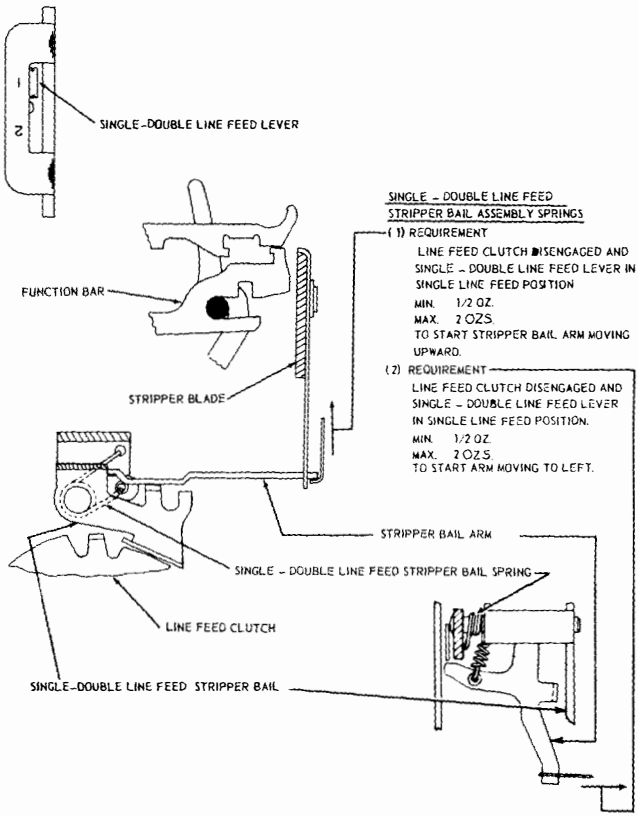
SPACING SUPPRESSION BAIL IN REAR POSITION. SCALE APPLIED NEAR CENTER OF HORIZONTAL PORTION OF BAIL.

MIN. 1/2 OZ.
MAX. 1-1/2 OZS.
TO START BAIL MOVING.

2.77 Line-feed Stripper-bail Mechanism

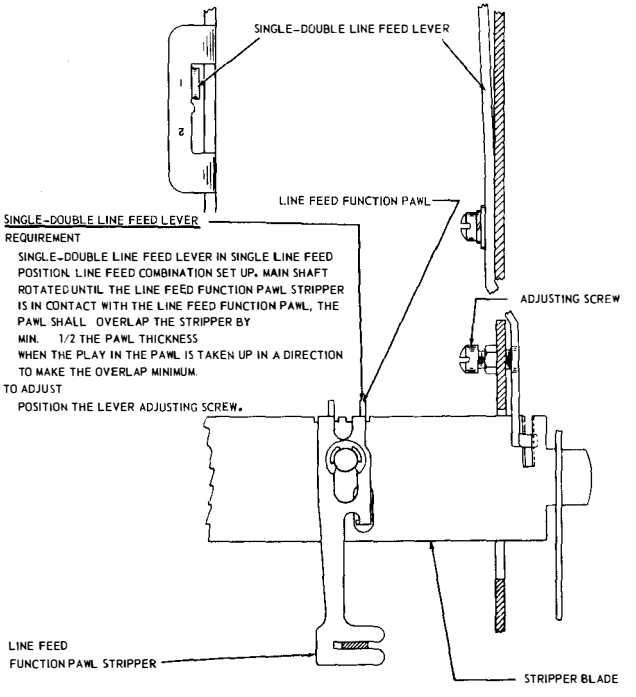


2.78 Single-double Line-feed Mechanism (Later Design)

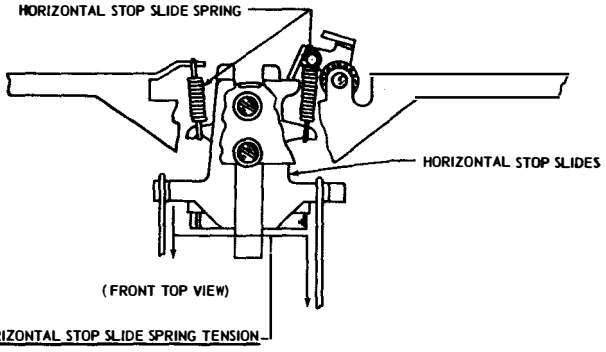


2.79 Single-double Line-feed Mechanism (Earlier Design)

NOTE. THIS ADJUSTMENT APPLIES ONLY TO UNITS WITH A TWO-STOP FUNCTION CLUTCH



2.80 Horizontal-motion-stop Mechanism



HORIZONTAL STOP SLIDE SPRING TENSION

REQUIREMENT

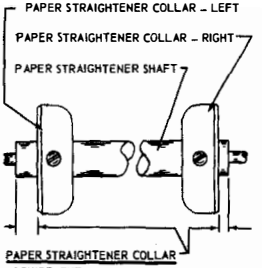
CODE BARS IN MARKING POSITION (LEFT).
TYPE BOX CLUTCH ROTATED 1/4 TURN FROM ITS STOP POSITION.
HORIZONTAL MOTION DECELERATING SLIDES HELD AWAY
FROM HORIZONTAL STOP SLIDES.

MIN. 1/2 OZ. MAX. 1-1/2 OZS. FOR UPPER AND LOWER SLIDES
MIN. 1-3/4 OZS. MAX. 3 OZS. FOR MIDDLE SLIDE
TO START SLIDE MOVING.

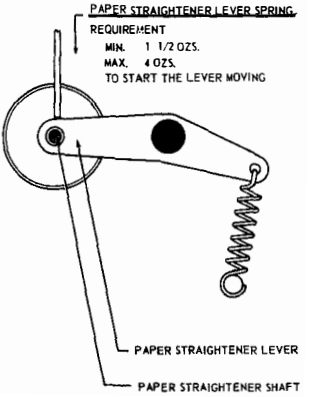
NOTE: WHEN CHECKING UPPER AND LOWER SLIDES, HOLD MIDDLE SLIDE 1/32 INCH FORWARD.

2.81 Paper Mechanism

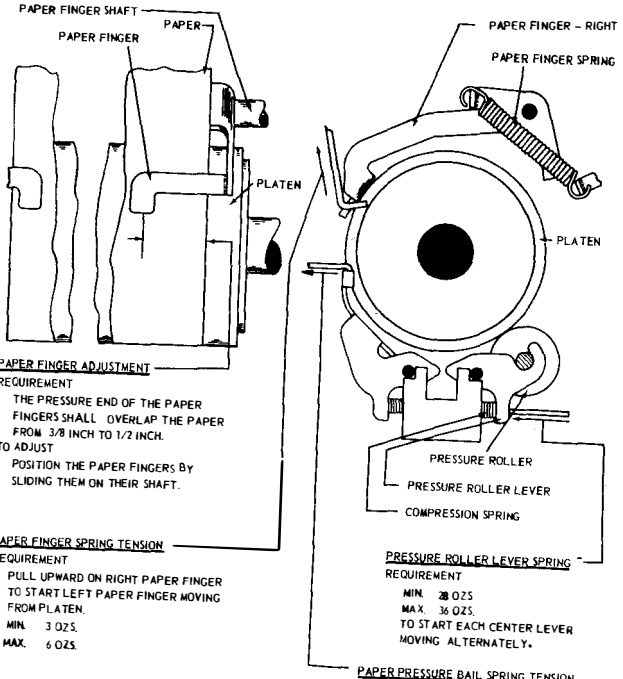
Note: For Sprocket-feed Mechanism, see BSP under that title.



PAPER STRAIGHTENER COLLAR
REQUIREMENT
LEFT COLLAR SPACE
MIN. 9/32 INCH
MAX. 21/64 INCH
FROM THE LEFT SHOULDER ON THE PAPER STRAIGHTENER SHAFT.
RIGHT COLLAR SPACED
MIN. 1/16 INCH
MAX. 5/64 INCH
FROM THE RIGHT SHOULDER.
TO ADJUST
POSITION COLLARS ON SHAFT WITH SET SCREWS LOOSENED.



2.82 **Paper Mechanism**



PAPER FINGER ADJUSTMENT

REQUIREMENT

THE PRESSURE END OF THE PAPER FINGERS SHALL OVERLAP THE PAPER FROM 3/8 INCH TO 1/2 INCH.

TO ADJUST

POSITION THE PAPER FINGERS BY SLIDING THEM ON THEIR SHAFT.

PAPER FINGER SPRING TENSION

REQUIREMENT

PULL UPWARD ON RIGHT PAPER FINGER TO START LEFT PAPER FINGER MOVING FROM PLATEN.

MIN. 3 OZS.

MAX. 6 OZS.

PRESSURE ROLLER LEVER SPRING

REQUIREMENT

MIN. 28 OZS.

MAX. 36 OZS.

TO START EACH CENTER LEVER MOVING ALTERNATELY.

PAPER PRESSURE BAIL SPRING TENSION

REQUIREMENT

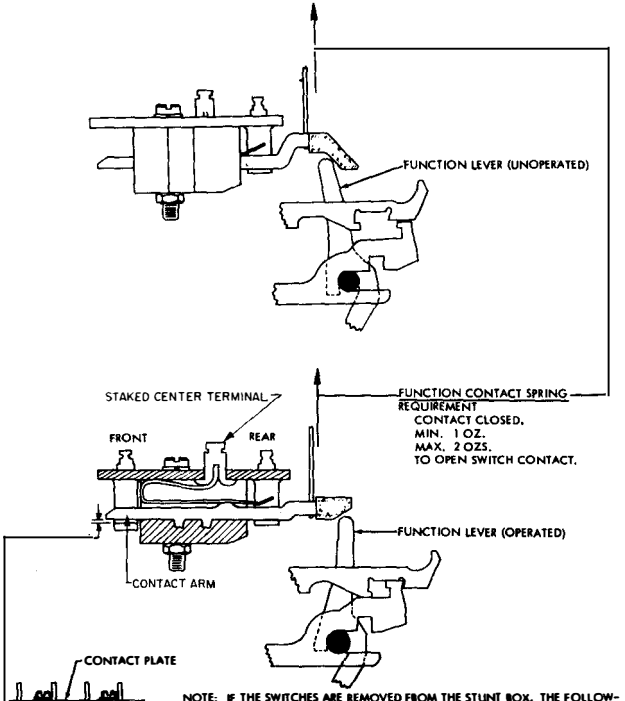
SCALE HOOKED OVER PRESSURE BAIL AT EACH END OF PLATEN.

MIN. 7 OZS.

MAX. 20 OZS.

TO MOVE PRESSURE BAIL FROM PLATEN.

2.83 Function Contact Assembly (With Staked Center Terminal)

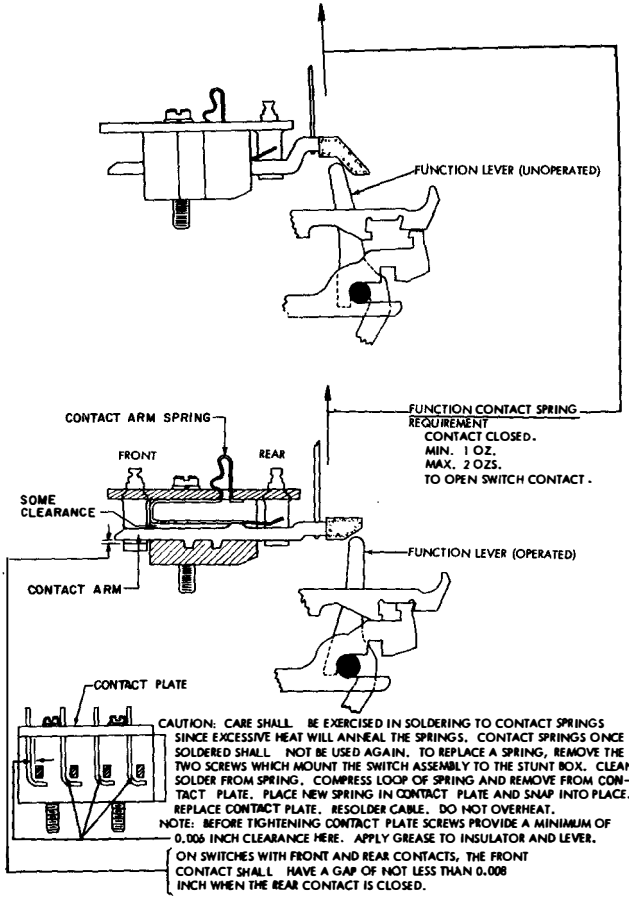


NOTE: IF THE SWITCHES ARE REMOVED FROM THE STUNT BOX, THE FOLLOWING REQUIREMENTS APPLY:

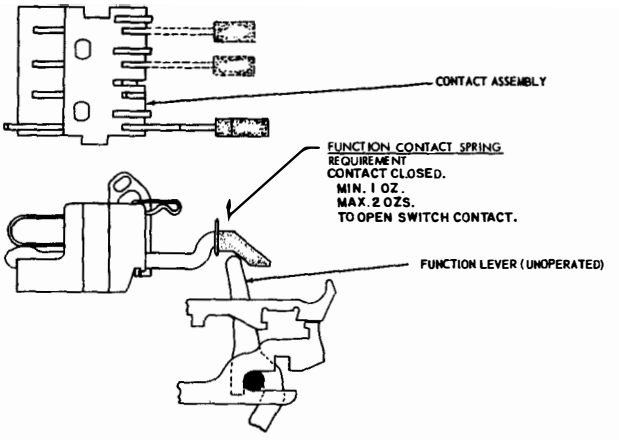
(1) PROVIDE AT LEAST 0.006 INCH CLEARANCE BETWEEN THE CONTACT ARM AND THE VERTICAL PORTION OF THE CONTACT CLIP. IF THE SWITCH HAS CONTACTS FRONT AND REAR, THIS CLEARANCE APPLIES TO BOTH FRONT AND REAR. TO OBTAIN THIS CLEARANCE, POSITION THE CONTACT PLATE BEFORE TIGHTENING THE CONTACT PLATE SCREWS.

(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.

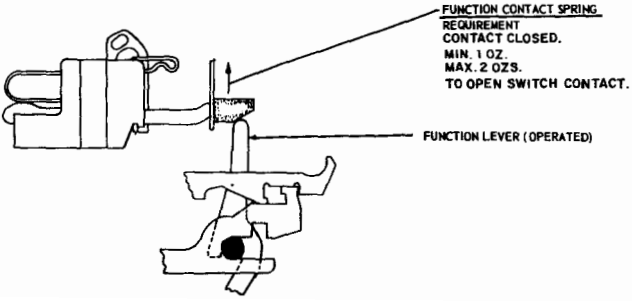
2.84 Function Contact Assembly (With Contact Arm Spring Loop)



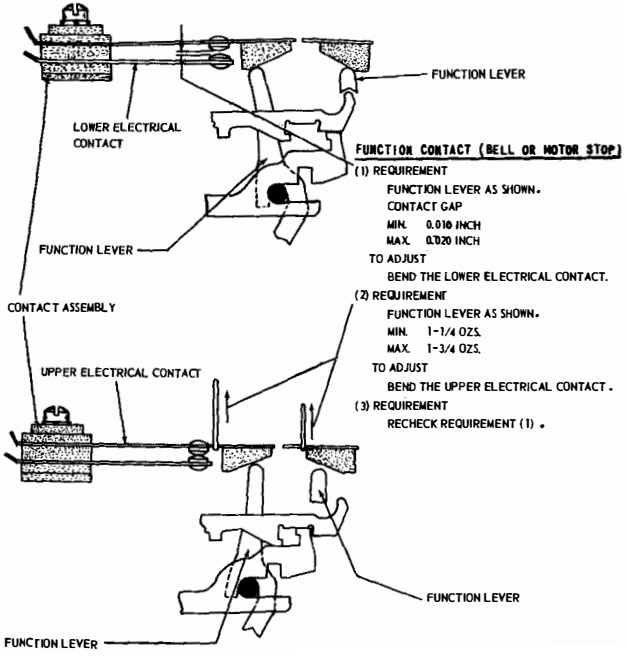
2.85 Function Contact Assembly (With One-piece Contact Block)



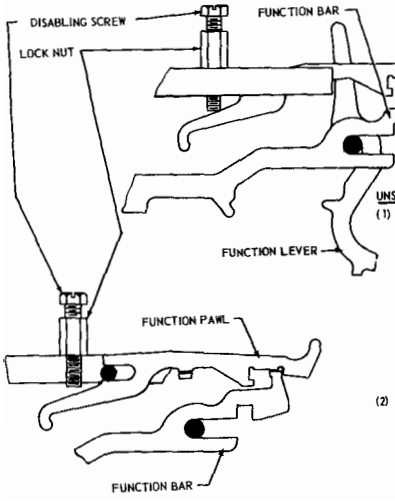
CAUTION: CARE SHALL BE EXERCISED IN SOLDERING TO CONTACT SPRINGS SINCE EXCESSIVE HEAT WILL ANNEAL THE SPRINGS. CONTACT SPRINGS ONCE SOLDERED SHALL NOT BE USED AGAIN.



2.86 Function Contact Assembly (With 28A and 28A-1 Typing Units Only)



2.87 Unshift-on-space Mechanism (Left View)



UNSHIFT-ON-SPACE FUNCTION PAWL

(1) REQUIREMENT

TO PREVENT UNSHIFT-ON-SPACE FUNCTION, PROVIDE CLEARANCE BETWEEN THE LOWER EDGE OF THE UNSHIFT-ON-SPACE FUNCTION PAWL AND ITS FUNCTION BAR.

MIN. 0.015 INCH
MAX. 0.060 INCH

TO ADJUST

LOOSEN THE LOCK NUT AND TURN THE DISABLING SCREW IN.

(2) REQUIREMENT

TO RESTORE THE UNSHIFT-ON-SPACE FUNCTION, BACK OFF THE SCREW SO THAT PAWL FULLY ENGAGES THE FUNCTION BAR. THEN CONTINUE TO TURN THE SCREW OUT ONE TO THREE TURNS.

2.88 Codebar Detent Mechanism

CODE BAR DETENT

REQUIREMENT

FRONT PLATE REMOVED. ALL CLUTCHES DISENGAGED. SUPPRESSION AND SHIFT CODE BARS SHALL 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
(IF SO EQUIPPED)

NOTE

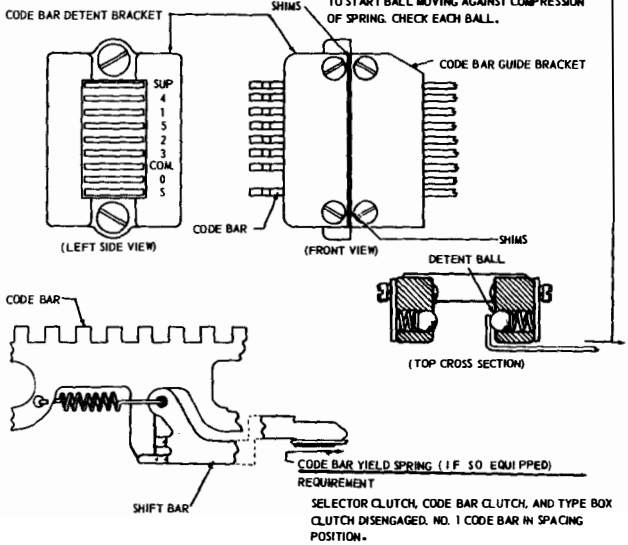
UNLESS THERE IS REASON TO BELIEVE THAT THESE SPRINGS ARE CAUSING OPERATING FAILURE DO NOT CHECK THIS REQUIREMENT.

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 (IF SO EQUIPPED)

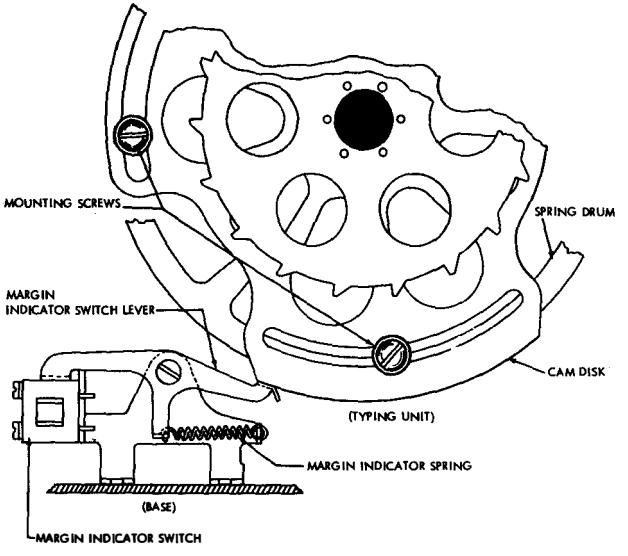
REQUIREMENT

SELECTOR CLUTCH, CODE BAR CLUTCH, AND TYPE BOX CLUTCH DISENGAGED. NO. 1 CODE BAR IN SPACING POSITION.

MIN. 14 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.

2.89 Margin-indicating Mechanism (Later Design)



MARGIN INDICATOR LAMP

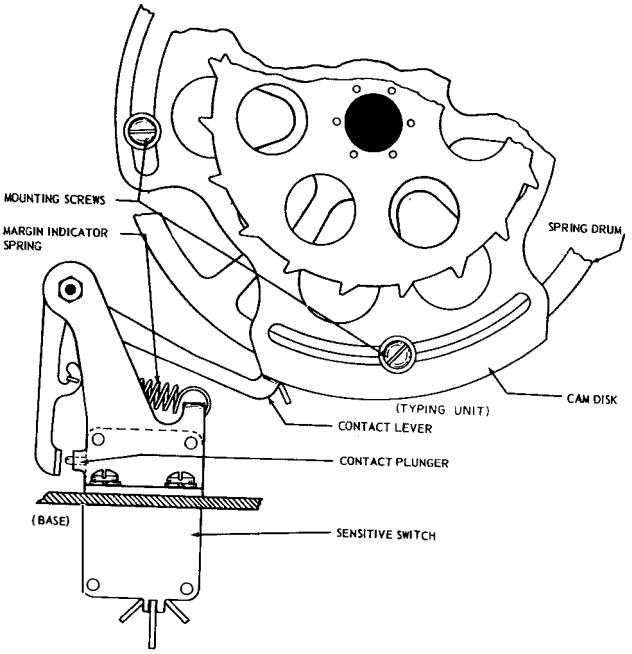
REQUIREMENT

OPERATING UNDER POWER, THE LAMP SHALL LIGHT ON THE DESIRED CHARACTER.

TO ADJUST

SET THE TYPE BOX CARRIAGE TO PRINT THE DESIRED CHARACTER AND POSITION THE CAM DISK COUNTERCLOCKWISE ON THE SPRING DRUM WITH ITS THREE MOUNTING SCREWS LOOSENED SO THAT THE SWITCH JUST OPENS. IF A LINE SHORTER THAN 72 CHARACTERS IS REQUIRED, IT MAY BE NECESSARY TO REMOVE THE CAM DISK SCREWS AND INSERT THEM IN ADJACENT SLOTS IN THE DISK, IF THE RANGE OF ROTATION IN ONE SLOT IS NOT ENOUGH.

2.90 Margin-indicating Mechanism (Earlier Design)



MARGIN INDICATOR LAMP

REQUIREMENT

OPERATING UNDER POWER, THE LAMP SHALL LIGHT ON THE DESIRED CHARACTER.

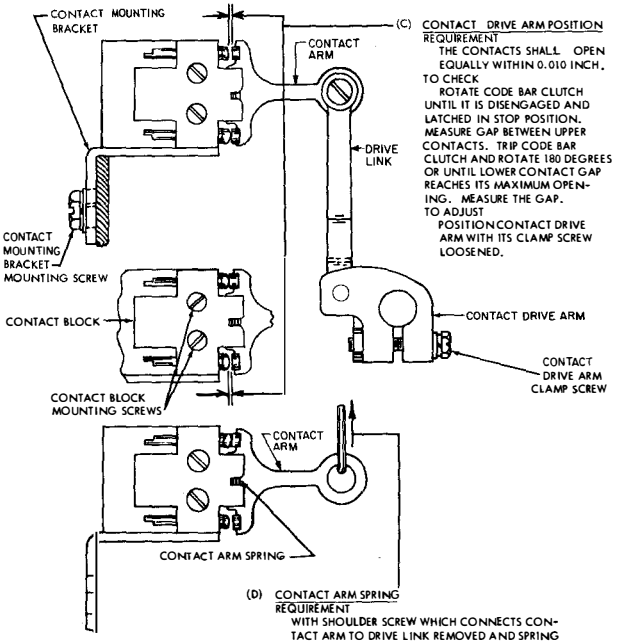
TO ADJUST

SET THE TYPE BOX CARRIAGE TO PRINT THE DESIRED CHARACTER AND POSITION THE CAM DISK COUNTERCLOCKWISE ON THE SPRING DRUM WITH ITS THREE MOUNTING SCREWS LOOSENED SO THAT THE SWITCH JUST OPENS. IF A LINE SHORTER THAN 72 CHARACTERS IS REQUIRED, IT MAY BE NECESSARY TO REMOVE THE CAM DISK SCREWS AND INSERT THEM IN ADJACENT SLOTS OF THE DISK, IF THE RANGE OF ROTATION IN ONE SLOT IS NOT ENOUGH.

2.91 Universal Contact (Selector)

(A) CONTACT MOUNTING BRACKET
REQUIREMENT
THE DRIVE ARM LINKAGE SHALL BE VERTICALLY ALIGNED TO PREVENT BINDS.
TO ADJUST
POSITION THE CONTACT MOUNTING BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

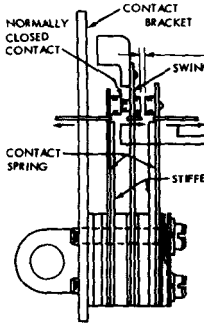
(B) CONTACT BLOCK
REQUIREMENT
THE CONTACT FACES SHALL BE IN A VERTICAL STRAIGHT LINE.
TO ADJUST
LOOSEN THE TWO CONTACT MOUNTING SCREWS. PRESS THE CONTACT BLOCK TOWARD THE REAR OF THE TYPING UNIT FIRMLY AGAINST THE SCREWS AND TIGHTEN THE SCREWS.



(C) CONTACT DRIVE ARM POSITION
REQUIREMENT
THE CONTACTS SHALL OPEN EQUALLY WITHIN 0.010 INCH.
TO CHECK
ROTATE CODE BAR CLUTCH UNTIL IT IS DISENGAGED AND LATCHED IN STOP POSITION. MEASURE GAP BETWEEN UPPER CONTACTS. TRIP CODE BAR CLUTCH AND ROTATE 180 DEGREES OR UNTIL LOWER CONTACT GAP REACHES ITS MAXIMUM OPENING. MEASURE THE GAP.
TO ADJUST
POSITION CONTACT DRIVE ARM WITH ITS CLAMP SCREW LOOSENED.

(D) CONTACT ARM SPRING
REQUIREMENT
WITH SHOULDER SCREW WHICH CONNECTS CONTACT ARM TO DRIVE LINK REMOVED AND SPRING SCALE APPLIED VERTICALLY UPWARD OR DOWNWARD
MIN. 2 OZS.
MAX. 5 OZS.
TO OPEN EITHER CONTACT.

2.92 Universal Contact Assembly (Break-Before-Make) Mounted on Stuntbox (Preliminary)



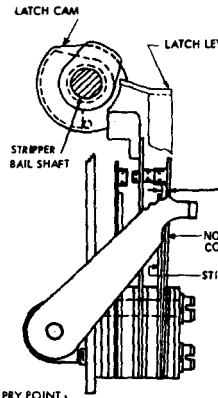
NOTE
THESE ADJUSTMENTS SHALL BE MADE WITH THE CONTACT BRACKET ASSEMBLY REMOVED.

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

(B) NORMALLY OPEN CONTACT GAP
REQUIREMENT
WITH THE NORMALLY CLOSED CONTACT CLOSED
MIN. 0.020 INCH --- MAX. 0.025 INCH
TO ADJUST---BEND STIFFENER.

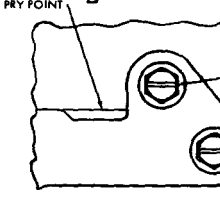
(C) CONTACT SPRING TENSION (TWO SPRINGS)
REQUIREMENT
WITH THE SWINGER HELD AWAY
MIN. 2 OZS.---MAX. 3 OZS.
TO MOVE EACH SPRING AWAY FROM STIFFENER.
NOTE: IF NECESSARY REMOVE AND FORM SPRING.

(D) 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 SHALL 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 SHALL THEN REST AGAINST LATCH CAM.

(E) CONTACT BRACKET
REQUIREMENT
WITH THE MAIN SHAFT ROTATED UNTIL THE STRIPPER SHAFT DRIVELINK IS AT ITS HIGHEST 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 WIDTH OF THE LATCHING SURFACE OF THE LATCH LEVER SHALL EXTEND BEYOND BOTH CAMS.

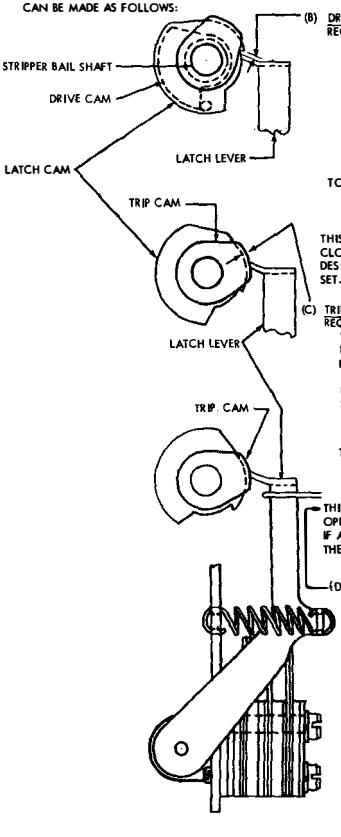


2.93 Universal Contact Assembly (Break-Before-Make) Mounted on Stuntbox (Preliminary)

(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 SHAFT DRIVELINK IS AT ITS HIGHEST POSITION THERE SHALL 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 SHALL BE RESTING ON THE TRIP CAM AND THE CLEARANCE BETWEEN THE LATCH LEVER AND THE LATCH CAM SHALL 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.

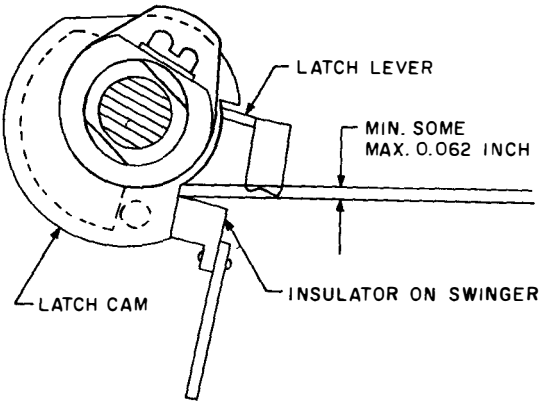
TO MOVE LEVER AWAY FROM TRIP CAM.

2.94 Nominal 53.88 Millisecond Spacing Pulse at 100 WPM Operation

NOTE: THE FOLLOWING ADJUSTMENTS SHALL BE MADE ONLY WHERE TIMING REQUIREMENTS ARE SPECIFIED FOR THE NORMALLY CLOSD CONTACTS. THEY MAY BE MODIFIED TO MEET OTHER SPECIFIC REQUIREMENTS.
COMPLETE ALL OF THE FOREGOING STANDARD ADJUSTMENTS FOR THE STUNT BOX UNIVERSAL CONTACT BEFORE PROCEEDING.

(A) NORMALLY OPEN CONTACT GAP (SEE (B) 2.92).
MIN. 0.010 INCH – MAX. 0.025 INCH
IF THERE ARE NO SPECIFIED TIMING REQUIREMENTS FOR THE NORMALLY OPEN CONTACTS. THE CONTACT BRACKET REQUIREMENT IN 2.92 (E) NEED NOT BE MET.

(B) SWINGER INSULATOR CLEARANCE
REQUIREMENT
WITH THE STRIPPER SHAFT DRIVELINK AT ITS HIGHEST POINT, THE BAKELITE INSULATOR ON THE UPPER END OF THE SWINGER SHALL BE SOME TO 0.062 MAX. BELOW START OF LATCH CAM RISE (GAUGED BY EYE).
TO ADJUST
LOOSEN CONTACT BRACKET MOUNTING SCREWS AND POSITION CONTACT BRACKET TO MEET THE REQUIREMENT. THE WIDTH OF THE LATCHING SURFACE OF THE LATCH LEVER SHALL EXTEND BEYOND BOTH CAMS.



(C) TIMING OF NORMALLY CLOSED CONTACTS
PRELIMINARY
WITH THE STRIPPER SHAFT DRIVELINK AT ITS HIGHEST POINT, BEND NORMALLY CLOSED CONTACT STIFFENER TO GIVE MIN. 0.030 INCH – MAX. 0.035 INCH GAP BETWEEN NORMALLY CLOSED CONTACTS.
FINAL
CHECK SPACING PULSE IN ACCORDANCE WITH 2.95. IF NECESSARY, REFINE DRIVE CAM TIMING (B) 2.93 WITHIN SPECIFIED .003 TO .008 LIMITS. RECHECK SPRING TENSIONS (C) AND (D) 2.92. REPEAT STROBE CHECK IF READJUSTMENT WAS NECESSARY.

2.95 **Universal Contact Assembly Mounted on Stuntbox (Final):** The following adjustments shall 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.

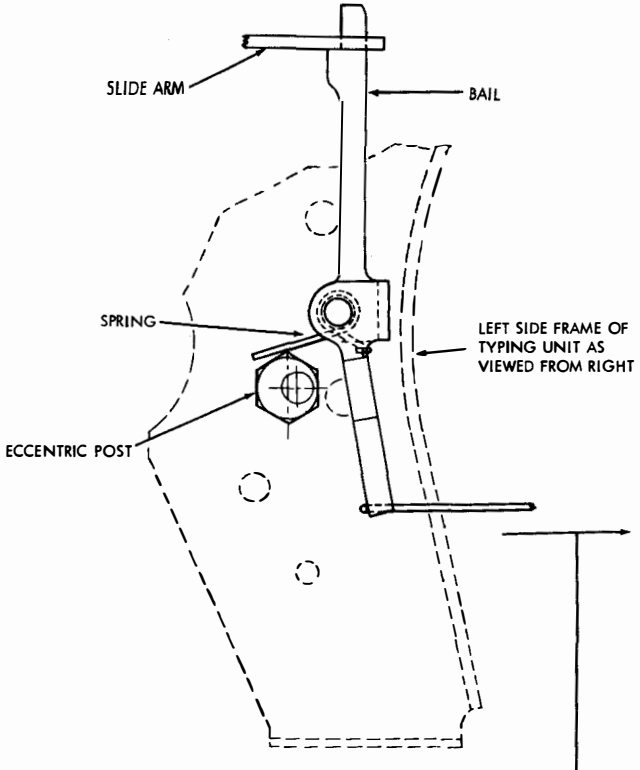
TABLE A

Procedure	For 83B2 Control Office or Auto. Relay Paint	For WADS "A" Service
1. Arrange test set to send into selector magnet of selector mechanism 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	Does not apply
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. **TEST**—With the printer receiving repeated LTRS characters the normally closed contact shall open for 400 ±30 divisions.		

TABLE A (Cont'd)

Procedure	For 83B2 Control Office or Auto. Relay Paint	For WADS "A" Service
READJUST — Adjust cam on right side of universal-contact mechanism until contact opens for 400± 15 divisions.	Does not apply	Applies
6. Change stroboscope connections from normally closed contact to normally open contact and observe that contact remains closed for at least 238 divisions. Also note that it closes prior to end of third selective pulse. If the closure time is less than 238 divisions recheck all the mechanical adjustments.	Applies	Does not apply

2.96 Form Feed-out Mechanism



FORM FEED-OUT TORSION SPRING TENSION

REQUIREMENT

MIN. 1/8 OZ.

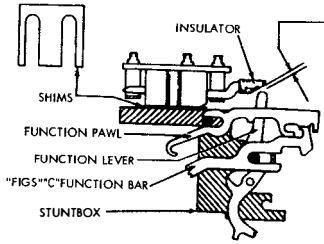
MAX. 1-1/4 OZ.

TO START BAIL MOVING TOWARDS REAR OF UNIT.

TO CHECK

DISENGAGE LINE FEED CLUTCH TRIP LEVER.

2.97 Answer-back Stuntbox Contact (TWX)



"FIGS" "C" STUNTBOX CONTACT (ANSWER-BACK)

REQUIREMENT

CLEARANCE BETWEEN CONTACT INSULATOR AND FUNCTION LEVER MIN. SOME --- MAX. 0.008 INCH

TO CHECK

STUNTBOX MOUNTED ON TYPING UNIT AND LTRS COMBINATION MANUALLY SET UP ON TYPING UNIT SELECTOR. ROTATE TYPING UNIT MAIN SHAFT UNTIL FUNCTION LEVER IS IN EXTREME FORWARD POSITION TOWARD CONTACT INSULATOR.

TO ADJUST

WITH CONTACT MOUNTING SCREWS LOOSENED, ADD OR REMOVE SHIMS AS REQUIRED.

3. ASSOCIATED BELL SYSTEM PRACTICES

3.01 The following Bell System Practice contains additional information related to this section.

Subject	Section
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

Paragraph	Requirement	BSP
2.10	TRANSFER LEVER ECCENTRIC	P98.912
2.45	LOWER DRAW WIRE ROPE	P98.819, Iss. 2
2.50, 2.51	AUTOMATIC CARRIAGE-RETURN LINE-FEED BELLCRANK SPRING	P98.999.36
2.82	PAPER PRESSURE BAIL SPRING	P98.999.34
2.88	CODEBAR YIELD SPRING	P98.861