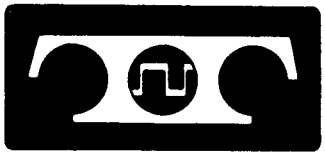
BULLETIN 235B

TECHNICAL MANUAL
28 TRANSMITTER DISTRIBUTOR SET (SINGLE CONTACT) LXD



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CORPORATION
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INTRODUCTION

Bulletin 235B provides description, adjustments, lubrication, and disassembly and reassembly procedures for the Model 28 Single Contact Transmitter Distributor Set, the transmitter distributor unit and the single and multiple mounted transmitter distributor bases.

The bulletin is made up of a group of appropriate, independent sections. They are separately identified by title and section number, and the pages of each section are numbered consecutively, independent of other sections.

The identifying number of a section, a 9-digit number, appears at the top of each page of the section, in the left corner of left-hand pages and the right corner of right-hand pages. The sections are placed in the manual in ascending numerical order.

To locate specific information refer to the table of contents on the following page. Find the name of the involved component in column one and the title of section in column two. The correct 9-digit section number will then be found in column three. Turn to page one of the section indicated where the contents of that section will be found (except where a section is small and does not require a listing of contents).

Note: Information previously contained in Bulletin 258B is now included in Bulletin 235B in its 9-digit sectionalized form.

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Note: For information on motor units, see Bulletin 295B.

28 SELF-CONTAINED TRANSMITTER DISTRIBUTOR SETS

(SINGLE CONTACT AND MULTICONTACT)

DESCRIPTION

CONTENTS PAGE

1. GENERAL

1.01 This section describes three 28 Self-Contained Transmitter Distributor Sets. They are the Single Contact, Multicontact, and Miniaturized sets. To provide clarity for the sets, each is separately described and illustrated. The following descriptions and illustrations are of typical sets.

1.02 A typical 28 Self-Contained Transmitter Distributor Set consists of a base, transmitter distributor unit, a motor or motor unit, and a cover. The base and cover may be regular size as illustrated in Figures 1 and 5 for use with a motor unit, or they may be a miniaturized design for use with a small motor as illustrated in Figure 3.

1.03 A transmitter distributor set is an electromechanical unit of communication equipment used to read code combinations perforated in a paper tape. The mechanical action initiated by the code combinations in the tape is translated into electrical impulses in the form of Baudot code signals and transmitted over a signal line or radio channel. It is a sending unit only.

1.04 Transmission may be performed at 60, 75, or 100 words per minute depending on the set of gears used between the motor and the intermediate gear assembly. Signaling between a transmitter distributor and a distant station is accomplished electrically by use of the 5-unit start-stop permutation code, and may utilize the 7.42 unit transmission pattern or the 7.00 unit transmission pattern depending on the transmitting cam sleeve used.

1.05 Each set is equipped with a control switch for turning the set off without disconnecting it from the signal circuit. Most sets are equipped with an automatic line shunting switch which closes the loop signal circuit when the transmitter distributor is removed from its base.

1.06 Power is brought into each set through a power switch to the motor or motor unit. The motor or motor unit provides motive power for driving the transmitter distributor unit through an intermediate gear assembly.

1.07 The message signals are read from the perforated tape, either chadless or fully perforated, and transmitted by either a 0.020 or 0.060 ampere dc line current to external receivers.

1.08 A three-position control switch is provided on each transmitter distributor unit for placing the set in RUN position to read tape; STOP position to stop tape reading; and FREE position to free the feed wheel so that tape may be fed under the tape lid into the tape guide without raising the lid.

2. TECHNICAL DATA

WEIGHTS AND DIMENSIONS

Transmitter Distributor Set	Approx. Dimensions (Inches)			Approx. Weight
	Height	Width	Depth	Pounds
Single Contact (Regular)	7	7-1/2	14-1/2	26-1/2
Single Contact (Miniaturized)	6	7-1/2	9-1/2	15
Multicontact	6	9	16	26

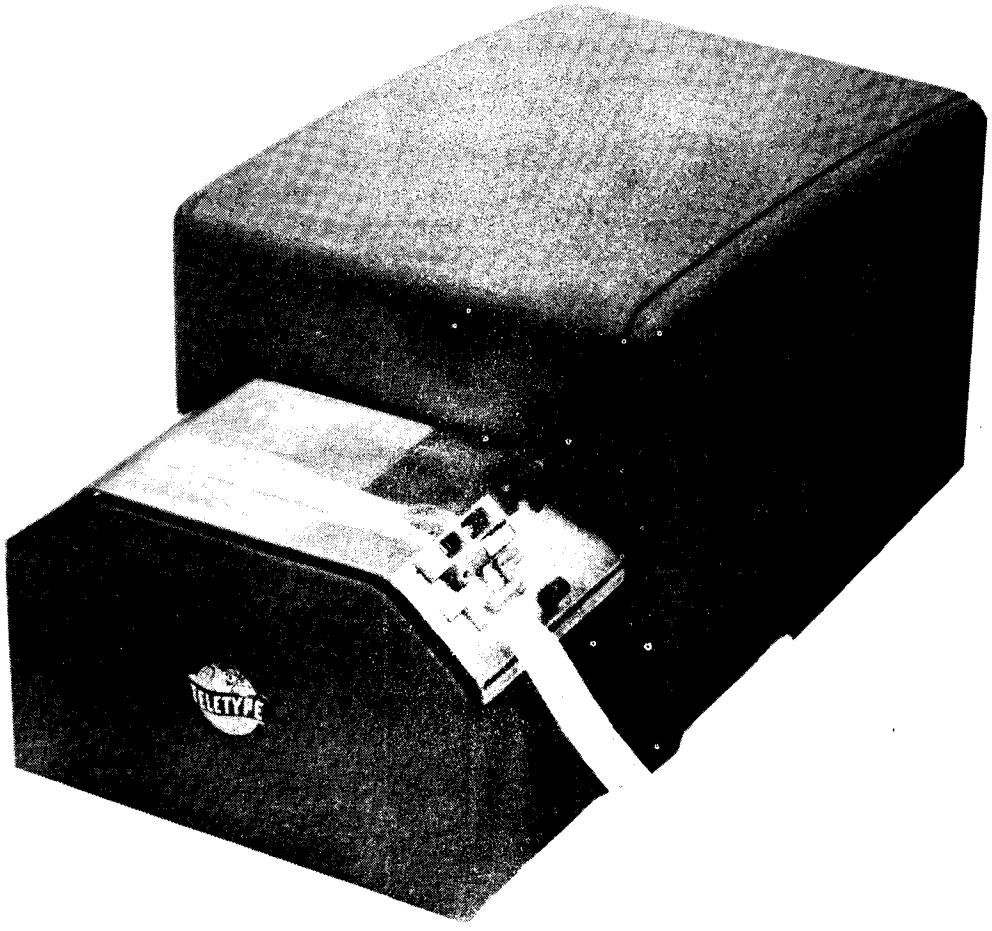

Figure 1 - Regular Size 28 Transmitter Distributor Set (Single Contact)

3. SINGLE CONTACT SETS

3.01 The transmitter distributors used in the two single contact sets (regular size, and miniature size) are identical as to function and configuration. The single contact mechanism is actuated once for each level of the code combination by a distributing cam sleeve. The code combinations sensed in the message tape are mechanically transferred to the single contact signal generator where they are translated into electrical impulses and transmitted sequentially to the signal line.

3.02 The transmitter distributor used in these sets may be equipped with code reading contacts for multiwire (simultaneous) output as an optional feature. By use of these contacts, which are actuated by the individual transfer levers, the tape message is electrically transmitted by parallel wires to external receivers for monitoring purposes or page copy. This is done simultaneously with transmission through the single contact signal generator.

REGULAR SIZE SET

3.03 The regular size single contact transmitter distributor set (Figure 2) consists of a base, a motor unit, transmitter distributor unit and a cover. The base extends a full length of the set, and is equipped with an intermediate gear assembly and vibration mounts. It serves as a mounting for a transmitter distributor unit, and a standard size 28 motor unit which may be either a 115 volt, 60 cycle, ac synchronous, or a 115 volt series governed.

3.04 A slip-over type cover encloses the motor unit and that portion of the base not occupied by the transmitter distributor unit.

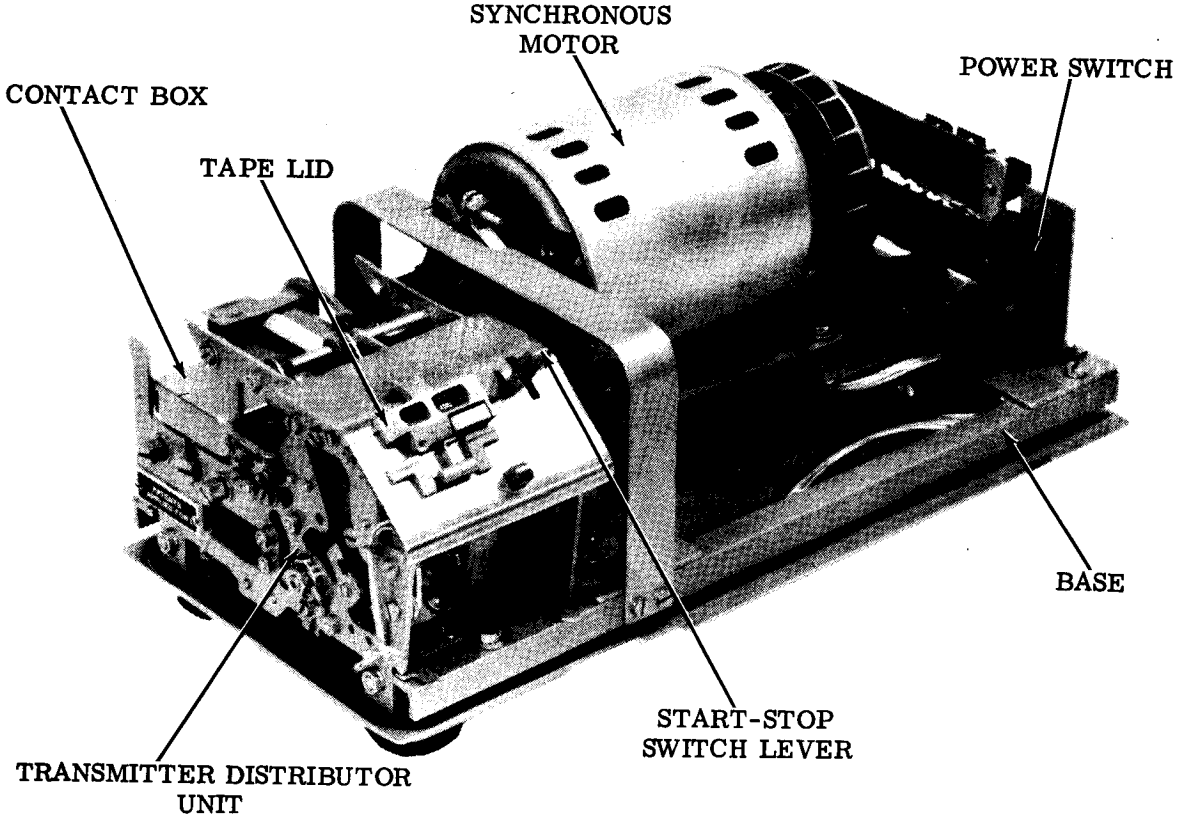

Figure 2 - Regular Size 28 Transmitter Distributor Set (Cover, Coverplate, and Panel Removed)

3.05 A U-shaped front panel covers three sides of the transmitter distributor. This panel snaps into position. It is easily removed for access to the mechanism of the transmitter distributor.

MINIATURIZED SET

3.06 The miniaturized set has been so characterized because of its compactness (Figure 4). The smallness in size is accomplished through design of the base and cover, and by use of a compact 23 millihorsepower synchronous motor. This set performs the same function as the regular size set; yet it occupies less space by about five inches in depth. The cover is the slip-over type which houses the remaining portion of the set other than the transmitter distributor. The U-shaped front panel is the same as that for the regular size set.

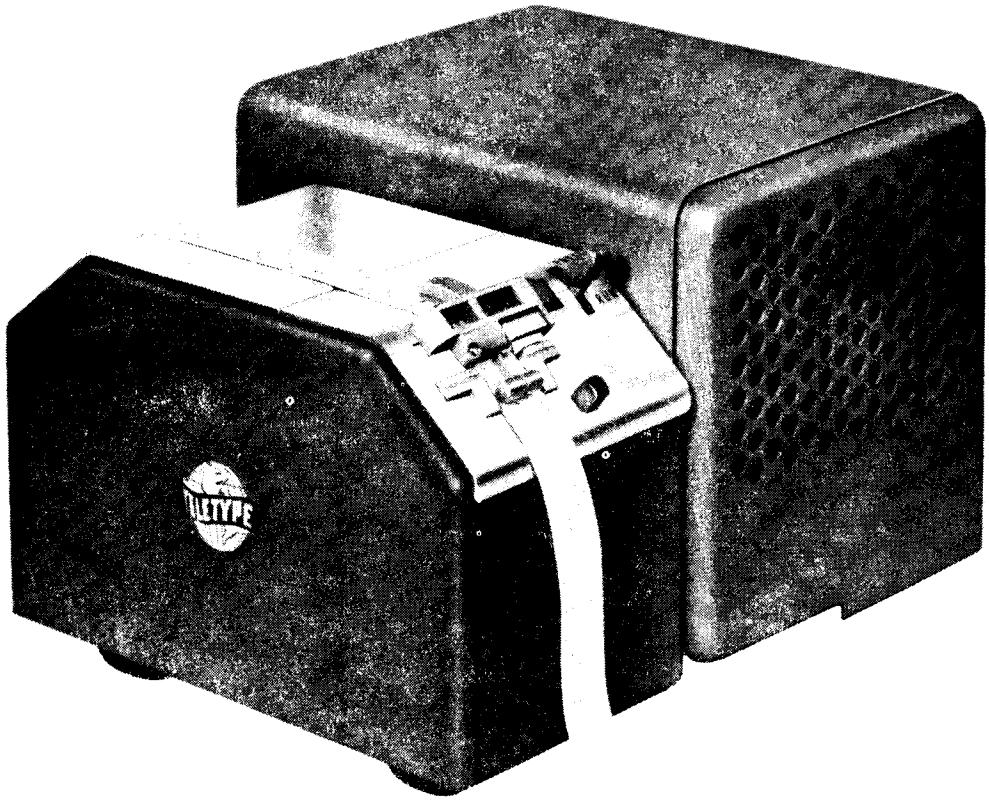

Figure 3 - Miniaturized 28 Transmitter Distributor Set (Single Contact)

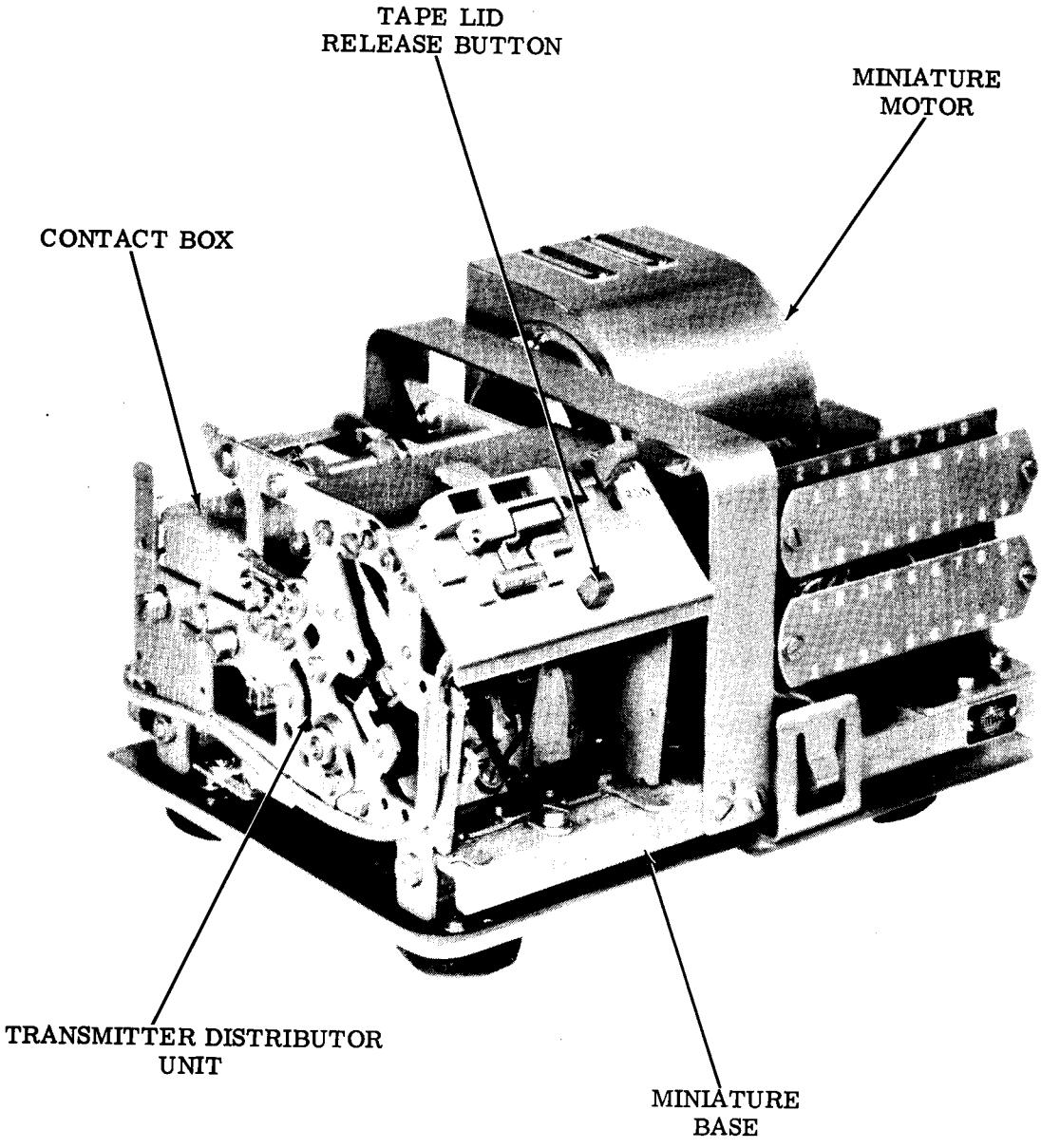

Figure 4 - Miniaturized 28 Transmitter Distributor Set
(Cover, Coverplate and Front Panel Removed)

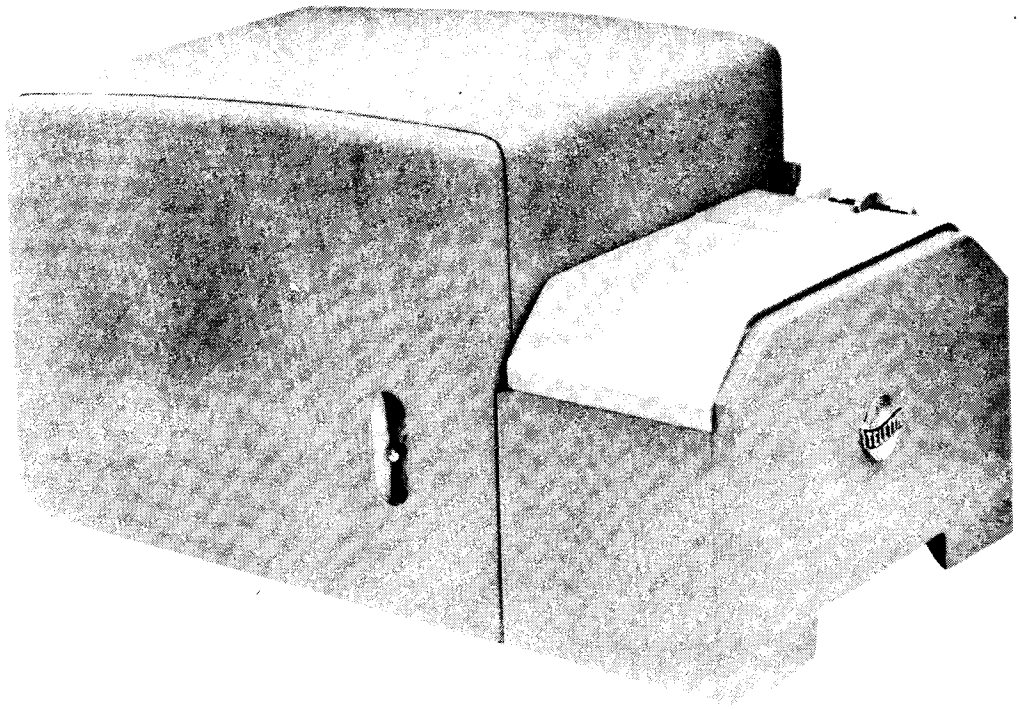

Figure 5 - 28 Transmitter Distributor Set (Multicontact)

4. MULTICONTACT SET

4.01 The multicontact transmitter distributor set (Figure 6) is approximately two inches wider and two inches deeper than the single contact set. It is driven by a full size 28 motor unit which may be either synchronous or governed.

4.02 The function of this set is somewhat different from that of the single contact set. The sensing and distributing mechanisms are capable of being actuated independently of each other either locally or from a remote source, or they may be actuated in conjunction with each other as a straight through transmitter distributor.

4.03 The wiring of this set terminates at two 24-point connectors located at the rear of the base to provide external control, and the output or input of multiwire transmission.

4.04 The versatility of this set makes it possible to transmit the tape message by parallel wire to an external receiver for message verification, or error detection. Likewise, it is possible to return parallel wire input to the distributing portion of the set for sequential transmission.

4.05 Auxiliary contacts are provided in the set, and operate from the sensing cam sleeve for controlling external circuits.

4.06 An auxiliary contact is provided at the distributor cam sleeve for controlling the clutch on the sensing shaft.

4.07 An index mark is provided seven characters ahead of the sensing pins for aligning the starting point of the message tape.

4.08 The spring biased tape lid may be raised for inserting message tape by depressing a plastic tape lid release plunger.

4.09 Transmission of tape may be stopped by operating the start-stop switch lever, by raising the tape lid, or allowing tape to run out. When the tape lid is raised or when tape runs out, the tape-out sensing pin rises and breaks a circuit to the sensing clutch magnet through its contact.

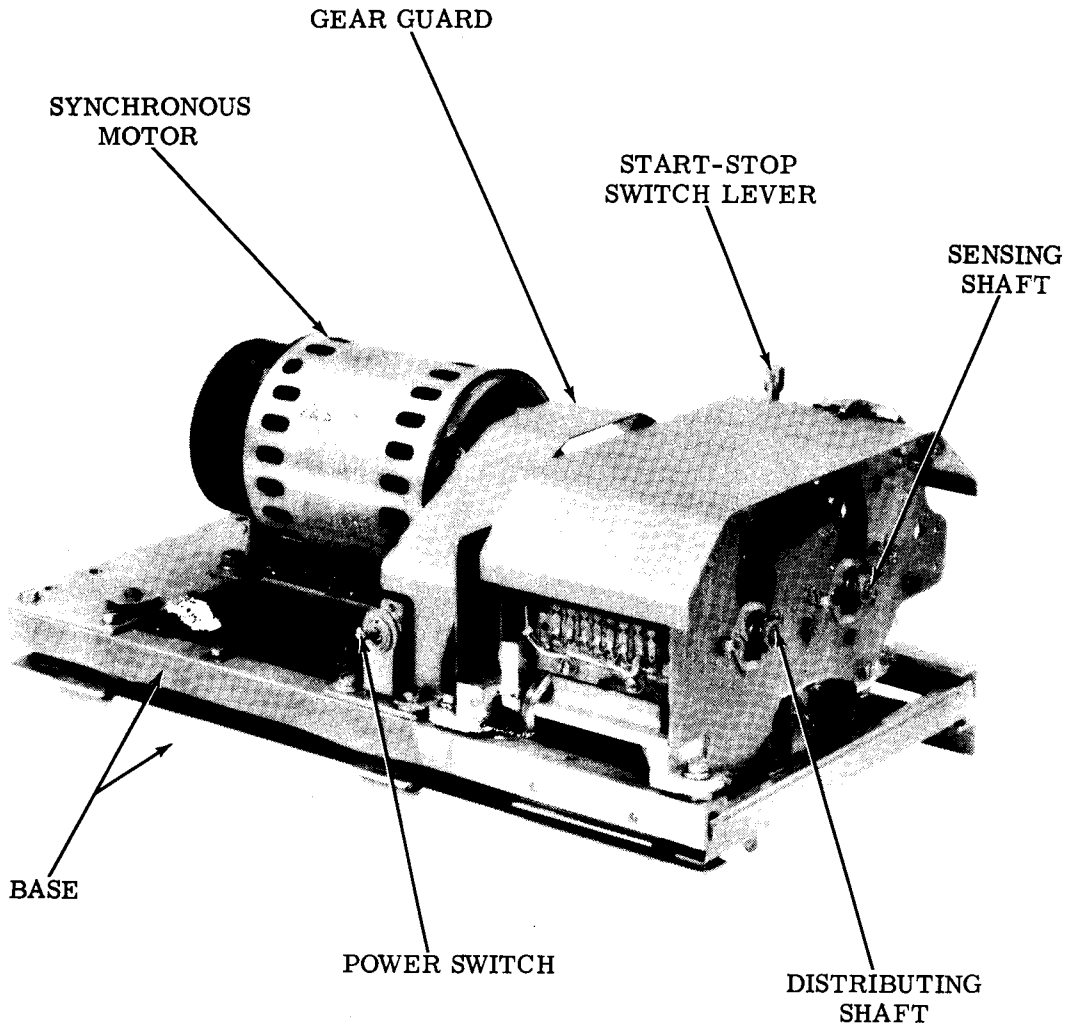

Figure 6 - 28 Transmitter Distributor Set (Multicontact — Cover Removed)

TELETYPE CORPORATION
Skokie, Illinois, U. S. A.

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28 TRANSMITTER DISTRIBUTOR UNIT (LXD)

DESCRIPTION AND PRINCIPLES OF OPERATION

CONTENTS PAGE

CONTENTS PAGE

1. GENERAL

1.01 This section provides the description and principles of operation for the 5- and 6-level 28 transmitter distributor unit (single contact).

1.02 All references in text to left or right, front or rear, up or down are made from a position in front of, and facing the unit.

1.03 The single contact 28 transmitter distributor unit (Figure 1) is an electromechanical device, which reads code combinations perforated in tape, translates these combinations into electrical impulses, and transmits them in the form of a 5- or 6-level, start-stop permutation code to one or more receiving stations.

1.04 The unit can be used as a component in a self-contained set, in an Automatic Send-Receive Set (ASR), or in a gang-mounted arrangement.

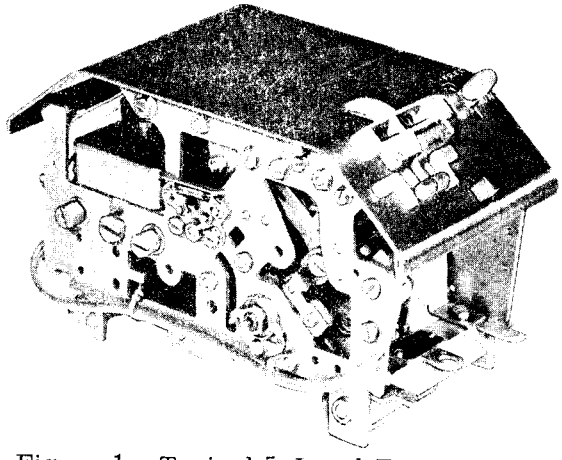


Figure 1 - Typical 5-Level Transmitter Distributor Unit

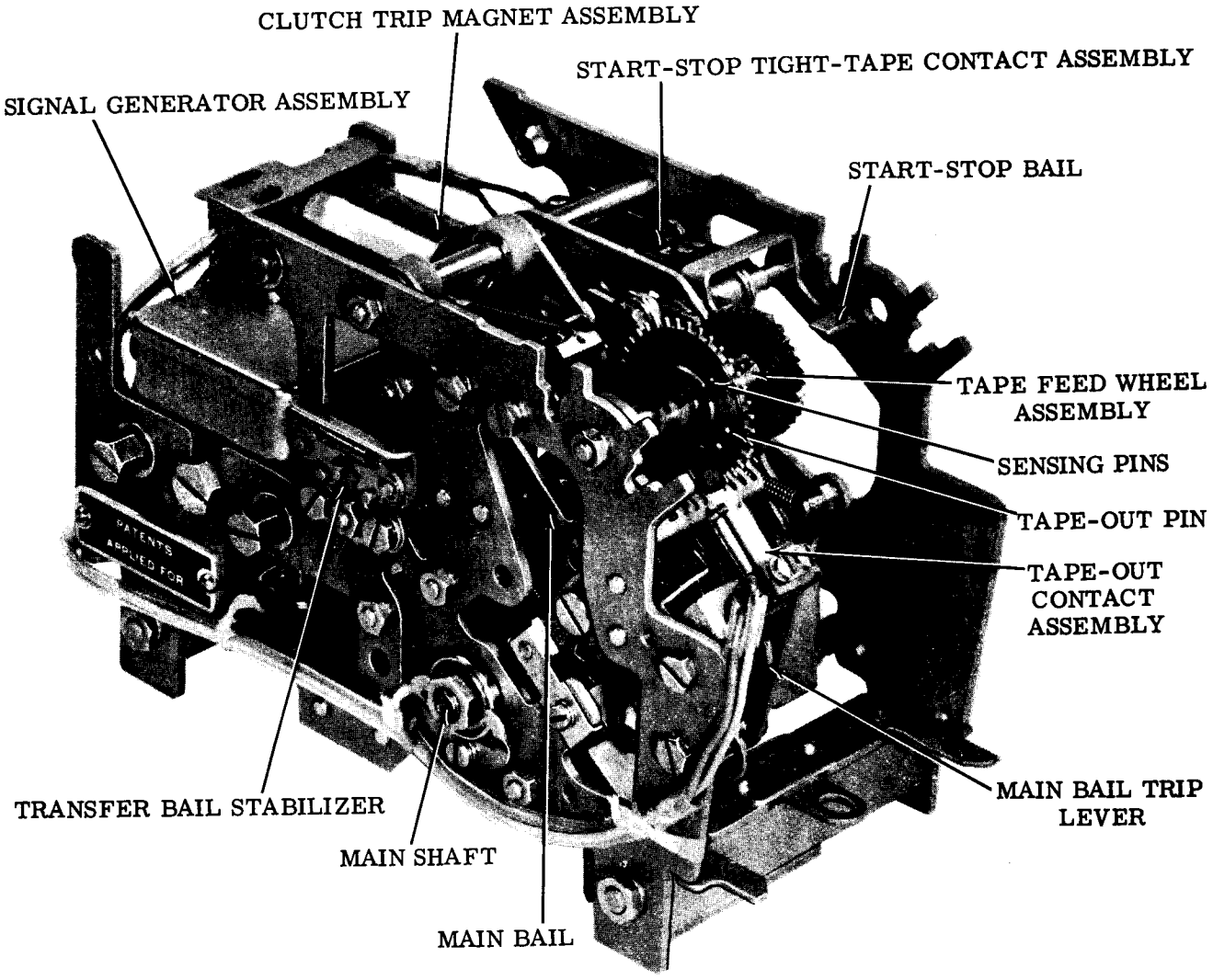


Figure 2 - Transmitter Distributor Unit (Cover Plate, Top Plate and Tape Guideplate Removed)

1.05 The transmitter distributor uses a single camshaft to start, and sequentially perform, the functions of sensing the intelligence stored in a perforated tape. An electrical contact is linked to certain mechanisms to translate the intelligence sensed into pulses of current (marking) and no current (spacing). The unit accepts either chadless or fully perforated tape (Figure 4).

1.06 The signal generator assembly (Figure 12) includes a contact toggle assembly, a drive link, a cover, and an eccentric for adjusting the signal contacts. The signal contacts may be made of either tungsten or gold-plated tungsten.

Note: Gold-plated contacts may be used for both standard applications (including those with data sets) and special low-level applications. However, once used for standard application, they may not be suitable for special low-level application.

2. FUNCTION AND CONFIGURATION

FUNCTION

2.01 The basic operation of the transmitter distributor is to mechanically sense perforated tape and transfer the information to the signal generator, which performs the actual signal transmission (Figure 2).

2.02 The transmitter distributor can be thought of as having two basic functions. The transmitter (tape reader) senses or reads the punched code combinations in the tape and transfers this data mechanically to the distributor. The distributor (signal generator) converts the parallel signal from the transmitter into sequential, start-stop signals for distribution on line.

CONFIGURATION

2.03 The following operating mechanisms of the transmitter distributor are contained between three parallel plates.

(a) The tape sensing mechanism which consists of a bank of sensing pins, (5 or 6 depending on the code level) each with its corresponding transfer lever and latchlever (Figures 2 and 3).

(b) The main shaft assembly, (Figures 2 and 3) which is centrally located in the lower portion of the unit, has the outer race of each ball bearing clamped to the respective front and rear plates. The main shaft assembly consists of multiple cams, eccentrics, and a clutch. Motor power to the shaft is obtained from an external source and is controlled by the clutch and the clutch trip magnet assembly.

(c) A tape feed mechanism that accommodates either chadless or fully perforated tape.

(d) A tape-out pin (Figure 2), located to the right of the sensing pins, stops transmission if there is no tape in the sensing head (Figure 5).

(e) A quick disconnect 36-pin terminal or plug which aligns with its mate on a base, facilitates making electrical connections (Figure 3).

(f) A nylon insulating screw is mounted on the connector bracket and adjusted to align with, and actuate the "Line Shunt Switch" on the associated base (Figure 3).

2.04 The tape lid has the following components:

(a) A three-position control lever for manual control of the unit. The lever positions are FREE, STOP, and RUN.

(b) A pair of adjustable guides (Figure 5) for aligning and locating 11/16- or 7/8-inch wide tape over the feed wheel. An index line is scored in the tape guides 0.600 inch (6 characters) ahead of the sensing pins to aid in aligning the tape.

(c) A tight-tape device on the tape lid stops transmission if the tape becomes taut or tangled.

(d) A spring-loaded tape lid (Figure 5) that snaps open when the red tape lid release plunger is depressed.

ELECTRICAL CIRCUITS

2.05 The transmitter distributor has two electrical circuits, the clutch trip magnet circuit and the signal circuit. The clutch trip magnet circuit consists of the clutch trip magnet coils which are in series with the tape-out, start-stop, and tight-tape contact assemblies. The signal circuit consists of the transmitter signal generator contacts wired to provide neutral operation.

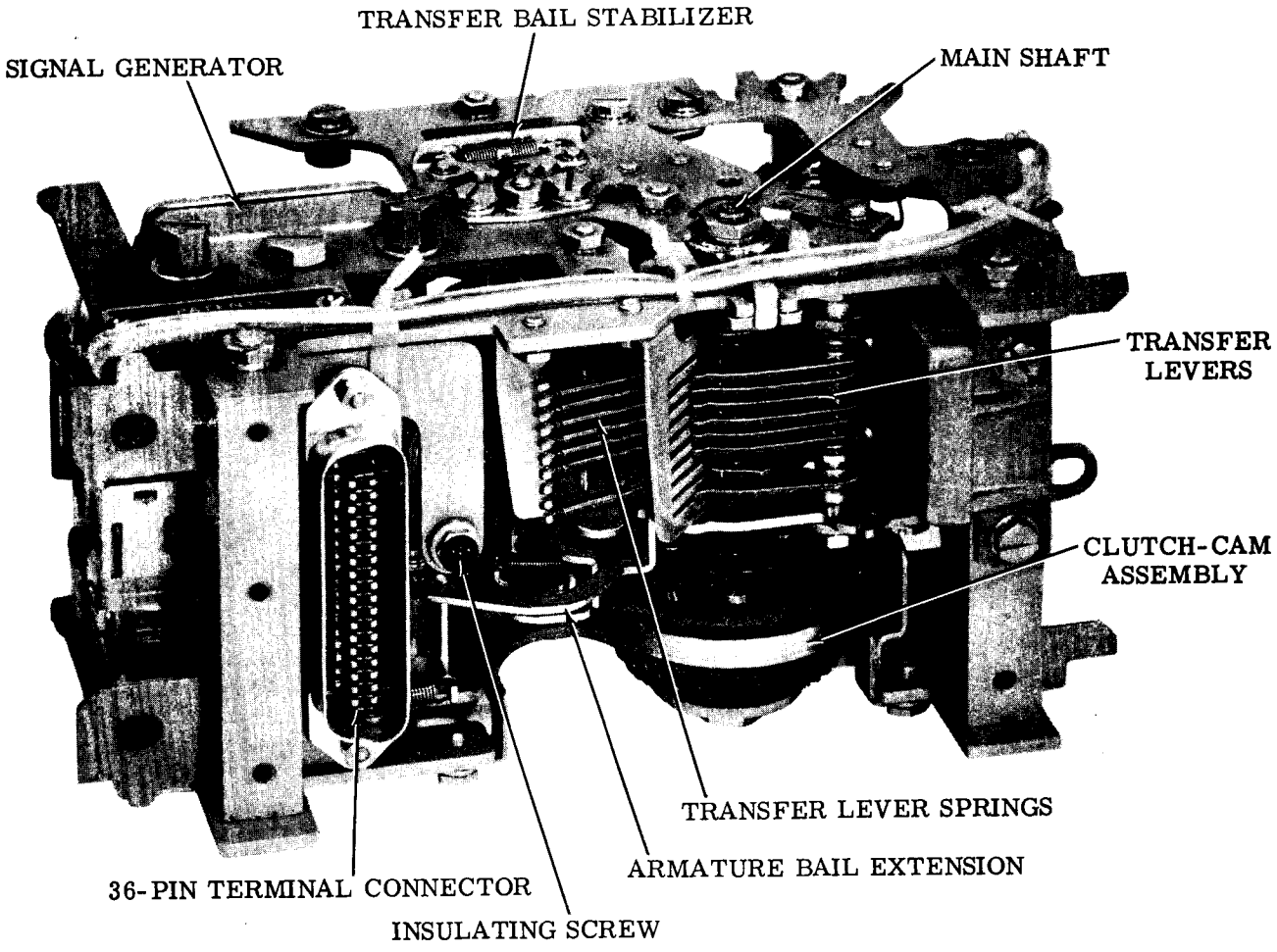


Figure 3 - Transmitter Distributor Unit (Bottom View)

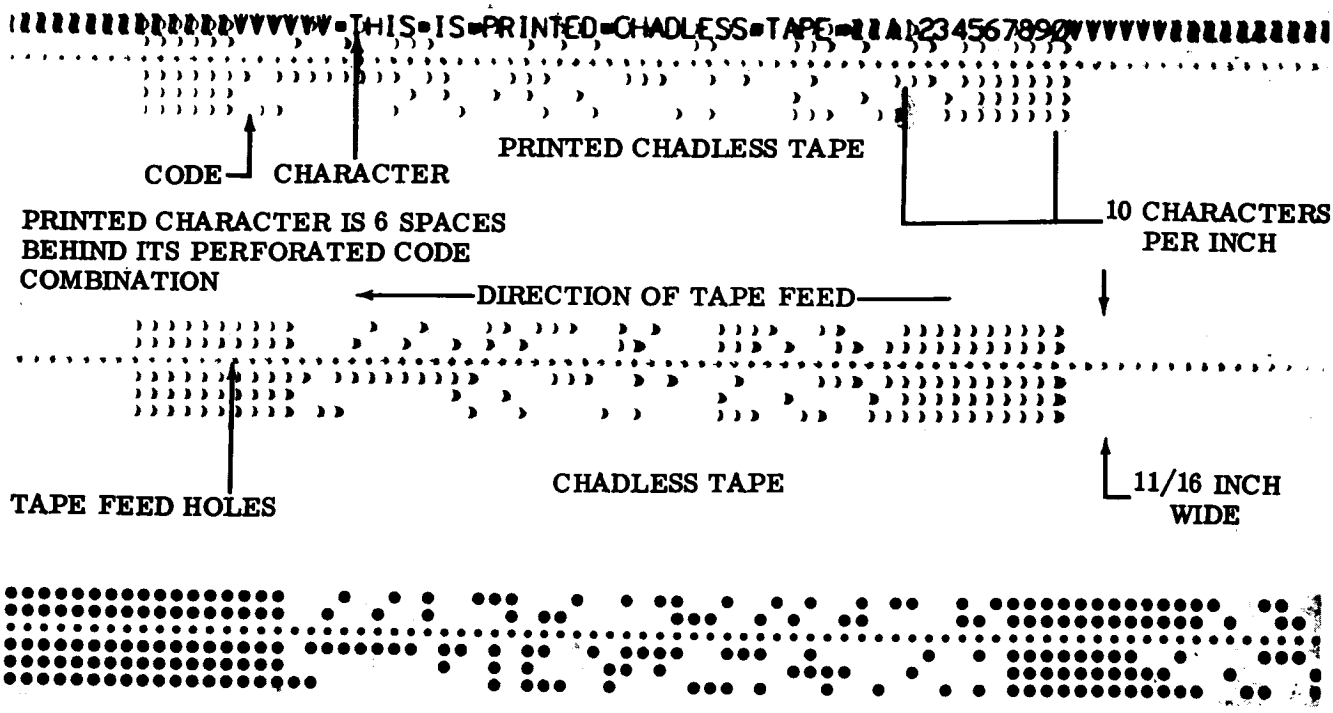


Figure 4 - Standard 5-Level Perforated Tapes

A. Control Circuits

2.06 The control circuit (clutch trip magnet) operates from the following power sources:

(a) 115 v ac ±10% 60 cycles.

(b) 120 v dc ±10% with suitable external resistance.

(c) 50 v dc ±10% with suitable external resistance.

2.07 The tight-tape, tape-out, and manual control mechanisms operate contact assemblies which are in series with the clutch trip magnet assembly. Actuation of any one of these devices opens the clutch trip magnet circuit, causing the clutch to become disengaged, and the transmitter to go into an idle line condition.

Note: Overload protection must be provided externally to the unit.

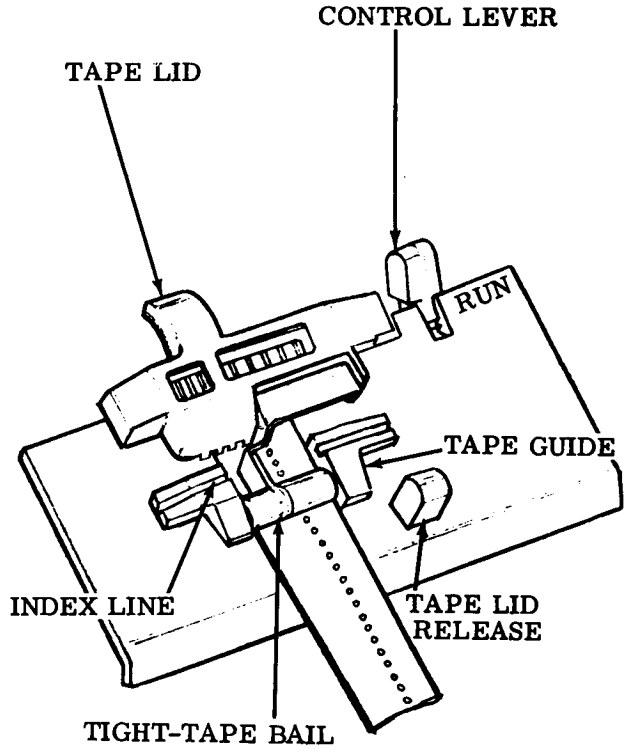
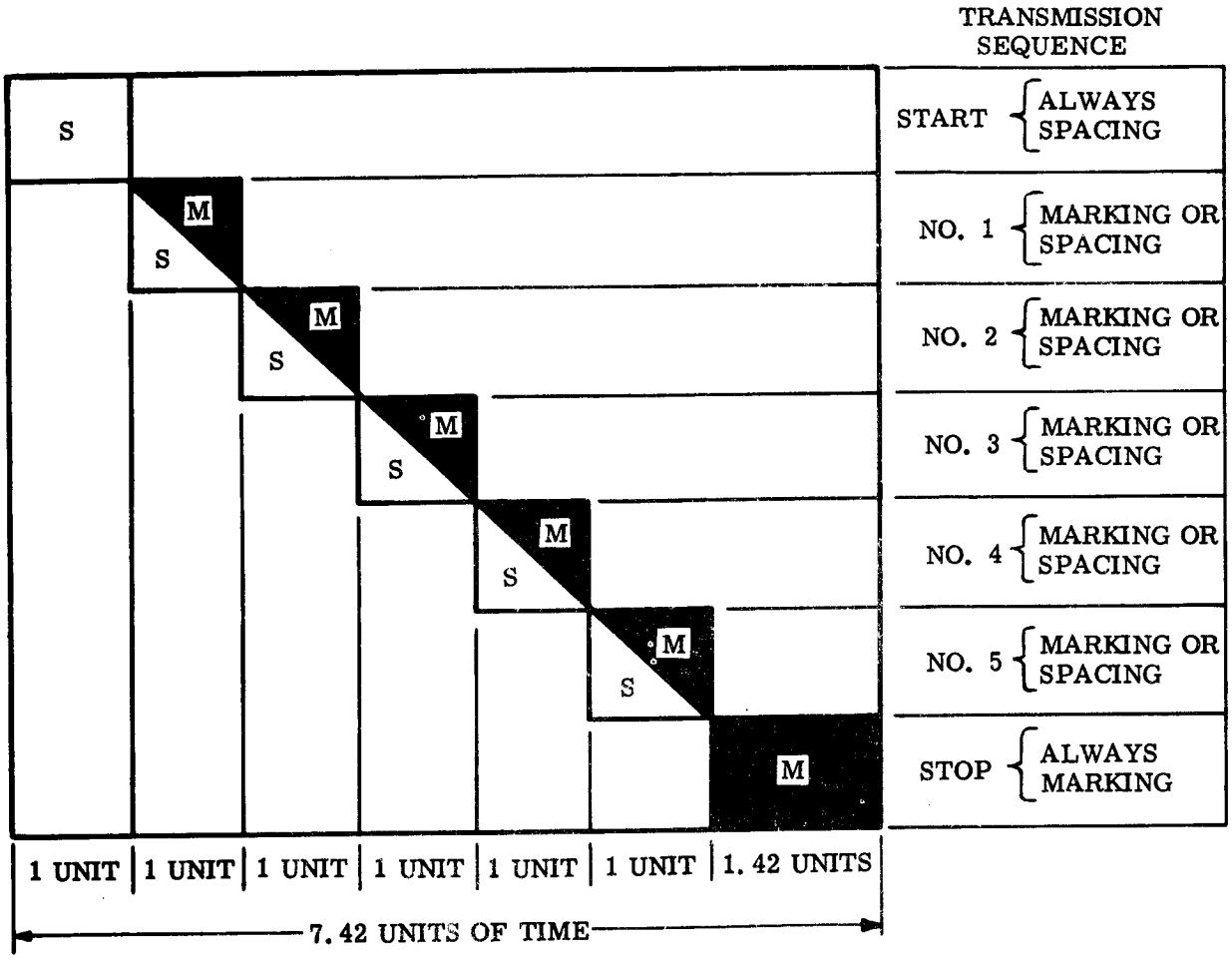
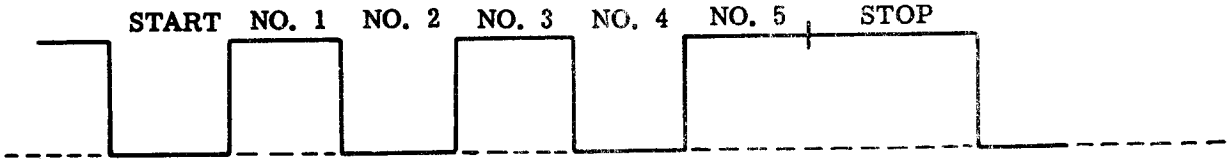


Figure 5 - Tape Guideplate



SIGNALING CODE



GRAPHIC REPRESENTATION OF LETTER "Y"

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LETTERS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	BLANK	C.R.	L.F	SPACE	LTR.	FIG.
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2	○		○				○		○	○	○	○				○	○	○			○	○	○						○		○	○
FEED HOLES	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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CODE HOLE COMBINATIONS OF TYPICAL CHARACTER ARRANGEMENT

Figure 6 - Start-Stop Signaling Code

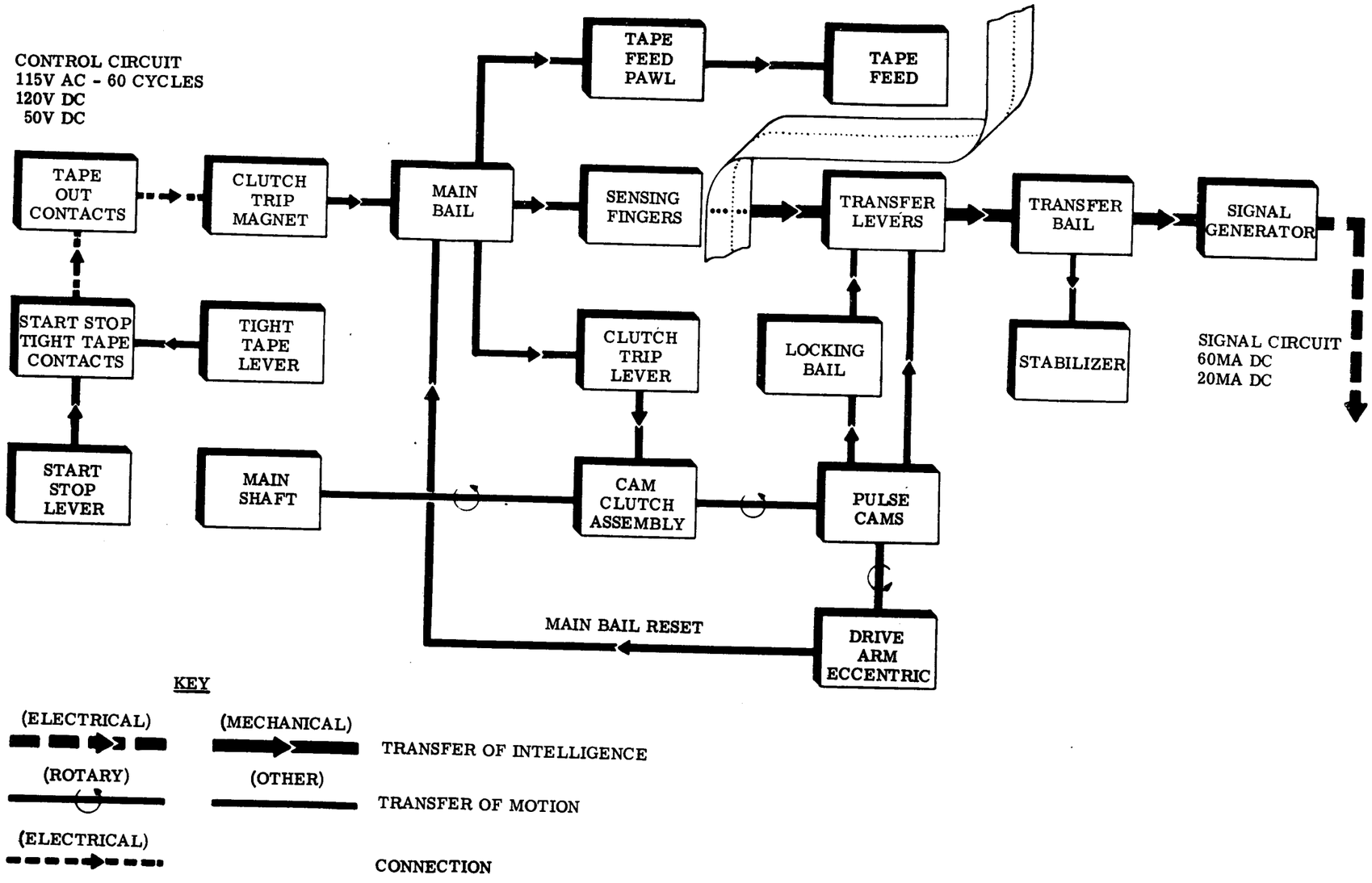

Figure 7 - Functional Block Diagram of Transmitter Distributor Unit

B. Signal Circuit

2.08 The signal contacts in the signal generator operate efficiently at a signal line current of:

60 milliamperes ±10% dc
20 milliamperes ±10% dc

2.09 The signal code transmitted is a 5- or 6-level start-stop neutral code (Figure 6) consisting of current and no-current intervals or pulses. A marking pulse is a measured interval of time during which current flow is permitted through the closure of a contact. A spacing pulse is a measured interval of time during which the current flow is interrupted through the opening of a contact. The start and stop pulses are necessary to keep the receiving apparatus synchronized with the transmitter.

3. TECHNICAL DATA

OPERATING

3.01 Operating data for the unit includes:

Code . . . . . 5- or 6-level.

Operating speeds . . . various speeds up to 100 wpm. Speed is varied by making external gear changes.

Tape . . . . . chadless or fully perforated.

Motor power . . . from external motor unit.

ELECTRICAL

3.02 Electrical requirements for the clutch trip magnets can be summarized as follows with the control circuit operating from the following external sources:

(a) 115 v dc ±10% 60 cycles.

(b) 120 v dc ±10% with suitable external resistance.

(c) 50 v dc ±10% with suitable external resistance.

PHYSICAL

3.03 The approximate physical dimensions for the unit are:

Width	7-1/2 inches
Depth	3-5/8 inches
Height	5 inches
Weight	7 pounds

4. GENERAL OPERATION

4.01 The following paragraphs describe the general operation of the 28 transmitter distributor unit. In conjunction with these paragraphs see Figure 6, Functional Block Diagram of Transmitter Distributor Unit for pertinent information about unit operation.

4.02 The operating cycle starts with the transmitter distributor in the idle signal line condition, the drive motor running, tape in the unit, and the external portions of the transmitter distributor circuits complete. Move the control lever (Figures 5 and 8) to the RUN position. This positioning energizes the clutch trip magnet by completing the circuit through the start-stop and tight-tape contact assembly. Thus, the contact closes to complete the clutch trip magnet circuit, energizes the magnet, and pulls the armature up. The armature bail extension (Figure 9) cams the main bail latchlever about its pivot post to release the main bail.

4.03 The clutch tripbail is reset by an eccentric on the main bail. The eccentric rides in the slot of the clutch tripbail. When the eccentric on the spring biased main bail cams the clutch tripbail, the tripbail, in turn, moves the clutch trip lever (Figure 9) away from its latch. When the main bail is released, the clutch tripbail is also released by the interconnection. The main bail swings up drawn by the main bail spring and causes two actions to occur.

4.04 First, the main bail raises the feed pawl (Figure 10) one tooth on the feed wheel ratchet. Secondly, the main bail permits the sensing pins to rise to read the perforations in the tape. If any of the sensing pins sense a perforation in the tape they extend upward through the perforations until stopped by the spacer on the main bail, and in extending upward rotate their associated transfer levers up.

4.05 In rotating upward, the transfer lever extensions are brought above the line of action of the blade on the locking bail. If any of the sensing pins do not sense a perforation in the tape, the associated transfer levers remain stationary. The extensions on these transfer levers remain below the line of action of the locking blade on the locking bail (Figure 11).

4.06 During the movement of the main bail, the clutch tripbail pivots on its axis and pushes the clutch trip lever away from the shoe release lever to engage the clutch and start the camshaft rotating (Figure 9).

4.07 As the camshaft continues its rotation, the high part of the locking bail cam moves away from the locking bail and permits the locking bail to be pulled up by its spring. In its upward travel, the locking blade of the bail is positioned between the lower extension of the selected transfer levers and locks them into position (Figure 11).

4.08 Further rotation of the main shaft moves the lobe of the start cam into position so it cams its respective transfer lever. Since the start transfer lever has no sensing pin, the lever is always in the spacing position. The start transfer lever upper finger hooks the upper side of the transfer bail and causes it to pivot clockwise. The transfer bail extension (Figure 12) moves the signal generator drive link causing the toggle to open the marking contact and close the spacing contact in the signal generator contact assembly. The extension, in moving to the spacing position, forces the marking latch on the stabilizer (Figure 13) out of its way and continues its travel far enough to let the spacing latch fall into the latching position simulating a detent action.

4.09 The shaft continues its rotation until the cam for the first pulse (Figure 14) cams its transfer lever. Depending on the position of the transfer lever finger, upper or lower, the transfer bail (Figure 15) is rotated if the pulse to be transmitted is not the same as the preceding pulse. If the preceding pulse is the same, no action occurs because the bail has previously been rotated. However, if the preceding is different, the extension on the transfer bail moves the drive link and causes the toggle to open the closed contact and close the open contact. The extension also forces its way past the latch and continues its way until the opposite latch on the stabilizer can fall into position.

4.10 The action of the cams for the second, third, fourth, and fifth pulses follow the action of the first pulse in order and repeat the same action as described for the first pulse (Figure 14).

4.11 The cam for the stop pulse follows that of the fifth pulse and the train of action is the same as that of the first pulse except that the stop pulse has no sensing pin, and its transfer lever is blocked. Thus, its lower finger always hooks the transfer bail causing a marking pulse on the completion of each character.

4.12 The tape feed pawl (Figure 17) advances the tape feed ratchet one tooth against the action of the ratchet detent roller. The tape

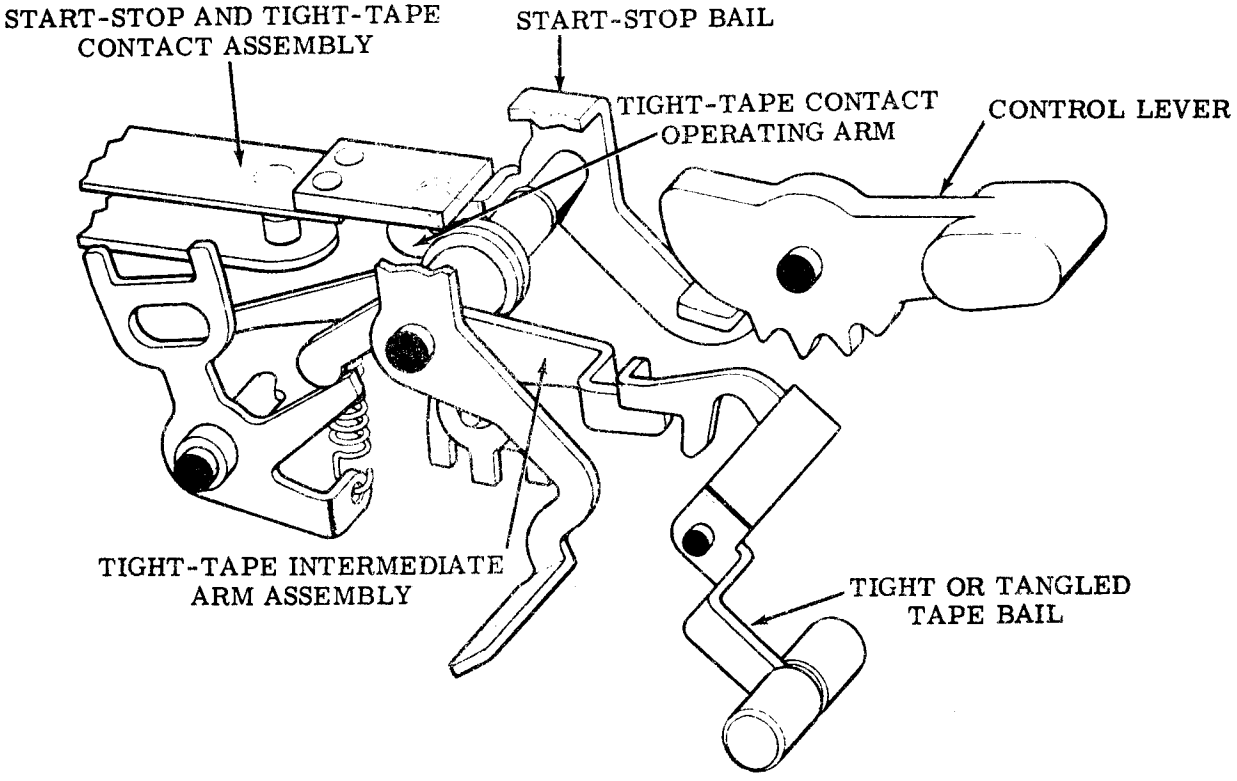

Figure 8 - Start-Stop and Tight-Tape Switch Mechanisms

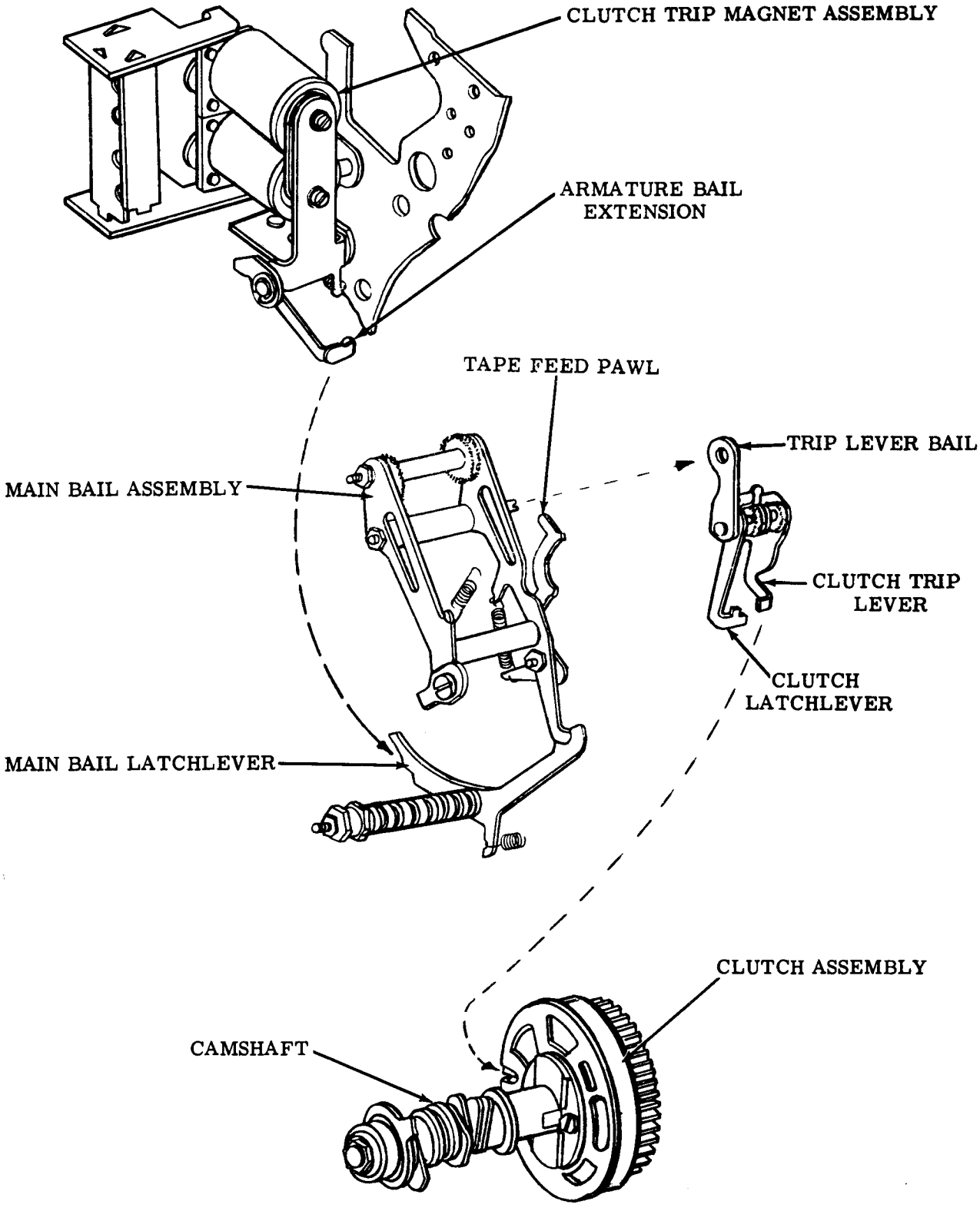

Figure 9 - Function Control Mechanism

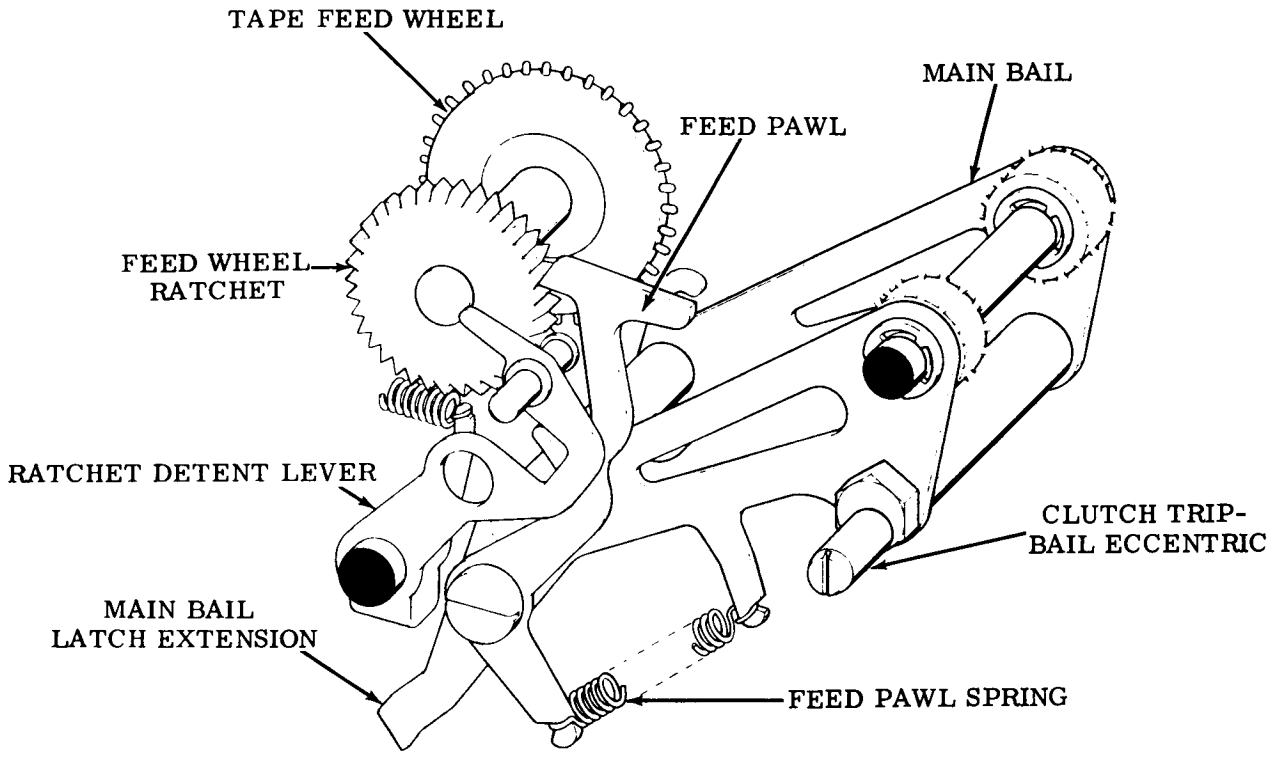

Figure 10 - Tape Feed Mechanism (Rear View)

feed ratchet is part of the tape feed wheel. The tape feed wheel advances the tape one character. The ratchet detent roller bears between two teeth on the ratchet and serves to hold the feed wheel and tape in position during the sensing portion of the operating cycle.

4. 13 Since the clutch tripbail does not latch, the drive arm moves again to its upper position. In so doing, repetition occurs when the main bail swings up, and the main shaft starts to rotate until the unit runs out of tape.

STOPPING THE ACTION

4. 14 The code sensing pins cannot differentiate between a no tape condition and perforations; therefore, the unit operates as if five perforations were sensed and goes through the actions previously described. However, if the tape-out sensing pin senses that there is no tape in the unit, the tape-out pin moves upward, lifting the swinger pad of the tape-out contact assembly and opens the clutch trip magnet circuit.

4. 15 Since the tape out contacts are in series with the start-stop and tight-tape contacts, the clutch trip magnet becomes de-energized and releases its armature. This action permits the armature extension to pivot out of its blocking position and allows the main bail latchlever to be moved by its spring (Figure 9).

4. 16 As the main bail is latched, the clutch trip lever blocks the clutch shoe lever. When the clutch shoe lever is blocked the inertia of the mechanism causes the clutch to rotate far enough to permit the clutch latch to fall into the notch on the clutch cam disc.

5. CLUTCH OPERATION

A. Clutch Engaged

5. 01 The clutch is engaged (Figure 18) by releasing the lower end of lever B. The upper end of lever B pivots about its ear C (which bears against the upper end of the secondary shoe) and moves its ear D, and the upper end of the primary shoe, toward the left until the shoe makes contact with the drum at point E. As the drum turns counterclockwise, it drives the primary shoe downward, so that it again makes contact with the drum, this time at point F. There, the combined forces acting on the primary shoe cause it to push against the secondary shoe at point G. The lower end of the secondary shoe then bears against the drum at point H. The

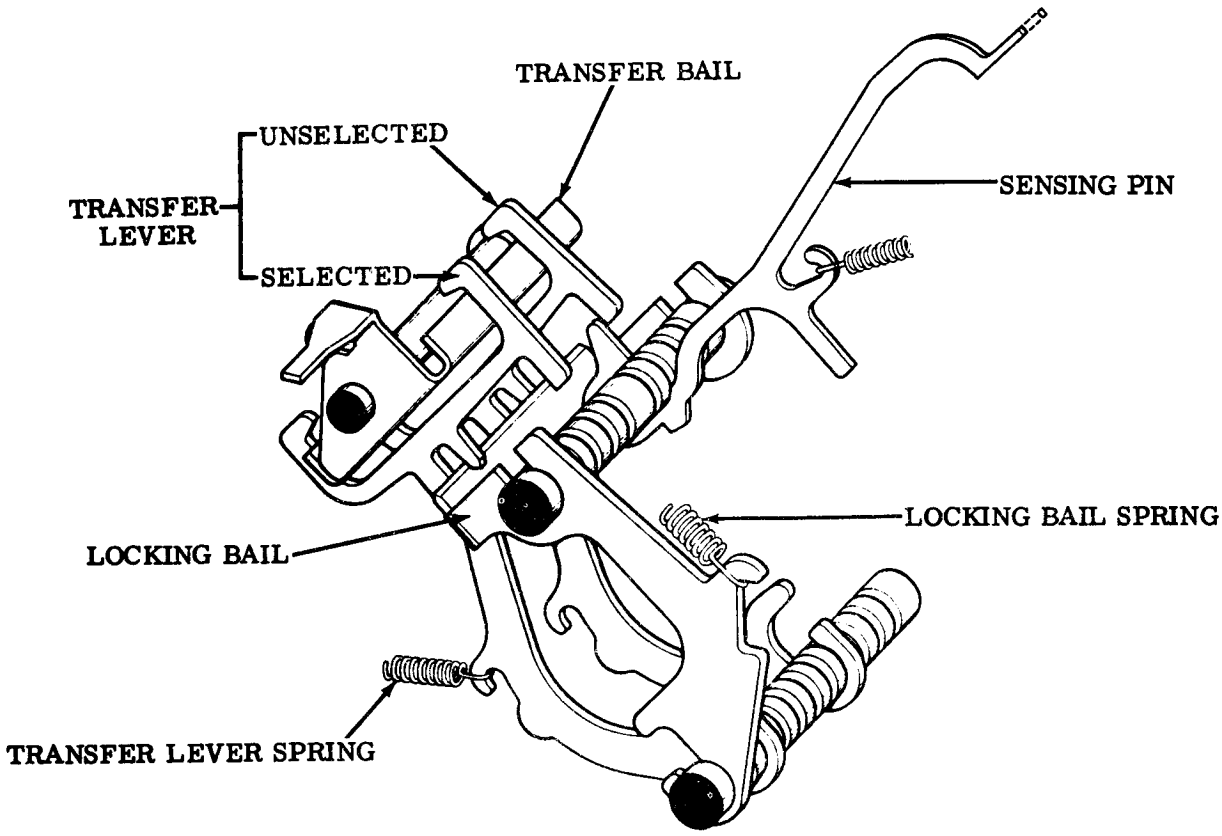

Figure 11 - Locking Bail and Transfer Lever Mechanisms

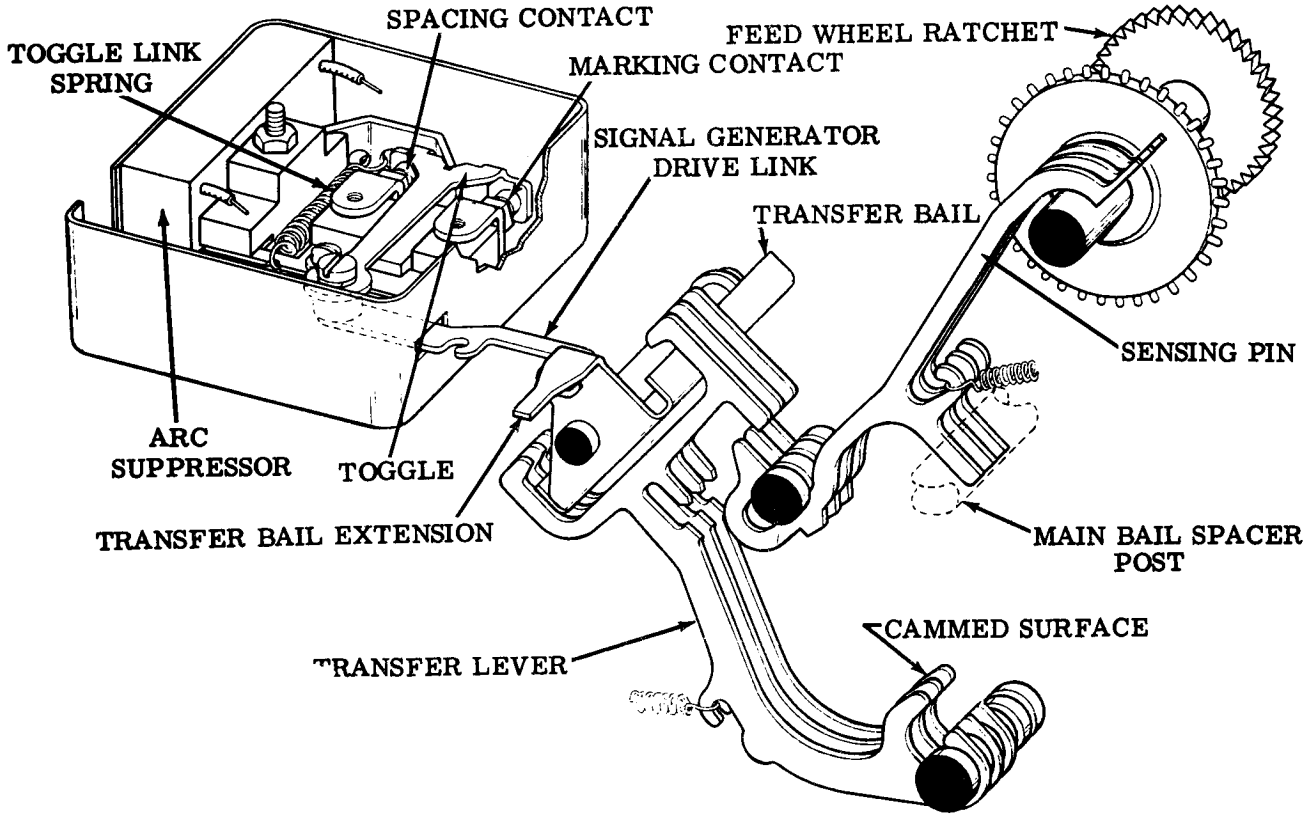

Figure 12 - Transfer Lever and Signal Generator Mechanisms

revolving drum acts to drive this shoe upward so that it again makes contact with the drum at point I. Since the forces involved are multiplied at each succeeding step, the final force developed at point I is very great. This force is applied to the lug J on the clutch cam disc causing it to turn in step with the drum. The cam disc on the clutch, connected to the camshaft, imparts a rotary motion to the cam assembly.

B. Clutch Disengaged

5.02 The clutch is disengaged (Figure 19) by bringing together lug A on the clutch cam disc and the lower end of the clutch shoe lever B. The upper end of lever B pivots about its ear C and allows its other ear D to move toward the right. The upper spring then pulls the two shoes together and away from the drum.

6. TAPE LID OPERATION

A. Opening

6.01 When the tape lid release plunger (Figure 20) is pressed, the shaft portion of the plunger presses against the tape lid plunger

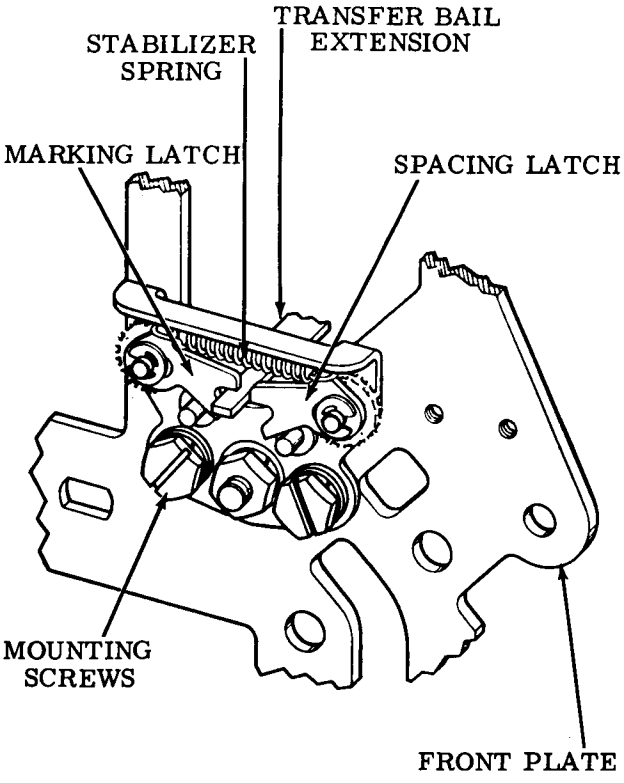

Figure 13 - Transfer Bail Stabilizer

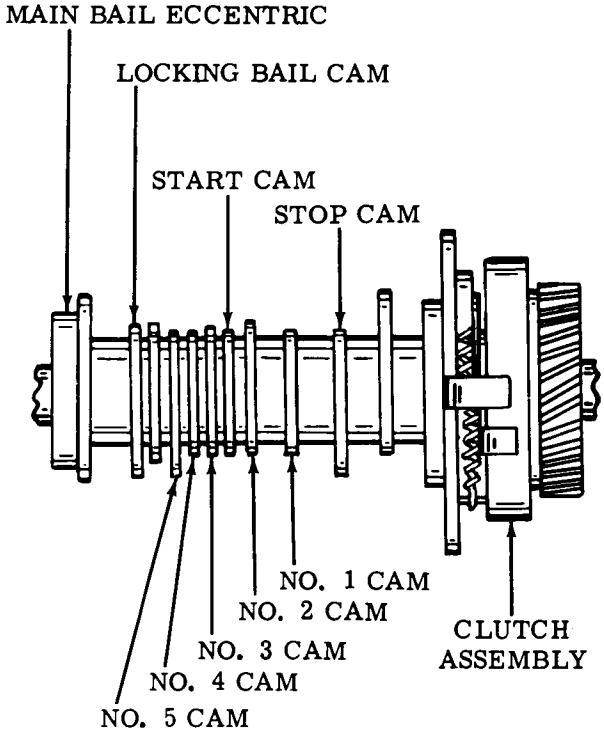

Figure 14 - Clutch Camshaft Assembly

bail extension causing the bail to pivot. The bail, in pivoting, moves its latching extension from under the tape lid latching post to swing down under action of its spring. Since the latching post is mounted on the tape lid behind the pivot point and below the tape guideplate, it causes the main part of the tape lid to swing upward (open) when the post swings downward.

B. Closing

6.02 The tape lid is manually closed by pressing it down against the tape guideplate. As the tape lid is closed, the latching post swings up and cams the latching extension out of its way until it passes the end of the extension which then is pulled under the post, by spring action, latching the post and tape lid.

7. CONTROL LEVER

RUN POSITION

7.01 To start transmission, the transmitter distributor unit must be in an idle signal line condition, the drive motor running, tape in the unit, and the external portions of the transmitter distributor circuits complete. Move the

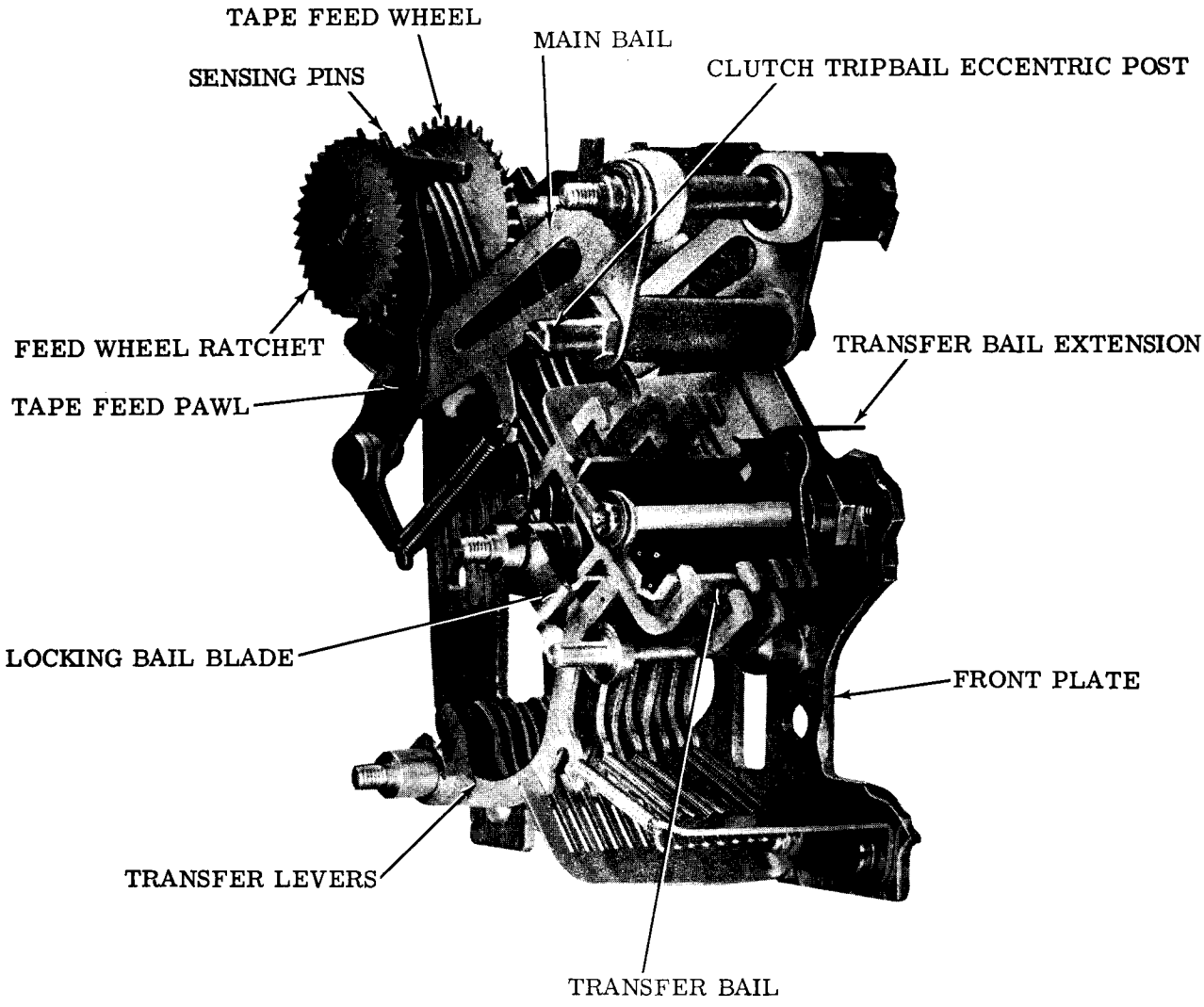

Figure 15 - Front Plate Assembly (Rear View)

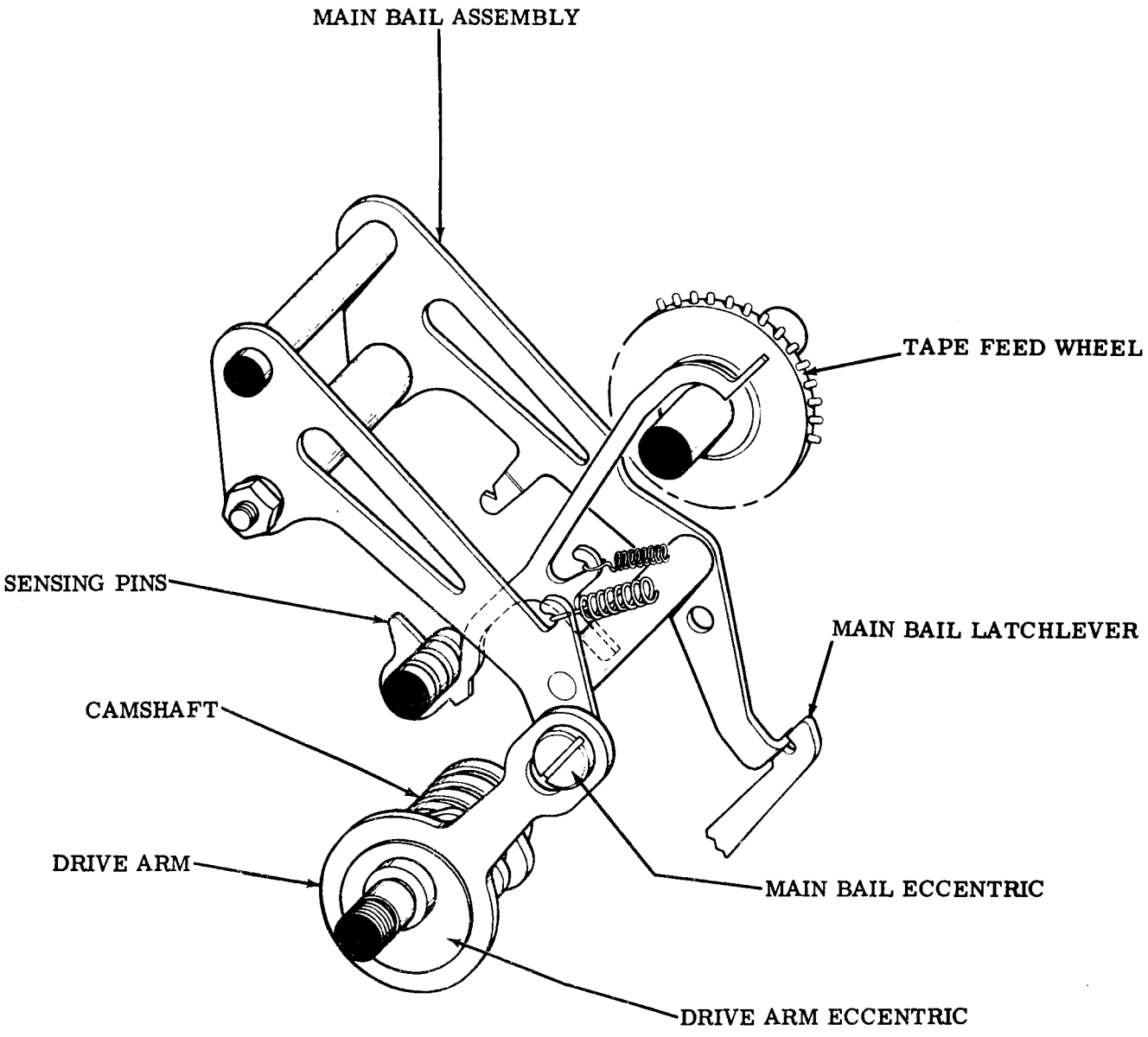

Figure 16 - Main Bail and Drive Arm Mechanism

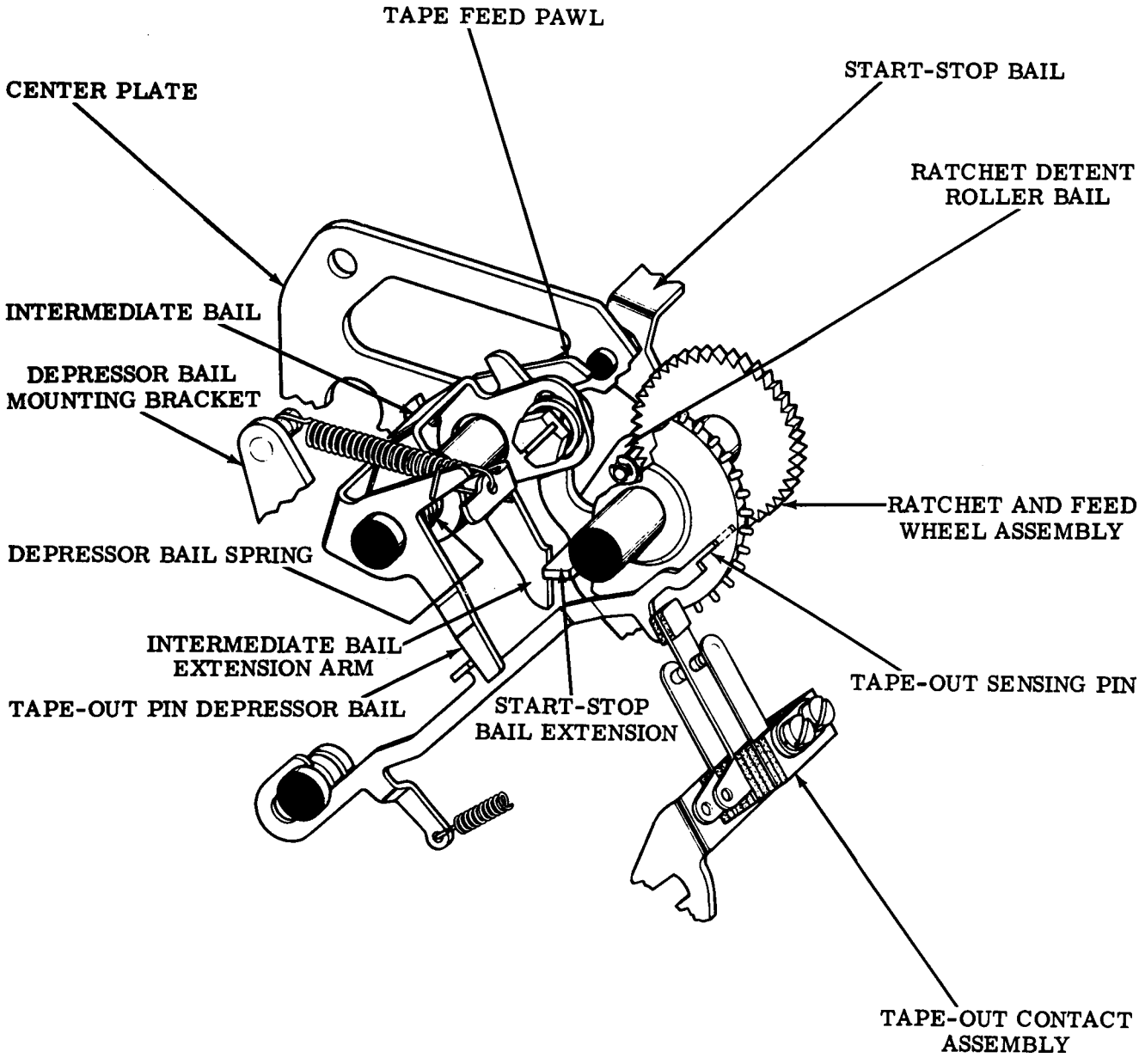

Figure 17 - Freewheeling and Tape-Out Mechanisms

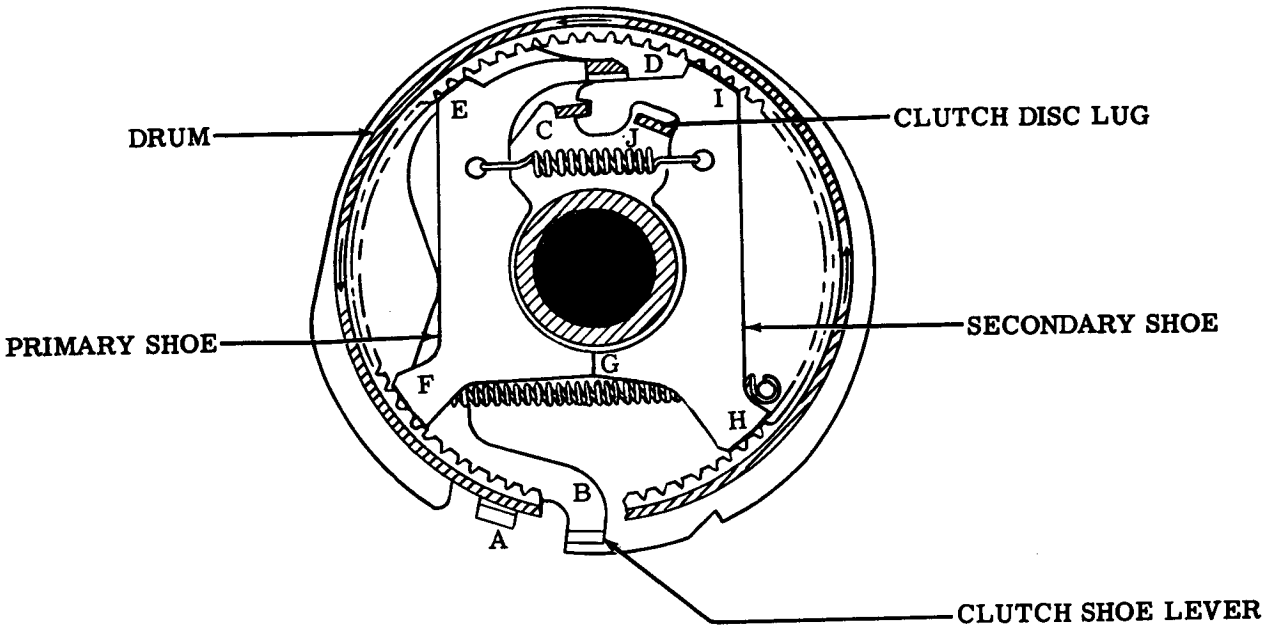

Figure 18 - Clutch — Engaged

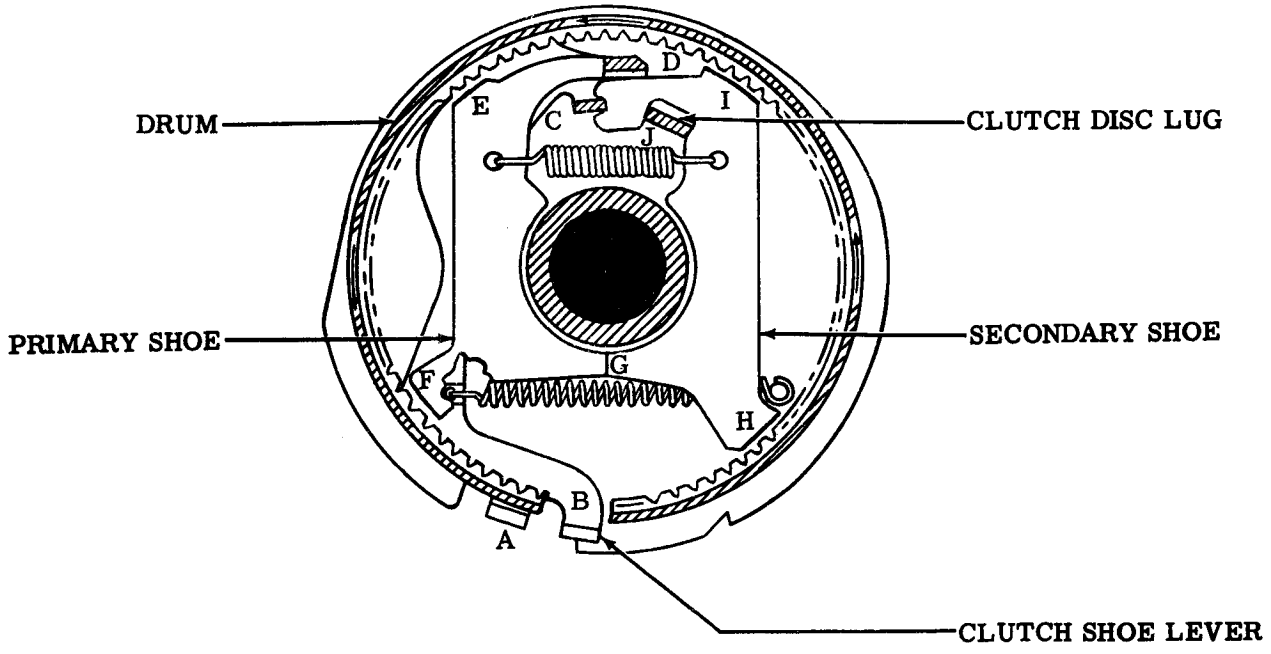

Figure 19 - Clutch — Disengaged

control lever to the RUN position. This positioning energizes the clutch trip magnet by completing the circuit through the start-stop and tight-tape contact assembly. Thus, the contact closes to complete the clutch trip magnet circuit, energizes the magnet, and pulls the armature up. The armature bail extension then cams the main bail latchlever about its pivot post to release the main bail.

STOP POSITION

7.02 When the control lever is pushed to its center or STOP position, the cam surface of the lever cams the start-stop lever bail causing the bail to pivot. As the bail pivots, its extension cams the swinger pad upward on the start-stop contact assembly opening the contacts. This action breaks the circuit to the clutch magnet assembly causing the armature to drop to its unattracted (unenergized) position.

FREE POSITION

7.03 When the CONTROL lever is placed in the FREE position, ie, freewheeling position, the cam surface of the lever cams the start-stop lever bail causing the bail to pivot. As the bail pivots, its extension cams the swinger pad on the start-stop assembly upward opening the contacts, and breaking the circuit to the clutch magnet assembly. The start-stop lever pushes the feed pawl and the ratchet detent roller away from the feed ratchet allowing the feed wheel to rotate freely.

7.04 The start-stop lever extension also cams the intermediate bail extension arm which rotates the intermediate bail. The intermediate bail, in rotating, allows the spring-loaded tape-out pin depressor bail to follow. The depressor bail with its mechanism is mounted on a bracket attached to the front plate. The result of this camming action is the depressing of the tape-out sensing pin to a flush or below flush position relative to the tape guideplate. The position of the tape-out sensing pin allows free passage of the tape under the tape lid (Figure 5).

8. TAPE CONDITIONS

TIGHT OR TANGLED TAPE

8.01 A tight or tangled tape raises the tight tape bail arm (Figure 5). The bail pivots and its extension cams the tight-tape intermediate arm assembly to which the tight tape arm is attached. When the arm assembly is cammed, the associated tight tape arm lifts the swinger on the start-stop, tight-tape contact assembly

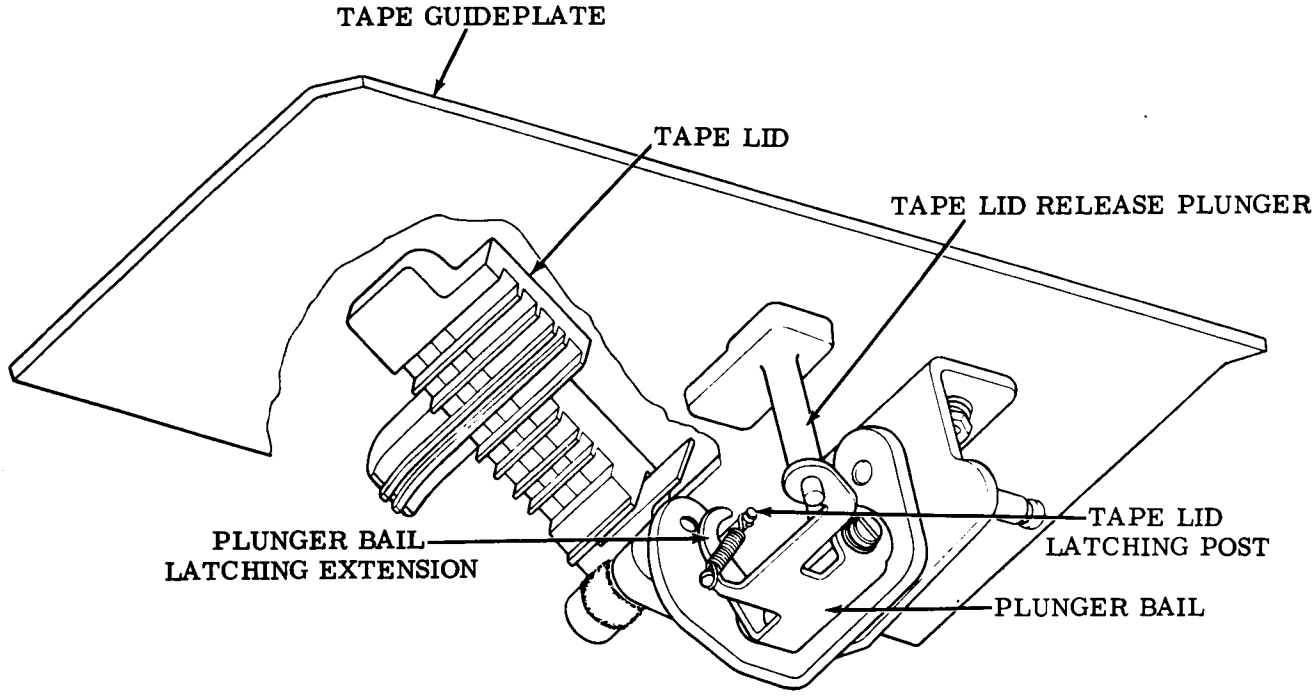

Figure 20 - Tape Lid Mechanism (Bottom View)

up, opening the clutch trip magnet circuit, causing transmission to stop.

TAPE-OUT SENSING PIN

8.02 The tape-out sensing pin (Figure 17) is to the right and slightly forward of the five aligned tape sensing pins. When the tape-out sensing pin is in a depressed position, the circuit is closed, and the unit transmits. Thus, with tape in the unit and the tape lid down, the tape holds the tape-out pin in a depressed position and the circuit is complete.

8.03 When no tape is present, the tape-out sensing pin thrusts up into a hole provided in the tape lid. The rising of the pin opens the tape-out assembly contacts, which opens the clutch magnet circuit, and transmission stops.

28 TRANSMITTER DISTRIBUTOR UNIT (LXD)

ADJUSTMENTS

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1. GENERAL

1.01 This section provides specific adjustments for the single contact 28 transmitter distributor. It reflects 5- and 6-level operation for LXD unit.

1.02 The adjustments are arranged in a sequence that should be followed if a complete readjustment is undertaken. The tools and spring scales required to perform these adjustments are found in tool section 570-005-800TC. A complete adjusting procedure should be read before attempting to make the adjustment. After an adjustment is completed, be sure to tighten any nuts or screws that may have been loosened. 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.

1.03 The adjusting illustrations indicate tolerances, positions of moving parts, spring tensions, and the angle at which scales should be applied. Coil springs which do not meet the requirements, and for which there are no adjusting procedures, should be discarded and replaced with new springs. If a part mounted on shims is removed, the number of shims used at each mounting screw should be noted so that the same number is replaced when the part is remounted.

Note: Remove power from unit before making adjustments.

1.04 When the requirement calls for the clutch to be disengaged, the clutch shoe lever must be fully latched between its trip lever and latchlever so that the clutch shoes release their tension on the clutch drum. When engaged, the clutch shoe lever is unlatched and the clutch shoes are wedged firmly against the clutch drum. When the main shaft is rotated by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve the drag on the clutch and permit the main shaft to rotate freely, apply pressure on a lug of the clutch disc with a screwdriver to cause it to engage its latchlever and thus disengage the internal expansion clutch shoes from the clutch drum.

1.05 The covers may be removed for inspection and minor repair of the unit; however, when more extensive maintenance is to be undertaken, it is recommended that the unit be disconnected from its source of power as a safety precaution.

1.06 References made to left, right, up, down, front, or rear, apply to the set in its operating position, as viewed from the operator's position.

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

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

1.08 Units may have signal contacts made of either unplated or gold-plated tungsten. If in doubt as to the type of contacts, remove contact box cover and inspect contacts for gold plating. Do not use burnishers, files, etc which will remove gold plating.

1.09 Use twill jean cloth (KS2423) (TP107162) to clean gold-plated contacts. Open contacts. Allow contacts to close on surface of twill jean. Draw twill jean part way through. Open contacts and withdraw twill jean.

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

1.11 Clean unplated tungsten contacts in accordance with standard procedures (Paragraph 1.07).

Servicing For Certain Low-Voltage Applications

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

1.13 For optimum reliable operation in these low-voltage applications, clean gold-plated contacts with twill jean, as instructed above, at intervals of approximately 50 hours of actual contact operation. Since maintenance interval and life expectancy of the contacts are dependent on the signal circuit, maintenance interval may be lengthened for specific applications.

Note 1: Applying operating voltage of standard Distortion Test Set directly to contacts may damage gold plating and impair low-voltage operation. When electrically adjusting or testing contacts (2.23), use an intermediate device, keyed by the contacts, to interrupt current to stroboscopic lamp of test set. This intermediate device must be capable of being keyed by a 3 to 20 volt change at maximum of 20 milliamperes.

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

2. BASIC UNITS

2.01 Clutch Mechanism

Note 1: Remove the transmitter distributor from its base before making a complete re-adjustment or spring tension checks.

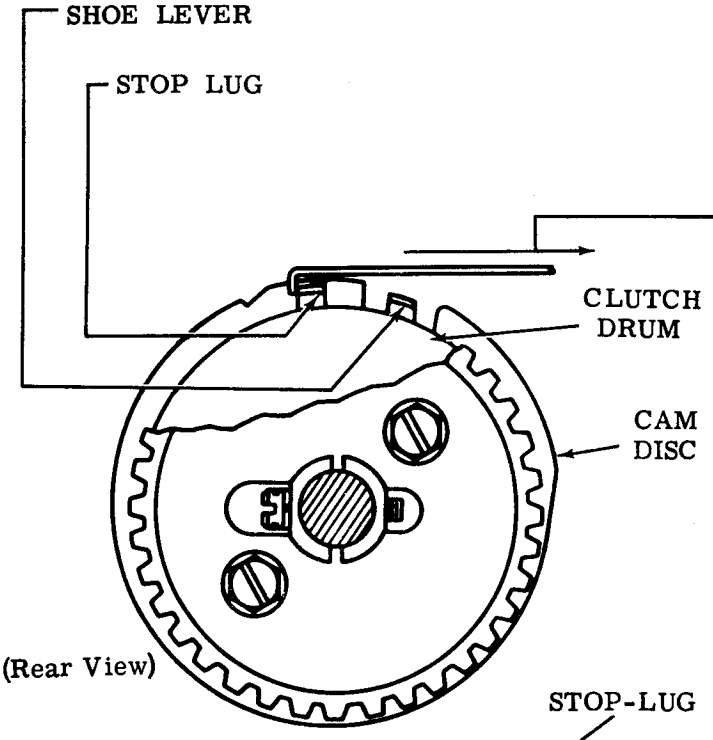
Note 2: Adjustments (A) and (B) are made at the factory and should not be disturbed unless good reasons exist that the requirements are not met.

(A) CLUTCH SHOE LEVER SPRING

To Check
Invert unit and rotate main shaft until clutch shoe lever and stop lug are up. With clutch engaged, hold cam disc to prevent turning.

Requirement
Min 15 oz---Max 20 oz
to move shoe lever in contact with stop lug.

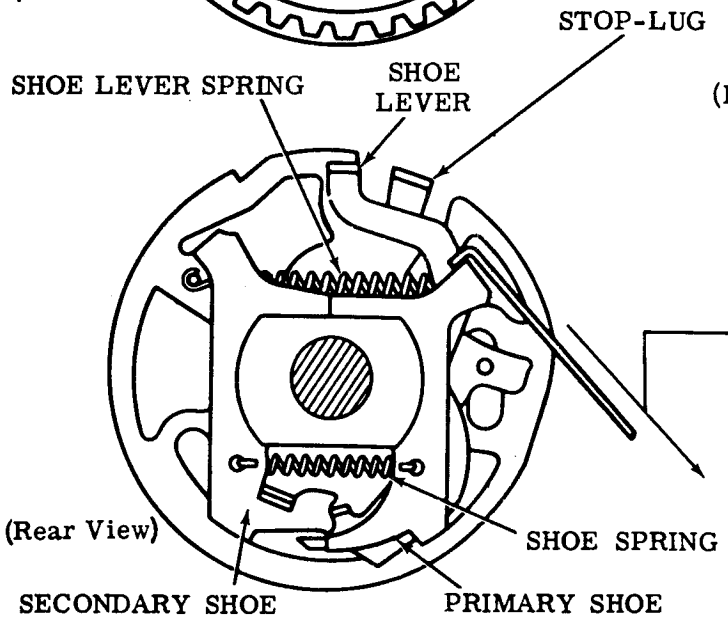
(Where set is equipped with tape slack mechanism)
Min 9 oz---Max 11 oz



(B) CLUTCH SHOE SPRING

To Check
Remove the clutch from the main shaft. With the clutch drum removed, hook spring scale as shown.

Requirement
Min 3 oz---Max 5 oz
to start primary shoe moving away from secondary shoe at point of contact.



2.02 Clutch Mechanism (continued)

Note: Remove transmitter distributor from base before making adjustments.

(A) CLUTCH SHOE LEVER

To Check

Trip transmitter distributor clutch. Pull shoe lever opposite the stop lug with a force of 32 oz. Release the force slowly to engage clutch shoes. Note clearance between clutch shoe lever and stop lug. Disengage the clutch, and again pull the lever opposite the stop lug with a force of 32 oz. Release the force slowly. Note clearance between the shoe lever and the stop lug.

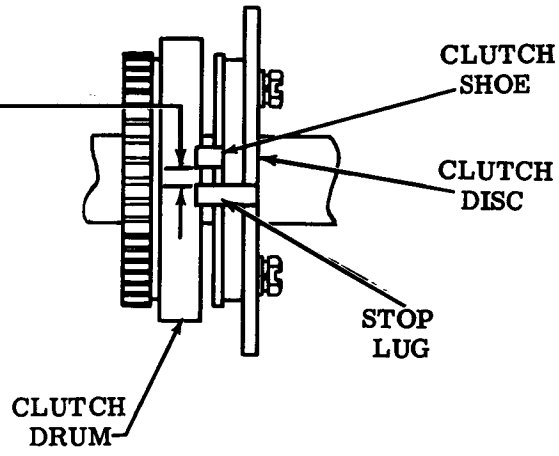
Requirement

Min 0.055 inch---Max 0.085 inch greater clearance with clutch engaged than with clutch disengaged.

To Adjust

Loosen clutch disc clampscrews. Place wrench over stop lug and move disc. Retighten screws.

Note: Drum must not drag on shoes when clutch is disengaged and rotated in its normal direction. Refine CLUTCH SHOE LEVER adjustment to correct shoe drag.



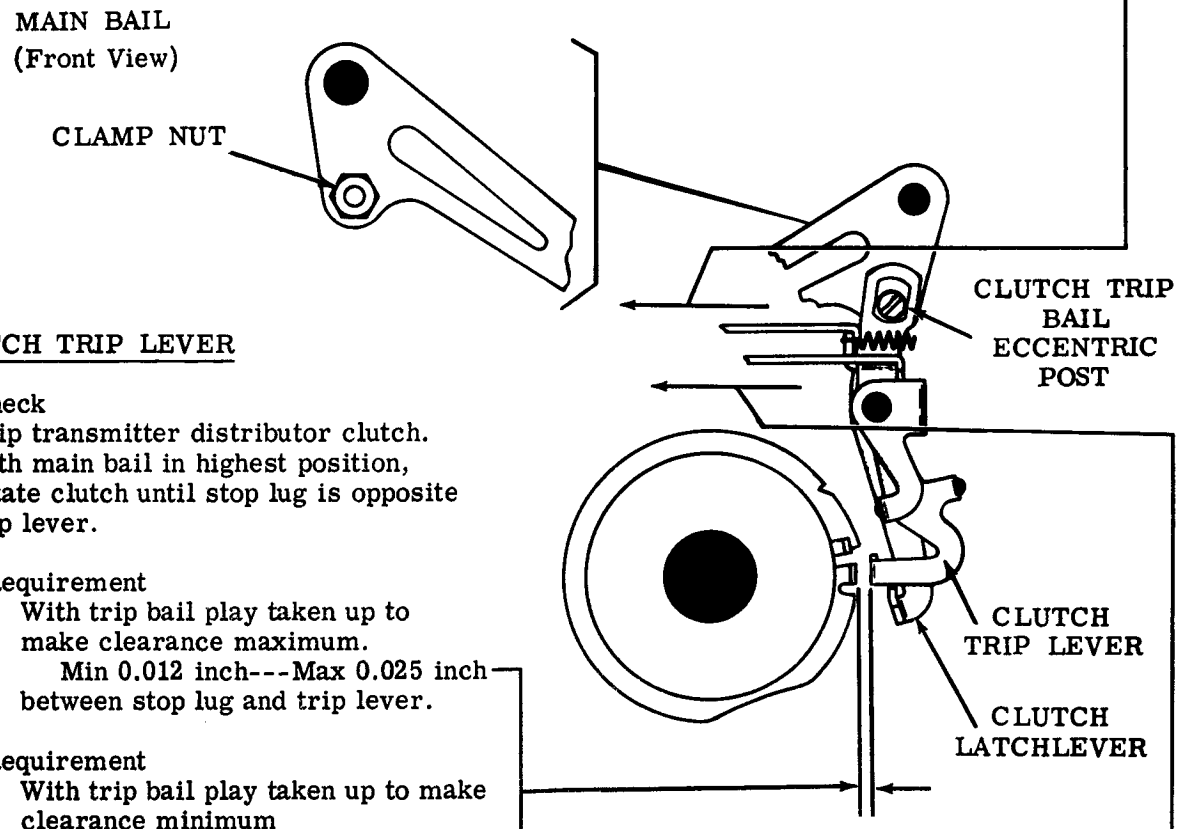
(Left Side View)

2.03 Clutch Mechanism (continued)

(D) CLUTCH LATCHLEVER SPRING

To Check
Trip clutch and rotate until latchlever is on low part of disc.

Requirement
Min 3 oz---Max 5 oz
to start clutch latchlever moving.



(B) CLUTCH TRIP LEVER

To Check
Trip transmitter distributor clutch. With main bail in highest position, rotate clutch until stop lug is opposite trip lever.

(1) Requirement
With trip bail play taken up to make clearance maximum.
Min 0.012 inch---Max 0.025 inch
between stop lug and trip lever.

(2) Requirement
With trip bail play taken up to make clearance minimum
some clearance
between stop lug and trip lever.

To Adjust
Loosen clamp nut friction tight and rotate trip bail eccentric post. Check Requirement (1). Retighten clamp-screw.

(C) CLUTCH TRIP LEVER SPRING

Requirement
With clutch engaged
Min 7 oz---Max 10-1/2 oz
to start clutch trip lever moving.

2.04 Clutch Mechanism (continued)

(A) CLUTCH MAGNET ASSEMBLY

(1) To Check
Place armature in attracted (energized) position.

Requirement
Armature to contact core face of top magnet with
—Min some---Max 0.004 inch between armature and core face of bottom magnet at point of least clearance. (Sets with Tape Shoe and Tape Feed Assurance Mechanisms
—Min 0.004 inch---Max 0.007 inch)

To Adjust
Remove magnet mounting bracket screws and lift clutch magnet assembly from the unit. Loosen mounting screws and position hinge.

(2) To Check
Place high part of backstop eccentric toward top of unit. Hold armature in attracted (energized) position.

Requirement
—Min 0.045 inch---Max 0.055 inch between armature bail and backstop eccentric.

To Adjust
Loosen backstop clamp nut and position eccentric. Retighten backstop clamp nut.

(3) To Check
If clutch magnet assembly was removed in (1) To Check, replace it in unit to its lowest position. Tighten magnet mounting bracket screws friction tight. Disengage clutch.

Requirement
Min 0.007 inch---Max 0.015 inch between end of armature bail extension and main bail latch.

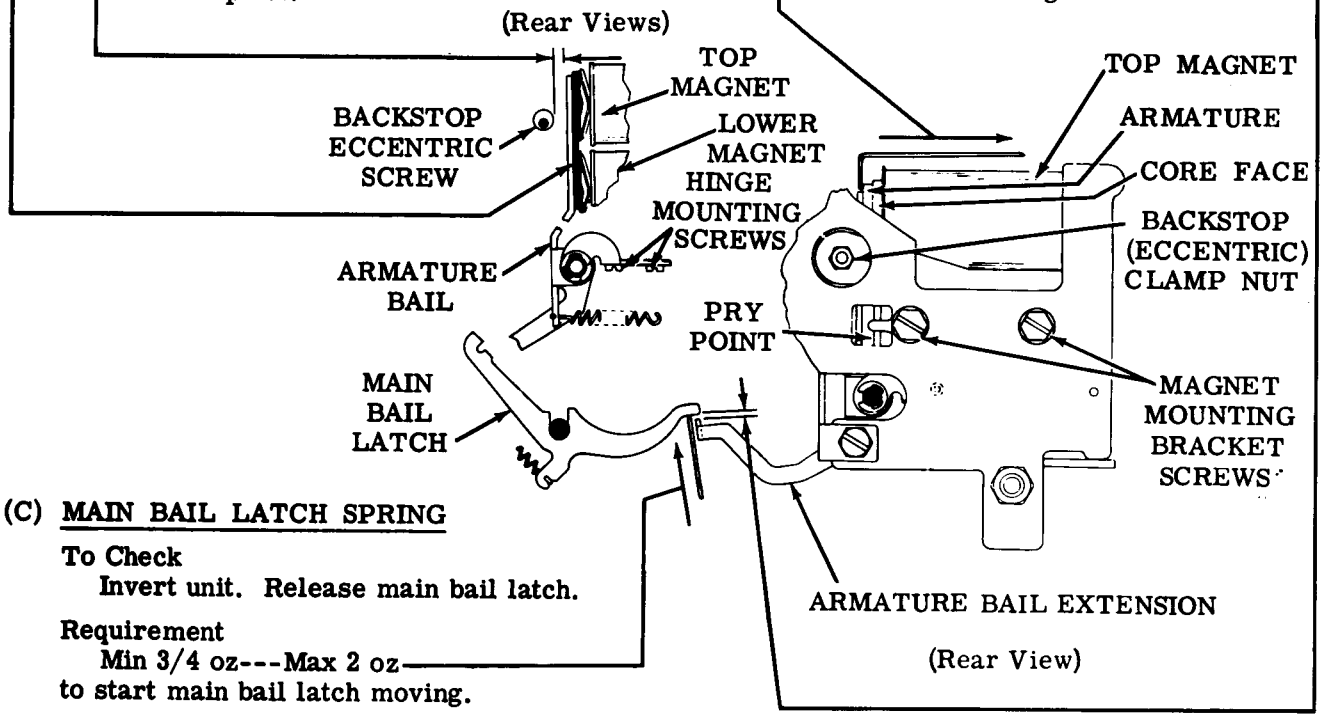
To Adjust
Position clutch magnet assembly using adjusting slot.

Note: Under ac power, armature "chatter" must be at a minimum. If excessive "chatter" is present, refine requirement under (1) To Check, and recheck requirements under (2) and (3) To Check.

(B) ARMATURE BAIL SPRING

To Check
Place armature in de-energized position and hold main bail latchlever away from armature bail extension.

Requirement
— Min 1 oz---Max 2 oz
(Sets with Tape Shoe and Tape Feed Assurance Mechanisms only
— Min 3-3/4 oz---Max 4-3/4 oz)
to start bail moving.



(C) MAIN BAIL LATCH SPRING

To Check
Invert unit. Release main bail latch.

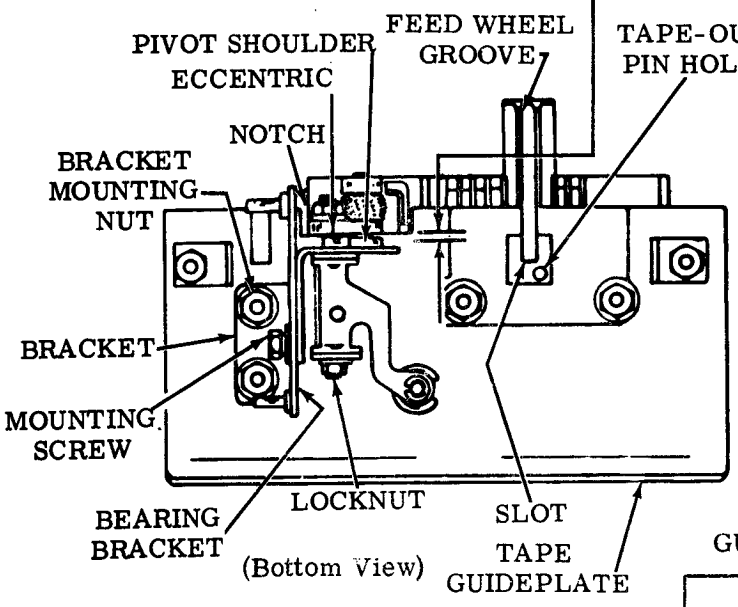
Requirement
Min 3/4 oz---Max 2 oz
to start main bail latch moving.

2.05 Tape Lid

TAPE LID

To Check
Remove top plate and tape guideplate. Lubricate before adjustment.

(1) Requirement
With tape lid held against notch in tape guideplate, feed wheel groove lined up with slot in tape guideplate, and tape-out pin holes lined up
Min some---Max 0.010 inch between tape lid and pivot shoulder.



To Adjust
Loosen bracket mounting nuts. Insert tip of appropriate gauge (Note 1) through slot in tape guideplate and into feed wheel groove. Position bracket. Tighten nuts.

Note 1: Use one of the following three gauges in making this adjustment:

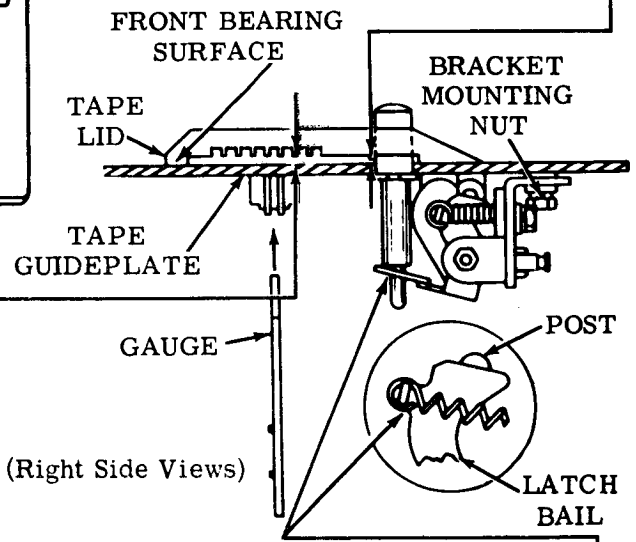
TAPE	GAUGE
5-Level	TP156743
6-Level	TP170311 (In-Line Feed Hole)
6-Level	TP173503 (Advance Feed Hole)

(2) Requirement
With front bearing surface of tape lid touching tape guideplate
Min 0.010 inch---Max 0.018 inch between fin indicated and tape guideplate.

To Adjust
Loosen bearing bracket mounting screws. While pressing tape lid against tape guideplate, position bearing bracket. Recheck Requirement (1).

Note 2: If Requirement (2) cannot be met, position bearing bracket so that its mounting screws are located in centers of holes in bracket. Repeat Requirements (1) and (2).

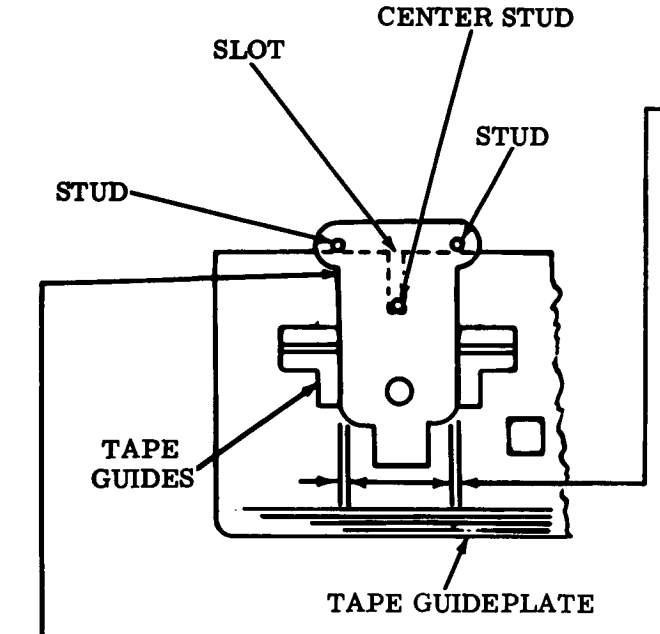
Note 3: When tape guideplate and top plate are assembled to reader, tape lid may touch top plate, and a different clearance from that specified in Requirement (2) can be expected. However, with tape lid closed, there must always be at least 0.002 inch clearance between tape guideplate and heel pad.



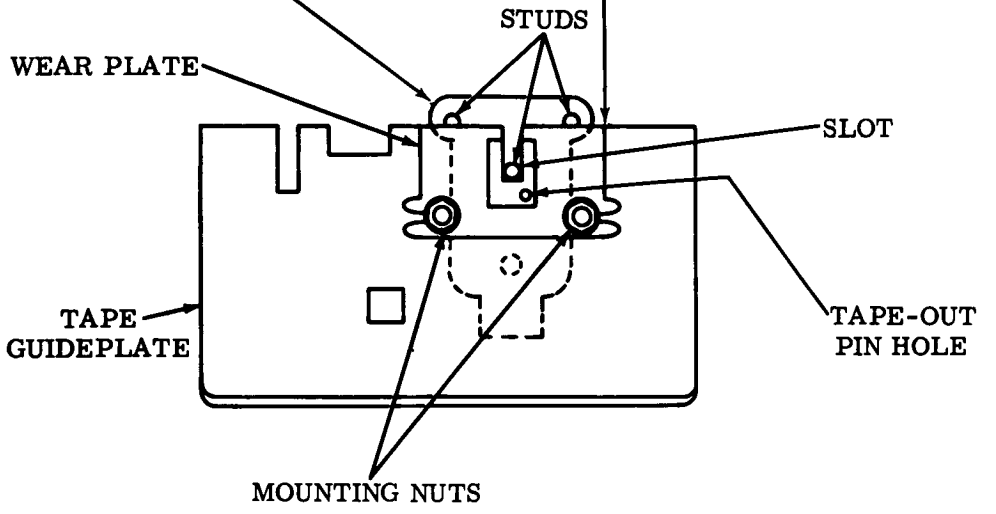
(3) Requirement
With tape lid latched against tape guideplate, release plunger must have some endplay.

To Adjust
Loosen locknut. Raise tape lid and rotate high part of eccentric towards bearing bracket. Close tape lid and continue rotating high part of eccentric towards bearing bracket until latch bail just falls under flat on post. Recheck operation of latch bail by depressing release plunger with tape lid held down.

2.06 Tape Lid (continued)



(Top View)



(Bottom View)

TAPE GUIDE

To Check
Unlatch tape lid and position gauge as illustrated.

(1) Requirement
Min some---Max 0.003 inch between gauge and each tape guide.

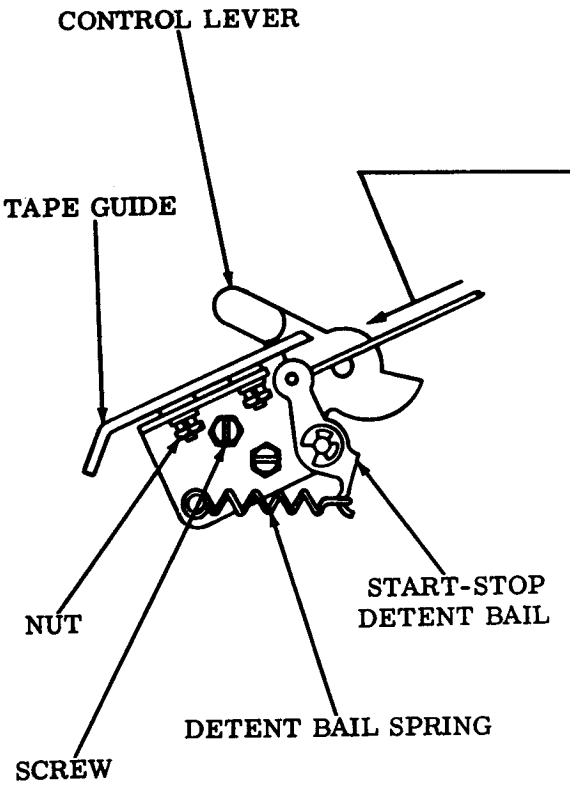
(2) Requirement
Edge of wear plate flush with edge of tape guideplate.

(3) Requirement
Tape must not ride up the sides of the tape guides.

To Adjust
Loosen mounting nuts. Position wear plate until it overhangs tape guideplate. Push gauge down until top two studs butt up against tape guideplate thus positioning edge of wear plate flush with edge of tape guideplate. Hold gauge and wear plate and position each tape guide to meet Requirement (1). Tighten mounting nuts.

Note: Tape guides may touch gauge, but they must not bind against gauge when it is removed.

2.07 Tape Lid (continued)



(Rear View)

(A) START-STOP DETENT BAIL SPRING

To Check
Place control lever in run position.

Requirement
Min 14 oz---Max 22 oz
to start detent bail moving away from control lever.

(B) TAPE LID RELEASE PLUNGER SPRING

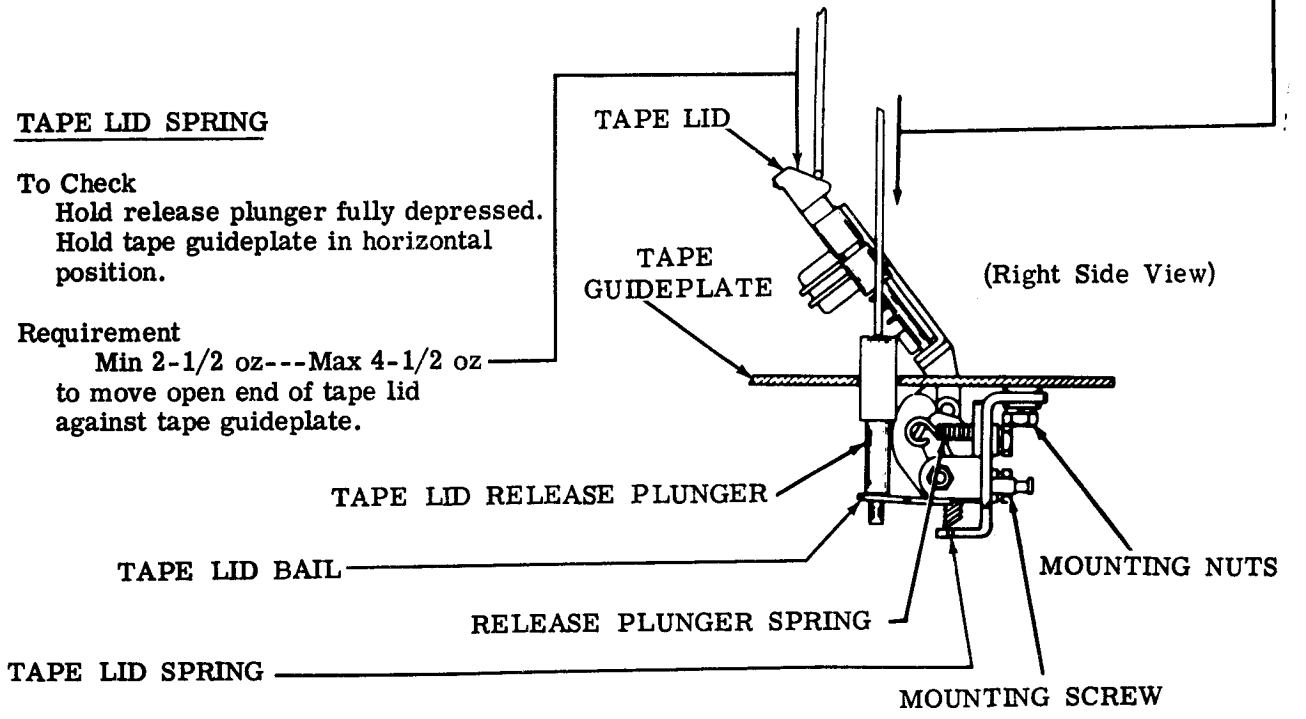
To Check
Unlatch tape lid. Place tape guideplate in a horizontal position and hold it there.

Requirement
Min 28 oz---Max 48 oz
to start tape lid bail moving.

(C) TAPE LID SPRING

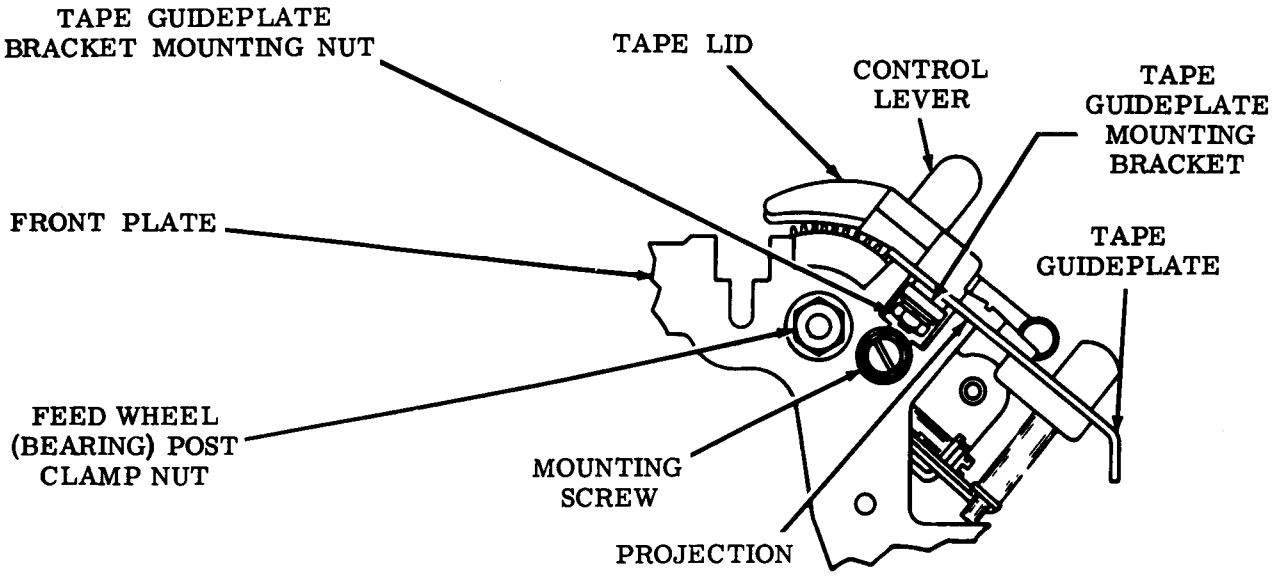
To Check
Hold release plunger fully depressed. Hold tape guideplate in horizontal position.

Requirement
Min 2-1/2 oz---Max 4-1/2 oz
to move open end of tape lid against tape guideplate.



(Right Side View)

2.08 Tape Lid (continued)



(Front View)

Note 1: To prevent damage to the tape-out pin, position stop arm to its lowest position and hold control lever bail extension from feed wheel ratchet.

TAPE GUIDEPLATE

(1) Requirement
Feed wheel post is not to interfere with mounting brackets of top plate and tape guideplate.

To Adjust
Loosen clamp nut and rotate feed wheel post.

(2) Requirement
Tape guideplate to rest firmly against a minimum of three of the four projections on side plates.

To Adjust
Rotate unit clutch to its stop position. Trip clutch to put sensing pins in their highest positions. Unlatch tape lid and place control lever to run position. Loosen mounting screws and mounting nuts. Position tape guideplate on reader to meet Requirement (2). Position tape-out pin into hole in tape guideplate. Tighten mounting screws.

Note 2: Mounting nuts loosened in Requirement (2) are tightened after performing Requirement (3) and TOP PLATE adjustment.

(3) Requirement
Edge of tape guideplate to project over side plates by equal amounts as gauged by eye.

To Adjust
Position type guideplate.

Note 3: Tight-tape bail extension must be under top plate.

2.09 Top Plate

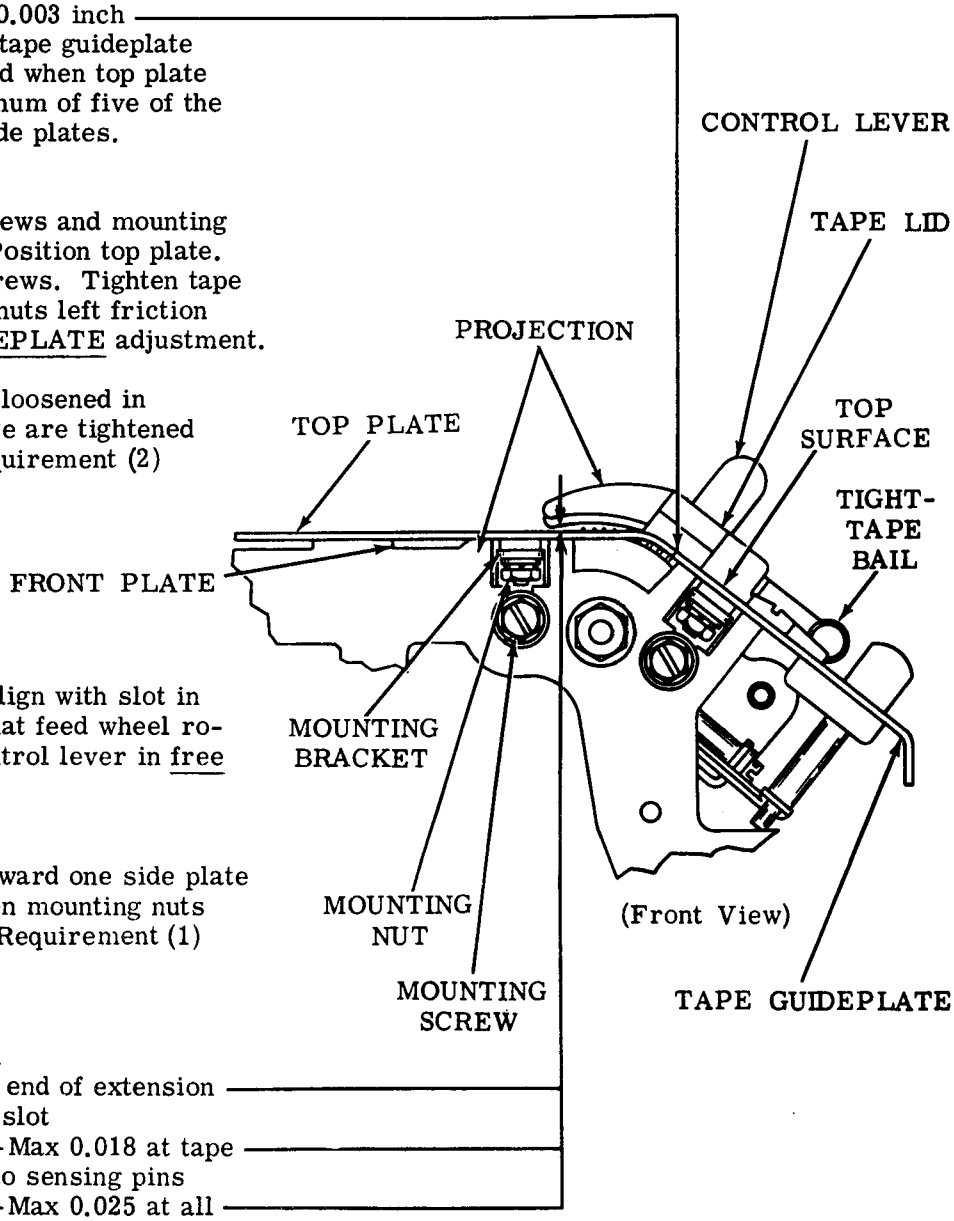
TOP PLATE

To Check
Remove cover plate and unlatch the tape lid.

(1) Requirement
Min flush---Max 0.003 inch below top surface of tape guideplate along width of tape lid when top plate is resting on a minimum of five of the six projections on side plates.

To Adjust
Loosen mounting screws and mounting nuts friction tight. Position top plate. Tighten mounting screws. Tighten tape guideplate mounting nuts left friction tight in TAPE GUIDEPLATE adjustment.

Note: Mounting nuts loosened in Requirement (1) above are tightened after performing Requirement (2) below.



(2) Requirement
Feed wheel slot to align with slot in tape guideplate so that feed wheel rotates freely with control lever in free position.

To Adjust
Position top plate toward one side plate or the other. Tighten mounting nuts left friction tight in Requirement (1) above.

(3) Requirement
With tape lid latched
Min 0.010 inch at end of extension covering feed wheel slot
Min 0.010 inch---Max 0.018 at tape guideplate adjacent to sensing pins
Min 0.010 inch---Max 0.025 at all other areas
between tape lid projection and top plate with play taken up toward tape guideplate.

To Adjust
Loosen tape lid bearing bracket mounting screws. Position tape lid. Recheck TAPE LID adjustment, Requirements (1) and (2).

2.10 Cover Plate

(A) COVER PLATE

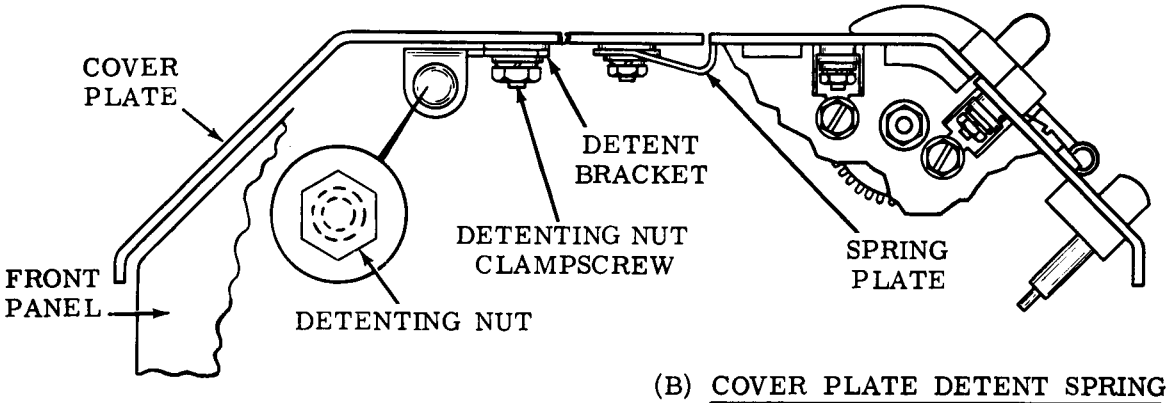
(1) Requirement
Right edge of cover plate holds flush against left edge of top plate by the cover plate detents.

(2) Requirement
Cover plate rests against at least three of the four projections (front and rear plate).

(3) Requirement
Front edge of cover plate and top plate align.

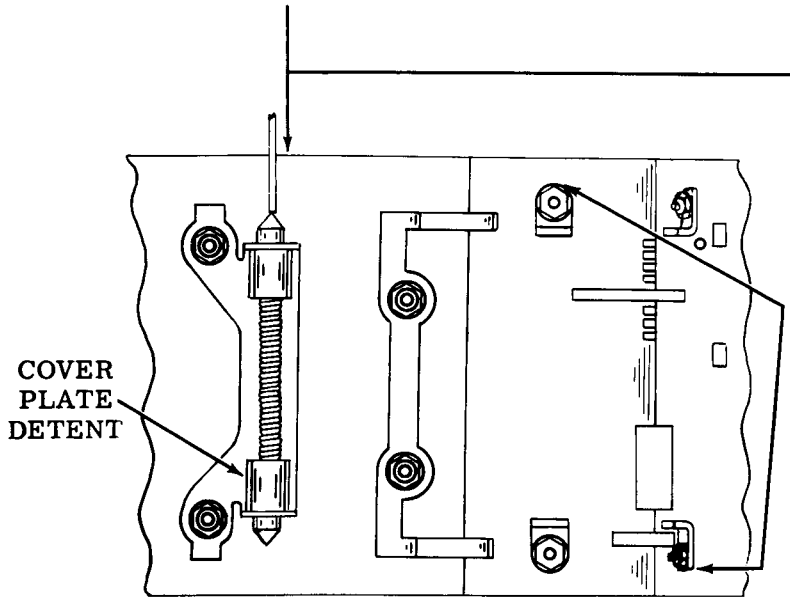
To Adjust
With detenting nut clampscrew (front and rear plate) friction tight, move clampscrews to their extreme lower right position, then tighten screws. Loosen detent bracket and spring plate mounting nuts. Place cover on unit and position horizontally to meet requirements. Retighten mounting nuts.

(Front View)



(B) COVER PLATE DETENT SPRING

Requirement
With spring scale applied to center of one detent
Min 28 oz---Max 48 oz
to start plunger moving.



(Bottom View)

Note: Outer edge of each mounting bracket should be approximately in line with shoulder of its mounting stud. Replace tape guideplate, tape-out tension spring, top plate, and cover plate.

2.11 Tape-Out Switch Assembly

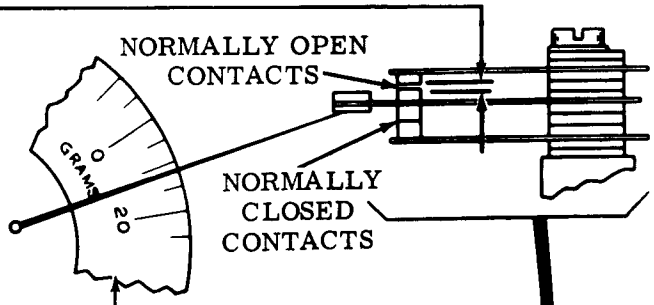
(A) TAPE-OUT CONTACT ASSEMBLY

To Check
Loosen spring bracket and move downward until tape-out pin extension no longer touches insulation on contact swinger.

(1) Requirement
Min 8 grams---Max 15 grams to separate normally closed contacts.

(2) Requirement
Min 0.008 inch---Max 0.015 inch between normally open contacts.

To Adjust
Remove tape-out contact assembly from unit by unhooking tape-out pin spring and removing bracket mounting screws. Form contact swinger using TP110445 spring bender. Replace contact assembly with swinger over tape-out pin extension. Place spring bracket shoulder bushing on upper hole and the washer on lower mounting hole. Rehook tape-out pin spring.



(B) TAPE-OUT SENSING PIN SPRING

To Check
Place control lever in run position.

Requirement
Min 38 grams---Max 45 grams to move tape-out pin to a position flush with tape guideplate.

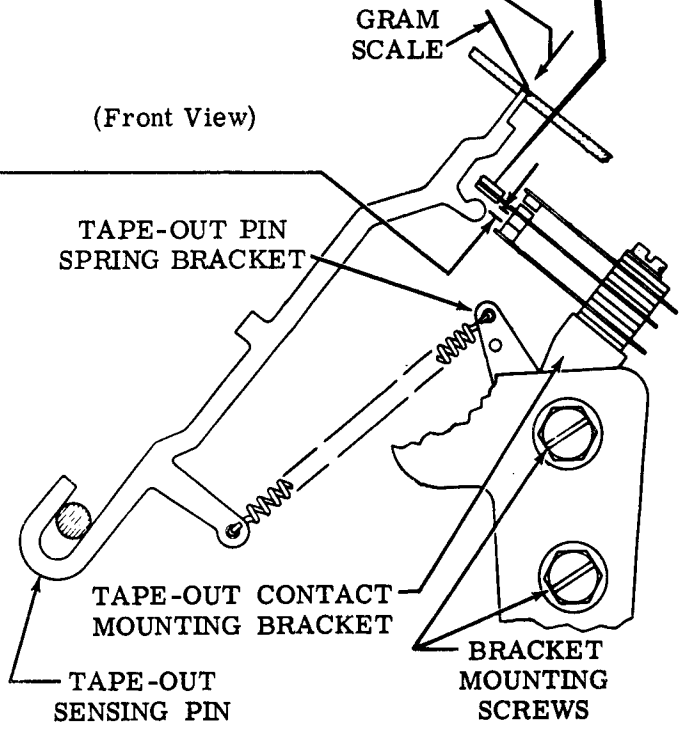
To Adjust
Loosen lower bracket mounting screw and position spring bracket to meet requirement. Retighten bracket mounting screw.

(C) TAPE-OUT CONTACT BRACKET

To Check
Insert tape under tape lid to hold tape-out pin down.

Requirement
Min 0.006 inch---Max 0.020 inch between tape-out pin upper extension and underside of insulation on swinger contact.

To Adjust
Loosen bracket mounting screws and adjust bracket. Retighten mounting bracket screws.



2.12 Tape-Out Switch Assembly (continued)

(B) DEPRESSOR BAIL TORSION SPRING

To Check
Place control lever in stop position. Unhook one end of intermediate tape-out bail spring.

Requirement
Min 2-3/4 oz---Max 5-1/2 oz to start tape-out bail moving away from tape-out pin depressor bail.

(C) INTERMEDIATE TAPE-OUT BAIL SPRING

To Check
Place control lever in run position. Unhook intermediate tape-out bail spring at post end.

Requirement
Min 3 oz---Max 5 oz
*Min 2 oz---Max 3 oz
to pull intermediate tape-out bail to its installed length.
*5-level only

(A) TAPE-OUT SENSING PIN

(1) To Check
Place control lever in stop position.

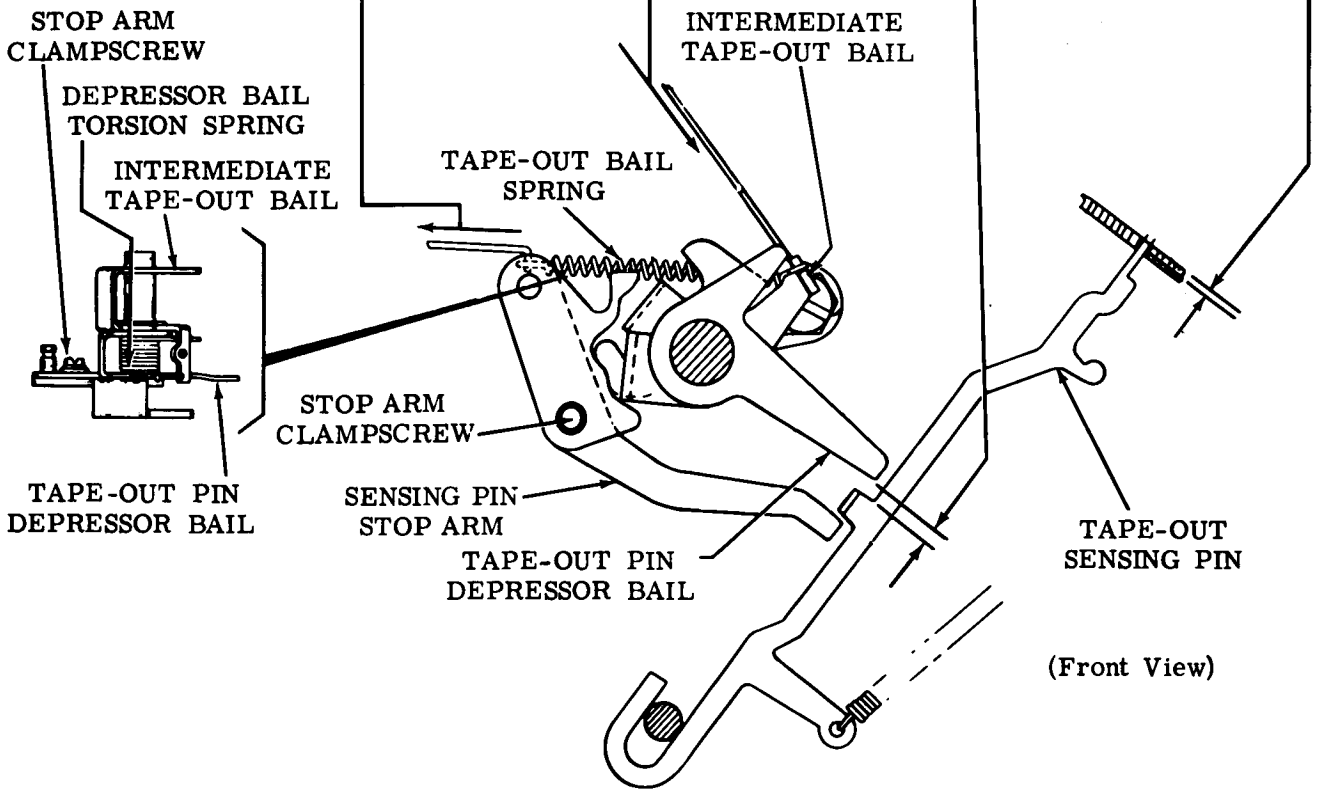
Requirement
Top of pin to be
Min flush---Max 0.010 inch below surface of tape guideplate.

To Adjust
Loosen stop arm clampscrew. friction tight. Position stop arm to meet requirement. Retighten clampscrew.

(2) To Check
Place control lever in run position.

Requirement
Clearance as shown should be
Min 0.055 inch

To Adjust
Loosen tape-out bail clampscrew. Position extension arm to meet requirement. Retighten clamp screw. Recheck requirement under (1) To Check.



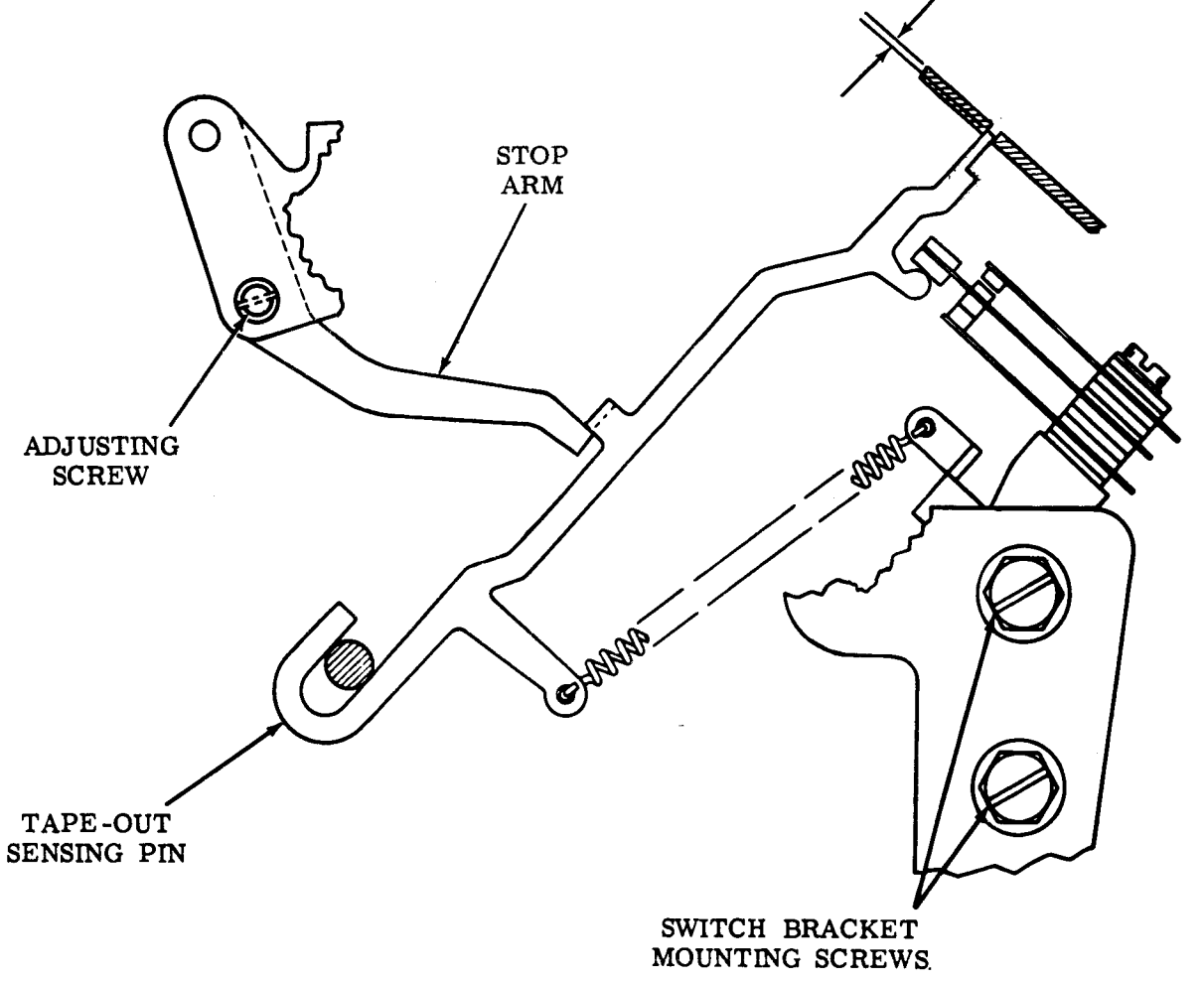
2.13 Tape-Out Switch Assembly (continued)

TAPE-OUT SENSING PIN (For Units Equipped with Tape Lid Sensing Lever)

To Check
Hold tape-out pin manually against stop arm.

Requirement
Top of pin to be
Min flush---Max 0.010 inch below top surface of guideplate.

To Adjust
Loosen switch bracket mounting screws. Position switch bracket to meet requirement. Retighten mounting screws.



(Front View)

2.14 Start-Stop Switch Assembly

(A) START-STOP SWITCH BRACKET

To Check
Place control lever in run position.
Disengage clutch.

(1) Requirement
Min 0.006 inch---Max 0.015 inch between start-stop bail extension and insulator on start-stop switch swinger.

To Adjust
Loosen switch bracket mounting screws. Position switch bracket to meet requirement. Retighten bracket mounting screws.

(2) Requirement
Start-stop bail extension and contact arm to fully engage insulated portion of start-stop switch swinger.

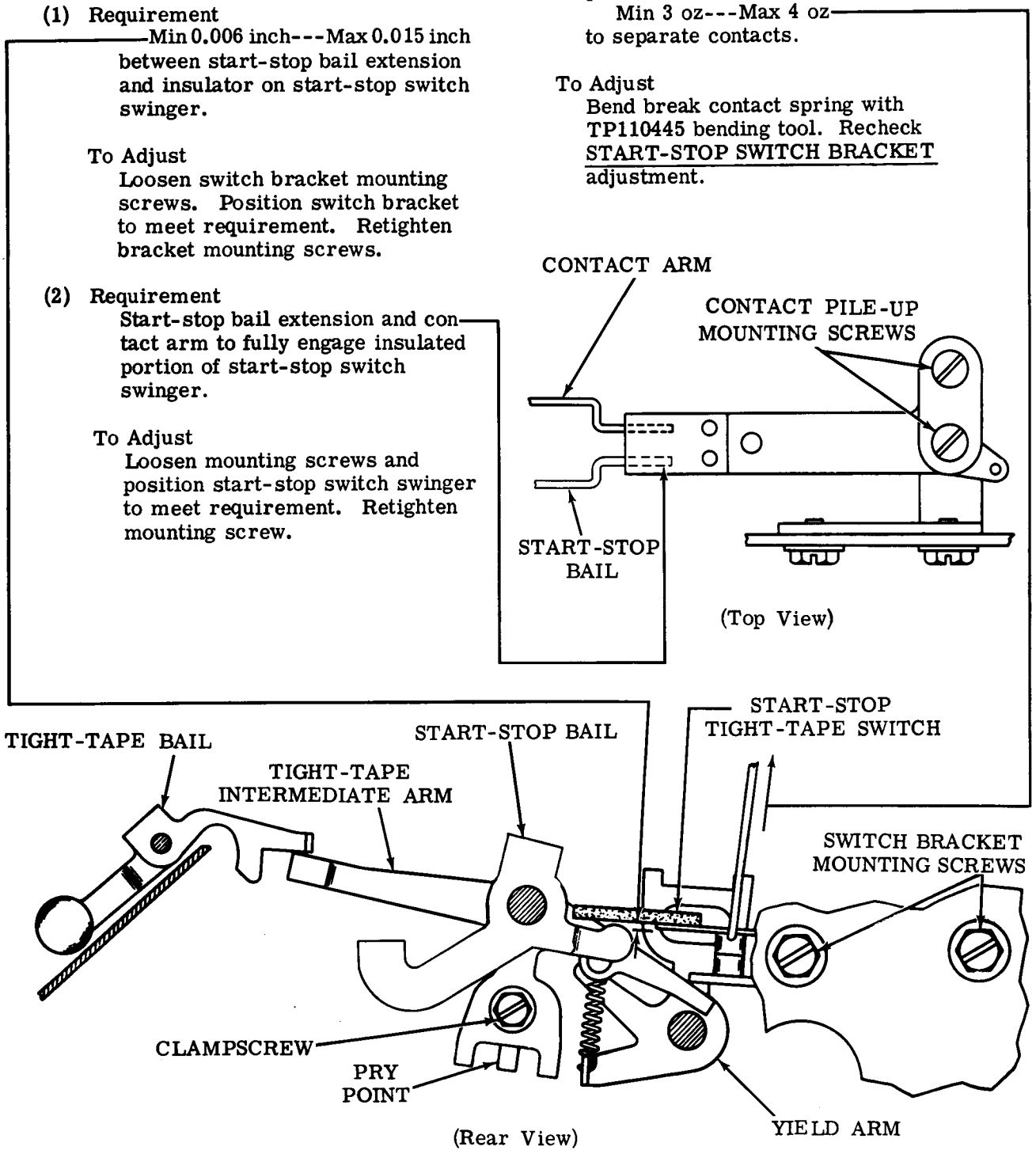
To Adjust
Loosen mounting screws and position start-stop switch swinger to meet requirement. Retighten mounting screw.

(B) TIGHT-TAPE START-STOP CONTACT SPRING

To Check
Place control lever in run position.

Requirement
Min 3 oz---Max 4 oz to separate contacts.

To Adjust
Bend break contact spring with TP110445 bending tool. Recheck START-STOP SWITCH BRACKET adjustment.



2. 15 Tight-Tape Mechanism

START-STOP SWITCH BRACKET (For Units Equipped with Tape Lid Sensing Lever)

To Check

Place intermediate tight-tape arm to center of its adjusting range with the contact arm.

(1) Requirement

Tight-tape start-stop contacts to:

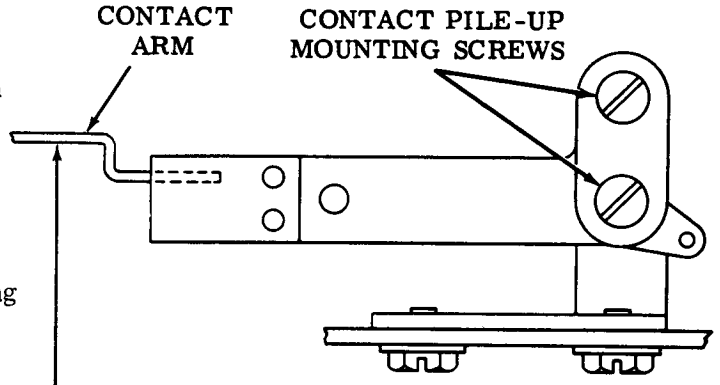
(a) Remain closed when tight-tape bail is raised 0.045 inch

(b) Open as bail is raised to 0.075 inch.

To Adjust

(a) Loosen tight-tape intermediate arm clampscrew. Position pry point midway in contact operating arm adjusting slot. Retighten clampscrew.

(b) Loosen switch bracket screws friction tight. Position contact pile-up to meet requirement.



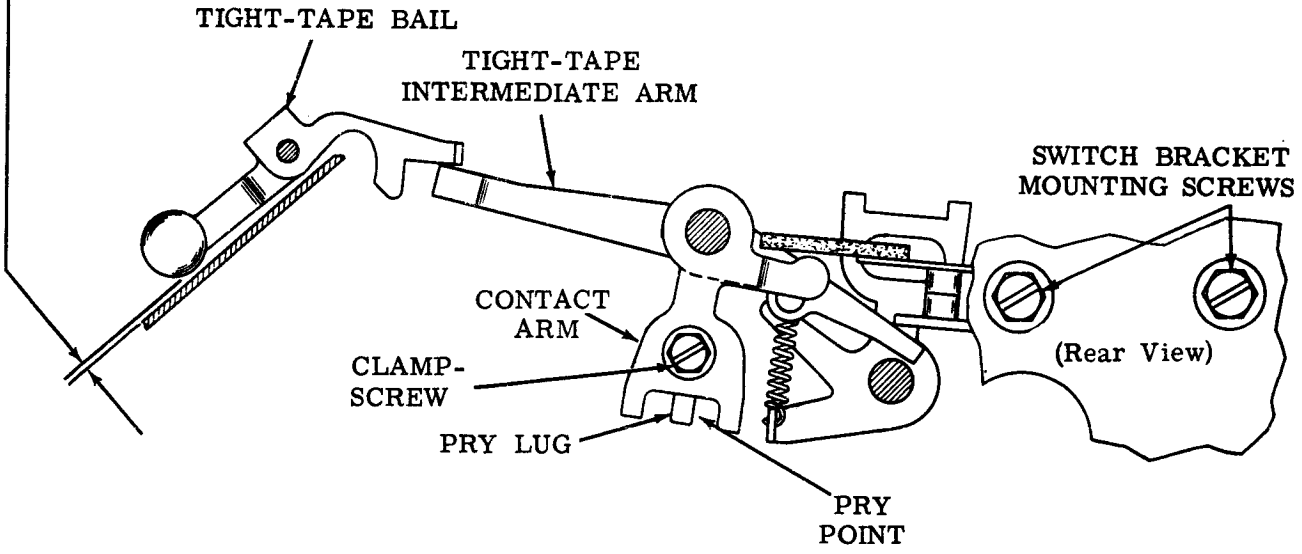
(Top View)

(2) Requirement

Contact arm to fully engage insulated part of switch swinger.

To Adjust

Loosen contact pile-up mounting screws. Position contact pile-up mounting bracket. Retighten mounting screws.



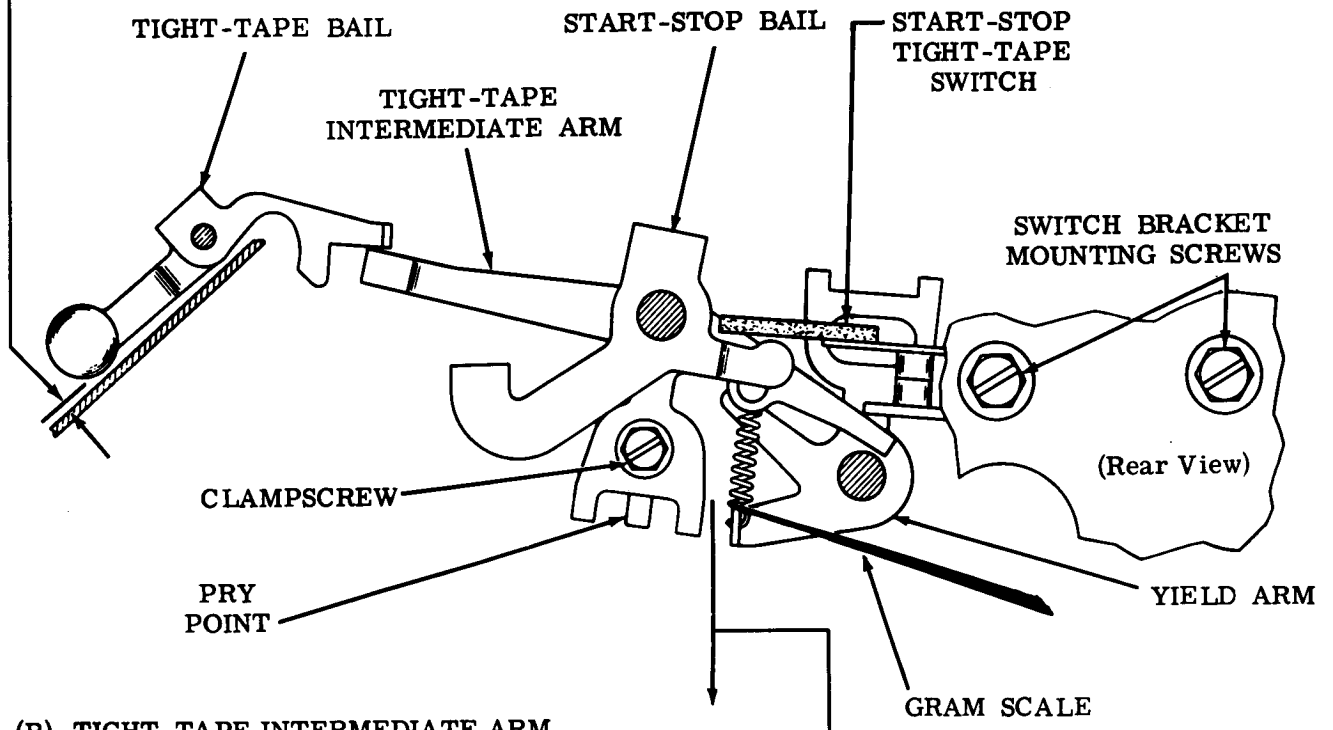
2.16 Tight-Tape Mechanism (continued)

(A) TIGHT-TAPE INTERMEDIATE ARM

To Check
Place control lever in run position.

Requirement
Start-stop contacts when tight-tape bail is raised away from tape guideplate:
(a) Remain closed when bail is raised 0.045 inch.
(b) Open as bail is raised to 0.075 inch.

To Adjust
Loosen clampscrew and position tight-tape intermediate arm using pry points. Retighten clampscrew.



(B) TIGHT-TAPE INTERMEDIATE ARM SPRING

To Check
Place control lever in run position.

Requirement
Min 20 grams (3/4 oz)---Max 40 grams (1-1/2 oz) to start yield arm moving.

2.17 Feed Wheel Mechanism

(D) MAIN BAIL

To Check
Place sensing pins in their lowest position.

Requirement
Highest sensing pin should be
Min 0.010---Max 0.020 inch
below surface of tape guideplate.

To Adjust
Loosen nut on main bail eccentric. Keeping high part towards right, adjust eccentric to meet this requirement. Retighten nut on main bail eccentric.

(C) MAIN BAIL TRIP LEVER

To Check
Replace top plate. Disengage unit clutch.

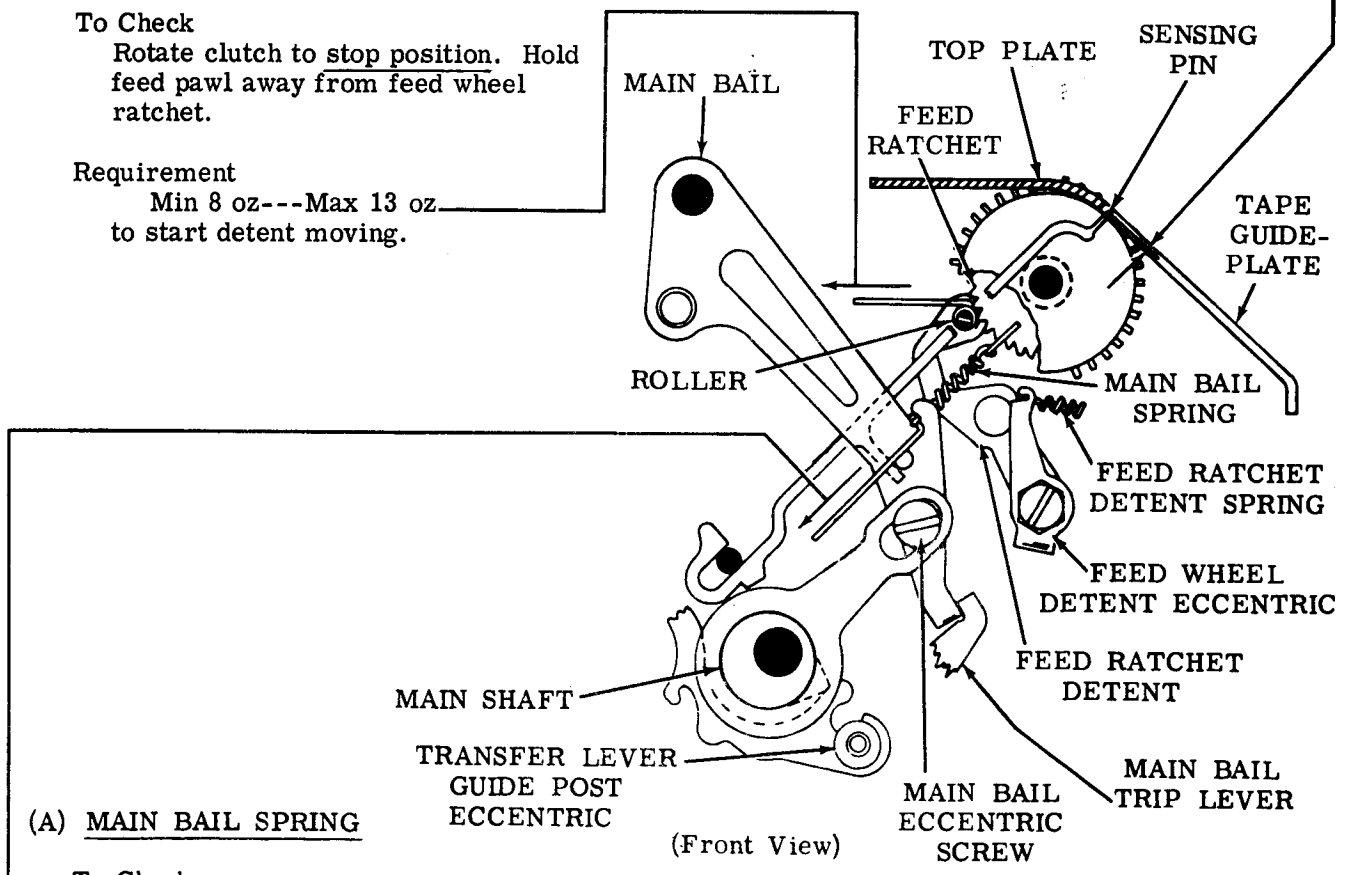
Requirement
Tip of highest sensing pin to be
Min flush---Max 0.005 inch
below top surface of tape guideplate.

To Adjust
Loosen nuts which secure transfer lever guide post and rotate it so that guide post eccentric positions main bail trip lever to meet requirement. Tighten nuts. Trip clutch and rotate it while checking operation of moving parts.

(B) FEED RATCHET DETENT SPRING

To Check
Rotate clutch to stop position. Hold feed pawl away from feed wheel ratchet.

Requirement
Min 8 oz---Max 13 oz
to start detent moving.



(A) MAIN BAIL SPRING

To Check
Remove top plate. Disengage clutch. Unhook spring end from main bail.

Requirement
Min 6 oz---Max 10 oz
to pull main bail to installed length.

2.18 Feed Wheel Mechanism (continued)

(A) SENSING PIN SPRING

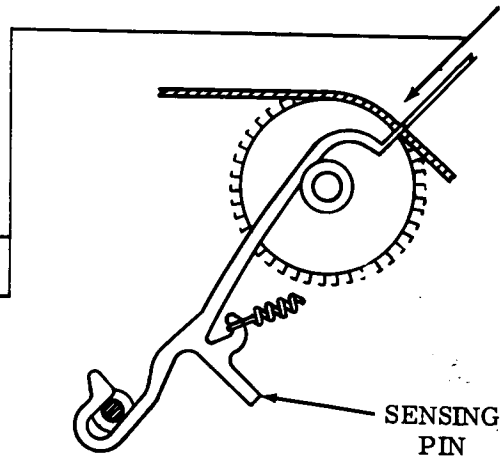
To Check

Open tape lid, and disengage unit clutch. Then hold armature in the attracted position to unlatch main bail and place sensing pins in their uppermost position. Hold rub-out deleter bail (if present) away from the sensing pins.

Requirement

*Chadless tape
Min 3 oz---Max 5 oz
**Perforated tape
Min 2 oz---Max 3 oz
to move each sensing pin flush with tape guide plate.

*For units using TP154349 spring — 5-level units
**For units using TP151103 spring — 6-level units



(Front View)

(B) FEED WHEEL DETENT

To Check

Open tape lid. Disengage the unit clutch to place sensing pins in their lowest position. Place high part of feed wheel ratchet detent eccentric toward the right. With an all marking code combination punched into a new piece of tape, place the tape on the feed wheel and over the sensing pins. Take up play in tape lightly toward the right.

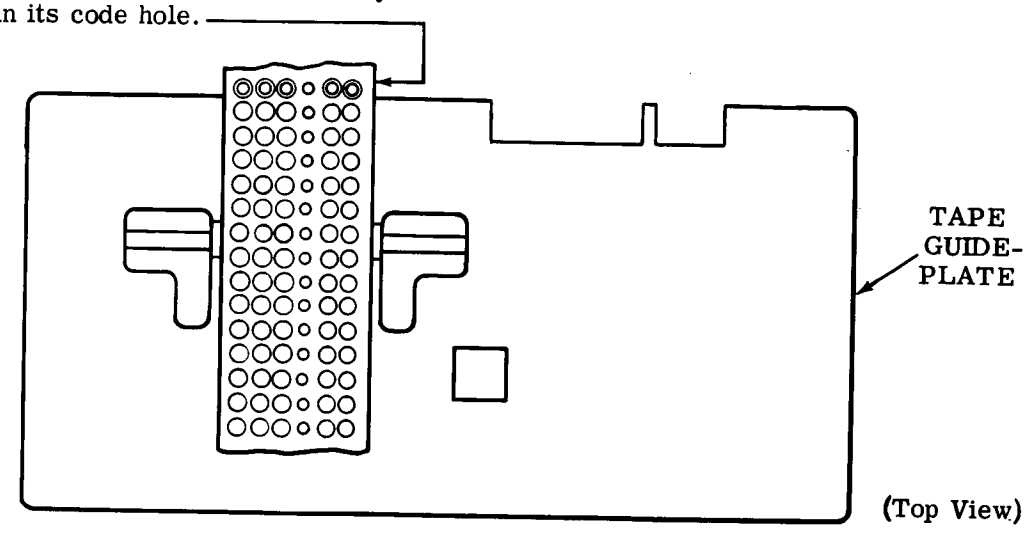
Requirement

Tip of each sensing pin to be centrally located in its code hole.

To Adjust

Loosen feed wheel ratchet detent eccentric friction tight and hold feed pawl away from feed wheel ratchet. Rotate feed wheel ratchet detent eccentric, keeping high part of eccentric towards the right.

Note: When unit is used to read chadless spliced tape, the sensing pins should be made to favor the trailing edge of the code hole.



(Top View)

2.19 Feed Wheel Mechanism (continued)

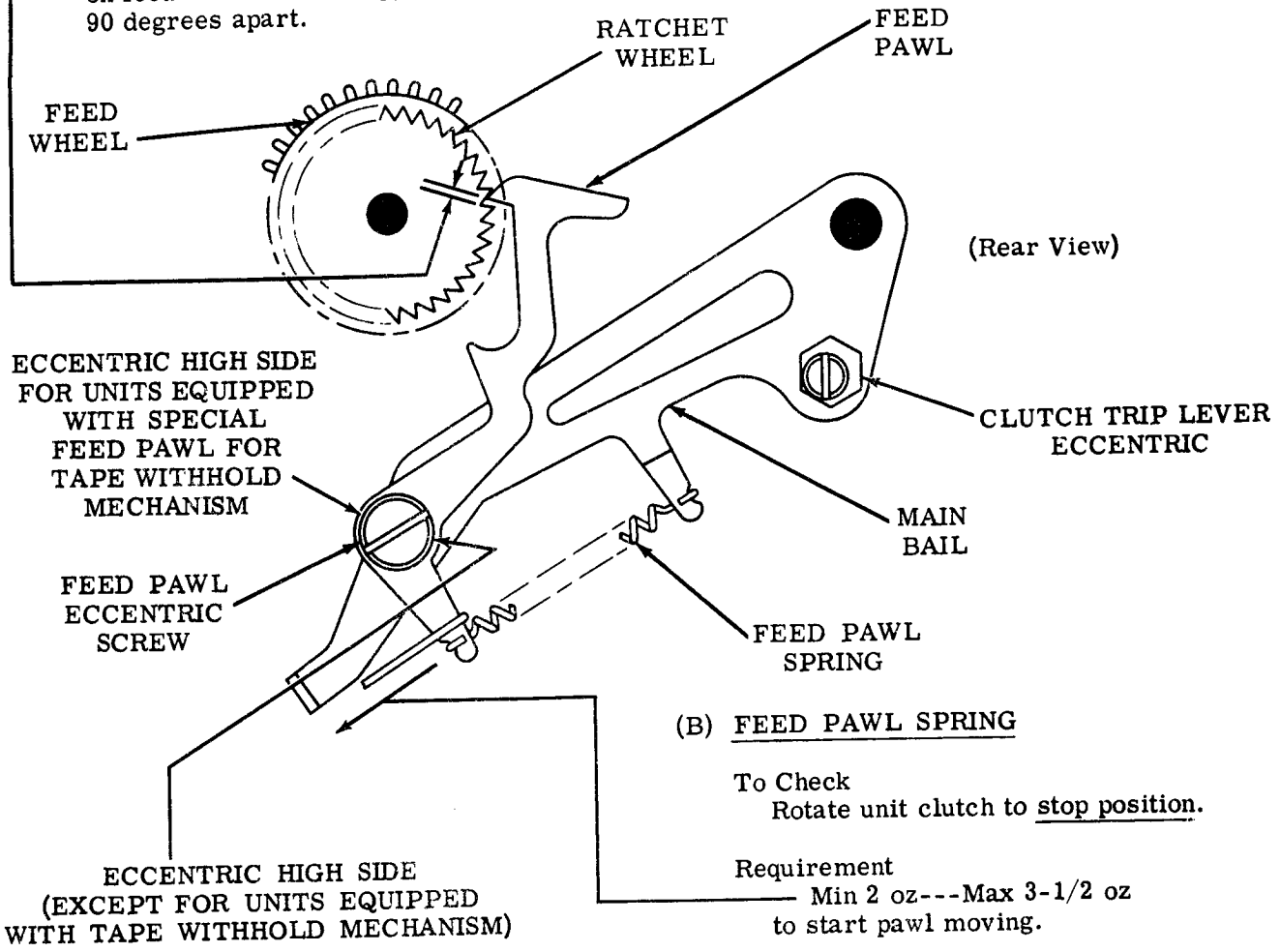
(A) FEED PAWL

To Check
Remove the top plate. With the high part of the feed pawl eccentric towards the right,* (viewed from rear plate) disengage the clutch to place the sensing pins in their lowest position.

*Left for units equipped with tape withhold mechanism.

Requirement
Min some---Max 0.003 inch between feed pawl and ratchet tooth just engaged.

To Adjust
Loosen feed pawl eccentric locknut, and position feed pawl eccentric. Recheck requirement at four positions on feed wheel ratchet approximately 90 degrees apart.

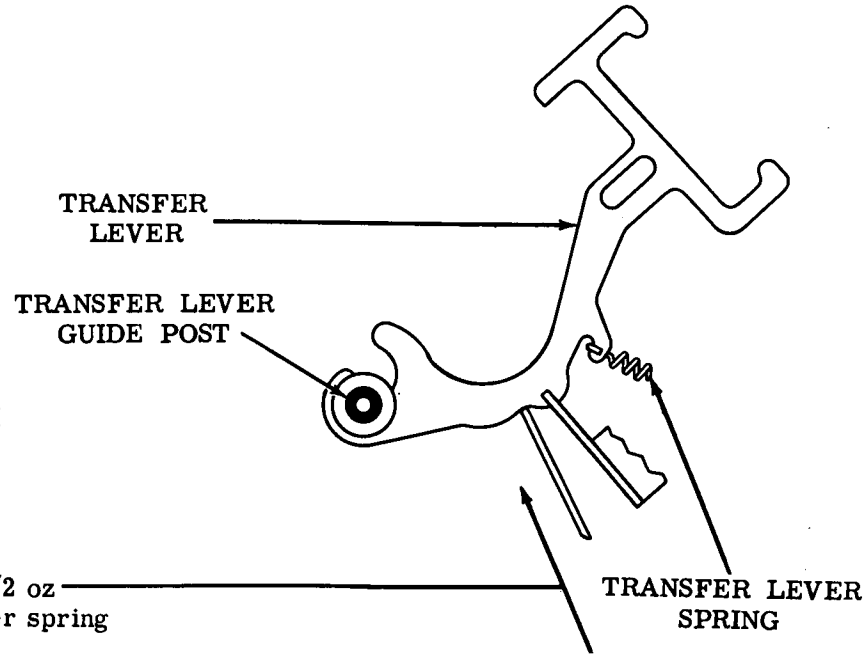


(B) FEED PAWL SPRING

To Check
Rotate unit clutch to stop position.

Requirement
Min 2 oz---Max 3-1/2 oz to start pawl moving.

2.20 Transfer Mechanism

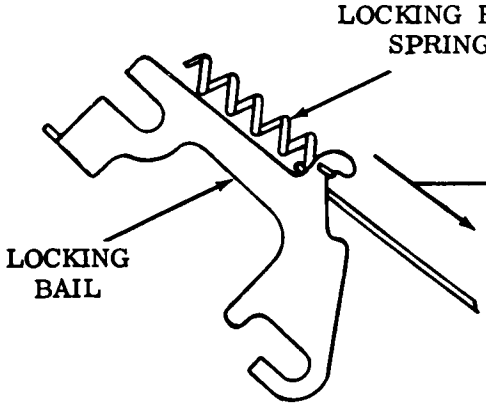


(A) TRANSFER LEVER SPRING

To Check
Disengage unit clutch.

Requirement
Min 1/2 oz---Max 1-1/2 oz to start each transfer lever spring moving.

(Rear View)

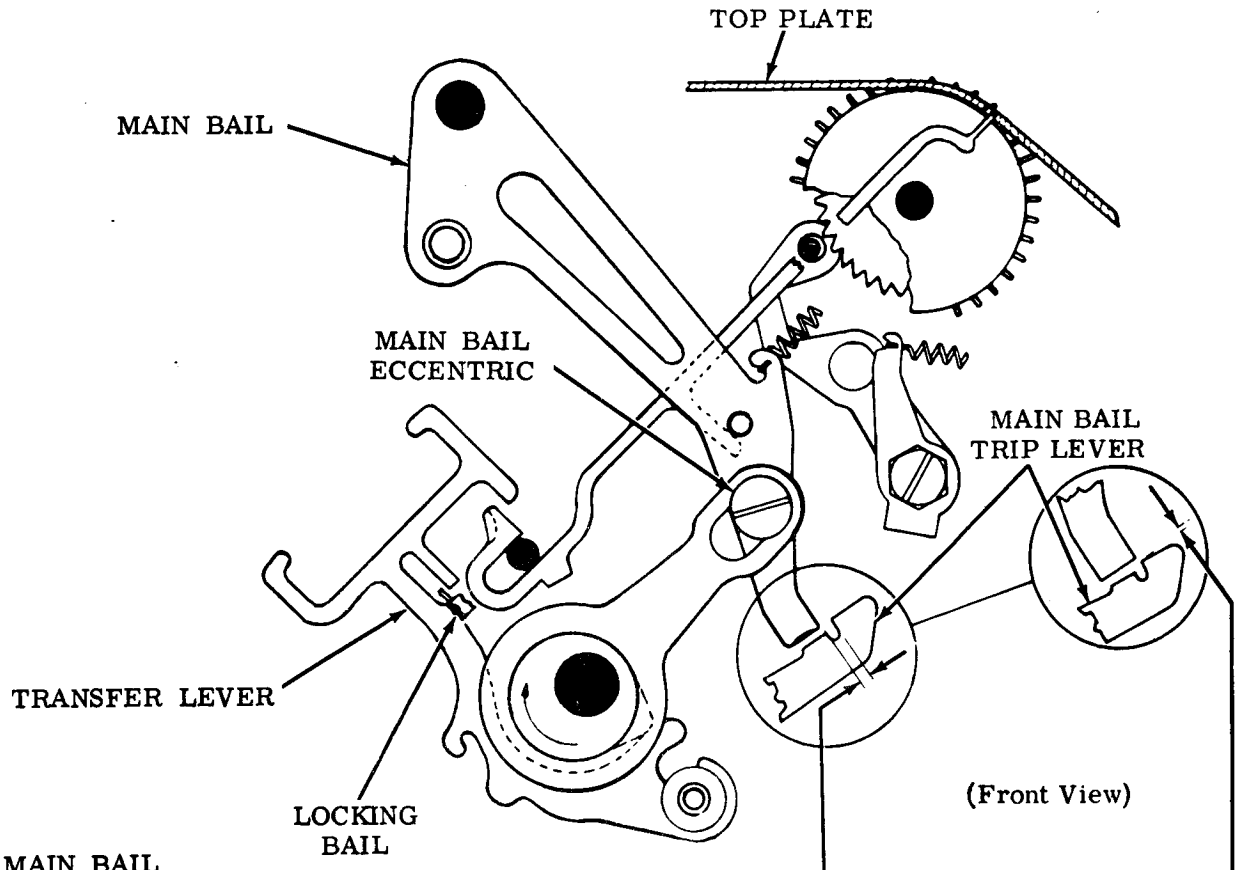


(B) LOCKING BAIL SPRING

Requirement
Min 10 oz---Max 14 oz to pull locking bail spring to its installed length.

(Front View)

2.21 Main Bail



MAIN BAIL

(1) To Check
Hold armature in its attracted (energized) position and rotate clutch until main bail is on its lowest position.

Requirement
Min 0.005 inch---Max 0.015 inch between main bail and main bail trip lever.

(2) To Check
Hold armature in its attracted (energized) position and rotate clutch until main bail is in its highest position.

Requirement
Min 0.005 inch between vertical surfaces of main bail and main bail trip lever.

To Adjust
Loosen nut on main bail and position main bail eccentric. Retighten nut. Check MAIN BAIL TRIP LEVER adjustment. Refine, if necessary.

2.22 Transfer Bail

(A) TRANSFER BAIL STABILIZER

(1) To Check
Select a LETTERS combination. Rotate main shaft until #3 transfer lever is on high part of its cam. Check clearance between side of transfer bail extension and marking latch.

(2) To Check
Select a BLANKS combination. Rotate main shaft until #3 transfer lever is on high part of its cam. Check clearance between side of transfer bail extension and spacing latch.

Requirement
Clearance in marking and spacing positions should be equal within 0.002 inch.

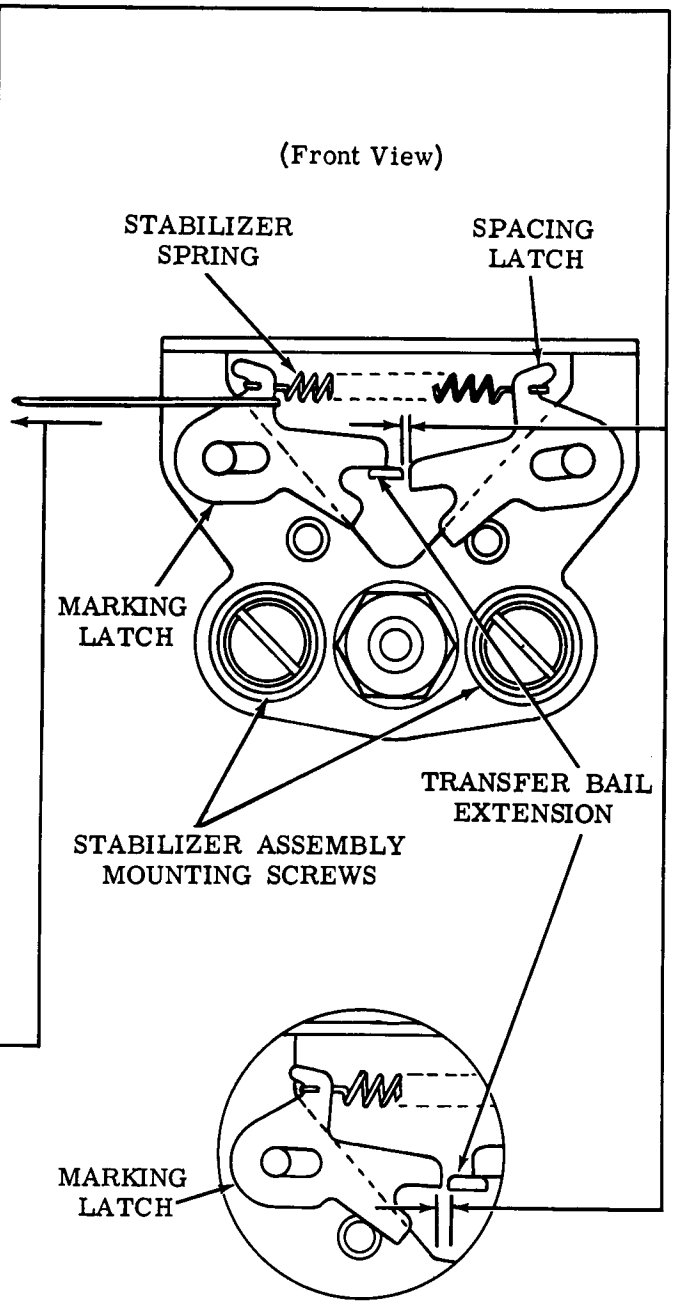
To Adjust
Loosen stabilizer assembly mounting screws friction tight, and position the assembly. Retighten assembly mounting screws.

(B) STABILIZER SPRING

To Check
Rotate clutch to stop position.

Requirement
Min 2-1/2 oz---Max 5 oz to start stabilizer latch moving.

Note: Latches should drop in place as other transfer levers cam the transfer bail.



2.23 Signal Contacts

(A) SIGNAL CONTACT CLEARANCE

To Check

Remove cover plate and signal contact box cover. Engage the unit clutch and rotate main shaft slowly until spacing contact is fully open. Measure the gap. Continue rotating the main shaft until marking contact is fully open. Measure the gap.

Requirement

Marking and spacing contact gaps measured in To Check to be equal within 0.001 inch.

To Adjust

Loosen mounting screws and position contact box using eccentric.

Note: Before operating, refine SIGNAL CONTACT CLEARANCE adjustment in accordance with Signal Contacts — Electrical.

CAUTION: IF CONTACTS ARE GOLD PLATED, CLEAN THEM BY PARTIALLY DRAWING A STRIP OF TP107162 TWILL JEAN BETWEEN THEM.

(B) DRIVE LINK SPRING

To Check

Trip clutch and rotate main shaft to stop position. Unhook stabilizer spring, and move latches away from transfer bail extension. Hold toggle firmly against spacing contact.

Requirement

Min 6 oz---Max 12 oz to start transfer bail extension moving.

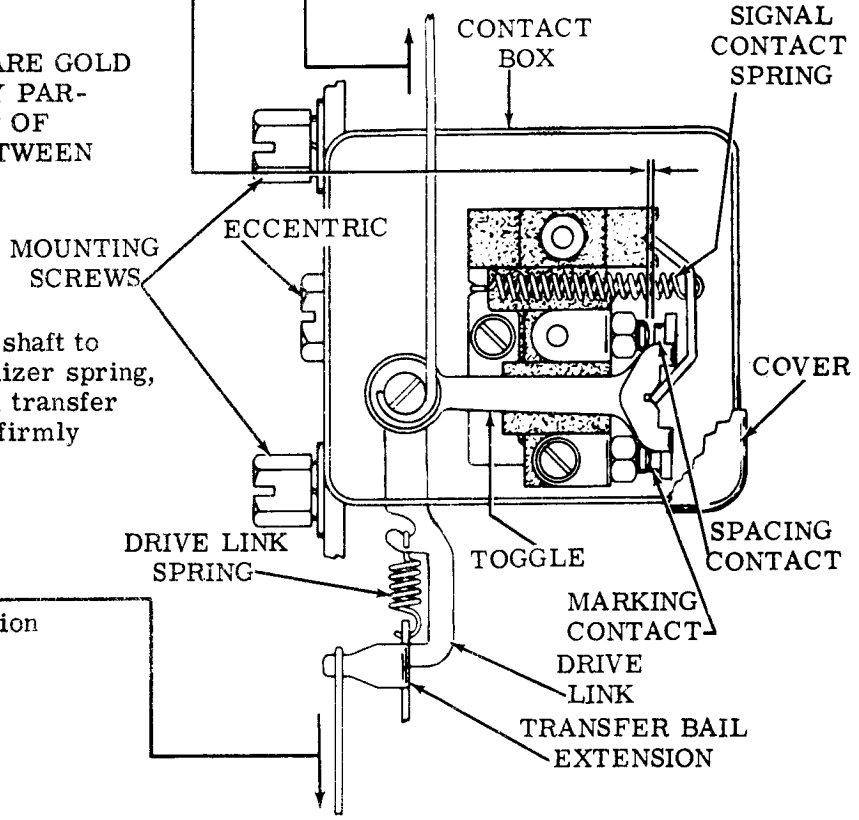
(C) SIGNAL CONTACT SPRING (TRANSMITTER DISTRIBUTOR SETS ONLY)

To Check

Place transmitter in stop position. Remove contact box cover, and toggle drive link spring from its link end. Move transfer bail towards the right (spacing) position, so that both toggle contacts are closed. Hook an 8-oz scale over the pivot screw and pull horizontally to the left.

Requirement

Min 2 oz---Max 3-1/2 oz to open left-hand contact. Replace toggle drive link spring to its link.



(Top View - Right Side)

Signal Contacts — Electrical

2.24 The strobing adjustment procedure is used for checking and adjusting signal contacts electrically, and at the same time, refining the mechanical adjustments for the transmitter distributor. The same procedure is used for checking both the marking and spacing pulses for both 5 and 6 level, and all unit codes. Differences exist, however, in the number, width, and tolerance of pulses, and in the allowable break width. The data appropriate to each level and unit code is tabulated on the associated Pulse Data Table. By following the general procedures given in Paragraphs 2.25 and 2.26 following, and using data from the appropriate table, the marking and spacing pulse adjustment can be made for all units. To illustrate the procedure further, the data appropriate to a 5-level, 7.42 unit code is added parenthetically as an example in the general adjustment procedure following.

Note: Gold-plated signal contacts should not be electrically adjusted unless there is an intermediate device available which, when keyed by the signal contacts, will interrupt the current to the stroboscopic test set. The intermediate device must be capable of being keyed by a 3- to 20-volt change in voltage at a current not in excess of 20 milliamperes. The standard stroboscopic test set operating voltage must not be applied directly to the signal contacts because of the possibility of damaging the contacts' gold plating and thus impairing their operating efficiency in this low-energy level application. (Refer to Paragraphs 1.08 through 1.13.)

2.25 Marking Pulse Adjustments

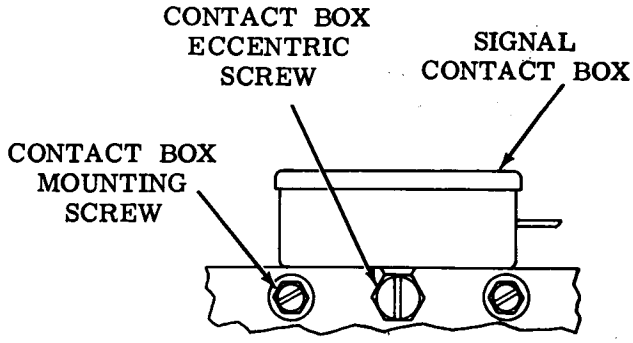
(a) Plug a signal distortion test set having the appropriate scale (eg, 7.42) into the signal line so that the marking contacts of the transmitter-distributor unit under test will interrupt the current to the stroboscopic lamp within the DXD. Have the transmitter-distributor transmitting "Y" or "R" continuously and the test set and transmitter-distributor operating at the same speed (100 wpm). Rotate the test scale to align the 0-scale mark of the START segment (end of STOP segment) with the end of the stop pulse image indicated by the rotating strobe light.

Note: The end of the stop pulse image should not vary more than one division in either direction when the scale is positioned so that the variation is centered about the 0-scale mark of the START segment.

(b) Check the position of each of the pulses against the position tabulated. Each pulse should be in its designated segment on the test scale, within the specified tolerance figure (eg, 15 div).

Note: Each marking code pulse may have one break, provided the break is not longer than the allowable break width specified (eg, 1 div) and the break comes within the tolerance range (eg, 5 div) and the end of the pulse.

(c) To adjust, loosen the two contact box mounting screws until they are friction tight. Rotate the eccentric of the contact box mounting bracket toward the right or left until the requirements are met. Tighten the mounting screws and recheck the adjustment.



(Front View)

Note: If these signal requirements cannot be met, refine the TRANSMITTER DISTRIBUTOR GEAR BACKLASH adjustment (See BASES) and the TRANSFER BAIL STABILIZER adjustment, viewing the signal on the test set.

2.26 Spacing Pulse Adjustments: The general procedure for adjusting the spacing pulse is identical to that outlined for marking pulses. The tolerances for spacing pulses may not be the same as for marking pulses however. Refer to the appropriate Pulse Data Table when making adjustments.

Note: On units equipped with signal regenerators, remove regenerator circuit card before applying test set probes to contact access terminals.

CAUTION: APPLYING OPERATING VOLTAGE OF DISTORTION TEST SET DIRECTLY TO GOLD-PLATED CONTACTS MAY MAKE THEM UNSUITABLE FOR LOW-VOLTAGE APPLICATIONS. REFER TO 1.12 FOR SERVICING INSTRUCTIONS.

2.27 Follow the general procedure outlined in Paragraphs 2.25 and 2.26 substituting the appropriate data from the following table.

PULSE DATA TABLE
FIVE-LEVEL UNITS, 7.00 UNIT CODE

PULSE	MARKING		SPACING	
RANGE	*NOMINAL	TOLERANCE	*NOMINAL	TOLERANCE
STOP PULSE	36 (STOP) TO 142 (STOP)	BEGIN ±5 DIV END ±1/2 DIV	36 (STOP) TO 142 (START)	BEGIN ±6 DIV END ±1/2 DIV
START PULSE	142 (STOP) TO 6 (ONE)	BEGIN ±5 DIV END ±5 DIV	142 (STOP) TO 6 (ONE)	BEGIN ±6 DIV END -5, ±6 DIV
PULSE 1	6 (ONE) TO 12 (TWO)	BEGIN ±5 DIV END ±5 DIV	6 (ONE) TO 12 (TWO)	BEGIN ±6 DIV END -5, ±6 DIV
PULSE 2	12 (TWO) TO 18 (THREE)	BEGIN ±5 DIV END ±5 DIV	12 (TWO) TO 18 (THREE)	BEGIN ±6 DIV END -5, ±6 DIV
PULSE 3	18 (THREE) TO 24 (FOUR)	BEGIN ±5 DIV END ±5 DIV	18 (THREE) TO 24 (FOUR)	BEGIN ±6 DIV END -5, ±6 DIV
PULSE 4	24 (FOUR) TO 30 (FIVE)	BEGIN ±5 DIV END ±5 DIV	24 (FOUR) TO 30 (FIVE)	BEGIN ±6 DIV END -5, ±6 DIV
PULSE 5	30 (FIVE) TO 36 (STOP)	BEGIN ±5 DIV END ±5 DIV	30 (FIVE) TO 36 (STOP)	BEGIN ±6 DIV END -5, ±6 DIV
ALLOWABLE BREAK WIDTH	1 DIV	MUST FALL WITHIN PULSE TOLERANCE	1 DIV	MUST FALL WITHIN PULSE TOLERANCE

*Ranges specified apply only for test sets (DXD) having a 7.42 unit code scale.

2.28 Follow the general provisions outlined in Paragraphs 2.25 and 2.26 substituting the appropriate data from the following table.

PULSE DATA TABLE
FIVE-LEVEL UNITS, 7.42 UNIT CODE

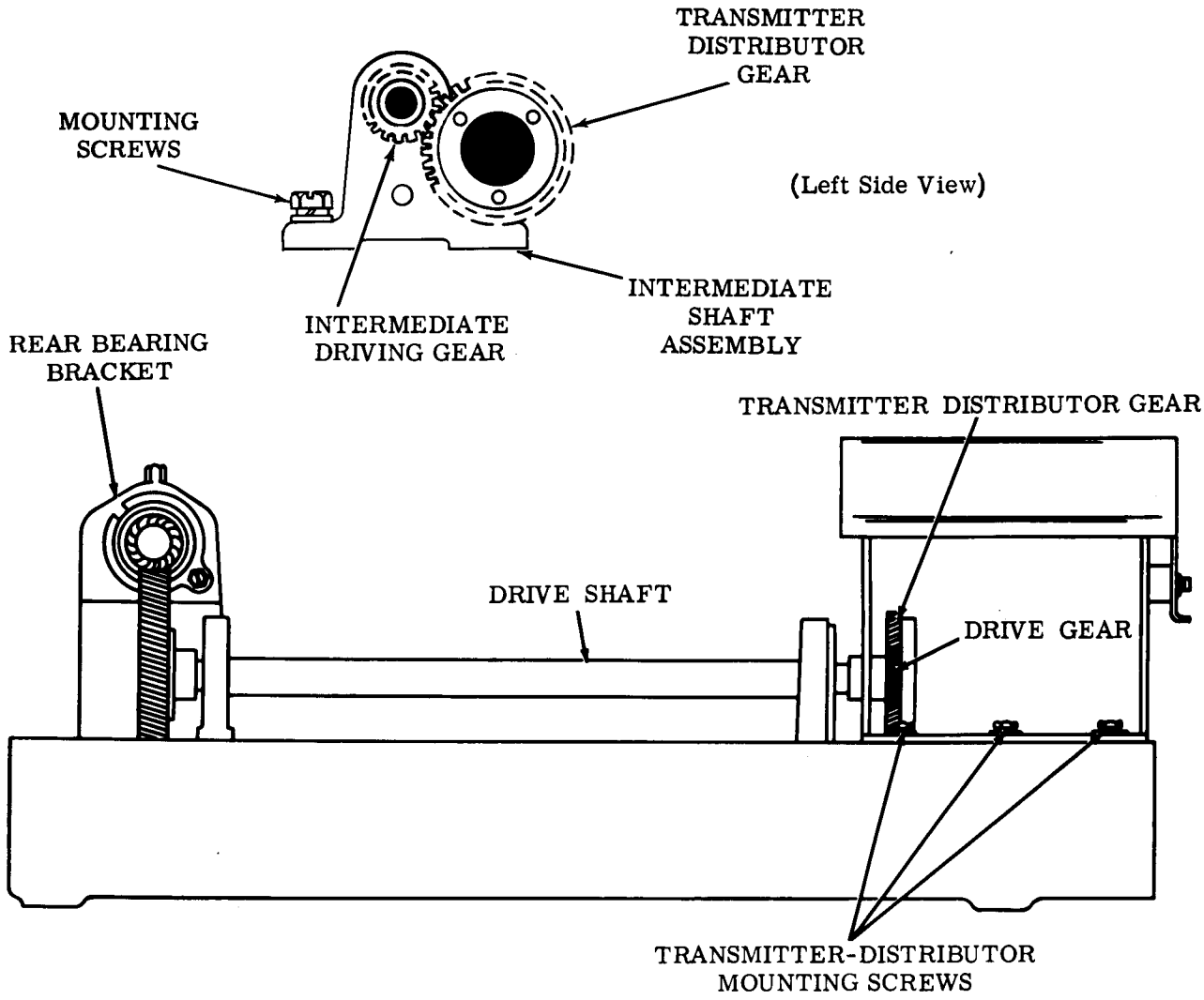
PULSE	MARKING		SPACING	
RANGE	NOMINAL	TOLERANCE	NOMINAL	TOLERANCE
STOP PULSE	0 (STOP) TO 0 (START)	BEGIN ±5 DIV END ±1/2 DIV	0 (STOP) TO 0 (START)	BEGIN ±6 DIV END ±1/2 DIV
START PULSE	0 (START) TO 0 (ONE)	BEGIN ±5 DIV END ±5 DIV	0 (START) TO 0 (ONE)	BEGIN ±6 DIV END ±6 DIV
PULSE 1	0 (ONE) TO 0 (TWO)	BEGIN ±5 DIV END ±5 DIV	0 (ONE) TO 0 (TWO)	BEGIN ±6 DIV END ±6 DIV
PULSE 2	0 (TWO) TO 0 (THREE)	BEGIN ±5 DIV END ±5 DIV	0 (TWO) TO 0 (THREE)	BEGIN ±6 DIV END ±6 DIV
PULSE 3	0 (THREE) TO 0 (FOUR)	BEGIN ±5 DIV END ±5 DIV	0 (THREE) TO 0 (FOUR)	BEGIN ±6 DIV END ±6 DIV
PULSE 4	0 (FOUR) TO 0 (FIVE)	BEGIN ±5 DIV END ±5 DIV	0 (FOUR) TO 0 (FIVE)	BEGIN ±6 DIV END ±6 DIV
PULSE 5	0 (FIVE) TO 0 (STOP)	BEGIN ±5 DIV END ±5 DIV	0 (FIVE) TO 0 (STOP)	BEGIN ±6 DIV END ±6 DIV
ALLOWABLE BREAK WIDTH	±1 DIV	MUST FALL WITHIN TOLERANCE LIMITS	±1 DIV	MUST FALL WITHIN TOLERANCE LIMITS

2.29 Follow the general provisions outlined in Paragraphs 2.25 and 2.26 substituting the appropriate data from the following table.

PULSE DATA TABLE
SIX-LEVEL UNITS, 8.50 UNIT CODE

PULSE	MARKING		SPACING	
RANGE	NOMINAL	TOLERANCE	NOMINAL	TOLERANCE
STOP PULSE	0 (STOP) TO 0 (START)	BEGIN ±7 DIV END ±1/2 DIV	0 (STOP) TO 0 (START)	BEGIN ±8 DIV END ±1/2 DIV
START PULSE	0 (START) TO 0 (ONE)	BEGIN ±7 DIV END ±7 DIV	0 (START) TO 0 (ONE)	BEGIN ±8 DIV END ±8 DIV
PULSE 1	0 (ONE) TO 0 (TWO)	BEGIN ±7 DIV END ±7 DIV	0 (ONE) TO 0 (TWO)	BEGIN ±8 DIV END ±8 DIV
PULSE 2	0 (TWO) TO 0 (THREE)	BEGIN ±7 DIV END ±7 DIV	0 (TWO) TO 0 (THREE)	BEGIN ±8 DIV END ±8 DIV
PULSE 3	0 (THREE) TO 0 (FOUR)	BEGIN ±7 DIV END ±7 DIV	0 (THREE) TO 0 (FOUR)	BEGIN ±8 DIV END ±8 DIV
PULSE 4	0 (FOUR) TO 0 (FIVE)	BEGIN ±7 DIV END ±7 DIV	0 (FOUR) TO 0 (FIVE)	BEGIN ±8 DIV END ±8 DIV
PULSE 5	0 (FIVE) TO 0 (SIX)	BEGIN ±7 DIV END ±7 DIV	0 (FIVE) TO 0 (SIX)	BEGIN ±8 DIV END ±8 DIV
PULSE 6	0 (SIX) TO 0 (STOP)	BEGIN ±7 DIV END ±7 DIV	0 (SIX) TO 0 (STOP)	BEGIN ±8 DIV END ±8 DIV
ALLOWABLE BREAK WIDTH	1 DIV	MUST LIE WITHIN TOLERANCE LIMITS	1 DIV	MUST LIE WITHIN TOLERANCE LIMITS

2.30 Basic Gear Adjustments



INTERMEDIATE GEAR — TRANSMITTER DISTRIBUTOR GEAR BACKLASH

To Check

With the MOTOR POSITION and TRANSMITTER DISTRIBUTOR POSITION adjustments completed, check the backlash between the gears.

(1) Requirement

Only a perceptible amount of backlash between the intermediate driving gear and the transmitter distributor gear.

To Adjust

Loosen three mounting screws that secure the transmitter distributor unit to its base. Position transmitter distributor to meet the requirement. Retighten the mounting screws.

(2) Requirement

Only a perceptible amount of backlash between the drive gear and the transmitter distributor gear.

To Adjust

Loosen three mounting screws that secure the transmitter distributor to its base. Position transmitter distributor to meet this requirement. Retighten the screws.

3. VARIABLE FEATURES

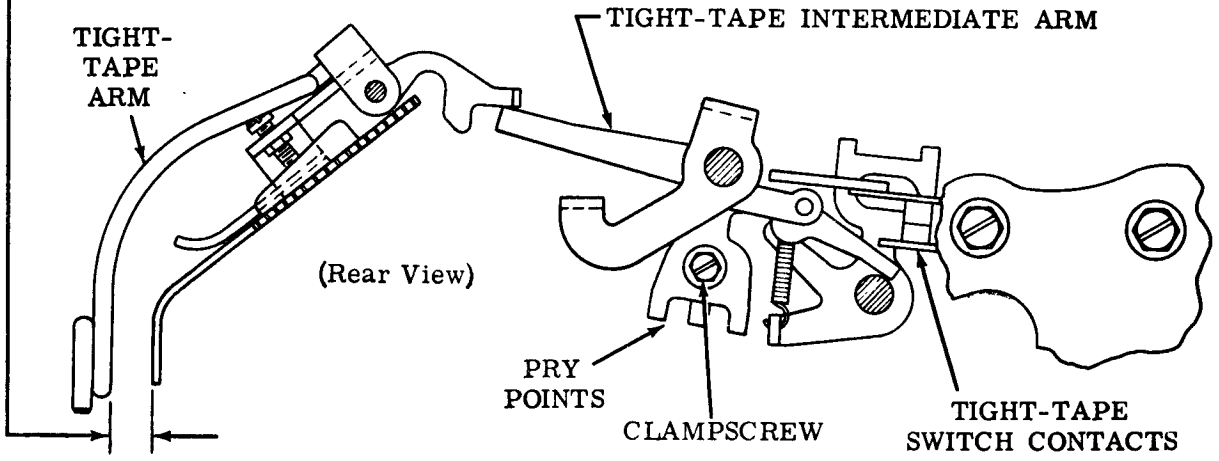
3.01 Tight-Tape and Tape Shoe Mechanism

(A) TIGHT-TAPE SWITCH

To Check
Place control lever in run position.

Requirement
Min 9/32 inch---Max 13/32 inch to open contacts when tight-tape arm is raised.

To Adjust
Loosen clampscrew. Using adjusting slot, position tight-tape intermediate arm to meet this requirement. Retighten clampscrew.



(B) TORSION SPRING

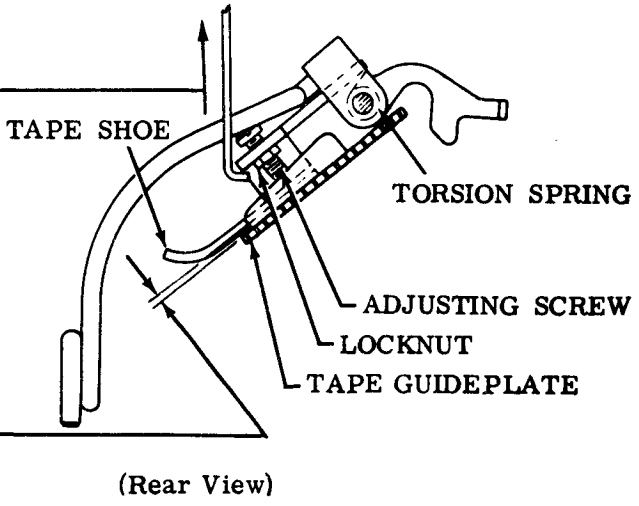
Requirement
Min 2-1/2 oz to lift tape shoe.

(C) TAPE SHOE

To Check
Latch tape lid in position. Check clearance between tape guideplate and tape shoe.

Requirement
Min 0.005 inch---Max 0.008 inch

To Adjust
Loosen locknut. Rotate adjusting screw to meet the requirement. Retighten locknut.



3.02 Tape Feed Assurance Mechanism

(A) TAPE SENSING FEED WHEEL PHASING

To Check
Place fresh, fully perforated tape (10 holes per inch) on tape guideplate across the feed wheel and tape feed assurance wheel. Set detent adjusting lever screw at midrange.

Requirement
Tape must lie flat on tape guideplate between feed wheel and tape feed assurance wheel.

To Adjust
Loosen bracket mounting screws friction tight. Position bracket to meet requirement. Retighten bracket mounting screws. Refine adjustment (if necessary) by rotating the detent lever adjusting screw.

Note: If tape is not available, use TP165800 gauge.

(B) TAPE MOTION CONTACT GAP

To Check
Place detent lever in detented position.

Requirement
Min 0.005 inch---Max 0.010 inch gap between the normally closed contacts.

To Adjust
Bend contact leaf and stiffener to meet requirement.

(C) TAPE MOTION CONTACT SWINGER

To Check
Hold detent lever from contact swinger.

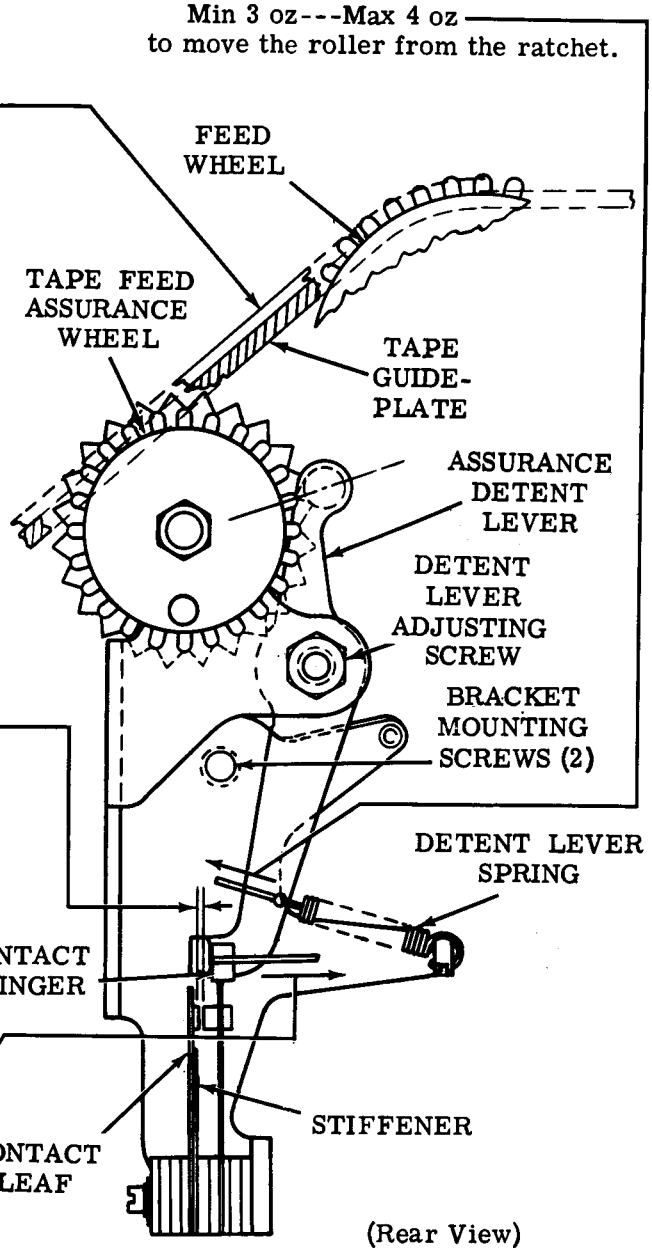
Requirement
Min 15 grams---Max 25 grams to separate contacts.

To Adjust
Bend swinger to meet requirement. Recheck TAPE MOTION CONTACT GAP.

(D) DETENT LEVER SPRING

To Check
Hold contact lever away from detent lever.

Requirement
Min 3 oz---Max 4 oz to move the roller from the ratchet.



3.03 Tape-Out Mechanism

(A) TAPE-OUT CONTACT

(1) To Check
Loosen contact bracket mounting screws. Pivot contact assembly until pad on tape-out pin extension is not touching the swinger pad. Check gap between normally open (top) contact points.

Requirement
Min 0.015 inch---Max 0.025 inch between normally open (top) contacts.

To Adjust
Bend upper contact spring to meet requirement.

(2) To Check
With assembly still in position, check force required to just separate normally closed (lower) contacts.

Requirement
Min 8 grams---Max 15 grams to just separate normally closed (lower) contacts.

To Adjust
Bend contact swinger. Recheck requirement under (1) To Check above.

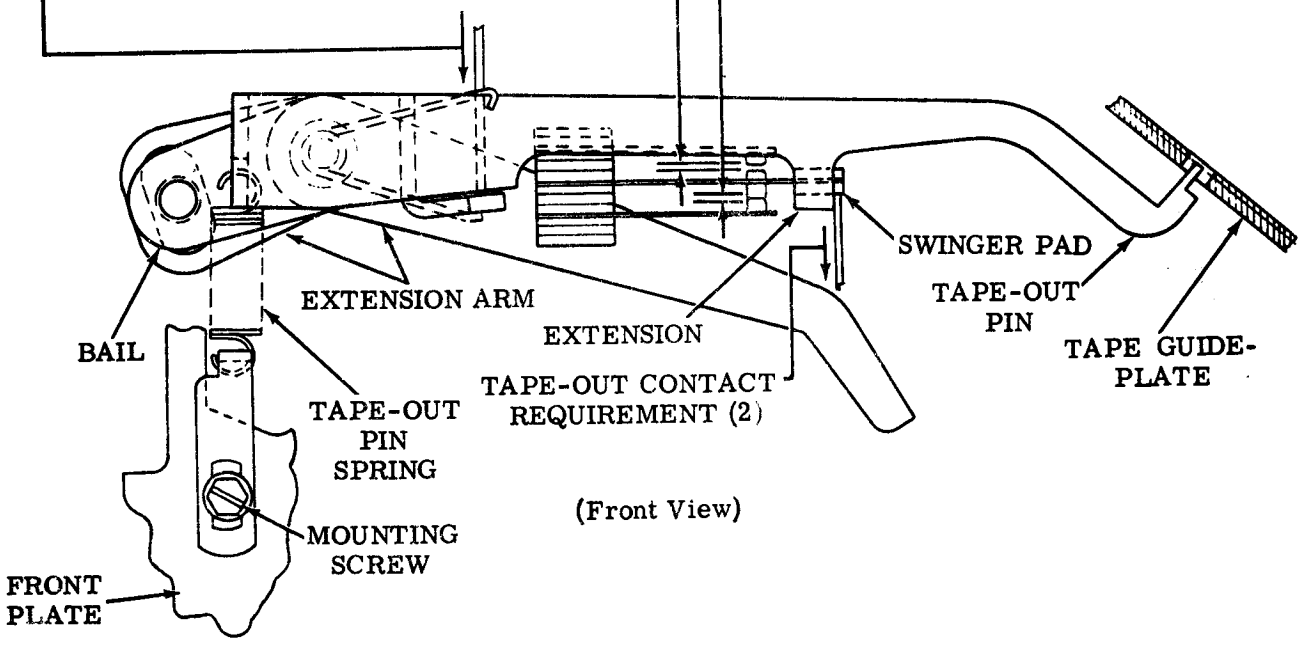
(3) To Check
Hold tape-out pin down. With some clearance between tape-out pin extension and underside of contact swinger, without tape, tape lid closed, and unit in run position, check gap between normally closed contacts.

Requirement
Min 0.008 inch---Max 0.018 inch gap between normally closed contacts.

To Adjust
With contact bracket mounting screws loosened, adjust contact mounting bracket to meet requirement. Retighten contact bracket mounting screws.

(B) TAPE-OUT BAIL TORSION SPRING

Requirement
Min 8 oz---Max 12 oz to separate bail from tape-out pin.



3.04 Tape-Out Mechanism (continued)

(C) TAPE-OUT PIN SPRING

To Check
Remove tape and open tape lid.

Requirement
Min 38 grams---Max 45 grams to press pin flush with tape guideplate.

To Adjust
Loosen tape-out spring bracket mounting screw and position bracket to meet requirement. Retighten bracket mounting screw.

(D) TAPE-OUT PIN

(1) To Check
Place control lever in free or stop position. Check position of tape-out pin in relation to tape guideplate.

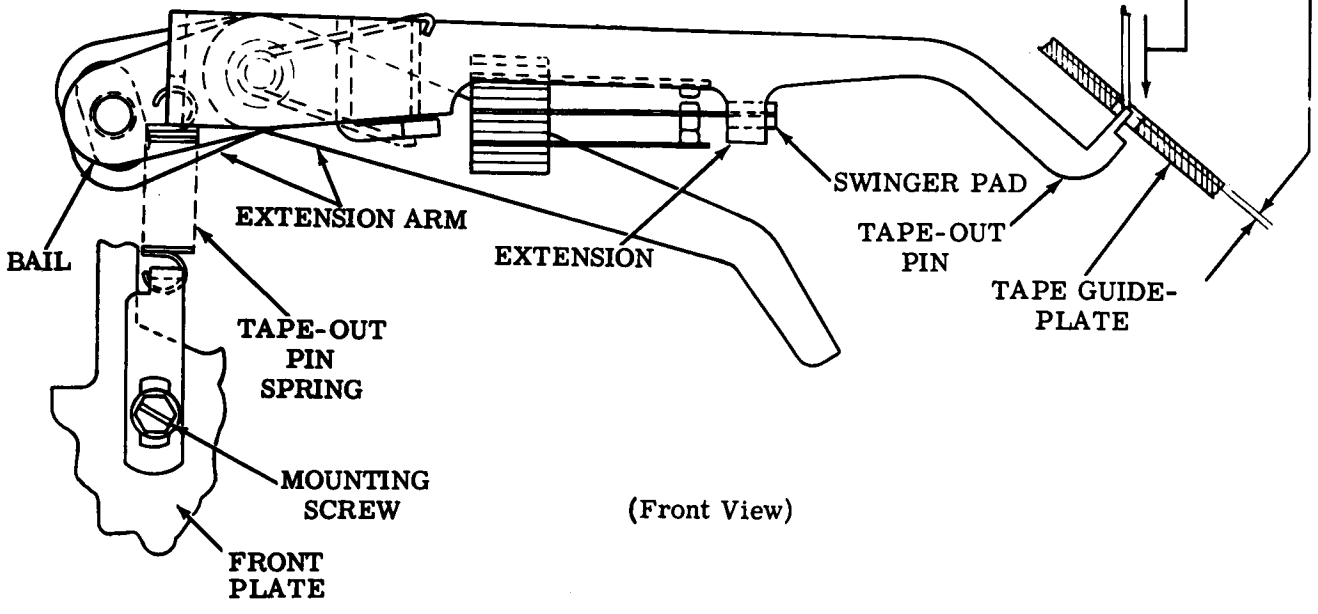
Requirement
Tape-out pin should be
Min flush---Max 0.010 inch
below surface of tape guideplate.

To Adjust
With control lever in stop position, loosen screw which secures the stop arm to the bracket with posts. Adjust stop arm to meet requirement. Tighten screw.

(2) To Check
Place control lever in run position. Check clearance between lower tape-out pin extension and tape-out bail extension.

Requirement
Min 0.055 inch clearance between lower tape-out pin extension and tape-out bail extension.

To Adjust
With control lever in run position, loosen screw which secures the extension arm to the intermediate tape-out bail. Using a tommy wrench or suitable tool, change relative position of extension arm to bail to obtain required clearance. Tighten screw. Check requirement under (1) To Check and refine, if necessary.



(Front View)

3.05 Code Reading Contacts

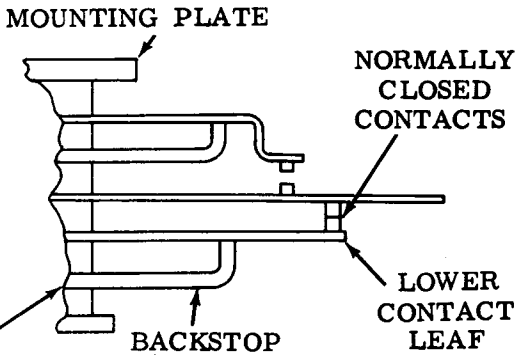
Note 1: Remove code reading contact assembly from transmitter distributor unit before making initial adjustments.

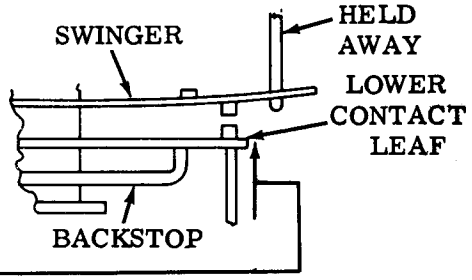
Note 2: When using the contact spring bender, start with the contact pile-up farthest from the handle of the tool and work toward the handle so as not to disturb adjustments already made.

(A) NORMALLY CLOSED CONTACTS — BACKSTOP

Requirement
Lower contact leaves for all levels should be parallel with the mounting plate and in line with one another.

To Adjust
Bend backstop to meet the requirement.

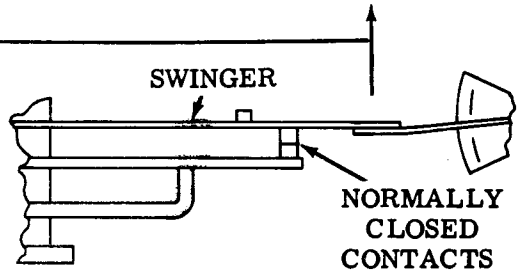




(B) NORMALLY CLOSED CONTACTS — SPRING

(1) Requirement
With swinger held away
Min 2 oz---Max 6 oz
to move lower contact leaf from backstop.

To Adjust
Bend lower leaf.



(2) Requirement
Min 30 grams---Max 40 grams
to open normally closed contacts.

To Adjust
Bend swinger.

Note 3: If it is necessary to bend backstop to obtain required tension, reposition backstop to meet NORMALLY CLOSED CONTACTS — BACKSTOP requirement.

(C) NORMALLY OPEN CONTACTS — GAP

Requirement
Min 0.010 inch---Max 0.015 inch
gap between normally open contacts.

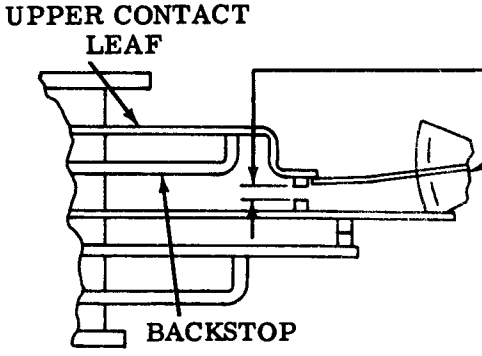
To Adjust
Bend associated backstop to meet requirement.

(D) NORMALLY OPEN CONTACTS — SPRING

Requirement
Min 30 grams---Max 40 grams
to move normally open contact away from backstop.

To Adjust
Bend upper contact leaf.

Note 4: If it is necessary to bend backstop to obtain required tension, reposition backstop to meet NORMALLY OPEN CONTACTS — GAP requirement.



(Front Views)

3.06 Code Reading Contacts (continued)

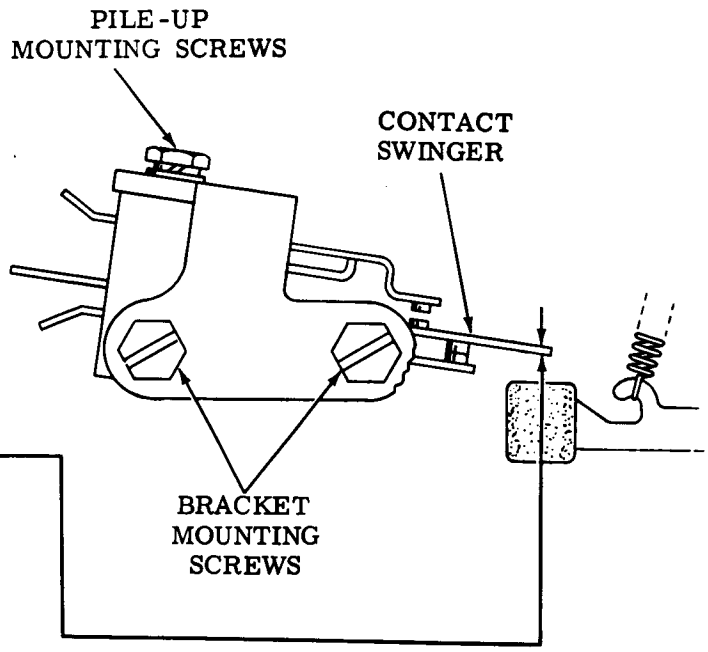
Note: Secondary adjustments should be made with code reading contact assembly installed in the transmitter distributor and with the contact assembly bracket approximately centered in its adjustment range. (Remove contact box to facilitate adjustment.)

(A) CONTACT ASSEMBLY POSITIONING

To Check
Align each swinger with its associated sensing arm. (Gauge by eye.)

Requirement
Swinger to be aligned with its sensing arm.

To Adjust
Loosen screws which mount the contact assembly to the contact bracket. Position the assembly to meet the requirement.



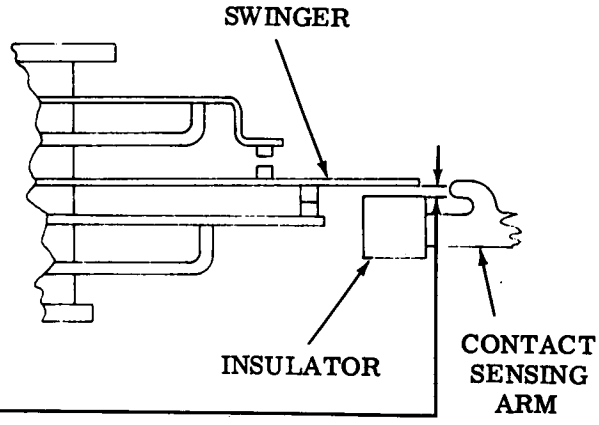
(Front Views)

(B) CONTACT SWINGER — SENSING ARM CLEARANCE

To Check
Place up-stop post out of the way and sensing arms in their uppermost positions. Select a BLANK combination.

Requirement
Min some---Max 0.010 inch gap between contact assembly swinger and insulator on contact sensing arm.

To Adjust
Loosen contact bracket mounting screws. Position bracket to meet the requirement. Tighten contact bracket mounting screws.



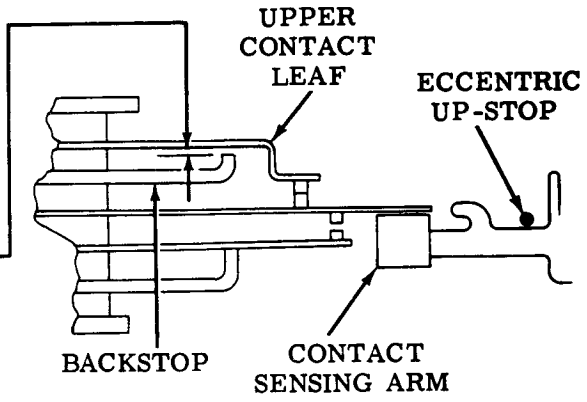
3.07 Code Reading Contacts (continued)

(A) CONTACT SENSING ARM — UP-STOP CLEARANCE

To Check
Rotate main shaft until sensing arms are in their highest positions. Engage clutch. Select a LETTERS combination.

Requirement
Min some---Max 0.008 inch clearance between upper contact leaf and its backstop.

To Adjust
Loosen nut that secures the eccentric up-stop to the front plate. Turn the eccentric to meet requirement. (High part of the eccentric should be toward the left.) Retighten eccentric nut.

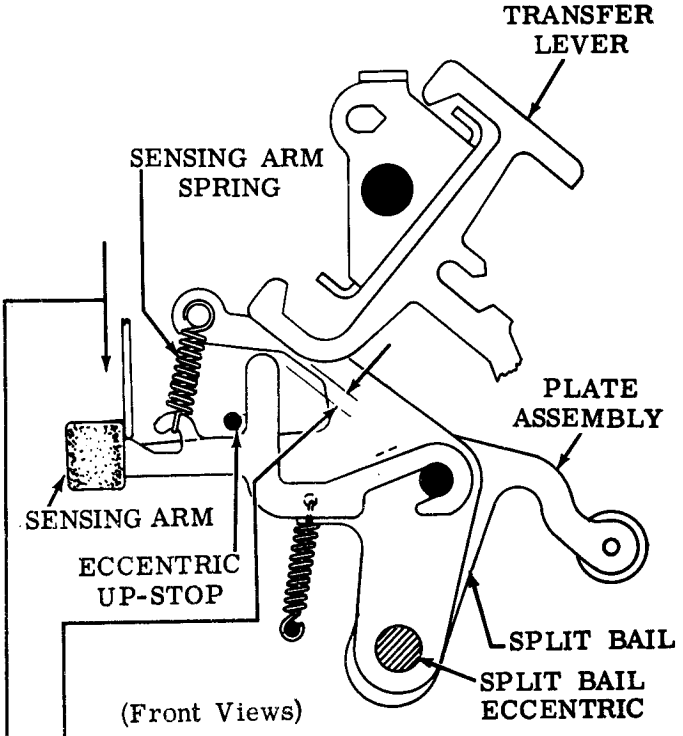


(B) SENSING ARM — TRANSFER LEVER ALIGNMENT

To Check
Trip clutch. Select BLANK combination.

Requirement
Sensing arms must engage a minimum of 2/3 of their respective transfer levers.

To Adjust
Add TP8896 shims between plate assembly and the split bail spacer to meet requirement. (Store remaining shims under flat washer at end of split bail eccentric screw.)



(Front Views)

(C) SENSING ARM SPRING

To Check
Disengage clutch.

Requirement
Min 2-1/2 oz---Max 3-1/2 oz to start sensing arm moving.

(D) SPLIT BAIL ECCENTRIC

To Check
Trip clutch. Select BLANK combination. Check clearance between closest transfer lever and its associated sensing arm.

Requirement
Min 0.005 inch---Max 0.010 inch

To Adjust
Loosen split bail eccentric locknut. Rotate split bail eccentric to meet requirement. Retighten locknut.

3.08 Code Reading Contacts (continued)

CONTACT SWINGER — SENSING ARM CLEARANCE (STROBING)

Note 1: When strobing the code reading contacts, use a DXD scale whose unit corresponds to that of the unit being checked. Refer to Contact Operating Requirements Table. The signal generator on the transmitter distributor must be synchronized with the DXD so that the end of the stop pulse image is in line with the end of the stop pulse on the DXD scale when transmission is continuous. Use a normal signal line direct current of 60 ma ±10% or 20 ma ±10% to strobe the contacts.

(1) Requirement
Contacts must open and close within the range specified on the Contact Operating Requirements Table.

(2) Requirement
Breaks in the pulses must be confined to the first and last 10 divisions of the trace.

CONTACT OPERATING REQUIREMENTS TABLE

Levels	Unit Code	Beginning Pulse			End of Pulse			Max. Pulse Length Osc (Div)
		Scale Segment	Scale Division	Tolerance (Div)	Scale Segment	Scale Division	Tolerance (Div)	
5	7.00	Pulse 1	25	±20	Pulse 5	15	±20	3
5	7.42	Pulse 1	30	±20	Pulse 5	40	±20	3
6	8.50	Pulse 0	45	±25	Pulse 5	5	±25	4

To Adjust
Loosen contact bracket mounting screws. Position bracket to meet requirements. Retighten contact bracket mounting screws.

Note 2: After making the adjustment, check clearance between contact swinger and insulator on the contact sensing arm when a BLANK combination has been selected and the main shaft rotated to place the sensing arms in their highest position. There must be some clearance. If the requirements cannot be met, recheck initial mechanical adjustments.

3.09 Auxiliary Contacts

Note: Make initial adjustments with the auxiliary contacts removed from the transmitter distributor unit.

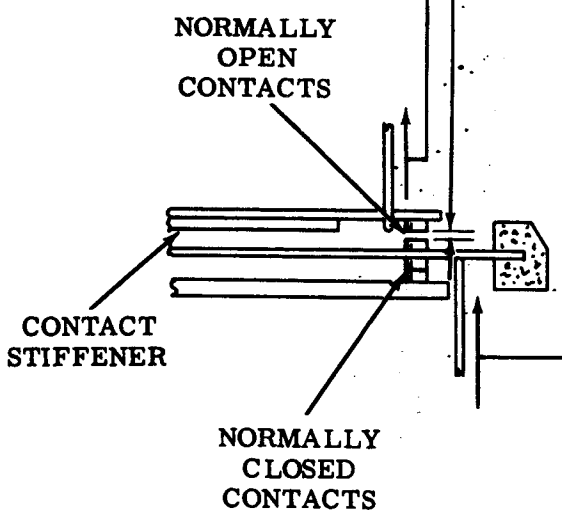
(A) NORMALLY OPEN CONTACTS

(1) Requirement
Min 5-1/2 oz---Max 6 oz
to move normally open contact
away from stiffener.

To Adjust
Bend normally open contact leaf
to meet requirement.

(2) Requirement
Min 0.015 inch---Max 0.020 inch
gap between normally open contacts.

To Adjust
Bend contact stiffener to meet
requirements.



(Front View)

(B) NORMALLY CLOSED CONTACTS

Requirement
Min 4 oz---Max 5 oz
to open normally closed contact.

To Adjust
Bend swinger contact to meet requirement.

3.10 Auxiliary Contacts (continued)

Note: Make secondary adjustments with the auxiliary contacts installed in the transmitter distributor.

(A) CONTACT SENSING ARM

(1) To Check
Disengage and latch clutch. Check clearance between insulator on swinger and bail.

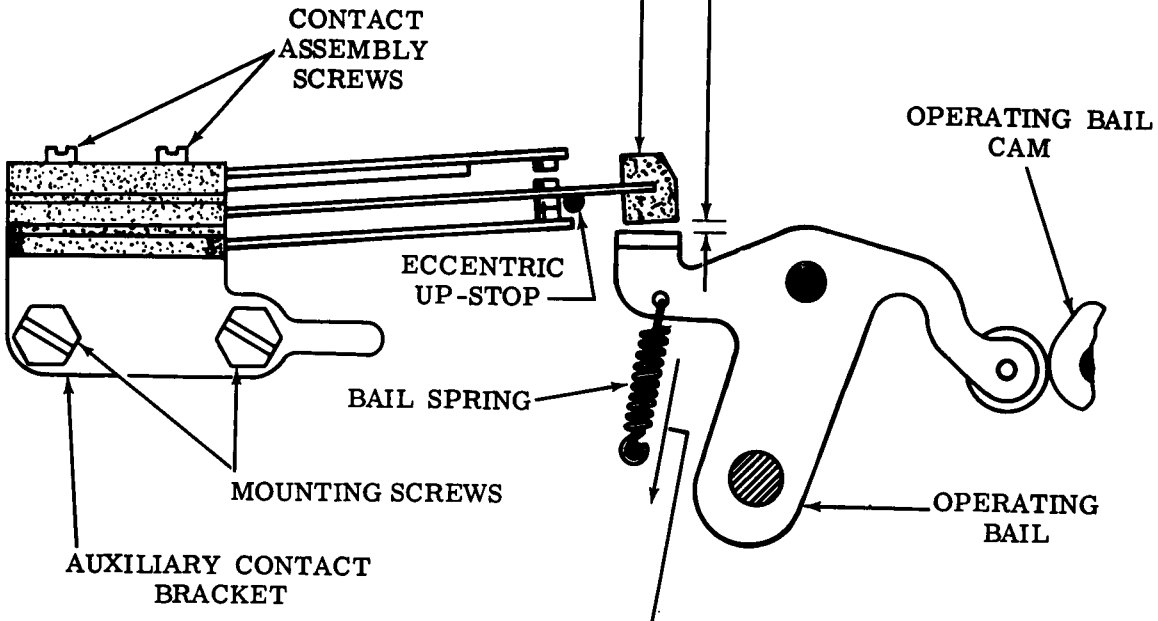
Requirement
Swinger insulator should be centrally located with respect to its operating bail.

To Adjust
Loosen contact assembly screws. Position swinger and contact springs. Retighten contact assembly screws.

(2) To Check
Check position of swinger with respect to its bail.

Requirement
Min 0.040 inch—Max 0.050 inch between insulator on swinger and its bail.

To Adjust
Loosen contact bracket mounting screws. Position contact bracket to meet requirement. Retighten contact bracket mounting screws.



(Front View)

(B) AUXILIARY CONTACT OPERATING BAIL SPRING

To Check
Disengage clutch.

Requirement
Min 5 oz---Max 7 oz to pull spring to its installed length.

3.11 Auxiliary Contacts (continued)

CONTACT SWINGER — OPERATING BAIL CLEARANCE

Note: When strobing the auxiliary contacts, use a DXD scale whose unit code corresponds to that of the unit being checked. (Refer to Contact Operating Requirements Table.) Synchronize the signal generator of the transmitter distributor with the DXD so that the end of the stop pulse image is in line with the end of the stop pulse on the DXD scale when transmission is continuous. Use normal direct current line signal of 60 ma ±10% or 20 ma ±10% to strobe the contacts.

Requirement

The contacts must open and close within the range specified in the Contact Operating Requirements Table.

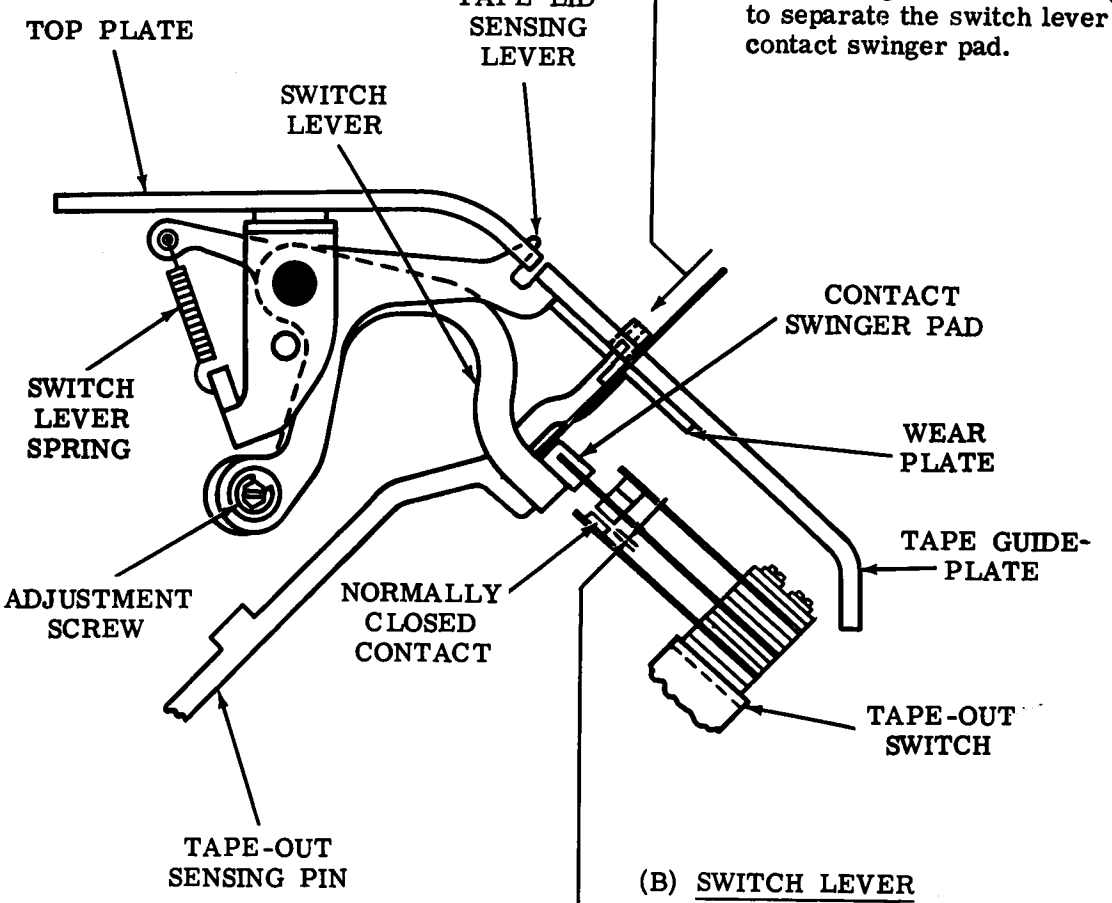
To Adjust

Loosen the contact bracket mounting screws. Position the contacts to meet the requirements. Retighten contact bracket mounting screws.

CONTACT OPERATING REQUIREMENTS TABLE

Levels	Unit Code	Start of Pulse			End of Pulse		
		Scale Segment	Scale Division	Tolerance (Div)	Scale Segment	Scale Division	Tolerance (Div)
5	7.00	Pulse 1	65	±15	Pulse 4	65	±15
5	7.42	Pulse 1	75	±15	Pulse 4	90	±15
6	8.50	Pulse 1	0	±20	Pulse 4	60	±20

3.12 Tape Lid Sensing Lever



(Front View)

(A) SWITCH LEVER SPRING

To Check
Open tape lid.

Requirement
Min 20 grams---Max 35 grams to separate the switch lever from the contact swinger pad.

(B) SWITCH LEVER

To Check
Open tape lid. Depress the tape-out sensing pin.

Requirement
Min 0.005 inch---Max 0.015 inch between the normally closed tape-out switch contacts.

To Adjust
Loosen the adjustment screw. With the tape lid sensing lever seated firmly against the tape guideplate, rotate the switch lever clockwise or counter-clockwise to meet requirement. Re-tighten adjustment screw.

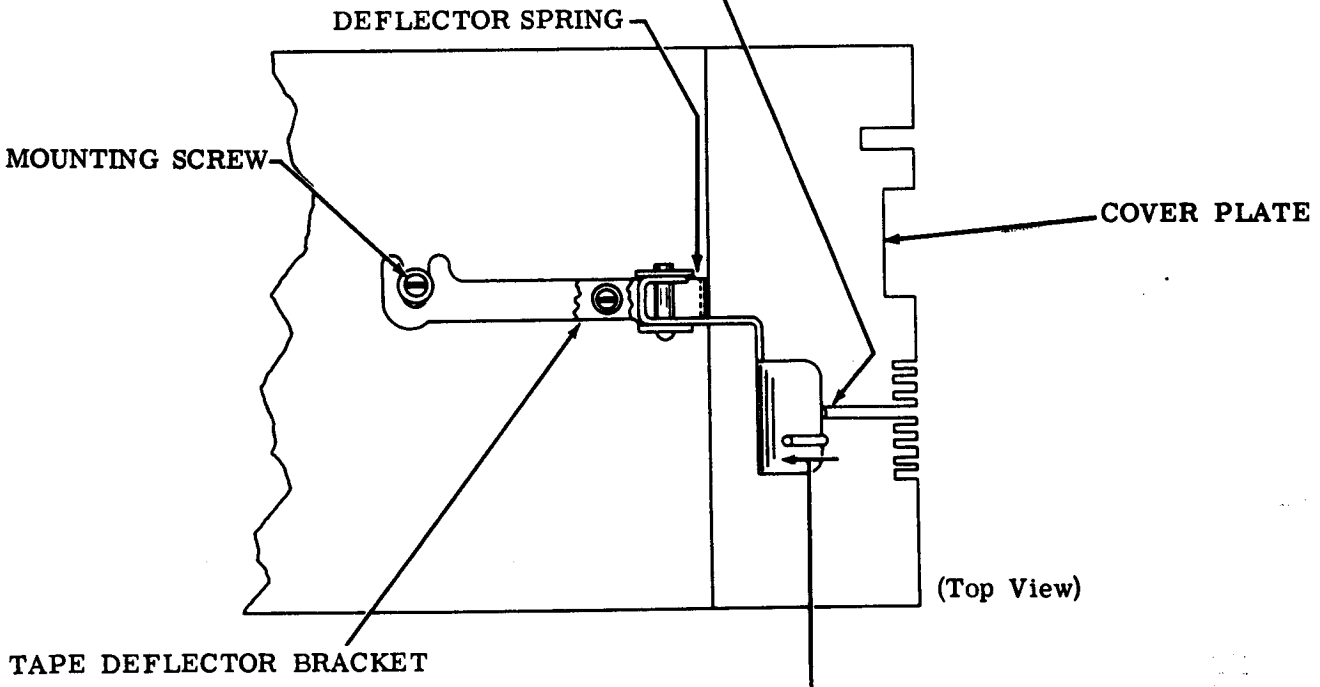
3.13 Tape Deflector

(A) TAPE DEFLECTOR BRACKET

To Check
Check position of deflector tang in relation to its hole in top plate when the unit is in its operating position.

Requirement
Deflector tang should be located centrally in its hole in the top plate.

To Adjust
Remove rear screw which secures tape deflector spring to the cover plate. Loosen forward screw. Position tape deflector. Replace rear screw, and tighten both forward and rear screws.



(B) TAPE DEFLECTOR SPRING

Requirement
Min 1-1/2 oz---Max 4 oz to start the deflector moving from its operating position.

To Adjust
Loosen mounting screw. Position the spring using the enlarged mounting slot. Retighten mounting screw.

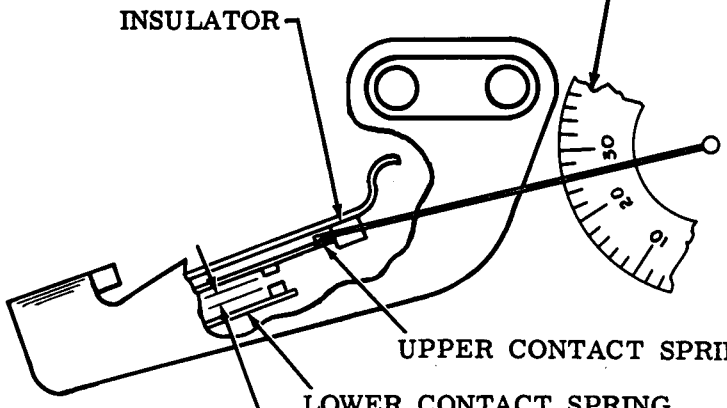
3.14 Start-Stop Pulse Contact

(A) CONTACT LEVER

To Check
Remove contact assembly from unit. Insure that no clearance exists between the contact lever and insulator.

Requirement
Min 20 grams---Max 30 grams to move insulator from contact operating lever.

To Adjust
Bend upper contact spring.



(B) CONTACT GAP (START AND STOP CONTACTS)

Requirement
Min 0.012 inch---Max 0.018 inch

To Adjust
Bend lower contact spring.

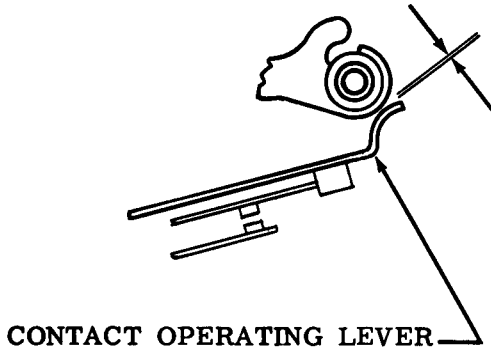
(Front Views)

(C) CONTACT BRACKET

To Check
Place unit in stop position. Latch clutch. Check clearance between contact operating lever and transfer lever.

Requirement
Min 0.012 inch---Max 0.018 inch

To Adjust
Loosen mounting bracket screws. Position contact assembly to meet requirement. Retighten mounting bracket screws. Replace contact assembly in unit.



3.15 Start-Stop Pulse Contact (continued)

CONTACT BRACKET (STROBING)

Note 1: When strobing auxiliary contacts, use a 7.42 unit DXD scale. Synchronize the signal generator of the transmitter distributor with the DXD so that the end of the stop pulse image is in line with the end of the stop pulse on the DXD scale when transmission is continuous. Use normal signal line direct current of 60 ma ± 10% or 20 ma ± 10% to strobe the contacts.

Requirement
Contacts must close within the following range.

	MIN CLOSURE	CLOSURE RANGE
STOP CONTACT	95 DIV	0 DIV OF STOP SEGMENT TO 142ND DIV OF STOP SEGMENT
START CONTACT	60 DIV	122ND DIV OF STOP SEGMENT TO 95TH DIV OF START SEGMENT

Note 2: Breaks are permissible within 5 divisions of the beginning or end of a trace.

To Adjust
Loosen contact bracket mounting screws. Position the contact bracket to meet requirements. Retighten contact bracket mounting screws.

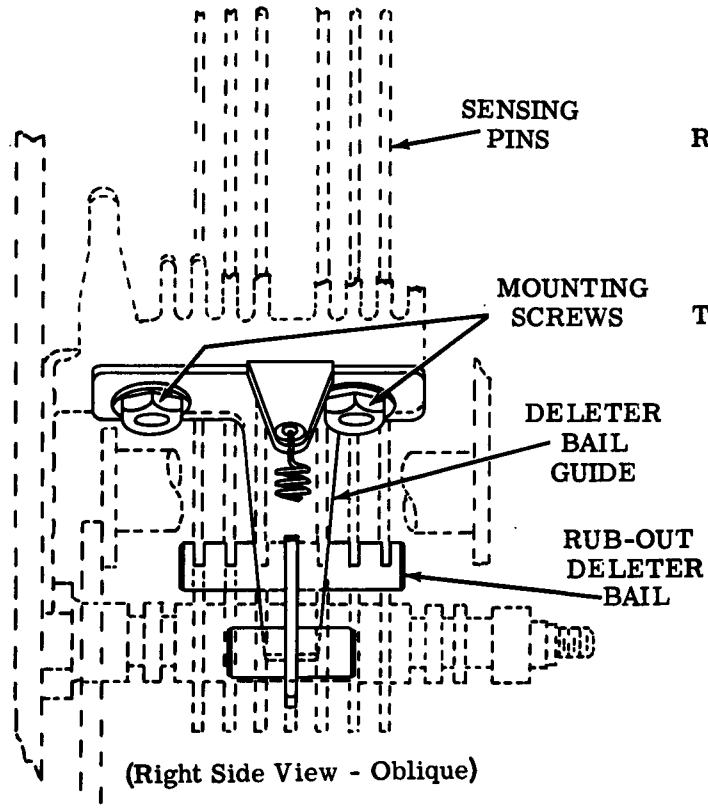
3.16 Rub-Out Deleter

(A) RUB-OUT DELETER BAIL GUIDE

To Check
Place sensing pins in their highest position. Check that deleter bail moves freely in its guide.

Requirement
When the rub-out permutation code is present, the rub-out deleter bail should rest against the lower projection of the sensing pin.

To Adjust
Loosen mounting screws friction tight. Position deleter bail guide. Retighten mounting screws.



(Right Side View - Oblique)

(B) SENSING PIN SPRING

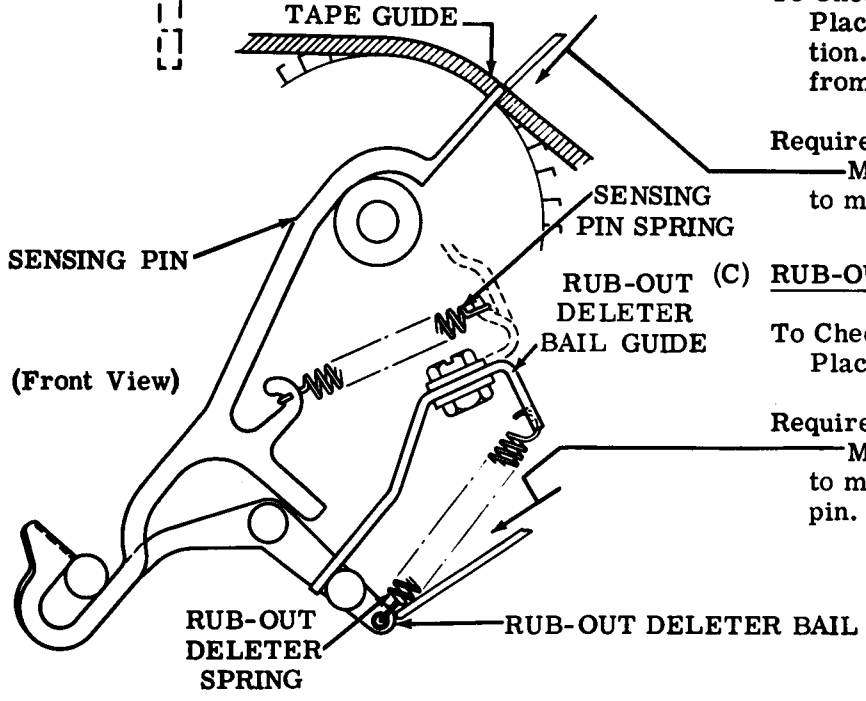
To Check
Place sensing pin in its highest position. Hold rub-out deleter bail away from the pin.

Requirement
Min 3 oz---Max 5 oz
to move pin flush with tape guide.

(C) RUB-OUT DELETER BAIL SPRING

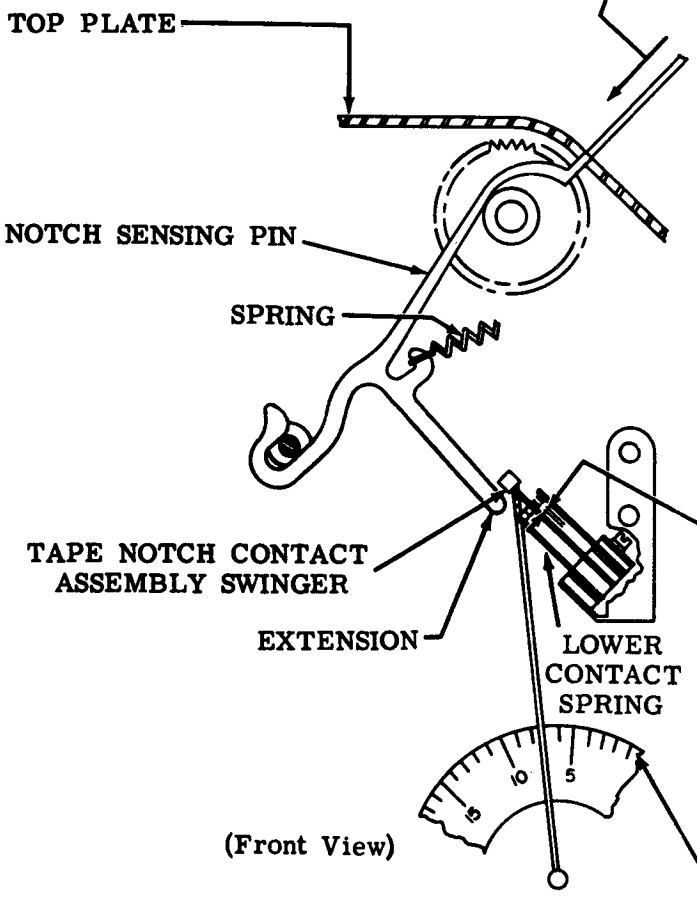
To Check
Place sensing pin in highest position.

Requirement
Min 1 oz---Max 2-1/2 oz
to move bail away from the sensing pin.



(Front View)

3.17 Tape Notch Sensing Mechanism



(A) TAPE NOTCH SENSING PIN SPRING

To Check
Place sensing pin in highest position.

Requirement
Min 1 oz---Max 3 oz
to push sensing pin flush with surface of top plate.

(B) TAPE NOTCH SENSING CONTACT

(1) To Check
Check the location of the insulator with relation to the extension on sensing pin.

Requirement
Insulator on swinger should be centrally located with respect to the extension on sensing pin.

To Adjust
Loosen contact assembly mounting screws. Position contact assembly to meet requirement. Retighten mounting screws.

(2) To Check
Place sensing pin flush with top plate. Check clearance between sensing pin extension and insulator of contact swinger. Check gap between normally open contacts.

Requirement
Min 0.008 inch---Max 0.015 inch

To Adjust
Bend swinger to meet requirement.

(3) To Check
Hold sensing pin extension away from swinger.

Requirement
Min 8 grams---Max 15 grams
to just separate normally closed contacts.

To Adjust
Bend lower contact spring to meet requirement.

3.18 Tape Notch Sensing Mechanism (continued)

CONTACT BRACKET (STROBING)

Note: When using the tape notch sensing contacts, use a 7.42 unit DXD scale. Synchronize the transmitter distributor so that the end of the stop pulse image is in line with the end of the stop pulse on the DXD scale when transmission is continuous. Use a normal direct current line signal of 60 ma ±10% or 20 ma ±10% to strobe these contacts.

(FOR UNITS WITH TAPE SLACK ARM)

(1) Requirement
The contact should open no earlier than the 15 mark of the first pulse and open no later than the 55 mark of the first pulse.

(2) Requirement
The contact should close no earlier than the 15 mark of the fifth pulse and close no later than the 55 mark of the fifth pulse.

(3) Requirement
Contact breaks will be permitted between the 15 mark and the 55 mark of the fifth pulse. The magnitude of the breaks must not extend beyond these limits.

To Adjust
Loosen bracket contact mounting screws. Position contact bracket to meet requirements. Retighten mounting screws.

(FOR UNITS WITHOUT TAPE SLACK ARM)

(1) Requirement
The contact should close no earlier than the 15 mark of the first pulse and close no later than the 55 mark of the first pulse.

(2) Requirement
The contact should open no earlier than the 15 mark of the fifth pulse and open no later than the 55 mark of the fifth pulse.

(3) Requirement
Contact breaks will be permitted between the 15 and 55 marks of the first pulse. The magnitude of the breaks must not extend beyond these limits.

To Adjust
Loosen bracket contact mounting screws. Position contact bracket to meet requirements. Retighten mounting screws.

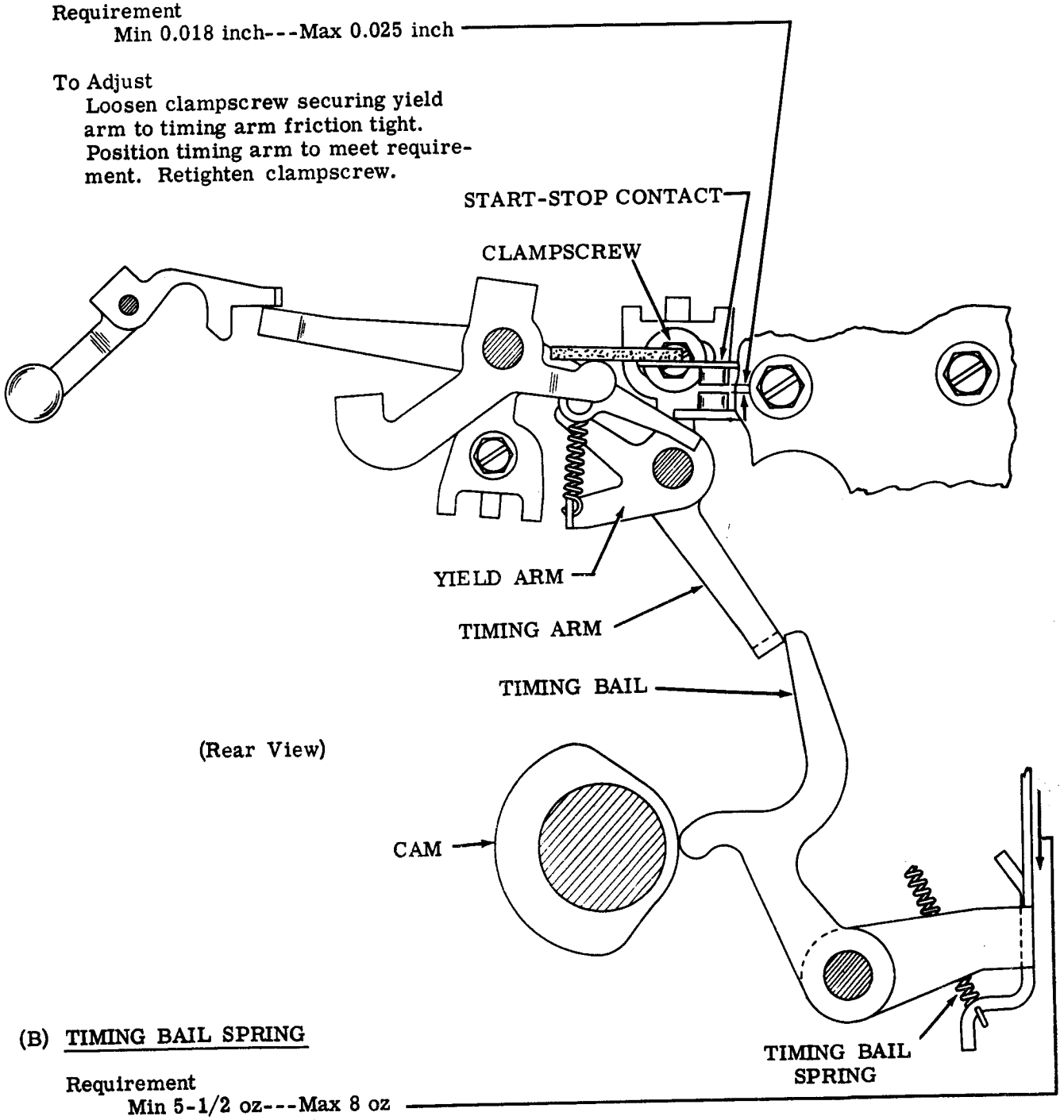
3.19 Transmitter Stop Mechanism

(A) START-STOP CONTACT GAP (FOR TABULATOR CONTROL)

To Check
Place timing bail on lower part of its cam. Check start-stop contact gap.

Requirement
Min 0.018 inch---Max 0.025 inch

To Adjust
Loosen clampscrew securing yield arm to timing arm friction tight. Position timing arm to meet requirement. Retighten clampscrew.



(B) TIMING BAIL SPRING

Requirement
Min 5-1/2 oz---Max 8 oz to start the bail moving.

3.20 Tape Slack Arm

TAPE SLACK CONTACTS

To Check

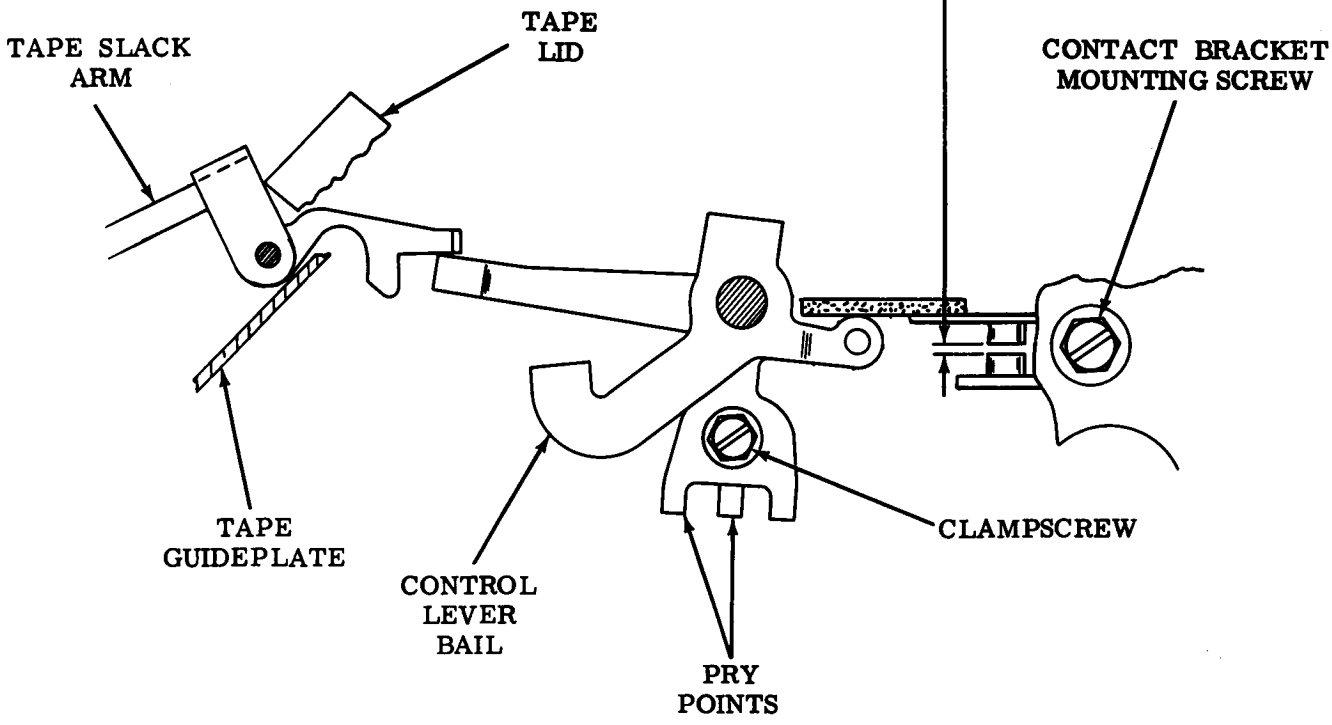
Close tape lid. Place control lever in run position. Check clearance between contacts when tape slack arm is raised to its maximum height.

Requirement

Min 0.010 inch---Max 0.020 inch

To Adjust

Loosen clampscrew. Set contact gap by positioning pry points. Retighten clampscrew.



(Rear View)

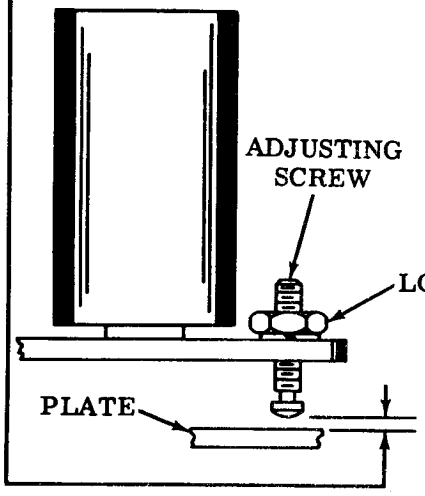
3.21 Tape Withhold Mechanism

(A) MAGNET ARMATURE GAP

To Check
With the armature attracted, check the gap between the end of the armature adjusting screw and the plate.

Requirement
Min 0.020 inch---Max 0.025 inch

To Adjust
Loosen armature adjusting screw locknut friction tight. Rotate adjusting screw to meet requirement. Retighten locknut.



(B) BLOCKING BAIL ARM ECCENTRIC

To Check
Place sensing pins in their lowest position. Place high part of block bail arm eccentric pivot to right at approximately the same angular position as the feed pawl eccentric.

Requirement
some clearance between the extension on the blocking bail and the tail of the feed pawl.

To Adjust
Loosen arm eccentric clampscrew. Rotate arm eccentric to meet requirement. Retighten clampscrew.

(C) BLOCKING BAIL ECCENTRIC PIVOT

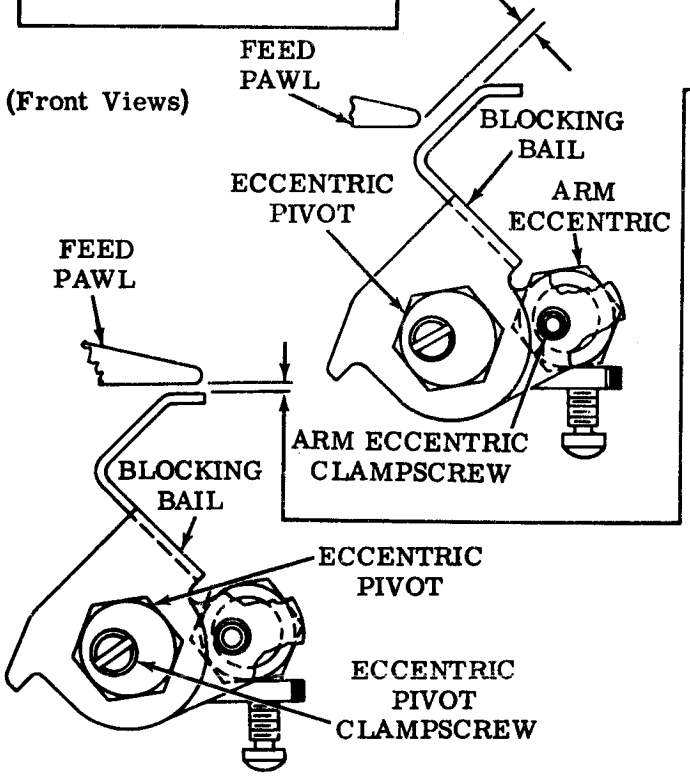
To Check
Trip clutch. Hold armature attracted. Hold main shaft latched in stop position. Check clearance between blocking bail extension and feed pawl at closest point.

Requirement
Min 0.002 inch---Max 0.035 inch

To Adjust
Loosen eccentric pivot clampscrew friction tight. Rotate eccentric pivot to meet requirement. Retighten clampscrew.

Note 1: Check BLOCKING BAIL ARM ECCENTRIC adjustment, and refine if necessary.

Note 2: As a final check on this adjustment there should be some---to---0.015 inch clearance between the feed pawl and the feed ratchet at the closest point, as the feed pawl is cammed out of the ratchet during the blocking operation (magnet armature attracted). If necessary, refine BLOCKING BAIL ARM ECCENTRIC and BLOCKING BAIL ECCENTRIC PIVOT adjustments to meet this requirement.



4. EARLY MODELS

4.01 Tape Lid Mechanism

Note: Remove top and tape guideplate. Lubricate before adjustment.

TAPE LID

(1) To Check
Hold tape against notch in tape guideplate. Align feed wheel groove in tape lid with slot in plate. Align tape-out pin hole in plate tape lid with hole in plate. Check clearance between tape lid and pivot shoulder.

Requirement
—Min some---Max 0.010 inch clearance between tape lid and pivot shoulder.

To Adjust
Loosen tape lid mounting nuts friction tight. Insert tip of TP156743 gauge through slot and into groove of lid. Position tape lid bracket. Retighten nuts.

(2) To Check
Tape lid front bearing surface should rest squarely against tape guideplate. Check rear bearing surface clearance.

Note: When both plates are assembled on unit, left edge of lid may touch top plate and some change in this clearance may be expected.

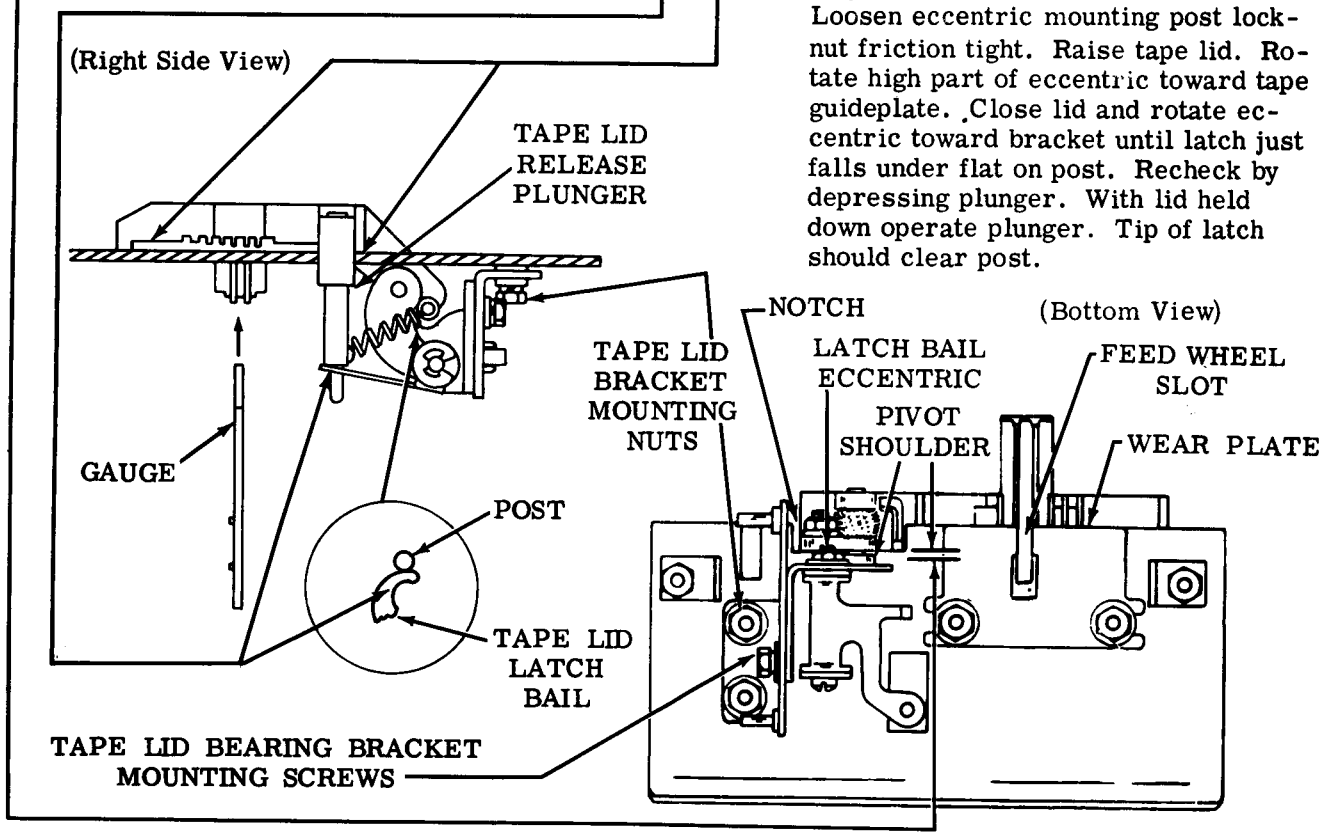
Requirement
—Min some---Max 0.003 inch clearance between rear bearing surface and tape guideplate.

To Adjust
Loosen tape lid bracket mounting screws friction tight. Press tape lid against tape guideplate. Position bracket. Recheck requirement. Retighten bracket mounting screws.

(3) To Check
Latch tape lid against tape guideplate. Check release plunger for endplay.

Requirement
—Some endplay when lid is latched against tape guideplate.

To Adjust
Loosen eccentric mounting post locknut friction tight. Raise tape lid. Rotate high part of eccentric toward tape guideplate. Close lid and rotate eccentric toward bracket until latch just falls under flat on post. Recheck by depressing plunger. With lid held down operate plunger. Tip of latch should clear post.

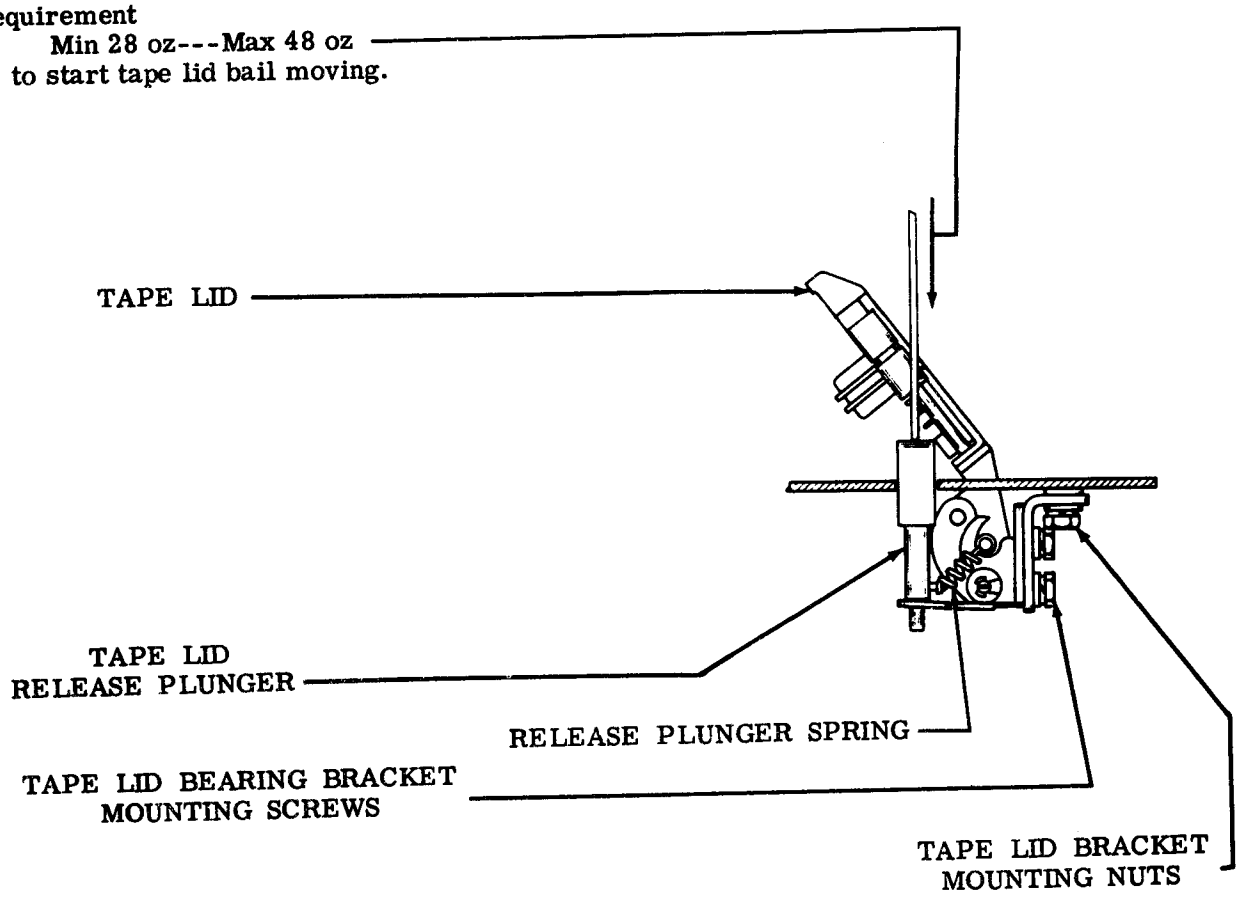


4.02 Tape Lid (continued)

TAPE LID RELEASE PLUNGER SPRING (For Units without Tape Lid Spring)

To Check
Hold tape guideplate horizontally. Unlatch tape lid.

Requirement
Min 28 oz---Max 48 oz to start tape lid bail moving.



(Right Side View)

28 TRANSMITTER-DISTRIBUTOR UNIT (LXD)

LUBRICATION

CONTENTS PAGE

1. GENERAL

1.01 This section provides lubrication information for the 5-level 28 transmitter-distributor unit (single contact).

CAUTION: THE UNIT IS SHIPPED WITH OIL RESERVOIR EMPTY. REMOVE COVER PLATE FOR ACCESS AND FILL OIL RESERVOIR AS INDICATED IN 2.07.

1.02 In this section, the general areas of the unit are shown by photographs. The specific points of lubrication are indicated by line drawings and descriptive text. The symbols in the text indicate the following directions:

O1	Apply one drop of oil.
O2	Apply two drops of oil, etc.
G	Apply thin coat of grease.
SAT	Saturate with oil (felt washers, oilers, etc).

1.03 Use KS7470 oil at all locations where the use of oil is indicated. Use KS7471 grease on all surfaces where grease is indicated.

1.04 The unit should be thoroughly lubricated, but over-lubrication which allows oil to drip or grease to be thrown on other parts, must be avoided. Exercise special care to prevent lubricant from getting between armature and pole faces. Keep all electrical contacts free from oil or grease.

1.05 The following general instructions supplement the specific lubricating points illustrated in this section.

(1) Apply one drop of oil to all spring hooks.

(2) Apply a light film of oil to all cam surfaces.

(3) Apply a coat of grease to all gears.

(4) Saturate all felt washers, oilers, etc.

(5) Apply oil to all pivot points.

(6) Apply oil to all sliding surfaces.

1.06 The transmitter-distributor unit should be lubricated before being placed in service or prior to storage. After a few weeks of service, relubricate to make certain that all specified points have received lubricant. There-

after, the following schedule should be adhered to:

OPERATING SPEED	LUBRICATION INTERVAL
60 wpm	3000 hours or 1 year*
75 wpm	2400 hours or 9 months*
100 wpm	1500 hours or 6 months*

*Whichever occurs first.

1.07 For information pertaining to lubrication of associated parts - ie, motors, bases, etc, refer to the appropriate sections.

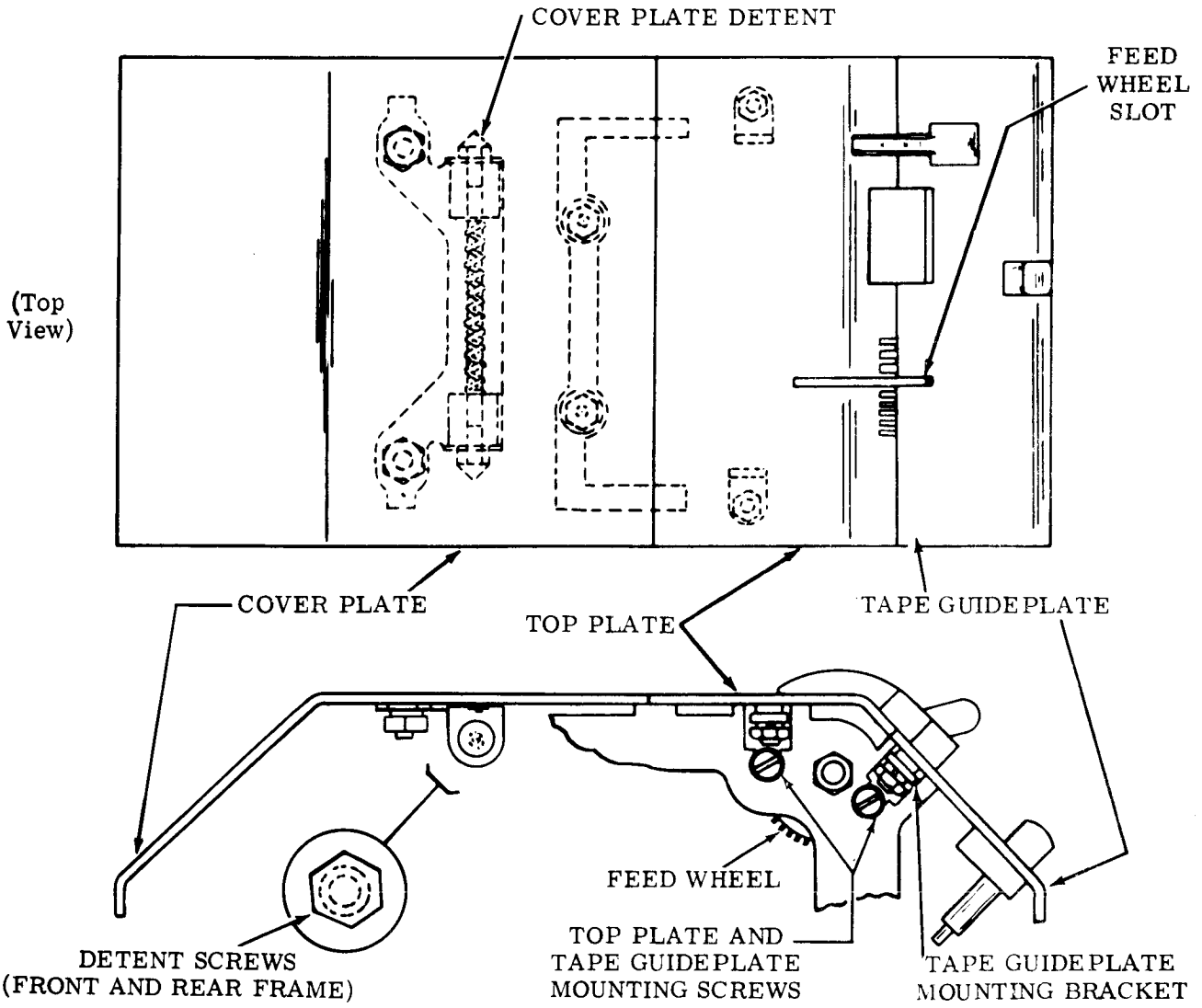
1.08 Instructions

(1) Removing Cover Plate: Lift left end of plate to release the detent fasteners then slide cover plate toward the left. Replace cover in the reverse order.

(2) Removing Top Plate: Loosen the front and rear mounting screws. Lift top plate upward.

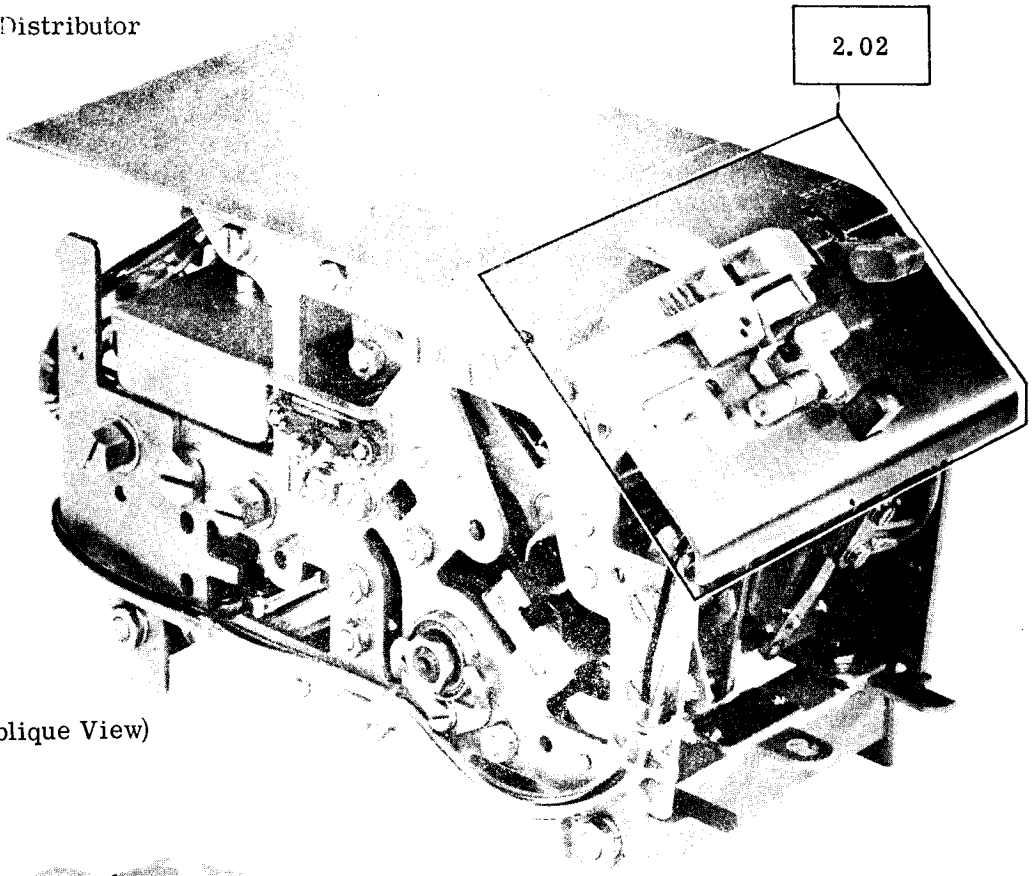
(3) Remaining Tape Guideplate: Loosen the tape guideplate mounting screws. Lift the tape guideplate.

(4) Removing Transmitter-Distributor Assembly: Remove the screws which attach the unit to the base, and lift unit up to disengage the gears. Disconnect electrical plug.

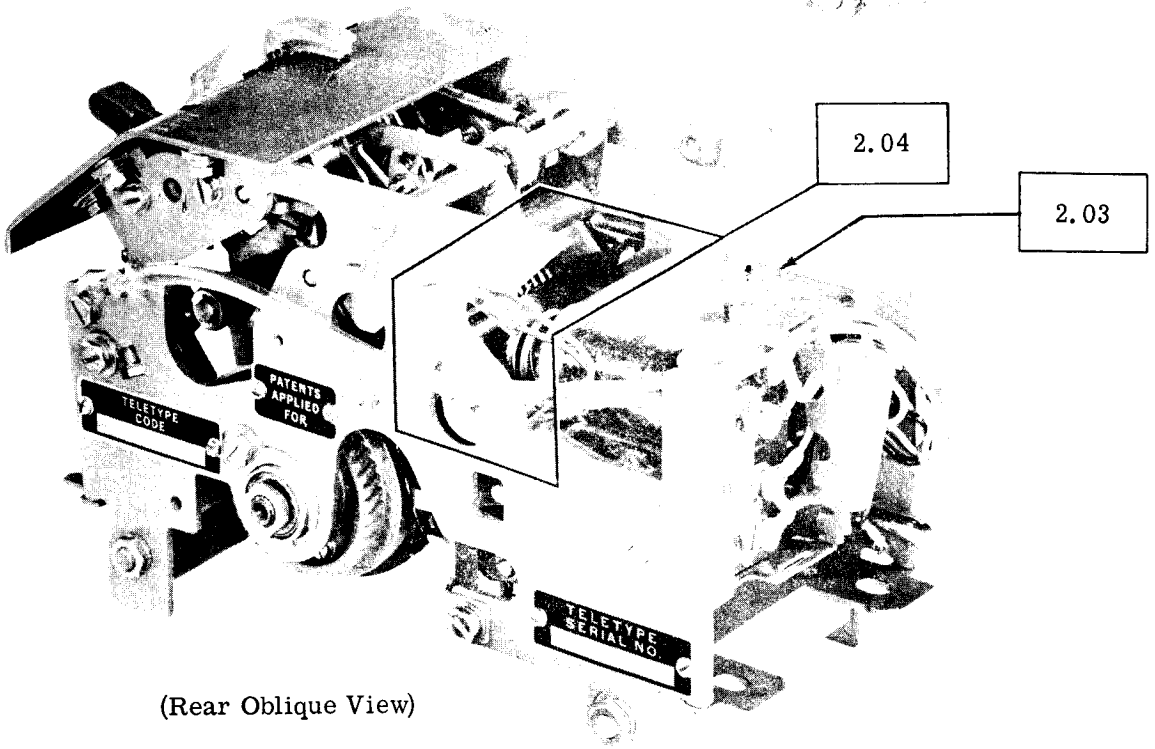


2. BASIC UNIT

2.01 Transmitter Distributor

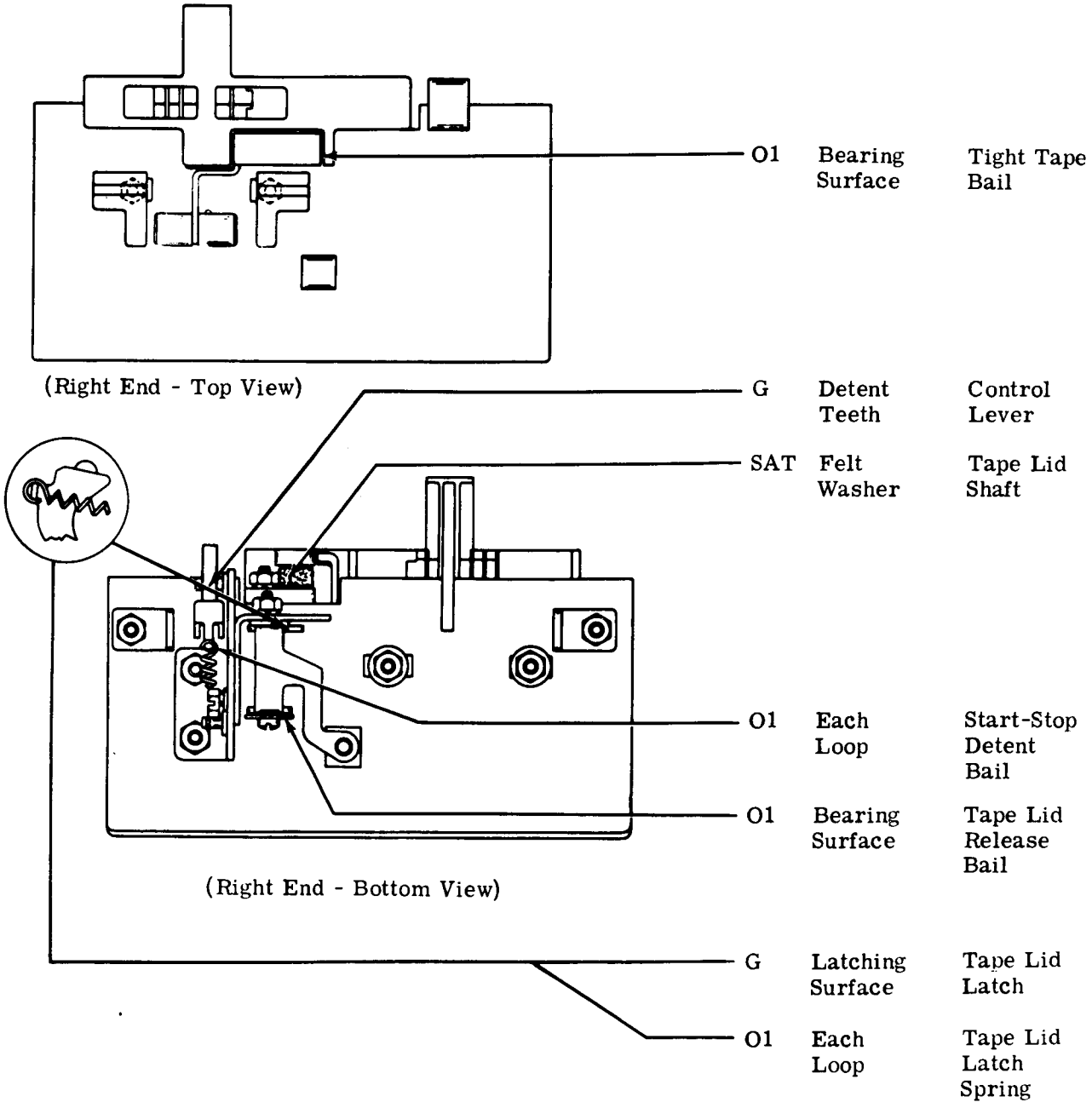


(Front Oblique View)

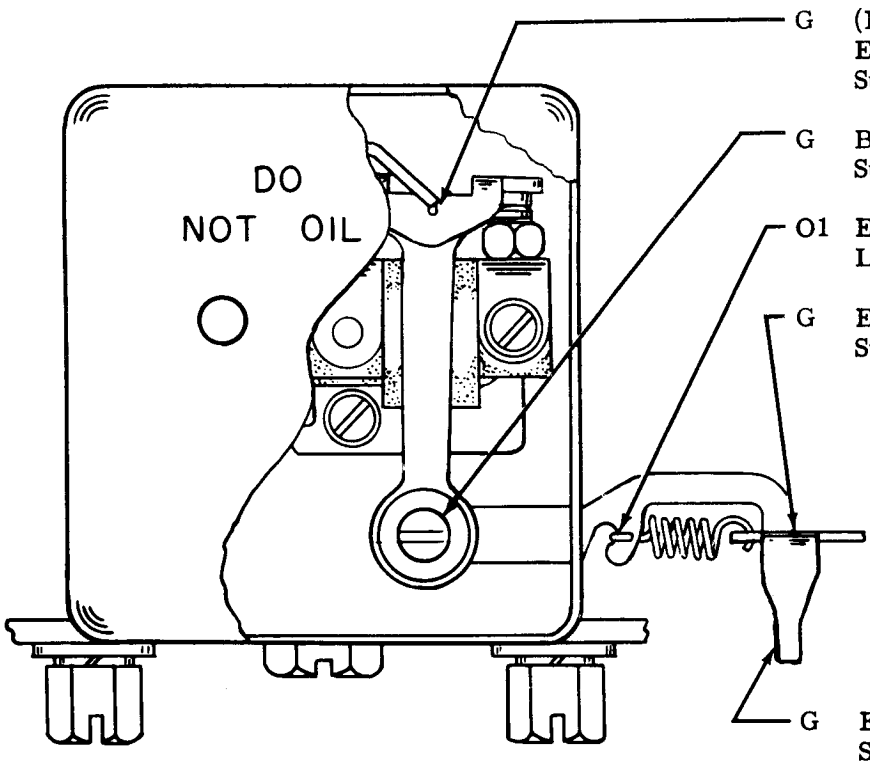


(Rear Oblique View)

2.02 Tape Guideplate



2.03 Signal Contact Assembly

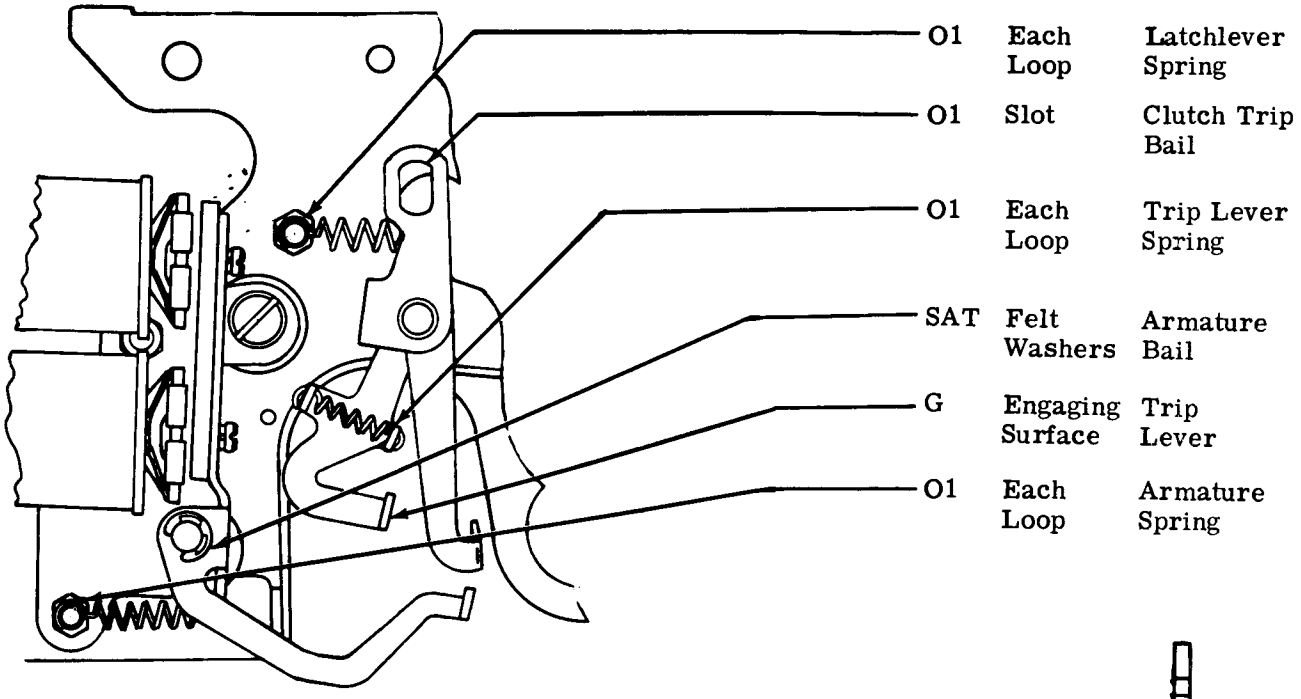


G	(Light Film) Engaging Surface	Toggle Link
G	Bearing Surface	Toggle (Metal) Bushing
O1	Each Loop	Drive Link Spring
G	Engaging Surface	Transfer Bail and Link
G	Engaging Surface	Transfer Bail Extension

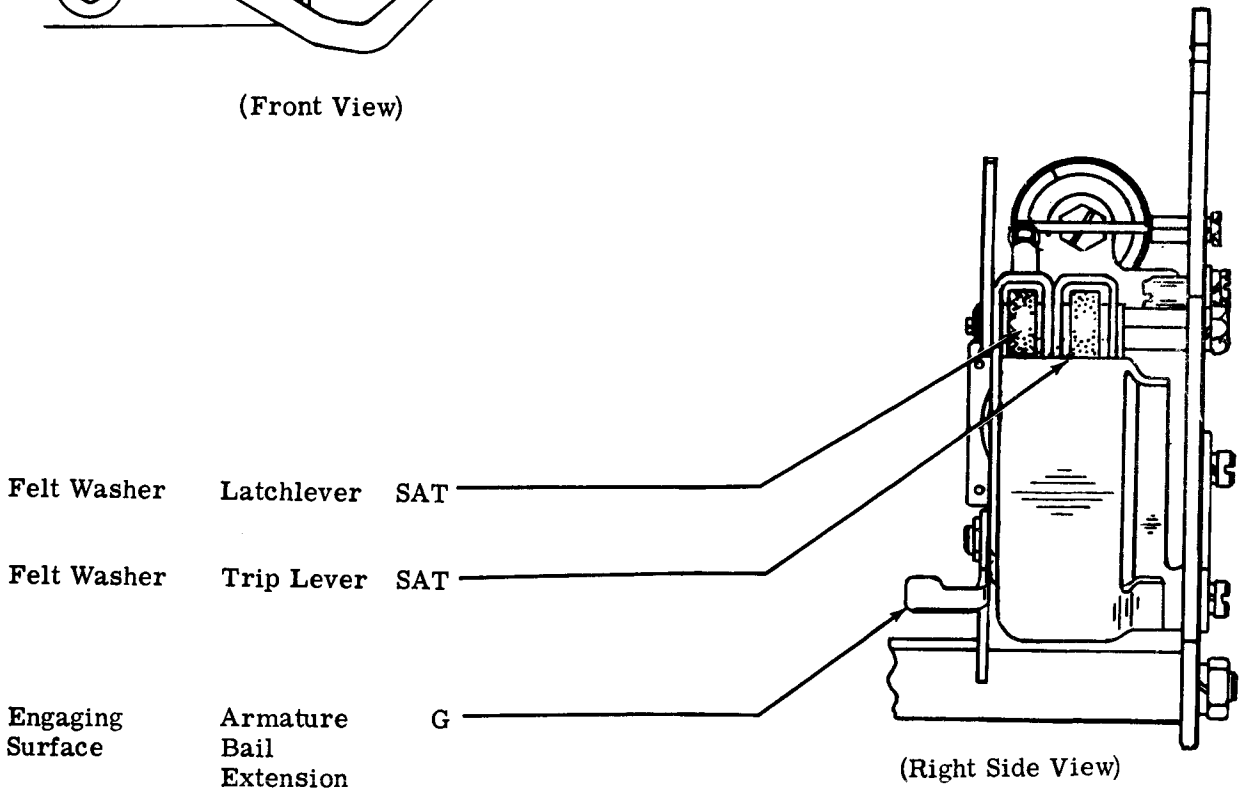
(Top View - Cover Plate Removed)

Note: The marking "DO NOT OIL" on the signal contact box should be interpreted literally. Portions of the mechanism should be greased as indicated, but no oil should be used.

2.04 Clutch Trip Assembly

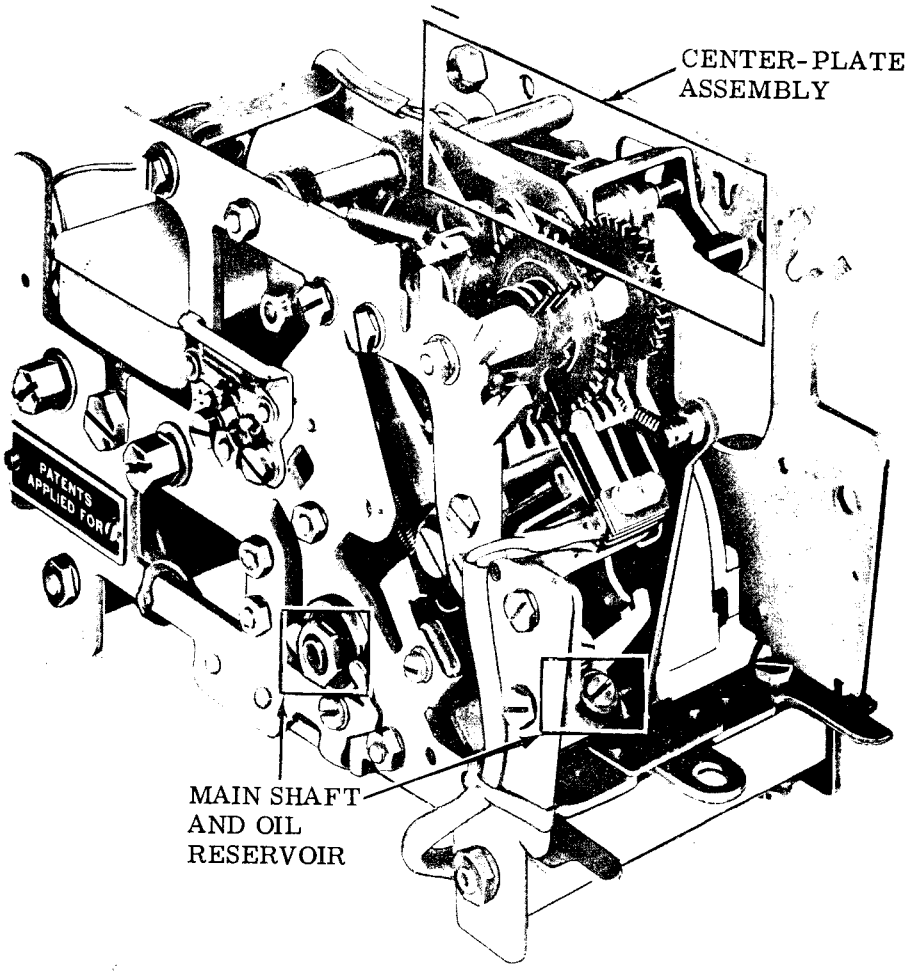


(Front View)

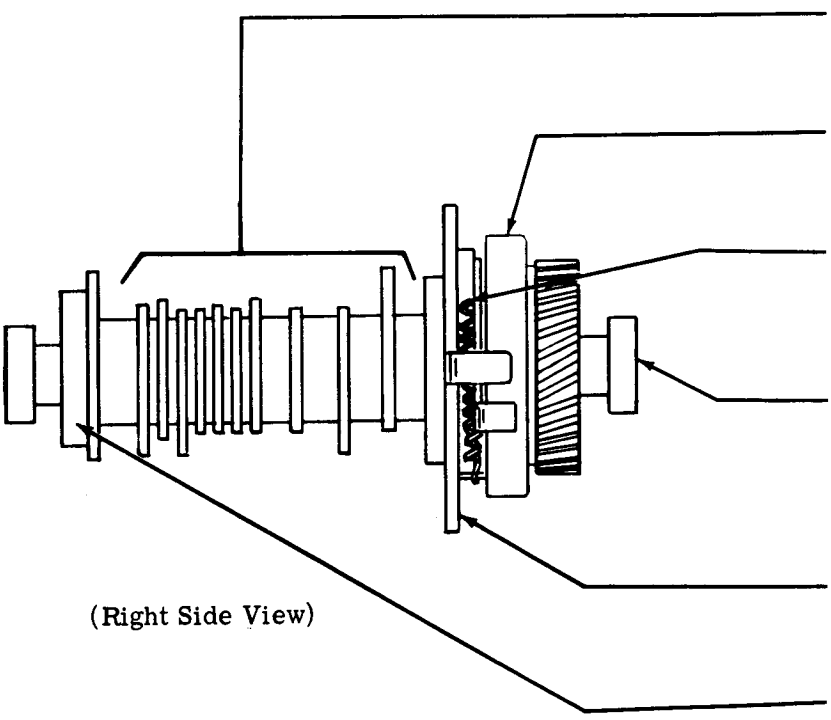


(Right Side View)

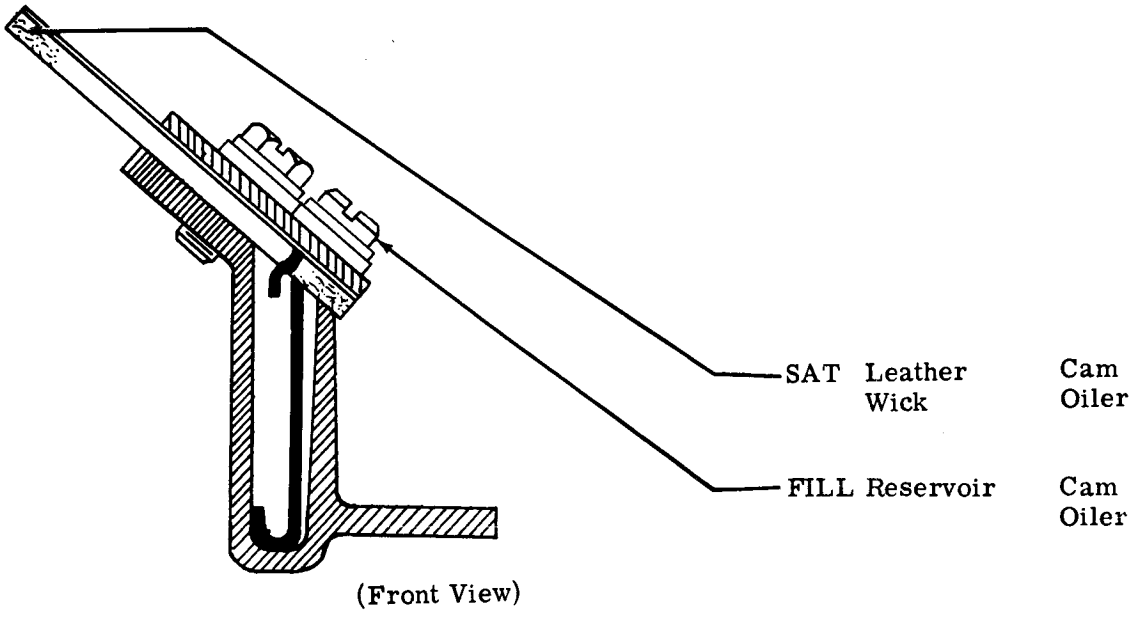
2.05 Main Shaft, Oil Reservoir, and Center-Plate Assembly



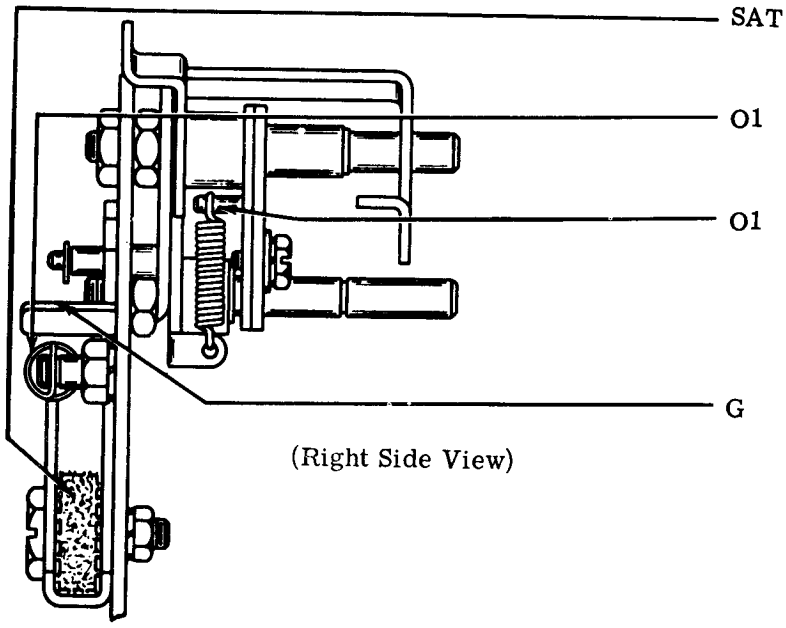
2.06 Main Shaft



2.07 Oil Reservoir

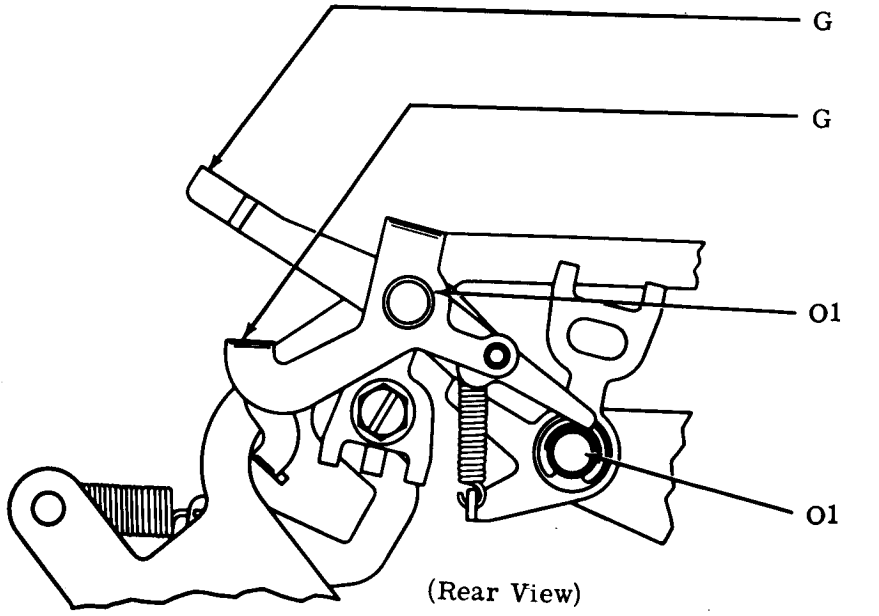


2.08 Center-Plate Assembly



SAT	Felt Washer	Ratchet Detent Bail
O1	Both Loops	Detent Bail Spring
O1	Both Loops	Tight Tape Arm Spring
G	Engaging Surface	Start-Stop Bail Extension

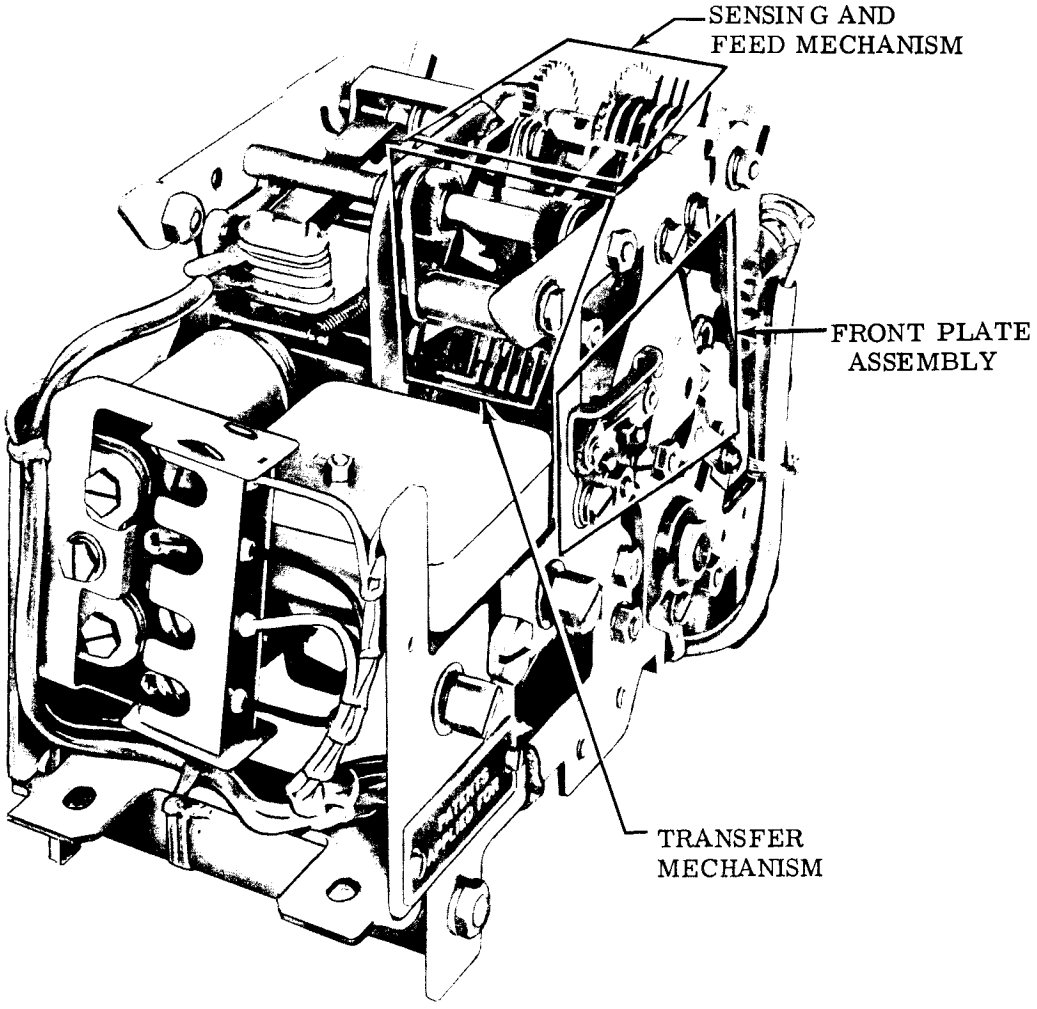
(Right Side View)



G	Engaging Surface	Tight Tape Arm
G	Engaging Surface	Start-Stop Bail
O1	Bearing Surface	Start-Stop Bail
O1	Bearing Surface	Yield Arm

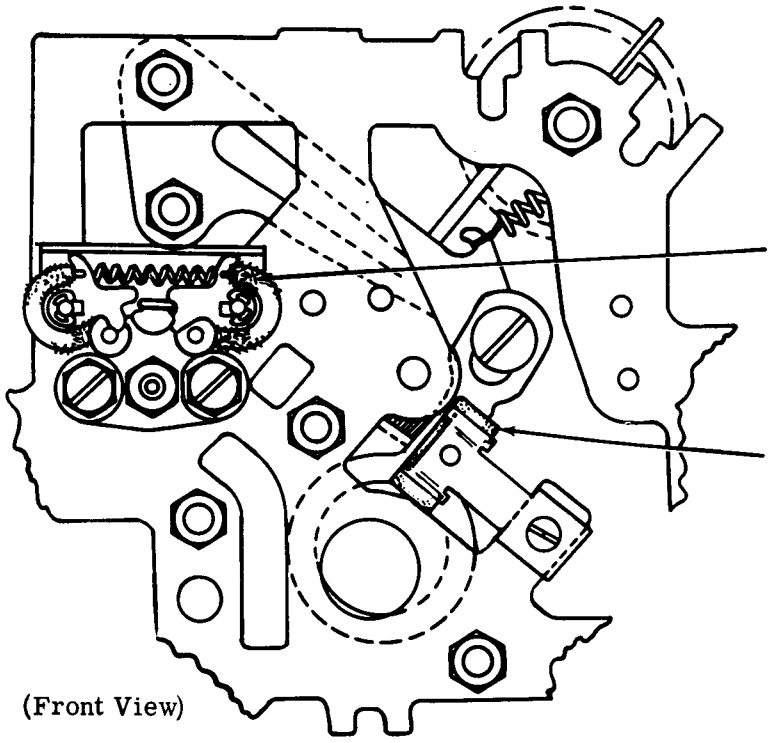
(Rear View)

2.09 Front Plate Assembly, Sensing and Feed Mechanism, and Transfer Mechanism



(Rear Oblique View)

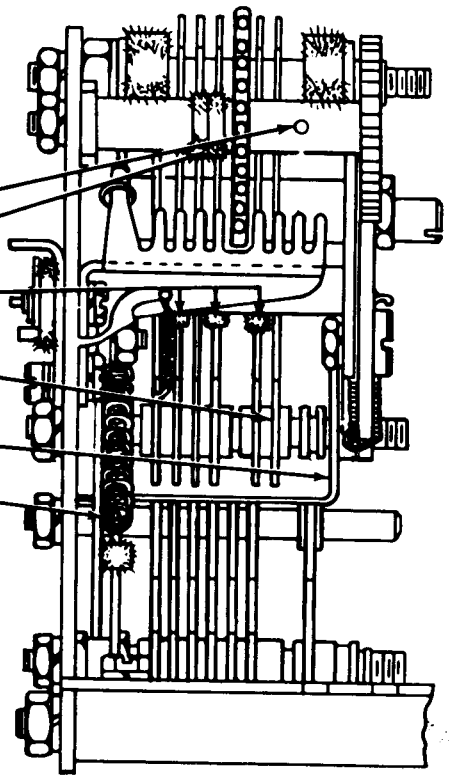
2.10 Front Plate Assembly



(Front View)

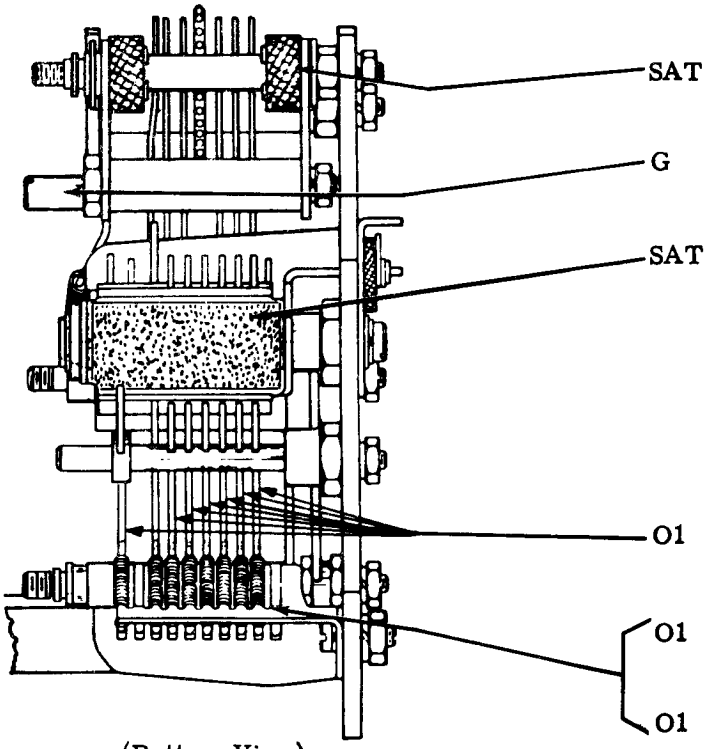
2.11 Sensing and Feed Assembly

Shaft	Feed Wheel	O3
Felt Wicks	Feed Wheel Bearing	SAT
Felt Wicks	Sensing Pins	SAT
Sliding Surface	Sensing Pin Guide Post	O6
Sliding Surface	Locking Bail	O2
Both Loops	Locking Bail Spring	O2



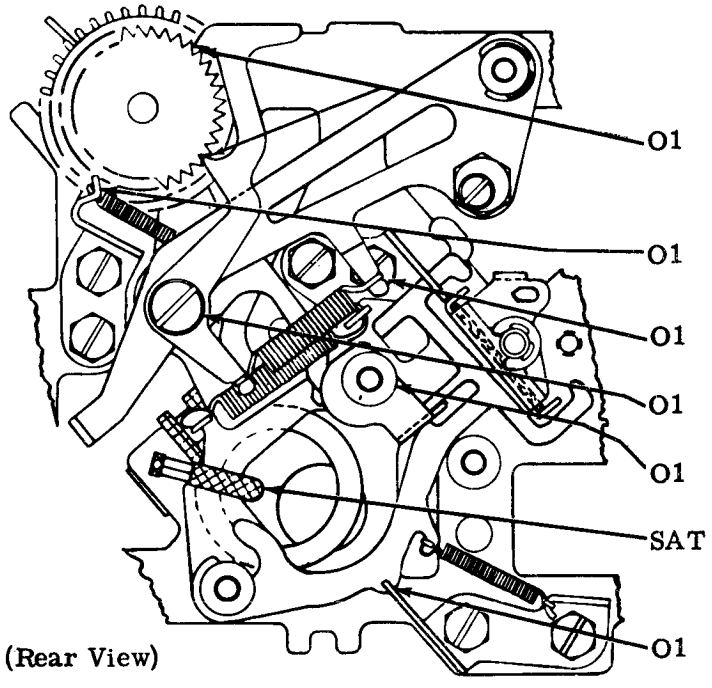
(Bottom View)

2.12 Transfer Mechanism



(Bottom View)

SAT	Each Felt Washer	Main Bail Pivots
G	Sliding Surface	Bail Drive Post
SAT	Leather Pad	Transfer Bail
O1	Sliding Surfaces	Transfer Levers
O1	Each Loop	Transfer Lever Springs
O1	Each Loop	Locking Bail Spring

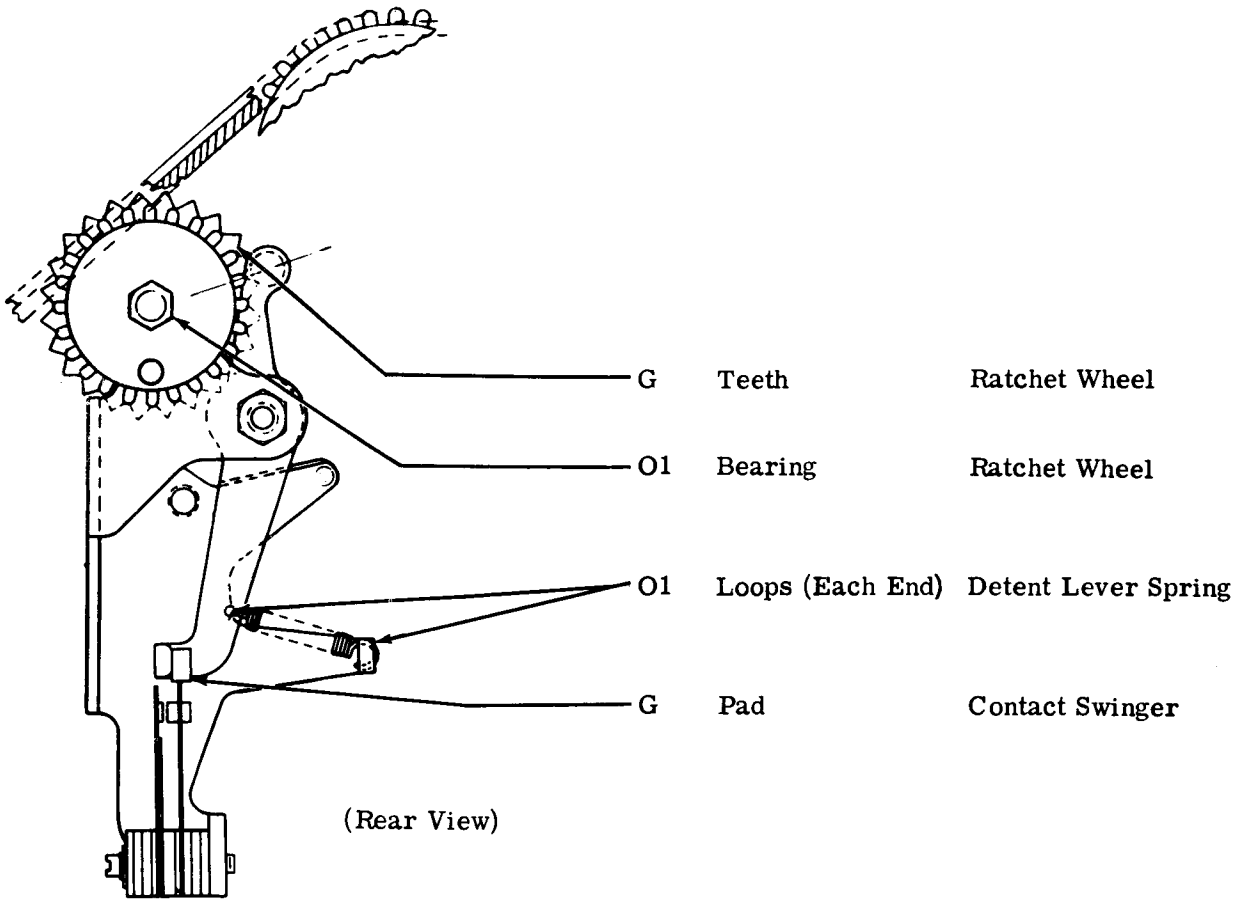


(Rear View)

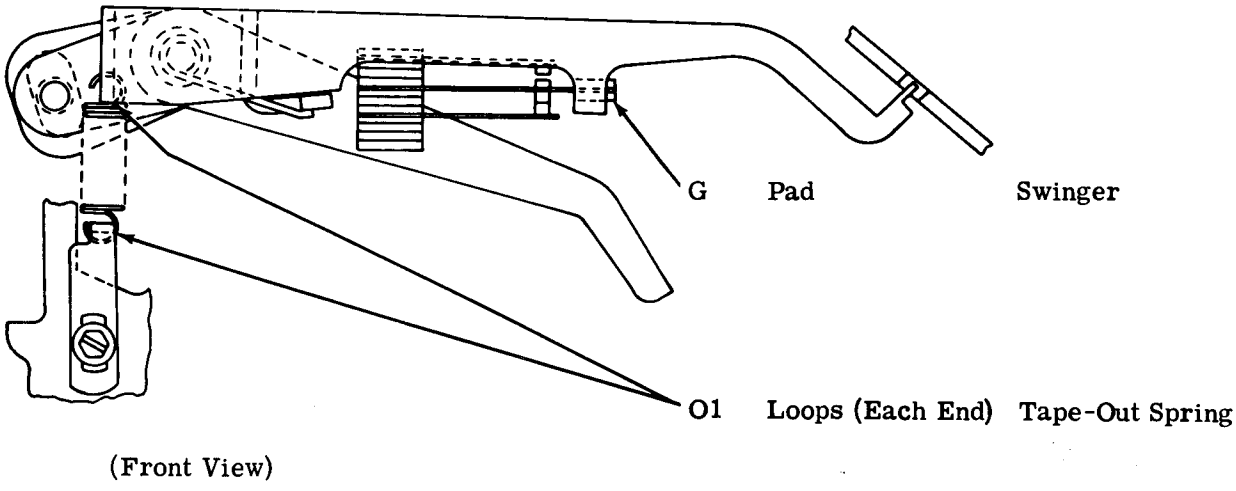
O1	Teeth	Feed Pawl and Ratchet Wheel
O1	Each Loop	Transfer Lever Springs
O1	Each Loop	Feed Pawl Spring
O1	Sliding Surface	Feed Pawl Pivot
O1	Engaging Surface	Locking Bail
SAT	Felt Washer	Locking Bail
O1	Sliding Surface	Transfer Levers

3. VARIABLE FEATURES

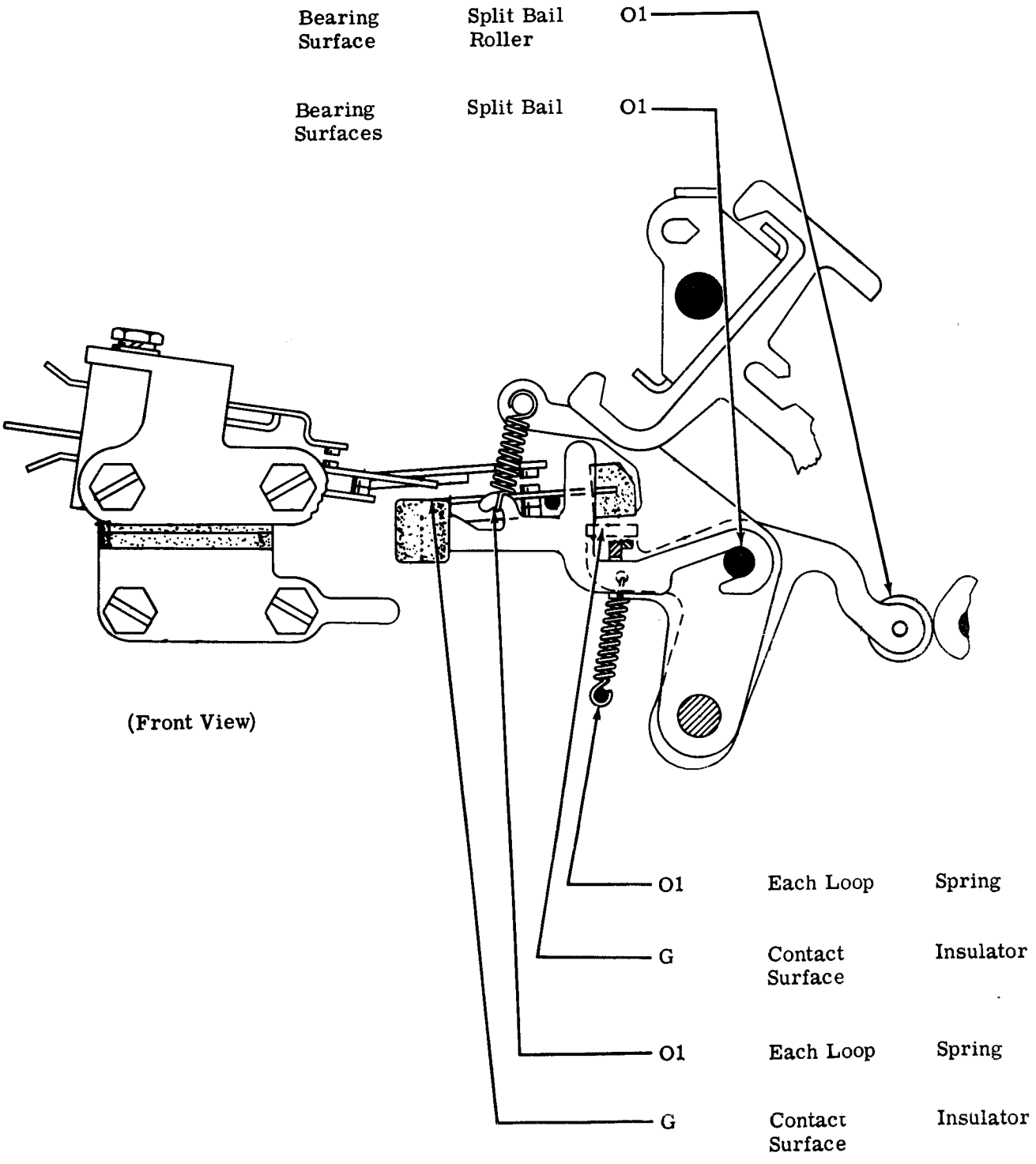
3.01 Tape Feed Assurance Mechanism



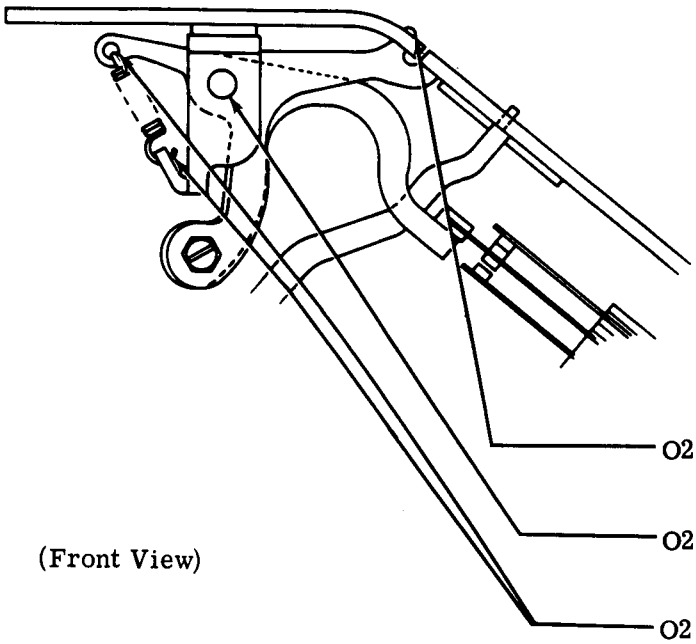
3.02 Tape-Out Sensing Mechanism



3.03 Code Reading Contacts



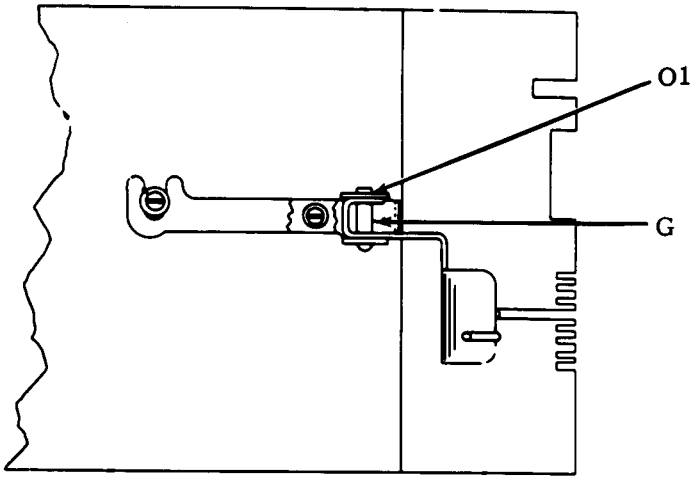
3.04 Tape Lid Sensing Lever



(Front View)

O2	Protrusion	Sensing Lever
O2	Pivot	Sensing Lever
O2	Loops (Each End)	Sensing Lever Spring

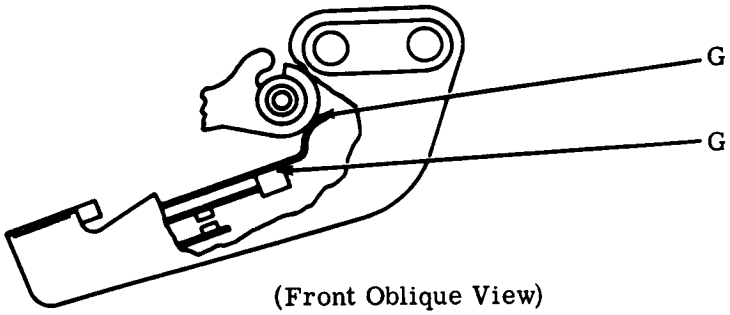
3.05 Tape Deflector



(Top View)

O1	Bearing Surface (Each End)	Tape Deflector
G	Thin Film Contact Surface	Deflector Spring

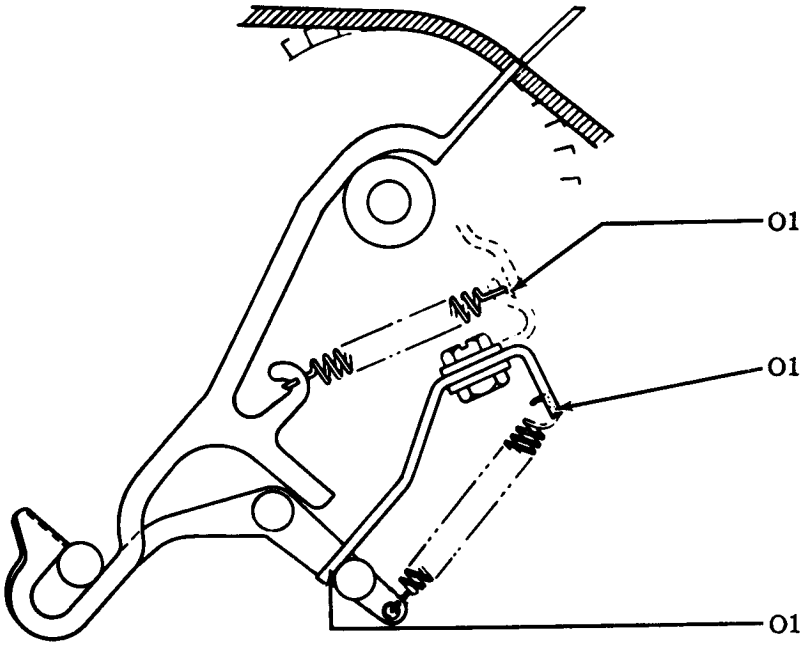
3.06 Start-Stop Pulse Contact



(Front Oblique View)

G	Engaging Surface	Contact Lever
G	Engaging Surface	Contact Insulator

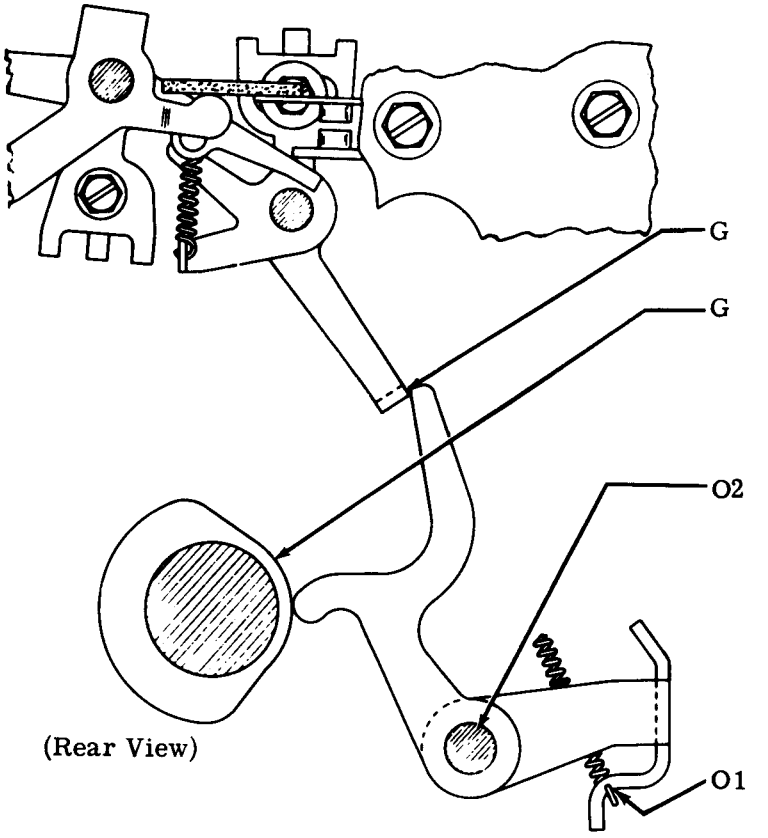
3.07 Rub-Out Deleter



(Front View)

O1	Each Loop	Spring
O1	Each Loop	Spring
O1	Engaging Surface	Deflector Bail Guide

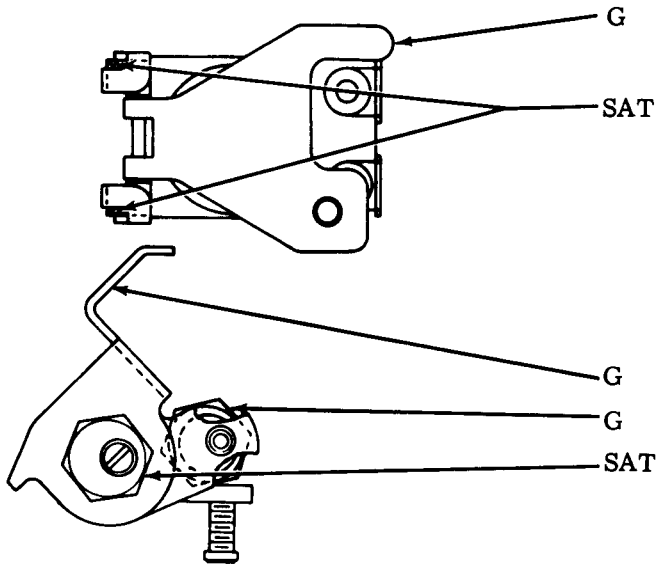
3.08 Transmitter Stop Mechanism



(Rear View)

G	Engaging Surface	Timing Arm
G	Light Film	Timing Cam
O2	Bearing Surface	Timing Bail
O1	Each Loop	Spring

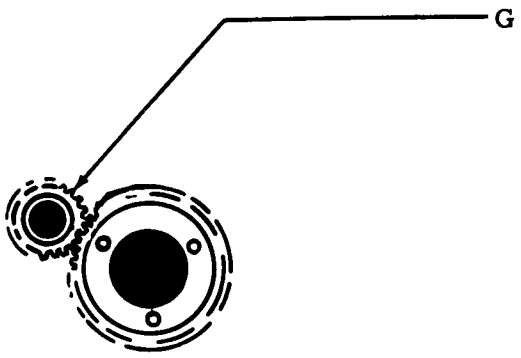
3.09 Tape-Withhold Mechanism



(Front View)

G	Extension	Armature
SAT	Felt Washers	Armature Pivot
G	Extension	Blocking Bail
G	Eccentric	Arm
SAT	Felt Washer	Eccentric Pivot

3.10 All Gears



G	Teeth	All Gears

28 TRANSMITTER DISTRIBUTOR UNIT (LXD)

DISASSEMBLY AND REASSEMBLY

CONTENTS PAGE

1. GENERAL

1.01 This section provides instructions for disassembly and reassembly of the 5- and 6-level, single contact, 28 transmitter distributor unit (Figure 1). These instructions outline a procedure for removing from the unit components or subassemblies, ie, tape guideplate assembly, rear plate assembly, main shaft assembly, and center plate assembly.

1.02 Most maintenance, lubrication, and adjustments can be done by removing the transmitter distributor from its base. If possible disassembly should be confined to the components or subassemblies which can, in most cases, be removed without disturbing the adjustments. However, when reassembling the unit, check all associated adjustments, clearances, and spring tensions.

CAUTION: DISCONNECT EXTERNAL AC OR DC POWER SOURCE BEFORE WORKING ON TRANSMITTER DISTRIBUTOR UNIT.

1.03 To facilitate adjustments on earlier models, a generous length of cable is provided between the unit and its terminal block to allow rotation or inversion of the unit. The ac or dc potential must be disconnected from its power source. Later model units plug into position on their bases.

1.04 Exercise care when replacing the unit to keep the cable free of any moving parts. For a more detailed illustration of the units, refer to the appropriate 28 transmitter distributor parts section.

1.05 Retaining rings are of spring steel and have a tendency to release suddenly. The loss can be minimized by holding the ring with the left hand to prevent it from rotating. Place the blade of a suitable screwdriver in one of the slots of the ring. Rotate the screwdriver in a direction to increase the diameter of the ring. The retaining rings should come off easily without flying.

1.06 If a shim mounted part is removed, note the number of shims used at each mounting point so that the same shim pile-up can be replaced when the part is reassembled.

1.07 Avoid loss of springs in disassembly by holding one spring loop with the left hand while gently removing the opposite loop with a spring hook. Do not stretch or distort springs while removing them.

1.08 Remove three screws that secure the transmitter distributor unit to the base and lift unit free. On earlier models remove cable connections from the terminal board and cable clamps from the base.

2. DISASSEMBLY AND REASSEMBLY OF UNIT

COVERPLATE

2.01 To remove the coverplate assembly, lift the coverplate from its detented position.

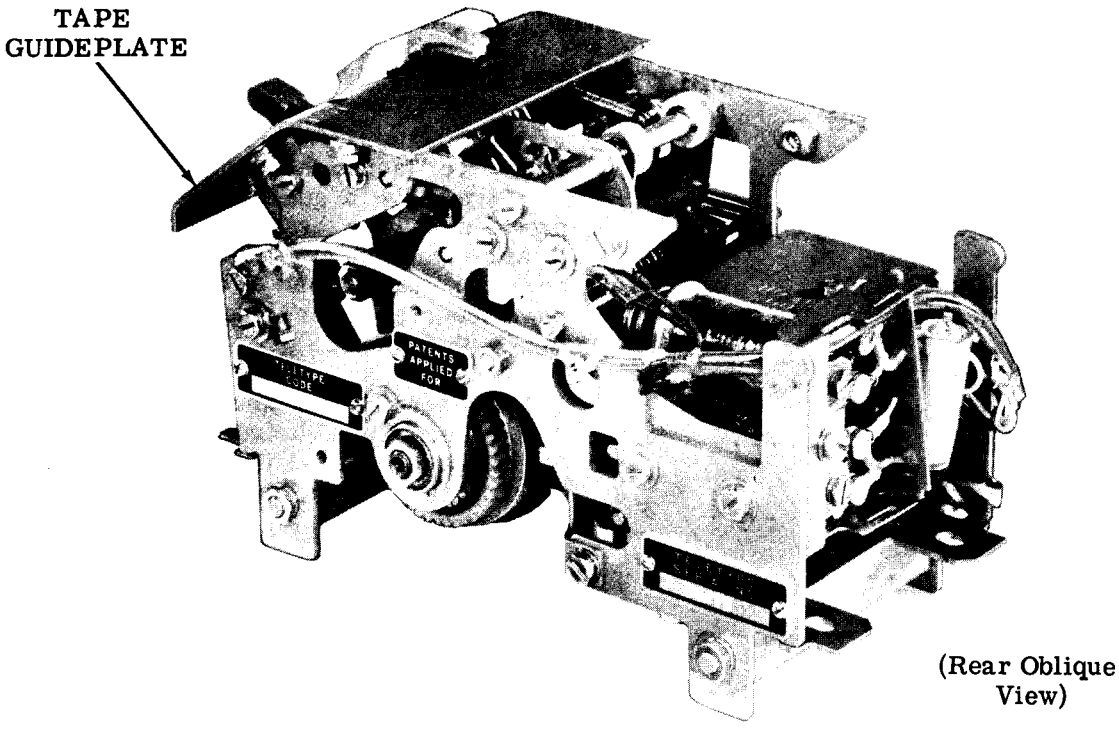


Figure 1 - Typical Transmitter Distributor (Cover Plate Removed)

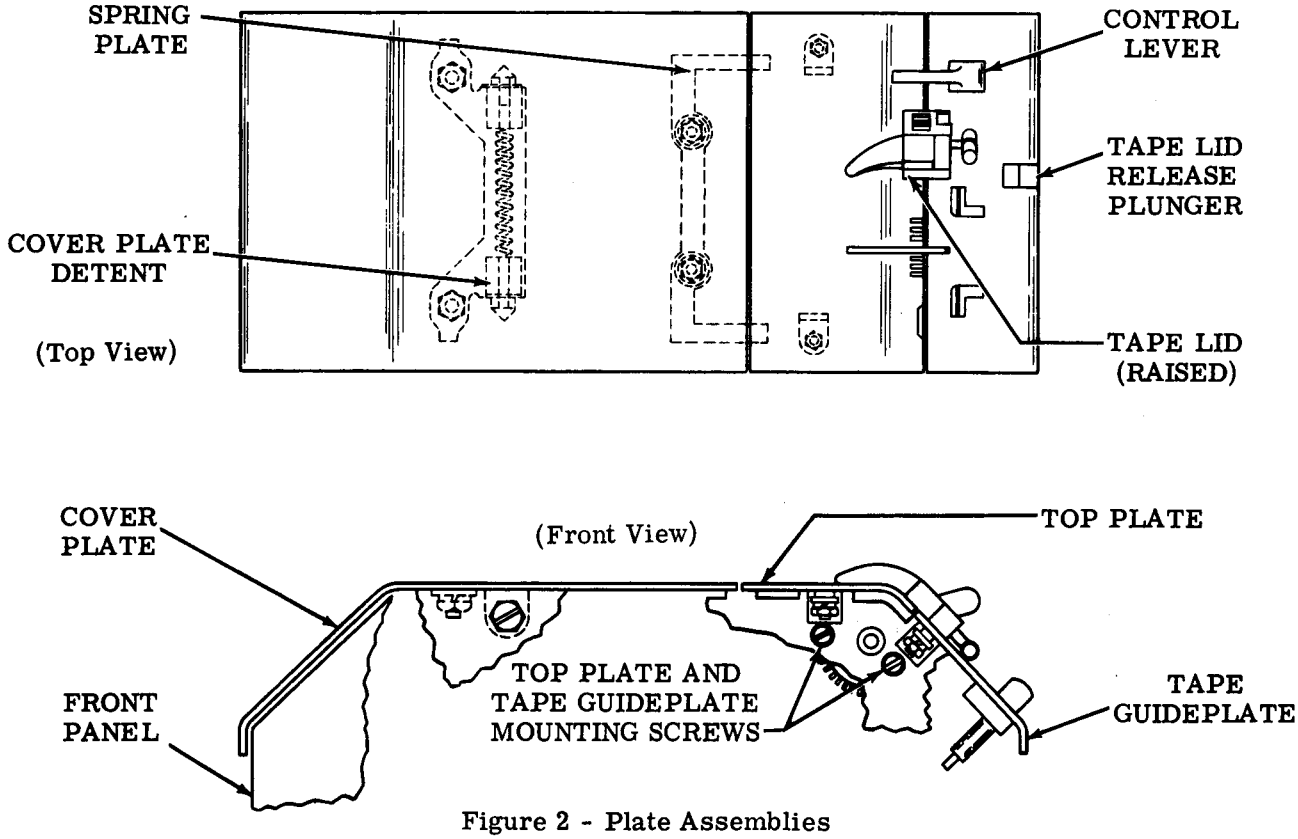


Figure 2 - Plate Assemblies

2.02 To replace the coverplate assembly, align the ends of the coverplate and top plate, slide the tips of the plate spring under the edge of the top plate, and snap the cover plate down into its detented position.

TOP PLATE

2.03 To remove top plate, loosen the front and rear mounting screws (Figure 2) and lift the plate upward.

2.04 To replace the top plate, guide the mounting screws into the notch of the front and rear plates. Align the sensing pins and feed wheel with their respective slots. Refer to TOP PLATE adjusting procedure if the plates do not align.

TAPE GUIDEPLATE

2.05 To remove the tape guideplate, loosen the front and rear mounting screws and slide the plate upward (Figure 2).

2.06 To replace the tape guideplate, guide the mounting screws into the respective notch of the front and rear plates while guiding the tape-out pin into its notch and locating the sensing pins against the left edge of the tape guideplate. Refer to TAPE GUIDEPLATE adjusting procedure.

OIL RESERVOIR

2.07 To remove the oil reservoir, remove the screws that secure the casting and lift the assembly upward and toward the right.

2.08 To replace the oil reservoir, reverse the procedure.

REAR PLATE ASSEMBLY

2.09 To remove the rear plate assembly:

(a) Remove cable assembly leads from start-stop contact assembly and magnet assembly.

(b) Remove hex nuts and lockwashers from bottom posts.

(c) Remove main shaft retaining ring.

(d) Remove screws TP151630 securing plate to post TP156622.

(e) Remove the two screws which secure the clutch trip magnet assembly bracket to the rear plate and remove clutch trip magnet assembly.

(f) Remove rear plate assembly from the remainder of the unit.

2.10 To replace the rear plate assembly, reverse the procedured steps.

MAIN SHAFT ASSEMBLY

2.11 To remove the main shaft assembly:

(a) Remove the clamp TP156831 and plate TP156832 from the front plate assembly.

(b) Remove the main shaft assembly.

2.12 To replace the main shaft assembly, replace in the reverse order.

CENTER PLATE ASSEMBLY

2.13 To remove the center plate:

(a) Remove the post TP156622.

(b) Remove the two nuts which secure the center plate to the two guide posts.

(c) Remove the spring TP7603.

(d) Remove the center plate assembly.

2.14 To replace the center plate assembly, reverse the procedured steps.

2.15 When reinstalling the transmitter or transmitter distributor unit on the base, adjust the gear backlash as outlined in the section, 28 Transmitter Distributor Unit (LXD) — Adjustments.

28 TRANSMITTER DISTRIBUTOR BASES

(SINGLE MOUNTING AND MULTIPLE MOUNTING)

DESCRIPTION

CONTENTS PAGE

1. GENERAL

1.01 This section describes the Model 28 transmitter distributor bases which provide mounting facilities for the 28 single mounting and the 28 multiple mounting transmitter distributor sets. It describes four different bases. Because of many variations possible, the bases described and illustrated are typical.

2. DESCRIPTION

2.01 Four types of bases are described in this section. Two bases are designed as mountings for single unit transmitter distributors; one as a single contact, single shaft, transmitter distributor, and the other as a slightly larger multicontact transmitter distributor. A third base identified as a miniaturized model is used for mounting a single contact transmitter distributor and a miniaturized motor. A multiple base is designed for mounting three transmitter distributors. Each base also serves as a mounting for a motor or motor unit.

SINGLE CONTACT SINGLE MOUNTING TRANSMITTER DISTRIBUTOR BASES

2.02 The base for the single contact transmitter distributor (regular size) consists of two angle iron rails with cross plates that form a framework. The framework is fastened to a subbase (or oil pan on some models) by means of three vibration mounts which serve to reduce vibration (Figure 1).

2.03 Brackets are provided for mounting terminal blocks on which electrical connections are made. A guard is mounted above the location of the gears for protection.

2.04 A multiple connector is mounted at the left front of the base for interconnection with a mating connector on the transmitter distributor.

2.05 A line shunting switch is provided on most bases adjacent to the multiple connector for keeping the line circuit closed when the transmitter distributor is removed from the base. This switch is actuated by an adjusting screw on the transmitter distributor. When the transmitter distributor is placed on the base, the line circuit includes the transmitter distributor before the line shunting switch opens.

2.06 Terminal blocks and a power switch are mounted on brackets at the rear of the base where electrical connections are made.

2.07 The base provides a rigid mounting support for the transmitter distributor and a motor unit (Figure 2). An intermediate gear assembly is mounted between the motor unit position and the transmitter distributor unit position.

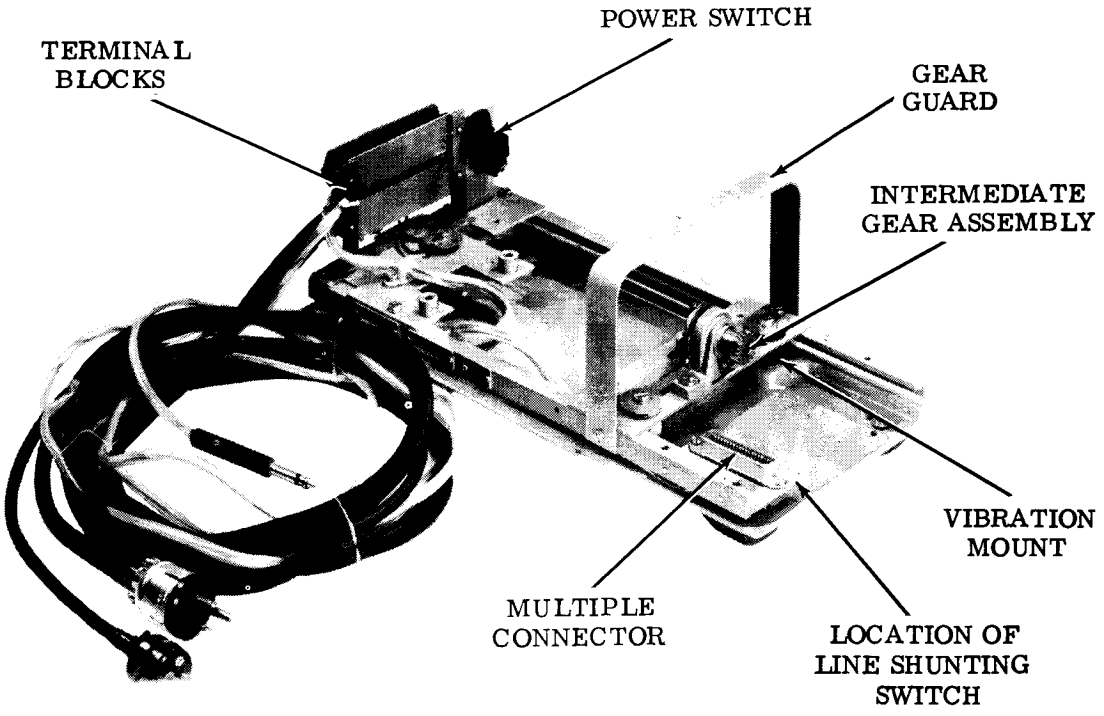


Figure 1 - Single Contact, Single Mounting Transmitter Distributor Base

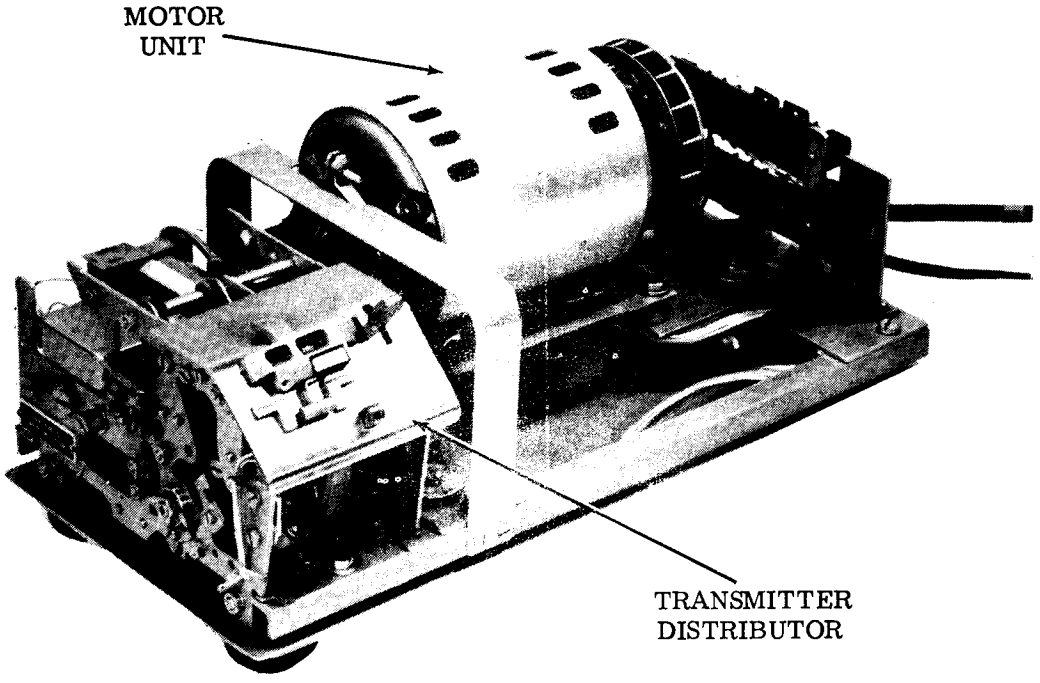


Figure 2 - Single Contact, Single Mounting Transmitter Distributor Base (Transmitter Distributor and Motor Unit in Place)

2.08 The intermediate gear assembly transfers motion from the motor to the transmitter distributor. The speed is determined by the set of drive gears used on the motor shaft and its mating gear on the intermediate gear assembly.

MULTICONTACT SINGLE MOUNTING TRANSMITTER DISTRIBUTOR BASES

2.09 This multicontact transmitter distributor base is similar to the base previously described. The frame structure is built in two pieces. The top structure serves as a mounting for a motor unit and the transmitter distributor (Figure 3). The bottom structure serves as a mounting for the top structure. Two 24-point connectors are mounted at the rear of the bottom structure for electrical connection to external apparatus. Two 24-point mating connectors are mounted to the rear of the top structure as a terminal for internal electrical connections. The top structure may be moved forward to disconnect all electrical connections or backward to connect them (Figure 4).

2.10 A power switch is mounted to a bracket on the left side and is accessible through the cover.

2.11 Electrical connections between the base and the transmitter distributor are made through a cable or cables with a multiple connector or connectors, which mate with connectors mounted on the transmitter distributor. The interconnection varies somewhat with different models. Other internal connections are made at terminal blocks under the motor unit position.

MINIATURE BASES

2.12 This base is designated miniature because of its compactness (Figure 5). The mounting facilities for a transmitter distributor are virtually the same as those for the single contact transmitter distributor base. However, this base is much shorter and lighter since the motor used on it is small and requires very little space for mounting.

2.13 Brackets with terminal blocks are provided at the right rear part of the base for making electrical connections, both external and internal. A cable connects these terminal blocks to the multiple connector which mates with the transmitter distributor connector and the line shunting switch.

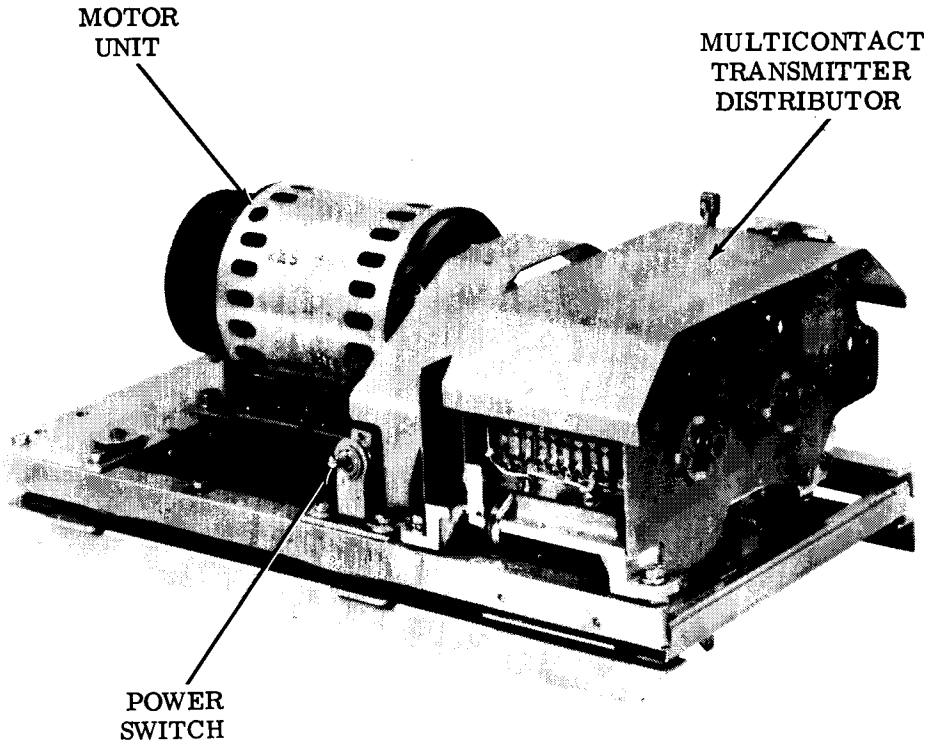


Figure 3 - Multicontact Single Mounting Transmitter Distributor Base (Transmitter Distributor and Motor Unit in Place)

2.14 The frame structure is fastened to a metal pan through three vibration mounts which absorb vibration from the motor and the transmitter distributor. Four rubber feet are mounted under the pan to prevent the set from marring the surface on which it sits.

2.15 A power switch is mounted on a bracket at the rear of the base and is accessible through the rear of the cover.

MULTIPLE MOUNTING BASES

A. General

2.16 The multiple mounting base is designed as a mounting for three transmitter distributors, a motor unit, drive shafting, and gears. There are two types of these bases, each with provisions for changing the driving speed of its associated transmitter distributors. One type is designed as a mounting for three single contact transmitter distributors (Figures 6 and 7). The other type is designed as a mounting for three multicontact transmitter distributors (Figures 8 and 9).

B. Bases for Single Contact Multiple Mounting Transmitter Distributors

2 17 The base, which serves as a mounting for three single contact transmitter distributors, is a one piece aluminum casting mounted by vibration mounts and brackets to a base pan. Brackets with terminal blocks are provided at the right rear portion of the base. These terminal blocks serve as a connecting point between external and internal electrical connections. Electrical cables lead from the terminal blocks to a multiple connector and a line shunting switch at each of the three transmitter distributor positions. Other cables lead to the motor and to a power switch located on a bracket at the front of the base.

2.18 A locking clamp is provided for locking each transmitter distributor in position on the base. A locating eccentric is also provided on the base as a means of fixing the adjustment position of the transmitter distributor.

2.19 A drive shaft across the front of the base is driven by the motor through a belt and a set of sprockets. Some bases have the speed

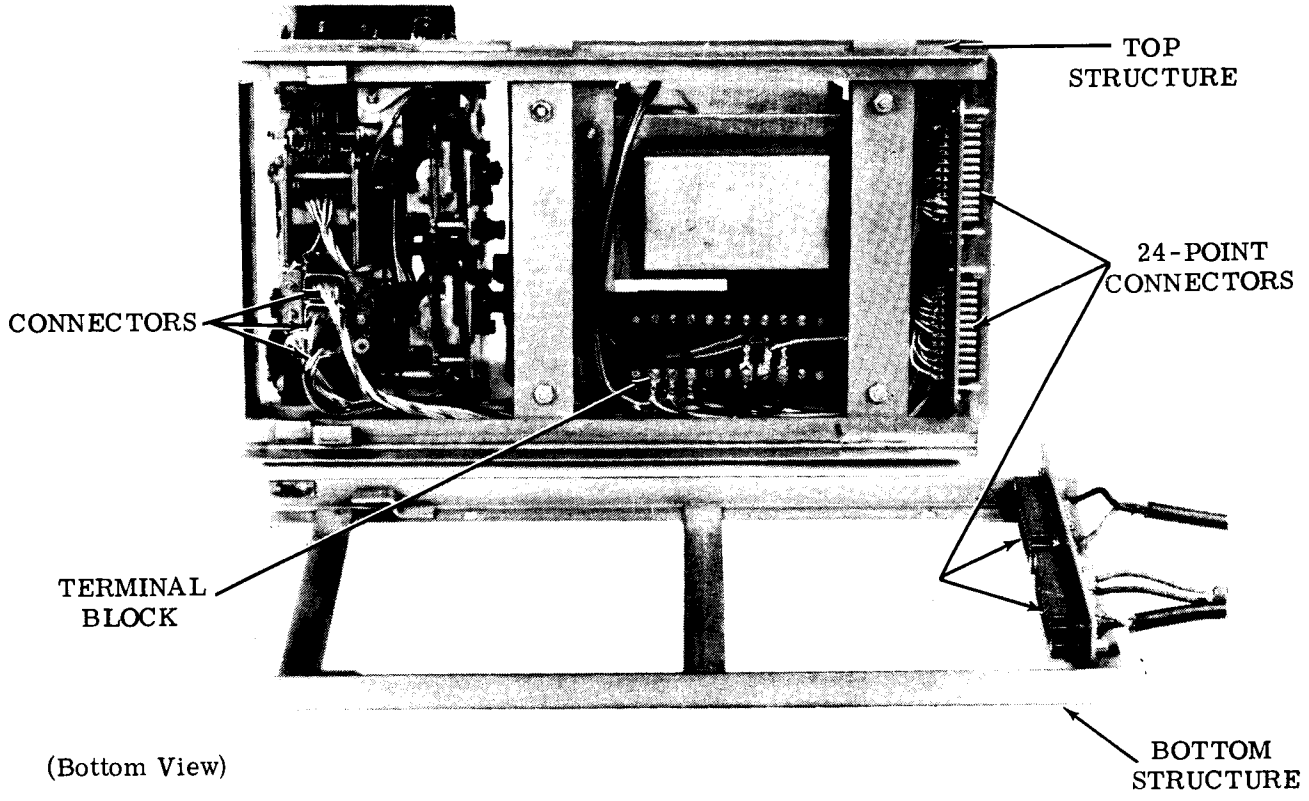


Figure 4 - Multicontact Single Mounting Transmitter Distributor Base (Transmitter Distributor and Motor Unit in Place)

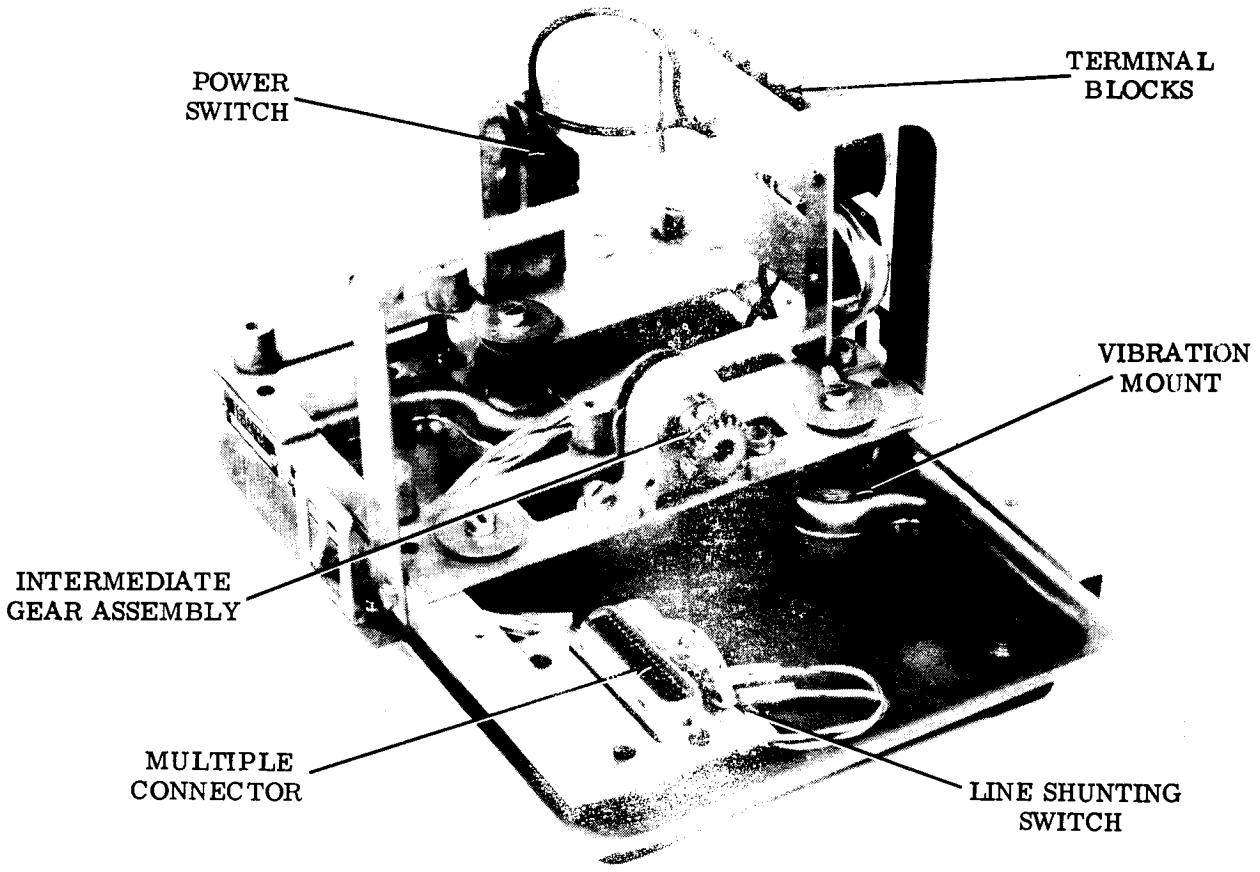


Figure 5 - [illegible] Base

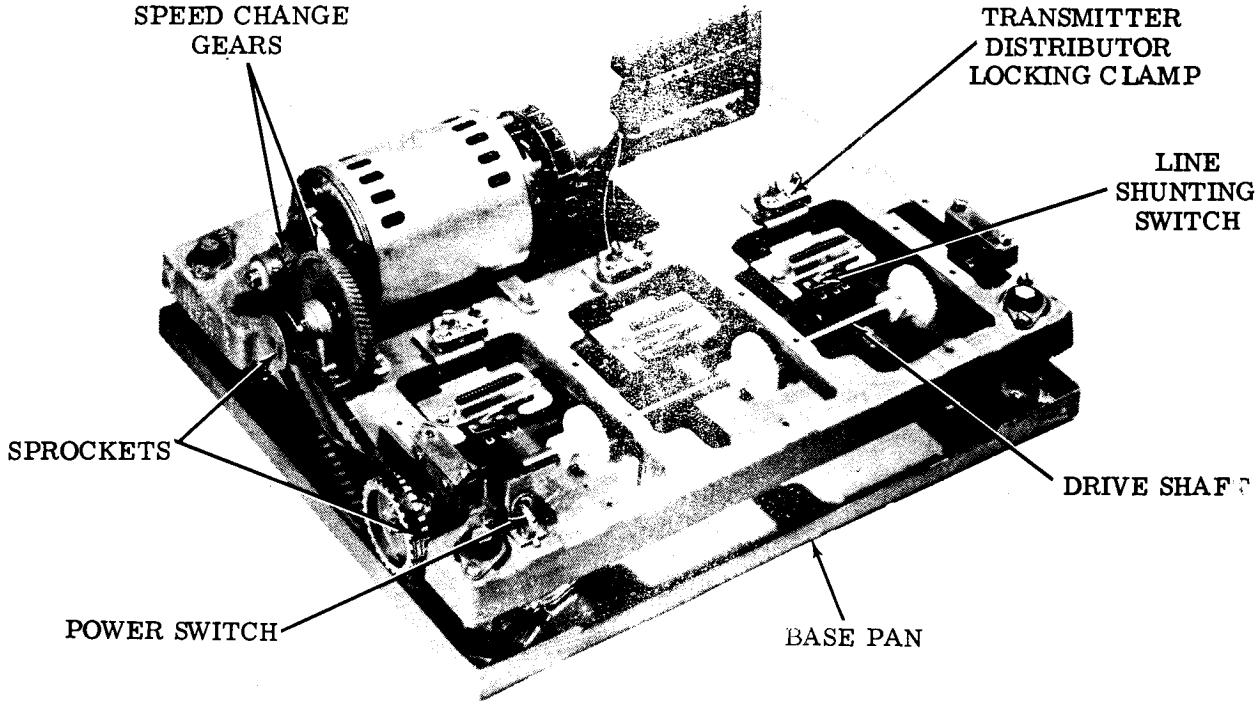


Figure 6 - Single Contact Multiple Mounting Transmitter Distributor Base (Common Speed)

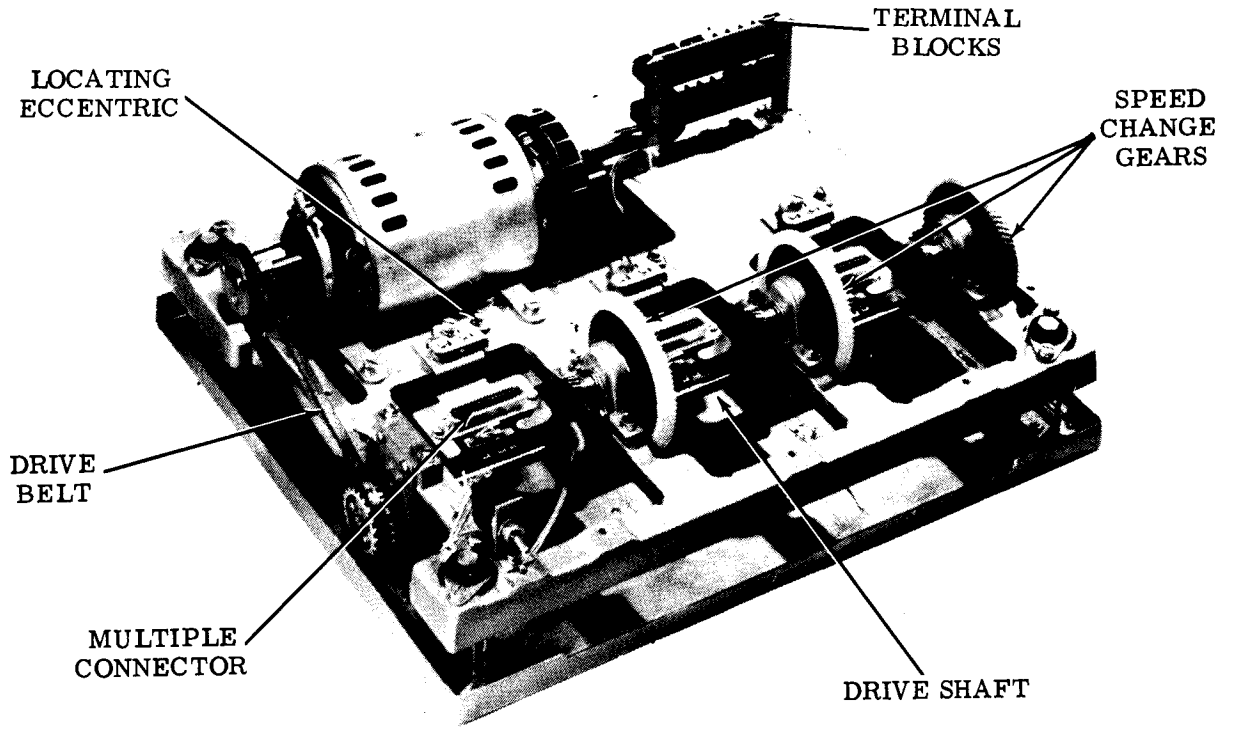


Figure 7 - Single Contact Multiple Mounting Transmitter Distributor Base (Variable Speed)

change gears between the motor pinion and an intermediate gear assembly (Figure 6). With this arrangement, the three gears on the drive shaft are the same size and drive all three transmitter distributors at the same speed. Other bases have speed change gears at each transmitter distributor (Figure 7). With this arrangement, each transmitter distributor may be driven at 60, 75, or 100 words per minute by changing its intermediate gears.

C. Bases for Multicontact Multiple Mounting Transmitter Distributors

2.20 The multiple mounting bases for the multicontact transmitter distributors also serve as a mounting for three transmitter distributors, a motor unit, drive shafting with gears, and electrical connections. Some of these bases are constructed of aluminum casting (Figure 8); others are constructed of steel plates (Figure 9). A drive shaft traverses the base near its center portion and drives the transmitter distributors, either directly or through a gear shift assembly. Where the shaft drives the transmitter distributor directly, the speed changes are made between the motor pinion and the intermediate gear (Figure 8). Where the gear shifts are used, the speed of any one of the transmitter distributors may be changed irrespective of others by shifting the gears (Figure 9).

2.21 Internal electrical connections vary with the different models. Some are made on terminal blocks at the left rear portion of the base; others are made by multiple connectors at the rear of the base. Connection with most transmitter distributors is made by multiple connectors at the rear of the transmitter distributor. Some models make connection by a loose end cable with multiple connector which mates with a connector underneath the transmitter distributor.

COVERS

2.22 In general, the covering for the transmitter distributors are of simple slip-over design.

2.23 The covering for single mounted transmitter distributors consists of two parts. One is a slip-over cover for the motor unit, terminal blocks, and intermediate gear assembly;

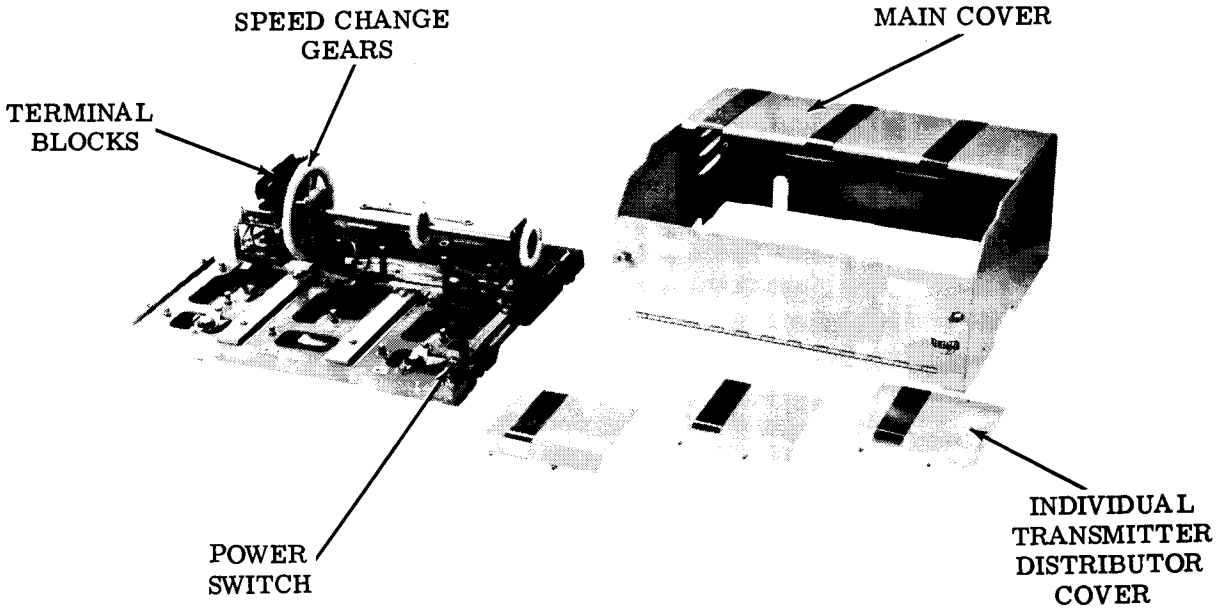


Figure 8 - Multicontact Multiple Mounting Transmitter Distributor Base (Common Speed)

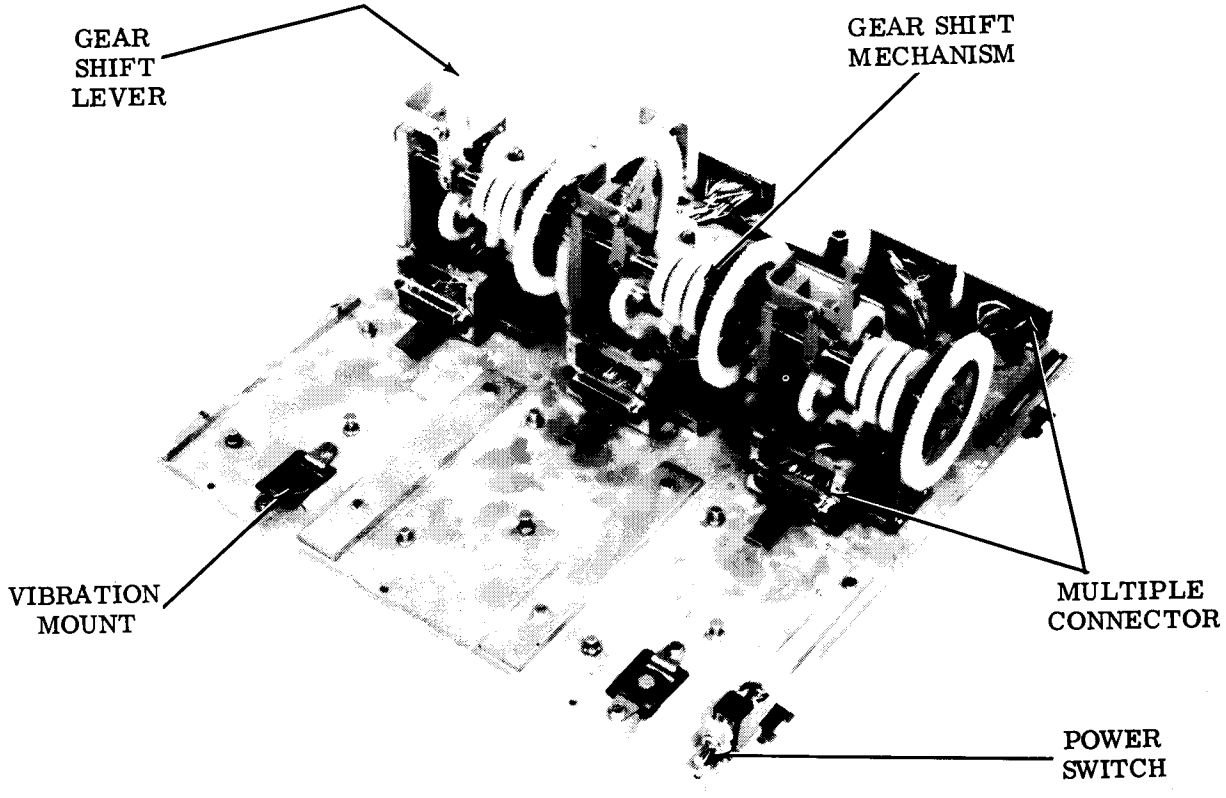


Figure 9 - Multicontact Multiple Mounting Transmitter Distributor Base (Variable Speed)

and the other is a U-shaped panel which encloses three sides of the transmitter distributor.

2.24 The covering for the multiple mounting sets consists of four parts. One is a slip-over cover for the motor unit, gearing, and terminal blocks; and the other three are cover plates for the individual transmitter distributors (Figure 8). The front side of the larger cover is hinged so that it may be opened for access to the front of the transmitter distributors.

28 TRANSMITTER DISTRIBUTOR BASES

(SINGLE MOUNTING AND MULTIPLE MOUNTING)

ADJUSTMENTS

CONTENTS PAGE

1. GENERAL

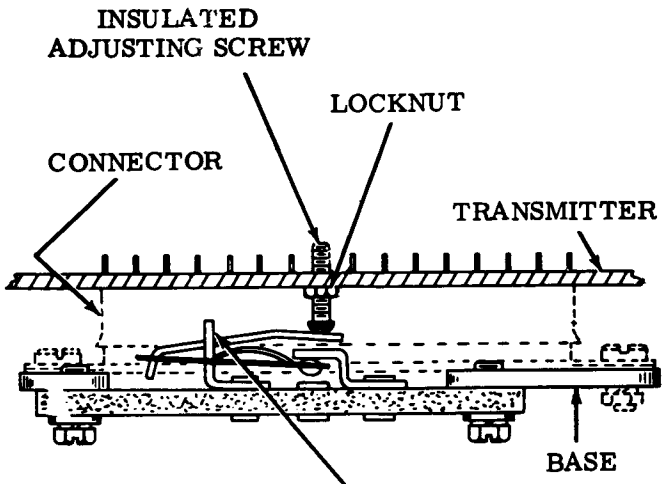
1.01 This section covers the requirements and adjusting procedures for the 28 transmitter distributor bases, both single mounting and multiple mounting. Three types of single mounting bases and two types of multiple mounting bases are covered.

1.02 Before attempting to adjust a base, disconnect the electric power.

1.03 The adjustments of the five different types of bases are treated separately in this publication for clarity.

2. ADJUSTMENTS

2.01 Single Contact Single Mounting Bases



TRANSMITTER DISTRIBUTOR GEAR

Requirement
There should be a barely perceptible amount of backlash between the intermediate driving gear and the transmitter distributor gear.

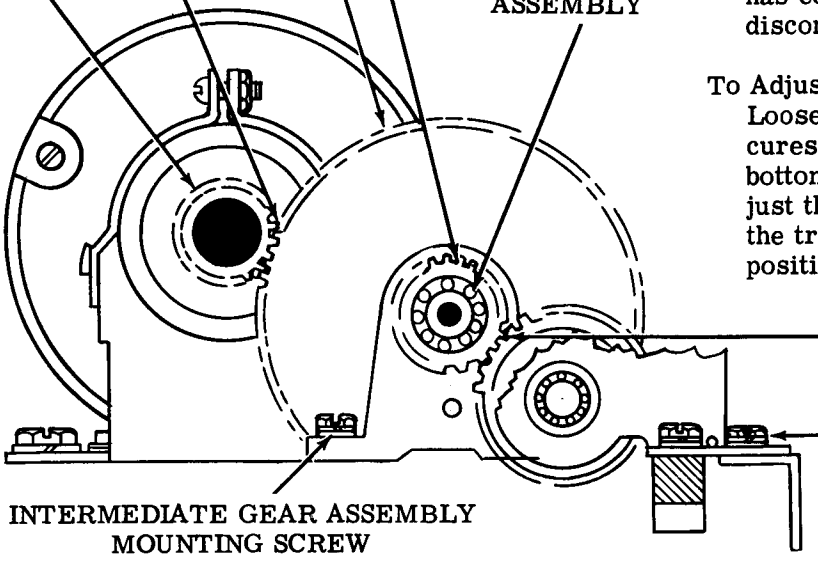
To Adjust
Position the transmitter distributor with its three mounting screws loosened.

INTERMEDIATE SHAFT ASSEMBLY

Requirement (Regular Size Base)
There should be a perceptible amount of backlash between the motor pinion and the intermediate driven gear.

Requirement (Miniature Base)
The clearance between the motor pinion and the intermediate driven gear should be Min 0.015 inch---Max 0.020 inch at the point where backlash is least.

To Adjust
Position the intermediate gear assembly with its mounting screws loosened.



LINE SHUNT SWITCH
(All Single Contact Bases)

Requirement
The line shunt switch should open when a transmitter distributor is placed in position on the base. The contacts should close before the transmitter distributor connector has completed more than one-half of its disconnect travel.

To Adjust
Loosen the white nylon locknut which secures the insulated adjusting screw at the bottom of the transmitter distributor. Adjust the screw to open the contacts when the transmitter distributor is correctly positioned. Tighten the locknut.

2.02 Single Contact Multiple Mounting Bases (Common Speed)

BELT TENSION

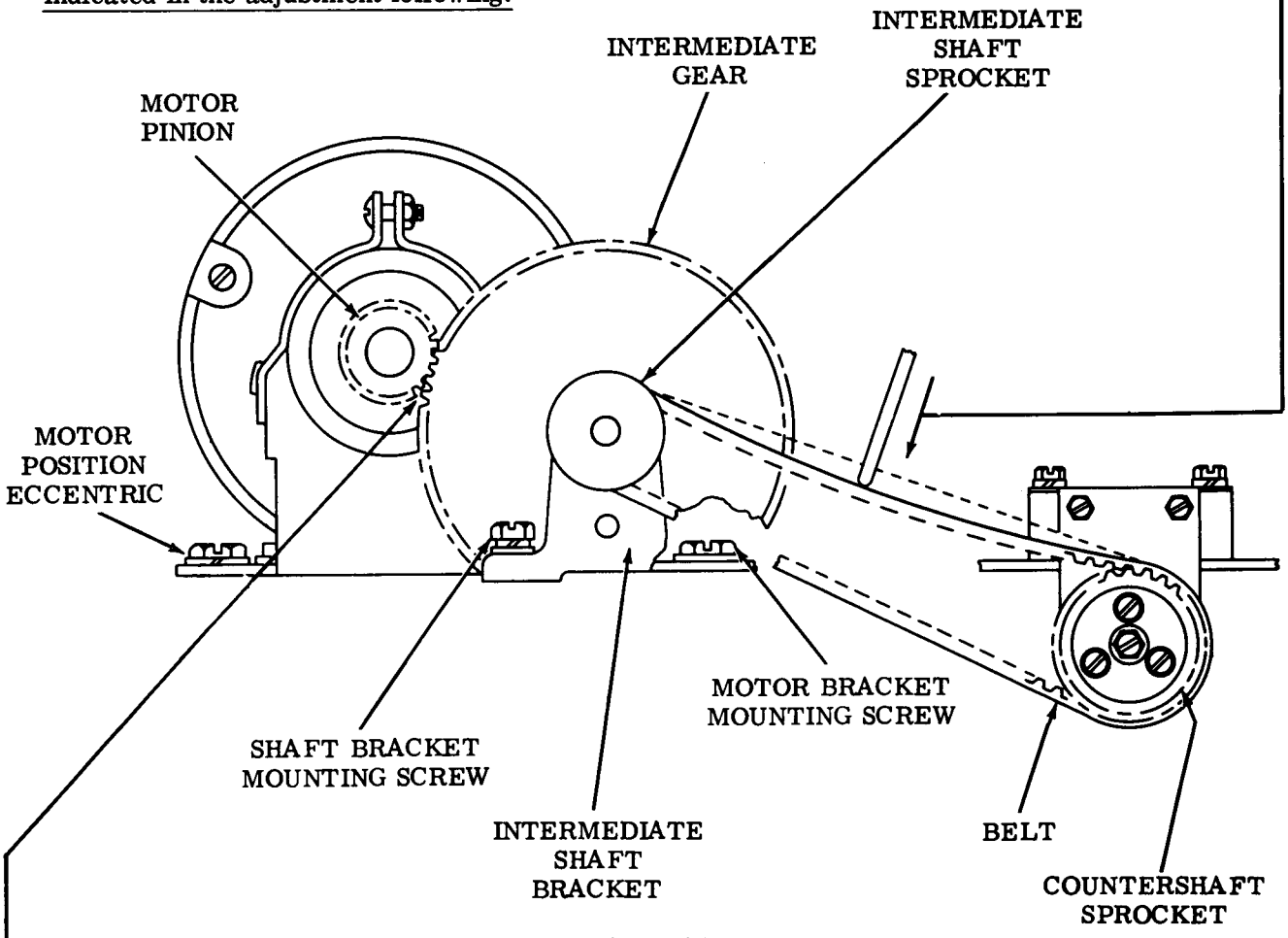
Requirement

Place a spring scale perpendicular to the belt about midway between the two sprockets, and push down. A force of 5 ounces should deflect the belt approximately 1/4 inch from a straightedge placed across the top of the two sprockets.

To Adjust

Loosen the two screws which secure the intermediate shaft bracket. Position the intermediate shaft bracket to meet the requirement.

Note: It may be necessary to move the motor to the rear to permit adjustment of the intermediate shaft bracket. If so, loosen the four motor mounting screws and the eccentric locking screw at the rear motor mount. It will be necessary to reposition the motor as indicated in the adjustment following.



MOTOR PINION - INTERMEDIATE GEAR BACKLASH

Requirement

There should be only a perceptible amount of backlash between the motor pinion and the intermediate gear at their closest point.

To Adjust

Loosen the four motor mounting bracket screws and eccentric locking screw at the rear motor mounting bracket.

2.03 Single Contact Multiple Mounting Bases (Common Speed) (continued)

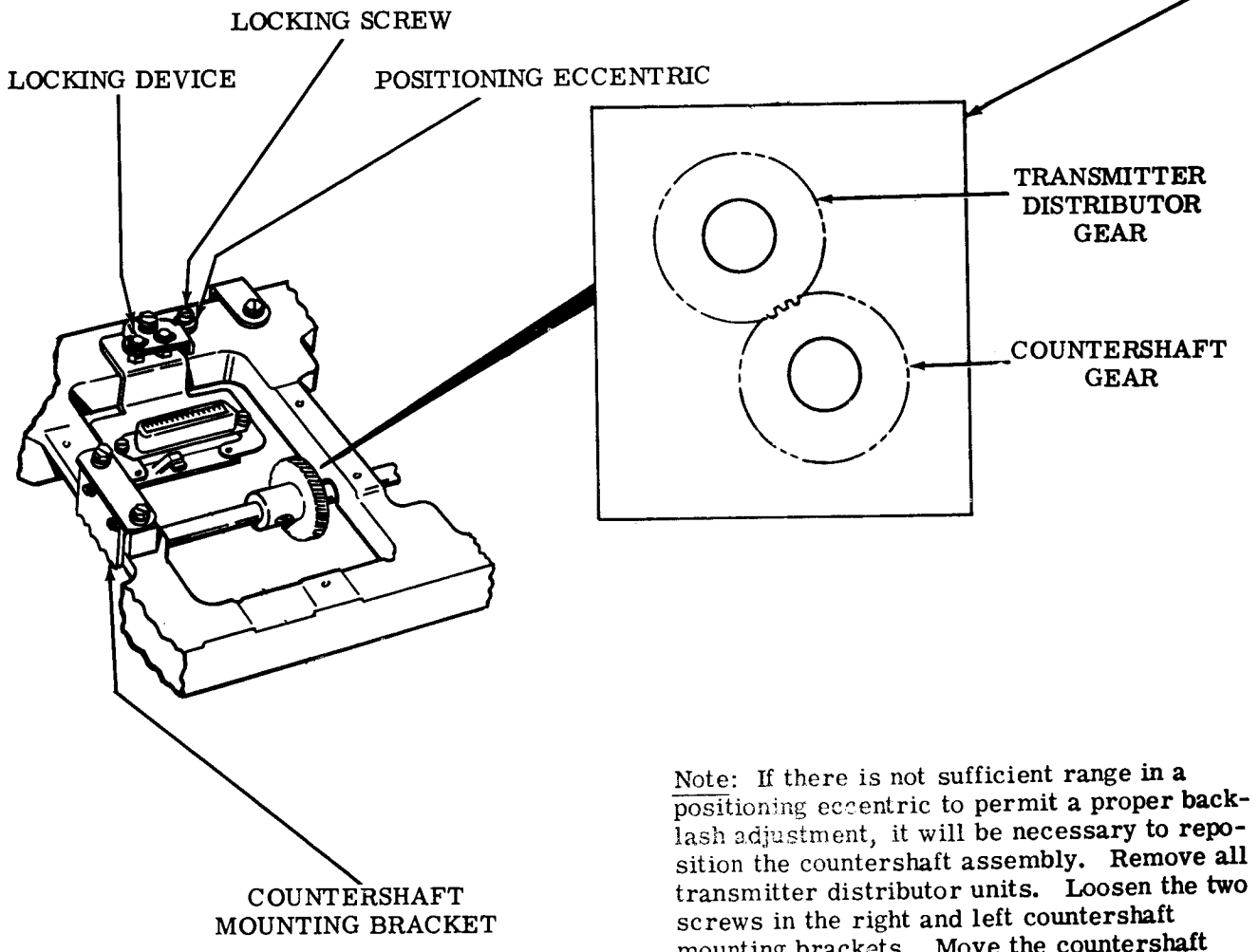
TRANSMITTER DISTRIBUTOR POSITIONING

Requirement

There should be a barely perceptible backlash between the transmitter distributor gear and the countershaft gear at the point of minimum clearance.

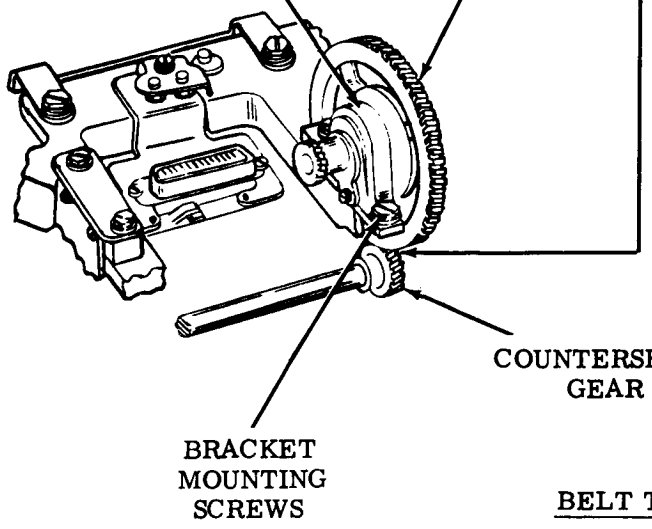
To Adjust

Loosen the positioning eccentric locking screw and position the locking device to the left. Place the transmitter or transmitter distributor successively in each of the three mounting positions and adjust in the following manner. Engage the connector on the transmitter distributor with its mating connector on the base, and mesh the transmitter distributor gear with the countershaft gear. Hold the transmitter distributor against its positioning eccentric and adjust the eccentric to meet the requirement. Tighten the eccentric locking screw.



Note: If there is not sufficient range in a positioning eccentric to permit a proper backlash adjustment, it will be necessary to reposition the countershaft assembly. Remove all transmitter distributor units. Loosen the two screws in the right and left countershaft mounting brackets. Move the countershaft assembly forward or to the rear as required, and keep the bracket assemblies parallel so as not to bind or place a strain on the countershaft. Tighten the bracket mounting screws. All prior adjustments will have to be repeated.

2.04 Single Contact Multiple Mounting Bases (Variable Speed)



INTERMEDIATE GEAR - COUNTERSHAFT GEAR BACKLASH

Requirement

There should be only a perceptible amount of backlash between the intermediate gear and its associated countershaft gear at the point of minimum clearance.

To Adjust

Loosen the two screws holding the intermediate shaft bracket and position the bracket to meet the requirement. Tighten the bracket mounting screws.

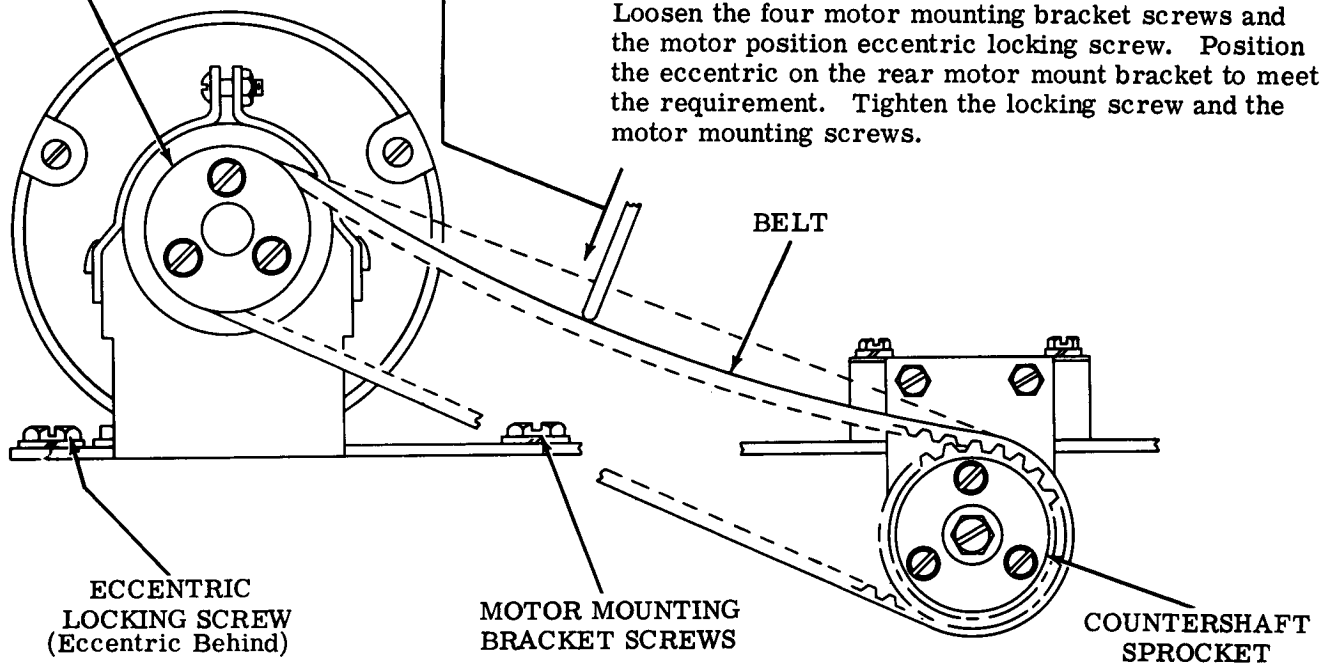
BELT TENSION

Requirement

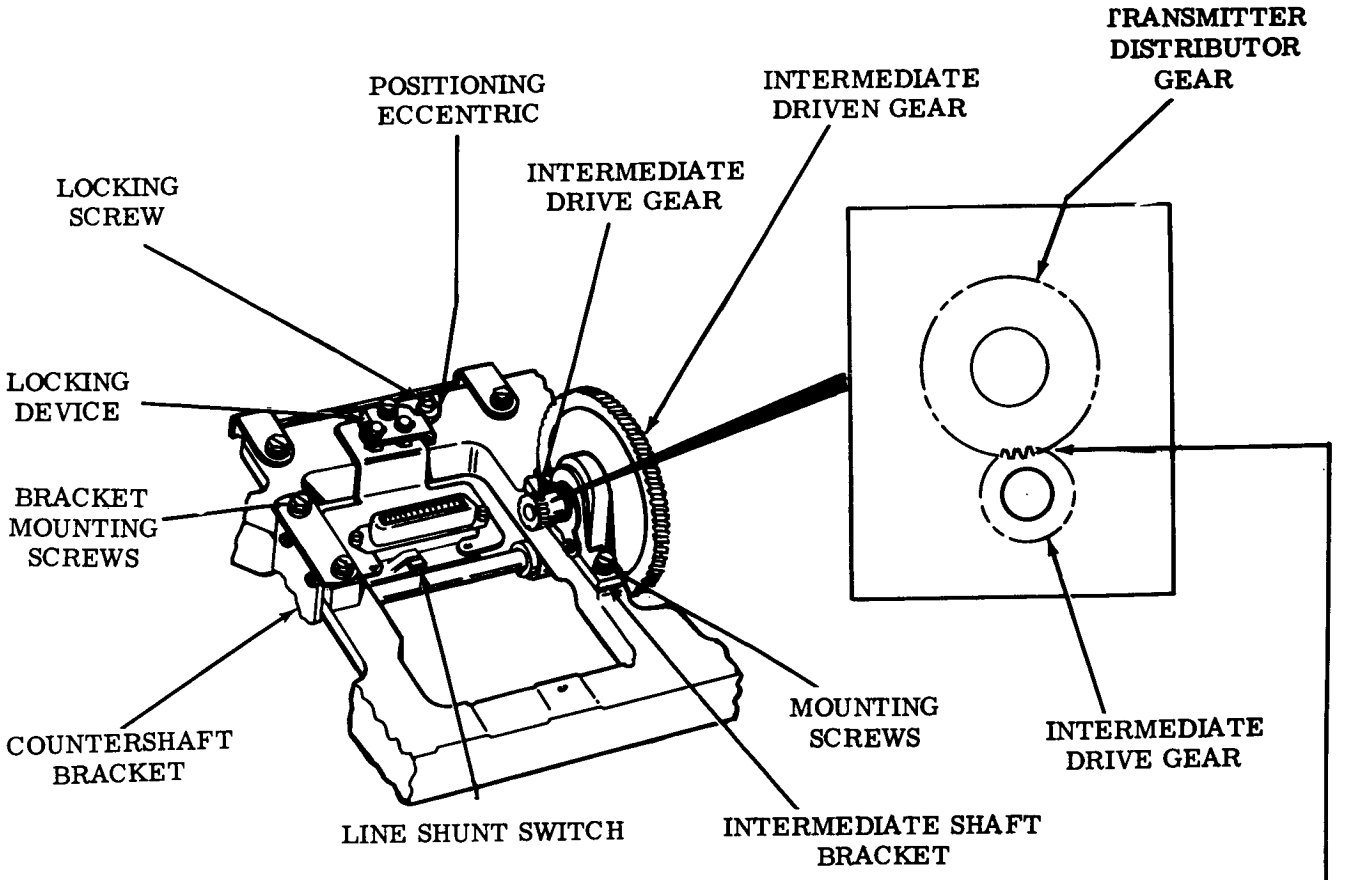
Place a spring scale perpendicular to the belt about midway between the two sprockets, and push down with a force of 5 ounces. The belt should deflect approximately 3/8-inch from a straightedge placed across the top of the two sprockets.

To Adjust

Loosen the four motor mounting bracket screws and the motor position eccentric locking screw. Position the eccentric on the rear motor mount bracket to meet the requirement. Tighten the locking screw and the motor mounting screws.



2.05 Single Contact Multiple Mounting Bases (Variable Speed) (continued)



TRANSMITTER DISTRIBUTOR POSITIONING

Requirement

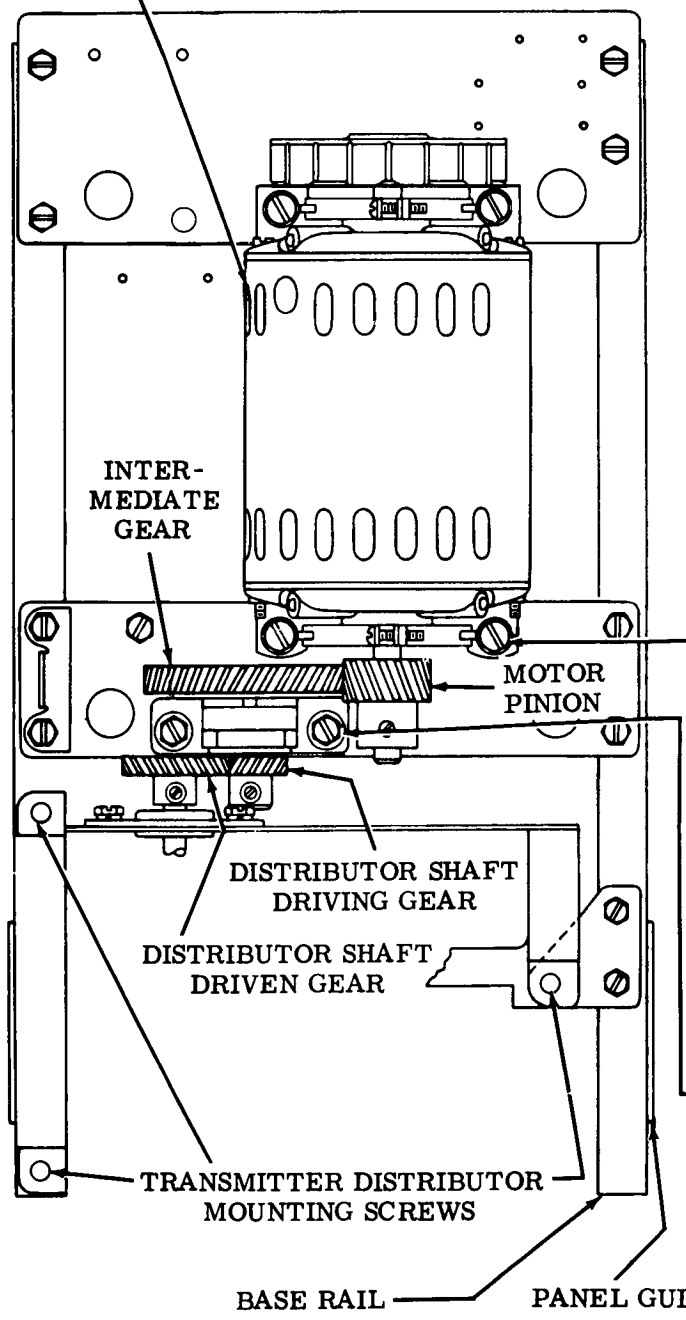
There should be a barely perceptible backlash between the transmitter distributor gear and its associated intermediate gear at the point of minimum clearance.

To Adjust

Loosen the positioning eccentric locking screw and position the locking device to the left. Place the transmitter or transmitter distributor successively in each of the three mounting positions and adjust in the following manner. Engage the connector on the transmitter distributor with its mating connector on the base, and mesh the transmitter distributor gear with the intermediate gear. Hold the transmitter distributor against its positioning eccentric and adjust the eccentric to meet the requirement. Tighten the eccentric locking screw.

Note: If there is not sufficient range in a positioning eccentric to permit a proper backlash adjustment, it will be necessary to reposition the countershaft assembly. Remove all transmitter distributor units. Loosen the two screws in the right and left intermediate shaft brackets, and the two screws in each countershaft bracket. Move the countershaft assembly forward or to the rear as required, keeping the bracket assemblies parallel so as not to bind or place a strain on the countershaft. Tighten the countershaft bracket mounting screws. The adjustments preceding will now have to be performed.

2.06 Multicontact Single Mounting Bases



CAUTION: IF THE MOTOR SHOULD BECOME BLOCKED FOR SEVERAL SECONDS, THE THERMAL CUTOUT SWITCH WILL BREAK THE CIRCUIT. SHOULD THIS HAPPEN, ALLOW THE MOTOR TO COOL AT LEAST 5 MINUTES BEFORE MANUALLY DEPRESSING THE RED BUTTON. AVOID REPEATED DEPRESSION.

INTERMEDIATE GEAR ASSEMBLY

Note: Remove gear guard.

(1) Requirement
At least 0.010 inch clearance between distributor shaft driving gear, and intermediate gear bracket bearing clamp.

To Adjust
Position driving gear with its mounting screw loosened.

(2) Requirement
Some clearance between distributor shaft driven gear and intermediate gear bracket bearing clamp.

(3) Requirement
Min some---Max 0.003 inch
Clearance between distributor shaft driving and driven gears at point where backlash is minimum.

(4) Requirement
Intermediate gear housing parallel to base.

To Adjust
Position intermediate gear bracket with its mounting screws loosened.

MOTOR UNIT MOUNTING SCREWS

INTERMEDIATE GEAR BRACKET MOUNTING SCREWS

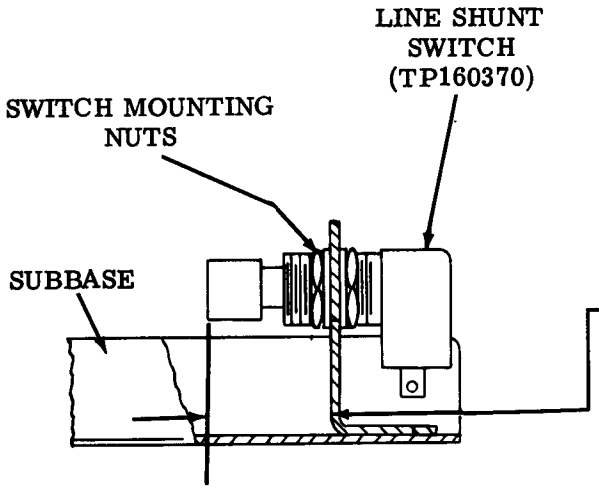
MOTOR PINION

(1) Requirement
Min some---Max 0.003 inch
Backlash between motor pinion gear and intermediate gear.

(2) Requirement
Motor parallel to base.

To Adjust
Position motor with its mounting screws loosened. Tighten mounting screws. Rotate shaft and recheck requirements.

2.07 Multicontact Single Mounting Bases (continued)



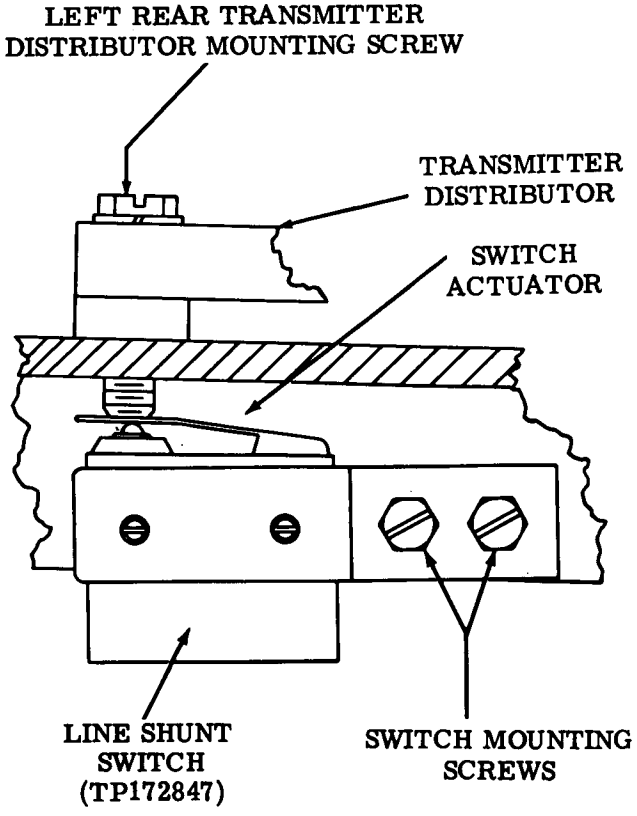
LINE SHUNT SWITCH

To Check
Remove unit from subbase.

(1) Requirement
Line shunt switch contacts should be closed.

(2) Requirement
Clearance between engaging surface of switch plunger and its mounting bracket
Min 49/64 inch---Max 51/64 inch

To Adjust
Position switch with its mounting nuts loosened.



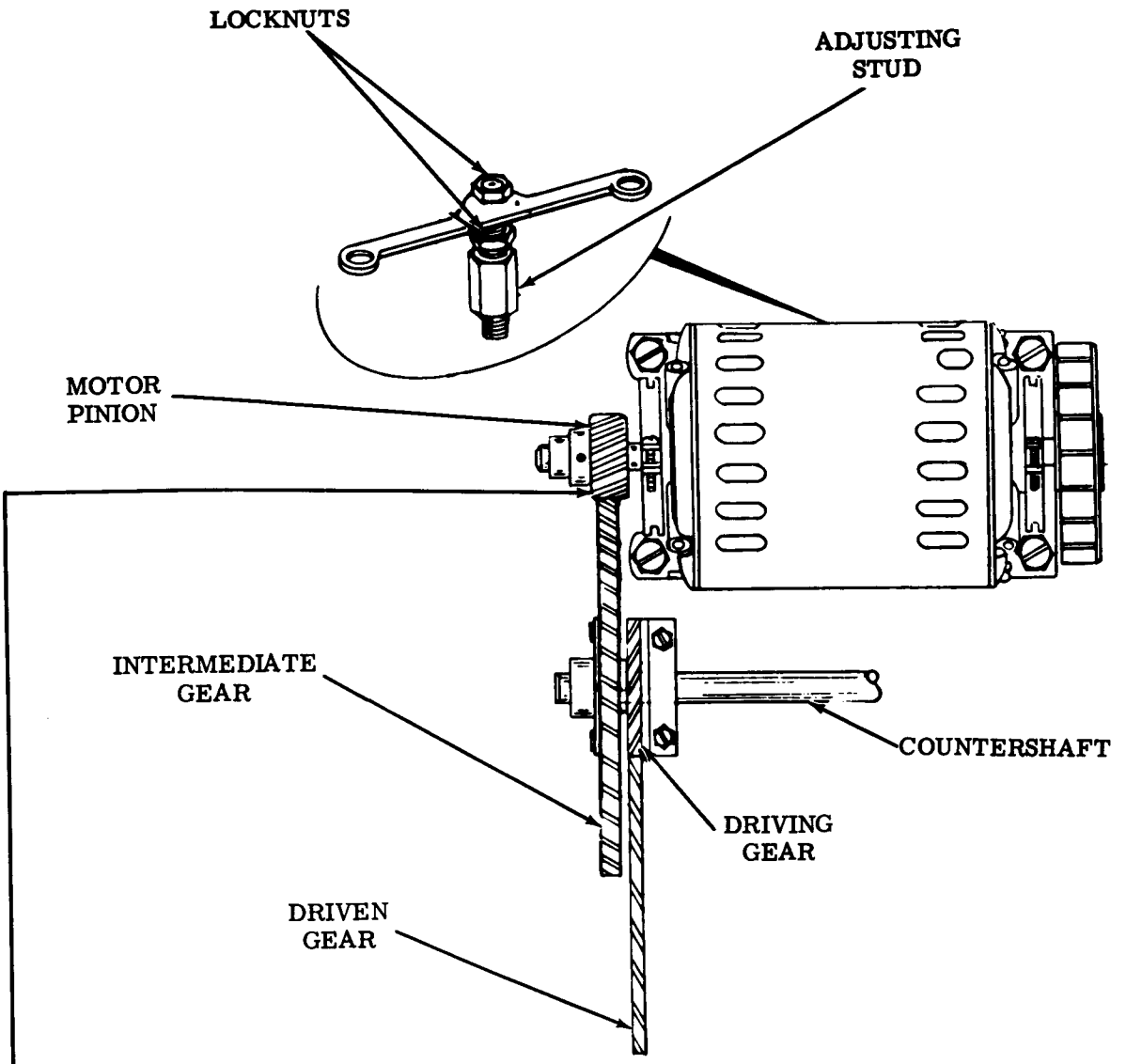
LINE SHUNT SWITCH

(1) Requirement
Line shunt switch contacts open when transmitter distributor left rear mounting screw is tightened.

(2) Requirement
Line shunt switch contacts closed when left rear mounting screw is loosened.

To Adjust
Back off left rear mounting screw 1/2 turn. Position switch actuator (switch mounting screws friction tight) against the transmitter mounting screw until the contacts just close (switch actuator should be approximately horizontal). Tighten switch mounting screws. Check requirements and refine adjustment if necessary.

2.08 Multicontact Multiple Mounting Bases (Common Speed)



MOTOR PINION

Requirement

Pinion and intermediate gear should have a barely perceptible amount of backlash at point of minimum clearance (check for one revolution of intermediate gear).

To Adjust

With its locknuts loosened, position the adjusting stud up or down.

2.09 Multicontact Multiple Mounting Bases (Common Speed) (continued)

COUNTERSHAFT

Requirement

Barely perceptible amount of backlash between countershaft driving gear and its associated transmitter distributor driven gear at point of least clearance.

(1) To Adjust

With locating plate mounting screws friction tight, position plate at center of its adjustment range.

(2) To Adjust

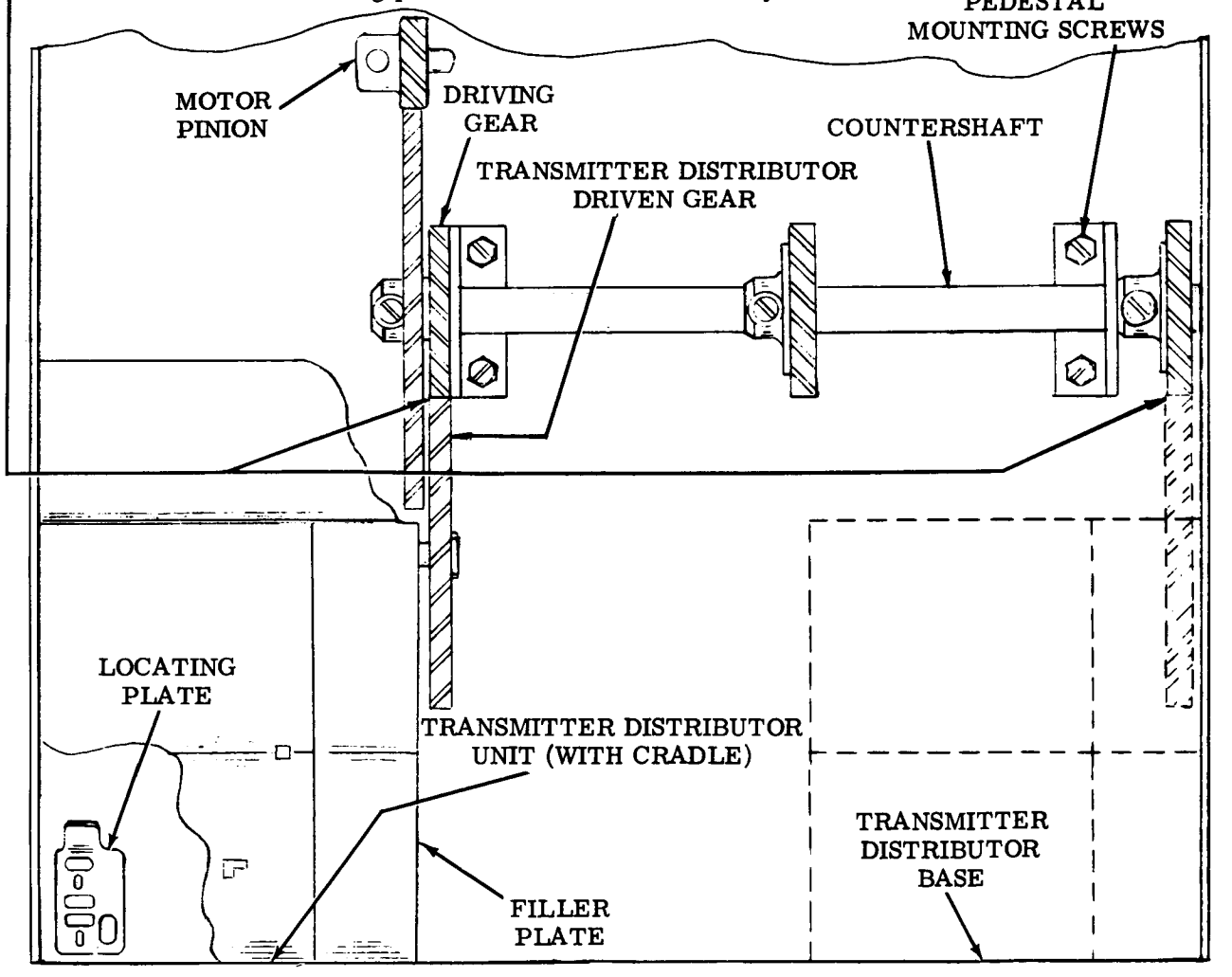
Insert transmitter distributor unit (with cradle) into left mounting position on base. Position locating plate to meet requirement. Tighten plate mounting screws.

(3) To Adjust

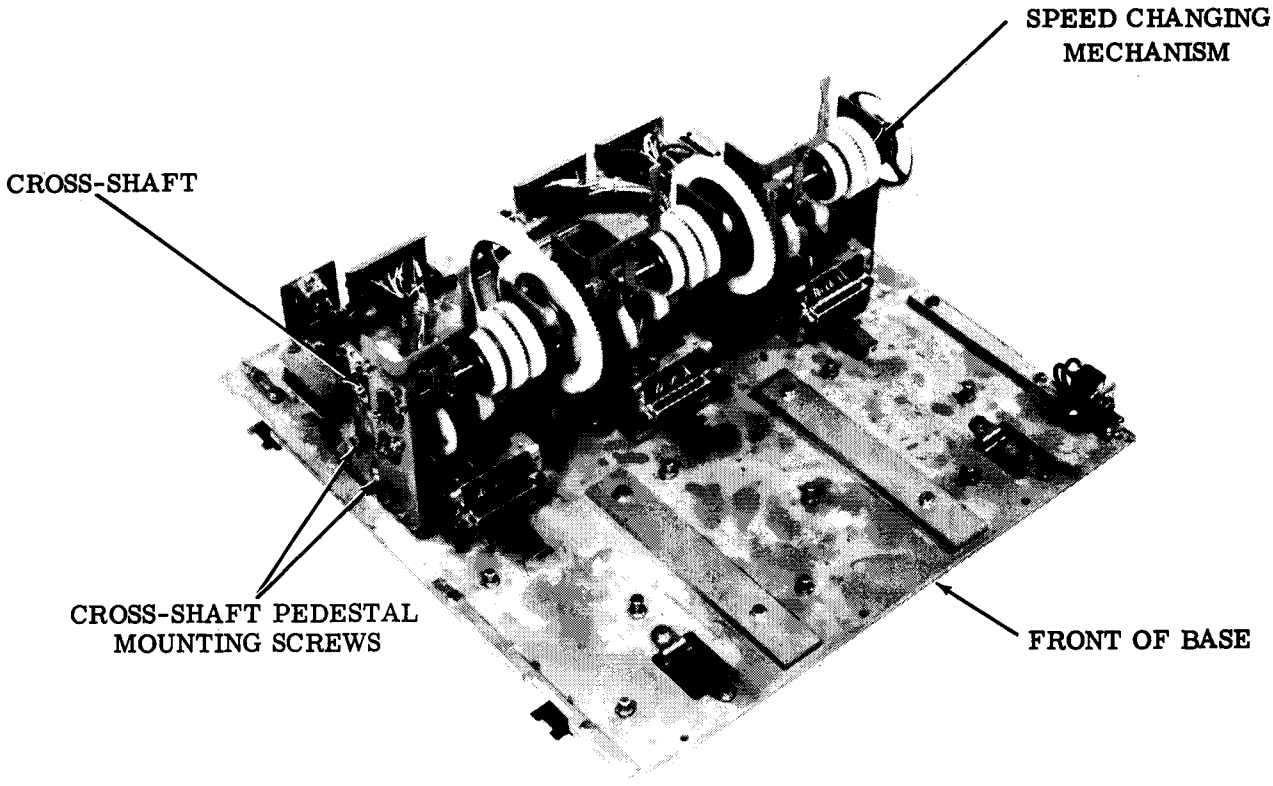
Remove transmitter distributor from left position, and place it in right mounting position. Loosen mounting screws on countershaft pedestals and position right end of countershaft to meet requirement.

(4) To Adjust

Tighten all mounting screws, check for binds, and recheck requirements in right and left mounting positions. Refine if necessary.



2.10 Multicontact Multiple Mounting Bases (Variable Speed)



CROSS-SHAFT POSITION

Requirement

The cross-shaft assembly should be parallel with the front edge of the base plate

Within 0.015 inch

To Adjust

Position the cross-shaft assembly with its pedestal mounting screws loosened. Refine, if necessary, to avoid binds in the shaft. Tighten the pedestal mounting screws.

2.11 Multicontact Multiple Mounting Bases (Variable Speed) (continued)

SPEED CHANGE GEAR

(1) Requirement

The backlash between each driven gear on the speed changing mechanism and each corresponding driving gear on the cross-shaft should be

Min 0.004 inch---Max 0.008 inch

and the two shafts should be parallel as gauged by eye.

To Adjust

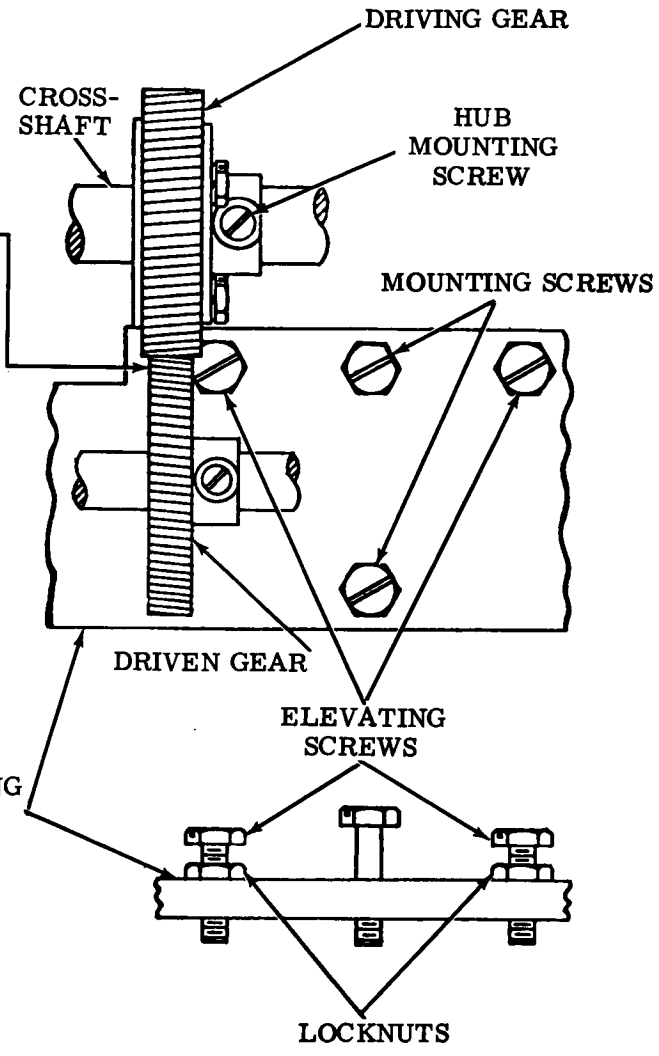
Position each speed changing mechanism with its mounting screws and the locknuts on the elevating screws loosened.

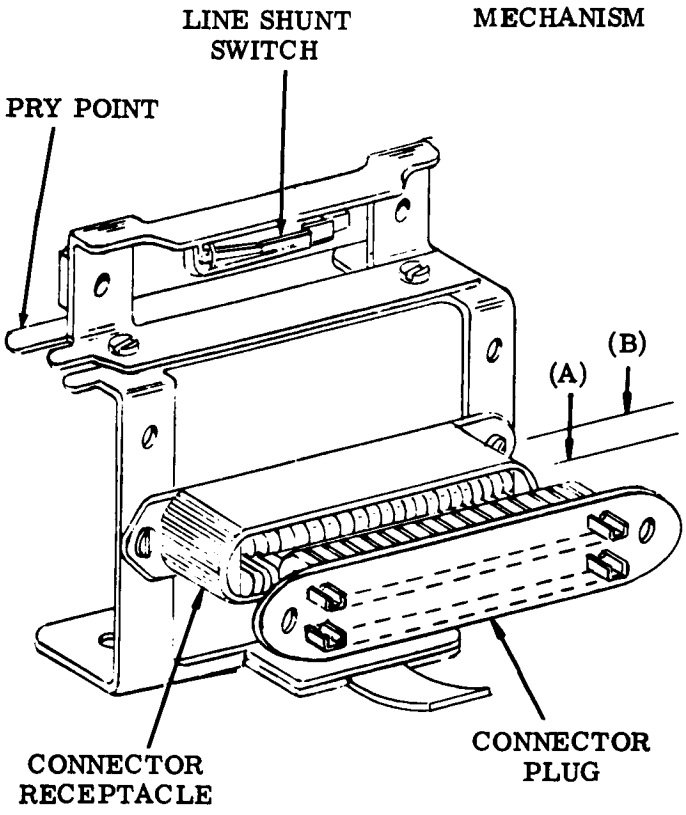
(2) Requirement

The gears on the speed change mechanism should mate over their entire width with the gears on the cross-shaft.

To Adjust

Position the gear on the cross-shaft with its hub mounting screw loosened.





LINE SHUNT SWITCH

To Check

Place a transmitter distributor in one of the mounting positions. Note the point (A) at which the connector plug starts to engage the connector receptacle, and the point (B) where the plug fully engages the receptacle.

Requirement

Line shunt switch should actuate (contacts close) before unit is withdrawn one-half the distance between points (A) and (B).

To Adjust

With switch bracket mounting screws friction tight, position switch by means of its pry point. Check all line shunt switches.

2.12 Covers

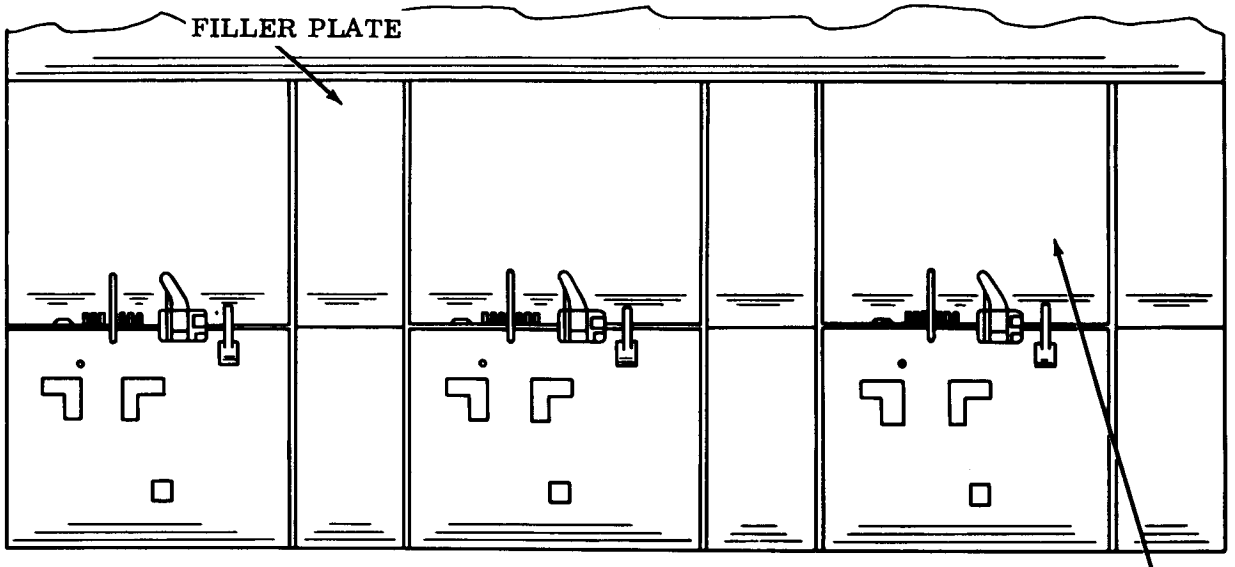
(B) FILLER PLATES

Requirement
Top surface of filler plate should align with upper surface of both top plate and tape guideplate. Common edges should bear against each other.

(1) To Check
Lay a straightedge across top plates and filler plates, 1/4-inch from coverplate. Gap between each plate and straightedge, 1/8-inch on each side of edge between top and filler plates (5 edges) should be flush to 0.010 inch.

(2) To Check
Lay a straightedge across tape guideplates and filler plates, 1/8-inch from lower edge of tape guideplates. Gap between straightedge and each tape guideplate 1/8-inch on each side of edge between tape guide and filler plates (5 edges) should be flush to 0.010 inch.

To Adjust
Position filler plate and its brackets with the bracket mounting screws and plate mounting nuts friction tight.



(A) COVERPLATES

(1) Requirement
With three transmitter distributor units in position on the base, the coverplates should align horizontally, and the mating edge of each coverplate and top plate should be flush.

To Adjust
Position coverplate with its detenting nuts loosened.

(2) Requirement
Edge of coverplate opposite driving gear should align with edge of top plate.

To Adjust
Position coverplate with the corner plate detent mounting nuts and spring plate mounting nuts friction tight.

Note: When less than three transmitter distributor units are used on the base, the unused compartment contains a dummy unit. Position the top plate and cover in a manner similar to adjustment procedure (A).

28 TRANSMITTER DISTRIBUTOR BASES

(SINGLE MOUNTING AND MULTIPLE MOUNTING)

LUBRICATION

CONTENTS

1. GENERAL

1.01 This section outlines the lubricating procedure and indicates the lubricating points for the 28 transmitter distributor bases, both single mounting and multiple mounting.

1.02 The transmitter distributor bases should be lubricated as directed in this section. The illustrations indicate points to be lubricated and the kind and quantity of lubricant. Lubricate the base gears and their associated gears just prior to placing them in service. After a few weeks in service, relubricate to assure adequate lubrication. The following lubrication schedule should be followed thereafter:

Operating Speeds in Words Per Minute	Lubrication Interval
60	3000 hours or 1 year*
75	2400 hours or 9 months*
100	1500 hours or 6 months*

*Whichever occurs first.

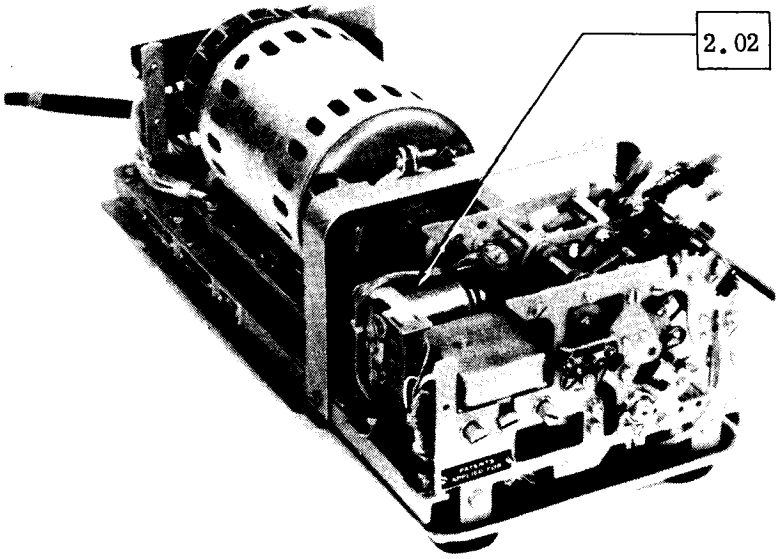
1.03 Use KS7471 grease on all surfaces where grease (G) is indicated.

1.04 Use special care to prevent oil or grease from getting between electrical contacts.

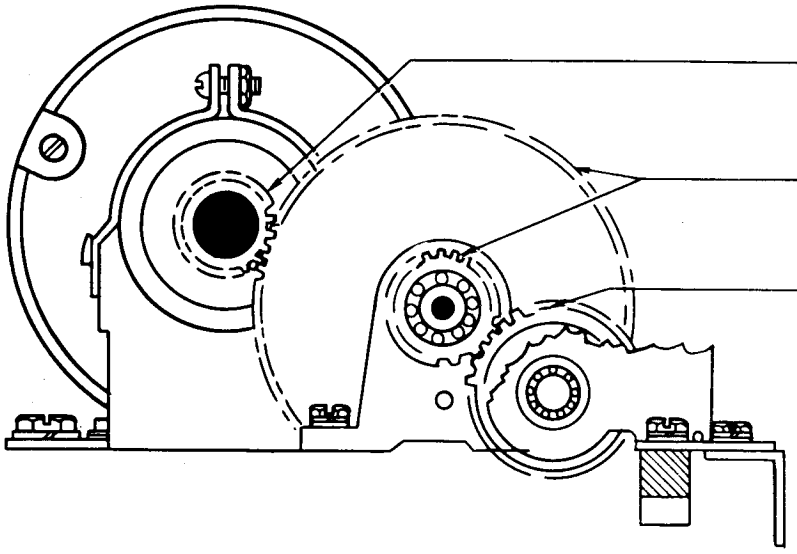
1.05 Apply a thick film of grease to all gears.

2. LUBRICATION

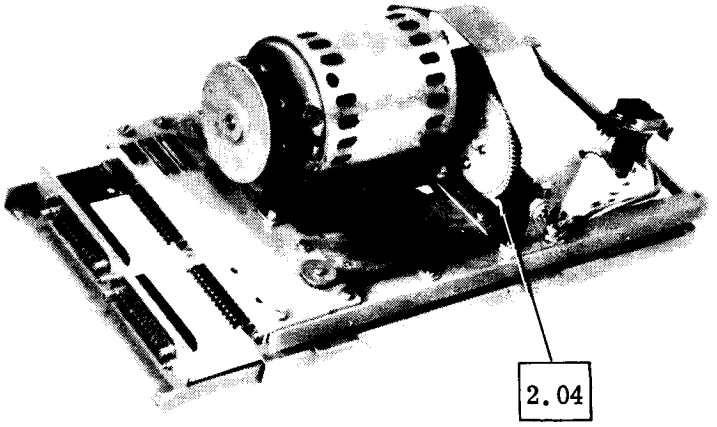
2.01 Single Contact Single Mounting Bases



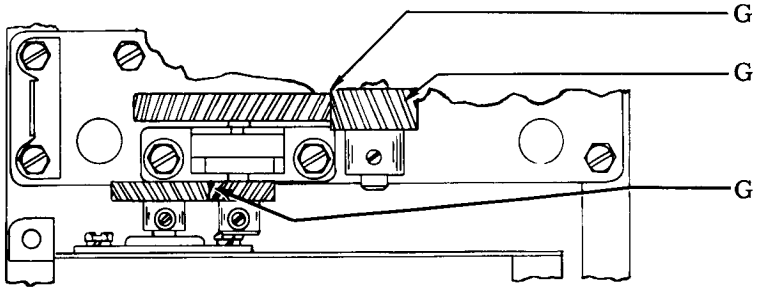
2.02 Intermediate Gear — Single Contact Single Mounting Bases



2.03 Multicontact Single Mounting Bases

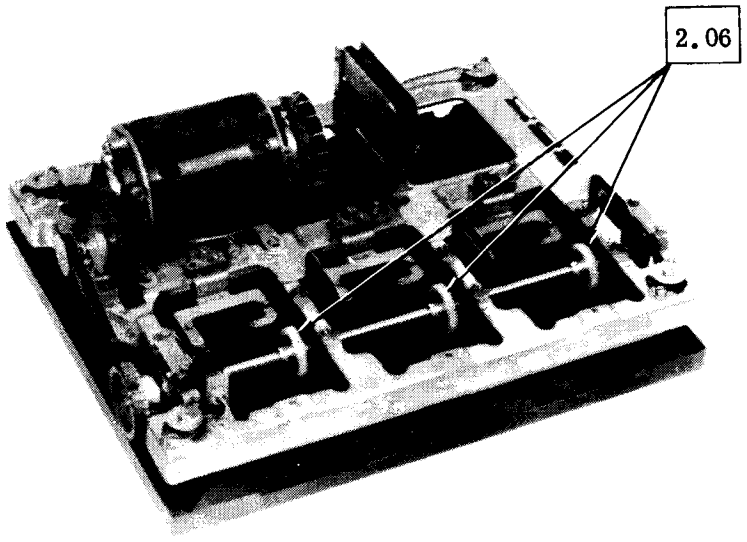


2.04 Intermediate Gear — Multicontact Single Mounting Bases

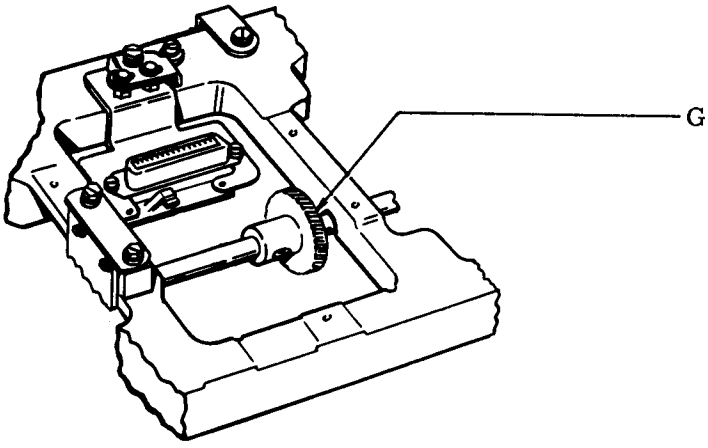


G	Teeth	Intermediate Gear
G	Teeth	Associated Gear
G	Teeth	Associated Gear

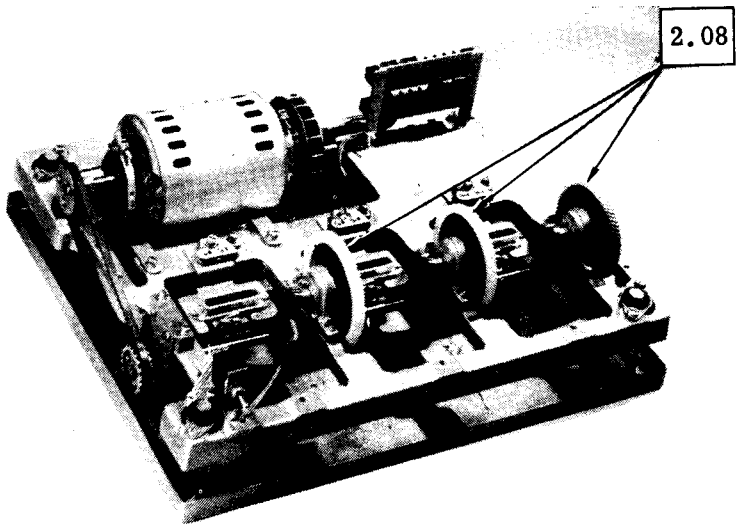
2.05 Single Contact Multiple Mounting Bases (Common Speed)



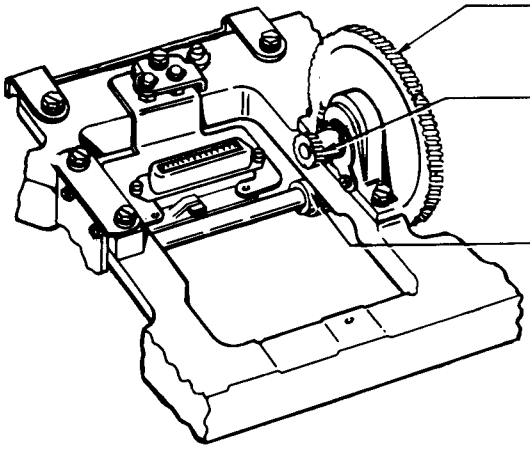
2.06 Countershaft Gear — Single Contact Multiple Mounting Bases (Common Speed)



2.07 Single Contact Multiple Mounting Bases (Variable Speed)

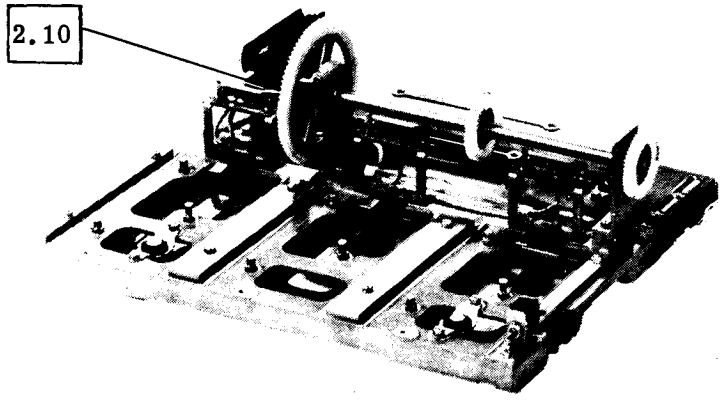


2.08 Intermediate Gears — Single Contact Multiple Mounting Bases (Variable Speed)

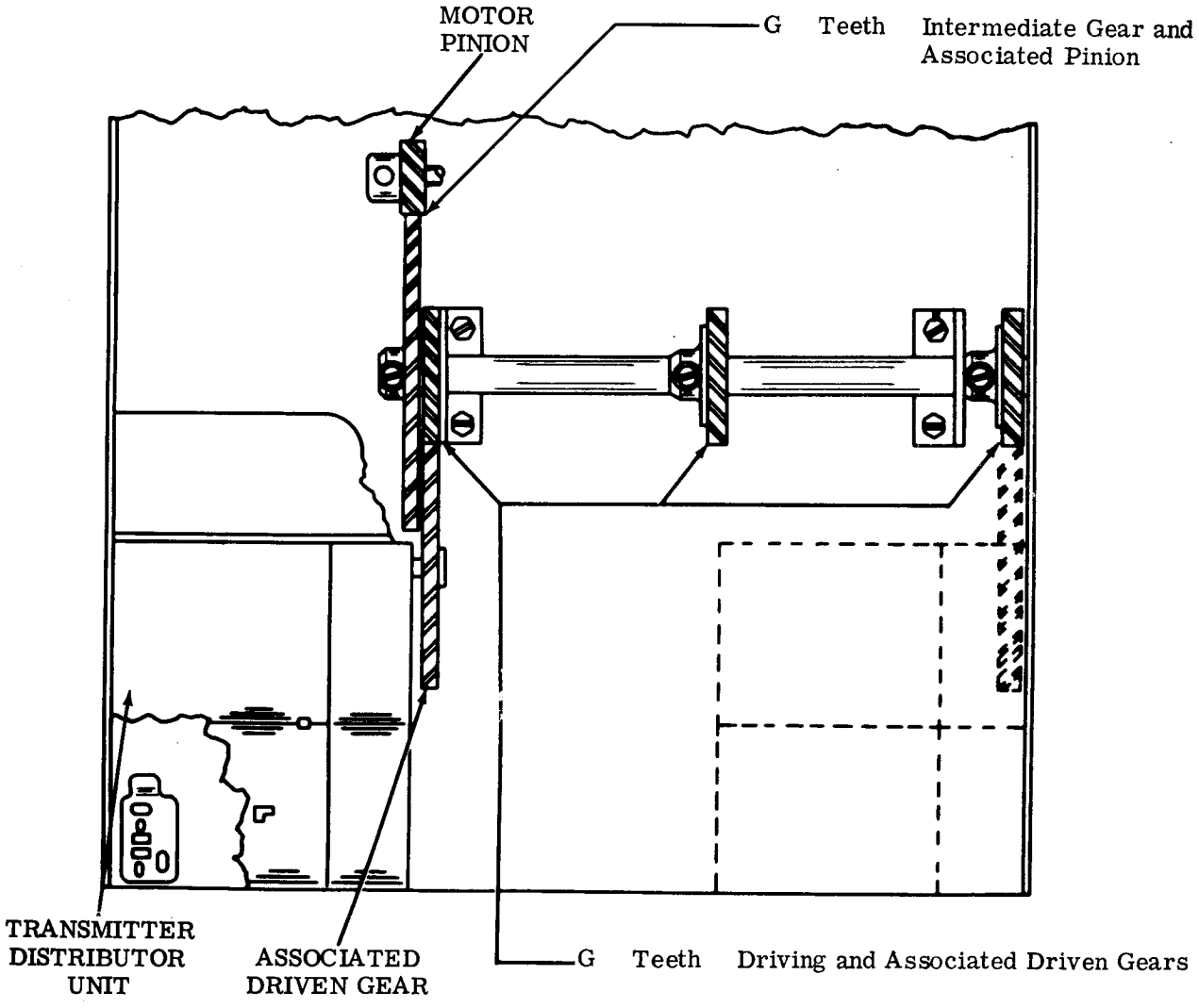


G	Teeth	Intermediate Driven Gear
G	Teeth	Intermediate Drive Gear
G	Teeth	Counter Shaft Gear

2.09 Multicontact Multiple Mounting Bases (Common Speed)



2.10 Gear Train — Multicontact Multiple Mounting Bases (Common Speed)



2.11 Drive Gears and Speed Change Gears — Multicontact Multiple Mounting Bases (Variable Speed)