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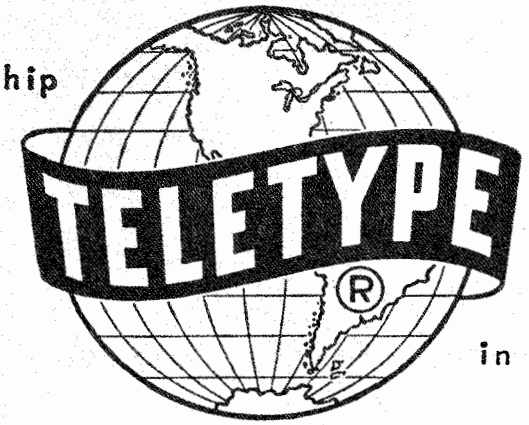


in printing telegraphy

BULLETIN 241B

TECHNICAL MANUAL

TAPE READER

(BX, BXB)

60 WPM

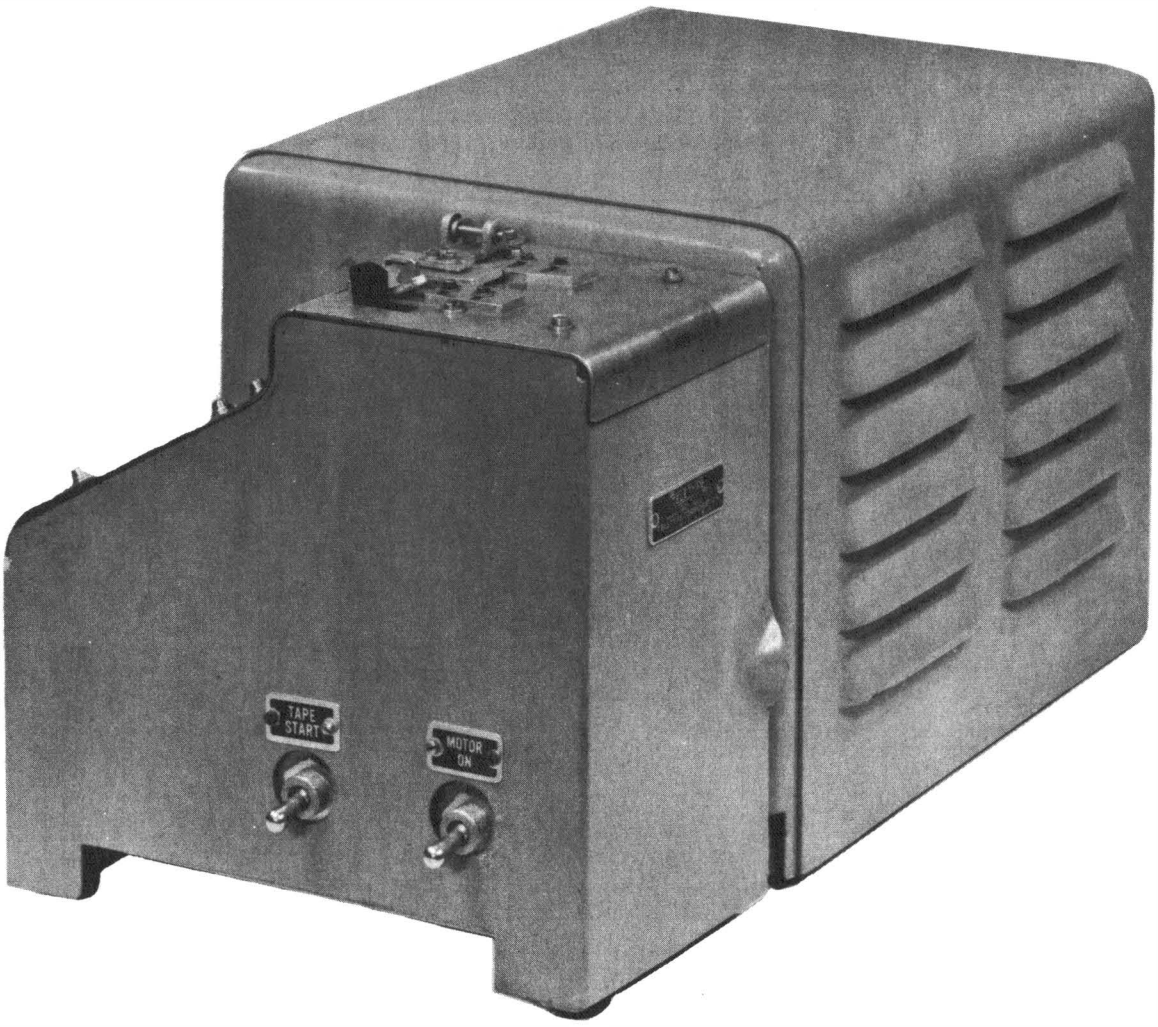
TELETYPE®
CORPORATION
SUBSIDIARY OF *Western Electric Company* INC.
CHICAGO, ILLINOIS, U.S.A.

LIST OF EFFECTIVE PAGES

MARCH, 1960
(Supersedes September, 1957 Issue)

PAGE NUMBER	CHANGE IN EFFECT
A	Change 1
B	Original
C to D	Change 1
1-1 to 1-2	Change 1
2-1 to 2-4	Change 1
3-1 to 3-17	Change 1
4-1	Original
4-2	Change 1
5-1	Change 1
6-1 to 6-16	Change 1

The above list indicates the effective pages as of the date of issue. Upon receipt of change pages, insert them numerically and discard any superseded pages.



TAPE READER (SINGLE UNIT)

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SECTION 1

DESCRIPTIONS

1. INTRODUCTION

a. This bulletin covers the following for the Teletype Tape Reader: Descriptions, Principles of Operation, Adjustments, Lubrication and Installation. The texts of Sections 1 and 2 are illustrated by photographs and drawings in Section 6. Refer to Tape Reader Parts Bulletin for disassembly and detailed arrangement of the associated parts.

b. Reference in the text to "left" or "right" indicates the viewers left or right as he faces the front of the unit. The viewer's front is when the motor-on and tape-start toggle switches are toward him. Pivot points are shown in the drawings by circles or ellipses which are solid black to indicate fixed points and are cross-hatched to indicate floating points.

2. GENERAL (Figure 1-0 & 1-1)

The Tape Reader is an electro-mechanical device which transmits intelligence into high speed telegraph systems. It converts the intelligence, which is presented to it in the form of perforated tape, into an electrical permutation code that is emitted at its output terminals on multiple wires. Driven by an a. c. synchronous or an a. c. series motor, the Reader is capable of operating speeds up to 600 words per minute (3600 operations per minute) and is available in variations which will read either five, six, seven or eight level tapes of the chadless or fully perforated type. It is designed to produce neutral pulses and when operated within its electrical limits, is suitable for use with either vacuum-tube or transistorized electronic units. A free-wheeling device facilitates tape insertion, and a tape-out mechanism will stop the Reader's operation when it runs out of tape. The basic components of the Tape Reader are a base, a motor unit and a reader unit. It is available in single- and double-unit models, the latter of which provides alternate tape feeding whereby time lost for tape insertion is eliminated. A description of each basic component follows.

3. BASE (Figure 1-1)

a. SINGLE UNIT. The base provides a foundation for the motor and reader and incorporates drive parts, electrical accessories and a cover. It is approximately 13-1/2 inches long, 7-3/8 inches wide and 7-1/4 inches high. The base itself is a formed metal plate with studs for mounting the motor at its rear and a bracket for mounting the reader at its front. The drive parts include two sprockets and a timing belt. A four point connector mounted by a bracket at the extreme rear provides electrical connection to both the 115 volts a. c. and 120 volts d. c. sources. Mounted on the same bracket is a 35-point output connector which links the Reader with associated equipment. A cable terminated by a 37-point connector provides electrical units. An arc suppressor, terminal board and fuses for the a. c. and d. c. voltages mount on a bracket on the right side of base. Motor-on and tape-start toggle switches are located on the front of the reader bracket. The cover consists of three sections: one section encloses the motor, another the sides of the reader and the third is a tape plate which covers the drive parts and serves to guide the tape from the reader.

b. DOUBLE UNIT. The double unit base is similar to the single unit, but differs in the following ways: It is 17 inches long and has two brackets instead of one located at its left front for mounting two readers abreast. The drive parts include 6 sprockets, 3 timing belts and a counter shaft. Two relays which provide for alternate feeding of tapes mount on the fuse bracket.

4. READER UNIT (Figure 1-1)

The reader unit incorporates electrical and mechanical apparatus to feed and sense the tape and provide code pulses on a multiple-wire basis at the output terminals. Mounting facilities for the various mechanisms are provided by two side plates held apart by three transverse rods. A drive mechanism includes a shaft and eccentric assembly mounted on the rear plate and a main bail assembly located at the left side. The control magnet operates a latch mechanism mounted on a bracket between the front and rear plates. The tape feed mechanism located at the upper left side of the reader is a pawl and ratchet arrangement which advances the tape by means of a feed wheel. The tape rides on a top plate and is held in place by a tape lid assembly and tape guides. A tape sensing mechanism, also situated at the upper left side of the reader, consists primarily of pins which are spring driven through the tape code holes and mechanically withdrawn by the main bail. The number of sensing pins is determined by the level tape to be read; for example, a five level tape requires five pins, a six level tape six pins etc. A contact mechanism, which feeds out the code pulses, mounts between the front and rear plates and to the right of the sensing mechanism. The free-wheeling and tape-out mechanisms both mount on the front plate. A 37-point connector, when engaged with the mating connector on the base, provides electrical con-

nection between the base and reader units.

5. MOTOR UNIT (Figure 1-1)

Mechanical motion for the Tape Reader is supplied by an a.c. synchronous or an a.c. series motor unit which operates from 115 volt a.c. power source and developes 1/20 HP at 3600 rpm. The motor itself rests in the cradle of a mounting bracket and is held in place by a strap at each end. For cooling purposes two fans are mounted at each end of the rotor within the end bells, and a combination fan and handwheel rides at the right end of the shaft. A relay, starting capacitor and thermal-cutout switch are contained in a compartment of the bracket beneath the motor. A red reset button, which protrudes through a mounting plate under the motor, provides a means of resetting the thermal-cutout switch.

6. ELECTRICAL CHARACTERISTICS

a. CIRCUITRY. Both the a.c. and d.c. input circuits terminate in the four-point power connector on the base (Figure 2-9). The a.c. circuit, which supplies electrical power to the motor unit, includes a 4-ampere fuse and a motor-on switch in series with the motor. The code and magnet circuits are connected in parallel across the common 120 volts d.c. source and are protected by a 1/8 ampere fuse. All wiring on the reader unit terminates in the 37-point connector on the rear plate, and the sensing contacts are, in turn, linked by individual leads to the 35-point connector on the base. The magnet circuit contains the following connected in series: a 1000 ohm resistance, a tape-start contact, a free-wheeling contact and the magnet coils; in addition, an arc suppressor is wired in parallel with the magnet. On the double-reader model, to provide alternate feeding of tapes, two relays are used (Figure 2-10). The coil of each relay is in parallel with one reader control magnet and its associated series resistor and the relay normally closed contact in series with the other reader control magnet. The output sensing contacts of both reader units are wired in parallel with the 35-point connector on the base. The Reader has electrical facilities for nine levels of code output including one control level and eight intelligence levels.

b. RATINGS. The Tape Reader contacts will control external signal circuits containing either or a combination of resistance, capacitance and inductance. The reader contacts have a maximum rating of 0.015 ampere at 130 volts d.c. The reader is furnished to the customer for neutral signal operation. The voltage supplied to the control magnet should be from 20 to 30 volts d.c. Not more than 6 volts shall be required to hold the control magnet armature attracted. Spark suppression is not provided and if required, must be included in the external circuits.

c. POWER SUPPLY REQUIREMENTS:
MOTOR UNIT

Input voltage: 115 volts $\pm$ 10 per cent a.c.
Phase: Single.
Frequency: 60 cycles $\pm$ 0.75 per cent.
Input current
  Starting: 9 amperes.
  Running: 1.85 amperes.
Wattage: 65.
Heat Dissipation: 50 watts.
Power Factor: 0.030.

SECTION 2

PRINCIPLES OF OPERATION

1. GENERAL

a. This section describes the operating principles of the Tape Reader. The basic function of this equipment is to convert code permutations perforated in paper tape to electrical pulses which are supplied simultaneously to multiple wires. The following general exposition is illustrated by the block diagram of Figure 2-1.

b. Both a.c. power and d.c. current are supplied to the Reader via the four-point power connector on the base. When the motor-on switch is on, the motor unit converts the electrical energy to mechanical motion, and the drive parts transfer this motion to the shaft and eccentric assembly on the reader unit.

c. From the four-point connector the magnet current must pass through the tape-start switch and the normally closed tape out and free wheeling contacts to the electromagnet of the latch mechanism. The latch mechanism controls the main bail assembly: when the tape start switch is on, the magnet is energized and the latch mechanism permits the main bail to be driven by the shaft and eccentric assembly; when the tape start switch is off, the magnet is de-energized and the latch mechanism renders the main bail inoperative.

d. The main bail assembly transfers motion to both the tape sensing and tape feed mechanisms. The feed mechanism moves the tape through the reader one step at a time so that each set of code holes is momentarily positioned for the sensing mechanism. The latter reads the code holes and, in accordance with them, controls the contact mechanism. The code current, taken from the same source as the magnet current, is regulated by the contact mechanism feeds out combinations of simultaneous pulses on multiple wires to the 35-point output connector on the base.

e. The tape maintains the tape out mechanism in its unoperated condition. When the Reader runs out of tape, the tape out mechanism opens its contact which stops the operation. When manually actuated, the free wheeling mechanism effects the following functions: it renders the tape out mechanism inoperative; it opens the free wheeling contact which stops the reader; it conditions the tape feeding mechanism such that tape can be easily inserted.

2. PERMUTATION CODE

The intelligence processed by the Tape Reader is conveyed by a permutation code of either five, six, seven or eight levels according to what variation of the code is being used. Each character is represented by a combination of intelligence pulses, each of which may consist of a current (marking) or no-current (spacing) time interval. A five level code has five intelligence pulses, a six level code six intelligence pulses etc. In addition to the intelligence pulses, each code combination includes a control pulse, always marking, which is used for control purposes in associated equipment and for blank recognition--i.e., the recognition of the code combination of which all intelligence pulses are spacing. With each operation of the Reader, the pulses making up a code combination are fed out simultaneously on individual wires. In tape form the characters are represented by combinations of code holes, the holes corresponding to marking pulses and the absence of holes corresponding to spacing pulses.

3. MOTION

a. MOTOR UNIT (Figure 2-2)

(1) Mechanical motion for the Tape Reader is supplied by the motor unit which is of the capacitor-start, synchronous type and operates from a 115 volt, 60 cycle, single-phase power supply. The motor includes a two-pole wound stator and a squirrel cage rotor. The stator has a main operating winding and an auxiliary winding connected in parallel (Figure 2-2). A 43 mfd., electrolytic starting capacitor and the switch of a start relay are in series with the starting winding, and the coil of the start relay and a thermal-cutout switch are in series with the running winding.

(2) When the motor switch is manually closed, the initial surge of current (approximately 9 amperes) energizes the starting relay coil (Figure 2-2) which closes the relay contacts. The magnetic flux produced by the main operating and auxiliary windings causes the rotor to turn. As the rotor accelerates the current through the motor start relay, the main operating winding and thermal-cutout switch decreases and, at approximately 5.7 amperes the magnetic flux produced by the motor start relay has decreased to a point which permits the motor start relay contacts to open. Opening the motor start relay contacts electrically removes the auxiliary winding from the circuit. The rotor continues to accelerate until it reaches synchronous speed. The thermal-cutout switch is placed in the circuit to prevent damage that might be caused by an overload. Should the unit draw excessive cur-

rent--because of a blocked rotor, for example ---excessive heat will be generated in the thermal-cutout switch, the switch will open and electrical power will be removed from the motor. The switch can be closed by pressing the red reset button that projects through the motor mounting plate.

(3) Two fans mounted at each end of the rotor within the frame draw cooling air through the slots in the end bell and exhaust it through the slots in the stator frame. Additional cooling is provided by the combination fan-handwheel mounted at the right end of the shaft. The motor's rotation is counterclockwise as viewed from the handwheel end.

b. DRIVE PARTS. The drive parts transfer motion from the motor to the reader or readers.

(1) SINGLE UNIT. The drive parts of the single unit include two sprockets and a timing belt. The driving sprocket mounts near the front end of the motor shaft (Figure 3-15), the driven sprocket mounts near the rear end of the reader shaft, and they are connected by the timing belt.

(2) DOUBLE UNIT. The drive parts of the double unit include six sprockets, three timing belts, a counter shaft and its mounting bracket. The bracket mounts on the base behind the readers (Figure 3-16). The counter shaft is supported by bearings in the bracket. The motor sprocket is linked to the driven sprocket at the rear end of the shaft by a timing belt. Each reader is connected by a timing belt to a driving sprocket on the counter shaft.

c. DRIVE AND LATCH MECHANISMS (Figure 2-3)

(1) The shaft and eccentric assembly on the reader transfers motion from the drive parts to the main bail assembly. The eccentric mounts on the front end of the shaft which is supported by a bearing housing mounted in the rear plate (Figure 2-3). The main bail assembly, located across the left side of the reader (Figure 2-7), transfers motion to the tape feeding and tape sensing mechanisms. An adjustable drive follower mounts on the surface of the bail (Figure 2-3). The latch mechanism, which controls the operation of the main bail assembly, is made up primarily of a control magnet, an armature, a latch lever and a latch lever spring. The control magnet and latch lever pivot on the same shaft and by means of the latch lever spring are pulled toward each other.

(2) When the tape-start switch is off, the magnet circuit (Figure 2-9) is open and the magnets are de-energized. The armature is held in the unoperated position by the armature spring, and the main bail is latched down by the latch lever. The reader is thus in its unoperated condition as shown in Figure 2-3. If there is tape in the reader and the tape-start switch is turned on, current flows in the magnet circuit. The magnet is energized and pulls the armature to the magnet pole pieces against the tension of the armature spring. The latch lever torsion spring tends to pull the latch lever to the right with the armature; but, if the drive eccentric is not in the proximity of its lowest point of travel, the main bail, under the tension of its spring, bears up against the lever and prevents the latter's moving. As the eccentric nears its lowest position, it cams down the drive follower which moves the bail down slightly. The bail's upward pressure on the latch lever is relieved and the latch lever spring moves the latch lever toward the control magnet armature which unlatches the main bail.

(3) A vertical force is exerted upward on the main bail spring (Figure 2-3). By means of the drive follower, the rotation of the eccentric is converted into a simple harmonic motion which is imparted to the main bail. Motion of the main bail is plotted in Figure 2-8. During the period of time from the most negative to the most positive part of the cycle, the rising eccentric permits the main bail to be pulled upward by the main bail spring and during the period of time from the most positive to the most negative part of the cycle, the lowering eccentric positively drives the main bail down. The amplitude of the bail's oscillation is fixed by the motion of the eccentric, but the position of the amplitude may be varied by the adjustable drive follower.

(4) When the tape start switch is turned off, the control magnet circuit is opened, the control magnet is de-energized and the control magnet armature spring causes the control magnet armature and latch lever to move toward the left. If the main bail is not in the proximity of the lowest point of travel, the lever encounters the surface of the main bail. When the main bail approaches its lowest position, its latching extension clears the latching surface on the latch lever, and the latch lever moves further to left, due to the force exerted by the latch lever spring, and latches down the main bail. As shown by the immediately preceding discussion and paragraph 3. c. (2) of this section, the reader can only be stopped or started when the main bail is near the lowest point of its cycle (Figure 2-8).

4. TAPE FEEDING (Figure 2-3)

a. The tape feed mechanism moves the tape through the reader one feed hole at a time so that each combination of code holes can be read by the tape sensing mechanism. The active elements of the feed mechanism are a feed pawl, a feed pawl spring, a wedge, a detent, a ratchet and a

feed wheel (Figure 2-3). The feed pawl is adjustably mounted on the main bail and is held against the ratchet by a spring. The wedge and detent mount on the inside of the front plate. The ratchet and feed wheel are formed as one part which is supported on bearings in the front and rear plates (Figure 2-7). During its movement through the reader, the tape rides on the top plate (Figure 2-4), being guided horizontally by tape guides and held down by a tape lid. A tape lid shoe holds the tape around the surface of the curved plate so that the tape is engaged by the feed wheel approximately ninety degrees of the latter's periphery (Figure 2-3).

b. As it rises during its cycle, the bail moves the feed pawl up along the periphery of the ratchet. The ratchet and feed wheel are prevented from rotating clockwise (Figure 2-3) by the detent which engages the ratchet. It is during this period that the tape is being read by the sensing mechanism, and the detent serves to hold the combination of code holes in position. Near the top of the main bail's cycle, the pawl drops into the next indentation between ratchet teeth. As the bail recedes during the last half of its cycle, the pawl, held in engagement with the ratchet by the spring, rotates the ratchet and feed wheel one tooth. The feed wheel, whose pins engage the tape feed holes, advances the tape one feed hole and thus places the next combination fo code holes in position to be read. Near the end of its downward travel, the pawl is engaged and held in place by the wedge to prevent the ratchet from overtraveling.

5. TAPE SENSING (Figure 2-5)

a. The tape sensing mechanism reads the combinations of code holes in the tape and, in accordance with the holes, controls the contact mechanism. The sensing mechanism consists of sensing pins and their springs (Figure 2-5). The contact mechanism is made up basically of switch bars, contact springs, contacts and terminals. The sensing pins protrude up through holes in the top of the main bail, and their bottom ends rest at the left end of the switch bars. Near the forward end of the switch bars are spacing and marking contact points. The contact points against which the bar contact points bear are mounted on steel posts that are insulated from each other in a bakelite bar. The switch bars rock on the tips of the contact springs.

b. When the Reader is in its unoperated condition, the sensing pins are held down by the main bail and the spacing contacts are closed as shown in Figure 2-5. When the Reader is operating and the main bail moves up during the first half of its cycle, it allows the pins and the left end of the switch bars to be moved up by the sensing pin springs. The pins rise through slots in the top plate, and, if there is a hole in the tape above any pin, it continues to move through the hole in the tape and its slot in the tape lid. The left end of its switch bar follows the pin and the bar rocks clockwise (Figure 2-5), opening the spacing contact and closing the marking contact. Electrical connection is made through the marking contact, the switch bar, the contact spring and the contact terminal, and a marking pulse is provided at the output terminal for that code level. On the other hand, if as any pin rises it does not encounter a hole, it is held down by the tape, the switch bar does not rock, the spacing contact remains closed and a spacing pulse is provided for that code level.

c. As the main bail moves down during the last half of its cycle, it retracts the sensing pins. But as was shown in paragraph 4.b. of this section, it is during this time that the tape is advanced. The moving tape forces the pins which are still protruding through the code holes to lean to the left. Slots in the top plate and tape lid permit this action. As illustrated in Figure 2-5, the switch bars, under pressure of the sensing pin springs, bear up against the bottom of the pins at a slight angle and at a point slightly to the left of their center line. As the bail continues to retract the pins, they clear the tape code holes and the pressure of the bar causes them to return to their upright position. At the end fo the cycle the pins are completely withdrawn as shown in Figure 2-5.

d. Since during any cycle all selected pins (those permitted to rise through the code holes) operate their switch bars in unison and since each sensing contact is connected to the 35-point signal connector by an individual lead, it can be readily seen that the pulses making up each code combination are fed out simultaneously on multiple wires. There is one more switch bar than there are sensing pins that rocks with each operation and provides the control pulse described in paragraph 2.b. of this section.

6. TAPE OUT OPERATION (Figures 2-6 & 2-9)

a. SINGLE UNIT. The tape out mechanism, which consists of a tape out lever and a contact in series with the magnet (Figures 2-6 and 2-9), stops the Reader's operation when it runs out of tape. During normal operation, the tape holds the rear vertical extension of the tape out lever down against the pressure of the lever torsion spring. Should the equipment run out of tape, the left extension is permitted to move up through its holes in the top plate and tape lid, and the lever rotates clockwise (Figure 2-6). Its right extension bears down against the lower contact spring and opens the contact. The circuit is broken and the operation of the Reader is stopped as described in paragraph 3. c. (4) of this section.

b. DOUBLE UNIT - ALTERNATE FEEDING OF TAPES (Figures 2-6 & 2-10)

(1) Two relays on the double unit base provide for alternate feeding of tapes. While the first reader is operating, tape can be inserted in the second reader. When first reader runs out of tape, it is automatically stopped and the second reader is started. This procedure can be continued as long as tape is inserted in the inoperative reader. The coil of each relay is connected in parallel with a reader magnet and the associated normally-closed relay contact is connected in series with the other reader magnet (Figure 2-10). The output voltages of the two readers are in parallel and both are wired to the 35-point connector.

(2) When reader No. 1 (Figure 2-10) is operating, its control magnet and relay are energized and relay contact is open. Thus, the control magnet circuit of reader No. 2 is open and the reader is inoperative. When reader No. 1 runs out of tape, its tape out contact opens, its control magnet and relay are de-energized and the control relay contact closes. If there is tape in reader No. 2, its control magnet and relay are energized, the relay contact opens and the reader begins to operate. Tape can now be inserted in reader No. 1.

7. FREE WHEELING OPERATION (Figure 2-6)

a. Manual operation of the free wheeling mechanism conditions the Reader such that tape can be easily inserted without opening the tape lid. The mechanism is made up of an intermediate lever, a free wheeling lever assembly and a contact in series with the magnet circuit (Figures 2-6 & 2-9).

b. In the mechanism's unoperated condition, the free wheeling lever is held in its left position by its free wheeling lever spring and the free wheeling contact is closed (Figure 2-6). If the free wheeling button is manually operated, the following operations occur simultaneously: The free wheeling lever pivots clockwise about its mounting screw. Its adjusting screw bears against the tape out arm, which is attached to the tape out lever shaft, and the shaft holds the left extension of the tape out lever retracted and out of the way even though there is no tape in the reader. The free wheeling lever's extension bears down against the lower contact spring and opens the free wheeling contact; if the reader is operating, it is stopped as described in paragraph 3. c. (4) of this section. The lower portion of the free wheeling lever cams down the intermediate lever which rotates counterclockwise about its pivot; its left extension, which engages a slot in the wedge, pulls the wedge down away from the feed pawl. A shaft, which extends laterally to the rear from the free wheeling lever, moves up and bends the detent out of engagement with the ratchet and rotates the pawl counterclockwise away from the ratchet. When the lever reaches its fully operated position, the notch on the rear extension of the button clears the top plate, and the button is pushed upward by its compression spring. The notch bears against the top plate and the lever is held in its operated position in opposition to the tension of its spring. When the free wheeling mechanism is operated, the feed wheel may be rotated freely, the rear extension of the tape out lever is out of the way, the unit is inoperative, and tape can be inserted without opening the tape lid.

c. If the free wheeling button is pushed down until its notch clears the top plate, the free wheeling lever is rotated counterclockwise by its spring. The tape out lever is no longer held in its unoperated position by the free wheeling lever; the wedge, pawl and detent return to their normal positions; the free wheeling contacts closes, and, if there is tape in the Reader, it will start to operate as described in paragraph 3. c. (2) of this section.

SECTION 3

ADJUSTMENTS

1. GENERAL

a. This section includes requirements and procedures for the Tape Reader adjustments and spring tensions. Location of clearances, position of parts and point and angle of scale applications are shown by the illustrations. Requirements and procedures are set forth in the texts that accompany the illustrations.

b. The adjustments are arranged in the order that should be followed if complete readjustment of the equipment is undertaken. The letters of the alphabet which precede the adjustments indicate the sequence to be followed on a particular page. Tools required to make the adjustments are not supplied with the equipment, but are listed in Teletype Bulletin 1124B. If a part is removed in order to make an adjustment, all adjustments which the removal of this part might facilitate should be made before the part is replaced. When a part mounted on shims is removed, the number of shims in each pile up should be noted so that identical pile ups can be made when the part is remounted. After an adjustment has been made, all nuts and screws that were loosened should be tightened.

c. The spring tension readings are indicated values in that they are those that should be obtained when Teletype scales are used as shown in the illustrations. Springs that do not meet requirements and for which there is no adjusting procedure should be replaced.

2. READER UNIT

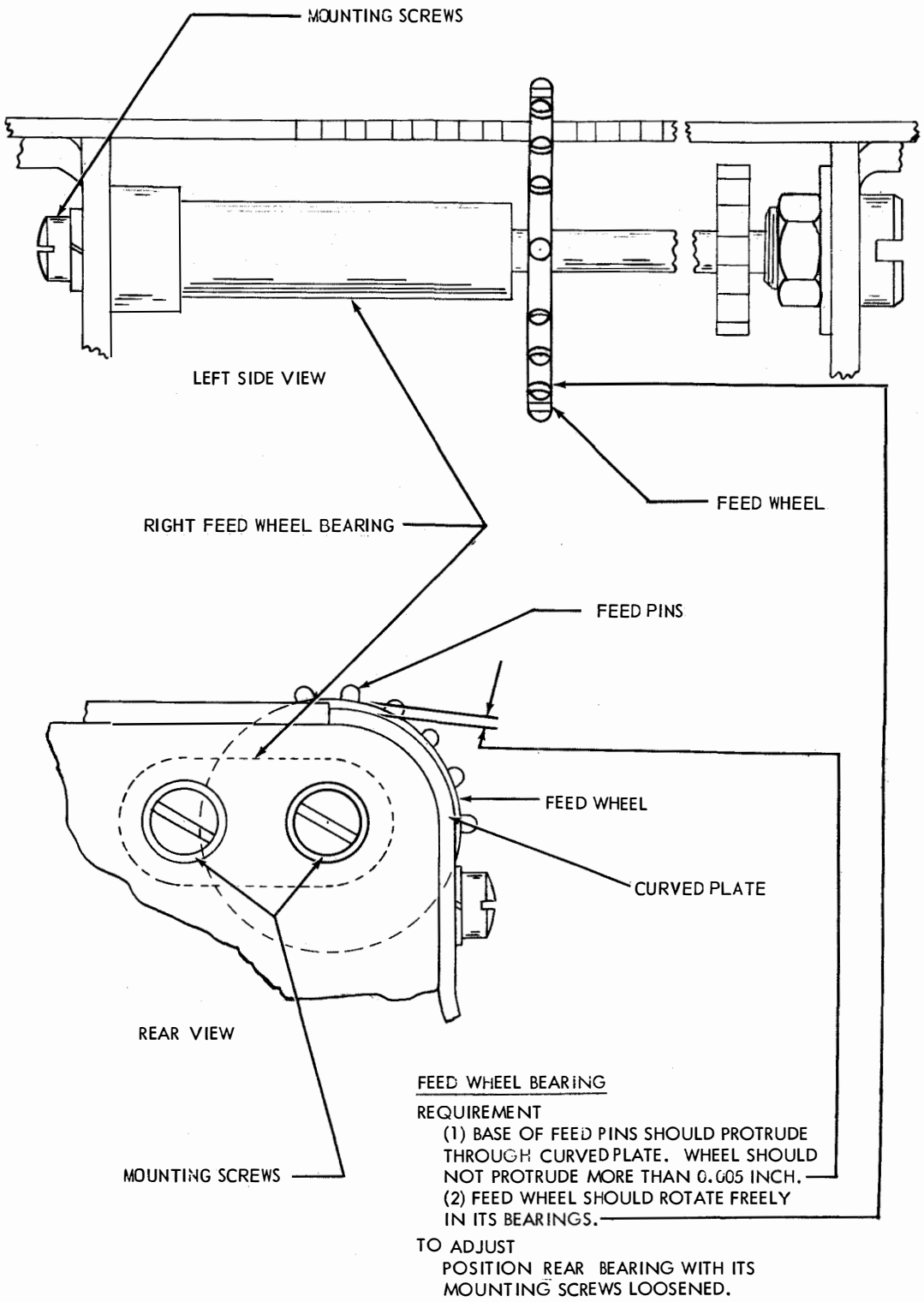


FIGURE 3-1. TAPE FEED MECHANISM

SENSING PIN POSITION

TO CHECK

PLACE BAIL DRIVE FOLLOWER IN ITS LOWEST POSITION.

REQUIREMENT

TOPS OF SENSING PINS SHOULD BE BELOW TOP SURFACE OF TOP PLATE. CLEARANCE:

MIN. 0.005 INCH----MAX. 0.020 INCH

TO ADJUST

POSITION BAIL ON FOLLOWER WITH FOLLOWER MOUNTING SCREWS LOOSENED.

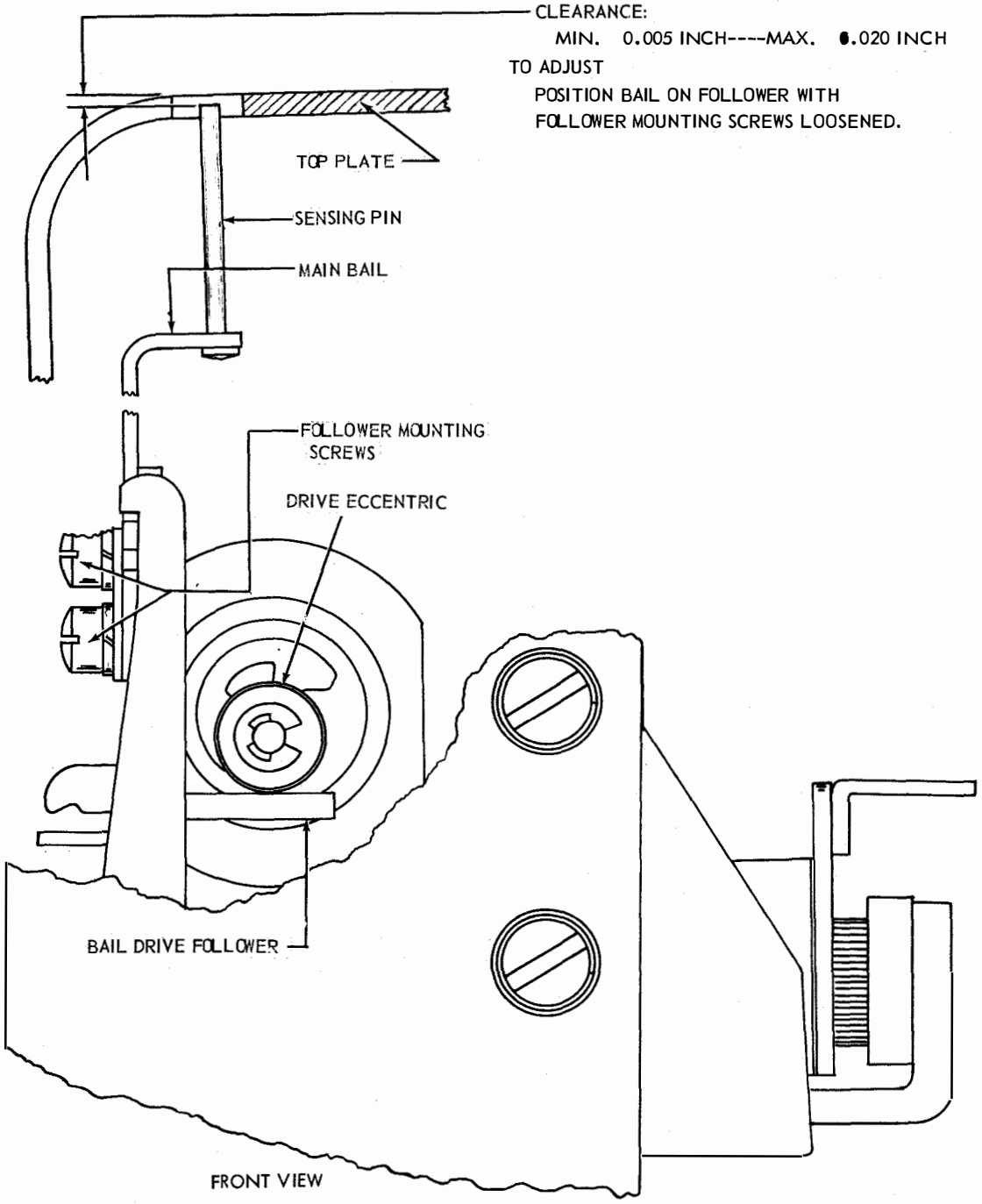


FIGURE 3-2. SENSING MECHANISM

(A) MAIN BAIL CENTER GUIDE

REQUIREMENT
(1) MAIN BAIL CENTER GUIDE POST ALIGNMENT SHOULD BE PARALLEL TO THE MAIN BAIL.
(2) MAIN BAIL SHOULD MOVE UP AND DOWN FREELY WHEN ACTUATED BY BAIL DRIVE FOLLOWER.
(3) TOPS OF SENSING PINS PARALLEL TO TOP OF TOP PLATE WITHIN 0.010 INCH.

TO ADJUST
POSITION GUIDE IN ELONGATED HOLES WITH MOUNTING SCREWS LOOSENED. RECHECK SENSING PIN POSITION ADJUSTMENT.

(B) MAIN BAIL SPRING

TO CHECK
PLACE MAIN BAIL IN ITS LOWEST POSITION.

REQUIREMENT
MIN. 11 OZS. MAX. 16 OZS. TO STRETCH SPRING TO POSITION LENGTH.

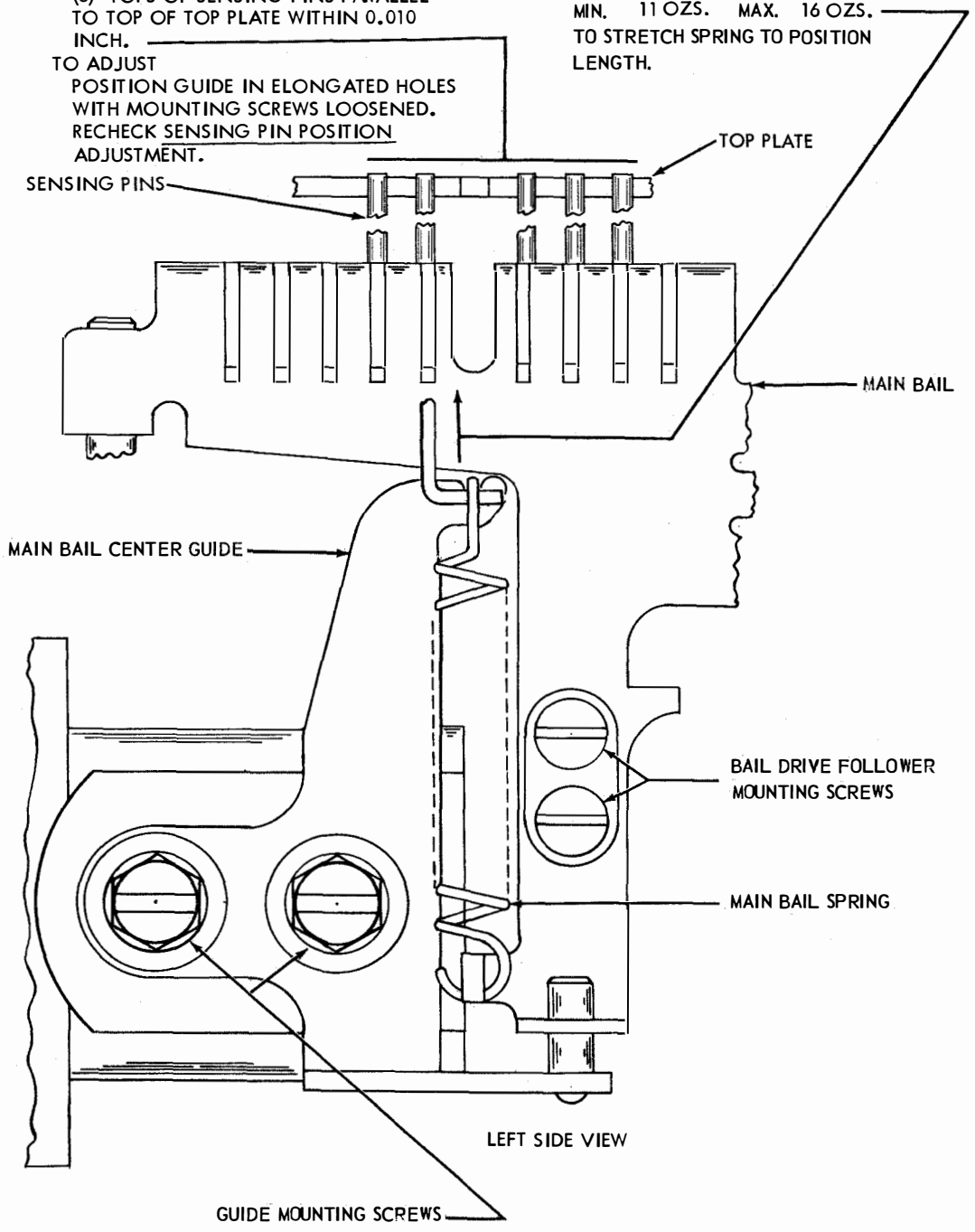


FIGURE 3-3. DRIVE MECHANISM

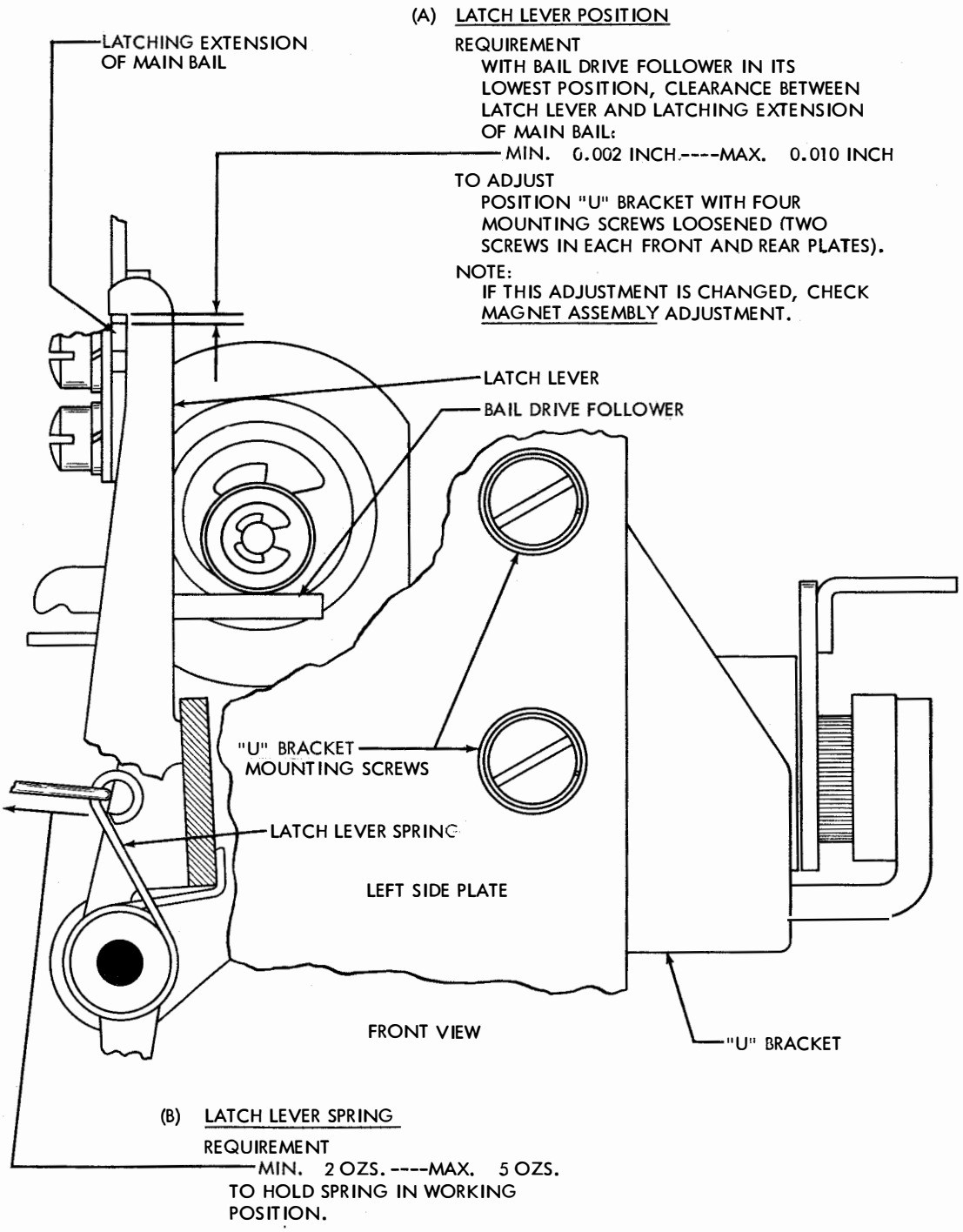


FIGURE 3-4. DRIVE AND LATCH MECHANISMS

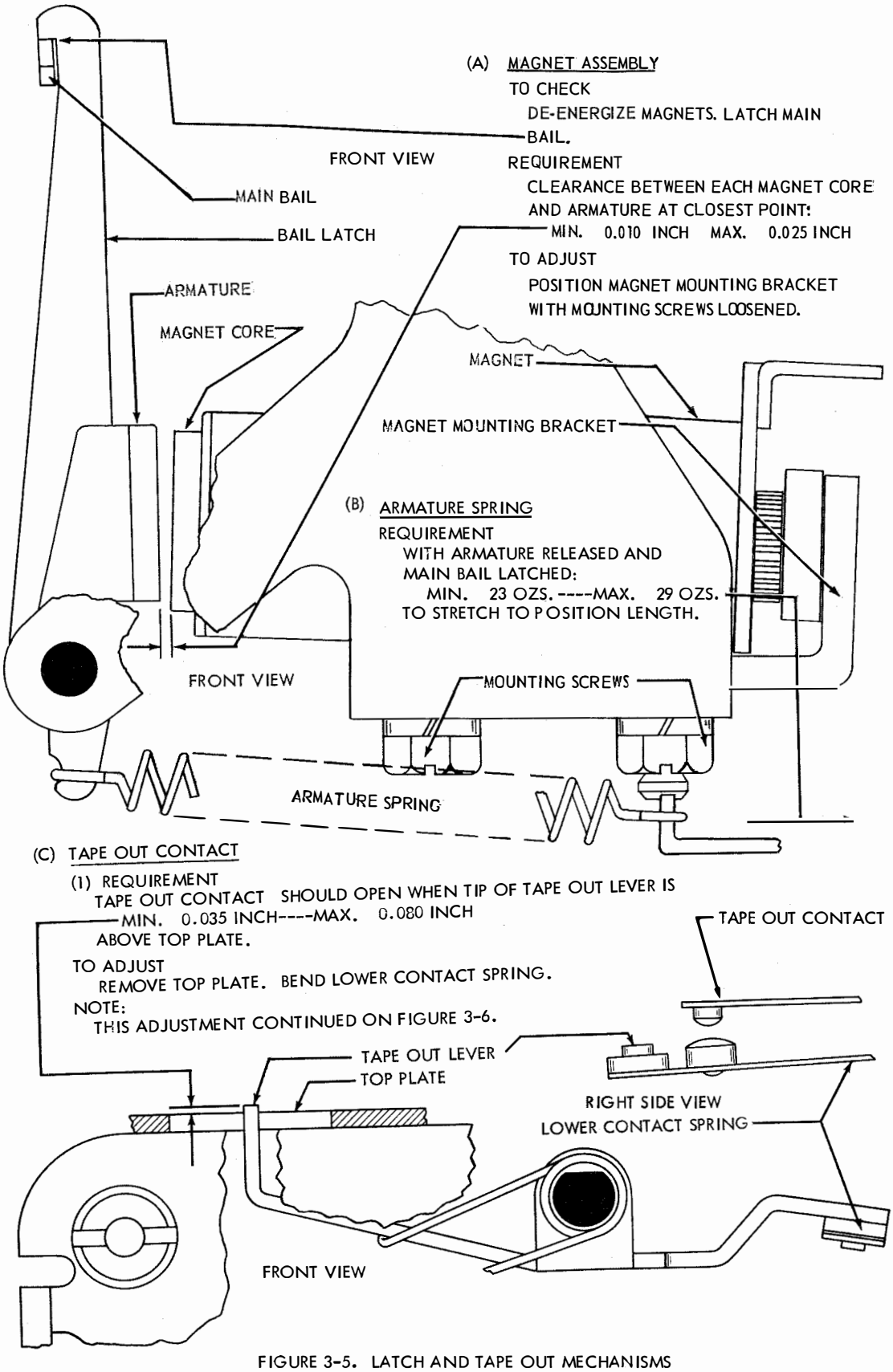
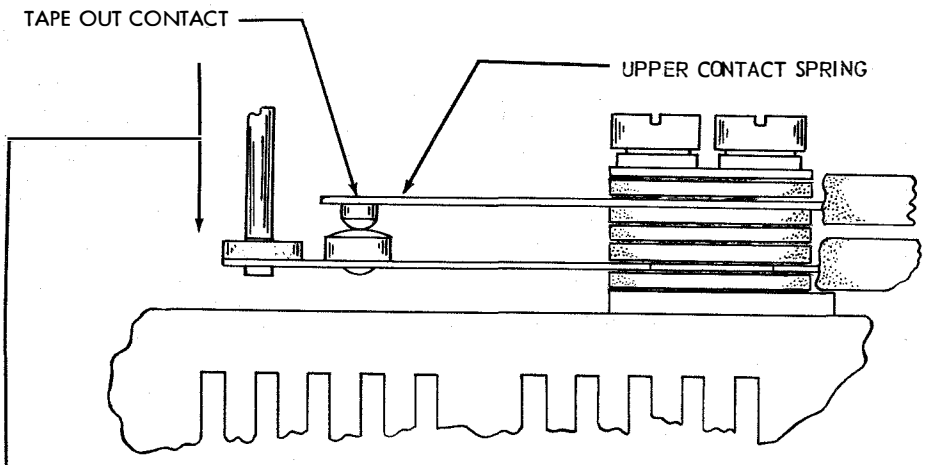


FIGURE 3-5. LATCH AND TAPE OUT MECHANISMS



RIGHT SIDE VIEW

(A) TAPE OUT CONTACT (CONTINUED FROM FIGURE 3-5)

(2) TO CHECK

REMOVE TOP PLATE.

REQUIREMENT

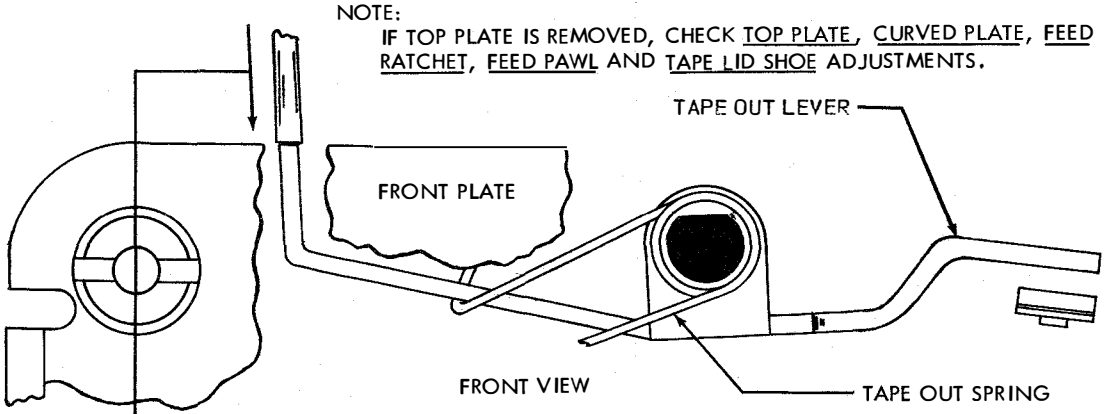
MIN. 3/4 OZ. --- MAX. 1 1/4 OZS.
TO JUST OPEN CONTACT.

TO ADJUST

BEND LOWER CONTACT SPRING. RECHECK REQUIREMENT NO. (1).

NOTE:

IF TOP PLATE IS REMOVED, CHECK TOP PLATE, CURVED PLATE, FEED RATCHET, FEED PAWL AND TAPE LID SHOE ADJUSTMENTS.



FRONT VIEW

(B) TAPE OUT LEVER SPRING

REQUIREMENT

MIN. 1 1/2 OZS. --- MAX. 2 OZS.
TO HOLD TIP OF TAPE OUT LEVER FLUSH WITH TOP OF SIDE PLATES.

FIGURE 3-6. TAPE OUT MECHANISM

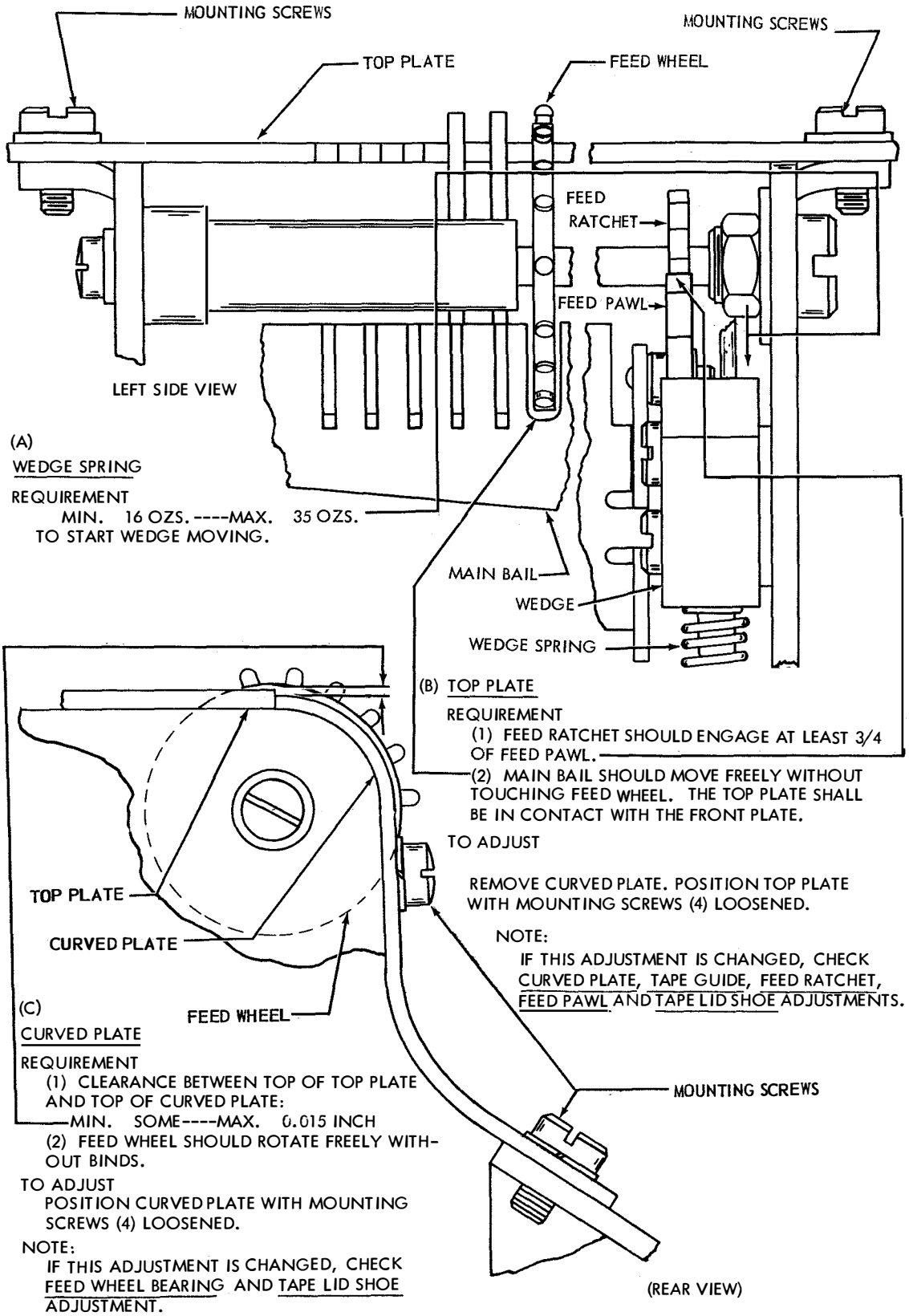


FIGURE 3-7. TAPE FEED MECHANISM

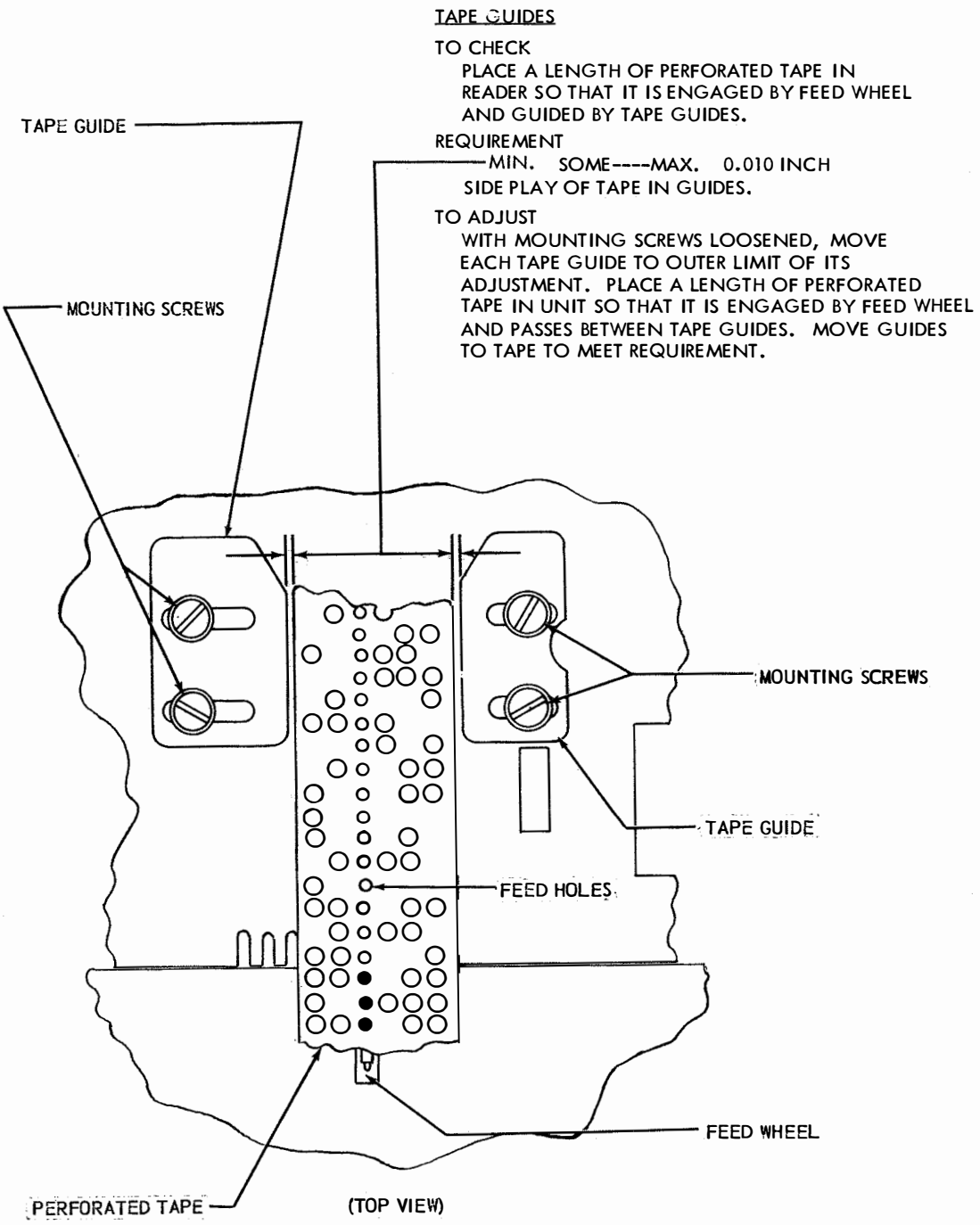
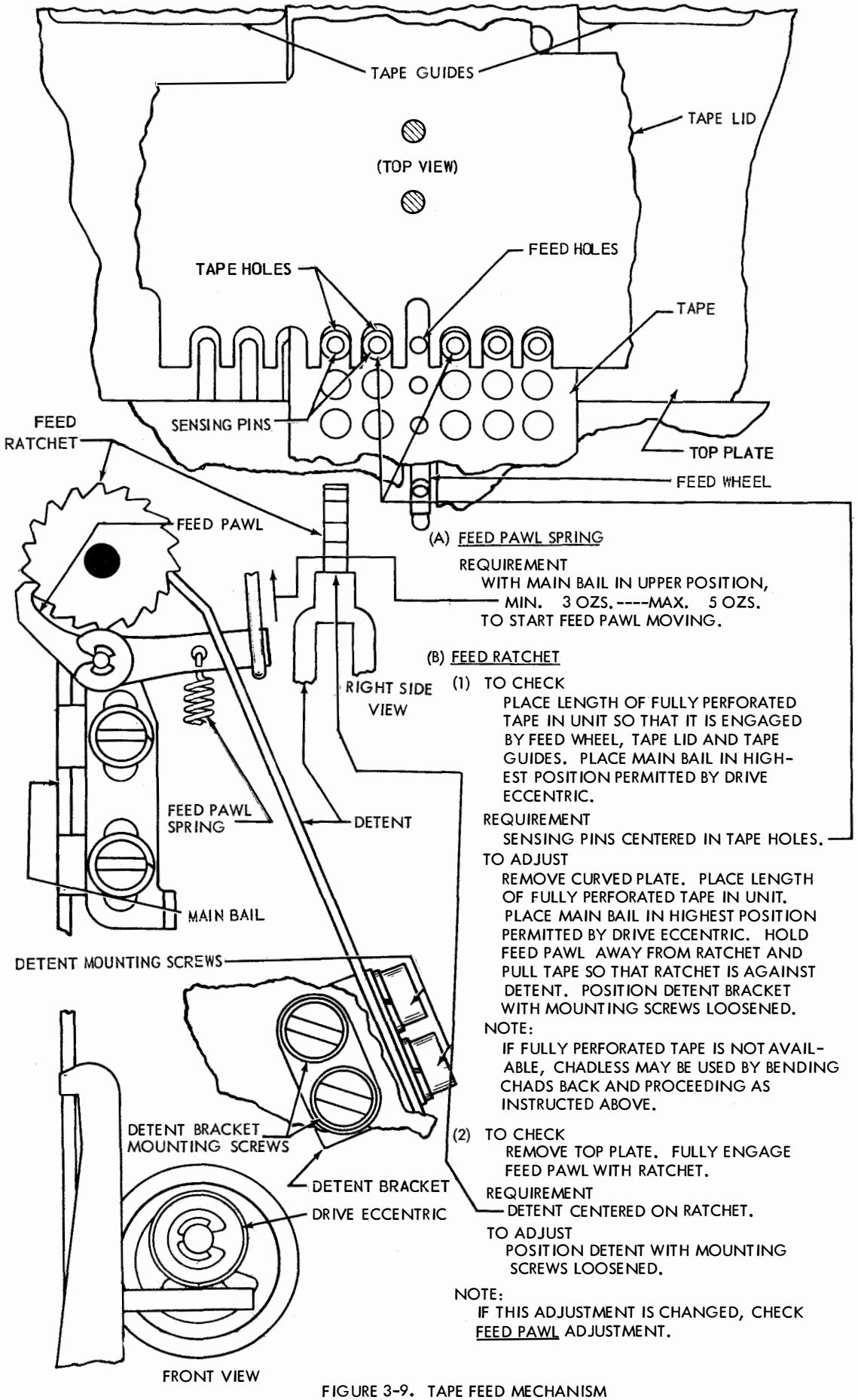


FIGURE 3-8. TAPE FEED MECHANISM



(A) FEED PAWL SPRING

REQUIREMENT
WITH MAIN BAIL IN UPPER POSITION,
MIN. 3 OZS.----MAX. 5 OZS.
TO START FEED PAWL MOVING.

(B) FEED RATCHET

(1) TO CHECK
PLACE LENGTH OF FULLY PERFORATED TAPE IN UNIT SO THAT IT IS ENGAGED BY FEED WHEEL, TAPE LID AND TAPE GUIDES. PLACE MAIN BAIL IN HIGHEST POSITION PERMITTED BY DRIVE ECCENTRIC.

REQUIREMENT
SENSING PINS CENTERED IN TAPE HOLES.

TO ADJUST
REMOVE CURVED PLATE. PLACE LENGTH OF FULLY PERFORATED TAPE IN UNIT. PLACE MAIN BAIL IN HIGHEST POSITION PERMITTED BY DRIVE ECCENTRIC. HOLD FEED PAWL AWAY FROM RATCHET AND PULL TAPE SO THAT RATCHET IS AGAINST DETENT. POSITION DETENT BRACKET WITH MOUNTING SCREWS LOOSENED.

NOTE:
IF FULLY PERFORATED TAPE IS NOT AVAILABLE, CHADLESS MAY BE USED BY BENDING CHADS BACK AND PROCEEDING AS INSTRUCTED ABOVE.

(2) TO CHECK
REMOVE TOP PLATE. FULLY ENGAGE FEED PAWL WITH RATCHET.

REQUIREMENT
DETENT CENTERED ON RATCHET.

TO ADJUST
POSITION DETENT WITH MOUNTING SCREWS LOOSENED.

NOTE:
IF THIS ADJUSTMENT IS CHANGED, CHECK FEED PAWL ADJUSTMENT.

FIGURE 3-9. TAPE FEED MECHANISM

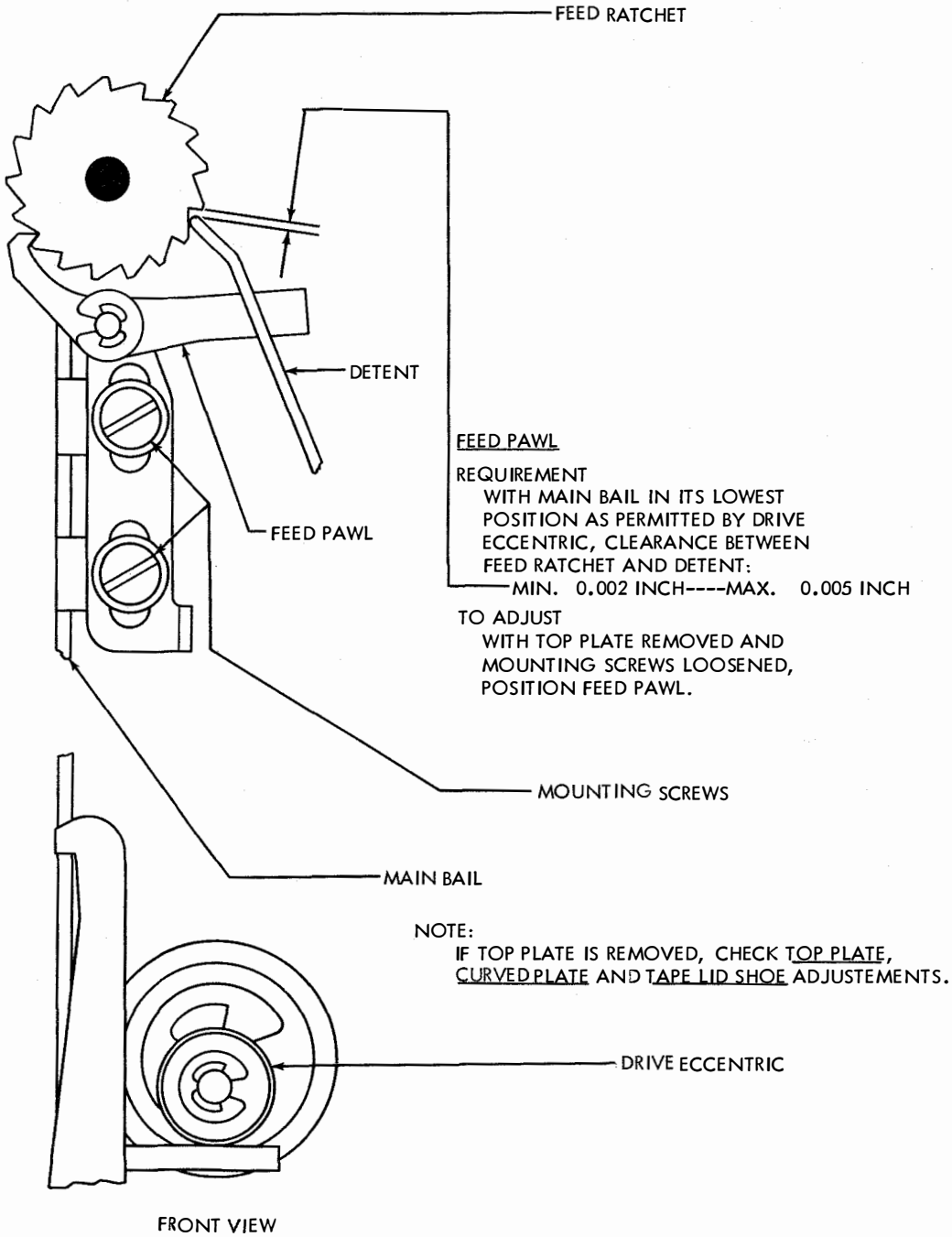


FIGURE 3-10. TAPE FEED MECHANISM

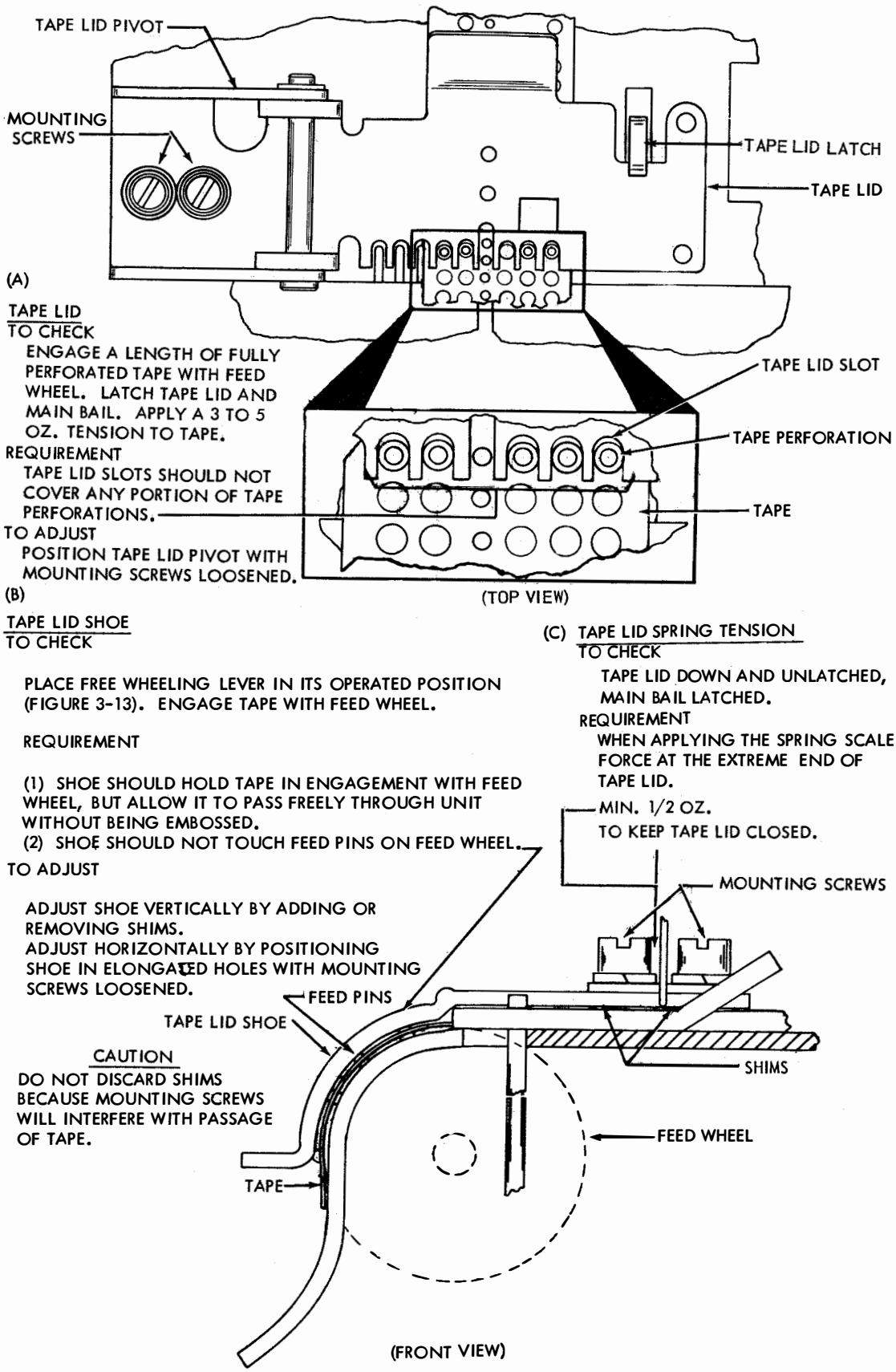


FIGURE 3-11. TAPE FEED MECHANISM

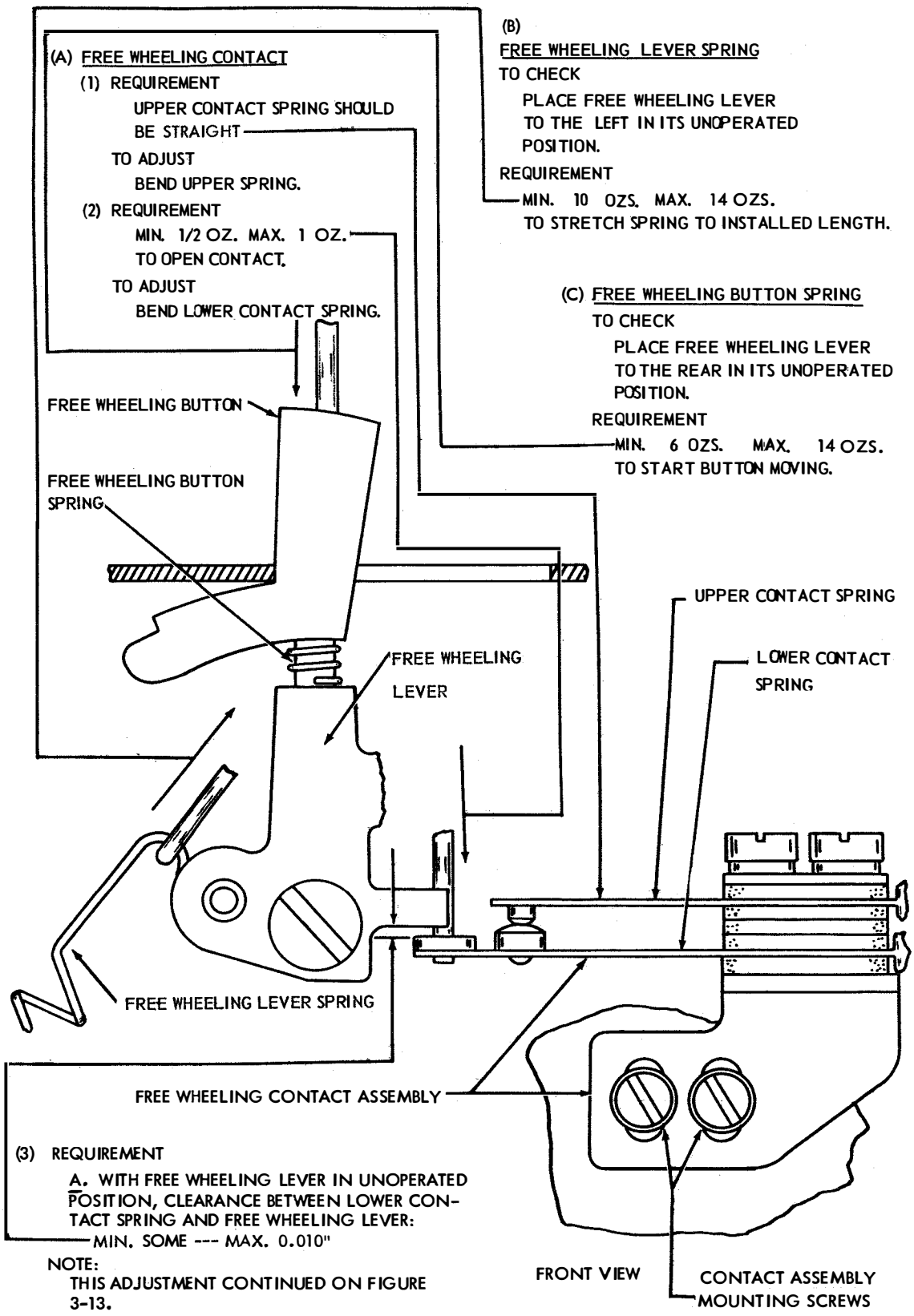


FIGURE 3-12. FREE WHEELING MECHANISM

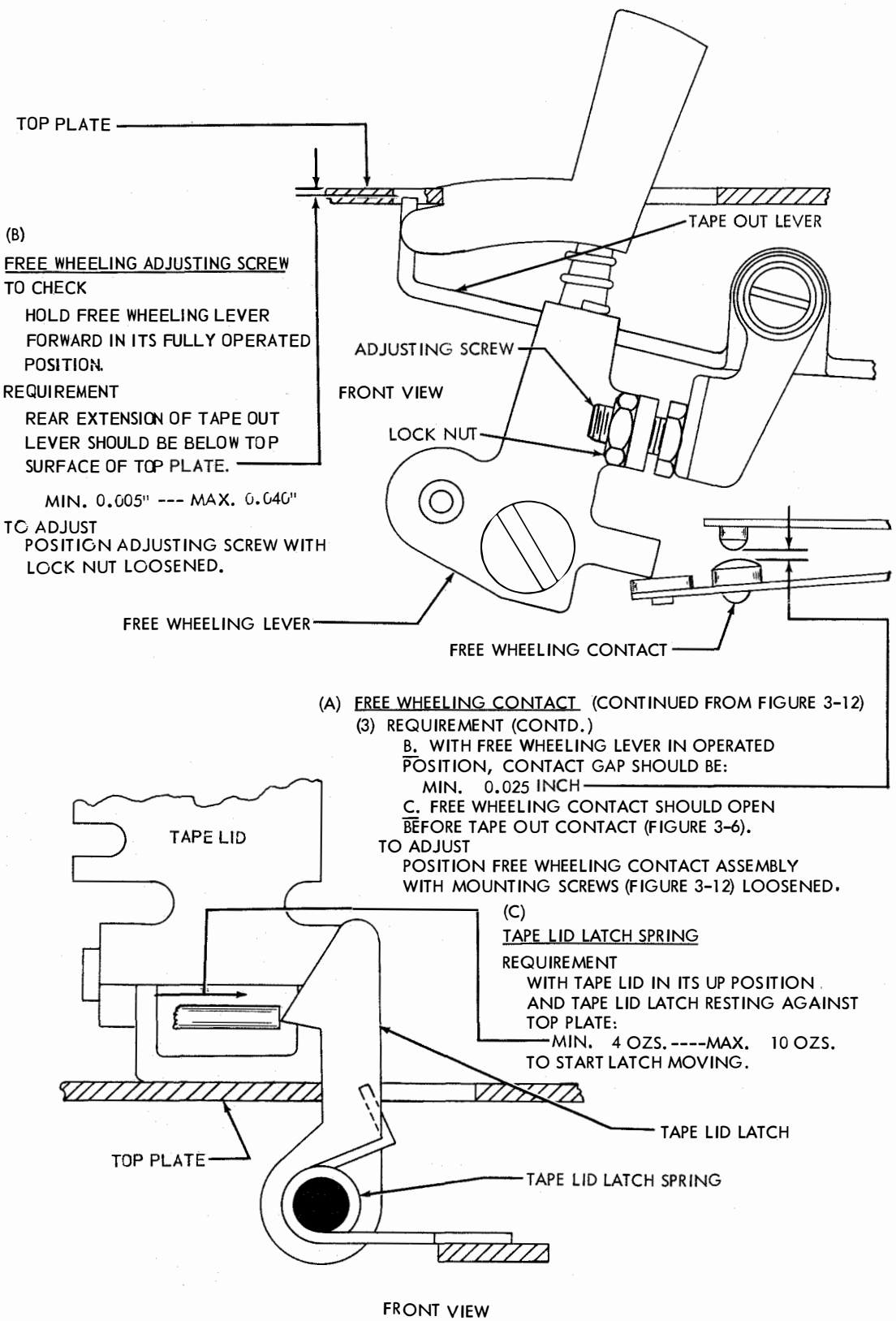


FIGURE 3-13. FREE WHEELING AND TAPE FEED MECHANISM

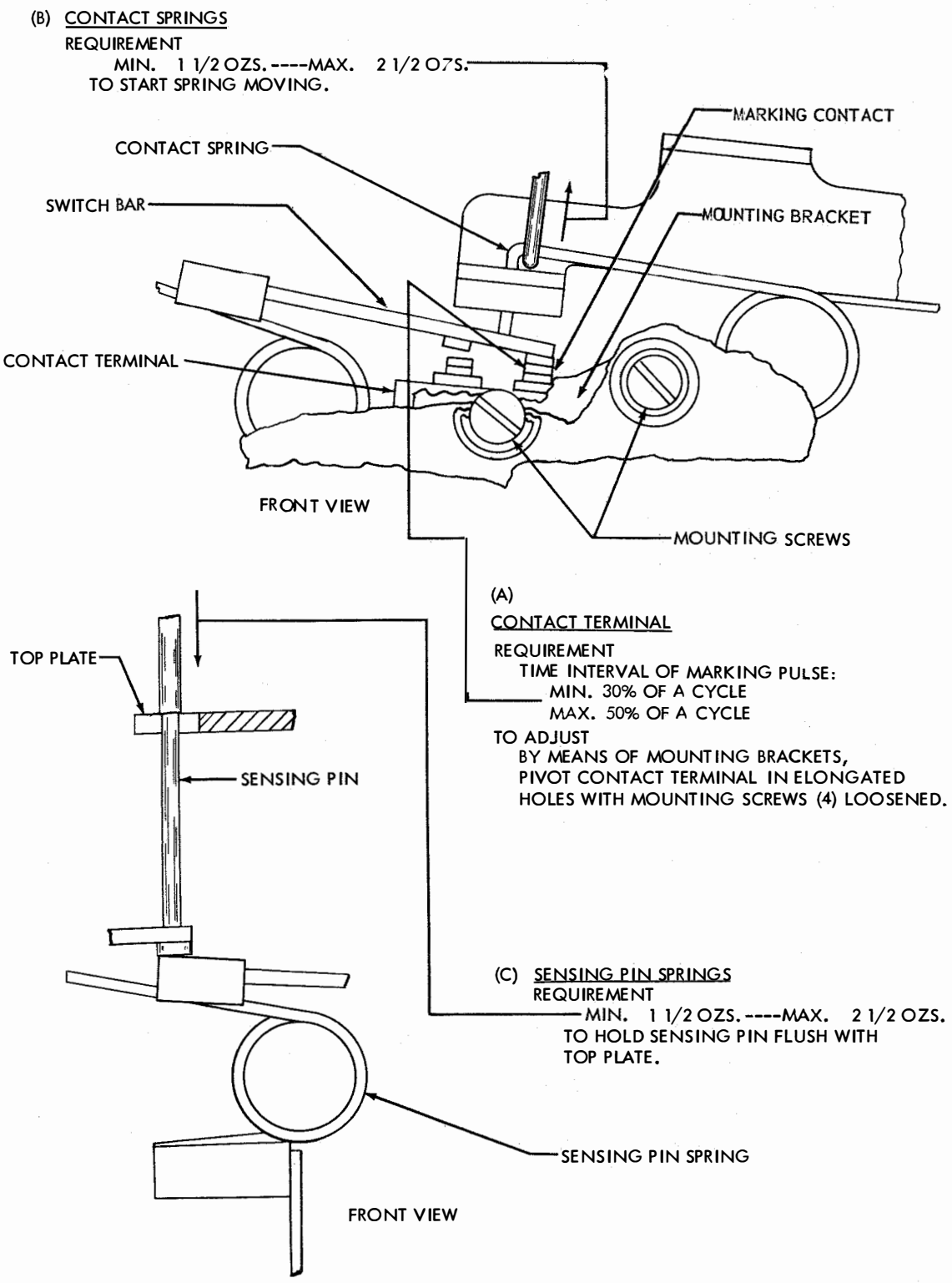


FIGURE 3-14. CONTACT AND SENSING MECHANISMS

3. BASE

NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY TO SINGLE UNITS ONLY.

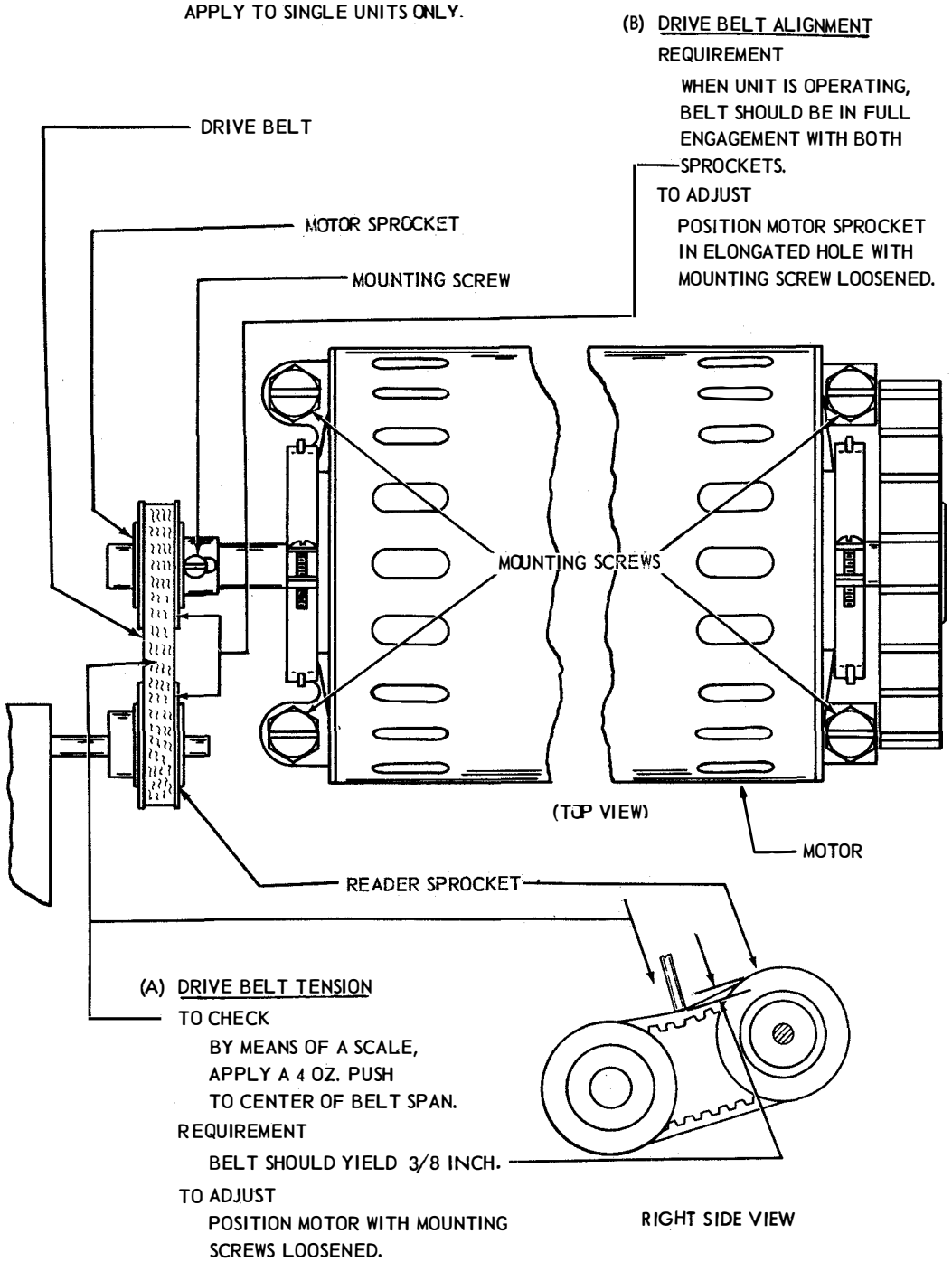


FIGURE 3-15. DRIVE PARTS (SINGLE UNIT)

NOTE: THE ADJUSTMENTS ON THIS PAGE APPLY TO DOUBLE UNITS ONLY.

(A) READER DRIVE BELTS TENSION

TO CHECK

BY MEANS OF A SCALE, APPLY A 4 OZ. PUSH TO CENTER OF BELT SPAN (SEE FIGURE 3-15).

REQUIREMENT

BELT SHOULD YIELD 3/8 INCH.

TO ADJUST

POSITION COUNTERSHAFT MOUNTING BRACKET WITH MOUNTING SCREWS LOOSENED.

(B) MOTOR DRIVE BELT TENSION

TO CHECK

BY MEANS OF A SCALE, APPLY A 4 OZ. PUSH TO CENTER OF BELT SPAN (SEE FIGURE 3-15).

REQUIREMENT

BELT SHOULD YIELD 3/8 INCH.

TO ADJUST

ADD OR REMOVE 75064 SHIMS BETWEEN MOTOR BASE AND MOUNTING STUDS.

(C) MOTOR DRIVE BELT ALIGNMENT

REQUIREMENT

WHEN THE UNIT IS OPERATING, BELT SHOULD BE IN FULL ENGAGEMENT WITH BOTH SPROCKETS.

TO ADJUST

POSITION MOTOR SPROCKET IN ELONGATED HOLE WITH MOUNTING SCREW LOOSENED.

(D) READER DRIVE BELTS ALIGNMENT

REQUIREMENT

WHEN THE UNIT IS OPERATING, BELT SHOULD BE IN FULL ENGAGEMENT WITH BOTH SPROCKETS.

TO ADJUST

POSITION EACH READER SPROCKET ON SHAFT WITH SET SCREW LOOSENED.

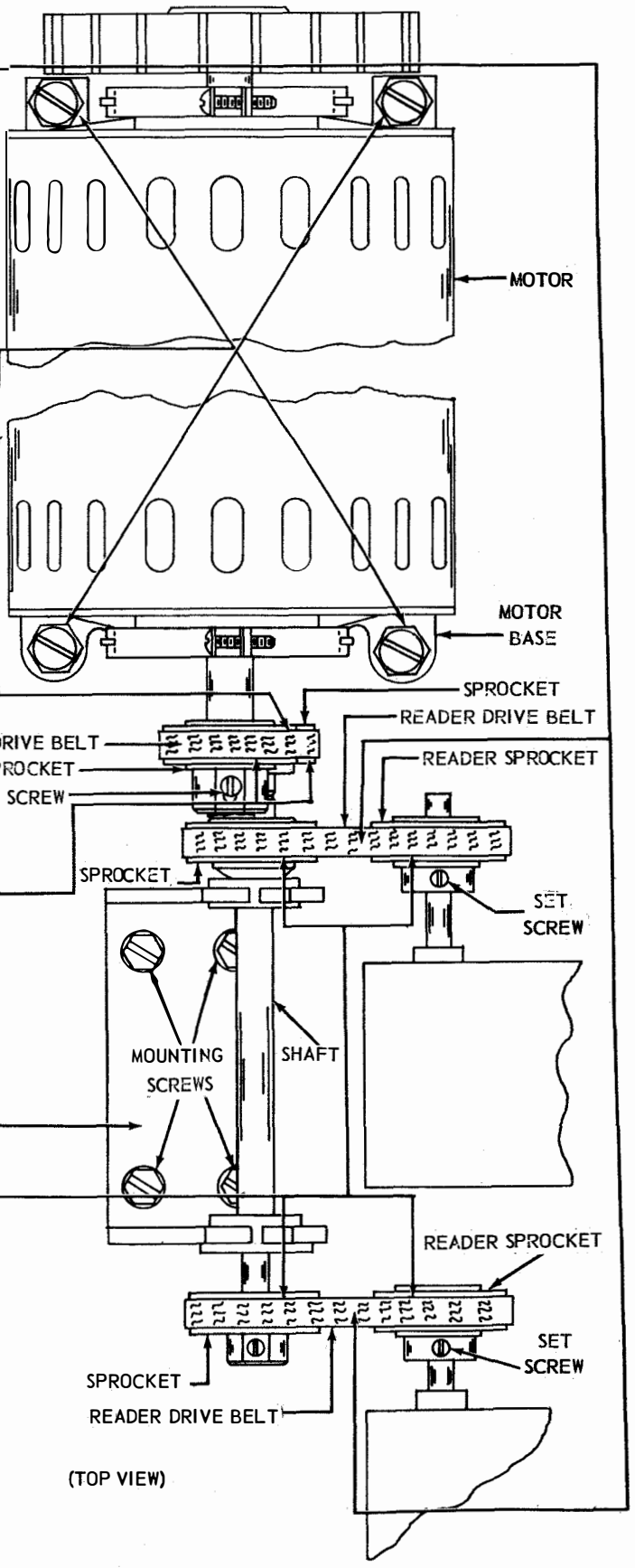


FIGURE 3-16. DRIVE PARTS (DOUBLE UNIT)

SECTION 4
LUBRICATION

1. GENERAL

a. This section contains instructions for lubricating the Tape Reader. The following figures illustrate the areas of the various parts to be lubricated, and the text on the figures indicate the kind and quantity of lubricant to be used.

b. The symbols appearing on the figures denote the following instructions:

O	Apply 1 drop of oil.
O2	Apply 2 drops of oil.
O3	Apply 3 drops of oil.
G	Apply thin film of grease.
SAT	Saturate (felt oilers etc.) with oil.
OGO	Apply a drop of oil, a thin film of grease and another drop of oil.
LUPL	Apply Lubriplate 105 (Teletype part No. 108805).

Except where Lubriplate 105 is called for, Teletype KS-7470 oil and KS-7471 grease should be used.

c. Over lubrication that might permit oil or grease to drip or be thrown on other parts should be avoided. Special care should be taken to prevent lubricant from getting between the armature and the magnet pole faces or between the electrical contacts.

2. SPECIFIC

a. CONTACT MECHANISM

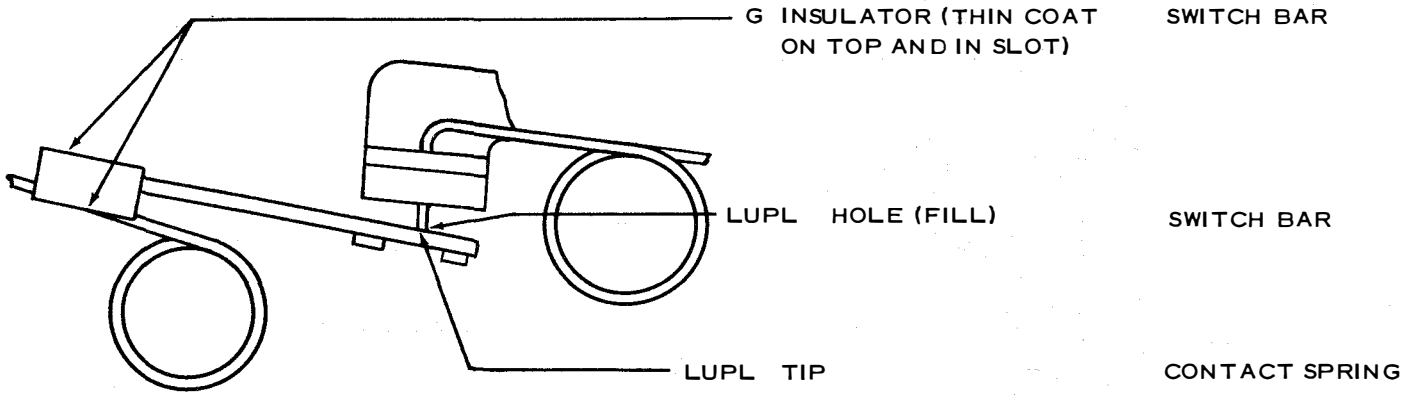
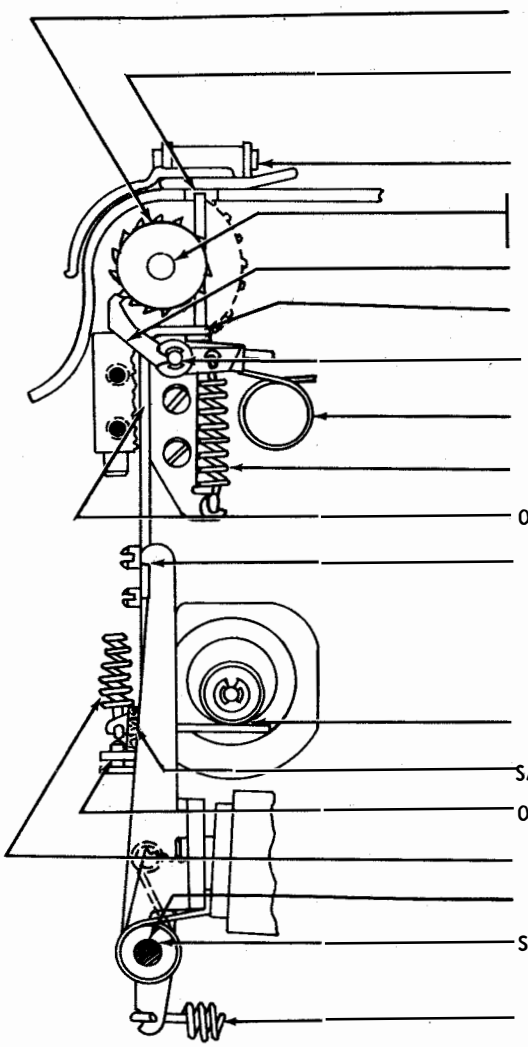


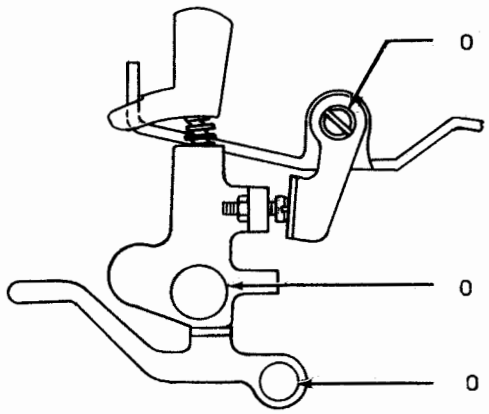
FIGURE 4-1

b. SENSING, LATCH, FEED AND DRIVE MECHANISMS



G	TEETH	FEED RATCHET
G	ENGAGING SURFACES (THIN COAT WHERE PINS BEAR ON TOP PLATE. WIPE OFF EXCESS.)	SENSING PINS
O	PIVOT	TAPE LID
O	BEARING-RIGHT	FEED WHEEL
OGO	BEARING-LEFT	FEED WHEEL
G	ENGAGING SURFACE	FEED PAWL
G	SENSING PIN SLOTS	MAIN BAIL
O	PIVOT	FEED PAWL
O	LOOPS	SPRINGS
O	HOOKS - EACH END	SPRING
OGO	GUIDING SURFACES (2)	MAIN BAIL
G	LATCHING SURFACE	MAIN BAIL
G	ENGAGING SURFACE	DRIVE FOLLOWER
SAT	FELT OILER	MAIN BAIL
OGO	GUIDING SURFACE	MAIN BAIL CENTER GUIDE
O	HOOKS - EACH END	SPRING
O	PIVOTS (2)	ARMATURE
SAT	FELT OILERS	ARMATURE SHAFT
O	HOOKS-EACH END	SPRING

c. TAPE OUT AND FREE WHEELING MECHANISMS



O	PIVOT	TAPE OUT LEVER
O	PIVOT	FREE WHEELING LEVER
O	PIVOT	INTERMEDIATE LEVER

FIGURE 4-2

SECTION 5

INSTALLATION

1. GENERAL

a. Refer to Specification 5855S for instructions for installing the reader unit, motor unit and the 136018 or the 136019 set of motor drive parts on the Tape Reader Base.

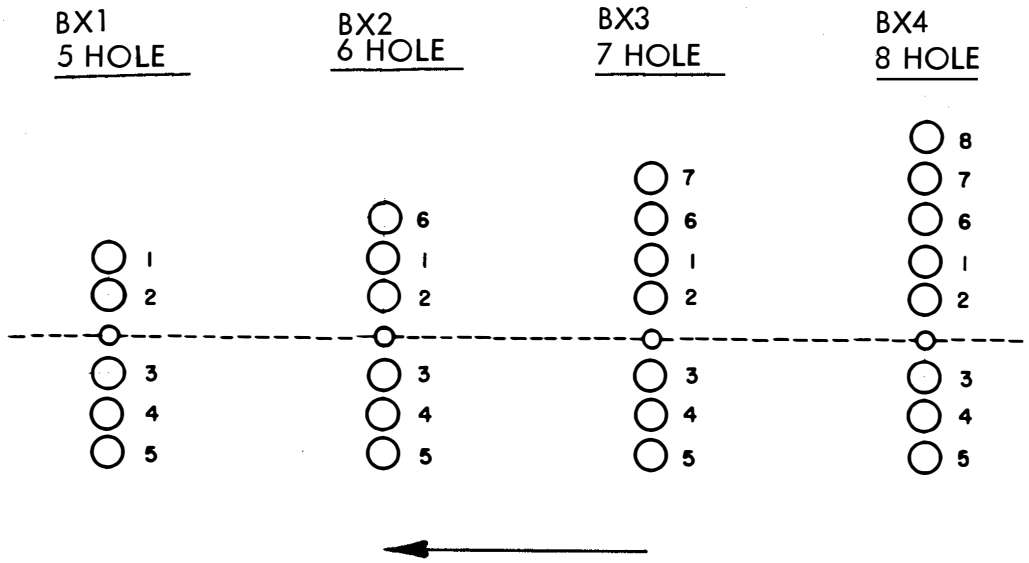
1. The 136018 set of parts when installed on a Tape Reader Base provides a driving connection between the motor unit and the Tape Reader.

2. The 136019 set of parts when installed on a Tape Reader Base provides a driving connection between the motor unit and two Tape Readers.

b. Refer to Teletype Bulletin 1163B for illustrations and lists of parts.

SECTION 6
FIGURES

Illustrations for Sections 1 and 2.



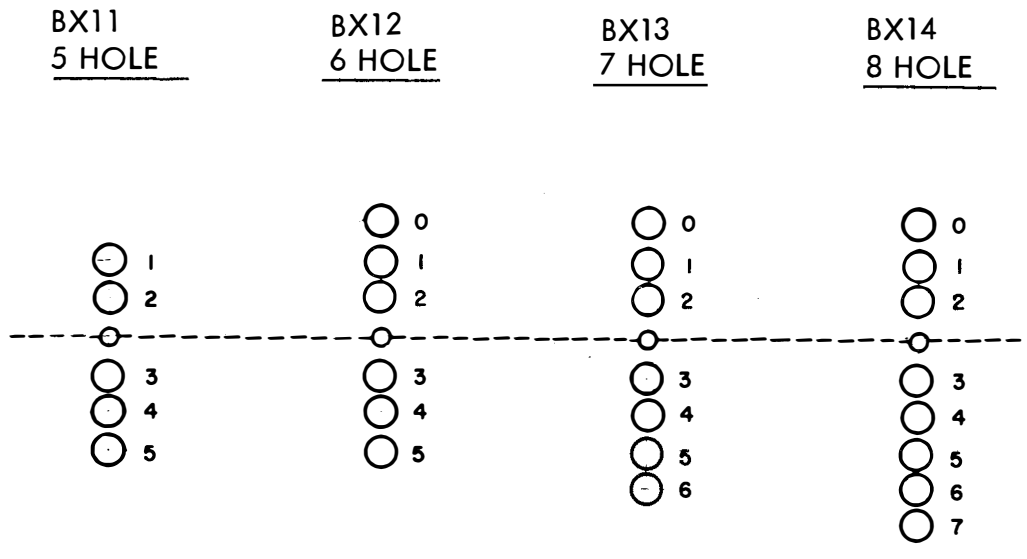
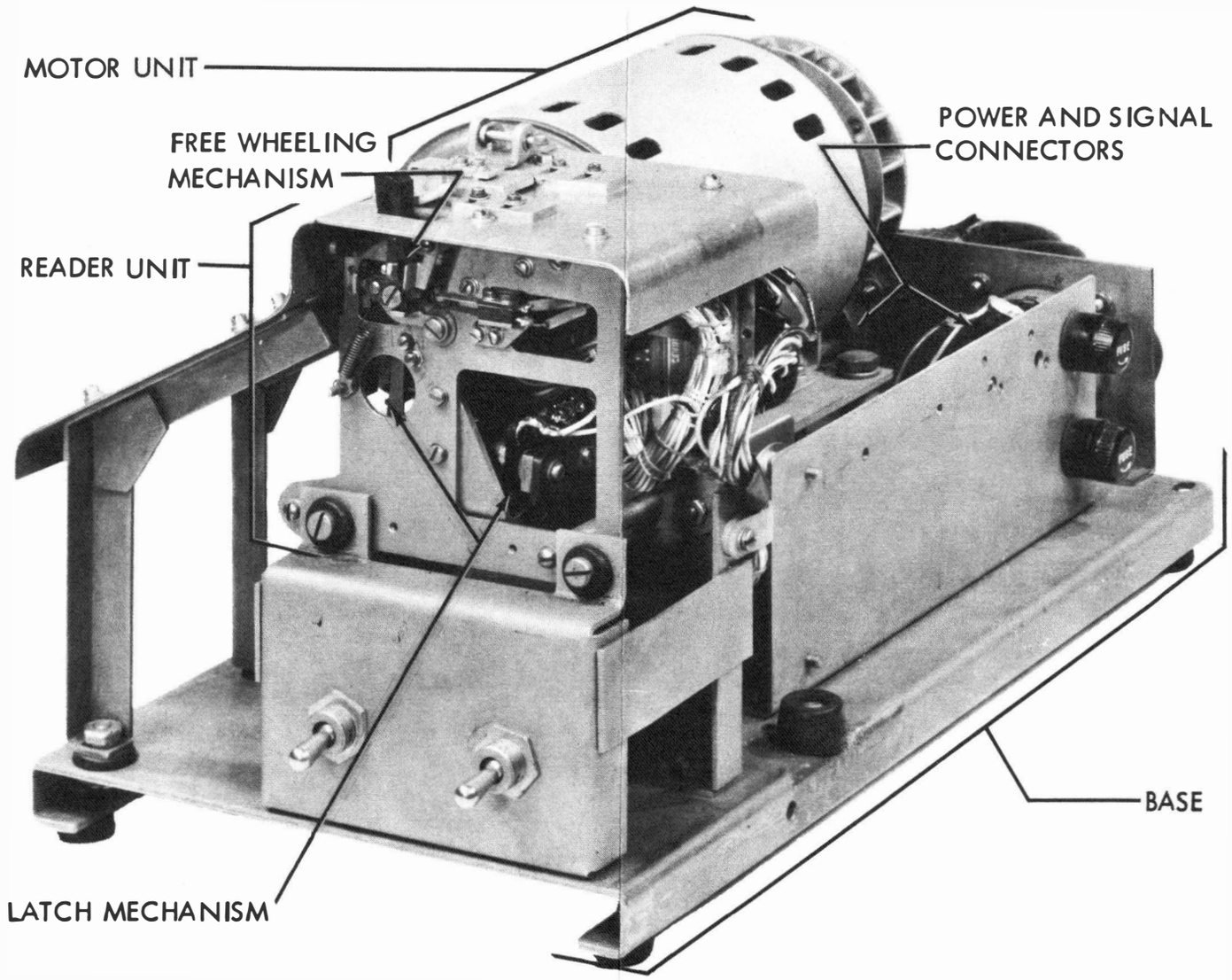


FIGURE 1-0. TAPE SENSING PIN ARRANGEMENTS



FRONT AND RIGHT SIDE VIEW
COVER REMOVED

FIGURE 1-1. TAPE READER

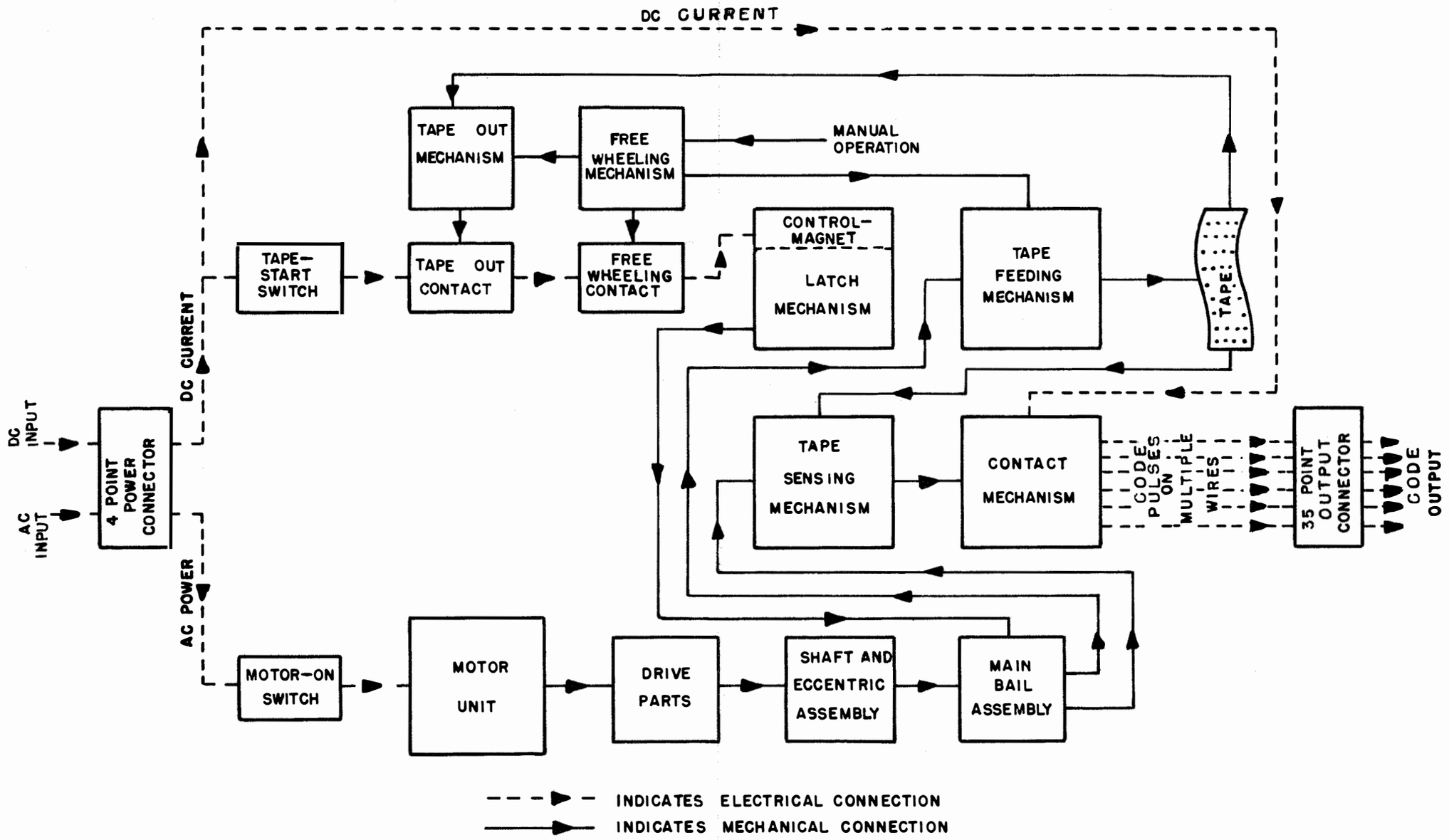


FIGURE 2-1
TAPE READER BLOCK DIAGRAM

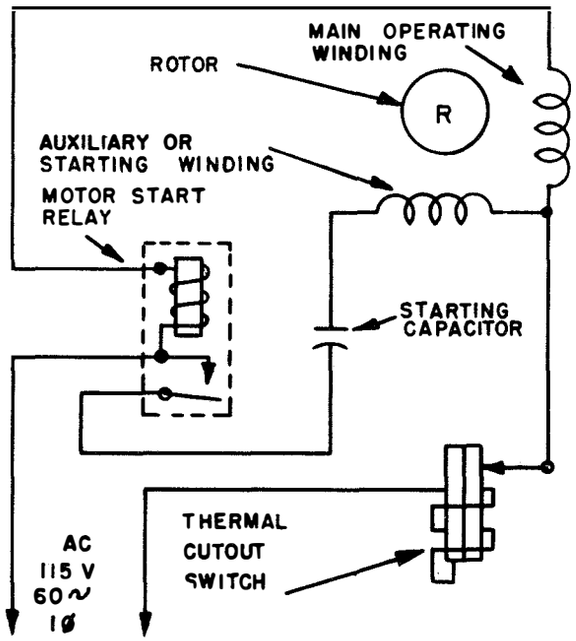
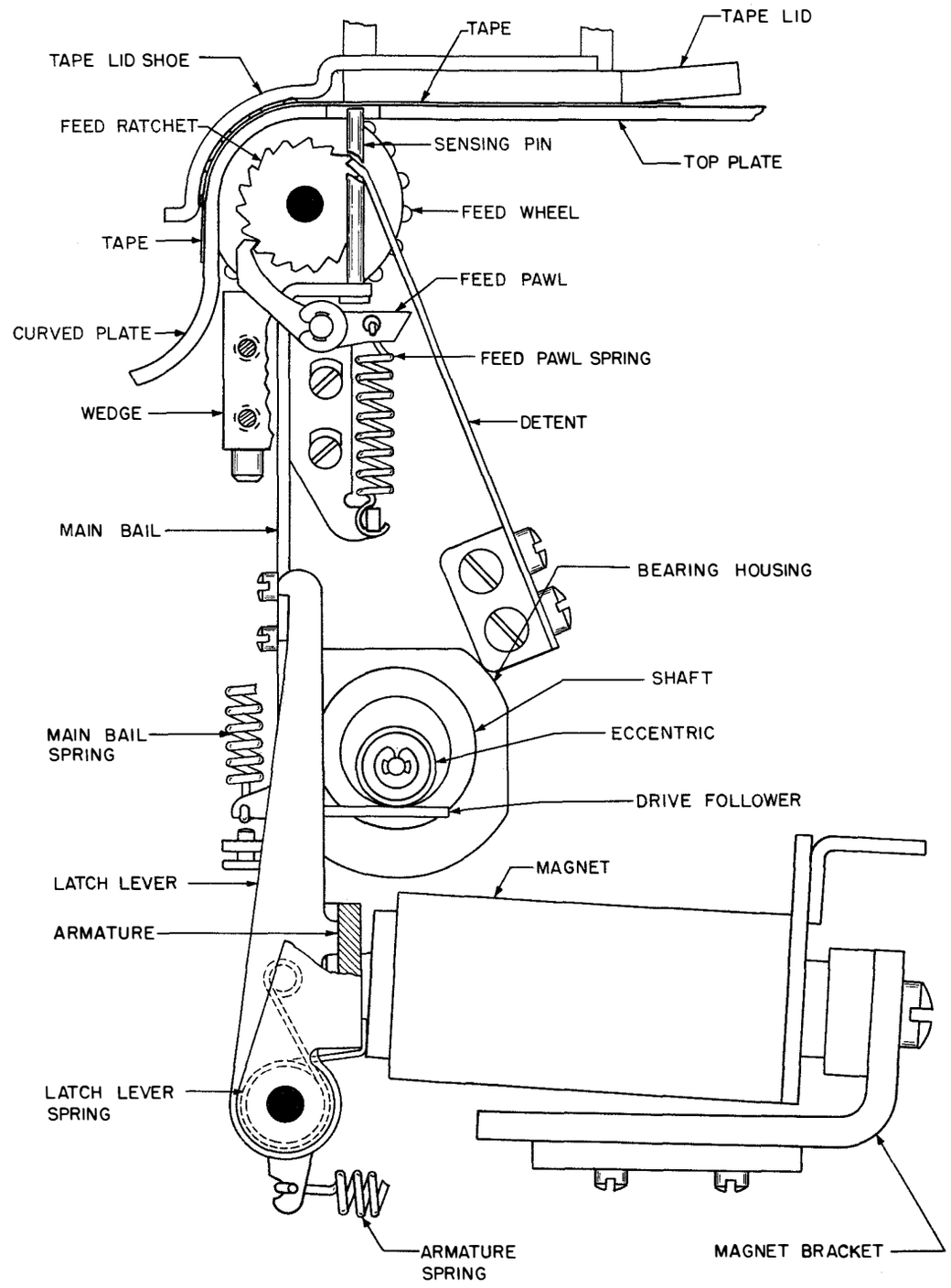
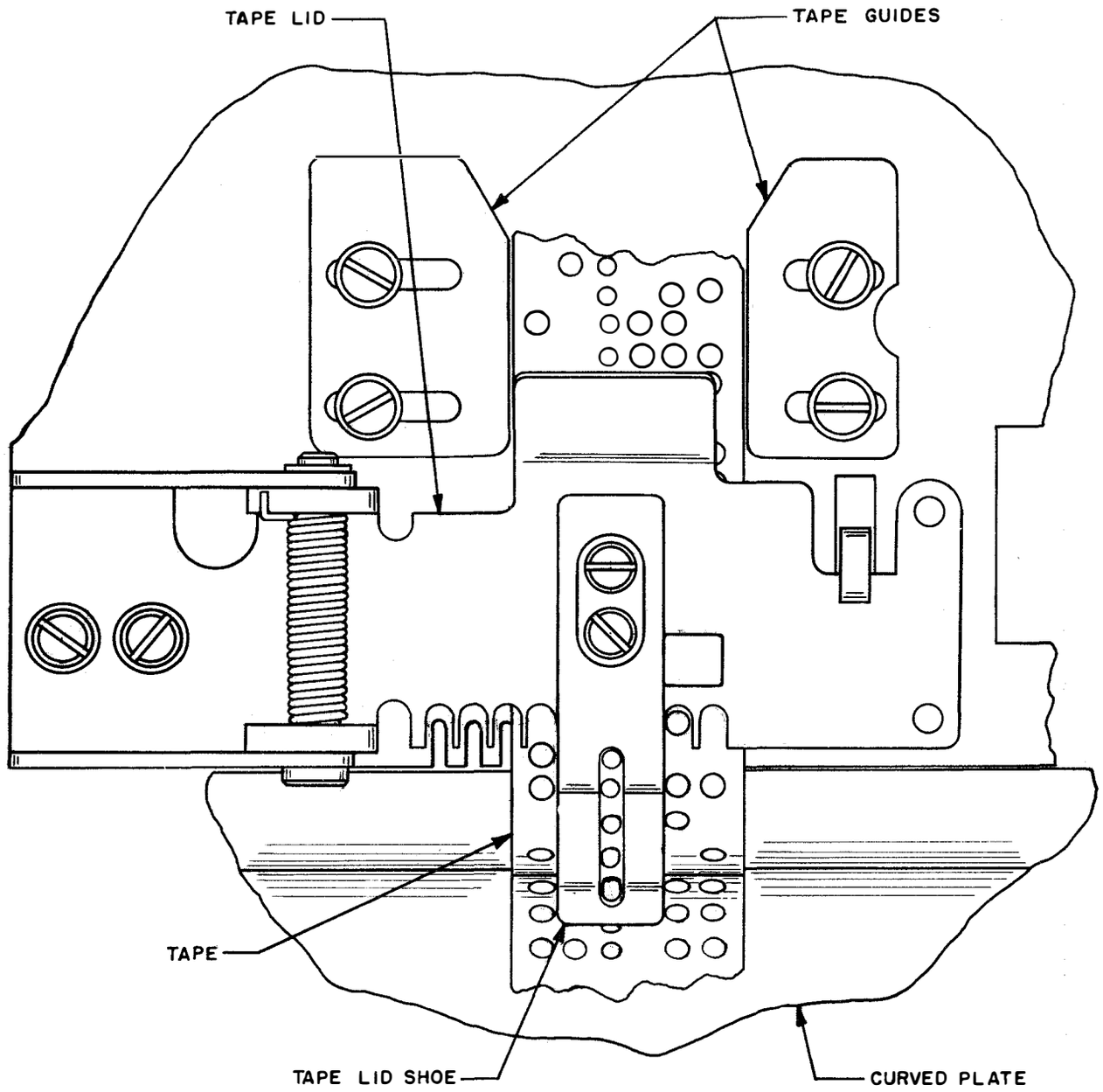


FIGURE 2-2
MOTOR UNIT SCHEMATIC WIRING DIAGRAM



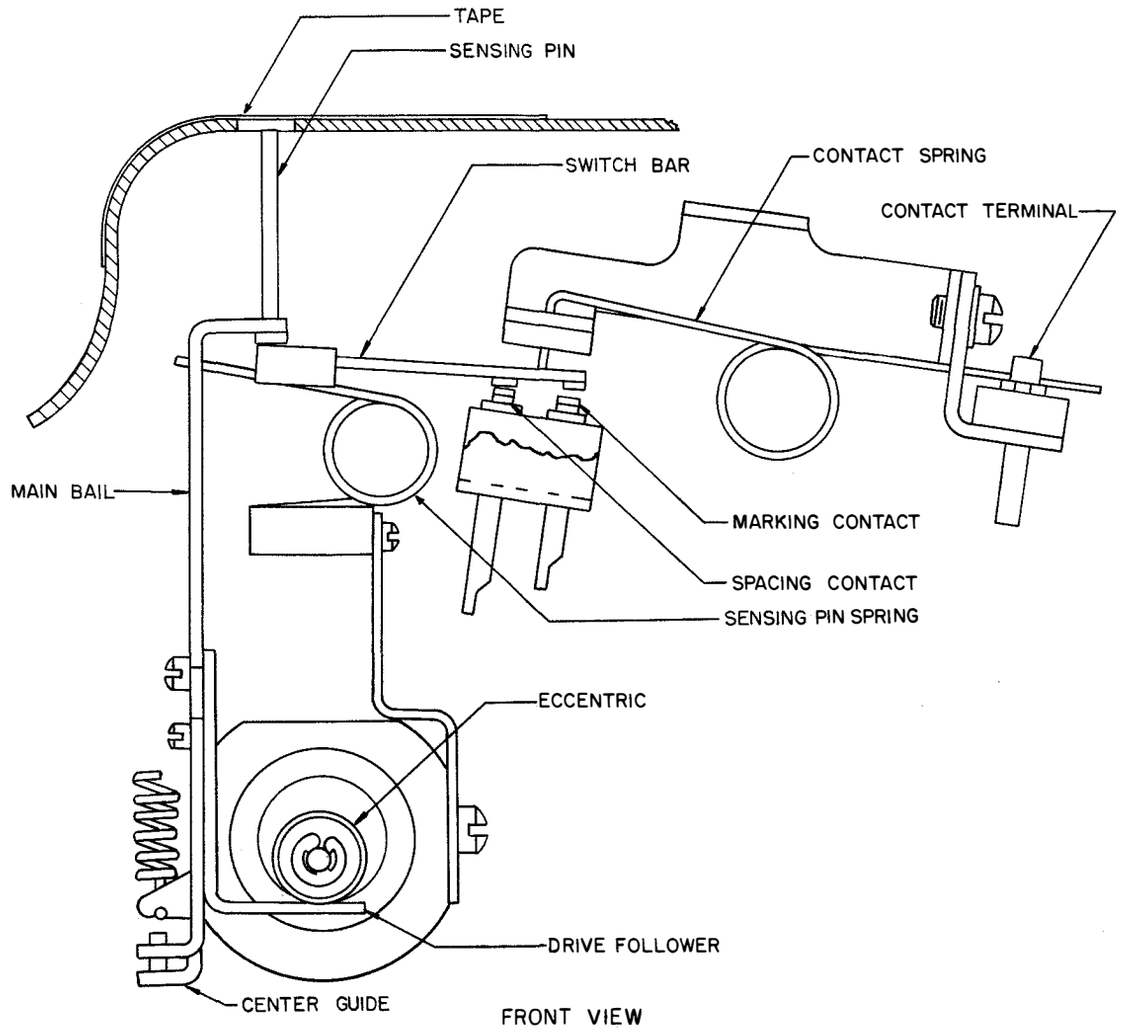
FRONT VIEW

FIGURE 2-3
DRIVE AND LATCH MECHANISMS



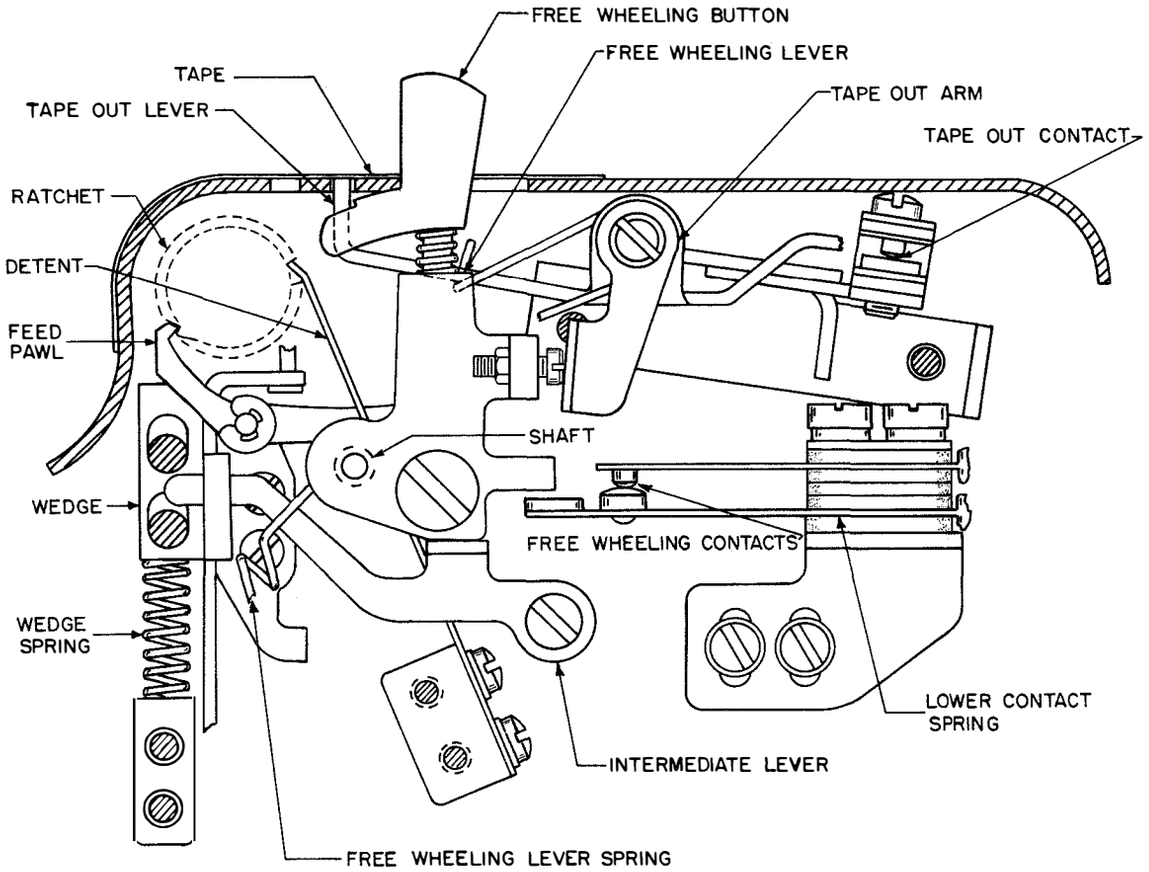
(TOP VIEW)

FIGURE 2-4
TOP PLATE ASSEMBLY



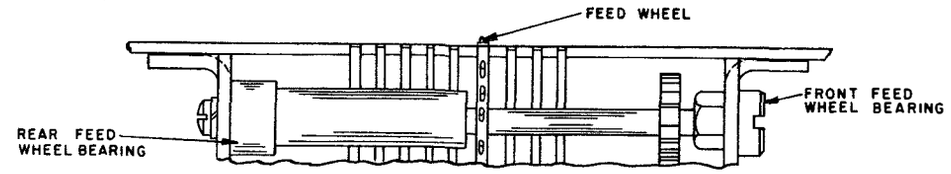
FRONT VIEW

FIGURE 2-5
SENSING AND CONTACT MECHANISMS

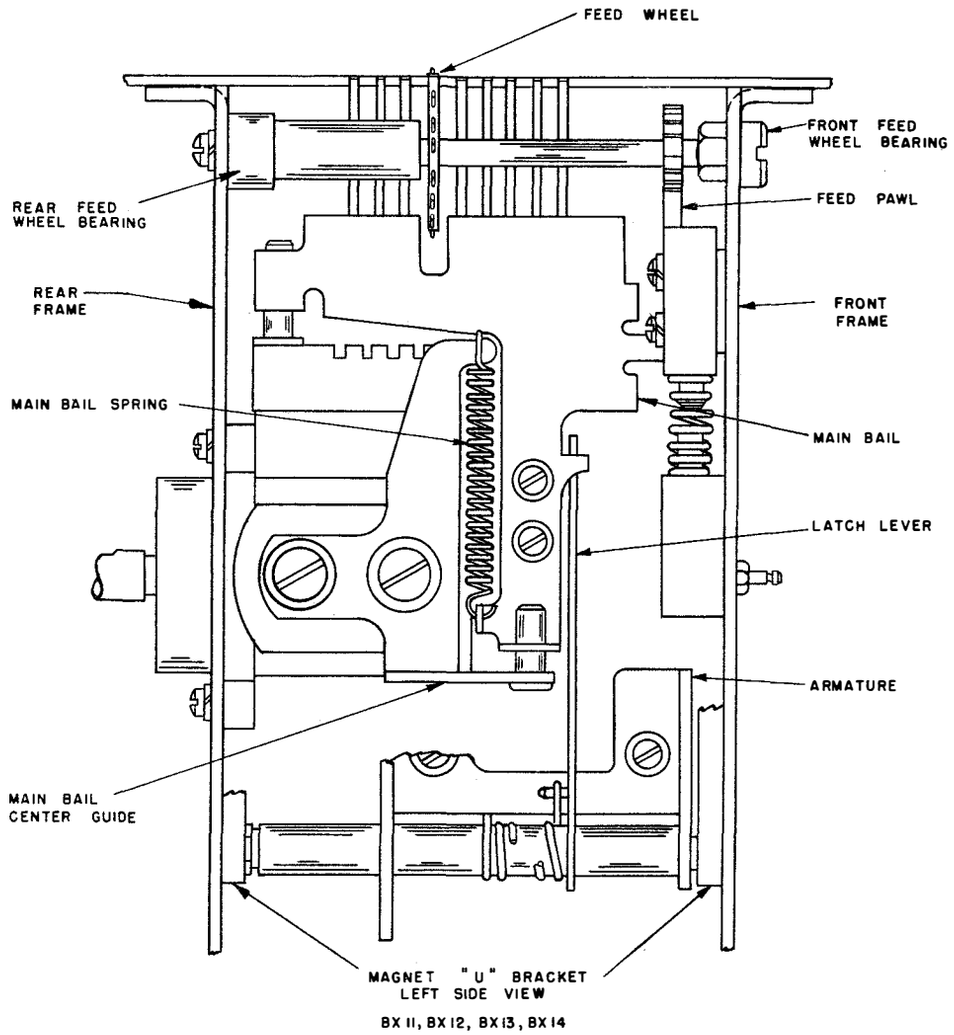


FRONT VIEW

FIGURE 2-6
FREE WHEELING AND TAPE OUT MECHANISMS



BX1, BX 2, BX 3, BX 4



BX 11, BX 12, BX 13, BX 14

FIGURE 2-7
READER UNIT

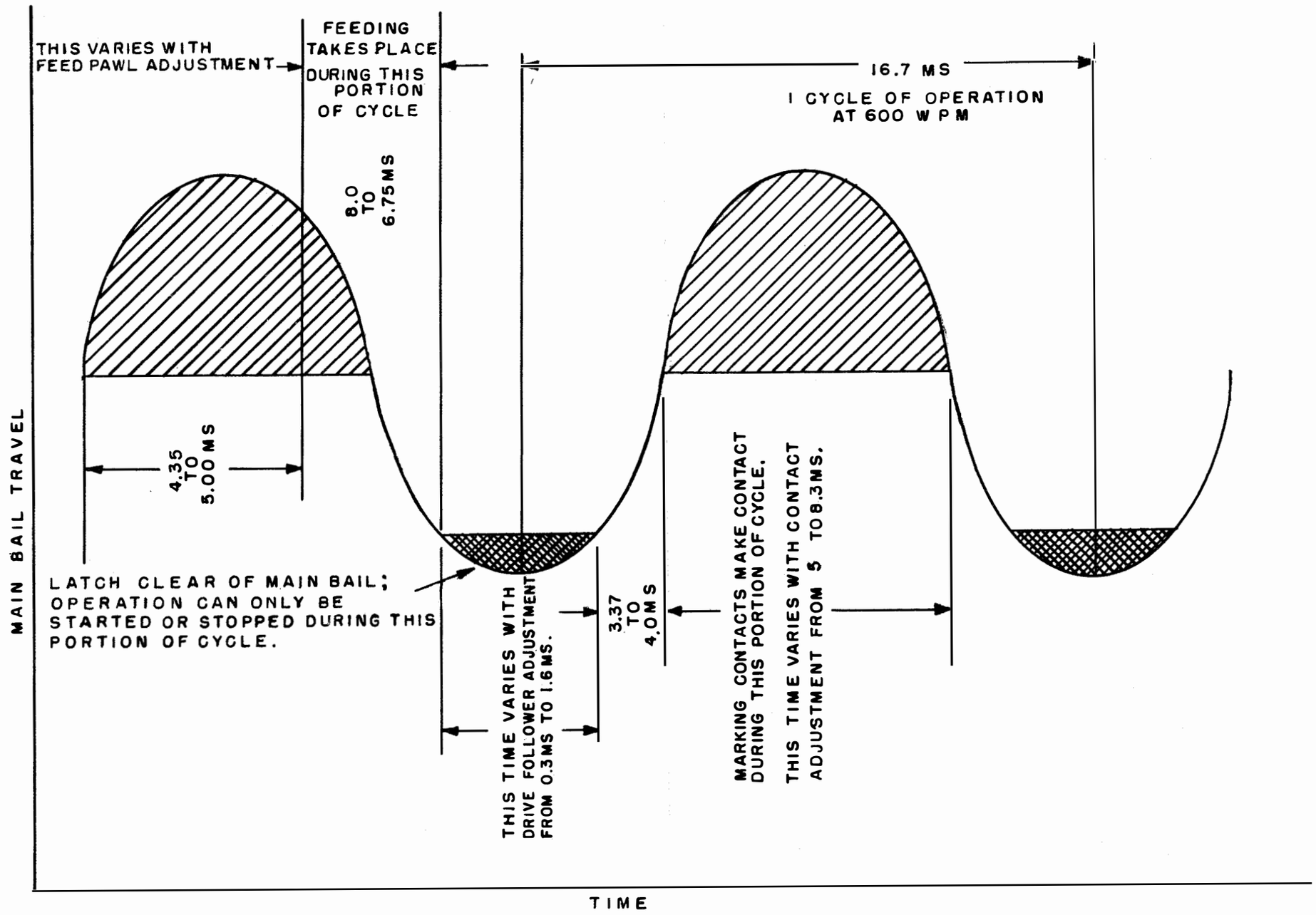


FIGURE 2-8

TAPE READER TIMING DIAGRAM

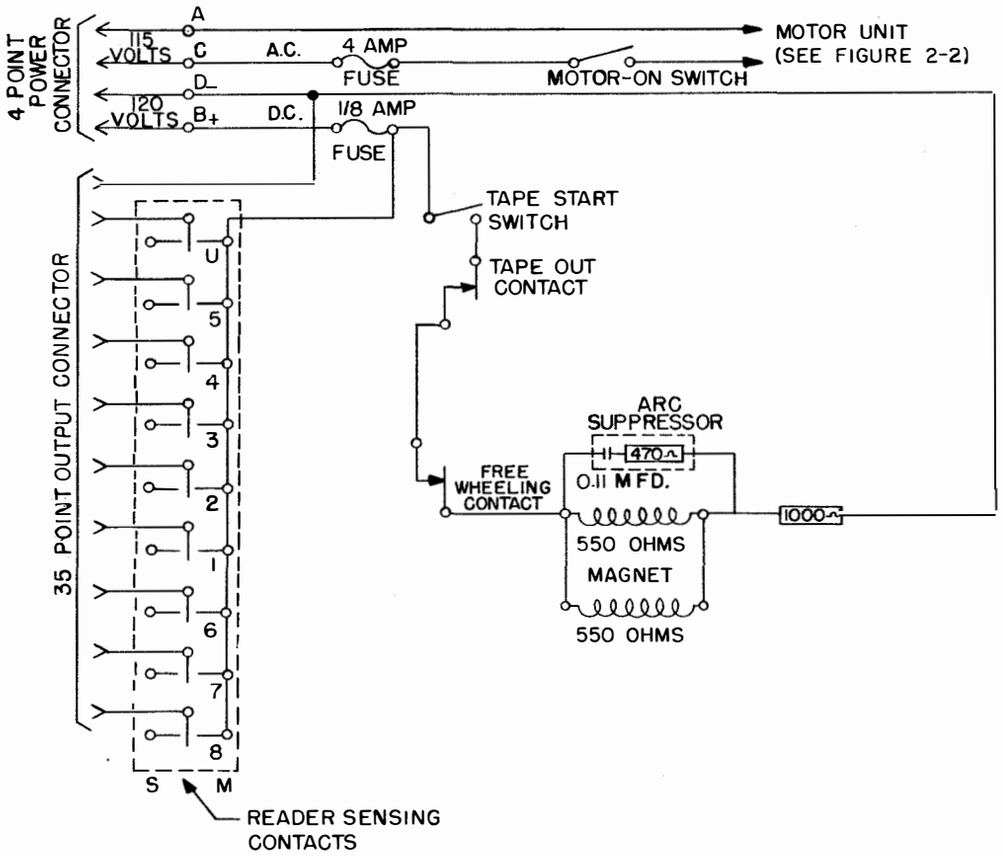


FIGURE 2-9
SCHEMATIC WIRING DIAGRAM OF A TYPICAL TAPE READER (SINGLE UNIT)

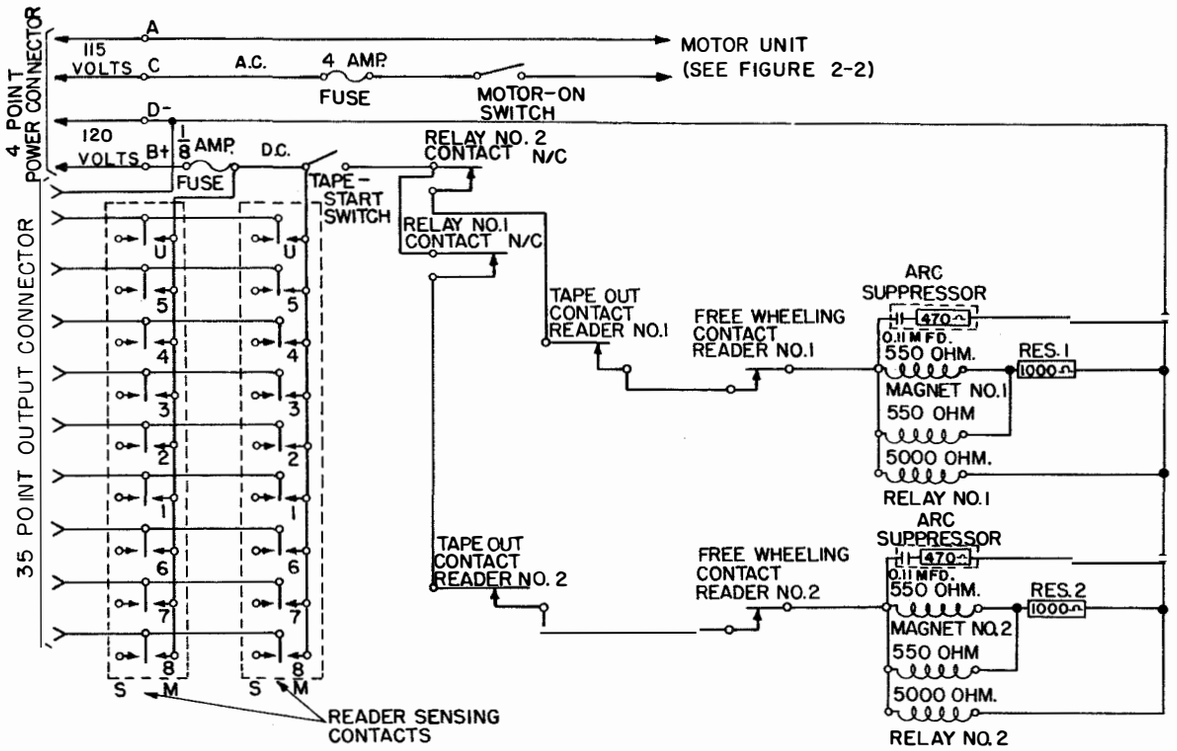


FIGURE 2-10
SCHEMATIC WIRING DIAGRAM OF A TYPICAL TAPE READER (DOUBLE UNIT)