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BULLETIN 279D

TECHNICAL MANUAL

HIGH SPEED TAPE PUNCH

(DRPE)

(A MODEL)

This publication replaces all previously dated Army and Navy manuals, and the Air Force TO 31W4-2FG-1351 Vol 1 of 6 dated 1 October 1969.

MARCH 1972

TELETYPE®
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5555 TOUHY AVENUE, SKOKIE, ILLINOIS

BULLETIN 279B

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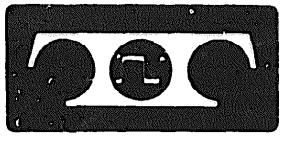

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INTRODUCTION

Bulletin 279B is a technical manual that provides general and specific technical information about the High Speed Tape Punch Unit (DPRE Type).

The bulletin is made up of a group of appropriate independent sections. The sections are complete within themselves; they are separately indentified 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 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 the 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).

TABLE OF CONTENTS

FILING INSTRUCTIONS

1. The following filing instructions apply to changes sent to the field.
2. Asterisks (*) in the table of contents indicate changes.
3. When the issue of a section changes, replace the old issue with the attached new one.
4. In the case of addendums, turn to the affected section and follow the instructions on the first page of the attached addendum.
5. Replace the old table of contents with this new one.

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

HIGH SPEED TAPE PUNCH UNIT

(DRPE TYPE)

DESCRIPTION AND PRINCIPLES OF OPERATION

CONTENTS

1. GENERAL

1.01 **This section provides the description and principles of operation for the high speed tape punch unit (DRPE type). It is reissued to add engineering changes and a punch backup mechanism. Since this is a general revision, marginal arrows normally used to indicate changes are omitted. The photographs and illustrations are representative of most models.**

1.02 The high speed tape punch unit uses tuned reed armatures, which are controlled by magnets to operate the punch pins. Tape feeding is accomplished with a spring driven escapement type feed mechanism.

1.03 Input to the unit is parallel **and** consists of shaped current pulses and a steady holding current. Output is perforated paper tape.

2. DESCRIPTION

2.01 The high speed tape punch unit (DRPE Type) is an electro-mechanical device that perforates coded information in paper tape (Figures 2, 3, 4, and 5). The unit produces code holes in paper tape in response to binary- parallel signals received from an electronic control unit. Early models operate at any speed up to 2000 words per minute (200 characters per second). Later models are available for operation up to 2400 words per minute (240 characters per second). These two types of units may be differentiated by the configuration of the reeds as shown in Figure 1.

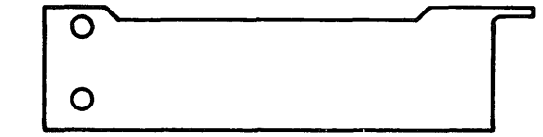
Note 1: Early design units may be equipped with solid reeds marked with an "X" on the fixed end. Inspect the reeds, and if they have the "X", do not use the punch at speeds over 850 words per minute. If higher speeds are required, replace the solid reeds with the laminated type (not marked with an "X").

Note 2: Because the majority of applications of DRPE type punches are required to operate below 1500 words per minute, the factory product is now adjusted to, and tested at, 1500 words per minute. For unit applications requiring 2400 words per minute operation, a suffix (/24) is added to the unit code, contained in the identification plate, starting with serial number 1753.

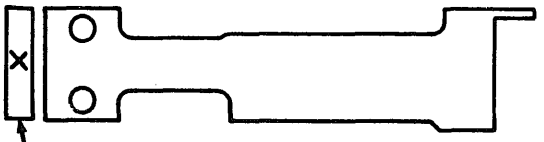
Example:

DRPE802 -denotes this unit is adjusted and tested for speeds up to 1500 words per minute.

DRPE802/24 - denotes this unit is adjusted and tested for speeds up to 2400 words per minute.



REED FOR 2000 WPM PUNCH UNIT



REED FOR 2400 WPM PUNCH UNIT (850 WPM ONLY IF WITH "X" ON END)

Figure 1 - Reed Identification for 2000 and 2400 Words Per Minute Punch Units

USES

2.02 The high speed tape punchunit is intended for use in receive-transmit sets and **high speed tape-to-tape re**ceiving terminals. It **is also compatible with co**mputer type applica**tions or wherever its high** speed capability may **be required.**

ASSOCIATED EQUIPMENT

2.03 **An electronic control unit provides the circuitry that converts low level signals to controlled, shaped, power signals capable of operating the punch magnets and reed armatures at the required high speeds. Connecting cables should be provided in the base or cabinet mounting facility. The ... chute, output tape guide and tape handling vary from application to application and, therefore, should also be provided as part of the mounting facility.**

SIGNAL INPUT

2.04 Signal code input to the punch is binary and parallel. Any code pulse combination and the control and tape feed pulses are simultaneous. These consist of shaped current pulses and a steady holding current (Figures 6 and 7). This input is provided by the electronic equipment mentioned in 2.03. Output from the unit is perforated paper tape. When released by a signal, the strain energy that has been stored by electro-magnets in the steel tuned reed armatures, is utilized to operate the punch pins and to trigger the escapement mechanism that feeds the tape.

TAPE

2.05 With the appropriate punch block assembly and associated parts selected and installed, the unit can be capable of perforating either 11/16 inch, 7/8 inch, or 1 inch tape (Figure 10). Tape guide channels can be provided to align any of these taps widths.

CODE LEVELS

2.06 The punch will perforate, depending on the unit and punch block selected, either 5-, 6-, 7-, or 8-level tapes according to **the** following arrangement:

5 Levels	6 Levels	7 Levels	8 Levels
	0 1	0 1	**0 1**
0 1	0 2	0 2	**0 2**
0 2	0 3	0 3	**0 3**
O F	***0 0 F**	**0 F**	**0 F**
0 3	**0 4**	**0 4**	**0 4**
0 4	**0 5**	**0 5**	**0 5**
0 5	**0 6**	**0 6**	**0 6**
		0 7	**0 7**
			0 8

0 = Code Hole
F = Feed Hole
***0 = Advance Feed Hole (if so equipped)**

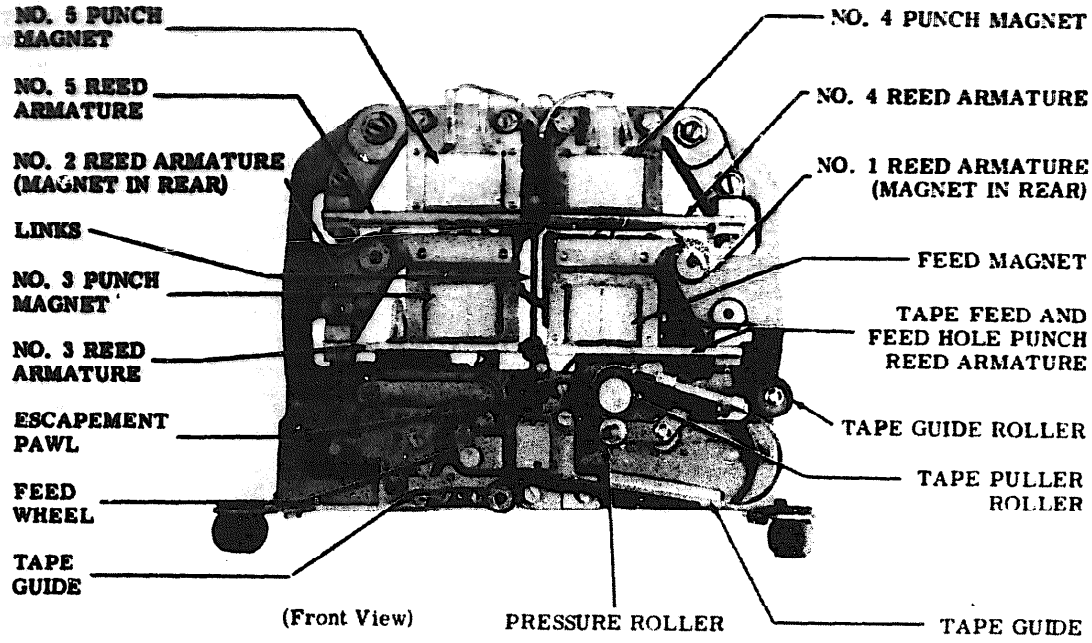


Figure 2 - Five-Level High Speed Tape Punch (Early Design)

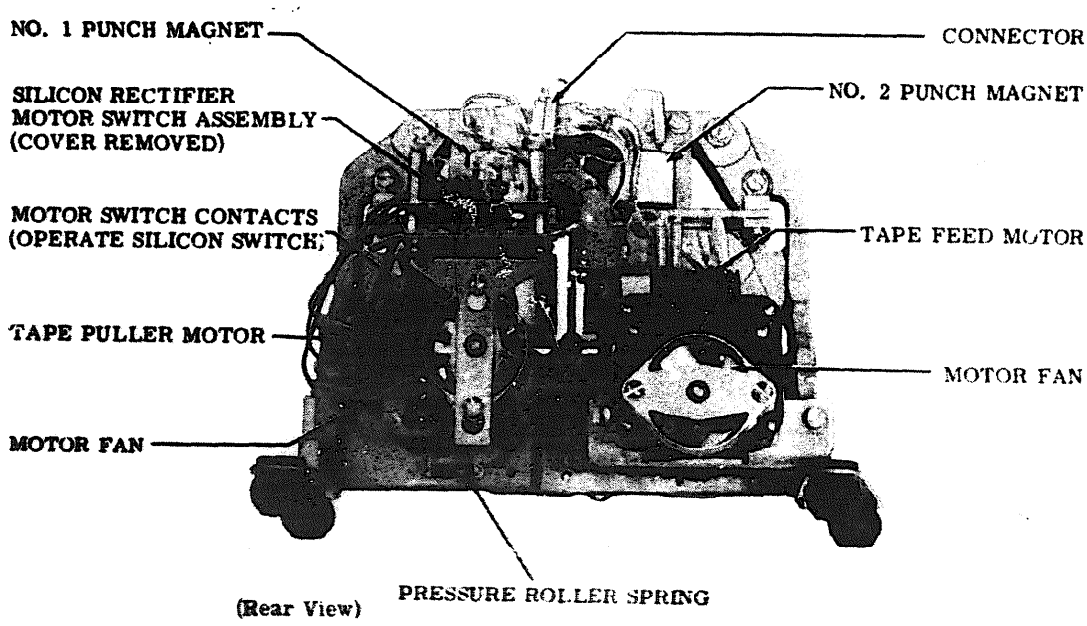


Figure 3- Five-Level High Speed Tape Punch (Early Design)

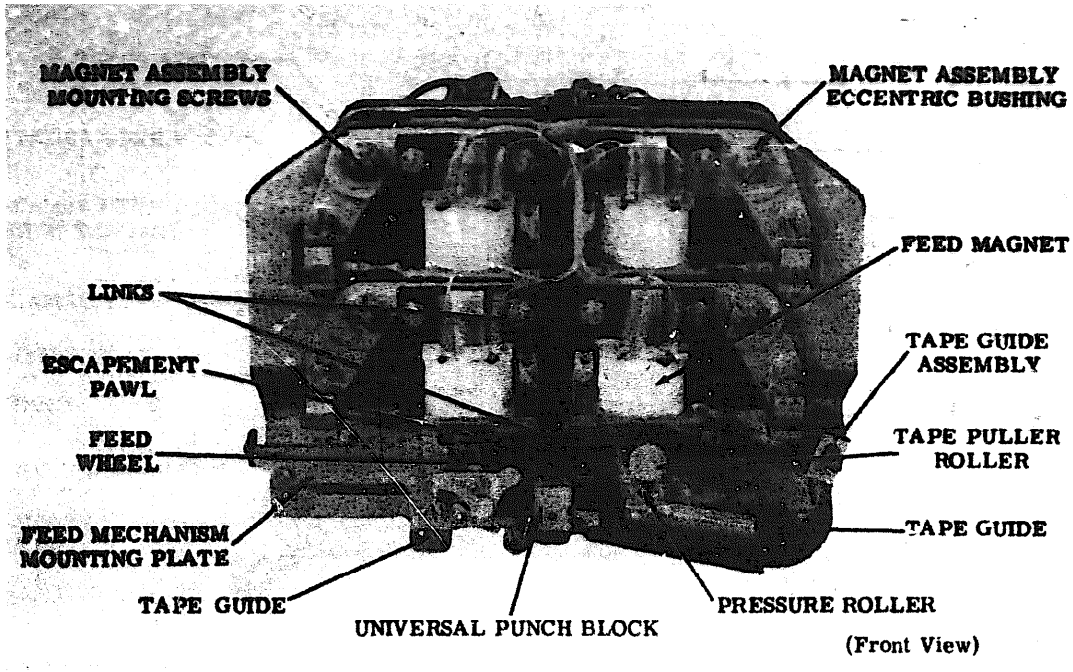


Figure 4 - Eight-Level High Speed Tape Punch (Later Design)

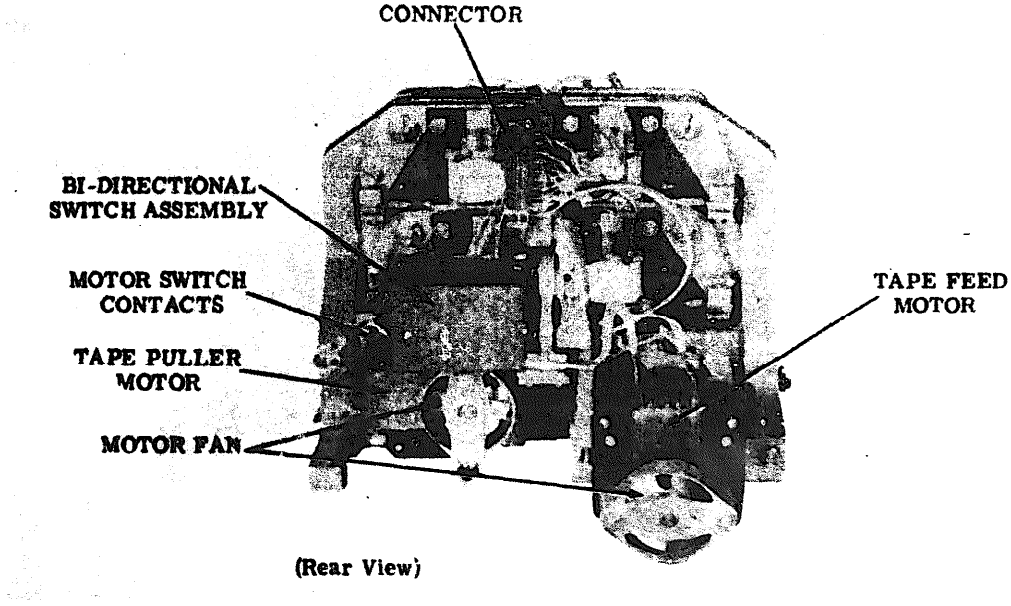


Figure 5- Eight- Level High Speed Tape Punch (Later Design)

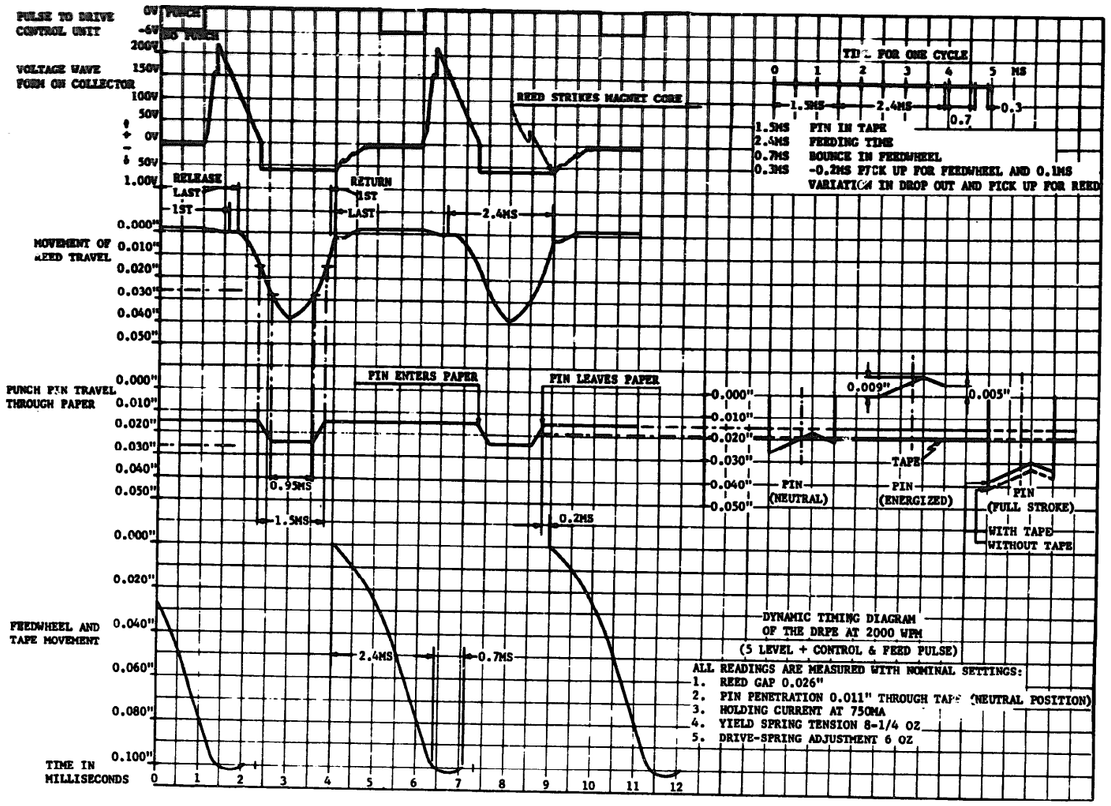


Figure 6- Typical Dynamic Timing Diagram
for 5-Level Punch Unit (Early Design)

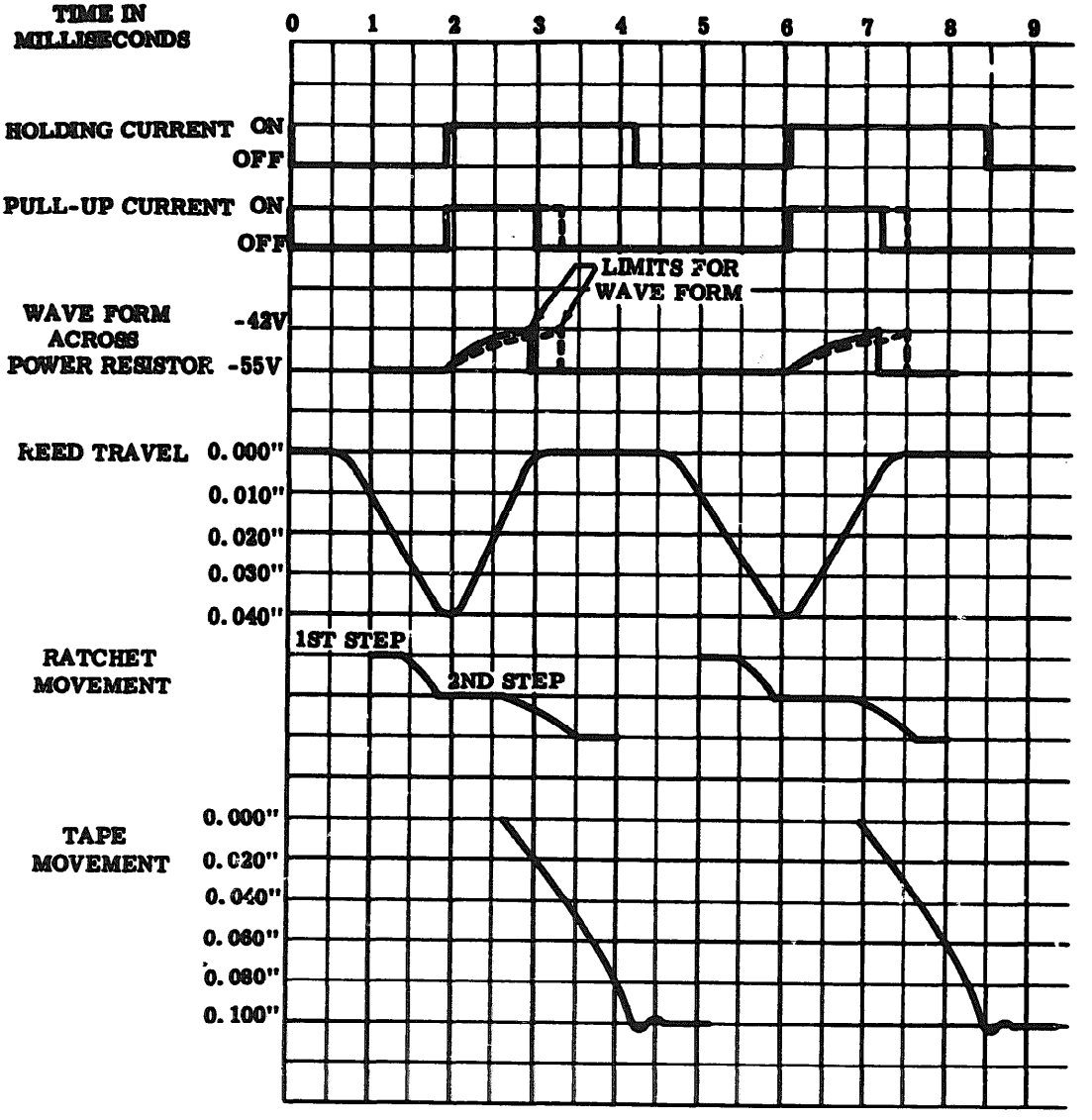


Figure 7- Typical Dynamic Timing Level Punch Unit (Later Design)

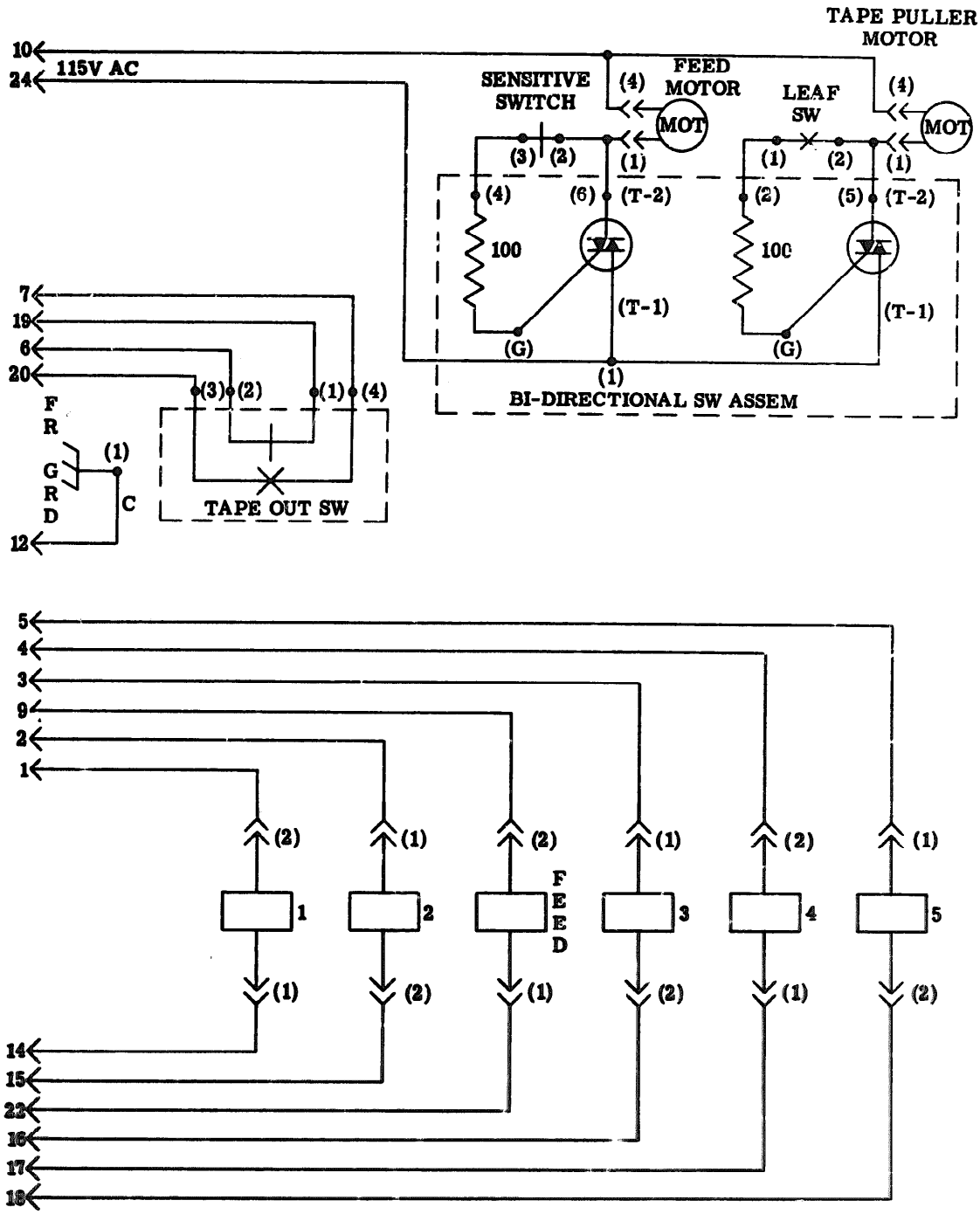


Figure 8- Typical Schematic Wiring for High Speed Tape Punch Unit (Early Design)

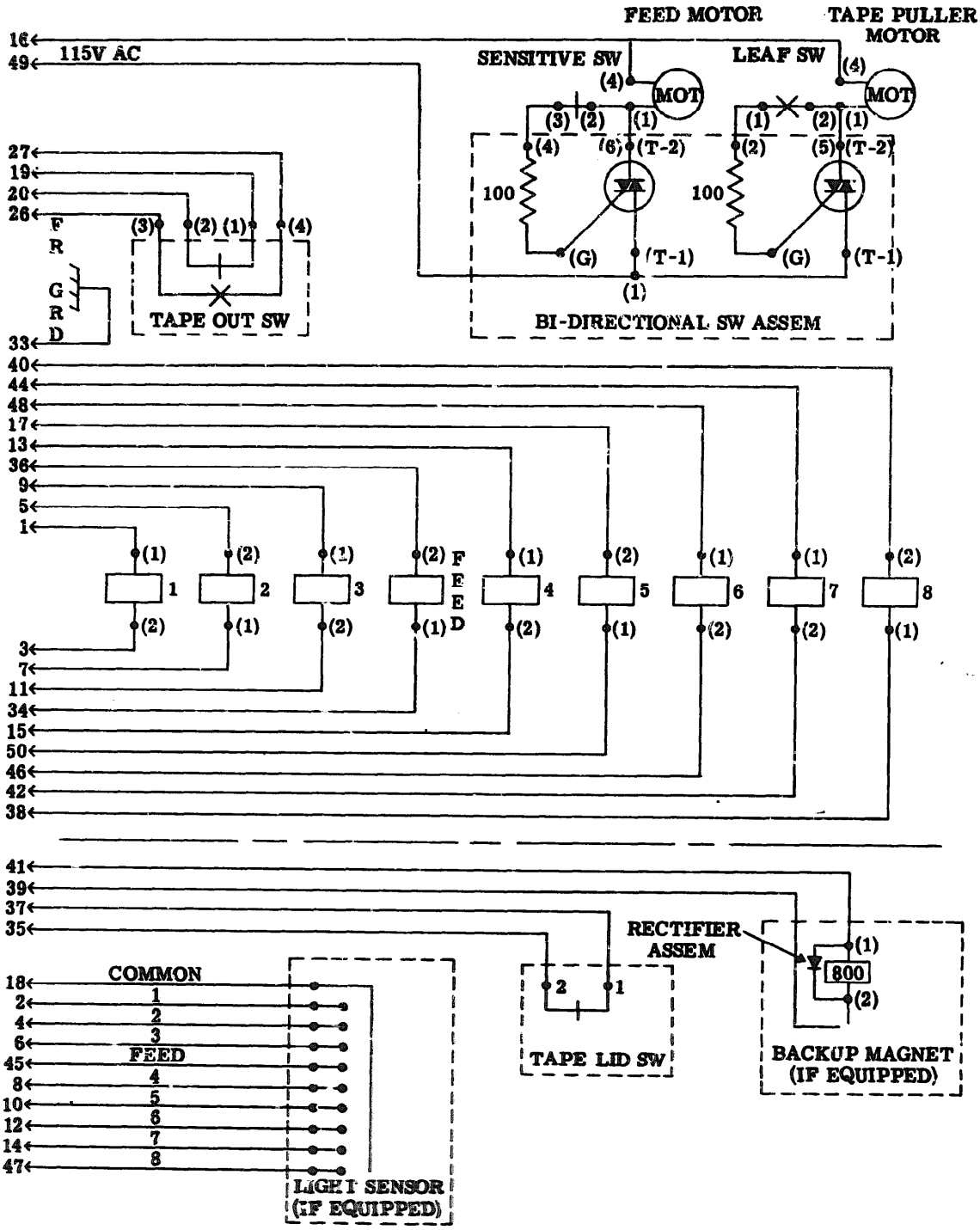


Figure 9- Typical Schematic Wiring for High Speed Tape Punch Unit (Later Design)

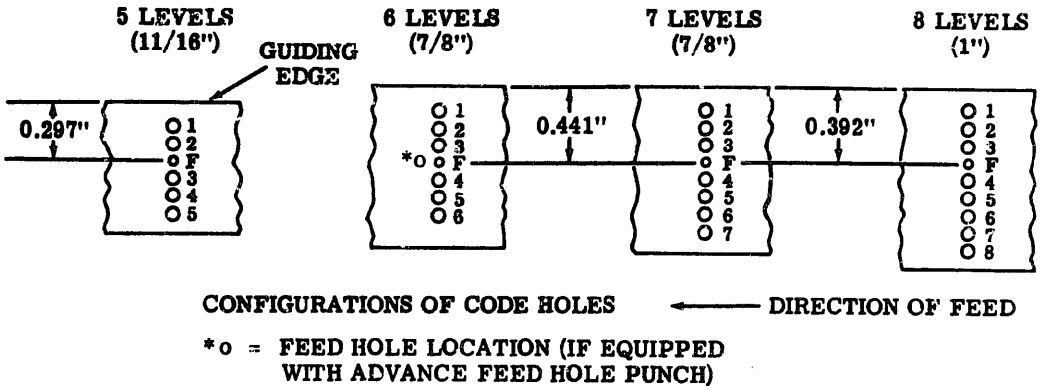


Figure 10 - Binary Permutation Code

SPEED AND TIMING

2.07 The high speed tape punch will operate at any speed up to 200 or 240 characters per second, depending on the model, in response to its incoming- signals. There are no timing restrictions as to when the signals may be fed to the unit, except that the incoming signals cannot be at a higher rate than the units maximum rated speed.

OPERATING POWER AND TEMPERATURE

2.08 The high speed tape punch unit has two shaded pole motors (Figures 3 and 5). ***The*** input to these motors is 115 v ac, ±10%, 50 or 60 hertz (depending on unit application), 75 **watts (each motor) at nominal voltage and 70°F ambient temperature. The unit may be operated in an environment ranging from 0 to 90 percent relative humidity and at an ambient temperature of +40°F to +110°F.**

WEIGHTS AND DIMENSIONS

2.09 **The 5-level tape punch weighs approximately 14 pounds and the 8-level unit weighs approximately 17 pounds, less variable features. The approximate overall dimensions less variable features, mounting facilities, and covers are 7-3/8 inches high, 9-3/8 inches wide, and 9-1/2 inches deep.**

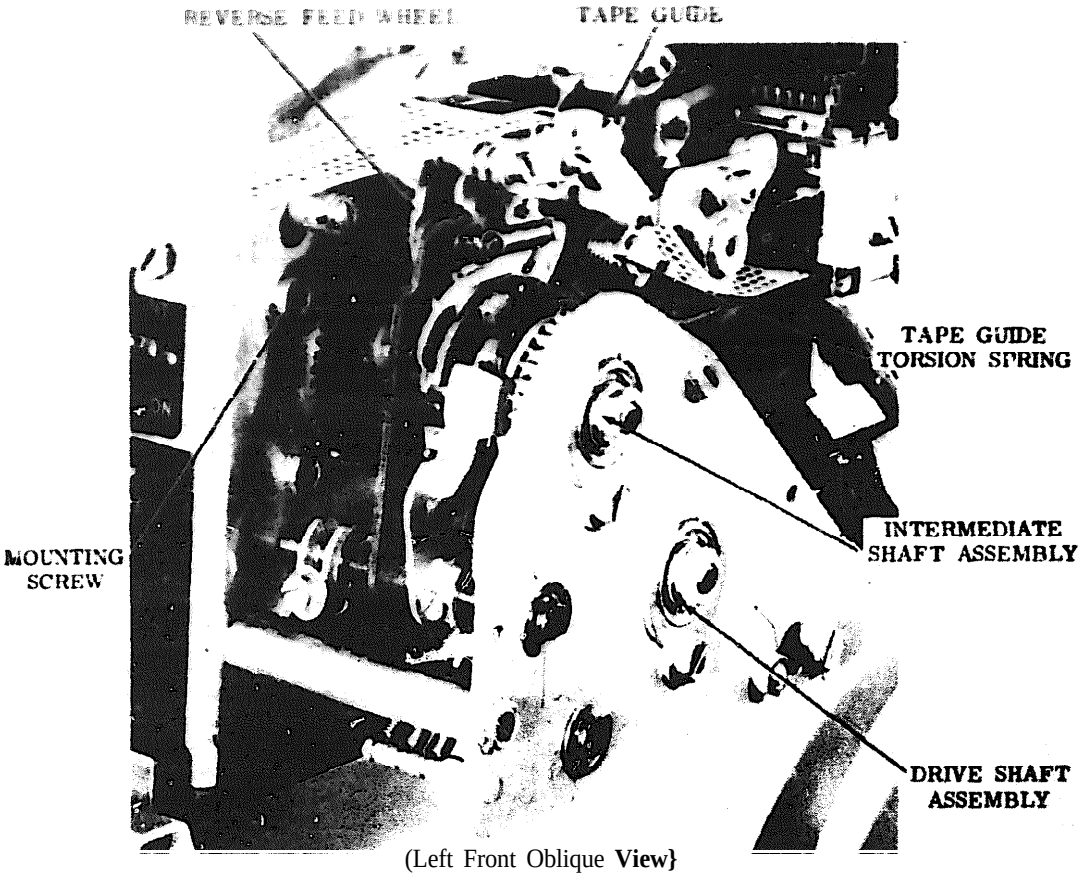
VARIABLE FEATURES

A. Photoelectric Reader (Verifier)

2.10 The high speed tape punch unit may be equipped with a photoelectric sensing assembly which includes a light source assembly, isolator tube, mirror tube assembly, chad chute, and a punch block with verifier (Figures 16 and 17). The verifier portion of the punch block contains the phototransistors. The parallel output of the phototransistors corresponds to the hole or no-hole condition of the paper tape and follows one character after the perforating position. The photoelectric reader assembly is intended for use in error detection systems or wherever it is necessary to regenerate a signal from the tape one character after perforation.

B. Punch Backup Mechanism

2.11 **The backup mechanism is an electromechanical device which, when given an electrical pulse, passes the product tape through the punch block, of the tape punch unit, in the reverse direction for 80 characters (Figure 11). During normal forward operation of the associated punch unit, the forward feed wheel will feed tape to the left. The tape is passed through the tape guide assembly (not engaging the reverse feed wheel). When an electrical pulse is received by the backup mechanism, the tape guide assembly pivots allowing the reverse feed wheel to engage the tape and the forward feed**



(Left Front Oblique **View}**

Figure 11- Punch Backup Mechanism, Less Cover

wheel to disengage. The tape is then pushed backwards through the punch block for exactly 80 characters. The reverse feeding stops after the 80th character in the tape has been fed. The tape guide assembly then pivots again, disengaging the tape from the reverse feed wheel and engaging it with the forward feed wheel. The punch unit then proceeds to operate in the forward mode. The backup mechanism is intended for use in error detection and correction applications.

C. Universal Punch Block

2-12 Later design models (2400 wpm) of the high speed tape punch, either with or without the photoelectric reader, may be equipped with the adjustable universal punch block assembly which includes an adjustable tape guide (Figure 21). An operating lever on the universal punch block and an adjustable tape guide may be positioned to accommodate any of the available four different levels and three widths of tape.

3. PRINCIPLES OF OPERATION

RECEIVING SIGNALS (Figures 6, 7, 8, and 9)

3.01 The binary code pulse combination and simultaneous binary control and tape feed pulse, which are required input *from the* electronic control unit to operate the punch unit, consist of the following: a steady holding current through all magnet coils during the standby

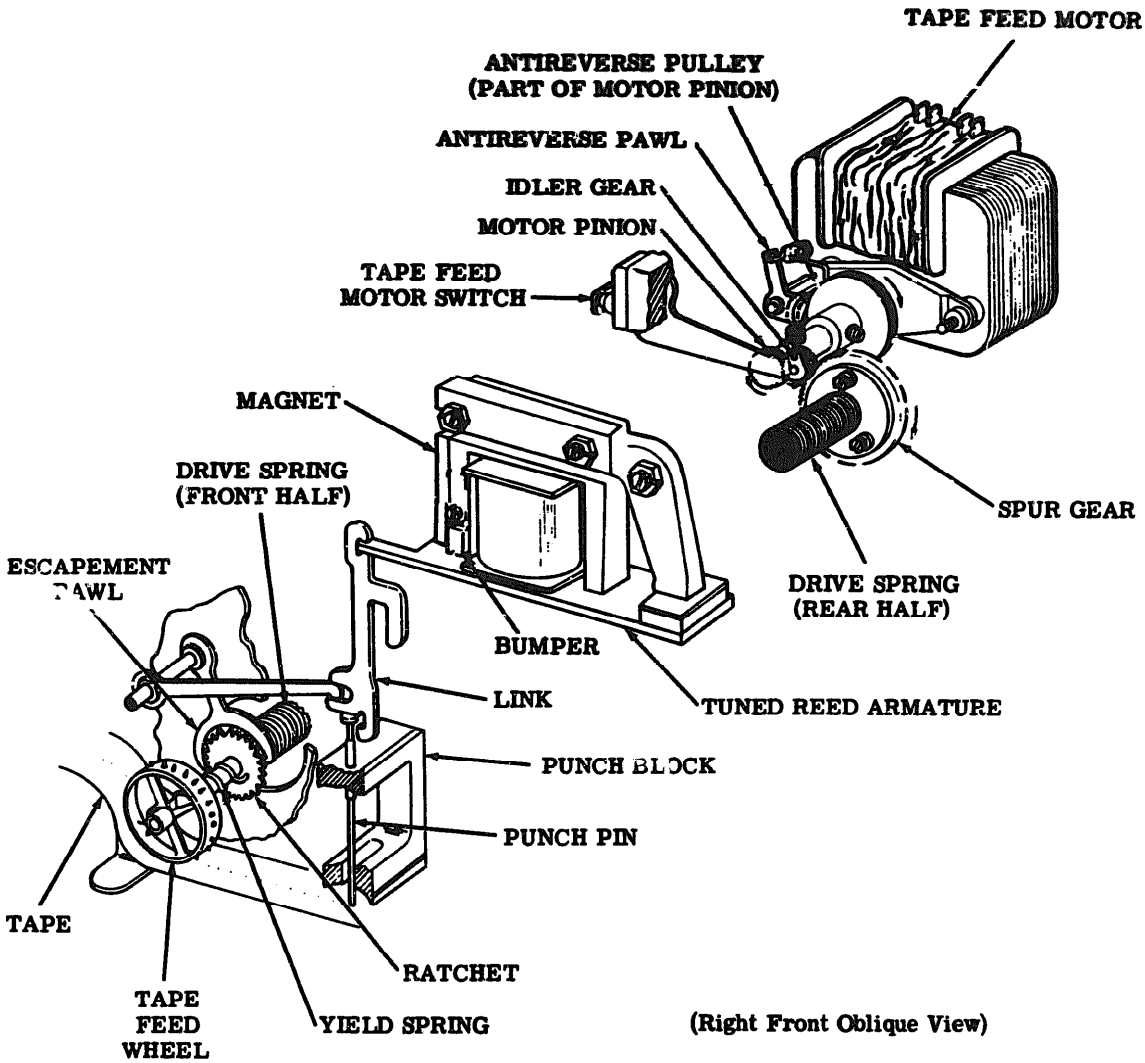
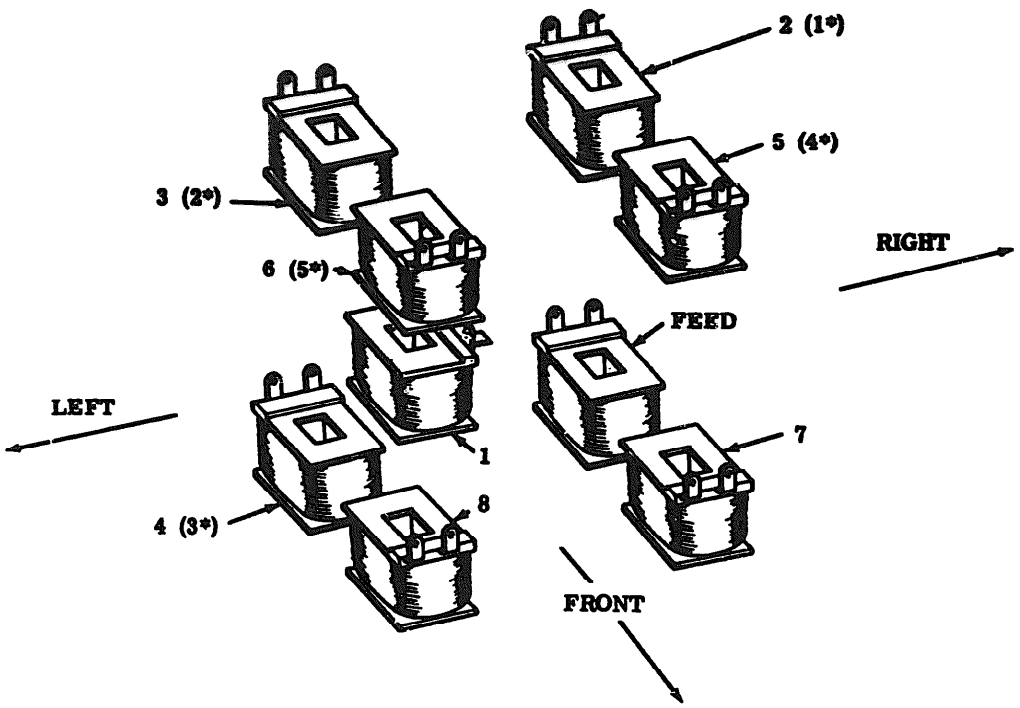


Figure 12 - Punch and Feed Mechanisms

(ready) period and through the coils of those code punch magnets that are to remain in a space (no-punch) state during the interval that a character code signal is being received. The tape feed hole for each character and any character marking code hole is punched in the tape through the release of a tuned reed armature during its no current interval of this character code signal. The no current interval, with its transition from holding current and back to the current state, is timed and spaced to match one-half of the natural resonant frequency cycle of a tuned reed combination that includes reed, linkage, punch and, in the case of the feed punch, the escapement and tape feed mechanism. Except for this wave shape-timing requirement, the high speed tape punch will accept the parallel wire binary signals at any speed from zero to its maximum rated number of words per minute without any changes or readjustments of the unit.

MAGNET AND REED ASSEMBLY (Figure 12)

3.02 **Mark (Punch) Code Pulse: The tuned reed armature, through its rigid vertical link to the punch pin, punches the tape when it**



5-LEVEL MAGNETS	OTHER MAGNETS	MAGNET POSITION
FEED	FEED	LOWER RIGHT REAR
	1-LEVEL	REAR CENTER
1*	2-LEVEL	UPPER RIGHT REAR
2*	3-LEVEL	UPPER LEFT REAR
3*	4-LEVEL	LOWER LEFT REAR
4*	5-LEVEL	UPPER RIGHT FRONT
5*	6-LEVEL	UPPER LEFT FRONT
	7-LEVEL	LOWER RIGHT FRONT
*5-LEVEL MAGNET	8-LEVEL	LOWER LEFT FRONT

Figure 13 - Punch et Positions

is released from its magnet by a no current interval (mark code signal, or any signal in the case of a feed punch). A rapid reduction to the no current state is obtained by momentary application of a reverse voltage of approximately +250 volts by the external control unit to the

trol unit and the punch magnet coils. Near the end of this cycle, a negative pulse (approximately -50 volts) is applied, through a variable re-

sistance in the control unit, to the punch magnet coil in time to quickly re-establish a holding current (approximately 750 ma at -17 v dc) that **catches** the tuned reed armature on its rebound **and holds it against its magnet until the next punch** pulse is received. Later model units are

3.03 **Space (No Punch) Code Interval: Any tuned reed armature, except for one released by a control pulse and associated with**

the feed punch mechanism, is held against its magnet during the character space code interval by the same holding current that passes through the magnet coil in the standby (ready) condition. The feed punch armature is released upon receipt of any code signals by a control pulse to punch and feed tape as described for the mark code pulse in 3.02.

3.04 The high speed punch comprises one magnet-punch mechanism to punch and feed tape, plus one for each code level to be punched. This provides six for a 5-level punch unit, or nine for an 8-level punch unit.

REED, LINK, AND PUNCH MECHANISM (Figure 12)

3.05 Each tuned reed armature has an extended tip that is arranged to align with and fit into the upper notch of its associated link. The reed is adjustable within its clamp and is mounted to an adjustable magnet bracket which also mounts an adjustable magnet. This combination is adjusted for proper alignment, air gap, and height, so that the punch pin just penetrates the tape with the reed in its neutral (unoperated) position.

3.06 Each long and short link is notched at the top for the reed and at the bottom for the punch pin, thereby enabling the reed to punch the tape on its down stroke after release, and to retract the punch pins on its return (rebound) stroke. The long links are guided by a fixed guide at the top plus an adjustable guide affecting both long and short links near the bottom. The link for the taps feed hole punch has an additional notch on its left side to operate the tape feed escapement pawl.

3.07 A head at the top of each punch pin fits into the notch of the link at its right to punch the tape on a down stroke of the link and to retract the pin from the die plate on the up stroke. An adjustable retaining plate, mounted **at the** top left side of the punch block assembly, holds the pins in position in case of punch block adjustment or removal.

TAPE FEED AND FEED HOLE PUNCH (Figure 12, 13, AND 14)

3.08 **Upon receipt of the binary control signal pulse at the tape feed hole punch magnet, the reed (armature) is released. These punch and feed mechanisms** then operate in the following sequence:

(a) The reed to punch pin link first drives the pin into the tape far enough to hold the tape and prevent feeding.

(b) As the link continues downward it pivots the escapement pawl, thereby allowing the ratchet to escape by one tooth under torque of the drive spring. An extended stop lug on the ratchet rotates with the ratchet. This releases the tape feed wheel to rotate, under torque Of the yield spring between the ratchet and feed wheel, when the feed wheel **is later** released by the tape and the punch pins are holding the tape.

(1) The drive spring is wound to its correct tension by a shaded pole motor through its pinion gear, a spring loaded idler gear with motor control switch, and a spur gear. (See Figures 8 and 9 for typical schematic wiring.)

(2) An antireverse paw1 engages the groove in a pulley at the rear Of motor pinion to prevent unwinding of the drive spring through the motor when power is removed by operation of the idler gear arm switch. This also prevents the idler gear spring and drive spring mechanisms from hunting for their balance positions.

(c) With the feed wheel still held against its yield spring torque by the tape; the armature, link and punch pin start their upward (rebound) movement. The escapement paw1 is again pivoted and the ratchet escapes another tooth at approximately the same time that the feed hole punch pin (with other pins, if any) is withdrawn from the tape. The tape is now moved by the feed wheel, under torque of its yield spring, until the feed wheel is blocked by the extended stop on the ratchet **(0.1 inch tape movement).**

(1) The tape feed wheel revolves (moves) 1/10 of an inch at its periphery, where the tape rides, for each punch and feed cycle.

(2) To maintain the ten feed holes to the inch spacing, the distance between the point where the feed-wheel punch pin enters the tape must be an exact multiple of 0.1 inch, so that the feed hole is presented to the feed pin at the right point to avoid strain, distortion and relative motion between tape and feed wheel.

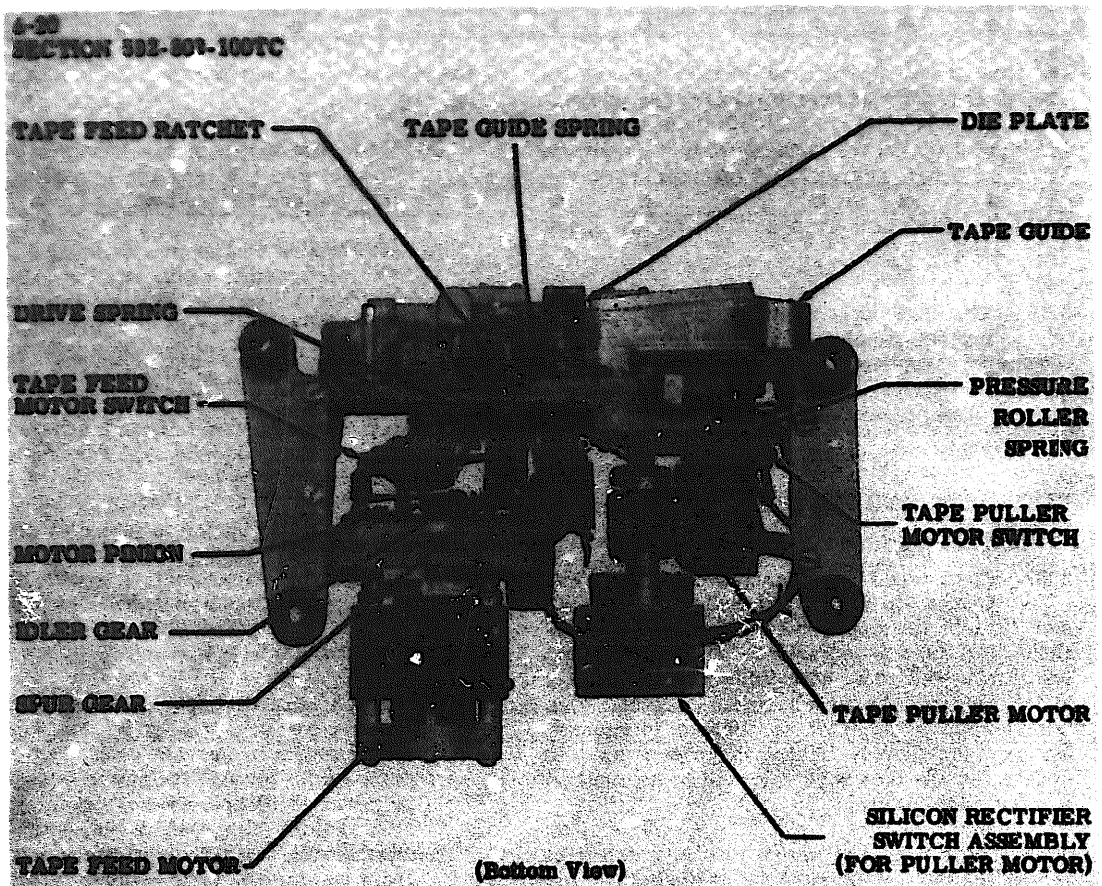


Figure 14 - High Speed Tape Punch

(3) The multiple of 0.1 inch distance may be adjusted, if necessary, by the TEN TO THE INCH adjustment given in the adjustment section.

(4) The read (armature), with its link and punch pin, continues upward (rebounds) to the latched position against the magnet where it is held by the holding current until the start of the next character or tape feedout cycle.

TAPE PULLER AND GUIDES (Figure 15)

3.10 The unpunched paper tape is normally stored on a tape reel mounted on associated apparatus. From there it is pulled, by the drive roller and shielded pole motor, into the high speed tape punch from the upper right side of the unit as follows:

(a) The tape travels to the left, under the pulley at the extreme right hand of the unit.

(b) The tape continues to the left, over the top of the tape guide, through the shielded slot, to the underside of the tape guide.

(c) Tape is then pulled over and around the drive roller, on the motor shaft, returning it toward the right between the drive roller and the spring loaded pressure roller (directly under the drive roller).

(d) The tape continues to the right, over and around the tape tension lever.

(1) The tape tension lever maintains a predetermined, constant, low tension on the tape where it is presented to the punch block and tape feed wheel.

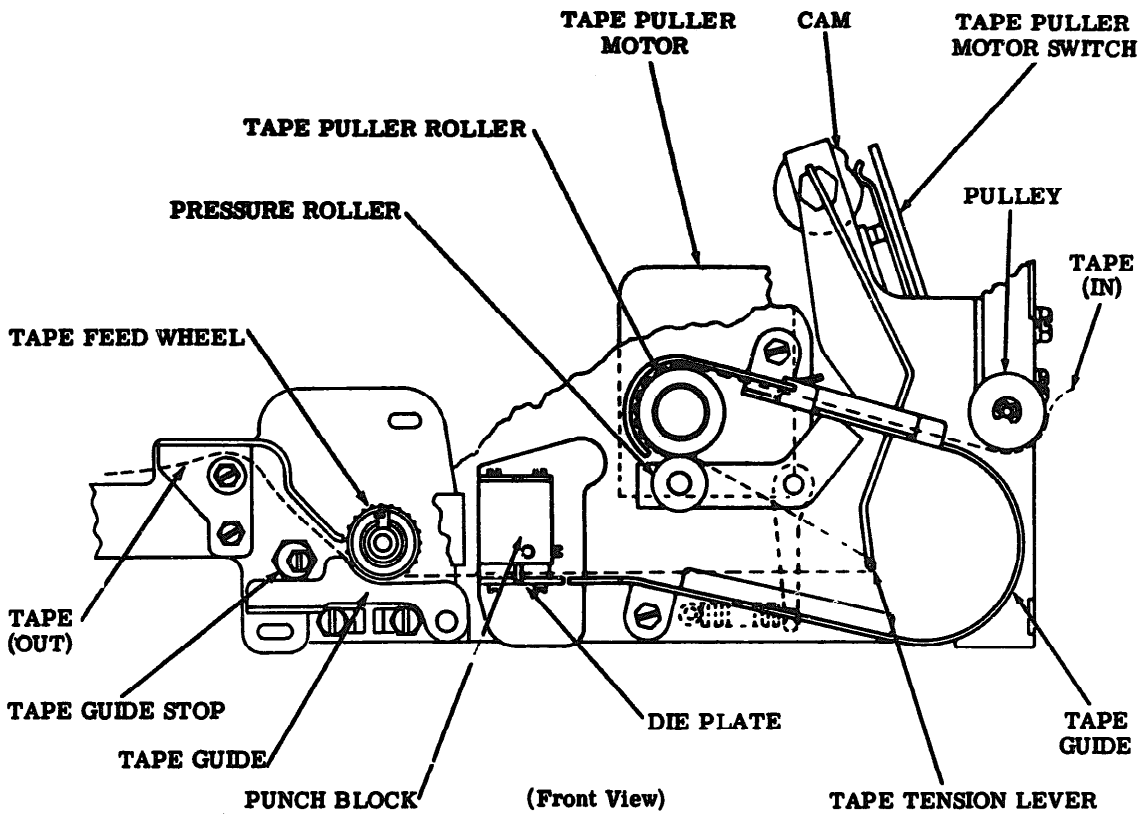


Figure 15 - Taps Puller and Guides

(2) This is accomplished by control of the taps puller motor through a torsion spring, double acting cam, and a switch at the opposite end of the taps tension lever. The motor power is thereby removed when the tape becomes too tight or too loose.

(e) *From* under the tension lever, the taps returns to the left and passes along the **tape guide, then between the die plate and punch block. All punch pins must be in their retracted positions (reed armatures pulled up) before a new tape can be inserted at this point.**

(f) The tape is then fed by the tape feed wheel and feed motor:

(1) Without Backup Mechanism: Between the feed wheel and a manually releasable, spring-loaded tape guide directly under the feed wheel. From the left of the feed wheel, it arches over **and clear of the adjustable guide stop post, then over the tape guide post at the extreme left.**

(a) An additional tape cover guide may be added after the feed wheel, as part of associated apparatus, to guide the tape to a tape winder.

(b) A chad chute, also part of associated apparatus, may be added under the punch die plate in order to dispose of the chad.

(2) With Backup Mechanism: Through the adjustable tape guide, of the backup mechanism, and exits the unit at the extreme left.

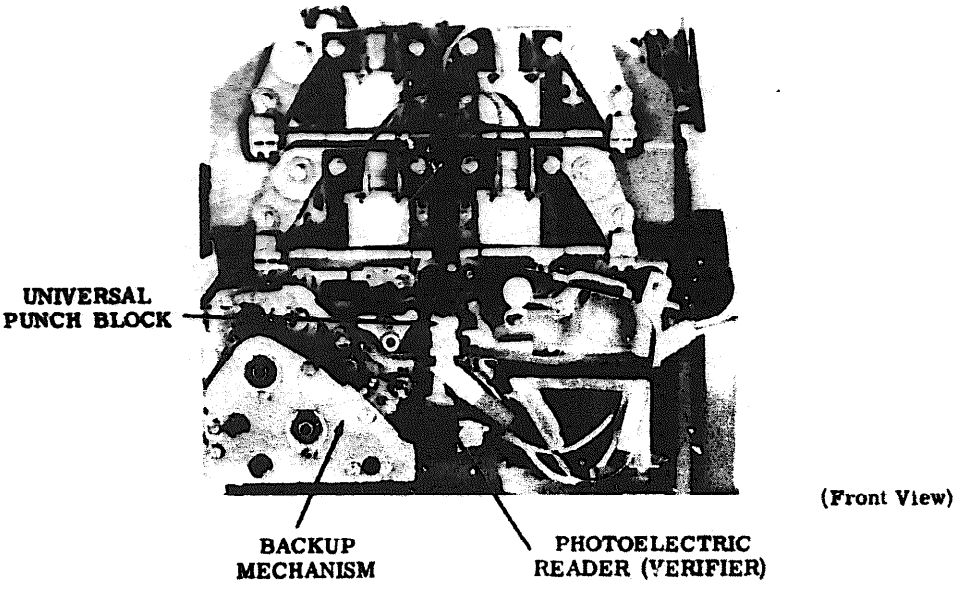


Figure 16 - 8-Level Tape Punch With Variable Features

VARIABLE FEATURES (Figure 16)

A. Photoelectric Reader (Verifier)

General

3.10 Light supplied by the light source assembly is directed onto the mirror in the **mirror tube assembly. The mirror redirects the light through the die plate window onto the bottom surface of the tape, illuminating the character code which immediately** follows the **perforating** position. If a hole is present, the **light passes unobstructed through the hole in the tape, through the cover glass, and** through the **transistor tube to strike and activate the** light **sensitive transistor. The activated transistor indicates the presence of a hole by permitting current to pass through its circuit.**

Light Source (Figure **17)**

3.11 The light source consists of a quartz iodine lamp, collimating lens, and hardware to mount them. The lamp filament is positioned at the focal point of the lens to **produce parallel light rays (collimated light).**

Mirror Tube Assembly (Figure 17)

3.12 A rectangular flat mirror is positioned so that the center of the reflecting surface coincides with the intersection of the vertical center line through the fourth level code position and the optical center line. The mirror tube is designed to enclose the light path from the light source to **the** code verifying position in the punch, **and to support the mirror.**

Die Plate Window (Figure 17)

3.13 The die plate window, which is permanently bonded to the die plate on the punch block, protrudes below the die plate. Its purpose is to permit collimated light (from the light **source) to pass through the die plate to the phototransistors.**

Phototransistor Assembly (Figures 17, 18, and 19)

3.14 Hole Condition (Figure 18): When a hole in the paper tape is in position over the die plate window, light passes from the light source assembly, through the die plate window,

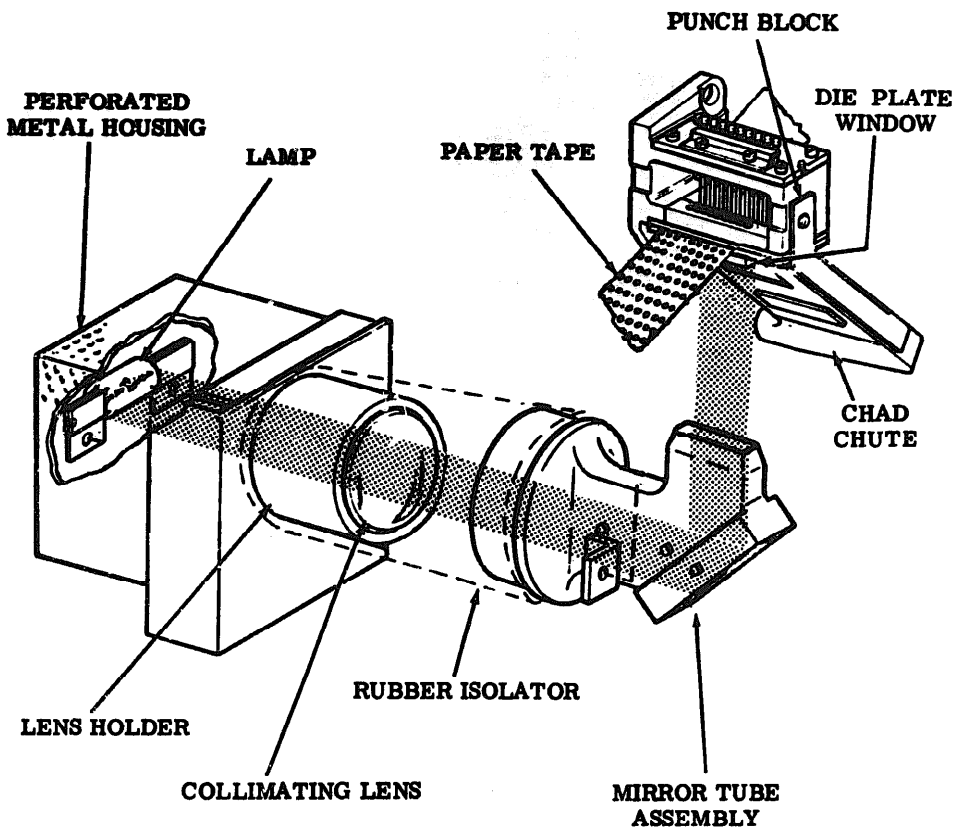


Figure 17 - Photoelectric Reader (Verifier)

through the hole in the tape, and through a tube to the phototransistor which responds to the light. This results in a current (mark) condition.

3.15 No Hole Condition (**Figure** 19): When blank tape is in position over the die **plate window, light cannot pass directly through the tape. Rather, the light is diffused and randomly oriented by the fibers in the tape. Further, as the diffused, disoriented light passes through the light directing tube, some of this light is absorbed and disoriented by the tube. The resulting "dim" light will not cause the phototransistor to respond. This results in a no current (space) condition.**

3.16 **Feed Hole (Figure 18): The code hole sensor tubes have an inside diameter of 0.062 inch (0.010 inch smaller than the code hole). In the case of the feed hole, the sensor tube is 0.054 inch so the web (that portion of tape between perforations) between feed holes will completely shut off the light. In this way an output is available from the feed hole when each character is advanced. This output can be used for detecting tape motion, as an input to a counter, or for anything that requires an output with each character advance.**

B. Punch Backup Mechanism (Figures 11 and 20)

Forward Mode (Figure 20)

3.17 **While the associated punch unit is punching tape, the backup mechanism is not functioning. The backup mechanism drive shaft**

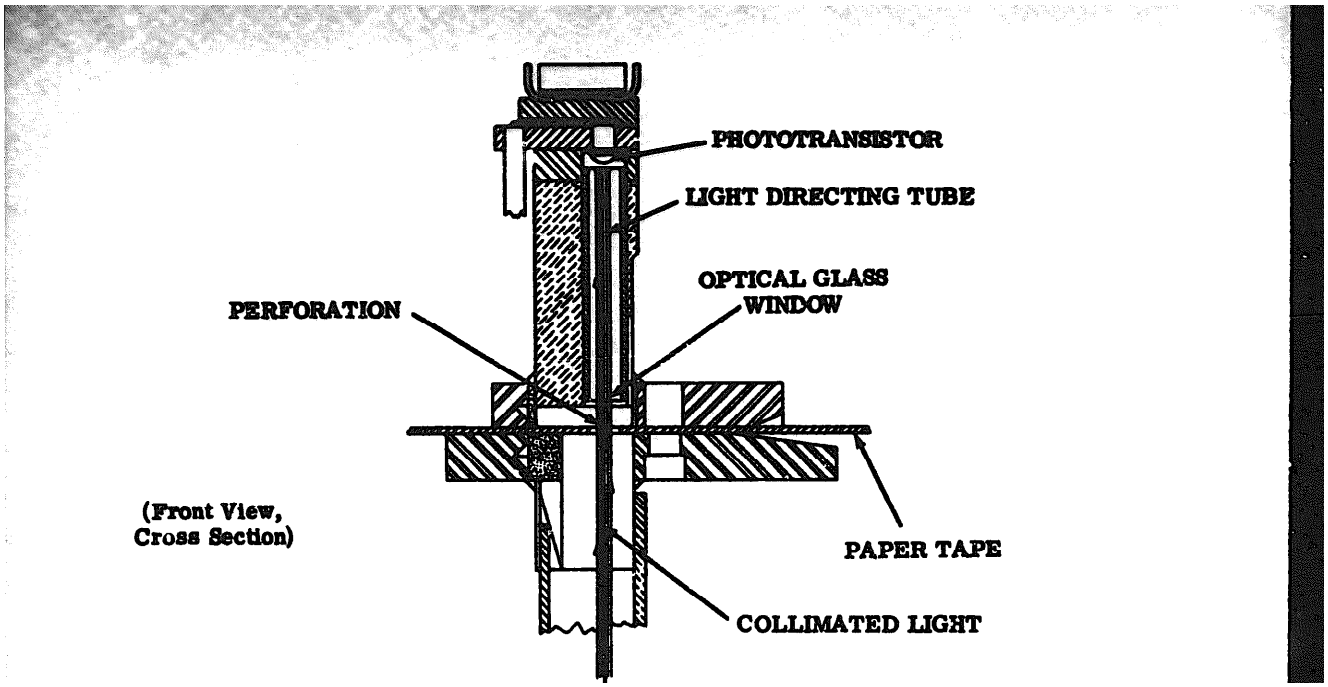


Figure 18 - Phototransistor Detects Perforation in Tape

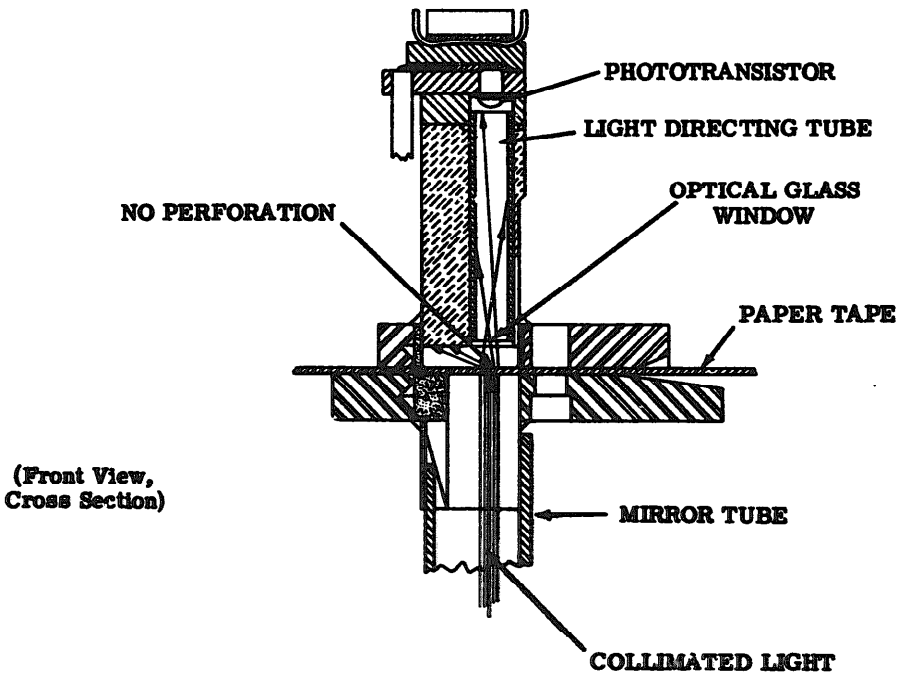


Figure 19 - Phototransistor Detects No Perforation in Tape

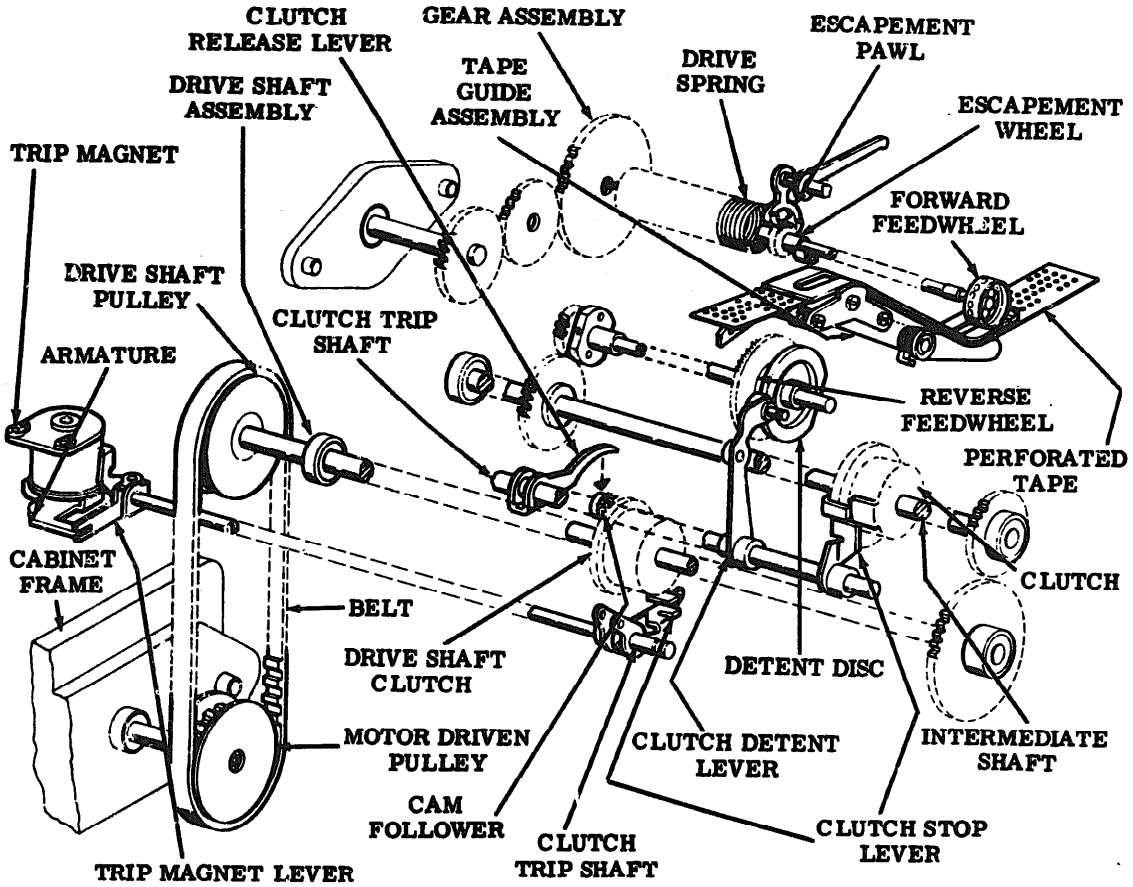


Figure 20 - Backup Mechanism (Left ***Front*** Oblique View)

is being driven clockwise at approximately 118 revolutions per minute by a 105 rpm shaded pole motor through a timing belt. Because the **spring clutches are disengaged, only the gear on the drive shaft and the mating gear on the intermediate shaft (rotating counterclockwise) are rotating.**

Reverse Mode (Figure 20)

3.18 **When a 6 volt dc (70 ms) pulse is supplied to the trip magnet, the magnet armature is attracted to the core. The armature pulls on the lever attached to the clutch trip shaft causing it to rotate clockwise. The clutch stop lever is rotated away from the clutch disc lug allowing the drive clutch to engage.**

3.19 **Engagement of the drive clutch (Figure 20) causes the cam assembly to rotate with the shaft. At the same time, the tape guide cam follower arm starts to rotate counterclockwise. A post on the arm allows the tape lid switch lever to be rotated clockwise by its spring. The lever operates the tape lid switch, which is wired for normally closed operation.**

3.20 **The tape guide cam follower arm, as it rotates, causes the center of the tape guide assembly to move down and toward the left. The tape guide torsion spring (Figure 20) tends to bias the assembly counterclockwise. As the tape guide assembly rotates counterclockwise, it moves away from the right eccentric stud and continues to rotate until the left end of the assembly comes to rest on the left**

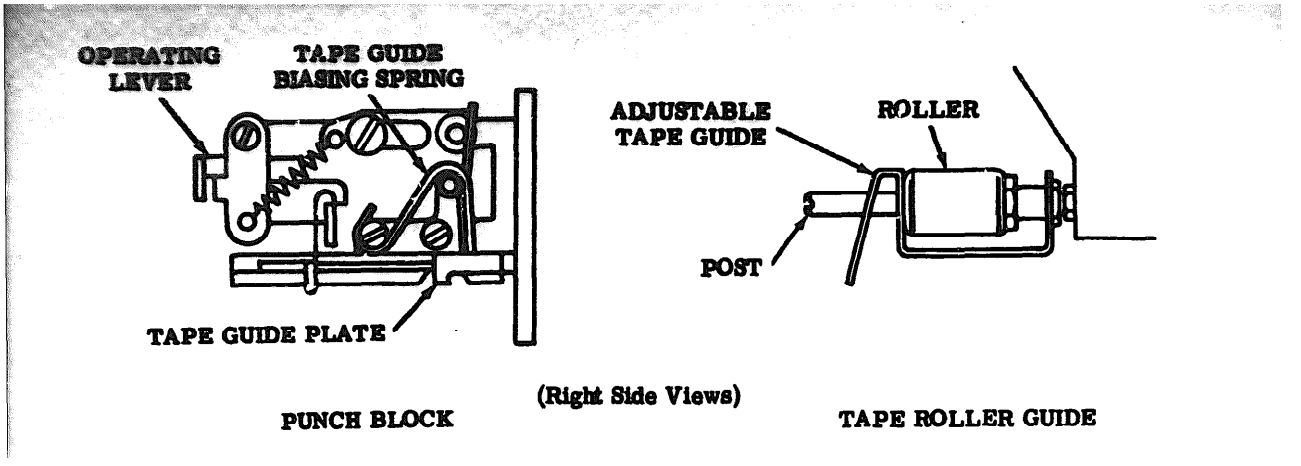


Figure 21- Universal Punch Block and Roller Guide

eccentric stud. At this point, the tape is engaged by both the reverse feed wheel and the forward feed wheel until the tape guide cam follower arm is on the high part of the cam assembly. The forward feed wheel then disengages the tape.

3.21 As the taps guide cam assembly continues its rotation, the cam assembly roller strikes theclutch release lever causing the trip **shaft to rotate counterclockwise. The rotation of the clutch stop lever releases the intermediate shaft clutch allowing it to engage. The drum and gear assembly begins to rotate counterclockwise causing the reverse feed wheel assembly to rotate clockwise. The reverse feed wheel assembly rotates twice to each rotation of the intermediate shaft. As the cutout on the feed wheel detent disc is completing the first rotation, the cam of the drum and gear assembly holds the detent lever away from the disc until the detent cutout has passed (Figure 20). When the detent cutout approaches the second complete revolution, the detent lever is no longer held away. The spring clutch of the intermediate shaft is stopped by its respective stop arm on the trip shaft, and the detent lever roller drops into the cutout on the detent disc. Because there are 40 teeth on the reverse feed wheel and its rotation is twice that of the intermediate shaft, 80 characters in the tape will be fed backwards.**

3.22 Shortly after the drum and gear assembly is back to its original position, t-he tape lid cam follower ***arm starts to*** move down to the low part of the tape guide cam assembly. **A** post on the follower arm causes the switch lever to rotate counterclockwise closingthe tape lid switch. At the same time, the center of the tape guide assembly is moving up and toward the right. The tape guide cam assembly rotates counterclockwise until its right side strikes the right eccentric stud. At this point, both feed **whe**els (forward and reverse) are again engaged with the tape. As the tape guide assembly begins **to rotate clockwise, the left end moves away from the left eccentric stud, disengaging the tape from the reverse feed wheel. The cam follower arm stops rotating when the drive shaft cam completes its revolution and the spring clutch disengages. The backup mechanism is now in its neutral (forward) mode of operation.**

C. Universal Punch Block (Figure 21)

3.23 **The universal punch block is an 8-level punch block with a tape guide plate, tape guide biasing spring, and operating lever, that are adjustable to accommodate either 8-level (1 inch), 6- or 7-level (7/8 inch), or 5-level (11/16 inch) tape. Units equipped with this punch block are also equipped with an adjustable tape input guide roller.**

HIGH SPEED TAPE PUNCH UNIT

(DRPE TYPE)

ADJUSTMENTS

CONTENTS

CONTENTS

1. GENERAL

1.01 **This section provides the adjusting procedures and illustrations for high speed punch units (DRPE type). It is reissued to incorporate the latest engineering changes. Arrows in margins indicate changes and additions.**

1.02 **Maintenance procedures which apply only to mechanisms of a particular design are so indicated in the appropriate places.**

CAUTION: REMOVE POWER FROM UNIT BEFORE MAKING ADJUSTMENTS UNLESS OTHERWISE STATED.

1.03 **The adjustments are arranged in a sequence that should be followed if a complete readjustment of the unit were under-**taken. In following such a procedure, parts or assemblies that are removed to facilitate adjustments should not be replaced until all other adjustments, which would befacilitated by removal of these parts, are made. If any adjustment is changed, related adjustments should be checked. Before making any adjustment, read the adjustment instructions thoroughly. After an adjustment is completed, be sure to tighten any nuts or screws which may have been loosened.

1.04 The spring tension values indicated are scale readings which would be obtained when proper scales are used as specified. Springs that do not meet the requirements, and for which no adjusting procedure is given, should be replaced by new springs.

1.05 Check all moving parts to make sure they are free from binds before operating the unit under power.

1.06 Parts ordering information can be obtained from Section 592-803-800TC. For the tools necessary in making the adjustments in this publication, refer to Section 570-005-800TC.

Note 1: Early design units may be equipped with solid reeds marked with an "X" on the end. Inspect the reeds, and if they have the "X", do not use the punch at speeds ***over*** 850 words per minute. If higher speeds are required, replace the solid reeds with the laminated type (not marked with an "X").

Note 2: Because the majority of applications of DRPE type punches are required to operate below 1500 words per minute, the factory product is now adjusted to, and tested at 1500 words per minute. For unit applications requiring 2400 words per minute operation, a suffix (/24) is added to the unit code contained in the identification plate starting with serial number 1753.

Example:

DRPE802 - denotes this unit is adjusted and tested for speeds up to 1500 words per minute.

DRPE802/24 - denotes this unit is adjusted and tested for speeds up to 2400 words per minute.

2.01 Punch Mechanism

PUNCH PIN BACKSTOP

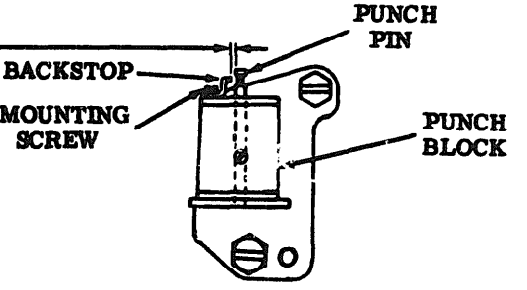
Requirement

Clearance between punch pin heads and backstop should be
Min 0.002 inch
gauge by eye.

To Adjust

With backstop mounting screws loosened, position backstop toward left. Tighten mounting screws.

Note: If punch block is removed from unit, backstop should be adjusted to retain punch pins.



(Front View)

LINK GUIDE BRACKET (EARLY DESIGN)

To Check

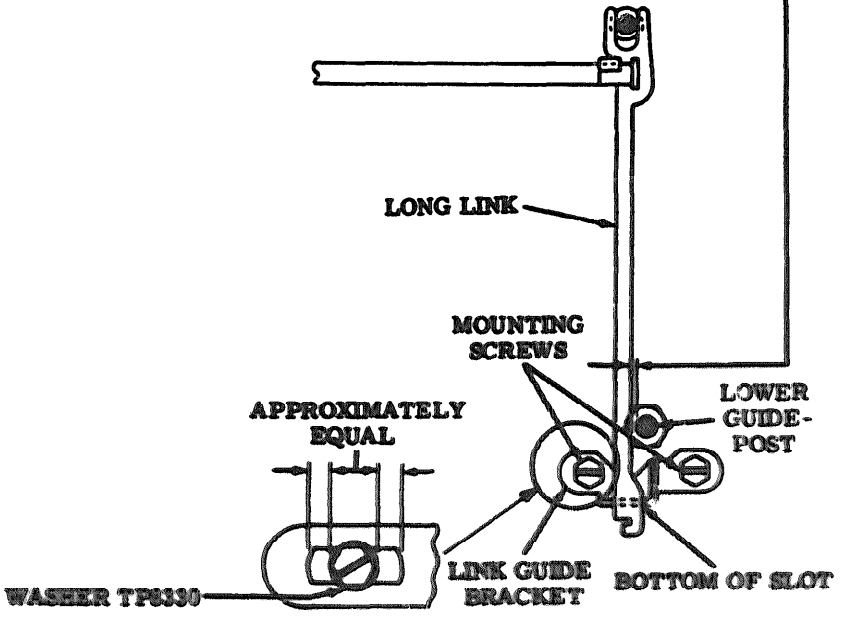
With punch block removed, remove feed and no. 7 magnet assemblies. Feed magnet is in lower right rear position; no. 7 magnet is in lower right front position.

Requirement

With long link pressed slightly against bottom of slots in link guide bracket, clearance between lower guidepost and long link with least clearance should be
Min some

To Adjust

Pre-position guide bracket so that it is centrally located in left mounting hole. (Washer TP8330 will provide approximately equal gap at both ends of elongated slot.) Check clearance between closest long link and lower guidepost to see if it meets requirement. If closest link is greater than 0.005 inch, adjust guide bracket toward right to meet requirement.



(Front View)

2.02 Punch Mechanism (continued)

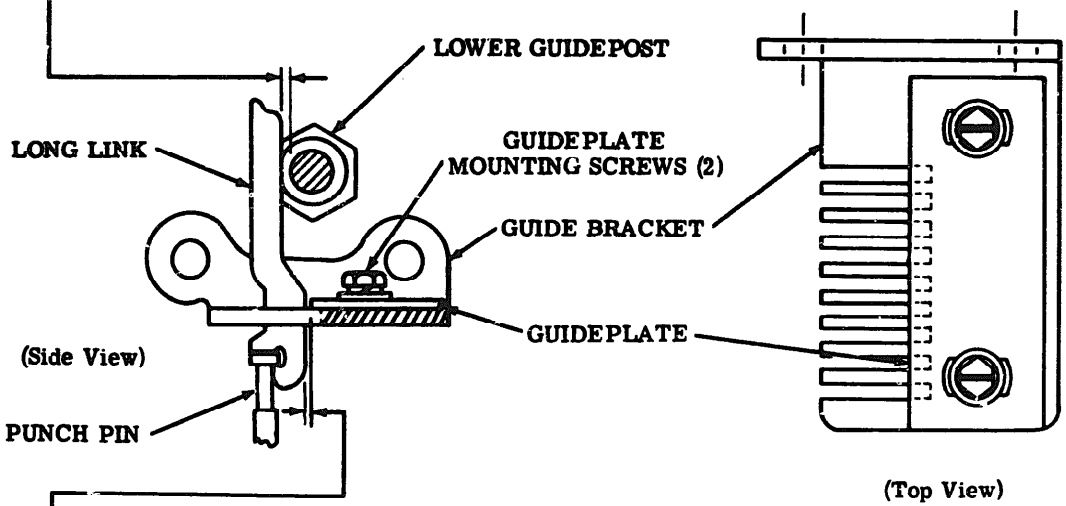
LINK GUIDE BRACKET (LATE DESIGN)

Note: The following adjustments should be made with punch block assembled to unit.

(1) Requirement
With links held against punch pins, clearance between lower guidepost and long link with least clearance should be
—Min 0.005 inch---Max 0.010 inch

(2) Requirement
Punch pins should move freely.

To Adjust
With magnet assemblies removed from unit (or de-energized) and punch block mounting screws (a nut is used in lower mounting position when photoelectric reader is used) friction tight, hold links against punch pins and pivot punch block around lower mounting screw toward right or left to meet requirements. Tighten mounting screws and recheck requirements.



(3) Requirement
With links held against punch pins, clearance between guideplate and two links with least clearance should be
—Min some---Max 0.005 inch

To Adjust
With guideplate mounting screws friction tight, move guideplate toward left or right to meet requirement. Tighten mounting screws and recheck requirement.

2.03 Punch Mechanism (continued)

PUNCH BLOCK

To Check
With punch block assembled to unit, punch pins should move freely.

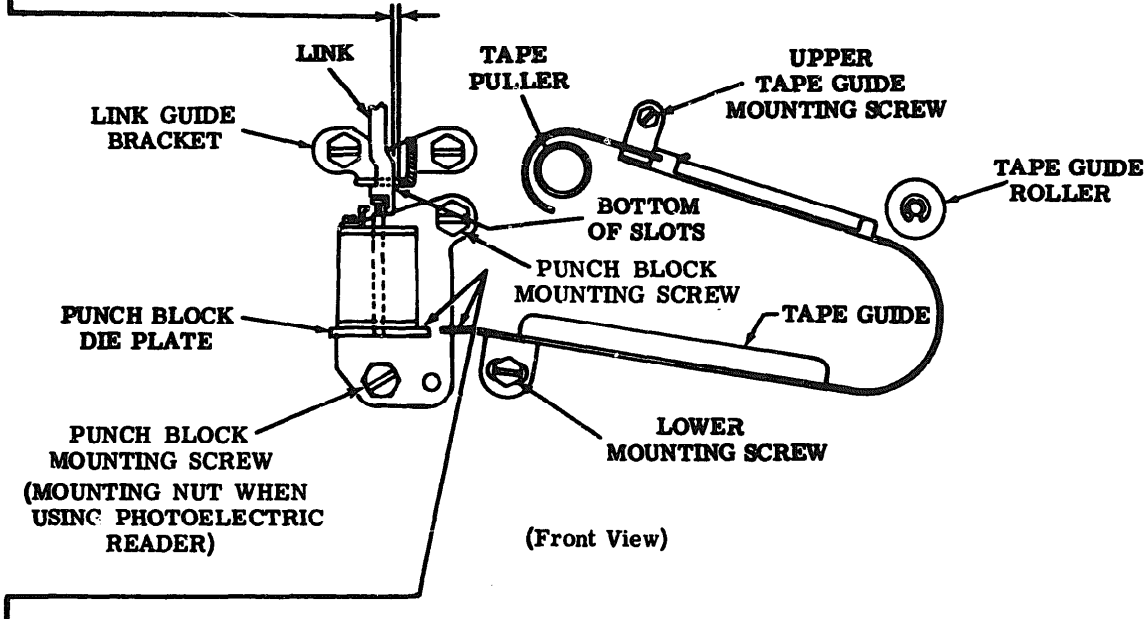
Note: Clearance should be checked at link guide bracket with links held against punch pins.

Requirement
With magnets removed from unit, or de-energized:

(1) Clearance between closest link and guide bracket should be Min some---Max 0.005 inch

(2) Clearance between all other links and guide bracket should be Min some---Max 0.012 inch

To Adjust
With punch block mounting screws and lower mounting screw (a nut is used in lower mounting position when photoelectric reader is used) loosened, pivot punch block about lower mounting screw to meet requirement. Tighten mounting screws.



TAPE GUIDE ALIGNMENT

Requirement
Top surface of tape guide should be aligned with top surface of punch block die plate extension as gauged by eye.

To Adjust
With lower mounting screw loosened, position tape guide to meet requirement. Tighten mounting screw.

2.04 Punch Mechanism (continued)

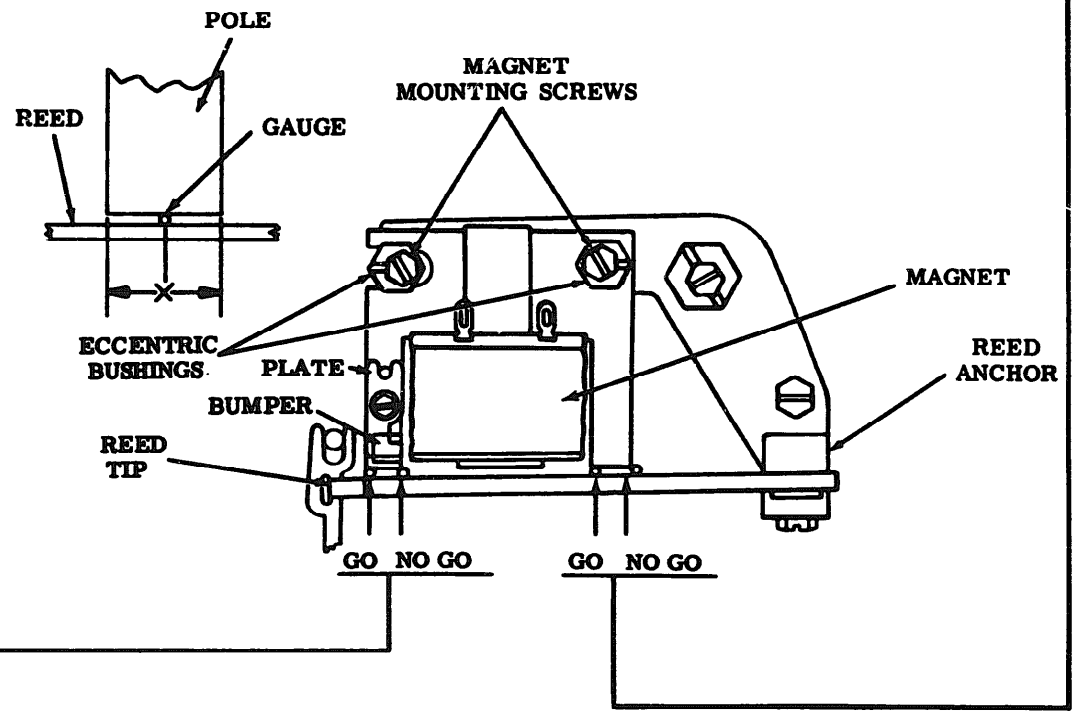
Note: This adjustment should be made with magnet bracket assemblies off unit and bumpers above pole face.

ARMATURE (REED) CLEARANCE

(1) Requirement
A 0.027 inch gauge should enter between pole face and reed from front (nearest reed tip) but should not enter from rear (nearest magnet).

(2) Requirement
An 0.008 inch gauge should enter between pole face and reed from front (nearest magnet) but should not enter from rear (nearest reed anchor).

To Adjust
With magnet mounting screws loosened, place gauge in center of pole face and rotate eccentric bushings to meet requirements. It is recommended that clearances between pole faces and reed be adjusted together. Note that eccentric highs should be toward outer edge of pole. Tighten magnet mounting screws and recheck requirements.



(Front View)

2.05 Punch Mechanism (continued)

BUMPER (SILENCING) (If Equipped)

Note 1: This adjustment should be made with magnet bracket assemblies off unit.

To Check

Make sure bumper is fully seated on its plate and reed mounting screws are tight. Place a 0.010 inch gauged between bumper and pole face (nearest reed tip). Energize magnet and check bumper-reed clearance.

(1) Requirement

Clearance between reed and edge of bumper with least clearance should be Min some (gauge by eye)---Max 0.005 inch

(2) Requirement

Clearance between bottom of bumper and pole face should be Min 0.005 inch---Max 0.010 inch

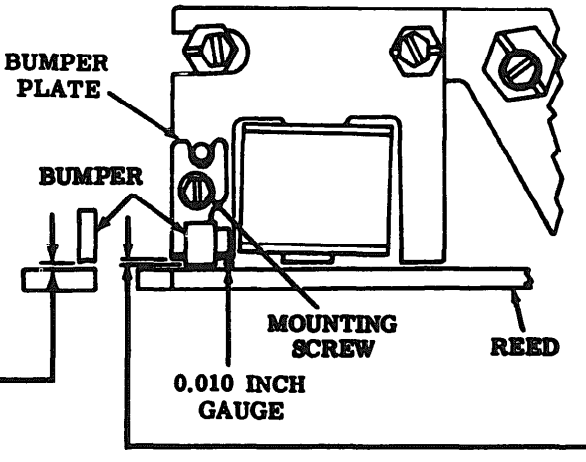
(3) Requirement

With magnet energized with 2 amperes, it should not be possible to pass a 0.002 inch feeler gauge between pole and reed at point of least clearance.

Note 2: Number 6 or number 7 terminal leads may be used to obtain 2 ampere potential for requirement (3).

To Adjust

With bumper plate mounting screw loosened, position bumper plate. Tighten mounting screws and recheck requirements.



(Front View)

2.06 Punch Mechanism (continued)

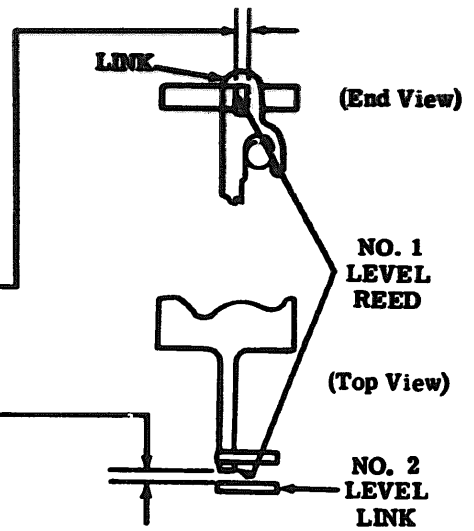
NO. 1 LEVEL REED POSITION (EARLY DESIGN) (EXCEPT 5-LEVEL)

Note: At this point, magnet assemblies should be assembled and adjusted in sequence to the punch. Sequence is as follows: no. 1, F, 4, 7, 8, 2, 3, 5, and 6 magnet assembly.

(1) Requirement
With play taken up between link and its guide (towards reed), clearance between side of no. 1 level reed tip and its link, and reed tip in full engagement with link should be
Min 0.012 inch

(2) Requirement
Clearance between no. 1 level reed and no. 2 level link should be
Min 0.005 inch---Max 0.015 inch

To Adjust
With reed mounting screws loosened, position reed. Tighten mounting screws.



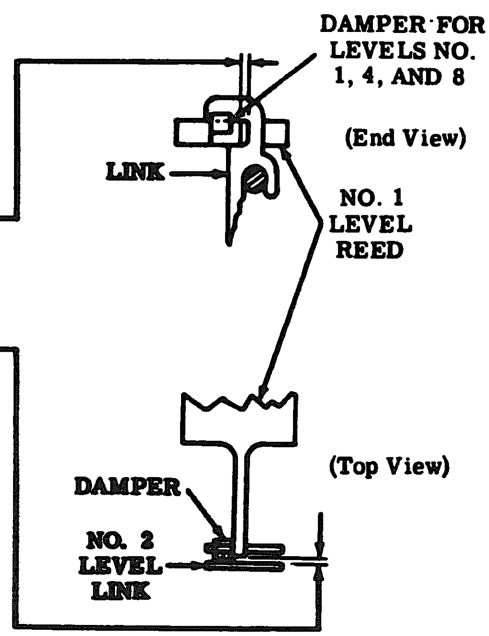
NO. 1 LEVEL REED POSITION (LATE DESIGN) (EXCEPT 5-LEVEL)

Note: At this point, magnet assemblies should be assembled and adjusted in sequence to the punch. Sequence is as follows: no. 1, F, 4, 7, 8, 2, 3, 5, and 6 magnet assembly.

(1) Requirement
With play taken up between link and its guide (towards reed), clearance between no. 1 level reed tip and its link should be
Min 0.030 inch---Max 0.045 inch

(2) Requirement
Clearance between tip of no. 1 level reed and no. 2 link should be
Min 0.035 inch---Max 0.045 inch

To Adjust
With reed mounting screws loosened, position reed. Tighten mounting screws. Recheck requirement (1) of ARMATURE (REED) CLEARANCE (2.04) adjustment.



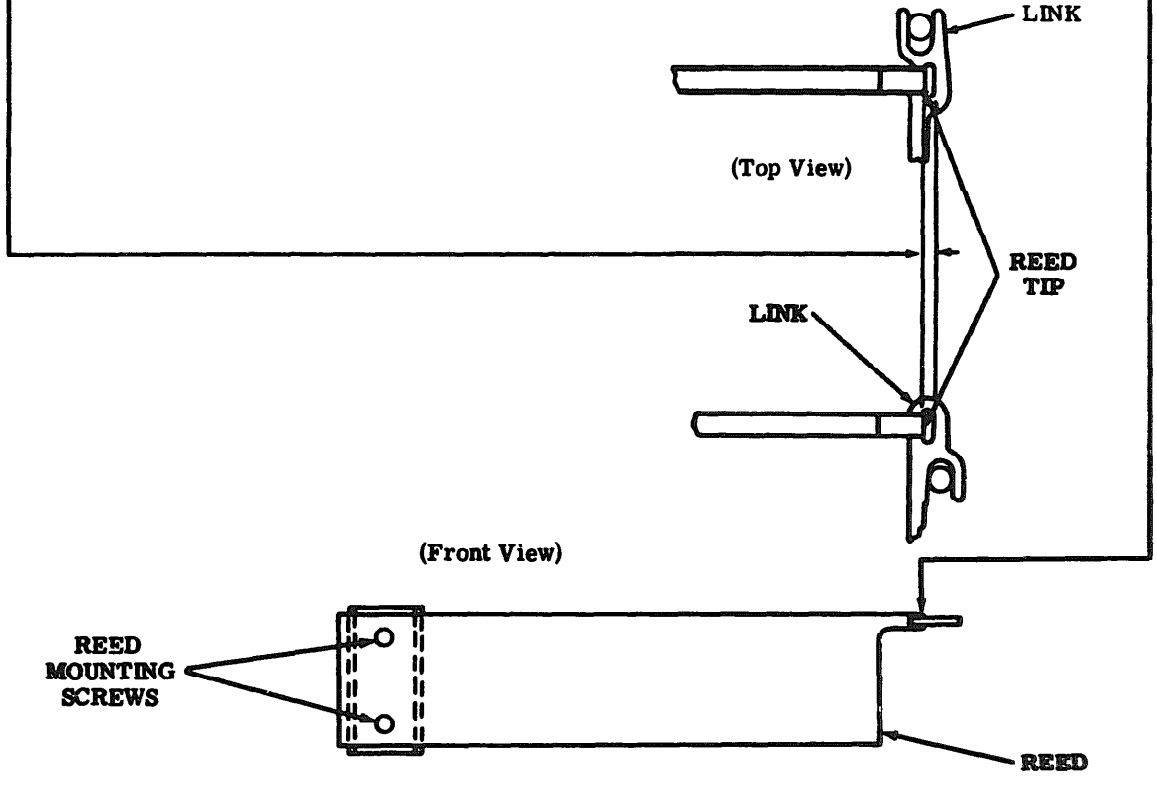
2.07 Punch Mechanism (continued)

REED POSITION (EARLY DESIGN)

(1) Requirement
Reed and link should be in full engagement when play between link and its guide is taken up toward reed with
Min 0.005 inch
between tip of reed and link.

(2) Requirement
Tip of reed should be centered in link as gauged by eye.

To Adjust
With reed mounting screws loosened, position reed. Tighten mounting screws.
Recheck requirement (1) of ARMATURE (REED) CLEARANCE (2.04) adjustment.



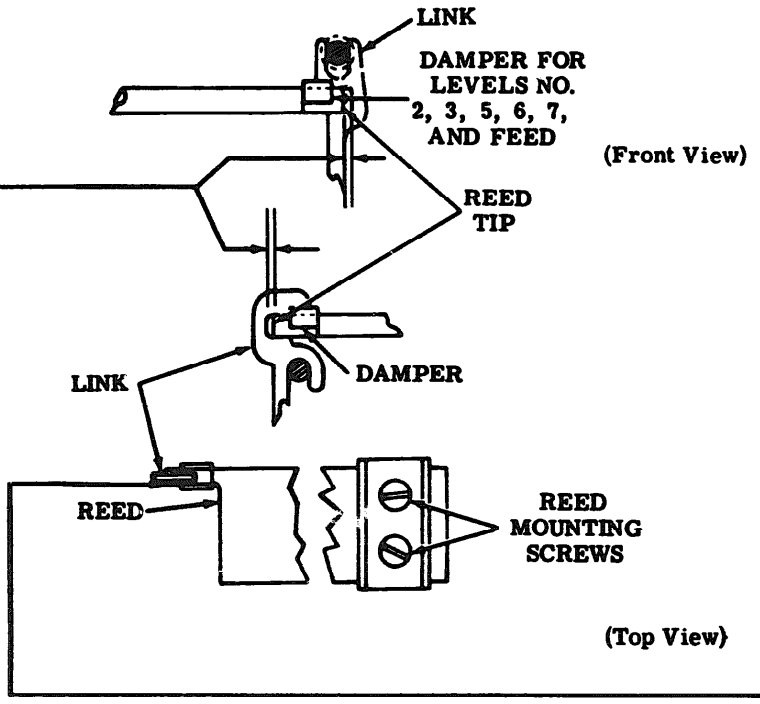
2.08 Punch Mechanism (continued)

REED POSITION (LATE DESIGN)

(1) Requirement
With play between link and its guide taken up toward reed, clearance between tip of reed and link should be
Min 0.030 inch---Max 0.045 inch

(2) Requirement
Tip of reed should be in full engagement with link, as gauged by eye, when punch pin penetration is adjusted
Approximately 0.006 inch below die plate.

To Adjust
With reed mounting screws loosened, position reed. Tighten mounting screws. Recheck requirement (1) of ARMATURE (REED) CLEARANCE (2.04) adjustment.



2.09 Punch Mechanism (continued)

PUNCH PIN PENETRATION

Note: DRPEs 1 and 2 (early design) use gauge TP148370. DRPEs 2 (late design) and 800 use gauge TP149902. All other DRPEs use gauge TP308373.

To Check

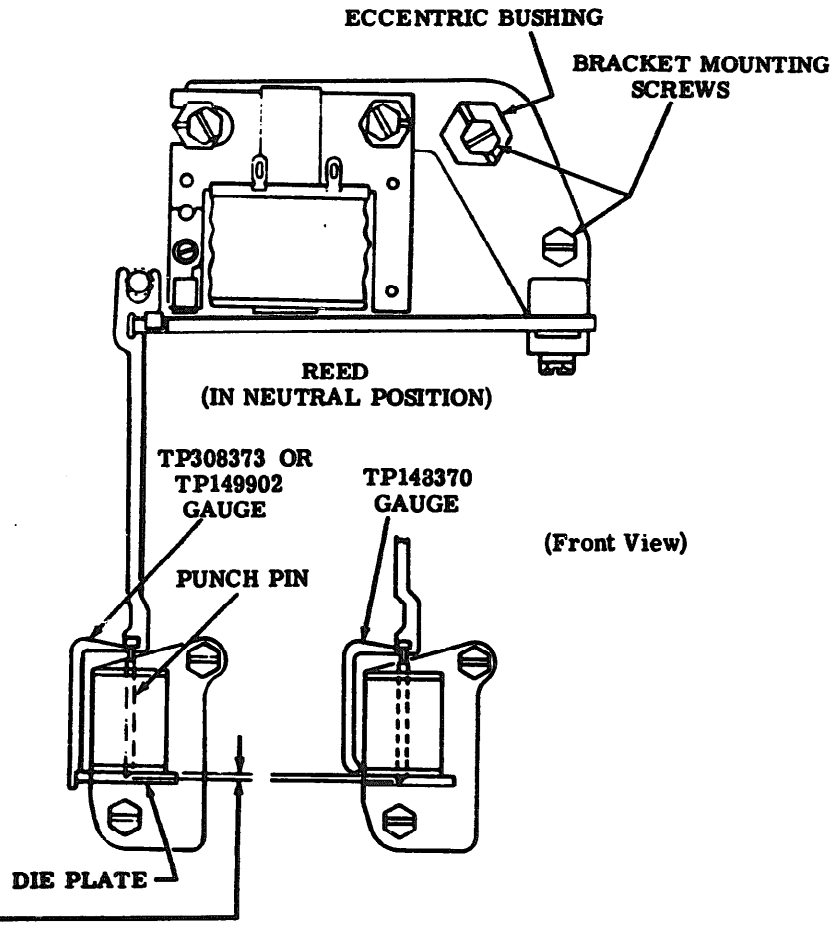
Make sure gauge is parallel with die plate projection and that gauge slides freely under punch pin heads. Check each pin starting with no. 1 pin.

Requirement

With reeds in neutral (unenergized) position, punch pins should just be entering die plate by
DRPEs 1, 2, and 800---approx 0.013 inch
all other DRPEs---approx 0.006 inch
as gauged by eye.

To Adjust

With bracket mounting screws loosened, rotate eccentric bushing until under side of punch pin head just touches gauge. Tighten mounting screws. Check each pin, starting with no. 1 pin. Note that eccentric high is away from lower mounting screw.

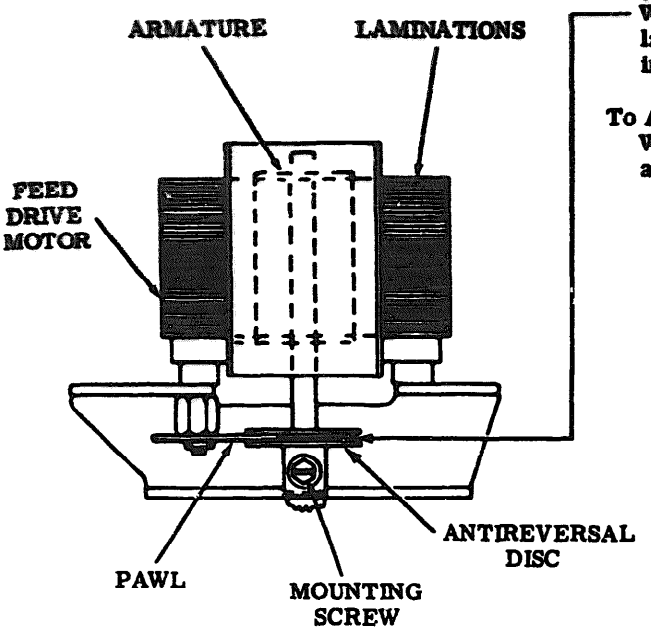


2.10 Tape Feed Mechanism

ANTIREVERSAL DISC POSITION

Requirement
With motor armature centered in laminations, pawl should be centered in slot in antireversal disc as gauged by eye.

To Adjust
With mounting screw loosened, position antireversal disc. Tighten mounting screw.

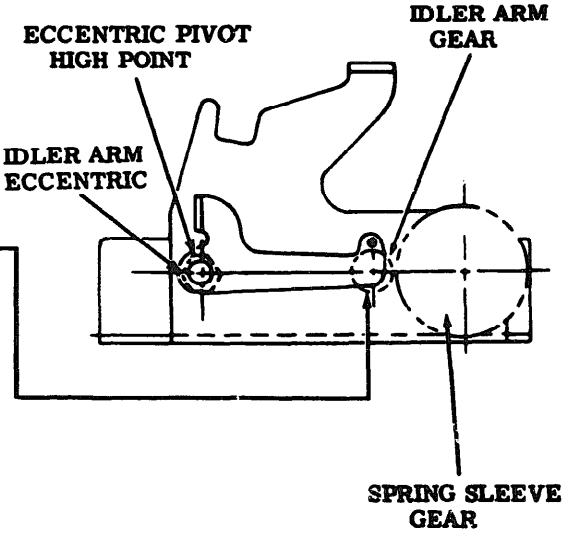


(Top View)

IDLER ARM GEAR MESH

Requirement
There should be a barely perceptible backlash between idler arm gear and spring sleeve gear with idler arm in position of least backlash.

To Adjust
With nut on idler arm eccentric pivot loosened, rotate eccentric to meet requirement. Note that eccentric high should be positioned up. Tighten nut.



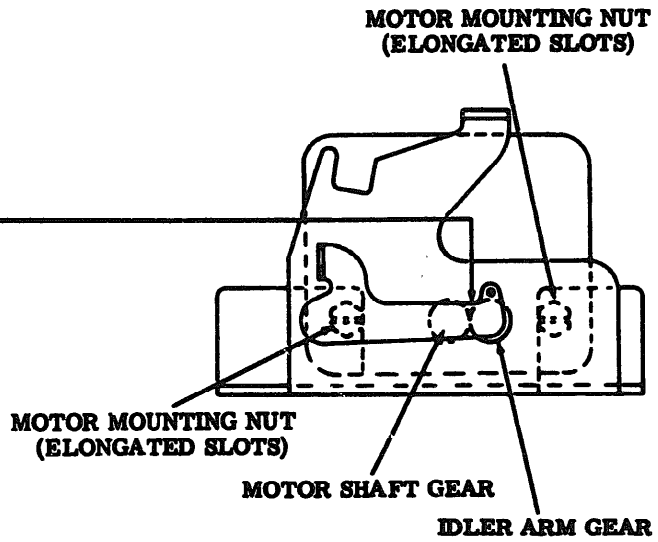
(Left Side View)

2.11 Tape Feed Mechanism (continued)

SPRING WINDER MOTOR GEAR MESH

Requirement
There should be a barely perceptible backlash between motor shaft gear and idler arm gear with idler arm in minimum backlash position.

To Adjust
With motor mounting nuts loosened, position motor. Tighten nuts.



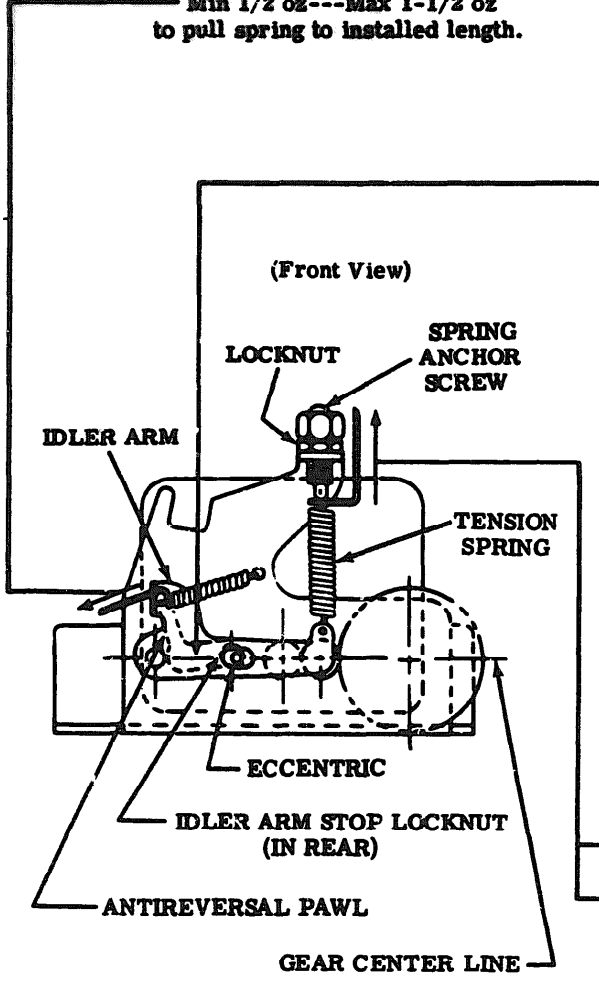
(Front View)

2.12 Tape Feed Mechanism (continued)

ANTIREVERSAL PAWL SPRING

To Check
Unhook spring from pawl and pull to installed length with spring scale.

Requirement
Min 1/2 oz---Max 1-1/2 oz
to pull spring to installed length.



IDLER ARM STOP

Requirement
Idler arm stop should stop idler arm an equal distance, above and below, center line of gears as gauged by eye.

To Adjust
With its locknut loosened, rotate stop. Note that eccentric high should be toward gears. Tighten locknut.

SPRING WINDER TENSION

To Check
Spring winder tension should be measured with drive spring unwound.

CAUTION: IF TORQUE FROM A FULLY WOUND DRIVE SPRING IS SUDDENLY RELEASED, PERMANENT DAMAGE TO SPRING WILL RESULT. SPRING TENSION CAN BE RELEASED IN STEPS AT ANTIREVERSAL DISC PAWL (2.10).

Requirement
Units with silicon control rectifier switch (large)
Min 8 oz---Max 10 oz
Units with bidirectional switch (small)
Min 10 oz---Max 14 oz
to start tension spring moving.

To Adjust
Rotate spring anchor screw with its locknut loosened. Tighten locknut.

2.13 Tape Feed Mechanism (continued)

SPRING WINDER SWITCH

CAUTION: POWER MUST BE REMOVED FROM UNIT BEFORE THIS ADJUSTMENT IS CHECKED.

To Check

Operate switch by moving large gear by hand. This measurement must not be made by pressing on idler arm in vicinity of switch actuator. Correct operation of switch may be determined by audible click or by use of a continuity tester.

Requirement

Clearance between top of eccentric idler arm stop and slot in idler arm against which it stops when switch has just opened should be

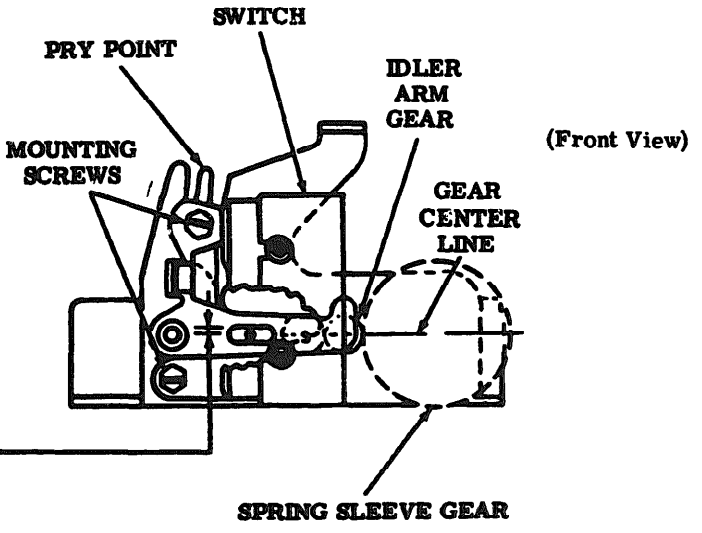
Min 0.015 inch---Max 0.020 inch
(units with silicon control rectifier switch (large))

Min 0.010 inch---Max 0.016 inch
(units with bidirectional switch (small))

There should be some overtravel after switch has closed.

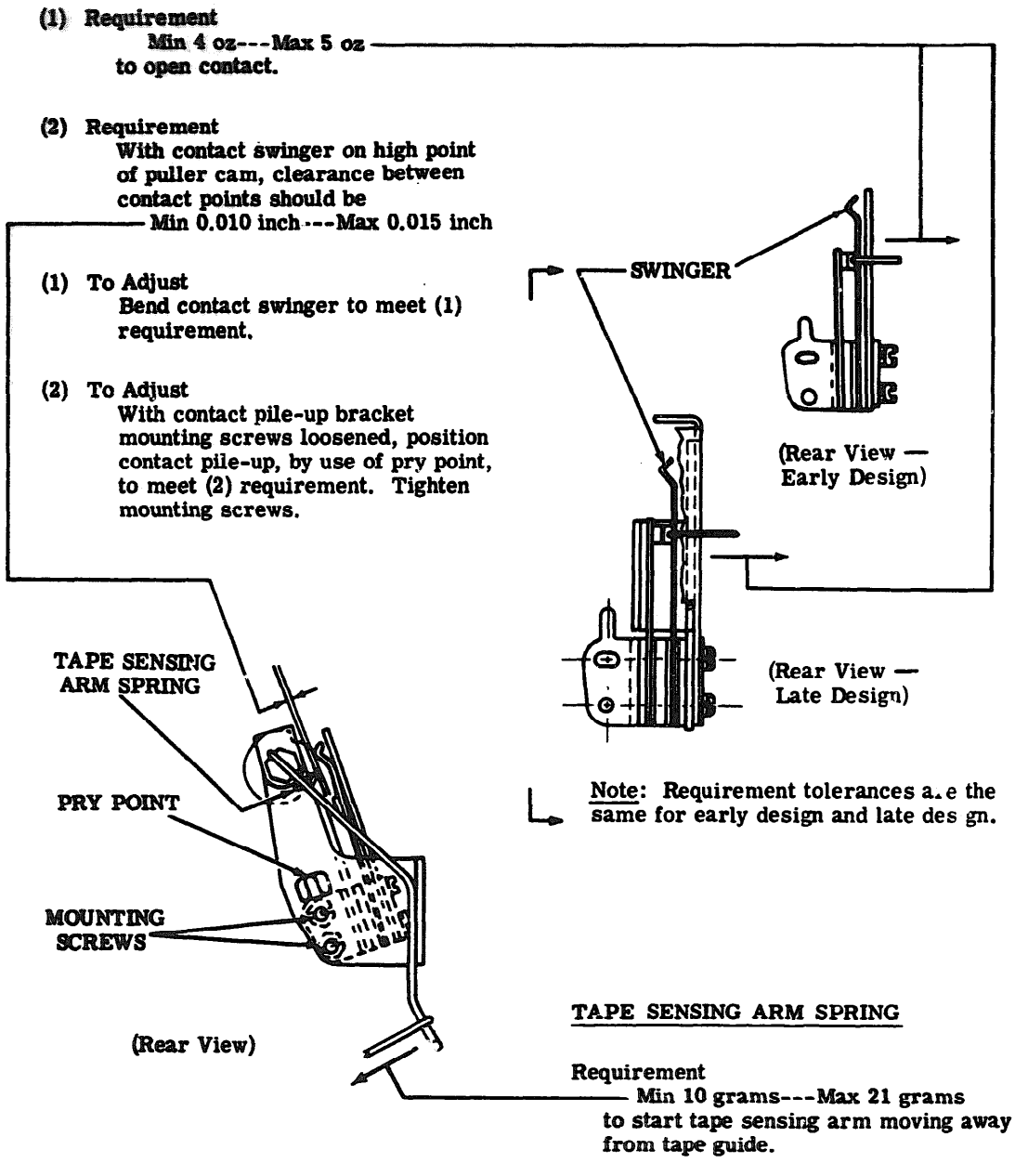
To Adjust

With switch bracket mounting screws loosened, position switch bracket by use of pry point. Tighten mounting screws.



2.14 Tape Feed Mechanism (continued)

TAPE PULLEP CONTACT PILE-UP

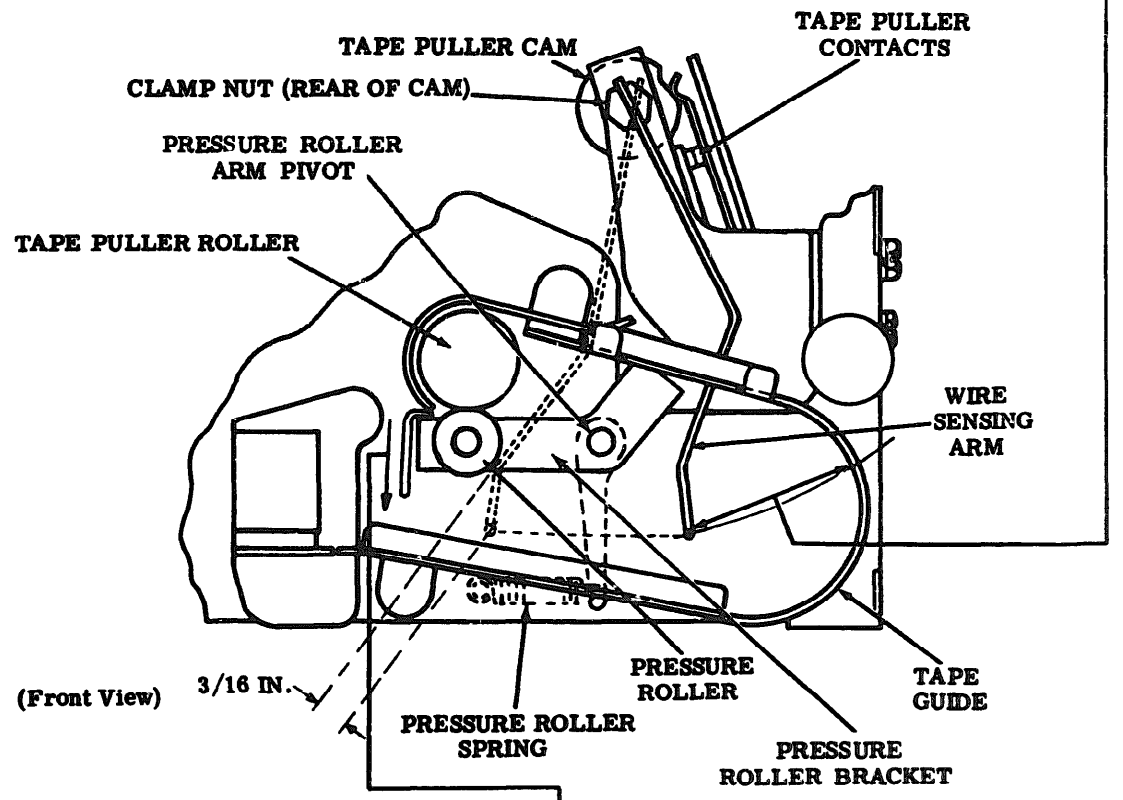


2.15 Tape Feed Mechanism (continued)

TAPE PULLER CAM

Requirement
Tape puller contacts should close when tip of wire sensing arm is Min 3/4 inch---Max 1 inch from tape guide, and should open when the arm is moved to a minimum of 3/16 inch from edge of pressure roller.

To Adjust
With tape puller cam clamp nut loosened, rotate cam to meet requirement. Tighten clamp nut.

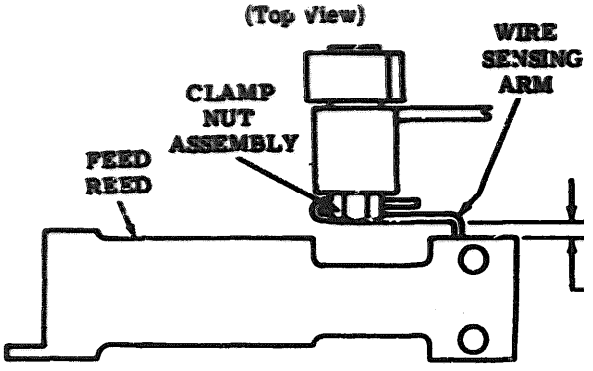


PRESSURE ROLLER SPRING

To Check
Hook an 8 oz spring scale over extensions of pressure roller bracket and pull at right angles to line joining pressure roller shaft and pressure roller arm pivot.

Requirement
Min 3 oz---Max 5 oz to start pressure roller moving away from tape puller roller.

2.14 Tape Feed Mechanism (continued)



WIRE SENSING ARM

To Check
Actuate tape puller cam from off to on position.

Requirement
Clearance between feed reed and wire sensing arm should be
Min 1/16 inch
with play taken up to make clearance a minimum.

To Adjust
Form wire sensing arm.

TIGHT-TAPE SWITCH (If Equipped)

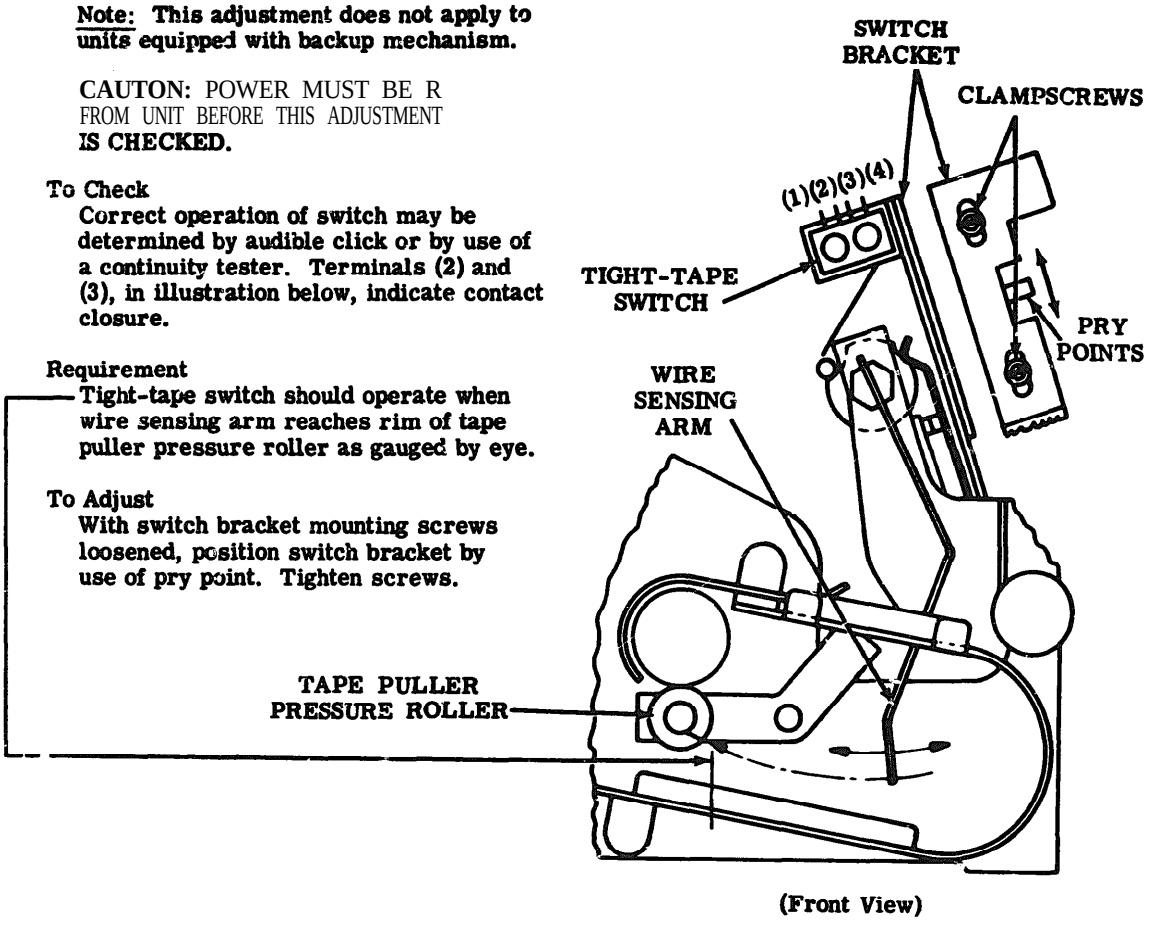
Note: This adjustment does not apply to units equipped with backup mechanism.

CAUTON: POWER MUST BE R FROM UNIT BEFORE THIS ADJUSTMENT **IS CHECKED.**

To Check
Correct operation of switch may be determined by audible click or by use of a continuity tester. Terminals (2) and (3), in illustration below, indicate contact closure.

Requirement
Tight-tape switch should operate when wire sensing arm reaches rim of tape puller pressure roller as gauged by eye.

To Adjust
With switch bracket mounting screws loosened, position switch bracket by use of pry point. Tighten screws.



2.17 Tape Feed Mechanism (continued)

Note: The following adjustment must be made with feed mechanism and grease retainer removed from unit.

CAUTION: **IF TORQUE FROM A FULLY WOUND DRIVE SPRING IS SUDDENLY RELEASED, PERMANENT DAMAGE TO SPRING WILL RESULT. SPRING TENSION CAN BE RELEASED IN STEPS AT ANTIREVERSAL DISC PAWL (2.10).**

RATCHET AND PAWL ESCAPEMENT

(1) Requirement

With no torque applied to ratchet and pawl, and with ratchet and pawl operated by hand, ratchet should make equal steps on up stroke and on down stroke of pawl, as gauged by eye or when using the TP332753 indicator assembly tool.

(2) Requirement

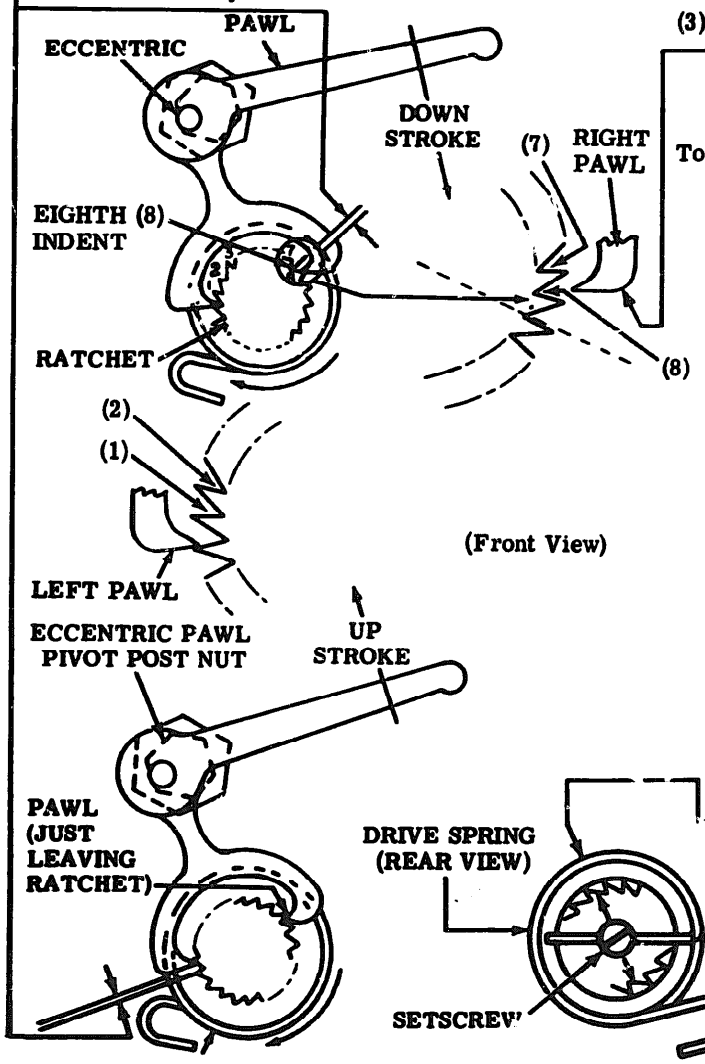
It should not be possible for ratchet to move more than one step with pawl in any position.

(3) Requirement

With pawl raised, right pawl tooth should be opposite eighth (8) indent in upper half of ratchet.

To Adjust

With nut on eccentric pawl pivot post loosened, use a wrench or an Allen wrench to rotate eccentric, keeping eccentric high toward left. Tighten nut.



DRIVE SPRING

Requirement

Drive spring should be concentric with ratchet wheel.

To Adjust

With setscrew loosened, position spring. Hold feed wheel and tighten setscrew to 2 lb-in. with torque wrench.

2.18 Tape Feed Mechanism (continued)

TAPE GUIDE CLEARANCE (PRELIMINARY)

Note: This adjustment does not apply to units equipped with backup mechanism.

To Check

A round 0.006 inch gauge placed between two feed pins and tape guide should just touch high point on feed wheel. Check at least three points.

(1) Requirement

Clearance between tape guide and feed wheel measured at closest point with gauge conforming to feed wheel should be

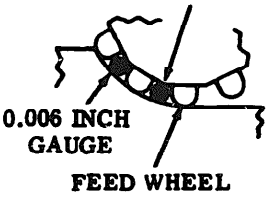
Min 0.004 inch---Max 0.006 inch

(2) Requirement

With perforated tape (feed only) inserted between feed wheel and tape guide, pull tape toward right and at same time push tape guide handle toward eccentric stop. When tape is released, it should move freely toward left.

To Adjust

Loosen tape guide mounting bracket screws and eccentric stop bushing screw. Position tape guide bracket toward right or left using pry point and rotate eccentric stop bushing. Tighten screws.



TAPE LID

To Check

With perforated tape in feed mechanism, pull tape over post guide toward left.

Requirement

Tape lid should be

Min some---Max 0.025 inch

above tape path, as gauged by eye.

To Adjust

With tape lid mounting screws loosened, position tape lid. Tighten screws.

YIELD SPRING

Note 1: This adjustment does not apply to units equipped with backup mechanism.

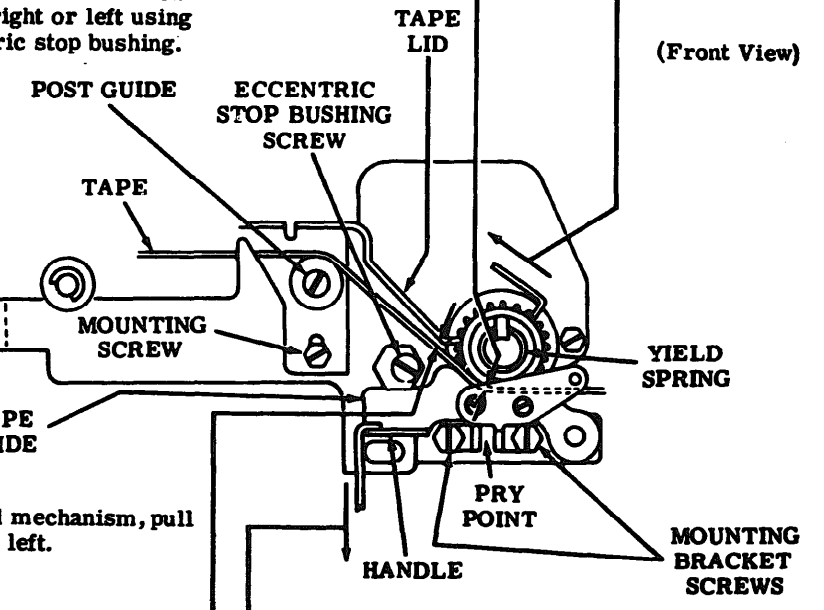
Note 2: This spring tension should be checked with ratchet and feed wheel removed from unit. Hold ratchet and rotate feed wheel several times to assure bind free operation.

Requirement

With spring scale hook over a feed pin on feed wheel and pulling in a counterclockwise direction, it should require

Min 8 oz---Max 10 oz

to start feed wheel moving away from its stop.



TAPE GUIDE SPRING

Requirement

Min 7 oz---Max 9 oz

To start tape guide moving away from its stop.

2.19 Tape Feed Mechanism (continued)

FEED MECHANISM — VERTICAL POSITION

Note 1: This adjustment does not apply to units equipped with backup mechanism.

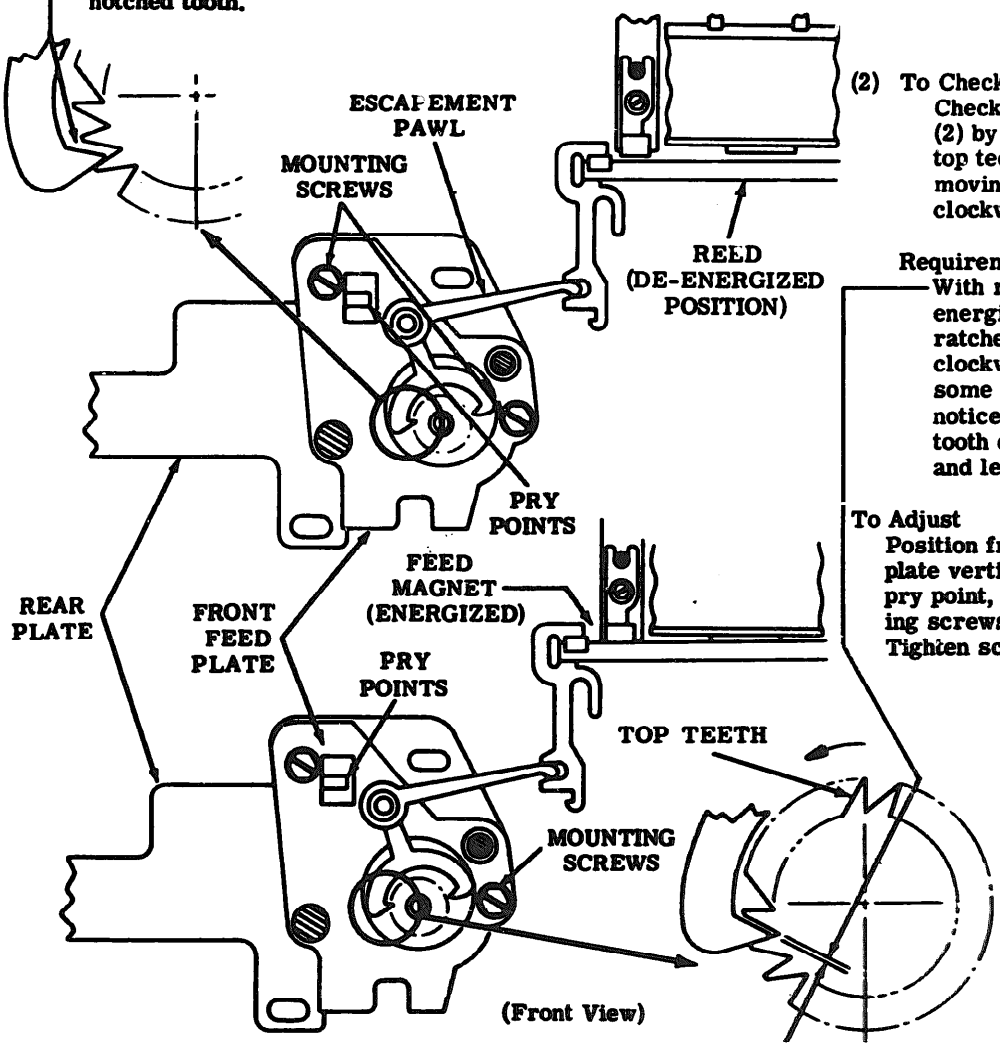
Note 2: Ratchet may fully unwind (slip) if reel magnets are de-energized and there is no tape in unit.

(1) To Check

With reed magnet de-energized and drive spring wound approximately two turns, apply light downward pressure on pawl, ratchet should step one tooth. Stepping may be determined by audible click of ratchet.

Note 3: If ratchet steps too fast (accelerated stepping) during To Check at two turns of drive spring, reduce amount of turns to eliminate accelerated stepping and enabling To Check stepping observation.

Requirement
With reed magnet in neutral (de-energized) position, left side pawl should just enter notched tooth.



(2) To Check
Check Requirement (2) by observing top teeth of ratchet moving counter-clockwise.

Requirement
With reed magnet energized, turn ratchet counter-clockwise so that some clearance is noticeable between tooth on ratchet and left side pawl.

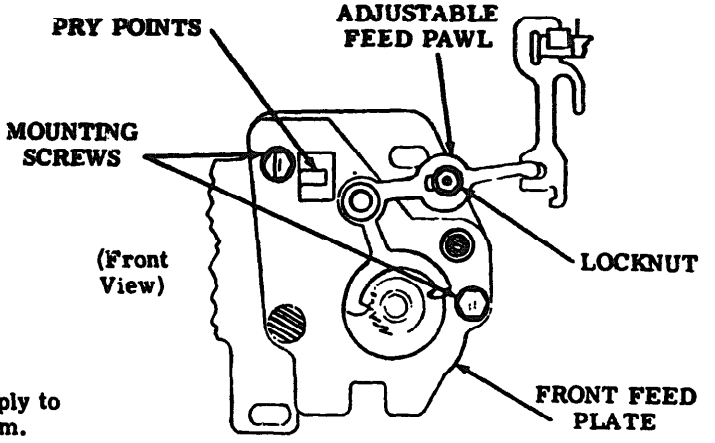
To Adjust
Position front feed plate vertically, using pry point, with mounting screws loosened. Tighten screws.

2.20 Tape Feed Mechanism (continued)

FEED MECHANISM — VERTICAL POSITION (Continued)

To Adjust (Units equipped with late design adjustable feed pawl)
With eccentric high to left or right and mounting nut on the eccentric post friction tight, rotate eccentric with a hexagon wrench until requirements are met. Tighten nut and recheck requirements.

Note: Make TAPE GUIDE PUNCH BLOCK (Units Equipped With Downstop) (2.21) requirement prior to making this adjustment.



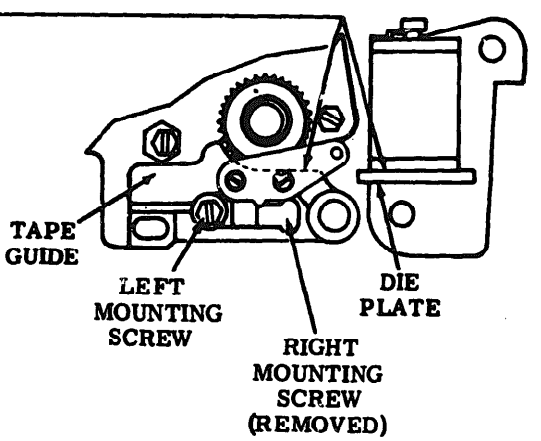
TAPE GUIDE PUNCH BLOCK
(Units Not Equipped With Downstop)

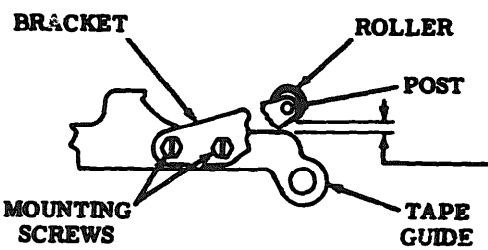
Note 1: This adjustment does not apply to units equipped with backup mechanism.

Requirement
Tape guide should align with die plate as gauged by eye.

To Adjust
With right mounting screw removed and left mounting screw loosened, pivot tape guide about left mounting screw. Replace right screw and tighten both mounting screws.

Note 2: If this requirement is not met, recheck TAPE GUIDE CLEARANCE (PRELIMINARY) (2.18) and TAPE LID (2.18) adjustments and refine if necessary.





SUPPRESSOR ROLLER

Requirement
With blank tape inserted and feed hole perforated, clearance between roller inside diameter and post should be Min 0.010 inch---Max 0.020 inch

To Adjust
Position bracket up or down with two mounting screws loosened. Tighten mounting screws.

2.21 Tape Feed Mechanism

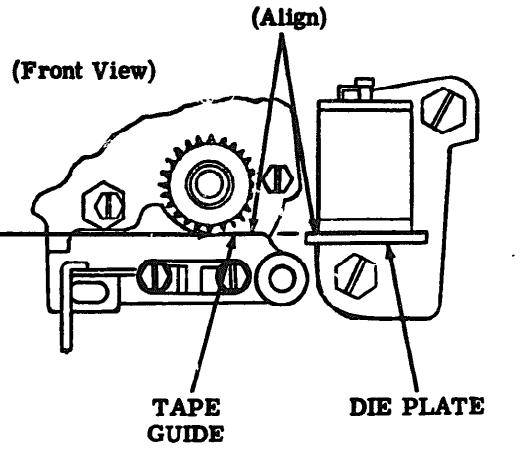
TAPE GUIDE PUNCH BLOCK
(Units Equipped With Downstop)

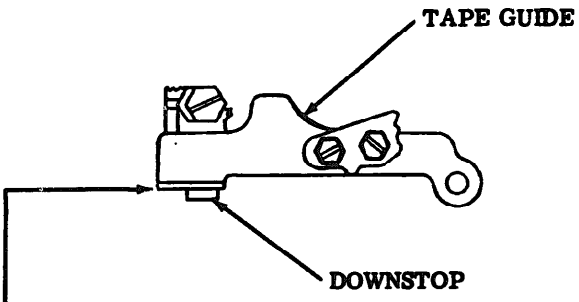
Note 1: This adjustment does not apply to units equipped with backup mechanism.

Note 2: Make this requirement prior to making FEED MECHANISM — VERTICAL POSITION (2.20) adjustment for units equipped with a late design adjustable feed pawl.

Requirement
Tape guide should align with die plate as gauged by eye.

To Adjust
With three mounting screws for front feed plate friction tight, use pry points (2.20) to move front feed plate up or down to meet the requirement. Tighten screws.

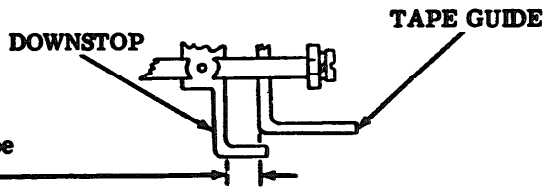




DOWNSTOP

Note: This adjustment does not apply to units equipped with backup mechanism.

To Check
Tape guide (in its down position) and downstop should have clearance and be in parallel.



Requirement
Between tape guide and downstop there should be
Min 0.030 inch---Max 0.060 inch
The downstop and tape guide handle should be parallel as gauged by eye.

To Adjust
With setscrew friction tight, position downstop to meet requirement. Tighten setscrew.

2.22 Tape Feed Mechanism (continued)

TEN TO THE INCH (PRELIMINARY)

Note 1: This adjustment does not apply to units equipped with backup mechanism.

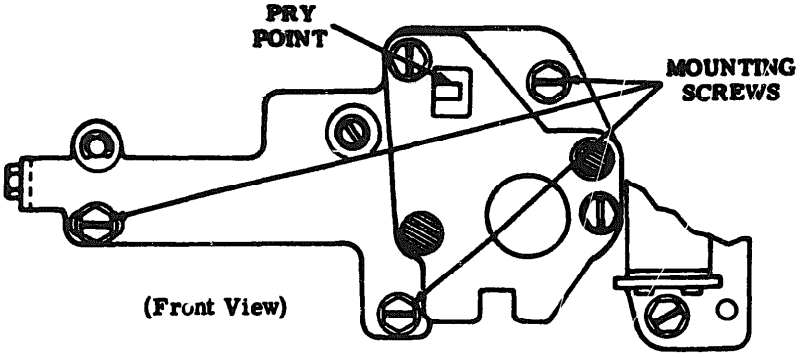
Requirement

With unit perforating tape and no levels marking, add one level marking at a time (in succession) until all levels are marking. Examine each perforated level in succession. Edges of holes in perforated tape should be clean cut and there should not be impressions or punch pin marks on spaces between holes.

To Adjust

Remove one of three feed mechanism mounting screws and center tapped hole in elongated slot as gauged by eye.

Note 2: If requirement is not met, recheck ARMATURE (REED) CLEARANCE (2.04), BUMPER (SILENCING) (2.05) and PUNCH PIN PENETRATION (2.09) adjustments and refine as necessary.



TAPE BIAS SPRING (STANDARD PUNCH BLOCK)

Note 1: This adjustment does not apply to units equipped with backup mechanism.

To Check

Perforate 3 or 4 feet of tape with all code levels marking. With one end of tape held at eye level, sight down tape. There should be no wavering in alignment of perforations with respect to edge of tape.

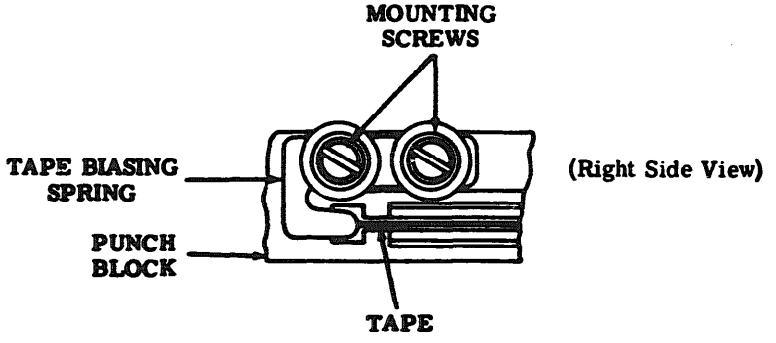
Requirement

Spring should bias tape towards rear of punch block without crimping or curling front edge of tape.

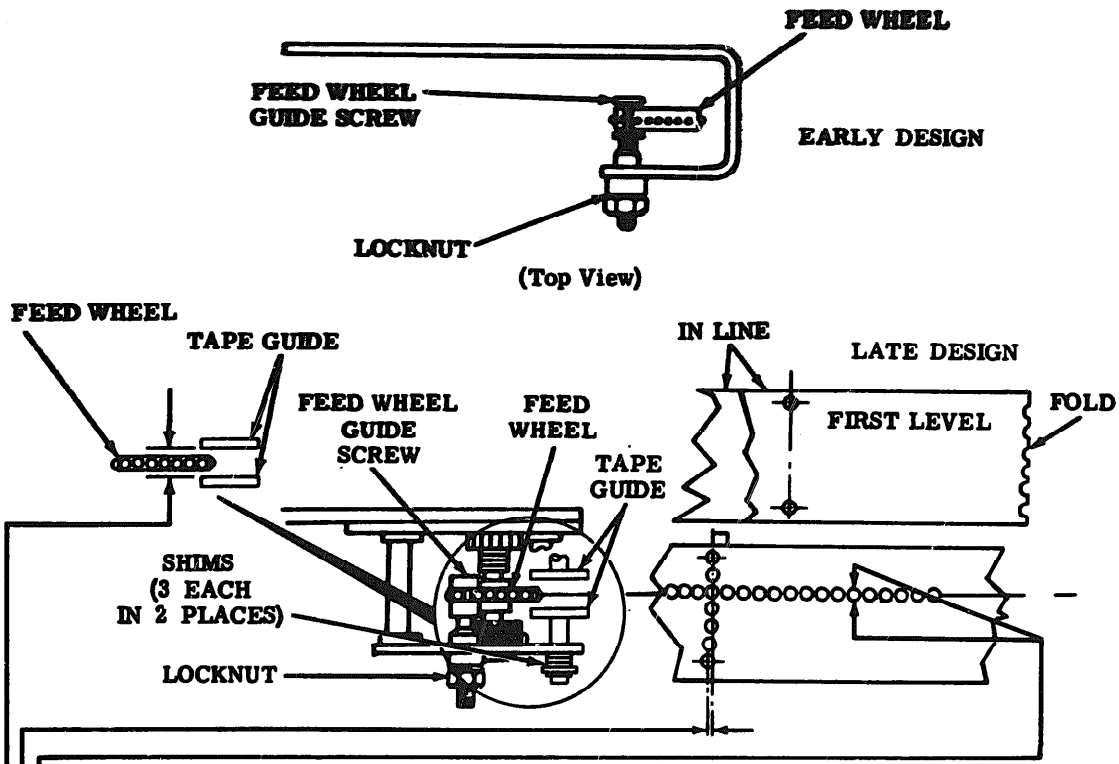
To Adjust

With mounting screws loosened, position bias spring. Tighten screws.

Note 2: Spring must not bind against lower guideplate or die plate.



2.23 Tape Feed Mechanism (continued)



FEED WHEEL LINE-UP

To Check

Perforate a length of tape at maximum unit speed and examine it for burrs. Fold tape with edges and first level in line. Fifth or eighth level holes (depending on unit level) should overlap as gauged by eye.

(1) Requirement

There should be no burr on front or rear edge of feed hole when tape is perforated at maximum unit speed.

(2) Requirement

With unit perforating tape at maximum speed, hole centers should be square to tape edge within ± 0.003 inch

To Adjust

With feed wheel guide screw locknut loosened, rotate screw using an Allen wrench. Tighten locknut.

(3) Requirement

Feed wheel should be centered between tape guide as gauged by eye.

To Adjust

Center tape guide by removing shims from one side of hub and adding to other side of hub until feed wheel/tape guide is centered. A total of six shims must be contained on each assembly after centering is completed.

2.24 Tape Feed Mechanism (continued)

TEN TO THE INCH (FINAL)

Note: Tape gauge TP302990 replaces tape gauge TP95960. First five holes in gauge TP302990 are same size as code holes in tape (0.072 inch diameter). Sixth hole in gauge is larger than first five (0.102 inch diameter). This arrangement allows a ±0.015 inch variation in ten to the inch spacing over five inches. Gauge TP95960 allowed a ±0.007 inch variation in ten to the inch spacing over five inches.

To Check

Perforate a length of tape, at least 5 inches long, with all levels marking. Place tape over smooth side of tape gauge TP302990 so that first number two code hole in tape is concentric with first hole (0.072 inch diameter) of tape gauge. Next four holes (0.072 inch diameter) in tape gauge should be visible through number two code holes in tape. Last number two code hole in tape should be entirely within sixth hole (0.102 inch diameter) in tape gauge. Favor short ten to the inch spacing at 1200 words per minute and long at 2400 words per minute (within gauge).

Requirement

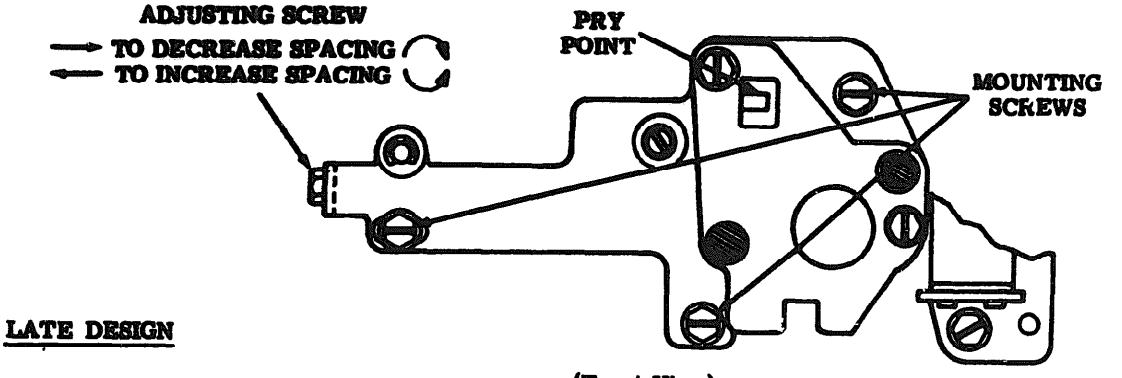
Tape punch should produce tape that conforms to tape gauge TP302990 at 1200, 2000, and 2400 words per minute.

To Adjust

Loosen three mounting screws that fasten feed mechanism to main casting. Rotate adjusting screw clockwise to move feed mechanism toward right or counterclockwise to move feed mechanism toward left until requirement is met. If ten to the inch spacing is short, feed mechanism should be moved toward left. If spacing is too long, it should be moved toward right. Tighten mounting screws and recheck FEED MECHANISM — VERTICAL POSITION (2.19) adjustment and refine if necessary. Recheck TEN TO THE INCH (FINAL) adjustment and refine if necessary.

2.25 Tape Feed Mechanism (continued)

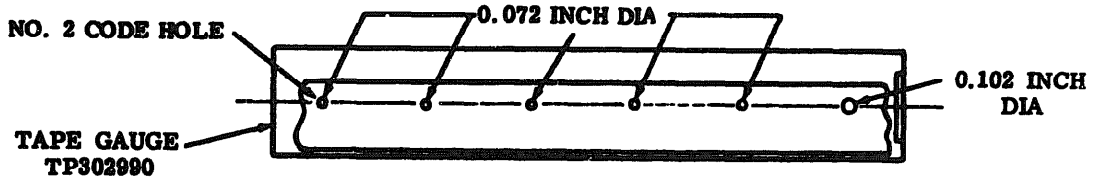
TEN TO THE INCH (FINAL) (continued)

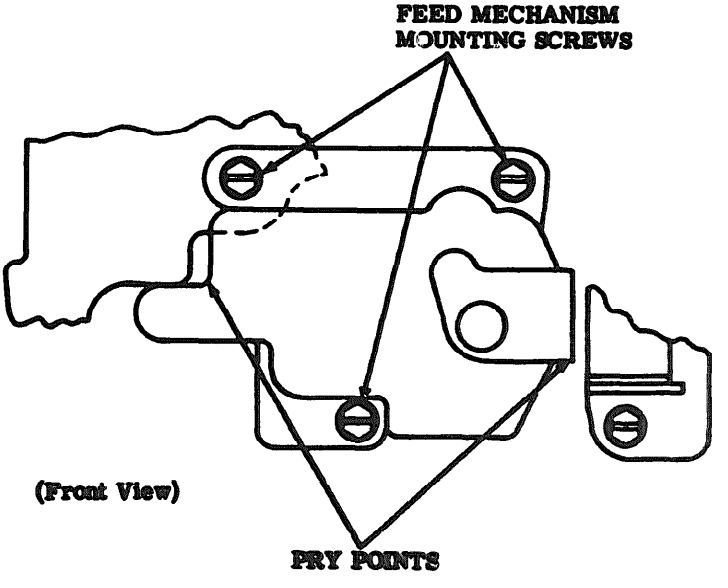


LATE DESIGN

(Front View)

(Top View)





EARLY DESIGN

(Front View)

2.26 Tape Feed Mechanism (continued)

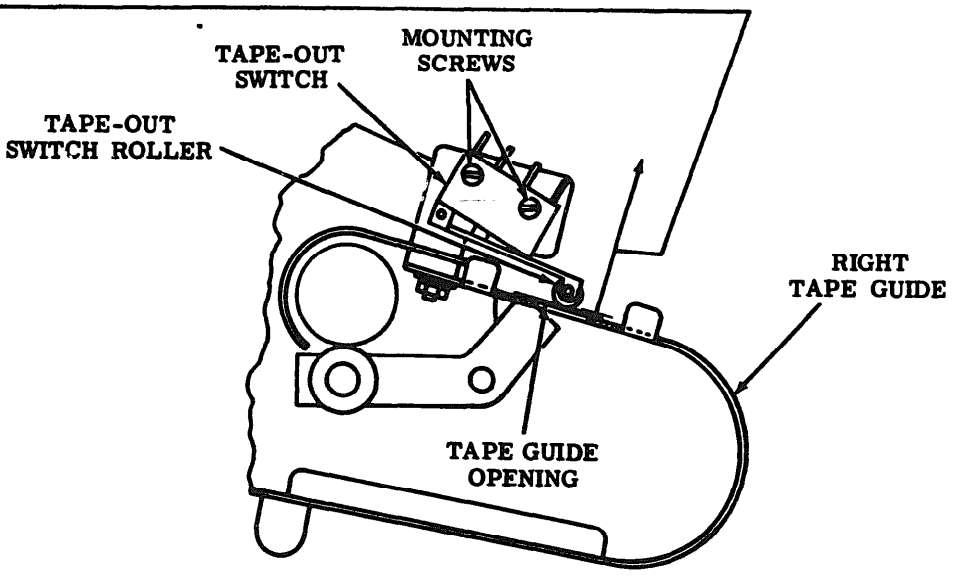
TAPE-OUT SWITCH (PRELIMINARY) (If Equipped)

Note: This adjustment does not apply to units equipped with backup mechanism.

To Check
Operation of switch may be determined by audible click of switch or by use of a continuity tester.

Requirement
The tape-out switch should open when bottom portion of switch roller has just passed through tape guide opening in an upward direction.

To Adjust
With tape-out switch mounting screws loosened, pivot switch around left mounting screw to meet requirement. Tighten screws.



(Front View)

2.27 Tape Feed Mechanism (continued)

TAPE-OUT SWITCH (FINAL) (If Equipped)

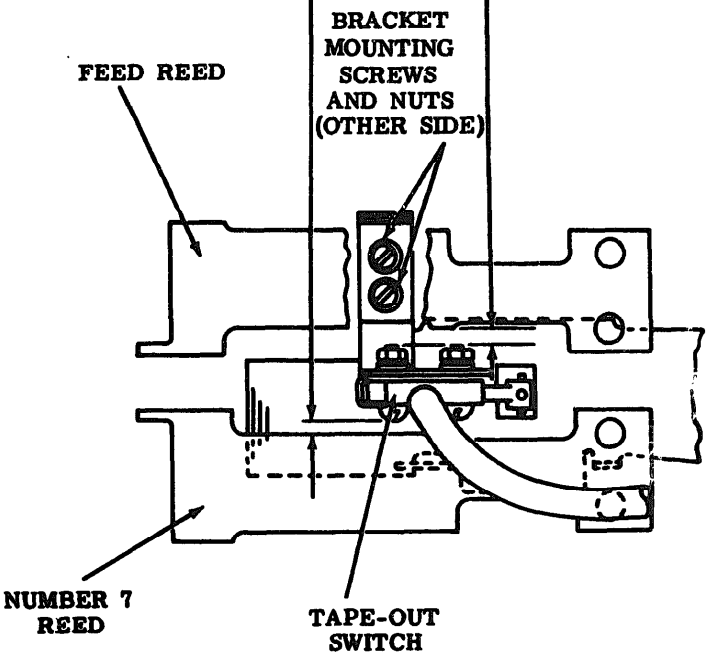
Note: This adjustment does not apply to units equipped with backup mechanism.

Requirement

Tape-out switch should be centered between feed reed and no. 7 code level reed as gauged by eye.

To Adjust

Loosen switch bracket mounting nuts and position switch bracket. Tighten nuts.



(Top View)

2.28 Tape Feed Mechanism (continued)

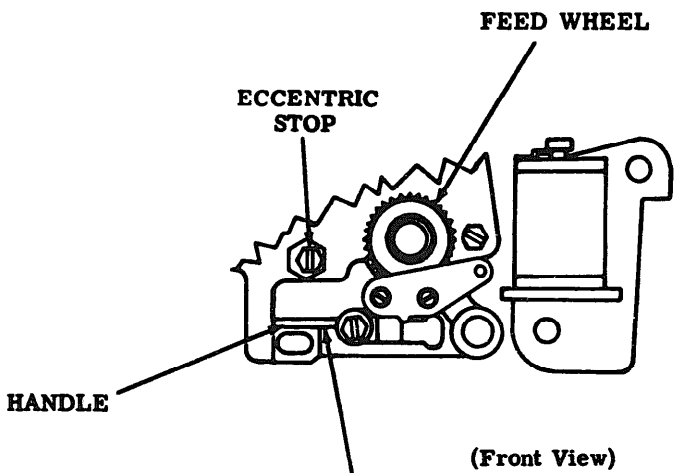
TAPE GUIDE CLEARANCE (FINAL)

Note: This adjustment does not apply to units equipped with backup mechanism.

To Check
Apply 6 oz to 8 oz pressure, at center of tape guide handle, toward eccentric stop.

Requirement
With punch operating at maximum operating speed, punching feed and no. 7 level only, tape produced should meet ten to the inch requirement with or without applying pressure to tape guide handle.

To Adjust
If requirement is not met, check and refine TAPE GUIDE CLEARANCE (PRELIMINARY) (2.18) adjustment.



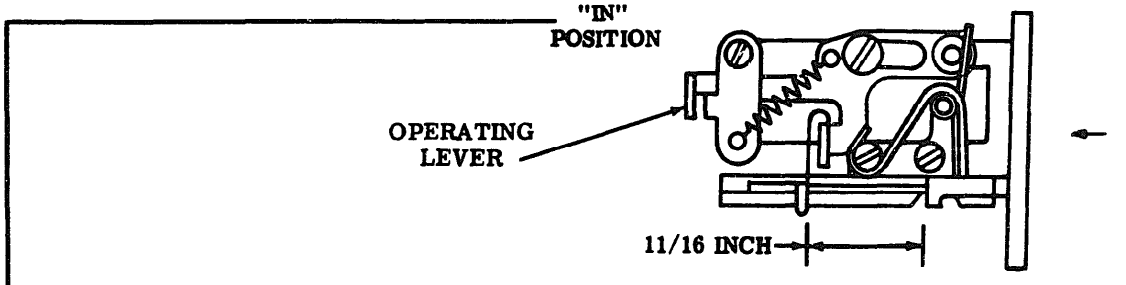
(Front View)

3. VARIABLE FEATURES

3.01 Universal Punch Block

Note 1: Standard punch mechanism adjustments also apply to universal punch block. Following are additional adjustments that apply only to universal punch block.

Note 2: Universal punch block adjustments should be made before TEN TO THE INCH (FINAL) (2.24) adjustment.



5-LEVEL TAPE

(Right Side View)

TAPE GUIDE WIDTH

Requirement

Operating lever should be positioned for width of tape used.

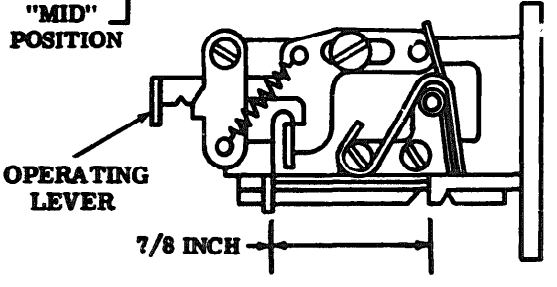
(1) 11/16 inch tape. . . . . extreme "in" position

(2) 7/8 inch tape. . . . . "mid" position

(3) 1 inch tape. . . . . extreme "out" position

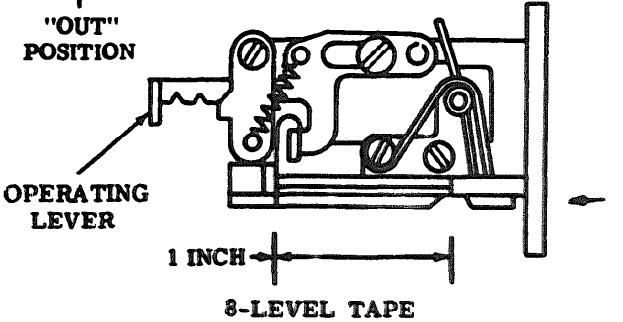
To Adjust

Position tape guide operating lever by hand.



6- AND 7-LEVEL TAPE

(Right Side View)

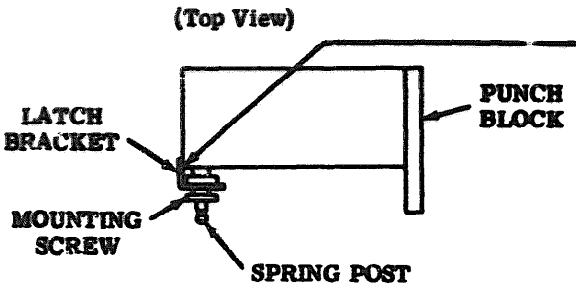


8-LEVEL TAPE

(Right Side View)

3.02 Universal Punch Block (continued)

LATCH BRACKET



Requirement
A 0.002 inch gauge should not enter, at point of least clearance, between latch bracket and punch block.

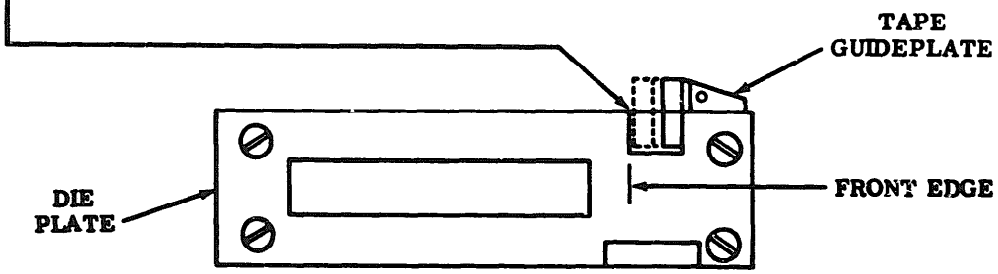
To Adjust
With spring post and mounting screw loosened, position latch bracket against face of punch block. Tighten mounting screw and spring post.

TAPE GUIDEPLATE

(1) Requirement
With tape guide in "mid" position and torsion spring endplay taken up to maximize clearance, clearance between lever with post and torsion spring should be
Min some---Max 0.005 inch
(See illustration in TAPE GUIDE BIASING SPRING (3.03) adjustment)

(2) Requirement
With tape guide in "in" position, tape guideplate should rest against front edge of slot in die plate.

To Adjust
With mounting screws friction tight, position bracket. Tighten screws.



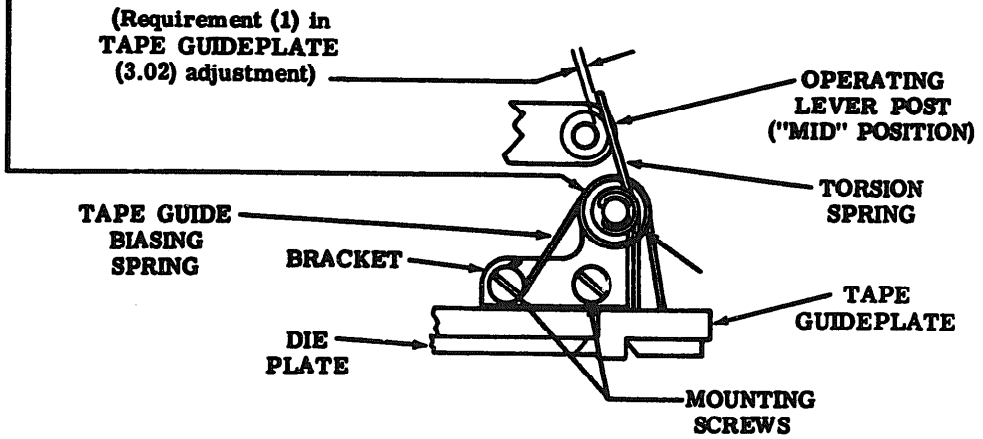
(Bottom View)

3.03 Universal Punch Block (continued)

TAPE GUIDE BIASING SPRING

Requirement
Tape guide biasing spring should be concentric with post as gauged by eye.

To Adjust
With mounting screw loosened, position spring. Tighten mounting screw while holding spring.

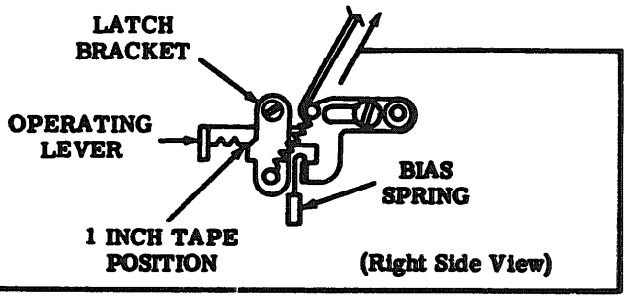


(Right Side View)

OPERATING LEVER SPRING

To Check
Unhook spring from operating lever.

Requirement
With operating lever in 1 inch tape position, it should require
Min 5 oz---Max 10 oz
to pull spring to installed length.



(Right Side View)

3.04 Universal Punch Block (continued)

TAPE BIAS SPRING (UNIVERSAL PUNCH BLOCK)

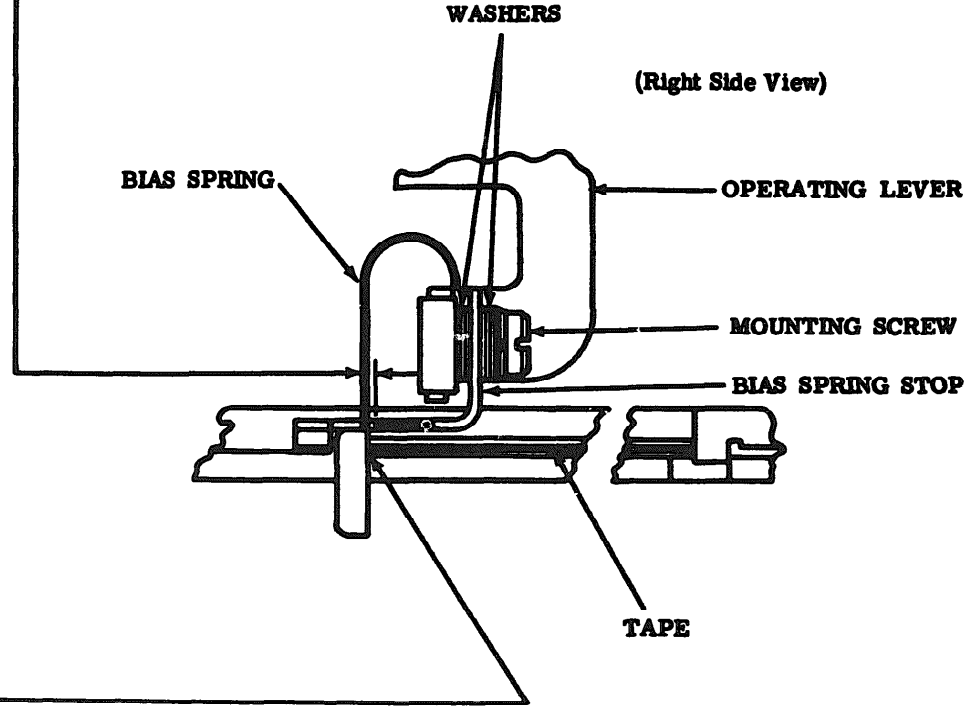
To Check
Perforate 3 or 4 feet of tape with all code levels marking. With one end of tape held at eye level, sight down tape. There should be no wavering in alignment of perforations with respect to edge of tape.

(1) Requirement
Spring should bias tape towards rear of punch block without crimping or curling front edge of tape.

(2) Requirement
With lever in one inch position and tape inserted in punch block, clearance between bias spring and bias spring stop should be
Min 0.005 inch---Max 0.020 inch

To Adjust
Add or remove washers on either side of bias spring stop. Tighten mounting screw.

Note: Spring must not bind against punch block casting or die plate.

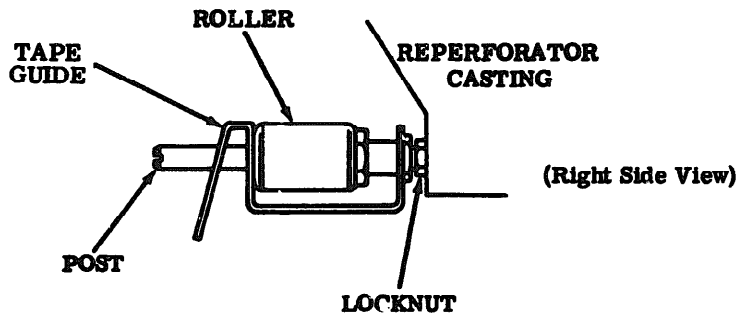


3.05 Universal Punch Block (continued)

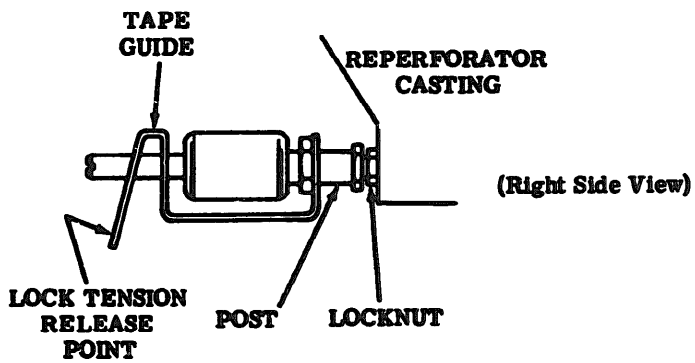
TAPE GUIDE-ROLLER POSITION (If Equipped)

Requirement
Tape guide should be positioned for width of tape in use.

To Adjust
Press lower outside end of tape guide in at lock tension release point and position guide.



5 LEVEL POSITION



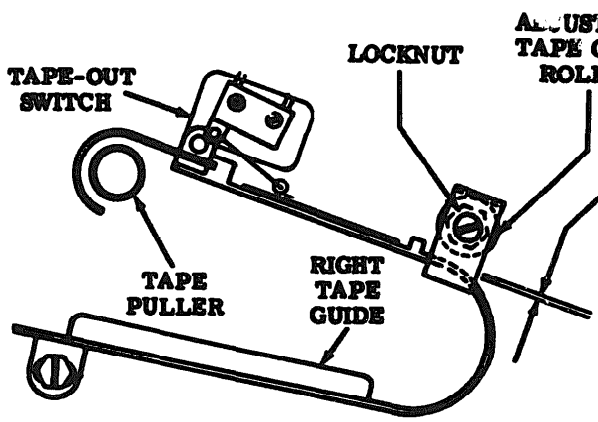
6, 7, AND 8 LEVEL POSITIONS

3.06 Universal Punch Block (continued)

ADJUSTABLE TAPE GUIDE

Requirement
Adjustable tape guide should be parallel with right tape guide as gauged by eye.

To Adjust
With locknut loosened, position adjustable tape guide to meet requirement.
Tighten locknut.



(Front View)

3.07 Photoelectric Reader (Verifier)

CAUTION **DO NOT ADJUST PHOTOVERIFIER PARTS, PUNCH PINS, OR REMOVE DIE PLATE IN PUNCH BLOCK ASSEMBLY. CARE MUST BE EXERCISED IN HANDLING GLASS WINDOW IN ORDER TO AVOID CHIPPING OR OTHERWISE DAMAGING IT.**

MIRROR TUBE POSITION (EARLY DESIGN)

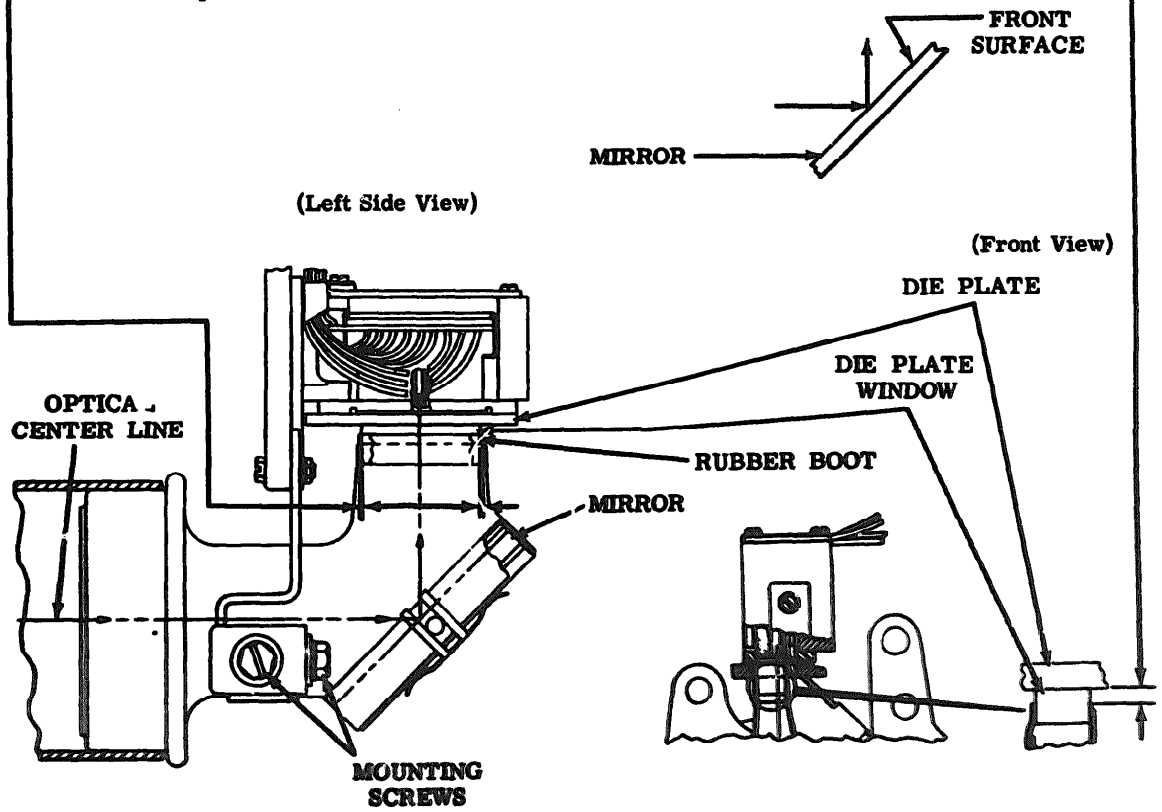
Note: Because mirror tube and chad chute both extend below perforator casting, it is necessary to mount the perforator on its support frame before mirror tube and chad chute are assembled.

(1) Requirement
Mirror tube should be horizontally and vertically aligned as gauged by eye.

(2) Requirement
Right edge of mirror tube should be tight against, and 0.093 inch below die plate window as gauged by eye.

(3) Requirement
Die plate window should be centered in mirror tube opening as gauged by eye.

To Adjust
While holding mirror tube assembly, loosen four mounting screws and position assembly to meet requirements. Tighten screws.



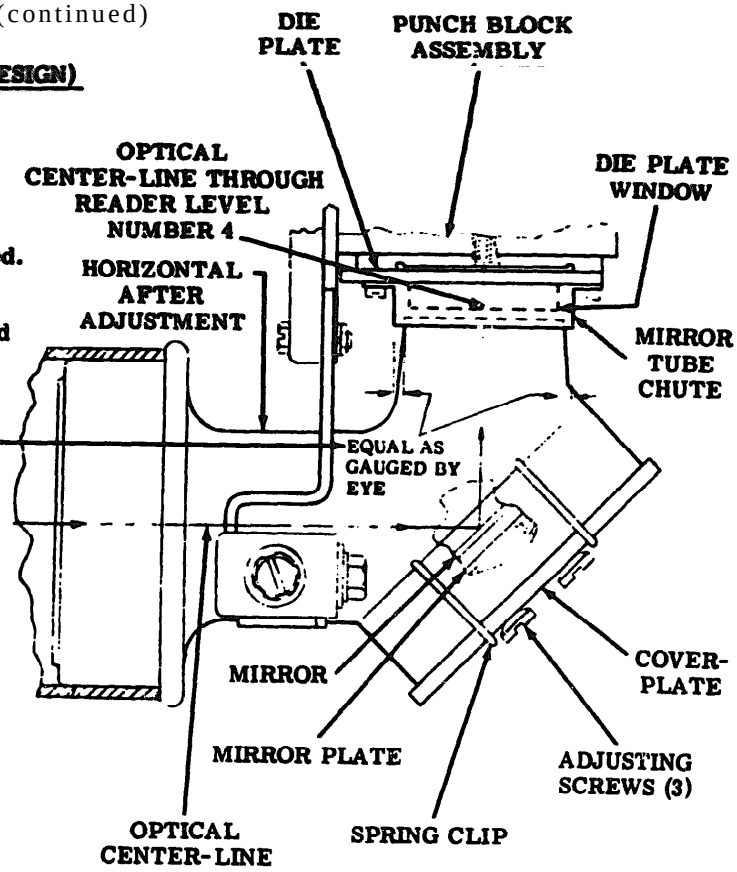
3.08 Photoelectric (Verifier) (continued)

MIRROR TUBE POSITION (LATE DESIGN)

Note: Because mirror tube and chad chute both extend below perforator casting, it is necessary to mount the perforator on its support frame before mirror tube and chad chute are assembled.

(1) Requirement

Mirror tube should be aligned horizontally and vertically and centered in the mirror tube chute front to rear as gauged by eye.



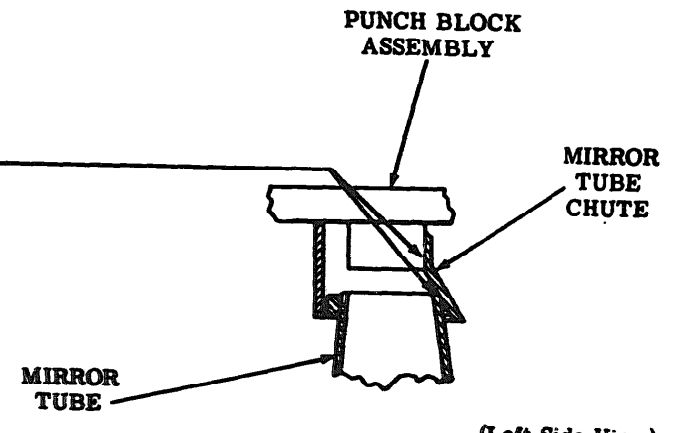
(Left Side View)

(2) Requirement

The right edge of the mirror tube should be biased against the right side of the mirror tube chute.

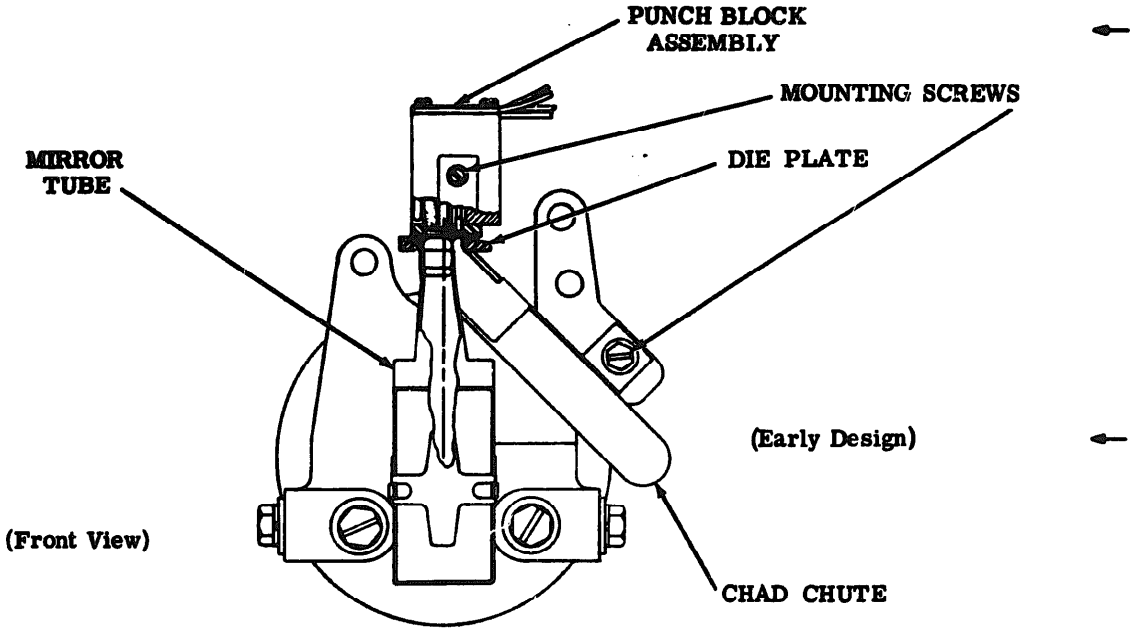
To Adjust

Loosen mounting screws and position mirror tube to meet requirements. Tighten screws.



(Left Side View)

3.09 Photoelectric Reader (Verifier) (continued)



CHAD CHUTE POSITION (EARLY OR LATE DESIGN

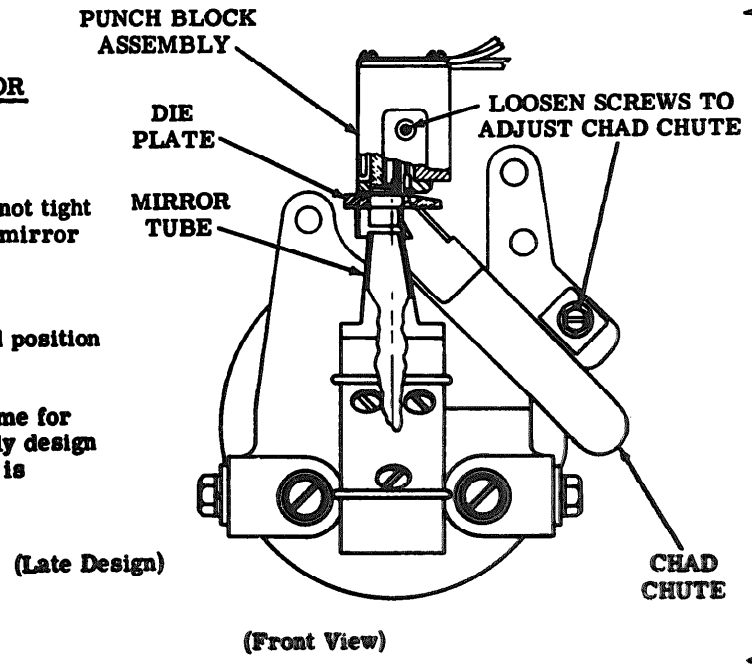
Requirement

Chad chute should fit firmly but not tight at bottom of die plate and top of mirror tube.

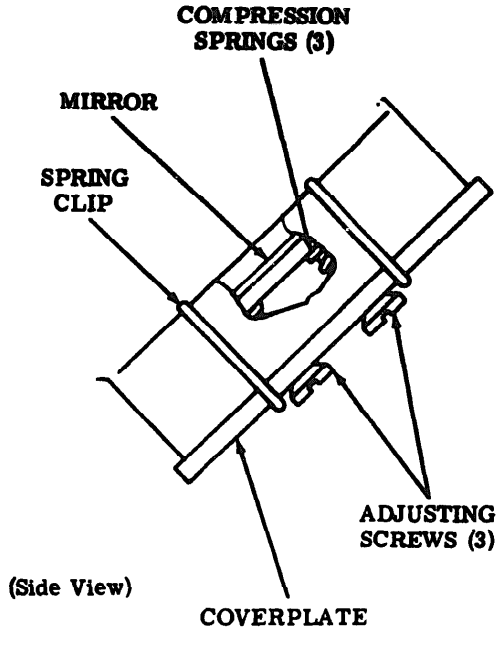
To Adjust

Loosen two mounting screws and position chad chute. Tighten screws.

Note: This adjustment is the same for early or late design parts. Early design is illustrated above, late design is illustrated below.



3.10 Photoelectric Reader (Verifier) (continued)

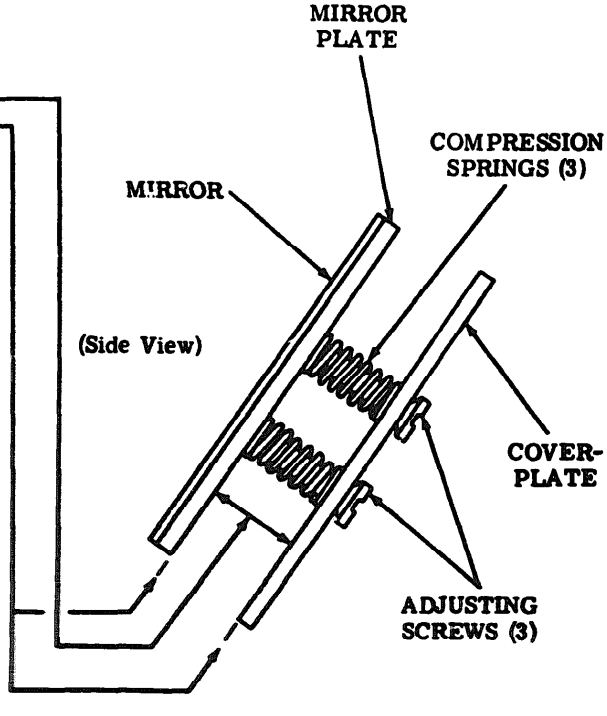


MIRROR ASSEMBLY (LATE DESIGN)

CAUTION: TO AVOID CHIPPING MIRROR WHEN REMOVING IT FROM THE MIRROR TUBE, COMPLETELY REMOVE SPRING CLIP.

Requirement
When assembling the mirror assembly with three screws, the spacing between the coverplate and the mirror plate must be 0.235 inch, ±0.015 inch, and both plates parallel within 0.010 inch.

To Adjust
Position the mirror plate by turning the screws in the coverplate.



3.11 Photoelectric Reader (Verifier) (continued)

CAUTION 1: **LAMP AND ITS HOLDER ARE EXTREMELY HOT DURING NORMAL OPERATION. EXERCISE CAUTION DURING ADJUSTMENT.**

CAUTION 2: **DO NOT HANDLE QUARTZ GLASS ENVELOPE OF LAMP, COLLIMATING LENS, OR PRISM. REMOVE GREASE OR FINGER PRINTS FROM LAMP BY CLEANING WITH A GREASE FREE SOLVENT SUCH AS ACETONE.**

LAMP FOCUS

To Check

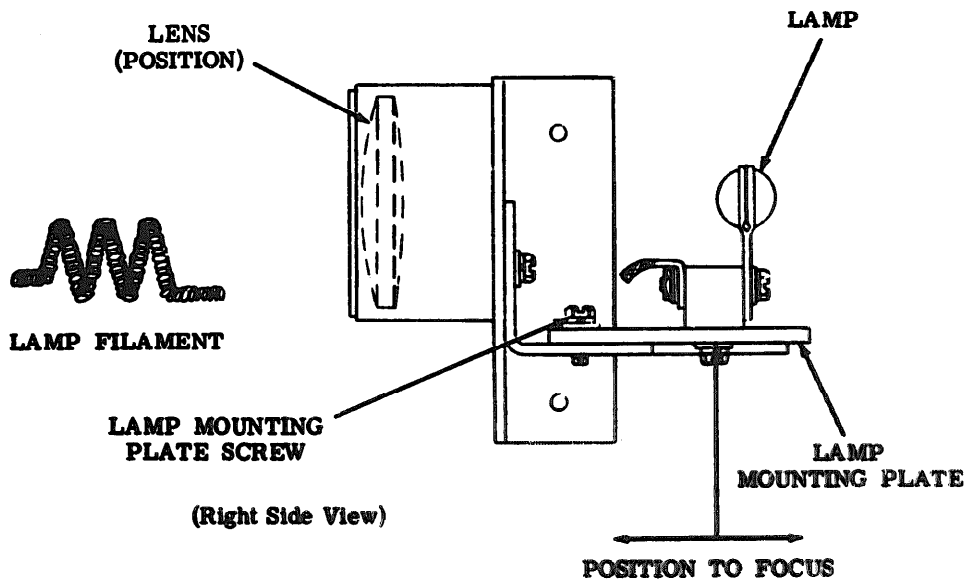
With mirror and gaskets removed from mirror tube, apply 9.5 volts (ac or dc) and aim lens at a light colored wall or a sheet of paper a minimum of 10 feet away. A sharp image of lamp filament should be observed.

Requirement

Lamp filament should be at focal point of lens.

To Adjust

Position lamp relative to lens with lamp housing cover removed and lamp mounting plate screws loosened. Tighten screws and replace cover.



3.12 Photoelectric Reader (Verifier) (continued

LAMP POSITION

To Check
Connect appropriate collector (refer to 7565WD) to ground through a low impedance ammeter. Apply -6 volts dc to phototransistor emitters (common) (black lead in cable).

Requirement (Preliminary)
In normal operating position, and 9.5 volts applied to lamp. lamp housing should be in line with mirror tube vertically as gauged by eye. Lamp housing should be aimed for maximum output on all levels.

Note 1: Check levels 1 and 8 for the output of the phototransistors. The output at both levels should be a minimum of 1.3 milliamperes.

To Adjust (Preliminary)
Loosen two screws securing vertical mounting bracket to lamp assembly. Aim lamp housing vertically and horizontally to meet requirement. Tighten screws.

Requirement (Final) — (Early Design)
Lamp housing should be aimed such that phototransistor outputs for all levels (including feed) will be 1.3 ma minimum.

To Adjust (Final) — (Early Design)
Loosen six screws securing bracket to mounting surface and bracket with lens holder. Adjust light source in three places to meet requirement. Tighten screws.

Note 2: Adjust light source in following sequence:

(a) vertical (up and down)

(b) vertical rotation

(c) horizontal rotation

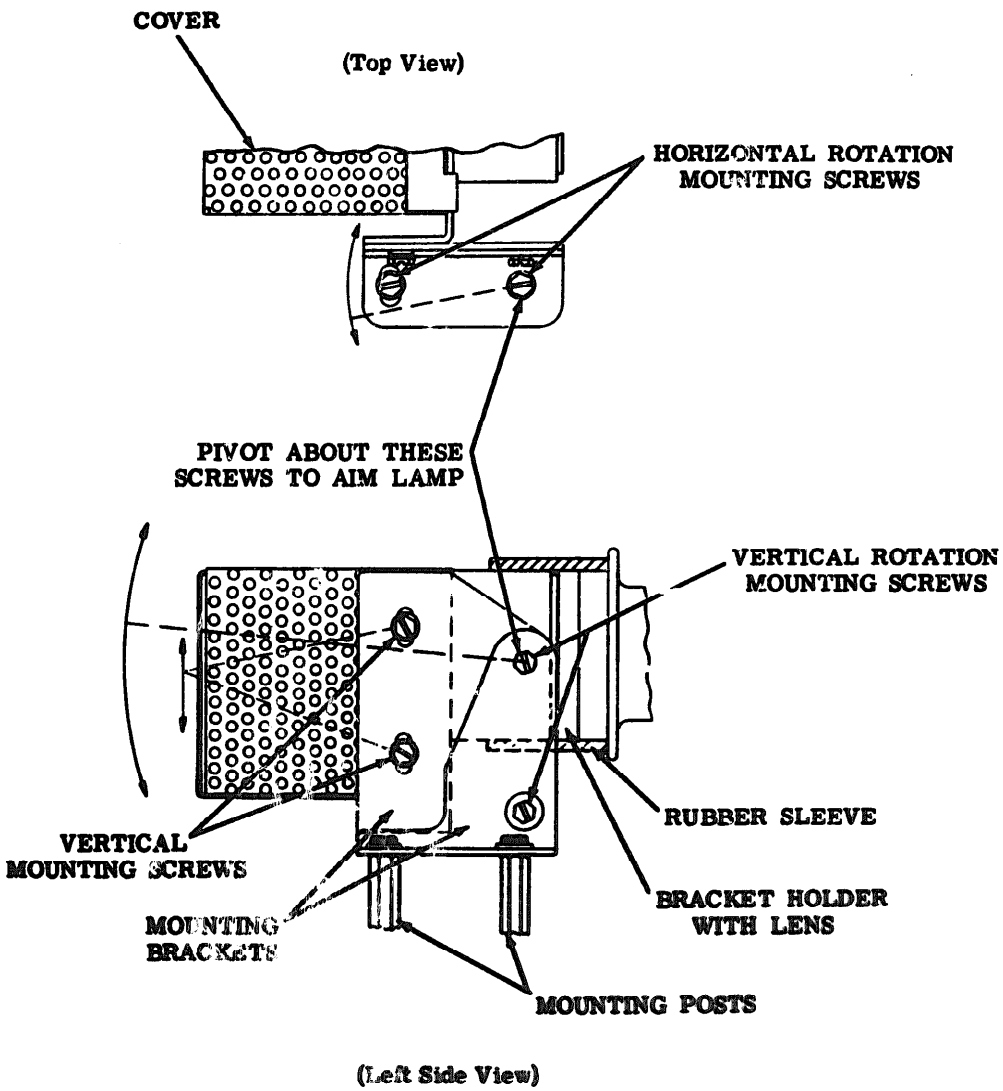
(d) tighten all adjusting screws

Requirement (Final) — (Late Design)
Mirror should be positioned to hold output (on all levels including feed level) of the phototransistors to minimum of 1.3 milliamperes.

To Adjust (Final) — (Late Design)
Position mirror using three adjusting screws. Excessive turning of one screw relative to other two should not be necessary.

3.13 Photoelectric Reader **(Verifier) (continued)**

LAMP POSITION (continued)



3.14 Punch Backup Mechanism

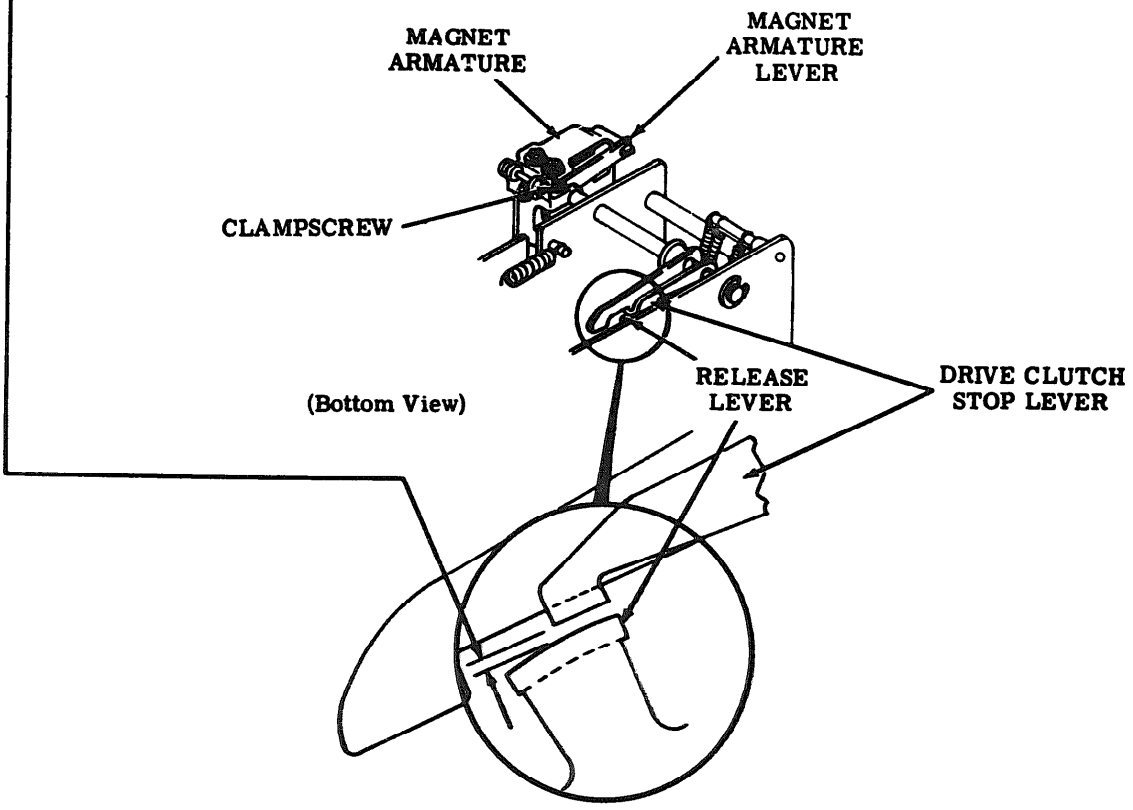
CLUTCH MAGNET ARMATURE

Note 1: Before attempting this adjustment, hold clutch magnet armature against magnet pole to make sure there is no gap between armature and magnet pole, and between armature and rear of magnet support bracket. Armature should not bind during normal travel.

Note 2: When armature is attracted to pole face, stop lever must move away from release lever to initiate drive shaft cycle.

Requirement
With clutch magnet armature against magnet pole and drive shaft rotated until release lever lug is directly under stop lever lug, there should be Min 0.008 inch---Max 0.015 inch clearance between lugs.

To Adjust
Hold clutch magnet armature against magnet pole and rotate drive shaft until release lever lug is under stop lever lug. Loosen clampscrew and move stop lever to meet requirement.



3.15 Punch Backup Mechanism (continued)

DRIVE CAM FOLLOWER LEVER

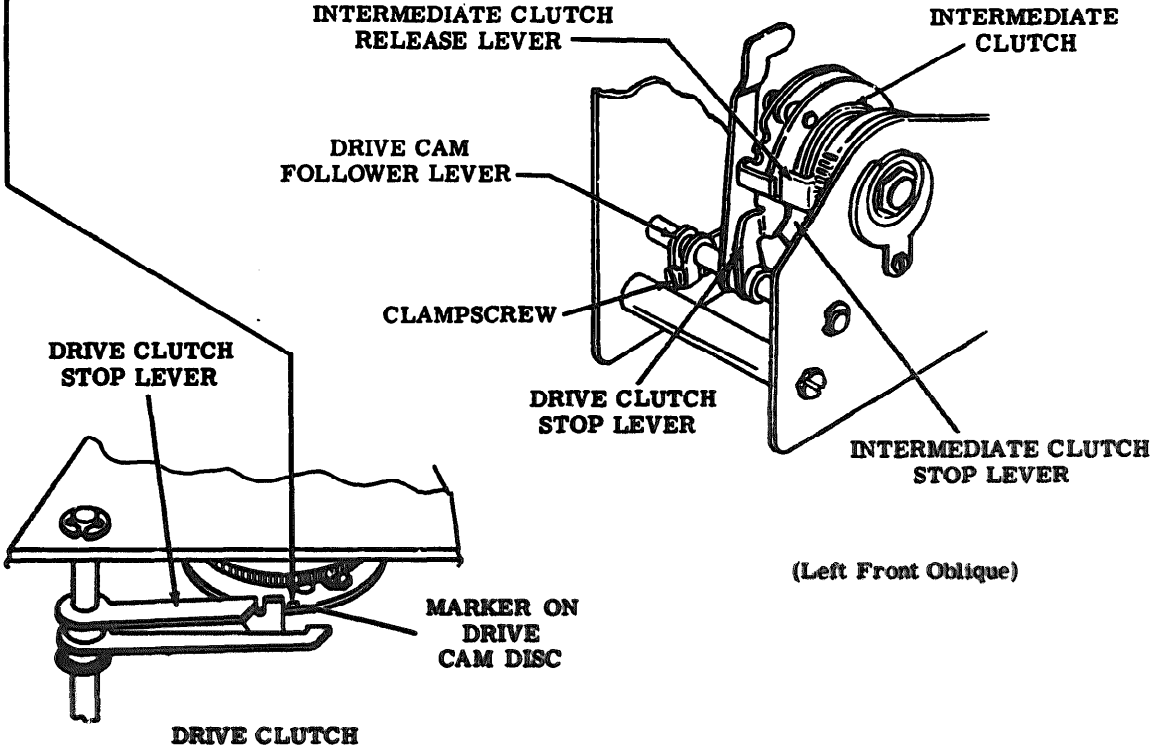
Note: Drive cam assembly positions tape guide assembly over reverse feed wheel before intermediate shaft begins to rotate.

Requirement

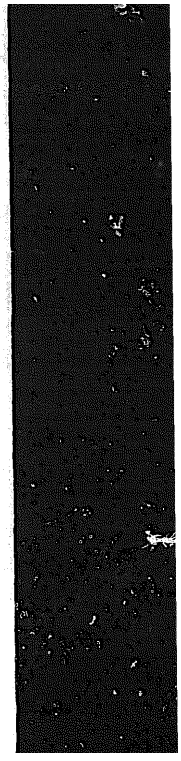
With magnet armature held against magnet pole, rotate drive shaft until end edge of drive clutch stop lever is about to line up with white marker (near rim) on drive cam disc. Then slowly rotate drive shaft in its normal direction to a point where intermediate clutch stop lever begins to move away from intermediate clutch release lever. At this point, edge of drive clutch stop lever should line up with same portion of marker on drive cam disc.

To Adjust

Actuate magnet by hand and rotate drive shaft until end edge of drive clutch stop lever lines up with center of marker on drive cam disc. Loosen clampscrew friction tight. Hold drive cam follower lever against roller of drive shaft cam assembly and move intermediate clutch stop lever to meet requirement. Tighten clampscrew.



3.16 Punch Backup Mechanism (continued)



CLUTCH SPRING ANCHOR PLATE (BOTH CLUTCHES)

Note 1: This adjustment is to prevent inside of both clutch springs from dragging against surface of clutch **drum prior to engagement.**

Note 2: (For Intermediate Shaft Assembly Only) If clutch spring is disengaged too soon, less than 80 characters may be backed-up by reverse feed wheel.

To Check

With drive shaft rotated until all clutches are dise**ngaged**, rotate **clutch** stop **lever** out away **from clutch. Lug of clutch release** lever will snap forward. **With** light pressure, push lug of release lever forward to overcome slight friction.

Requirement

With clutches disengaged and clutch release lever positioned forward with light pressure, there should be

Min 0.100 inch---Max 0.225 inch

clearance between leading edges of clutch release lever lug and cam assembly stop-lug. **Minimum clearance** narrows gap between inside **of clutch spring and outer surface of cl**utch drum. Maximum clearance **increases gap.**

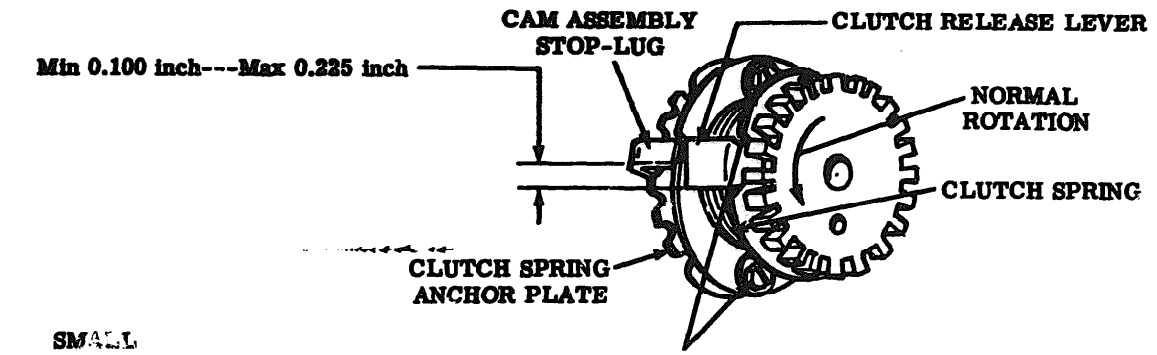
To Adjust

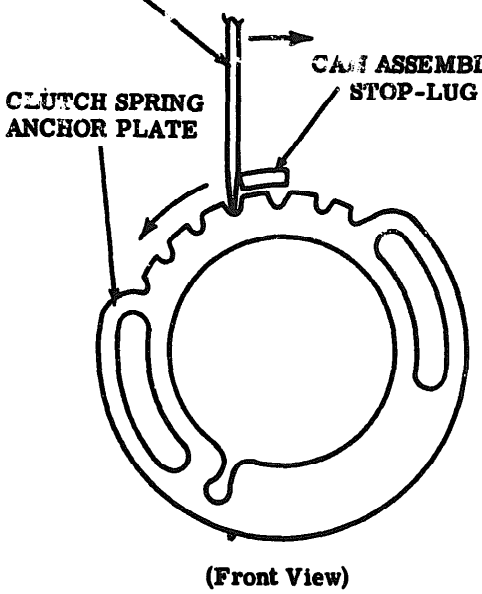
To Increase Clearance: Loosen both clutch spring anchor plate adjustment clampscrews friction tight and move clutch spring **anchor** plate in direction of normal clutch rotation.

To Decrease Clearance: Loosen both clutch spring anchor plate adjustment clampscrews friction tight and move clutch spring anchor plate in opposite direction of normal clutch rotation. Note that to move anchor plate back, clutch release lever must be pushed in same direction simultaneously which prevents clutch spring from locking up.

3.17 Punch Backup Mechanism (continued)

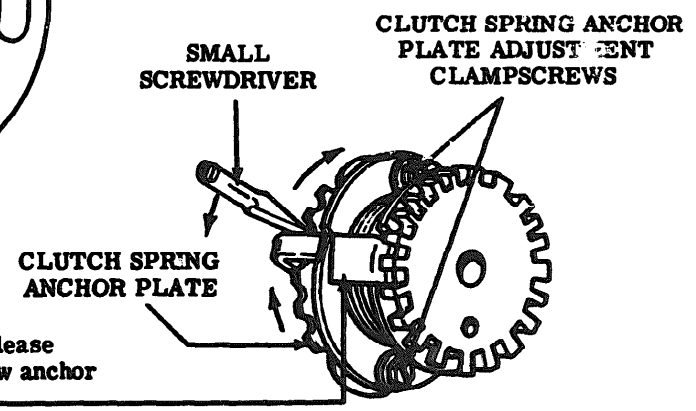
CLUTCH SPRING ANCHOR PLATE (BOTH CLUTCHES) (continued)





Note 3: Normal rotation for intermediate shaft assembly is shown here, but is reversed for drive shaft assembly.

Note 4: Use a small screwdriver to pry clutch spring anchor plate forward to increase distance, or backward to decrease distance.



Note 5: To decrease distance, release lever must be pushed back to allow anchor plate to move.

3.18 Punch Backup Mechanism (continued)

REVERSE FEED WHEEL DETENT DISC POSITIONING

Note 1: This adjustment is to assure that the tape will be backed up 80 characters ±1/2 character. See 3.34 for adjustment to assure that the tape will be backed up exactly 80 characters.

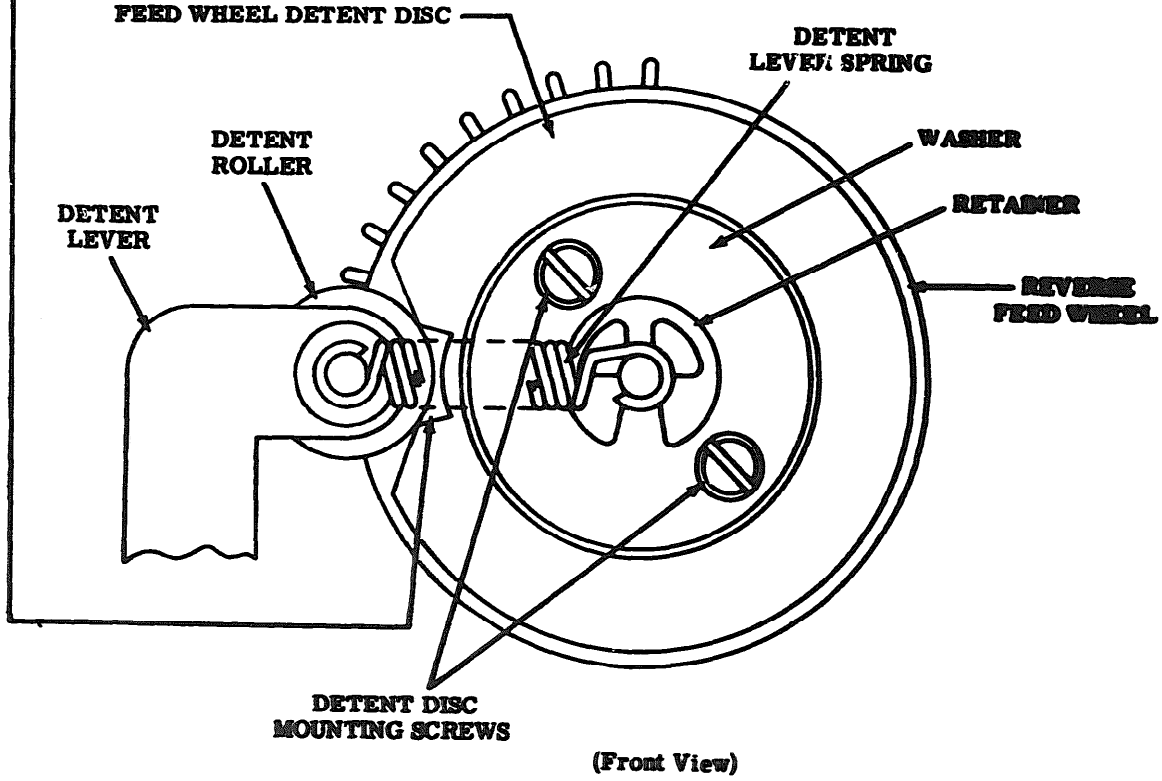
Note 2: Mounting holes in washer, disc, feed wheel, and gear hub must remain in line for mounting screw installation.

Requirement

With magnet armature released and all clutches disengaged, detent roller should seat in feed wheel detent disc notch.

To Adjust

Loosen both disc mounting screws. Hold release lever lug of intermediate shaft drum and gear assembly against its stop lever and turn disc to meet requirement. If requirement cannot be met, remove both screws, detent lever, lever spring, and retainer holding feed wheel. Pull feed wheel out until gears unmesh and turn feed wheel in required direction to meet requirement. Push feed wheel in to engage gear teeth. Replace hardware but do not tighten screws. Reposition notch and roller then tighten screws. Refine adjustment if necessary.



(Front View)

3.19 Punch Backup Mechanism (continued)

BACKUP SWITCH ACTUATING PLATE

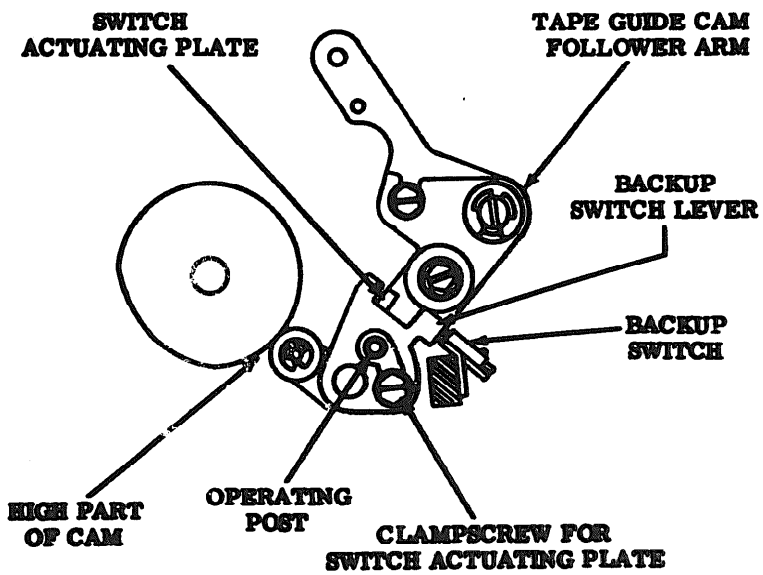
Note: The backup switch provides the electronic monitor for backup error control.

Requirement

With magnet armature against magnet pole and shaft rotated until main bail follower arm roller is at high part of drive cam, switch lever should depress switch button.

To Adjust

Loosen locknut on eccentric pivot post. (See Illustration 3.20.) Manually actuate magnet so magnet armature is against magnet pole. Rotate drive shaft until switch lever depresses switch button. Rotate eccentric pivot post to meet requirement. Tighten locknut.



(Front View)

3.20 Punch Backup Mechanism (continued)

BACKUP SWITCH

(1) Requirement
With trip magnet actuated and drive shaft rotated until tape guide cam follower arm roller is on high part of cam, tape lid switch contact should open.

(2) Requirement
With trip magnet actuated and drive shaft rotated until follower arm roller is on low part of cam, tape lid switch contact should close.

To Adjust
Loosen clampscrew of switch actuating plate and move plate to meet requirements. Tighten screw.

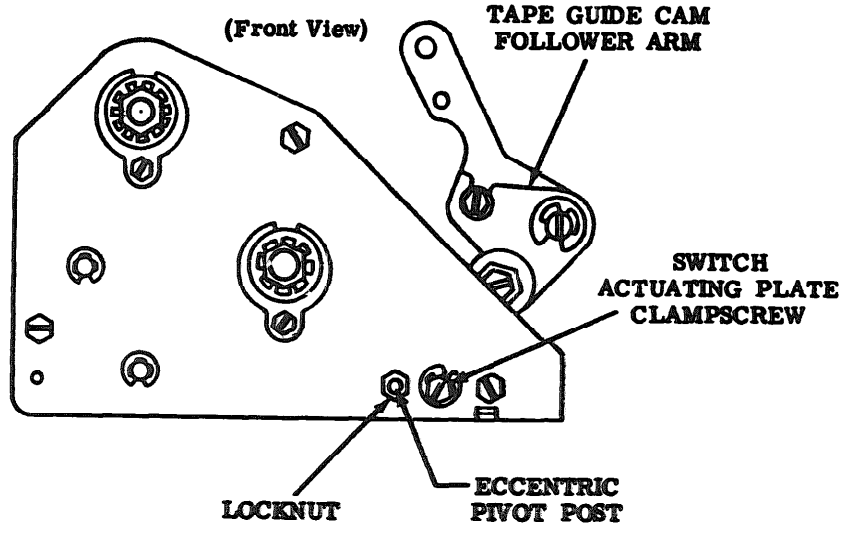
BACKUP SWITCH CONTACT OPERATION

To Check
Check operation of backup switch contact with oscilloscope.

(1) Requirement
Contact should open and close as required.

(2) Requirement
There should be no momentary contact closures or breaks during normally open or closed times.

To Adjust
Loosen clampscrew of switch actuating plate and move plate to meet requirements.



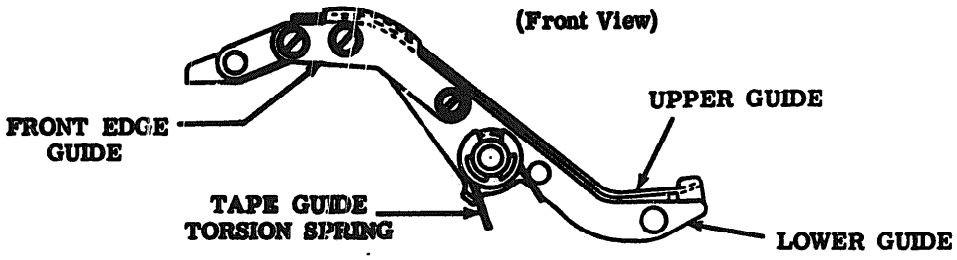
3.21 Punch Backup Mechanism (continued)

TAPE GUIDE (PRELIMINARY) EARLY DESIGN

Requirement

Loosen three mounting screws fastening upper guide to lower guide. (See illustration in 3.22) Move upper guide to obtain maximum gap between guides. Tighten screws.

Note: To remove tape guide assembly, proceed as follows: move turned end of tape guide torsion spring from spring post to tape guide lever projection, pivot tape guide slightly clockwise until both feed wheels are clear, and then remove tape guide assembly.



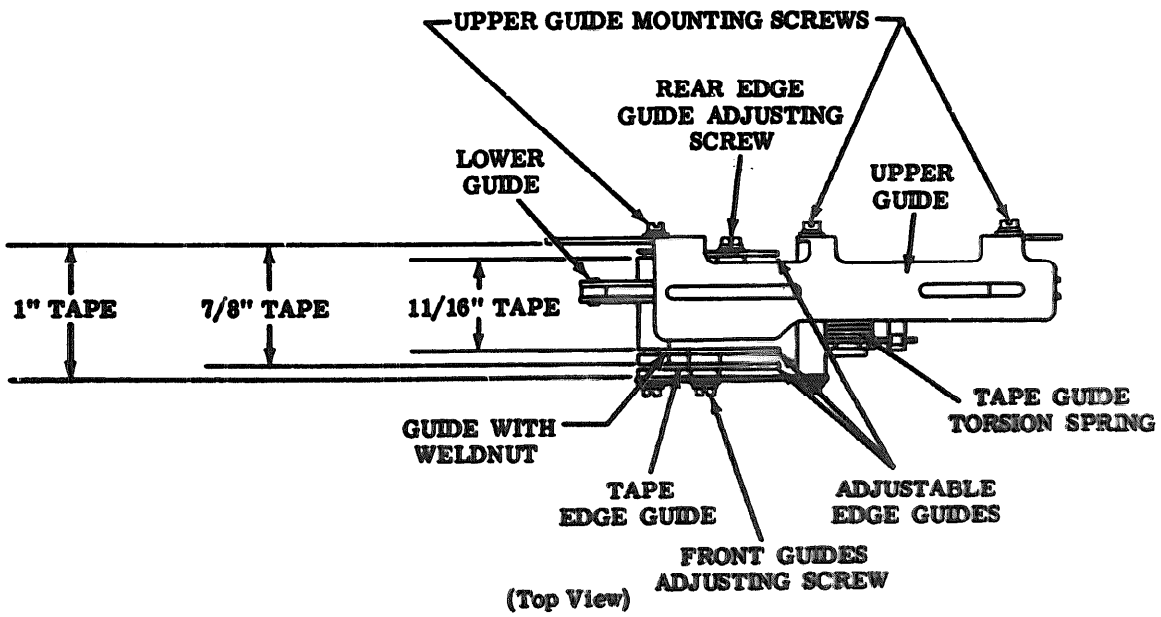
TAPE EDGE GUIDE (ONE INCH) EARLY DESIGN

Requirement

Top edges of three adjustable tape edge guides should be level with bottom of tape and should not press against tape.

To Adjust

Loosen guide adjusting screws and move guides down to meet requirement. Gauge by eye.



3.22 Punch Backup Mechanism (continued)

TAPE EDGE GUIDE (SEVEN-EIGHTHS INCH TAPE) EARLY DESIGN

Requirement

Top edge of front tape guide should be aligned with top edge of permanent tape guide while tops of remaining two guides are level with bottom of tape threaded through guide. There should not be pressure against tape. (See Illustration in 3.21.)

To Adjust

Loosen guide adjusting screws and move guides up or down to meet requirement. Gauge by eye.

TAPE EDGE GUIDE (ELEVEN-SIXTEENTHS INCH TAPE) EARLY DESIGN

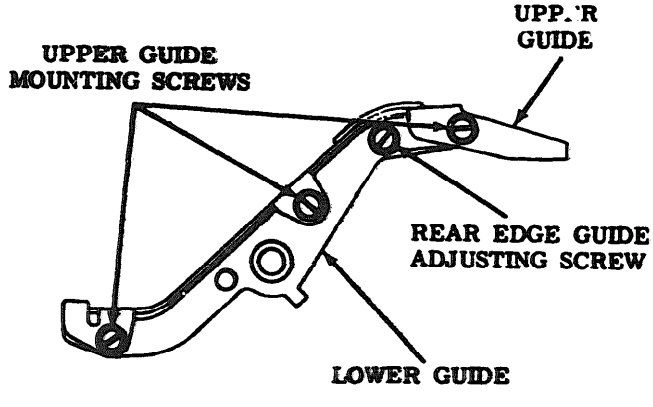
Requirement

Top edges of three guides should be aligned with top edge of permanent guide. (See Illustration in 3.21.)

To Adjust

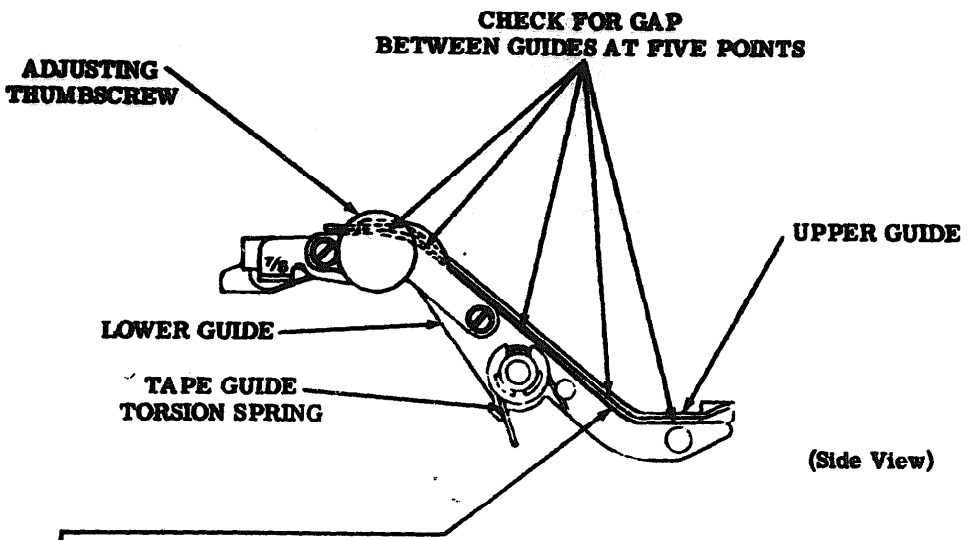
Loosen guide adjusting screws and move guides up to meet requirement. Gauge by eye.

Note: To install tape guide assembly, proceed as follows: place tape guide assembly on its respective pivot post and move assembly to rear while clearing feed wheels, align feed wheels within slot of guide and rotate assembly counterclockwise, and then lift formed end of lid assembly torsion spring and place over post in slot on cam follower lever so end of spring rests in slot.



(Rear View)

3.23 Punch Backup Mechanism (continued)



TAPE DEPRESSOR GUIDE (LATE DESIGN)

(1) Requirement
There should be a gap between upper guide and lower guide
Min 0.008 inch---Max 0.012 inch

(2) Requirement
There should be no less than 0.008 inch gap at any point along the guide.

To Adjust
Loosen three mounting screws holding upper guide to lower guide assembly. With all adjustable tape edge guides positioned at extreme bottom of their travel, insert a double thickness of one inch unperforated paper tape between the guides. Gently press upper guide against the paper tape and tighten three mounting screws. Paper tape should move relatively free along any point through the tape guide assembly. Remove paper tape and check gap at five points shown.

3.24 Punch Backup Mechanism (continued)

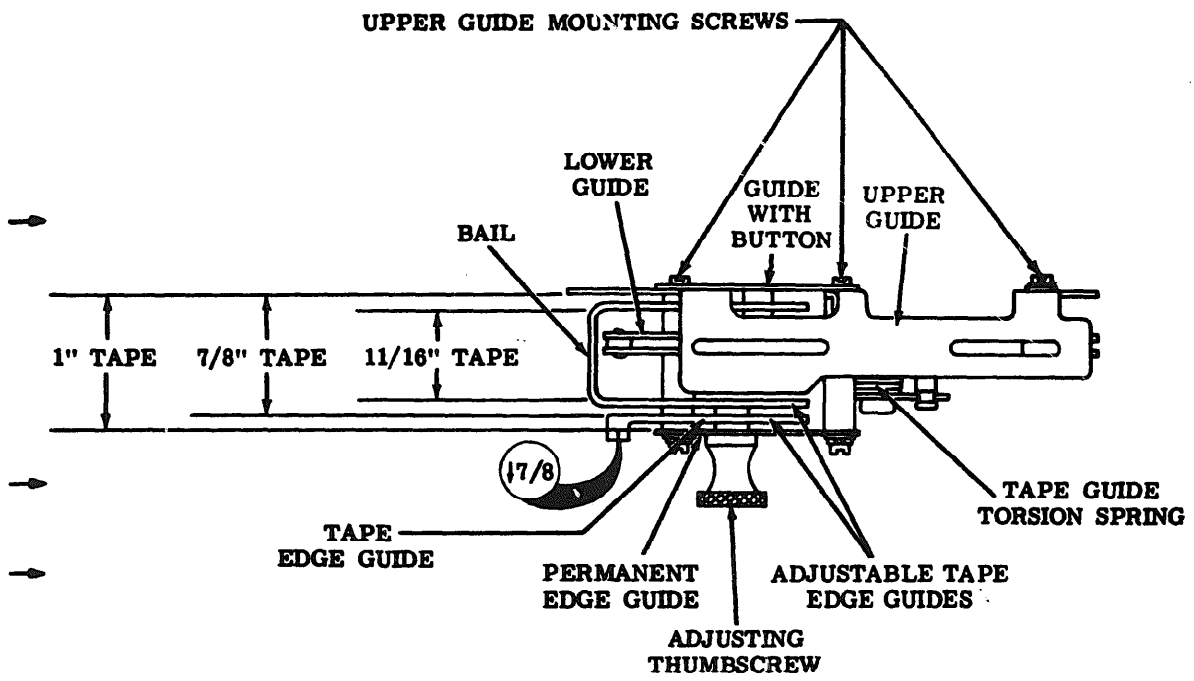
TAPE EDGE GUIDE (ONE INCH) LATE DESIGN

Requirement

Both adjustable tape edge guides should be positioned at extreme bottom of their travel and should not press against tape.

To Adjust

Loosen thumbscrew and move it down in its adjusting slot (extreme bottom of its travel). Tape edge guide should also move down. Push up on tab on tape edge guide (stamped 7/8) to be sure that guide remains down, Tighten thumbscrew.



(Top View)

3.25 Punch Backup Mechanism (continued)

TAPE EDGE GUIDE (SEVEN-EIGHTHS INCH TAPE) LATE DESIGN

Requirement

The 11/16 inch adjustable tape edge guide should be positioned at extreme bottom of its travel and should not press against tape. Top edge of the 7/8 inch adjustable tape edge guide should be aligned with top edge of the front (fixed) tape edge guide.

To Adjust

Loosen thumbscrew and move it down its adjusting slot to extreme bottom of its travel. Press down tab labeled 7/8 to place it in position for 7/8 inch tape. Tighten thumbscrew.

TAPE EDGE GUIDE (ELEVEN-SIXTEENTHS INCH TAPE) LATE DESIGN

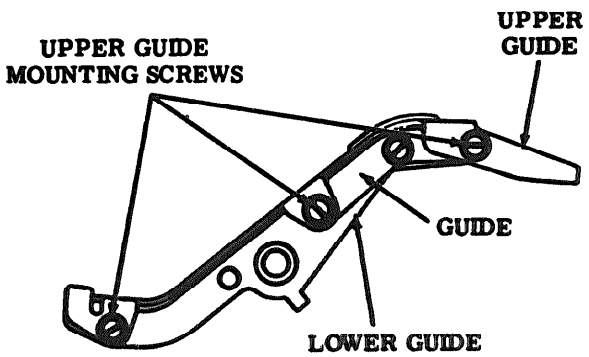
Requirement

Top edges of both guides (7/8 inch and 11/16 inch) should be aligned with top edge of fixed guide (1 inch). (See Illustration in 3.24.)

To Adjust

Loosen thumbscrew and move it up in its adjusting slot (extreme top of its travel). Push up on 7/8 tab on tape edge guide to meet requirement. Tighten thumbscrews.

Note: To install tape guide assembly, proceed as follows: Adjust tape edge guide to 11/16 inch tape width requirement. Place tape guide assembly on its respective pivot post and move assembly to rear while clearing feed wheels. Align feed wheels within slot of guide and rotate assembly counterclockwise, then lift formed end of lid assembly torsion spring and place over post in slot on cam follower lever so end of spring rests in slot.



(Rear View)

3.26 Punch Backup Mechanism (continued)

FORWARD FEED WHEEL

Requirement

With shaft rotated until all clutches are disengaged, tape guide torsion spring engaged, upper tape guide adjusted all the way up (or removed), and tape lid cam follower roller on low part of drive shaft cam:

(1) Right hand side of tape guide assembly should be aligned with forward feed wheel so that outer rim of forward feed wheel (less pins) conforms with radius of lower tape guide and clearance between forward feed wheel (less pins) and top edge of lower guide should be 0.004 inch to 0.006 inch maximum.

(2) **Left hand side of tape guide assembly should be aligned with reverse feed wheel so that top of feed pins are flush or just below top edge of lower tape guide when forward feed wheel clearance is zero as gauged by eye.**

(3) **At this point,** TAPE GUIDE (FINAL) (3.28) must be made.

(1) To Adjust

Loosen left and right hand eccentric stud mounting screws and turn eccentric highs up and away from tape guide assembly. Tighten eccentric stud screws. Loosen clampscrew of adjustable plate on tape guide cam follower arm and clampscrew of cam follower eccentric bushing friction tight. Rotate eccentric post and/or eccentric bushing until forward feed wheel meets requirement.

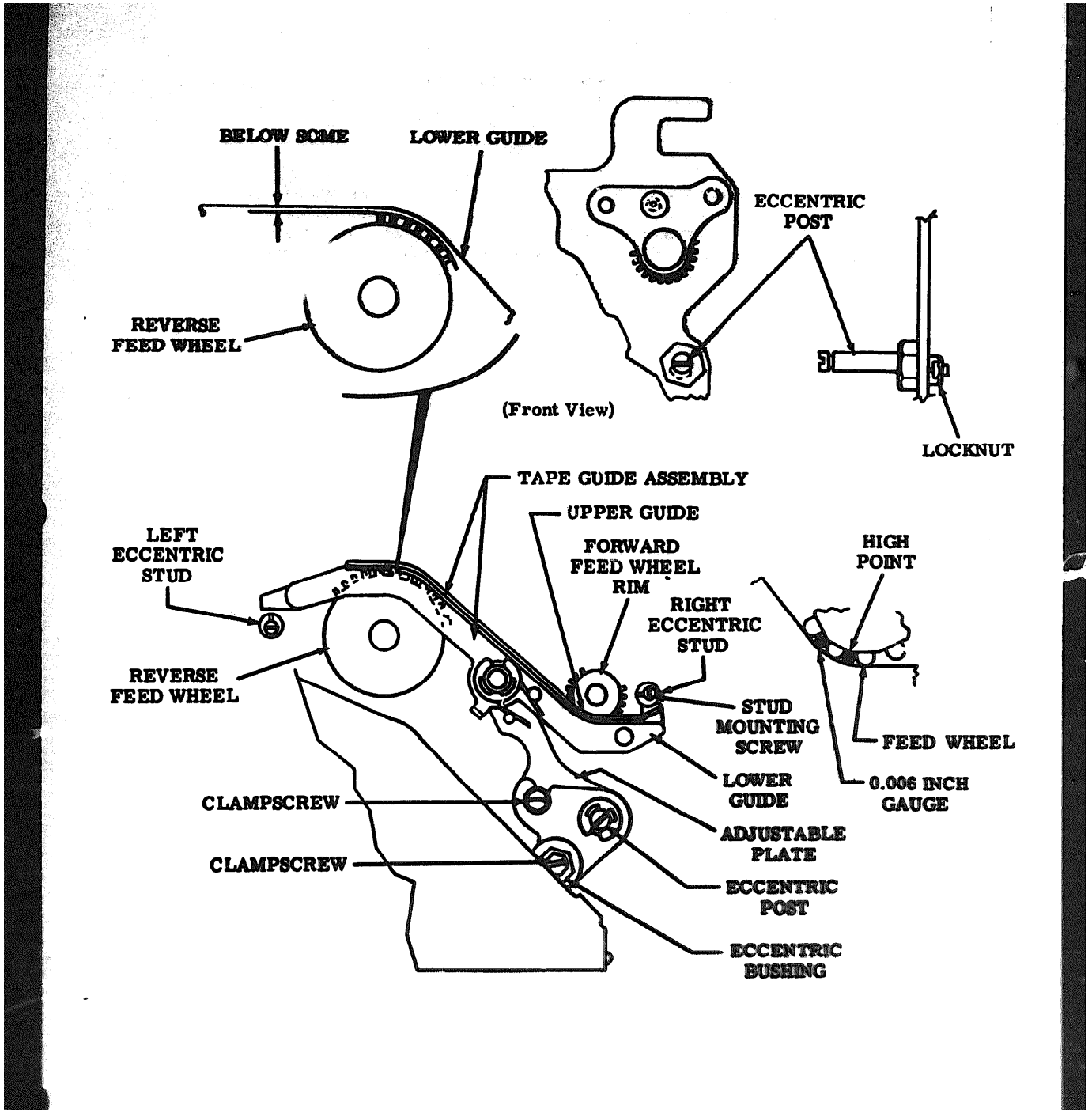
CAUTION: ECCENTRIC POST AND ECCENTRIC **BUSHING CAN MEET** THIS REQUIREMENT IN TWO **POSITIONS, 180° OUT** OF PHASE. PROPER POSITION **OF ECCENTRIC POST** AND ECCENTRIC BUSHING IS **MET WHEN ECC**ENTRIC HIGHS ARE UP.

(2) ***To* Adjust**

When forward feed wheel adjustment is met, rotate eccentric **bushing and/or eccentric post until top of feed pins of reverse feed wheel are flush or barely below top** of lower guide of tape **guide assembly. Recheck forward feed wheel** clearance and **refine if necessary by rotating eccentric post** and/or eccentric **bushing. Tighten eccentric post locknut and e**ccentric bushing **clampscrew and recheck requirements.**

3.27 Punch Backup Mechanism (continued)

FORWARD FEED WHEEL (continued)



3.20 Punch Backup Mechanism (continued)

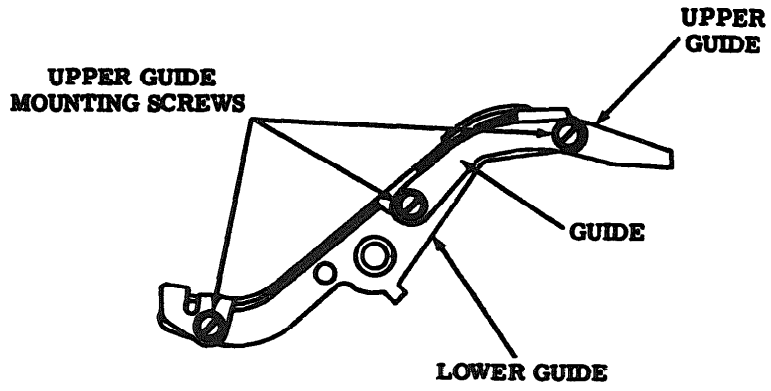
TAPE GUIDE (FINAL)

Requirement

Clearance between upper guide and lower guide should be:
Min 0.008 inch---Max 0.012 inch

To Adjust

Remove tape guide assembly. (See note in 3.21.)
Loosen three mounting screws fastening upper guide to lower guide. Insert a double thickness of one inch unperforated paper tape between tape guides. Gently press upper guide against paper tape. Paper tape should move freely along entire path of tape guide. Tighten three mounting screws. Install tape guide assembly. (See note in 3.22 or 3.25.)



(Rear View)

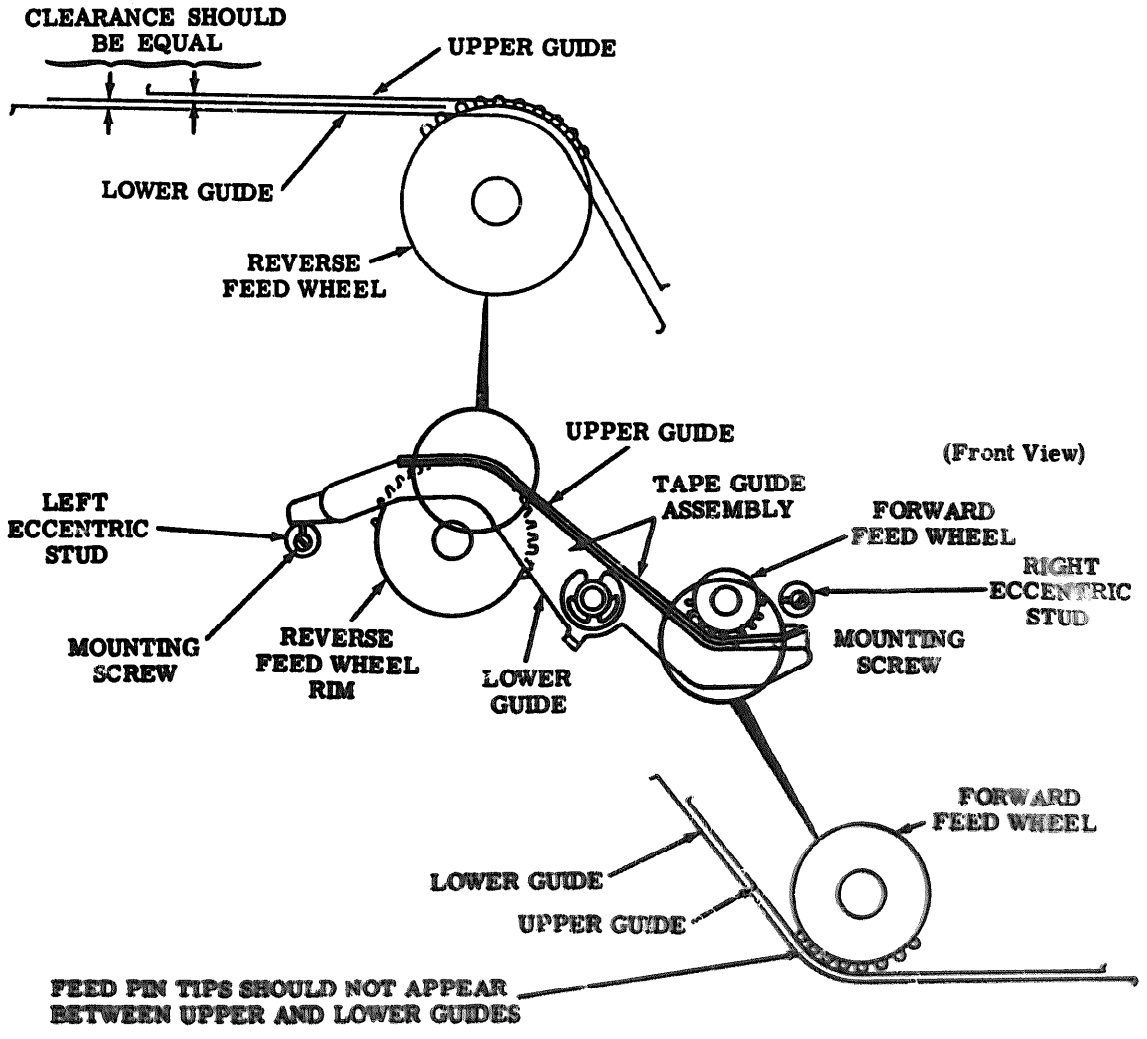
3.29 Punch Backup Mechanism (continued)

REVERSE FEED WHEEL

(1) Requirement
With magnet actuated and drive shaft rotated until taps cam follower roller is on high part **of cam, left portion** of tape guide **assembly** should be aligned with reverse feed wheel so that **rim** of feed wheel (less pins) is **centered** between upper and lower guides of tape guide assembly.

(2) Requirement
With magnet actuated and drive shaft rotated until tape cam follower roller is on high part of cam, right portion of taps lid should be aligned with forward feed wheel so that feed pin **tips do** not **appear** between upper and lower guides of tape guide assembly.

To Adjust
With left eccentric stud mounting screw loosened, rotate eccentric stud to meet requirements. If, **after** this adjustment, forward feed wheel pins are visible between upper and lower guides, it is necessary to ***refine*** forward feed wheel adjustment (3.26).



3.30 Punch Backup Mechanism (continued)

Note: The following adjustment must be made with backup mechanism and grease retainer removed from unit.

CAUTION: IF TORQUE FROM A FULLY WOUND DRIVE SPRING IS SUDDENLY RELEASED, PERMANENT DAMAGE TO SPRING WILL RESULT. SPRING TENSION CAN BE RELEASED IN STEPS AT ANTIREVERSAL DISC PAWL (2.10).

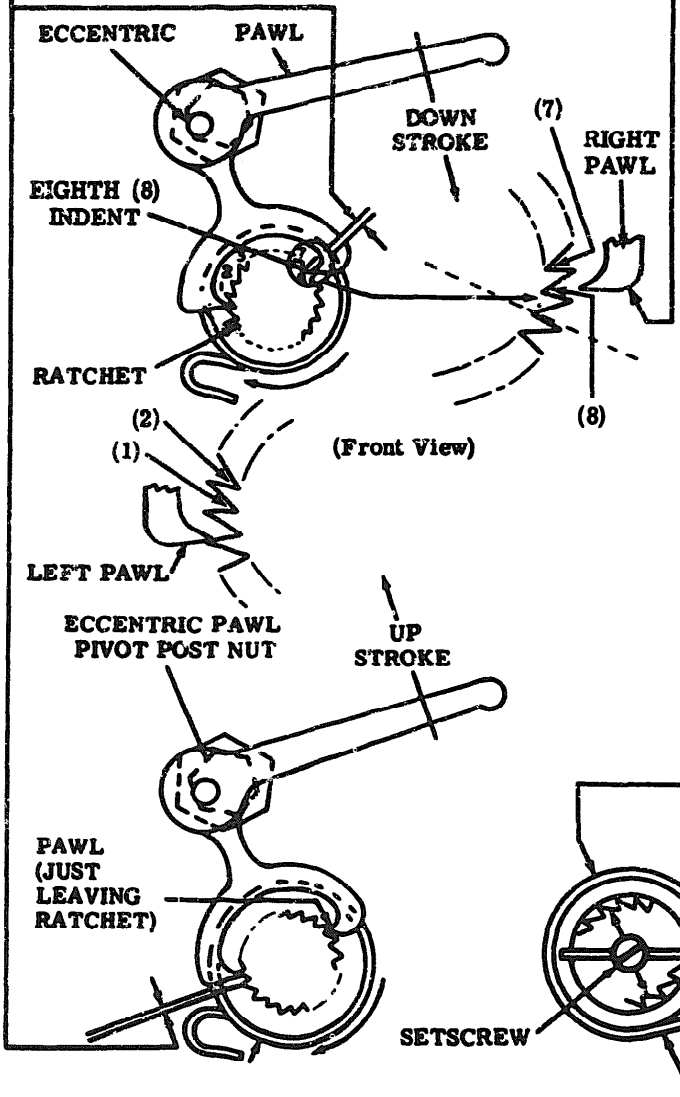
RATCHET AND PAWL ESCAPEMENT

(1) Requirement
With no torque applied to ratchet and pawl, and with ratchet and pawl operated by hand, ratchet should make equal steps on up stroke and on down stroke of pawl as gauged by eye.

(2) Requirement
It should not be possible for ratchet to move more than one step with pawl in any position.

(3) Requirement
With pawl raised, right pawl tooth should be opposite eighth (8) indent in upper half of ratchet.

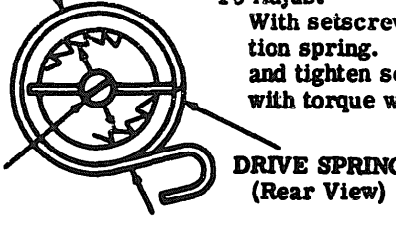
To Adjust
With nut on eccentric pawl pivot post loosened, use a wrench or an Allen wrench to rotate eccentric, keeping eccentric high toward left. Tighten nut.



DRIVE SPRING

Requirement
Drive spring should be concentric with ratchet wheel.

To Adjust
With setscrew loosened, position spring. Hold feed wheel and tighten setscrew to 2 lb-in. with torque wrench.



3.31 Punch Backup Mechanism (continued)

FEED MECHANISM — VERTICAL POSITION

Note 1: Make the following adjustment with backup mechanism installed.

Note 2: Ratchet may fully unwind (slip) if feed magnet is de-energized and there is no tape in unit.

(1) To Check

With feed magnet de-energized and drive spring wound approximately two turns, apply light downward pressure on pawl; ratchet should step one tooth. Stepping may be determined by audible click of ratchet.

Note 3: If ratchet unwinds (accelerated stepping) during To Check at two turns of drive spring, reduce amount of turns to eliminate accelerated stepping and enable To Check stepping observation.

Requirement

With feed magnet in neutral (de-energized) position, left side pawl should just enter notched tooth.

(2) To Check

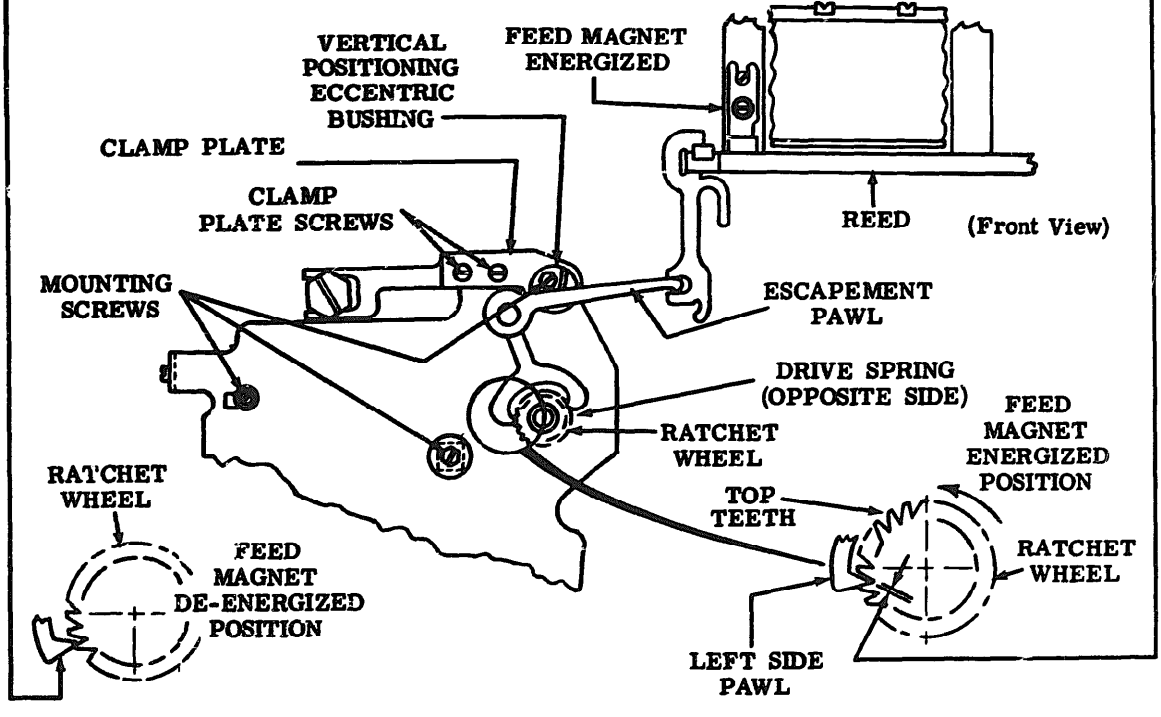
Check Requirement by observing top teeth of ratchet moving counterclockwise.

Requirement

With feed magnet energized, turn ratchet counterclockwise so that some clearance is noticeable between tooth on ratchet and left side pawl.

To Adjust (Units Equipped With Early Design Escapement Pawl)

Loosen three screws securing backup mechanism to casting and two screws holding clamp to vertical positioning eccentric bushing. Turn eccentric bushing until backup mechanism is positioned vertically. Tighten screws on clamp plate first, then tighten mounting screws. Recheck FEED WHEEL LINE-UP (2.23) and refine if necessary.

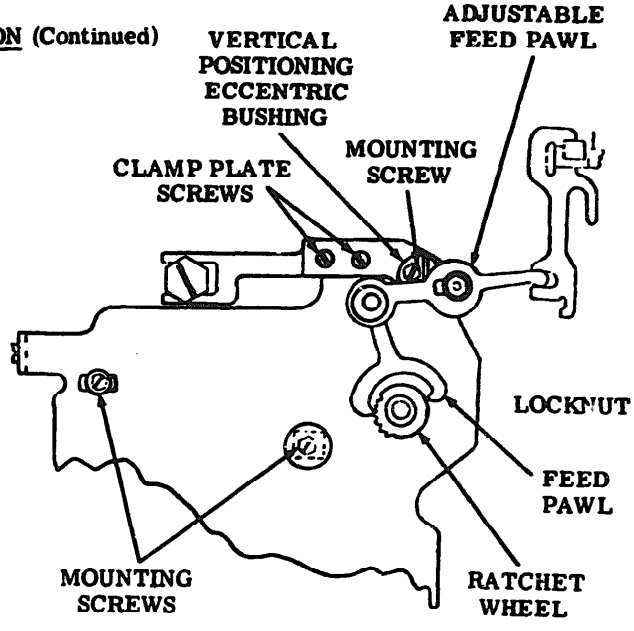


3.32 Punch Backup Mechanism (continued)

FEED MECHANISM — VERTICAL POSITION (Continued)

To Adjust (Units Equipped With Late Design Adjustable Feed Pawl)

With the eccentric high to the left or right and the mounting nut on the eccentric post friction tight, rotate the eccentric with a hexagon wrench until requirements are met. Tighten nut and recheck requirements.



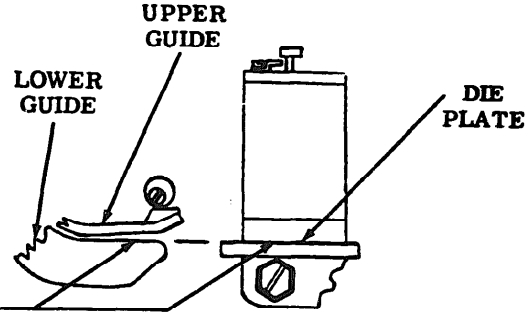
(Front View)

TAPE PUNCH BLOCK (Units Equipped With Late Design Adjustable Feed Pawl)

Note: Make this requirement prior to making the FEED MECHANISM — VERTICAL POSITION adjustment for units equipped with a late design adjustable feed pawl.

Requirement

Tape guide should align with die plate as gauged by eye.



(Front View)

To Adjust

Loosen three screws securing backup mechanism to casting and two screws holding clamp to eccentric bushing. Turn eccentric bushing until backup mechanism is positioned vertically. Tighten screws on clamp plate first, then tighten mounting screws.

3.33 Punch Backup Mechanism (continued)

TEN TO THE INCH

Requirement

Punch should produce tape that conforms to tape gauge TP302990.

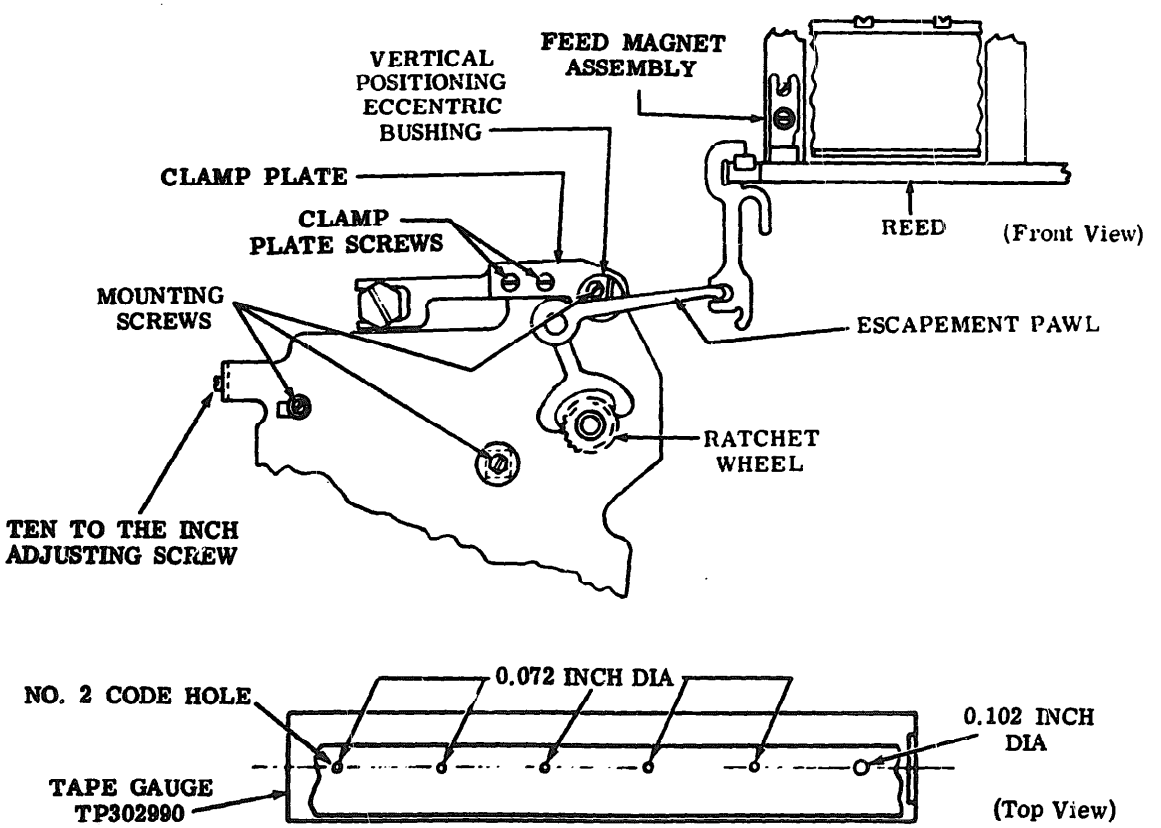
Note: First five holes in tape gauge TP302990 are same size as code holes in tape (0.072 inch diameter). Sixth hole in gauge is larger (0.102 inch diameter). This arrangement allows ±0.015 inch variation in ten to the inch spacing over five inches.

To Check

Perforate a length of tape (at least 5 inches long) with all levels marking. Place tape over smooth side of tape gauge so that first number two code hole in tape is concentric with first hole (0.072 inch diameter) in tape gauge. Next four holes (0.072 inch diameter) in tape gauge should be visible through number two code holes in tape. Last number two code hole in tape should be entirely within sixth hole (0.102 inch diameter) in tape gauge. Favor short ten to the inch spacing at 1200 words per minute and long at 2400 words per minute (within gauge).

To Adjust

Loosen three mounting screws that fasten backup mechanism to main casting. Rotate adjusting screw clockwise to move backup mechanism toward right or counterclockwise to move it toward left until requirement is met. If ten to the inch spacing is short, backup mechanism should be moved toward left. If spacing is too long, it should be moved toward right. Tighten mounting screws and recheck FEED MECHANISM – VERTICAL POSITION (3.31) and refine if necessary. Recheck ten to the inch spacing and refine if necessary.



3.34 Punch Backup Mechanism (continued)

Note 1: Make this adjustment with punch backup mechanism installed.

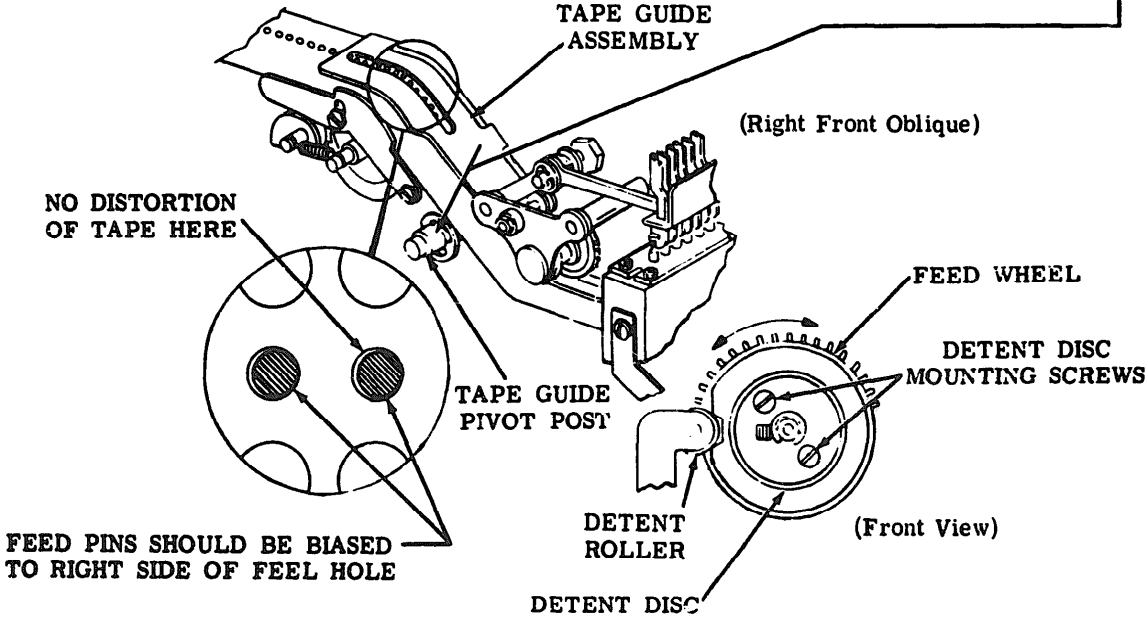
REVERSE FEED WHEEL PHASING

Note 2: This adjustment is to assure that the tape will be backed-up exactly 80 characters.

(1) Requirement (Preliminary)
With ten to the inch requirement made, punch about one foot of fully perforated tape. Push tape guide assembly down by pressing at tape guide pivot post until reverse feed wheel pins just enter feed holes of tape. (Do not press any further.) Feed pins should be biased to right side of hole but should not distort tape at edge of hole.

(2) Requirement (Final)
Punch at least one foot of fully perforated tape. Initiate a back-up and overpunch tape. No feed hole should be distorted or elongated by more than 0.003 inch. Repeat procedure and check at least ten times.

To Adjust
With both detent disc mounting screws friction-tight and while holding detent roller firmly against detent disc, move feed wheel in direction required. Tighten mounting screws.

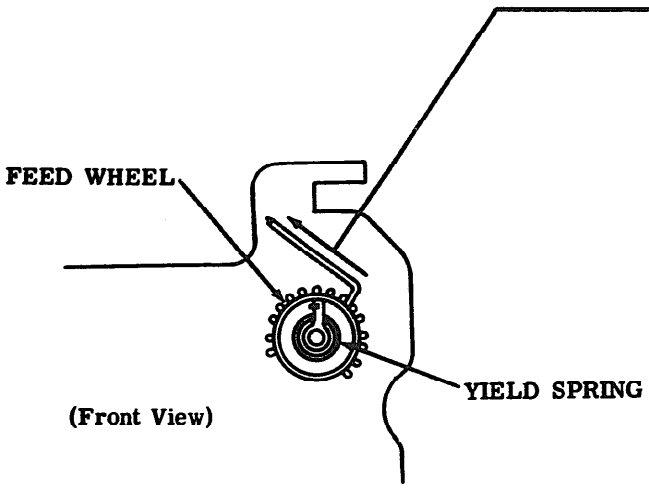


3.35 Punch Backup Mechanism (continued)

YIELD SPRING

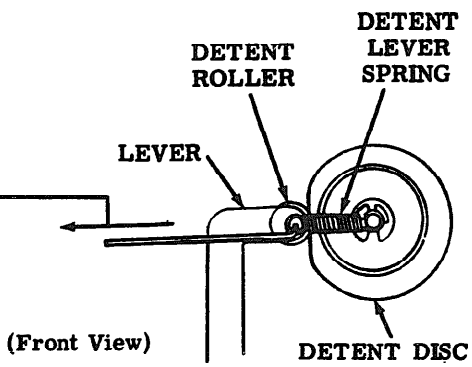
Requirement
With spring scale positioned over feed pin and pulled to move feed wheel in a counterclockwise direction, it should require
Min 8 oz---Max 10 oz
to start feed wheel moving.

Note: Check with ratchet and feed wheel removed. See appropriate disassembly section for procedure. Hold ratchet and rotate feed wheel several times to make sure there is no binding after parts are assembled.



DETENT LEVER SPRING

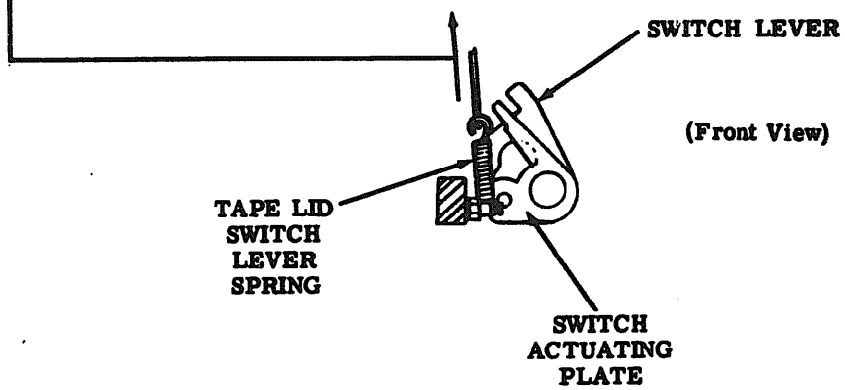
Requirement
With drive shaft rotated until both clutches are disengaged, it should require
Min 7 oz---Max 9 oz
to start detent lever spring moving from its detent position.



3.83 Punch Backup Mechanism (continued)

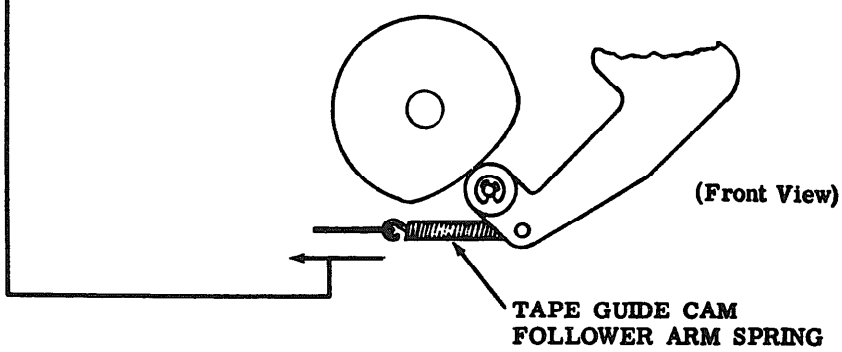
TAPE LID SWITCH LEVER SPRING

Requirement
With drive shaft rotated until both clutches are disengaged and spring removed from switch lever, it should require
Min 7 oz---Max 10 oz
to pull spring to its operating length.



TAPE GUIDE CAM FOLLOWER ARM SPRING

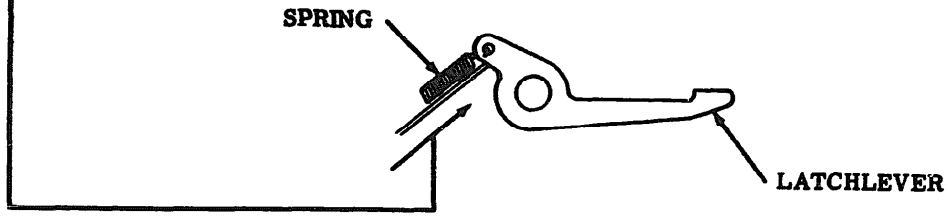
Requirement
With drive shaft rotated until both clutches are disengaged, it should require
Min 36 oz---Max 40 oz
to pull spring to its installed length.



3.37 Punch Backup Mechanism (continued)

DRIVE SHAFT CLUTCH LATCHLEVER SPRING

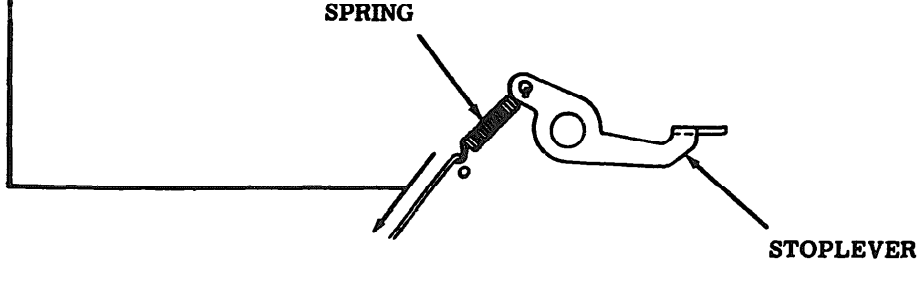
Requirement
With trip magnet actuated and drive shaft rotated until disc lugs are clear of both stop lever and latchlever, it should require Min 1-1/2 oz---Max 3-1/2 oz to start lever moving.



(Front View)

DRIVE SHAFT CLUTCH STOP LEVER SPRING

Requirement
With drive shaft rotated until both clutches disengage, it should require Min 2 oz---Max 4 oz to pull spring to its operating length.



(Front View)

3.38 Punch Backup Mechanism (continued)

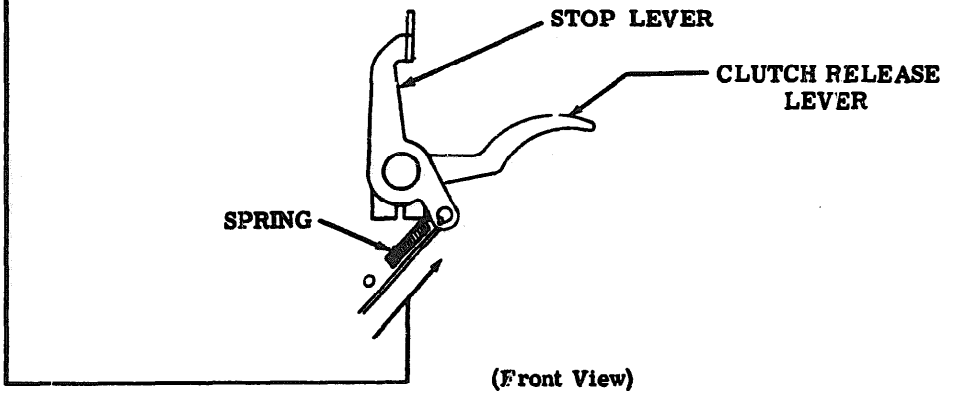
INTERMEDIATE SHAFT CLUTCH STOP LEVER SPRING

Requirement

With magnet actuated and drive shaft rotated until intermediate clutch engages and stop lever is against eccentric stop post, it should require

— Min 1-1/2 oz---Max 3-1/2 oz

to start lever and shaft rotating away from eccentric stop post.



(Front View)

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

SECTION 592-803-701TC
Issue 3, March 1968

HIGH SPEED TAPE PUNCH UNIT (DRPE TYPE)

LUBRICATION

CONTENTS PAGE

1. GENERAL

1.01 This section provides lubrication information for the high speed tape punch (DRPE type). It is reissued to add and revise lubrication information according to the latest engineering changes. These include new 2400 word per minute models and variable features such as a backup mechanism, photoelectric reader (verifier), and universal punch block. Because this is a **general** revision, marginal arrows whichindicate change have been omitted.

1.02 The high speed tape punch should be lubricated as directed in this section, The findicate points to be lubricated and the kind and quantityof lubricant to be used. Lubricate the unit just prior to placing it in service. After a few weeks of service, relubricate to make certain that all points receive lubrication. Thereafter, the lubrication interval is:

Operating Speed (Words per Minute)	Lubrication Interval
100	2000 hr or 6 mo*
500	400 hr or 3 mo*
l000	200 hr or 2 mo*
1500	150 hr or l-1/2 mo*
2000	75 hr or 1 mo*
2400	40 hr or 1 mo*

*Whichever occurs first.

1.03 Use KS7470 **oil** and Mobil #2 grease when lubricating this unit. See section 570-005-800TC for complete list of tools.

Note: TP143484 is a 1 lb can **of** Mobil #2 grease, TP145867 is the same **grease** in a 4 oz tube.

1.04 Saturate all spring wicks and felt oilers; lubricate friction surfaces of all moving parts. **Avoid** overlubrication. Prevent lubricant from getting between electrical contacts or between stepper magnet coils and armature.

1.05 Thephotographs indicate paragraph numbers that refer to specific line drawings of mechanisms and where these mechanisms are located on the equipment. Mechanisms in line drawings are shown upright unless otherwise specified.

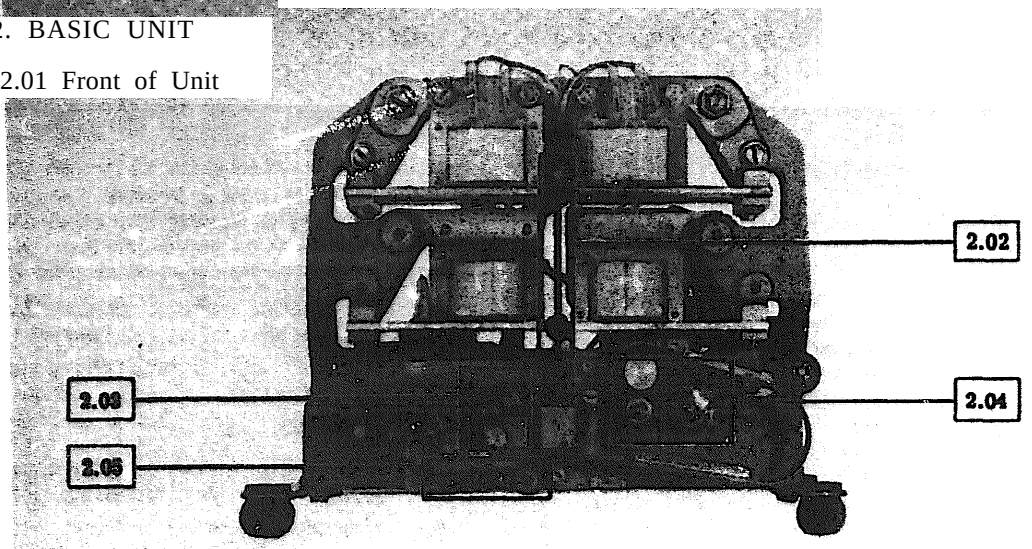
1.06 The illustration symbols indicate the following lubrication directions:

01 - Apply one drop of oil.
02 - Apply two drops of oil, etc.
SAT - Saturate with oil (felt oilers, washers, and wicks).
FILL - Fill with oil (oil holes and oil cups).
G - Apply l/64-inch film of grease unless directed otherwise.

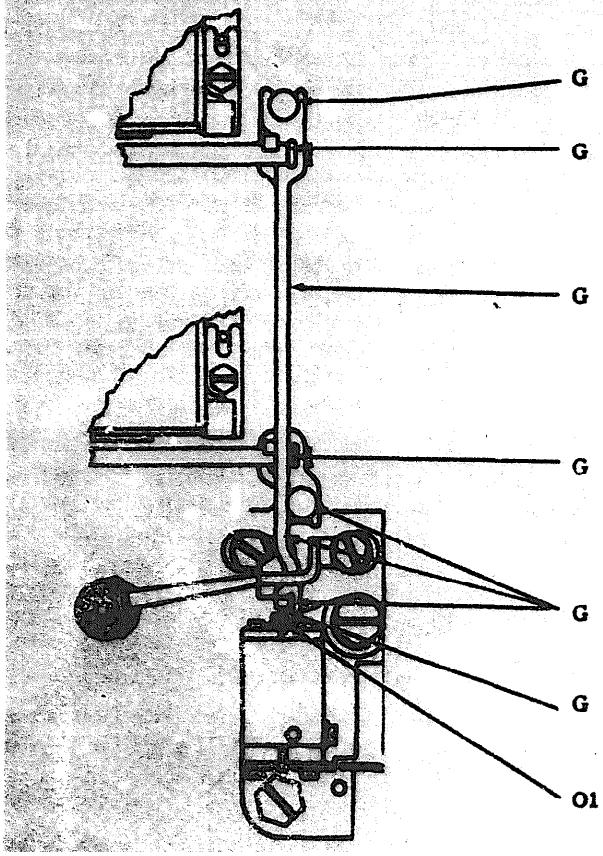
1.07 After each lubrication interval, wipe off excess lubricant from upper tape guideplate and punch pins.

2. BASIC UNIT

2.01 Front of Unit

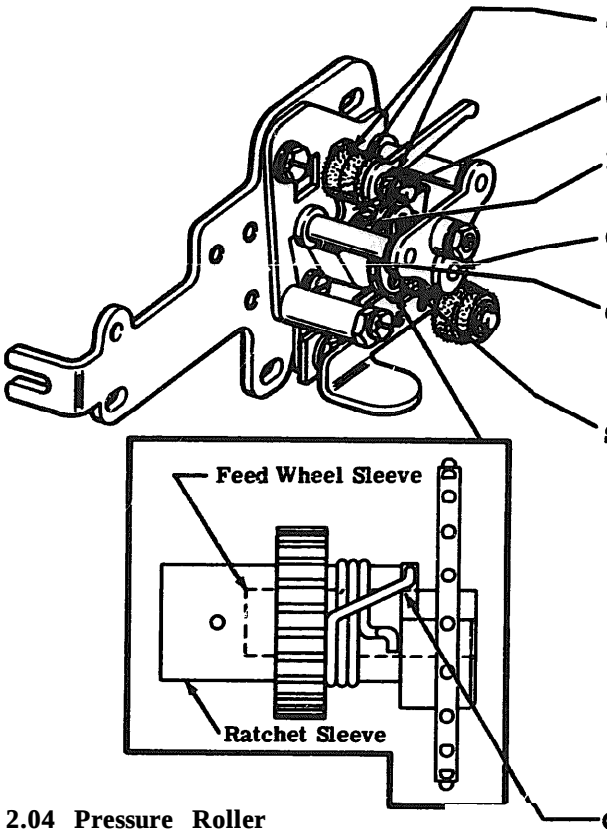


2.02 Links and Reed Tips



G	Links, Guides, and Posts	Links
G	Contacting Surfaces (To be coated with 1/32 inch of grease)	Reed Tips, Dampers, Links, and Bumpers
G	Links, Guides, and Posts	Links
G	Contacting Surfaces (To be coated with 1/32 inch of grease)	Reed Tips, Dampers, Links, and Bumpers
G	Links, Guides, and Posts	Links
G	Contacting Surface	Punch Pins
O1	Sliding Surface	Punch Pins

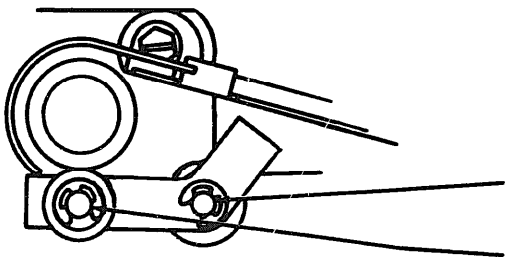
2.03 Escapement Pawls, Ratchet, and Grease Retainer



SAT	Felt Washers	Escapement Pawl Shaft
G	Contact Surfaces	Escapement Pawl
FILL	Fill Grease Retainer if Present	Escapement Ratchet
G	Shaft Hole - See Note	Feed Wheel Shaft
G	Spring Coils, Feed Wheel Shaft Surface	Feed Wheel Shaft and Yield Spring
SAT	Felt Washer (Late Design)	Feed Wheel Shaft

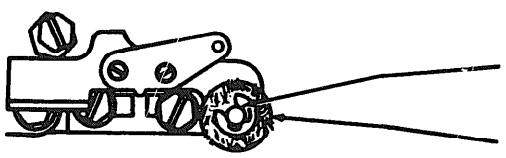
Note: If there is a hole through feed wheel shaft, apply lubricant to hole until it flows through to hole on ratchet. If there is no hole, disassemble feed and ratchet wheel assemblies as outlined in disassembly section. After reassembly, block feed wheel center hole and two cross holes in ratchet sleeve. Apply lubricant against end of ratchet sleeve until it flows from hole in ratchet sleeve.

2.04 Pressure Roller



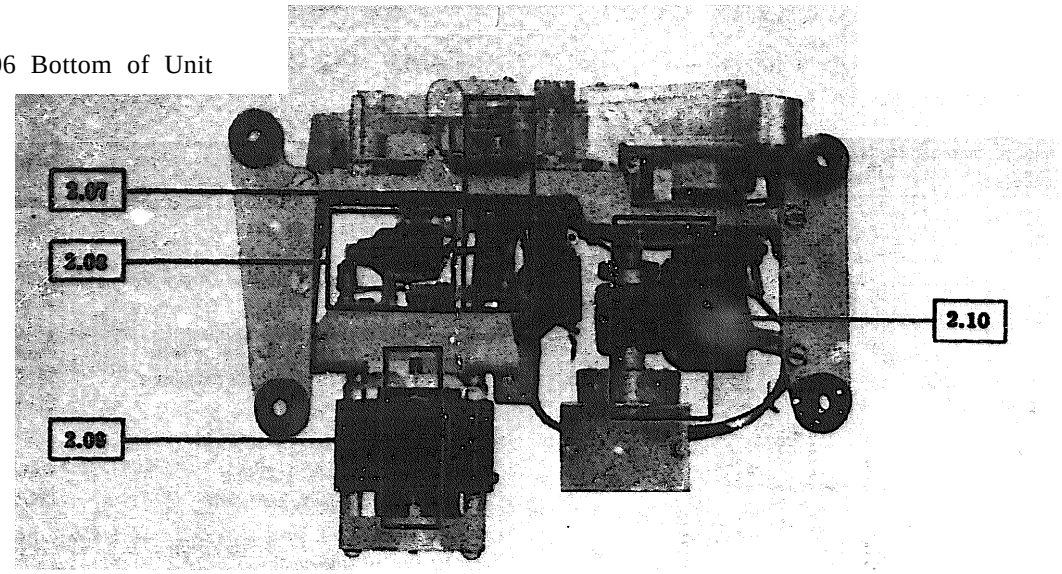
G	Contact Surface	Feed Wheel Spoke and Ratchet
O2	Each Pivot Bearing	Pressure Roller Bail
O2	Oilite Bearing (Each End)	Pressure Roller

2.05 Tape Guide Shaft

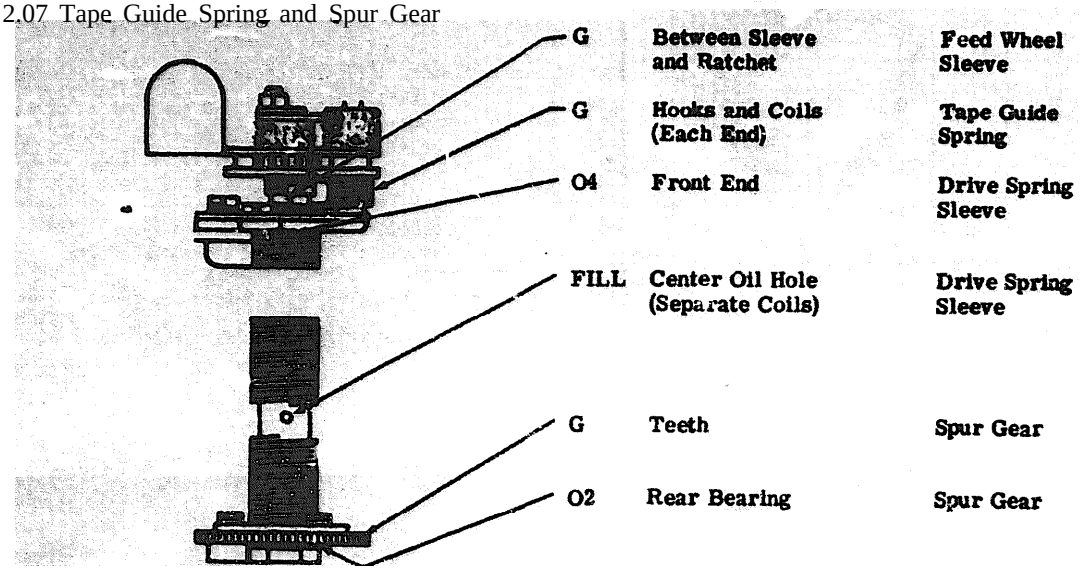


O2	Rear of Bearing	Tape Guide Shaft
SAT	Felt Washer	Bearing

2.06 Bottom of Unit

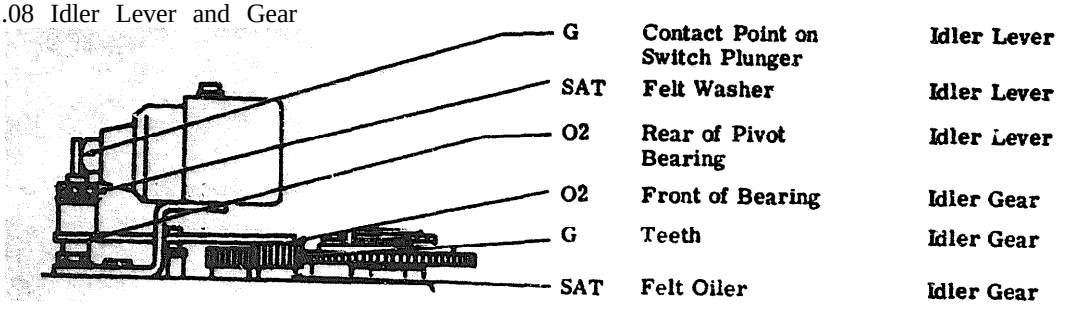


2.07 Tape Guide Spring and Spur Gear



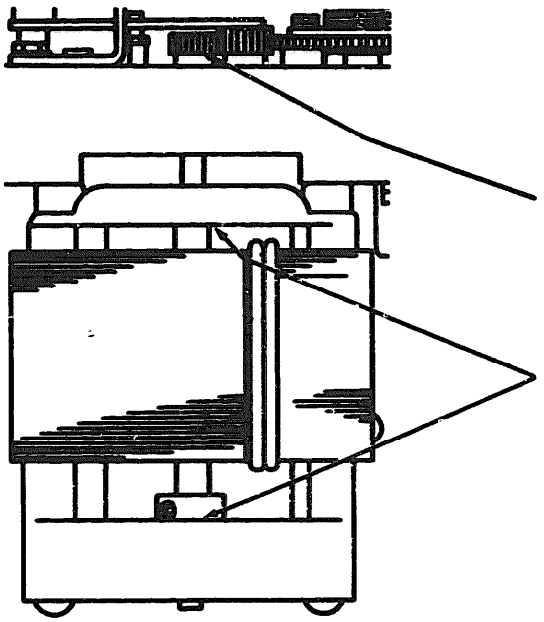
G	Between Sleeve and Ratchet	Feed Wheel Sleeve
G	Hooks and Coils (Each End)	Tape Guide Spring
O4	Front End	Drive Spring Sleeve
FILL	Center Oil Hole (Separate Coils)	Drive Spring Sleeve
G	Teeth	Spur Gear
O2	Rear Bearing	Spur Gear

2.08 Idler Lever and Gear



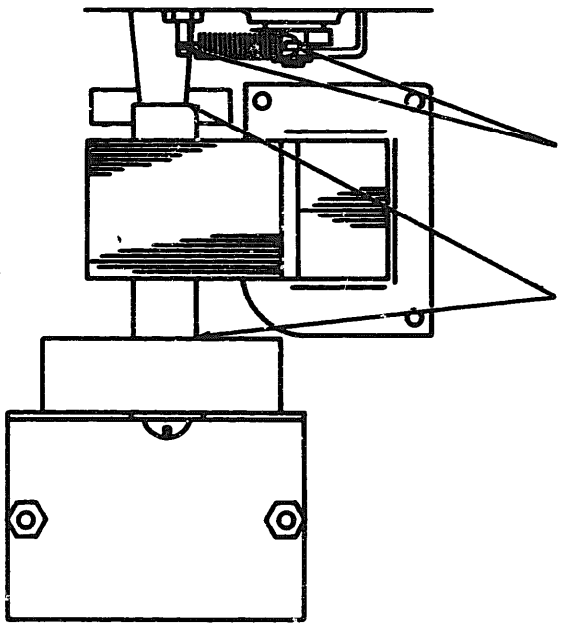
G	Contact Point on Switch Plunger	Idler Lever
SAT	Felt Washer	Idler Lever
O2	Rear of Pivot Bearing	Idler Lever
O2	Front of Bearing	Idler Gear
G	Teeth	Idler Gear
SAT	Felt Oiler	Idler Gear

2.09 Tape Feed Motor



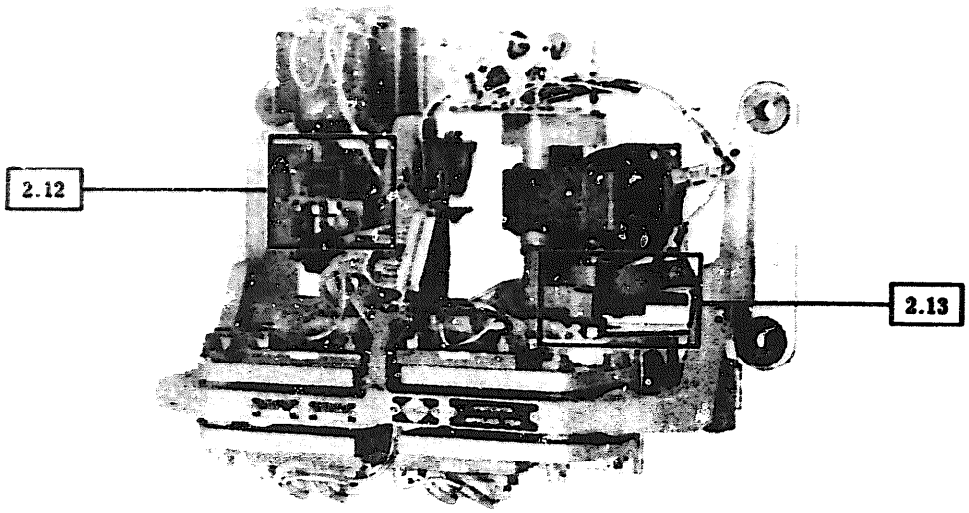
G	Teeth	Feed Motor Pinion
SAT	Felt Washers (2) (Inside Castings)	Tape Feed Motor

2.10 Tape Puller

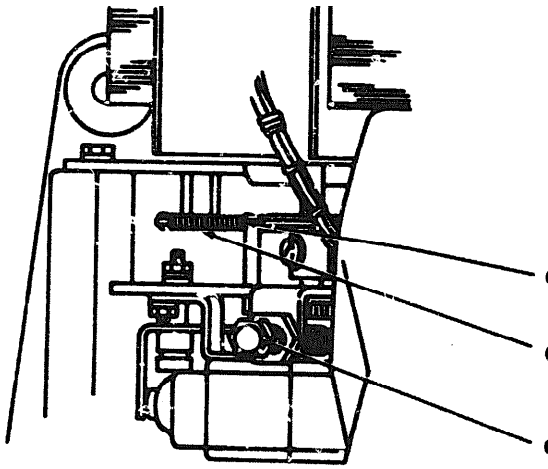


O1	Hooks (Each End)	Pressure Roller Spring
SAT	Felt Washers (2) (Inside Castings)	Tape Puller Motor

2.11 Top of Unit



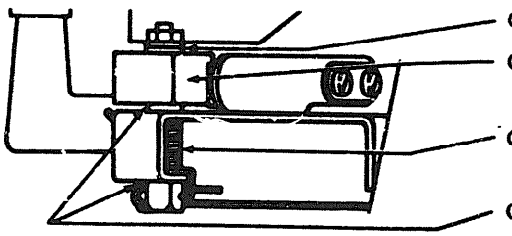
2.12 Antireverse Pawl and Pulley



Note: The antireversal pawl is intended to operate without lubrication. Clean pawl and V-groove pulley with suitable solvent at lubricating intervals.

O1	Spring Hooks (Each End)	Antireverse Pawl Spring
O2	Lever Pivot	Antireverse Pawl and Pulley
O2	Spring Hooks (Each End)	Idler Lever Spring

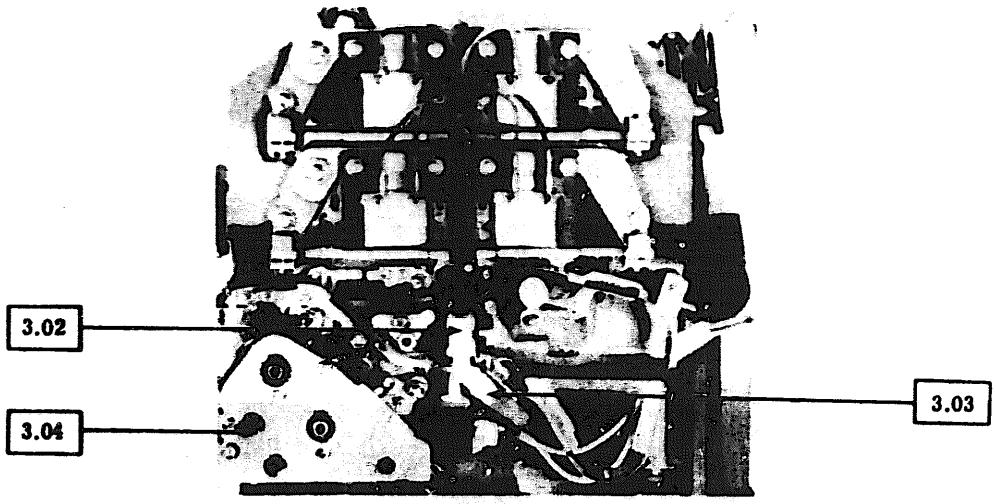
2.13 Tape Sensing Lever



O1	Cam Shaft	Contact Arm
G	Switch Cam	Tape Sensing Lever Switch
G	Spring Hooks and Coils	Tape Sensing Lever Spring
O1	Lever Bearings	Sensing Lever

3. VARIABLE FEATURES

3.01 High Speed Tape Punch



3.02 Universal Punch Block

Note: The universal punch block lubrication procedures are the same as the standard punch mechanism. See 2.02 and 2.03.

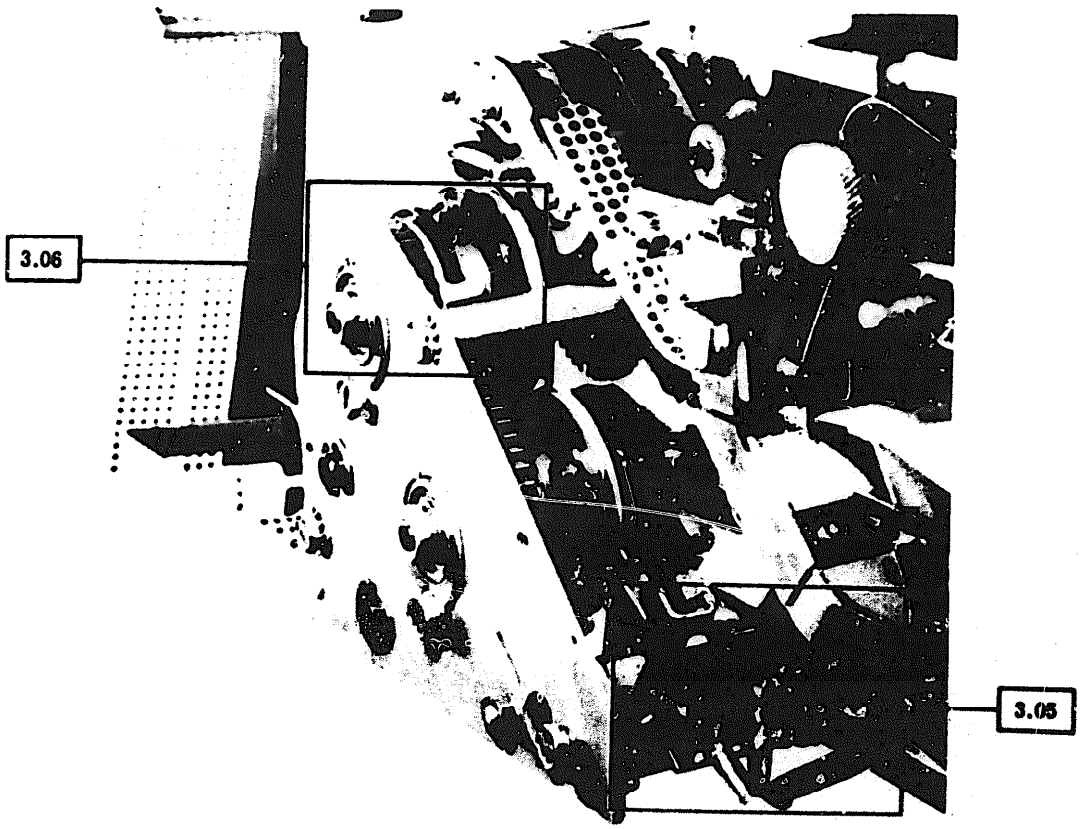
CAUTION **1: EXCESS OIL ON PAPER TAPE** MAY **PREVENT DATA FROM BEING SENSED CORRECTLY.**

CAUTION 2: WHEN LUBRICATING UNIVERSAL PUNCH BLOCK, DO NOT SPRAY LUBRICANT ON COVER OF LIGHT SOURCE.

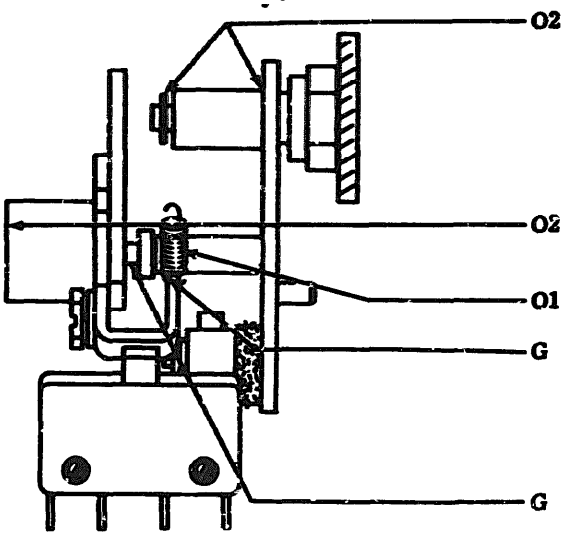
3.03 Photoelectric Reader (Verifier)

Note: The photoelectric reader (verifier) does not require lubrication.

3.04 Backup Mechanism

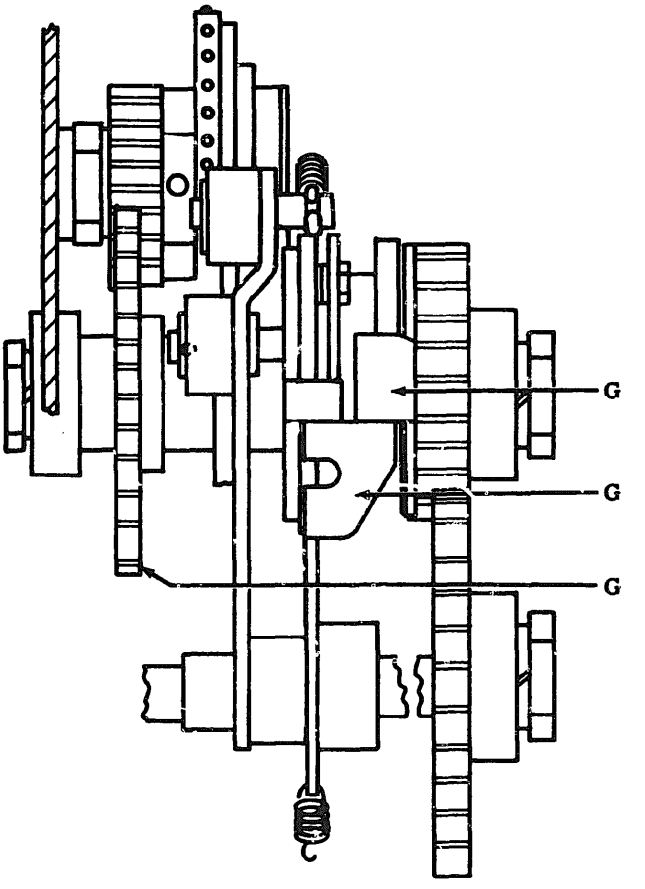


3.05 Switch Lever Assembly



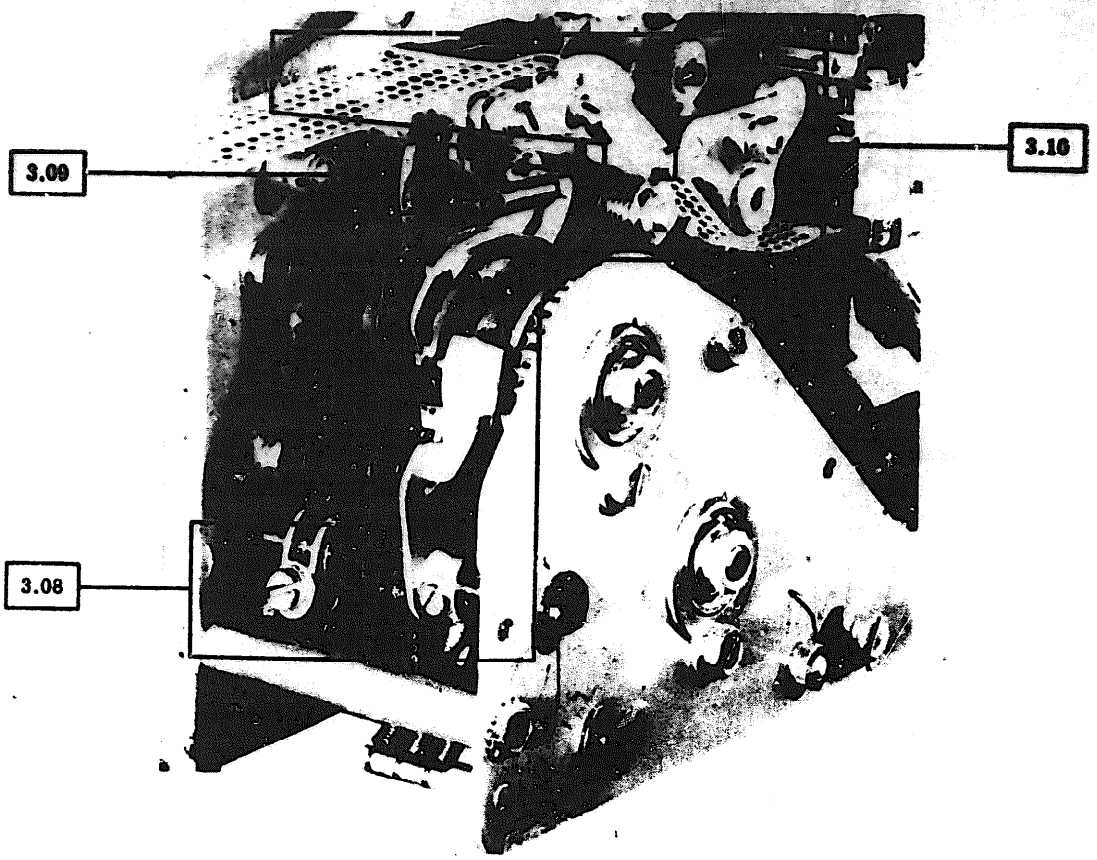
O2	Bearing Surfaces	Switch Lever Operating Post
O2	Contact Surfaces	Switch Lever Hub
O1	Coils	Tape Lid Spring
G	Hooks (Each End)	Tape Lid Spring
G	Mating Surfaces	Switch Lever Eccentric Post

3.06 Intermediate Shaft Assembly

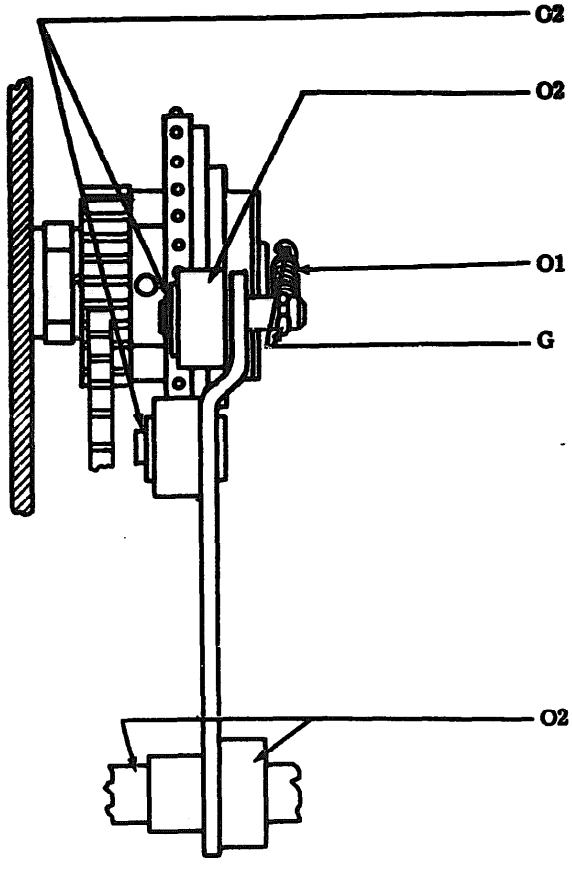


G	Mating Surface	Clutch Latch-lever Release
G	Mating Surface	Clutch Disc Lug
G	Gear Teeth	Intermediate Shaft Gear

3.07 Data Lever and Reverse Feed Wheel

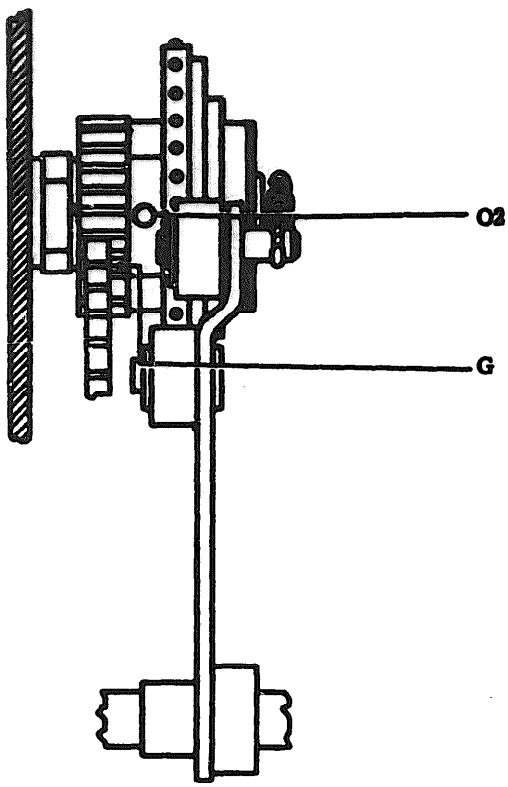


3.08 Detent Lever Assembly

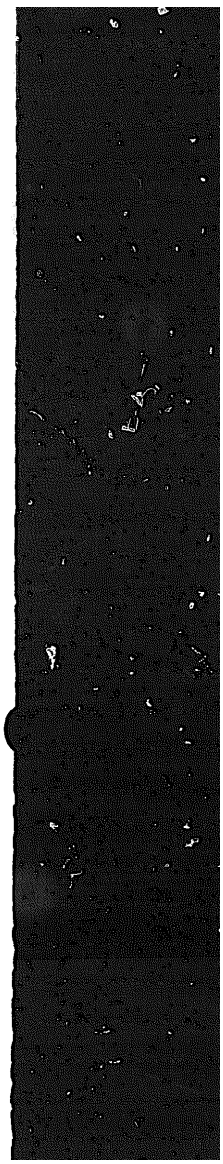


O2	Bearing Points	Cam Roller on Detent Lever
O2	Bearing Point	Hub of Detent Lever
O1	Coils	Detent Return Spring
G	Spring Hooks	Detent Return Spring
O2	Bearing Point	Hub of Detent Lever

3.09 Reverse Feed Wheel Assembly



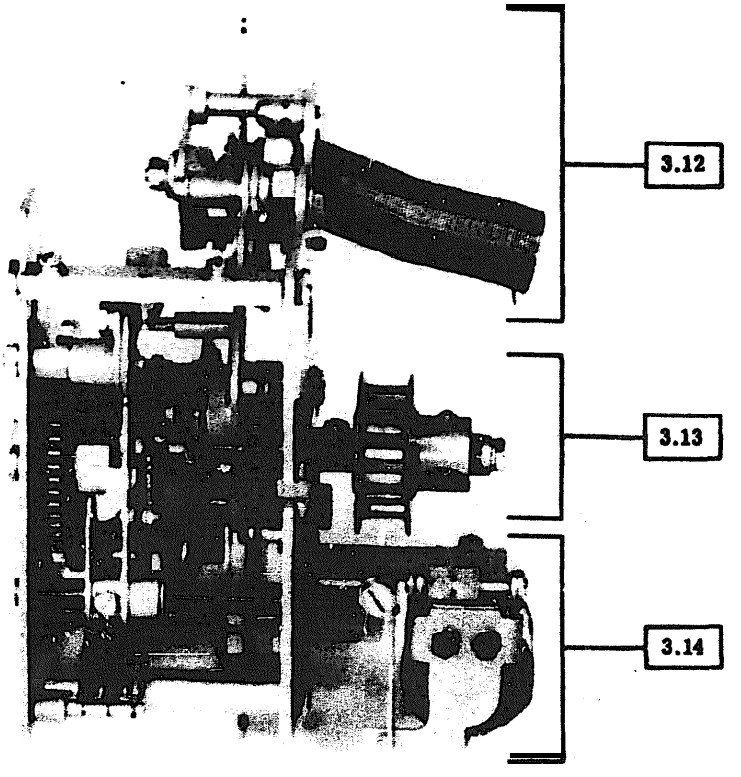
Bearing Point (Hole in shaft must be upright)	**Reverse Feed Wheel Driving Gear**
Fiber Gear Teeth Mating Surface	**Reverse Feed Wheel Driving Gear**



3.10 Tape Guide Assembly

See 2.05 through 2.07

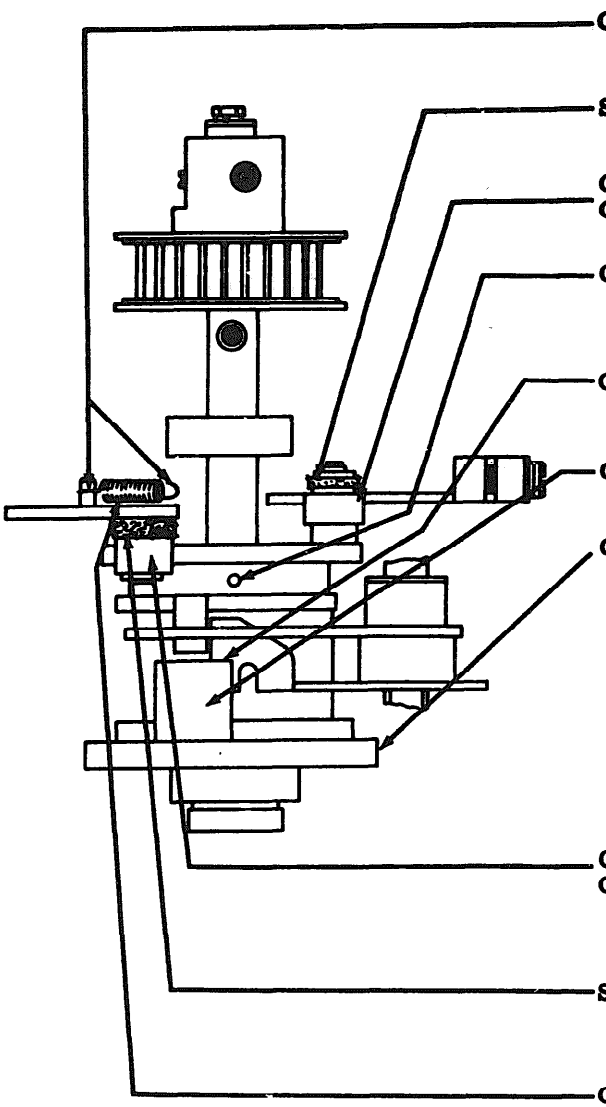
3.11 Escapement, Drive Shaft and Trip Magnet Assemblies



(Bottom View)

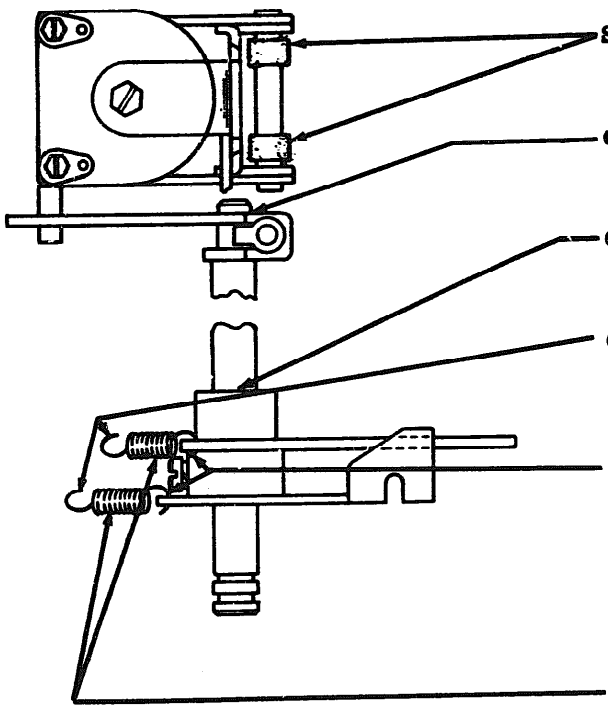
3.12 Escapement Assembly (Forward Feed Wheel)
See 2.03 through 2.13

3.13 Drive Shaft Assembly



G	Spring Hooks	Tape Guide Cam Follower Spring
SAT	Felt Wick	Drive Shaft Cam Roller
O2 G	Contact Surface	Tape Guide Cam Follower
O3	Hole (Must be Upright)	Drive Shaft
G	Mating Surface	Clutch Latchlever Release
G	Mating Surface	Tape Guide Cam Clutch Disc Lugs
G	Gear Teeth Meshing Surfaces	Drive Shaft Gear
G O2	Contact Surface	Tape Guide Cam Follower
SAT	Felt Wick	Tape Guide Cam Follower Arm
O1	Coils	Tape Guide Cam Follower Spring

3.14 Trip Magnet Assembly



SAT	Felt Wick	Armature Shaft Hinge Pin
G	Bearing Surface	Armature and Trip Shaft
O2	Bearing Surface	Clutch Latchlever Hub
G	Spring Hooks	Stop Lever Spring Latchlever Spring Trip Lever Spring
G	Spring Hooks	Stop Lever Spring Latchlever Spring Trip Lever Spring
O1	Coils	Stop Lever Spring Latchlever Spring Trip Lever Spring

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

HIGH SPEED TAPE PUNCH UNIT

(DRPE TYPE)

DISASSEMBLY AND REASSEMBLY

CONTENTS

1. GENERAL

1.01 This section provides disassembly and reassembly instructions for the high speed tape punch unit (DRPE type) It is reissued to add engineering changes, new 2400 **word** per minute models, and variable features. The variable ***features*** include a backup mechanism, photoelectric reader (verifier), and a universal punch block. Since this is a general revision, marginal arrows, used to indicate changes, are omitted The photographs used in this section are representitive of most models.

1.02 The disassembly procedure given divides the high speed tape punch **unit** into its major subassemblies in the reverse order to that normally used in the assembly of a new unit. If further disassembly is required, refer to Section 592-803-800TC which shows detailed arrangements of parts.

1.03 Most maintenance, lubrication, and adjustments can be accomplished simply by **removing** the unit from its enclosure. If possible, disassembly should be confined to subassemblies, **which can, in** some cases, be removed without disturbing adjustments. When reassembling subassemblies, be sure to check all associated adjustments, clearances, and spiring tensions.

1.04 If a part that is mounted on shims is removed, note then number of shims used at each of its mounting screws so that the same shim pile-up can be replaced when the part is **remounted.**

1.05 Retaining rings are made of spring steel and **have a** tendency to release suddenly. To avoid **loss** of these rings when removing them, proceed as follows hold retaining ring to prevent it from rotating. Place the blade of a screwdriver in one of the rings slots. Rotate the screwdriver in a direction to increase the *rings* diameter. The ring will come off easily without flying.

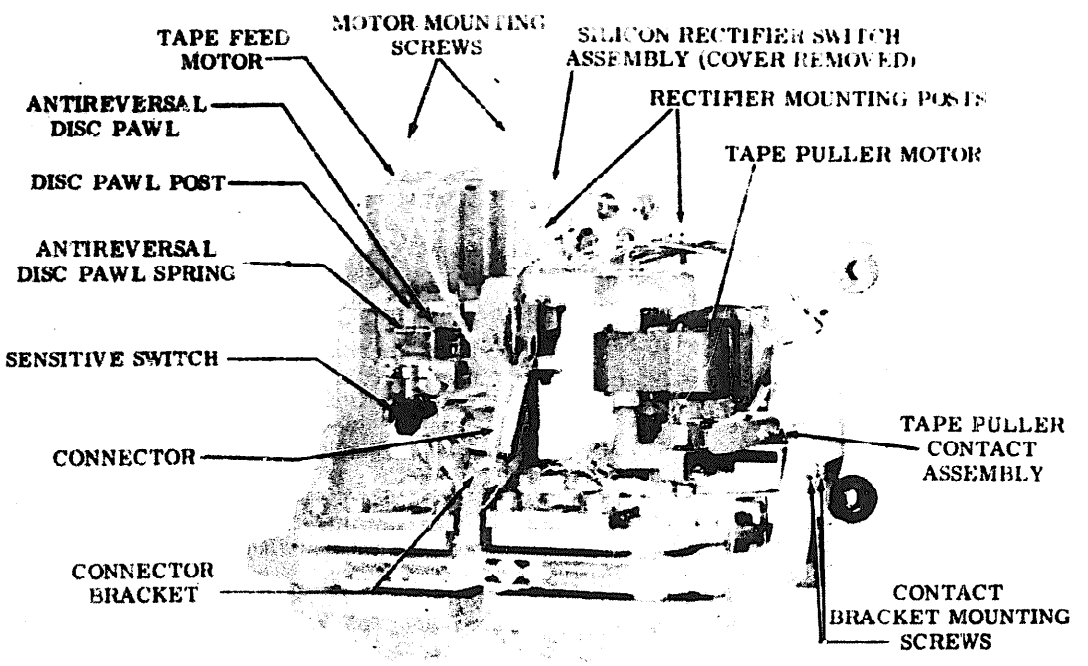


Figure 1 - Five-Level Punch Unit, Top View (2000 WPM)

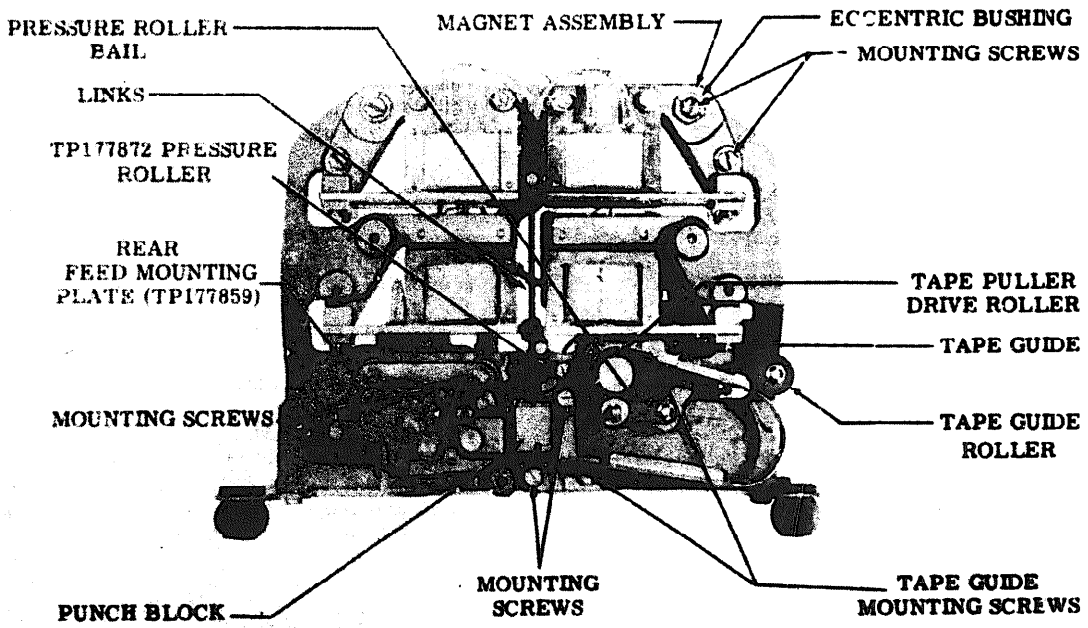


Figure 2 - Five-Level Punch Unit, Front View (2000 WPM)

1.06 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.

1.07 In removing a subassembly from the unit, the procedure followed, and the location from which parts are removed, should be carefully noted so that the unit can be reassembled correctly. Where no specific instructions are given for reassembly, reverse the procedure used in removing the subassembly. When reassembling, follow the adjustment sequence in Section 592-803-700 if the unit has been disassembled farther than subassemblies. Use this section to recheck adjustments after reassembly is complete.

1.08 Refer to Section 570-005-600 for information about the tools necessary for disassembly and reassembly procedures given in this section.

CAUTION: REMOVE POWER FROM UNIT BEFORE BEGINNING DISASSEMBLY PROCEDURES.

2. BASIC UNIT

SILICON RECTIFIER SWITCH ASSEMBLY (Figure 1)

2.01 To remove the silicon rectifier switch assembly:

(1) Pull associated quick disconnect cable terminals from the cable assembly connector and both motors, and either remove the sensitive switch and tape puller contact switch, or remove the connecting wires to these switches.

(2) Remove the cover (TP148319) by removing the two cover mounting post screws (TP151630) and lockwashers (TP2191).

(3) While holding the assembly with one hand, remove the two nuts (TP3598) and lockwashers (TP2191) that mount the assembly to the motor bracket.

CABLE AND CONNECTOR (Figure 1)

2.02 To remove the connector only, pull the cable terminal pins out of the connector and remove the two screws, lockwashers, and

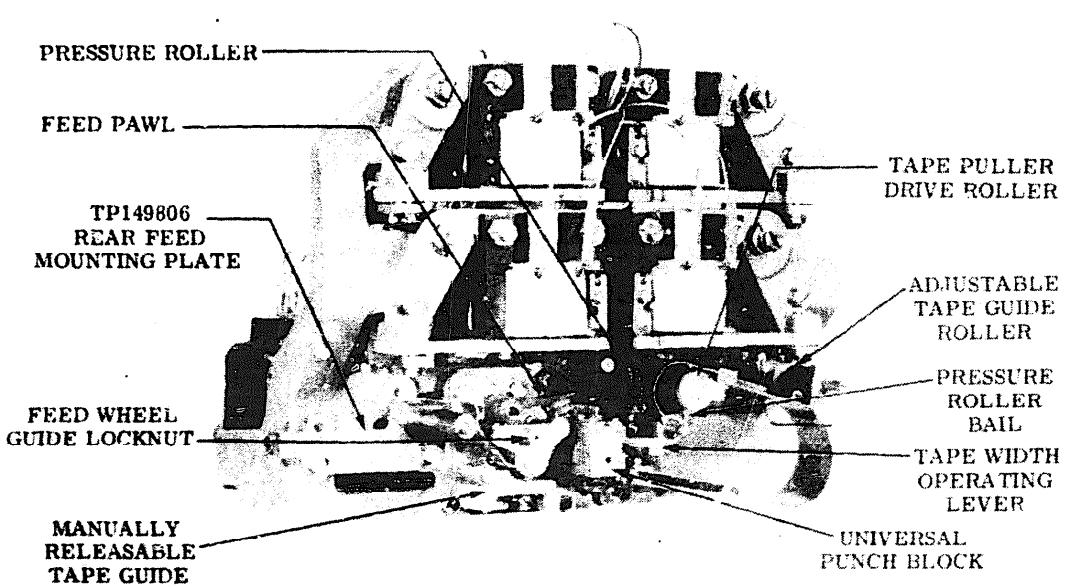


Figure 3 - Eight-Level Punch Unit. Front View (2400 WPM)

nuts that mount the comes to its bracket; **or the bracket and connector may be removed as a unit by removing the two bracket mounting** screws (TP151630) and lockwashers (TP2191).

TAPE FEED MECHANISM
(Figures 1, 2, 3, and 5)

2.03 To remove the ***feed*** mechanism:

(1) Manually release ihe torque from the drive spring (2900 wpm, TPl77847 or 2400 wpm, TP149833) in steps, Raise and lower the antireversal disc pawl allowing only a small portion of the torque to **unwind** at a time.

CAUTION: IF TORQUE FROM A FULLY WOUND DRIVE SPRING IS SUDDENLY RELEASED, PERMANENT GE TO SPRING WILL RESULT. SPRING TENSION SHOULD BE RELEASED IN ***STEPS*** AT THE ANTIREVERSAL DISC PAWL.

(2) After torque is released, loosen only the screw (TP152893) securing the end of the drive spring, under flat washer (TP125011) located on the feed wheel spur gear, and free the drive spring end.

(3) Remove the three screws (TP151631), lo&washers (TP2191), and flat washers (TP7002) that secure the feed mounting plate (2000 wpm, TP177859, ***or 2400 wpm,*** TP149806) to the main casting.

(4) Using care not to damage the springs or escapement pawl, remove the feed mounting plate with its associated feed mechanisms mounted on it.

YIELD SPRING (Figures 3, 4, and 5)

A. Disassembly

2.04 Before proceeding with the disassembly of the yield spring, the feed mounting plate must be removed as outlined in 2.03. After the mounting plate has been removed, follow the procedure outlined in this paragraph.

(1) Remove the two retaining rings (TP119651) securing the manually releasable tape guide (TP177865) and remove the guide.

(2) Remove the ratchet wheel grease retainer (TPl47879) (if equipped) by removing its two mounting screws, **lock**washers, and flat washers.

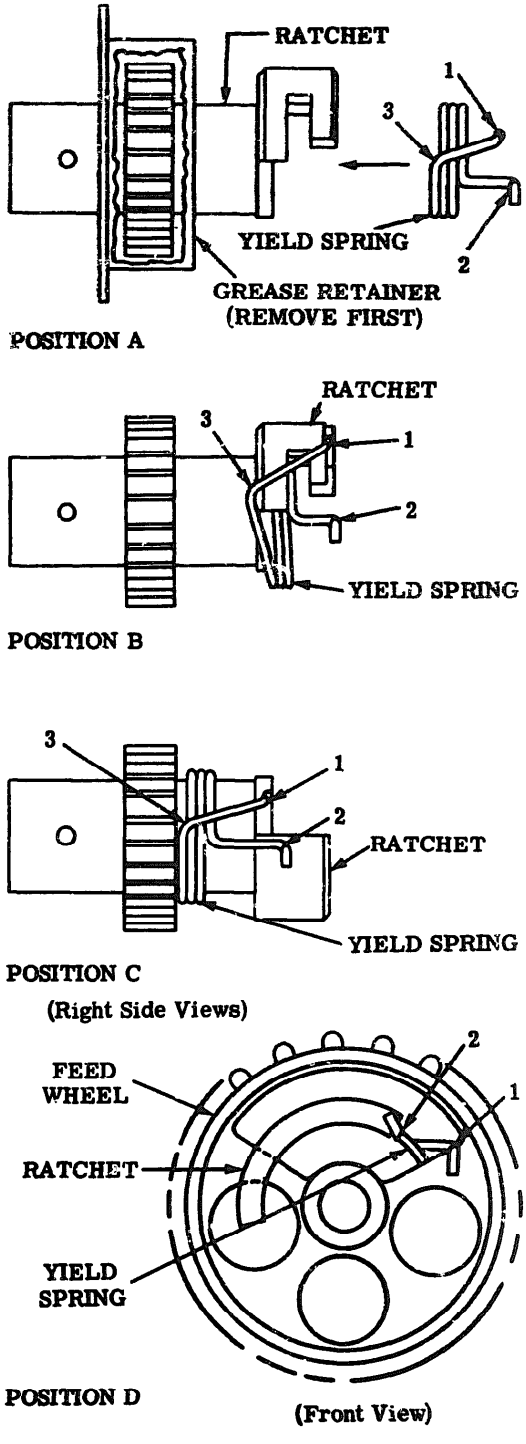


Figure 4 - Yield Spring **Assembly**

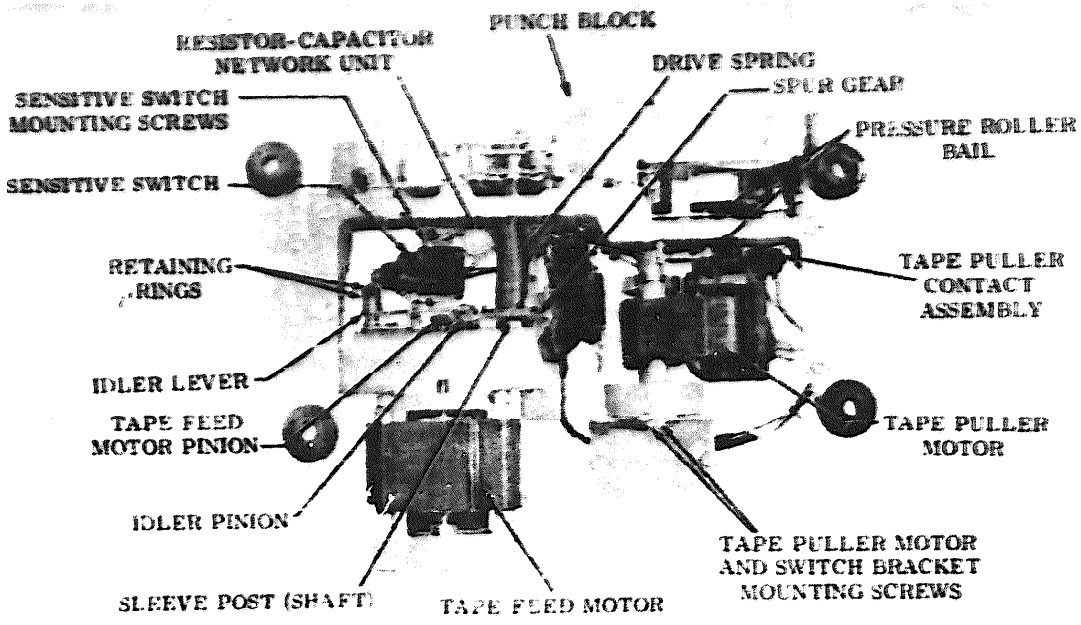


Figure 5- Five-Level Punch Unit Bottom View (2000 WPM)

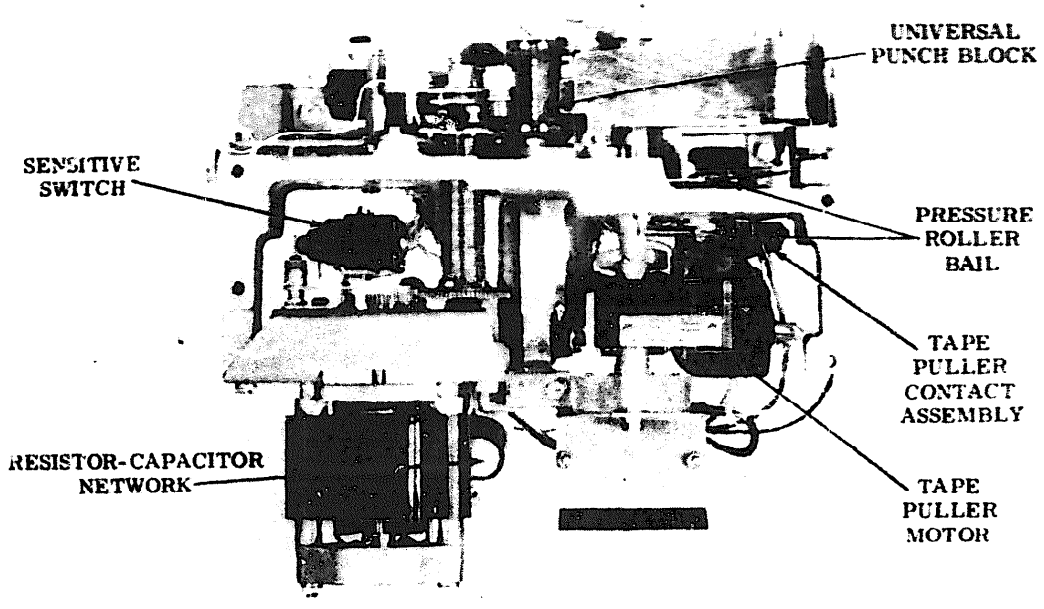


Figure 6 - Eight-Level Punch Unit. Bottom View (2400 WPM)

(3) Remove the feed (escapement) pawl (TP177815) and its eccentric post (TP177856) by removing the nut (TP3598) and lockwasher (TP2191) that secure the eccentric post to the feed wheel plate.

(4) Remove the feed wheel guide locknut (TP3598) and lockwasher (TP2191) and, with an Allen wrench, screw the feed wheel guide (2000 wpm, TP177863, or 2400 wpm, TP149801) in toward the rear of the unit until the feed wheel is released.

(5) Remove the feed wheel, yield spring and ratchet, and the drive spring as an assembly through the rear of the feed wheel plate.

(6) Referring to Figure 4, disengage ratchet and yield spring (shown in position D) by carefully gripping bend 1 with a long nose pliers and pulling the spring away from the feed wheel.

(7) Unwind the yield spring counterclockwise while holding bend 2 with a long nose pliers.

B. Reassembly

Text **To reassemble the yield spring to the ratchet and feed wheel:**

(1) Bring the yield spring to the ratchet as shown in Figure 4, position A.

(2) Using a long nose pliers to hold bend 1, lift bend 3 over ratchet as shown in Figure 4, position B.

(3) Still holding bend 1 with pliers, turn the yield spring clockwise onto the ratchet with bend 2 in place as shown in Figure 4, position C.

Note: At this point, lubricate the ratchet and feed wheel as specified in Section 592-803-701. Also, fill the ratchet wheel grease retainer with lubricant specified in Section 592-803-701.

(4) Assemble feed wheel to ratchet with yield spring bends in place as shown in Figure 4, position D.

TAPE FEED MOTOR (Figures 1 and 5)

2.06 **To remove the tape feed** motor with **its pinion:**

Pull the cable **connectors** from the **motor terminals.**

Remove the antireversal disc pawl spring (TP70466).

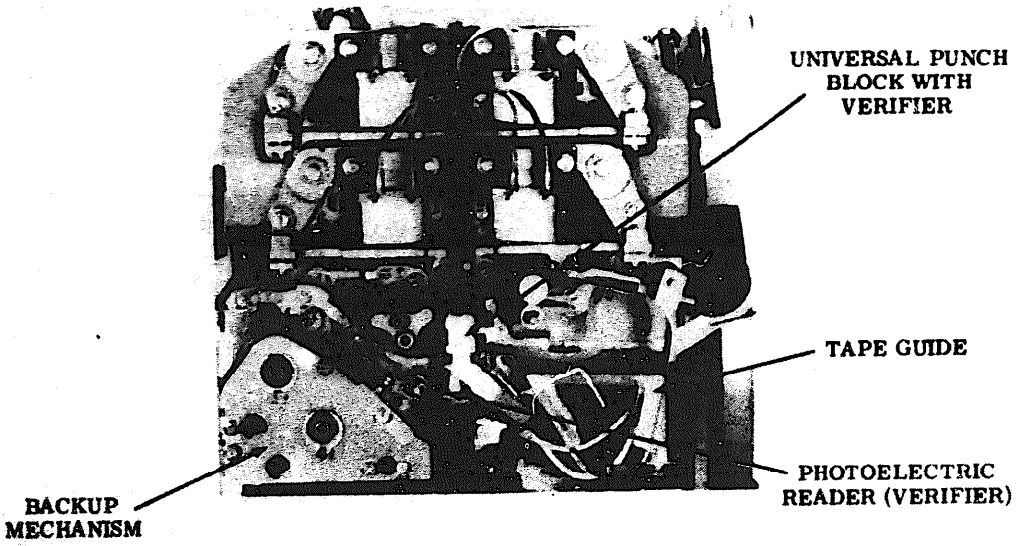


Figure 7 - Punch Unit with Backup Mechanism, Photoelectric Reader (Verifier), and Universal Punch Block with Verifier, Front View

(3) Remove the antireversal disc pawl post (TP149828), which still has the pawl and ring retainer on it.

(4) While holding the motor with one hand, remove the nut (TP112626), lockwasher (TP2669), and flat washer (TP34432) that secures the right hand motor stud to the mounting bracket.

(5) Carefully maneuver the motor out from the rear of the bracket.

SPUR GEAR AND DRIVE SPRING SLEEVE ASSEMBLY (Figures 5 and 6)

2.07 **To remove the spur gear and drive spring sleeve assembly:**

(1) Remove the nut (TP112626) and lockwasher (TP2669) that secure the drive shaft (TP177845) to the motor bracket.

(2) Carefully remove the spur gear and drive spring sleeve assembly through the front of the unit.

TAPE MOTOR SWITCH (Figures 5 and 6)

2.08 To remove the tape feed motor switch from its bracket, disconnect the switch wires from the silicon rectifier switch assembly first; then remove the two screws, lo&washers, and flat washers that mount the switch.

TAPE PULLER CONTACT ASSEMBLY (Figures 1, 5, and 6)

2.09 To remove the tape puller contact assembly:

(1) Disconnect the wire leads either at the contact pile-up or at the silicon rectifier switch assembly.

(2) Remove the two screws (TP179782) and lo&washers (TP2191) that mount the contact assembly to the main casting.

TAPE GUIDE (Figures 2, 3, and 7)

2.10 To remove the tape guide, remove the two screws (TPl51631), lockwashers (TP2191), and flat washers (TP7002) that secure it to the main casting.

TAPE PULLER MOTOR WITH DRIVE ROLLER (Figures 2, 3, 5, and 6)

2.11 **To remove the tape puller motor wit drive roller:**

(1) Disconnect the cable connectors from the motor terminals.

(2) Loosen the two motor mounting screws and remove the silicon rectifier switch assembly.

(3) While holding the motor with one hand, remove the two motor mounting screws, lockwashers, and flat washers from their tapped holes, but do not take them out of the motor assembly.

(4) While holding the pressure roller assembly down with one hand, ease the motor assembly out from the rear of the unit.

PRESSURE ROLLER AND BAIL (Figures 2, 5, and 6)

2.12 To remove the pressure roller **and** assembly:

(1) Remove the bail spring (TP90573).

(2) Remove the two ring retainers (TPll9652) securing the bail (TP177886) to the shaft (TP177901) and remove the shaft.

(3) Carefully remove the bail assembly from the front ***of*** the unit.

STANDARD PUNCH BLOCK ASSEMBLY (Figures 2 and 5)

2.13 To remove the standard punch block assembly:

(1) Remove the lower mounting screw (TP153442), lo&washer (TP2669), and flat washer (TP34432).

(2) While holding the punch block with one hand, remove the screw (TP153442), lockwasher (TP2669), and flat washer (TP34432) from the upper right mounting position.

(3) Carefully tilt the punch block away from the punch pin links and remove it from unit.

(4) Adjust the punch pin backstop bracket to retain the punch pins while the punch block assembly is removed from the unit.

MAGNET ASSEMBLIES (Figures 2 and 3)

2.14 To remove a magnet assembly:

(1) Remove the two wire leads to the magnet.

(2) Remove the upper mounting screw (TP85422), lockwasher (TP3639), flat washer (TP3438), and eccentric bushing (TP177819).

(3) While holding the magnet assembly with one hand, remove the lower mounting screw (TP74805), lockwasher (TP3639), and flat washer (TP3438).

(4) Carefully remove the magnet assembly from the punch pin links to disengage the reed from the link.

Note: Late model units have link dampers mounted to the reed extension. Care should be taken when removing magnet assemblies to avoid the loss of these dampers.

3. VARIABLE FEATURES

PHOTOELECTRIC R**EADER (VERIFIER)** (Figures 7 and 8)

3.01 To remove the chad chute (Figure 8):

(1) Remove the chad tube from the chadchute bracket by blocking thebracket in one hand and pulling the chad tube off the bracket with the other hand.

(2) Remove the chad tube bracke**t by removing** the two screws (TP151152)**, lockwashers (TP3640), and flat washers (TP125011) that** secure it to the punch block and adapter **bracket.**

3.02 To remove the light source assembly (Figure 8):

(1) Remove the two screws (TPl51630), lockwashers (TP2191), and the one flat washer (TP151610) that secure the light source assembly to the left-side bracket.

(2) Disconnect the rubber isolating tube from the mirror tube assembly by holding the mirror tube assembly in one hand while carefully pulling the isolating tube with the other hand.

(3) Carefully move the light source, as far as the leads will allow, and remove the perforated cover by removing its two screws (TP156740) and lockwashers (TP2191).

(4) Disconnect the two wire leads to the quartz iodine lamp, being careful not to touch the quartz envelope, by removing the nut and lockwasher retaining each lead.

(a) Quartz Iodine Lamp Burned Out: The lamp can be replaced by removing the two screws and lockwashers that retain it.

CAUTION: **WHEN REPLACING LAMP, DO NOT HANDLE QUARTZ GLASS ENVELOPE OF LAMP. REMOVE GREASE OR FINGER PRINTS FROM LAMP BY CLEANING WITH A GREASE FREE SOLVENT SUCH AS ACETONE.**

(b) Quartz Iodine Lamp Operable: If lamp is operable, replace the lockwashers and nuts removed in 3.02 (4) to disconnect the wire leads.

(5) The light source assembly can now be re-***moved from the*** unit.

3.03 To remove the mirror tube assembly (Figure 8):

(1) While holding the mirror tube assembly with one hand, remove the two screws (TP151631), lockwashers (TP2191), and flat washers (TPl25015) that secure the assembly to the two angle brackets (TP302972).

(2) Carefully pull the mirror tube assembly down and away from the punch block with verifier.

CAUTION: THE GLASS **PRISM** ATTACHED TO THE PUNCH **BLOCK,** TENDS BELOW THE PUNCH **BLOCK**, EXTHE MIRROR TUBE ASSEMBLY. EVERY PRECAUTION MUST BE TAKEN DURING DISASSEMBLY TO AVOID DAMAGING THE GLASS PRISM.

3.04 To remove the Bunch block assembly with verifier (Figure 8):

(1) Remove the waxed string that secures the punch block cable (light sensor) to the main casting.

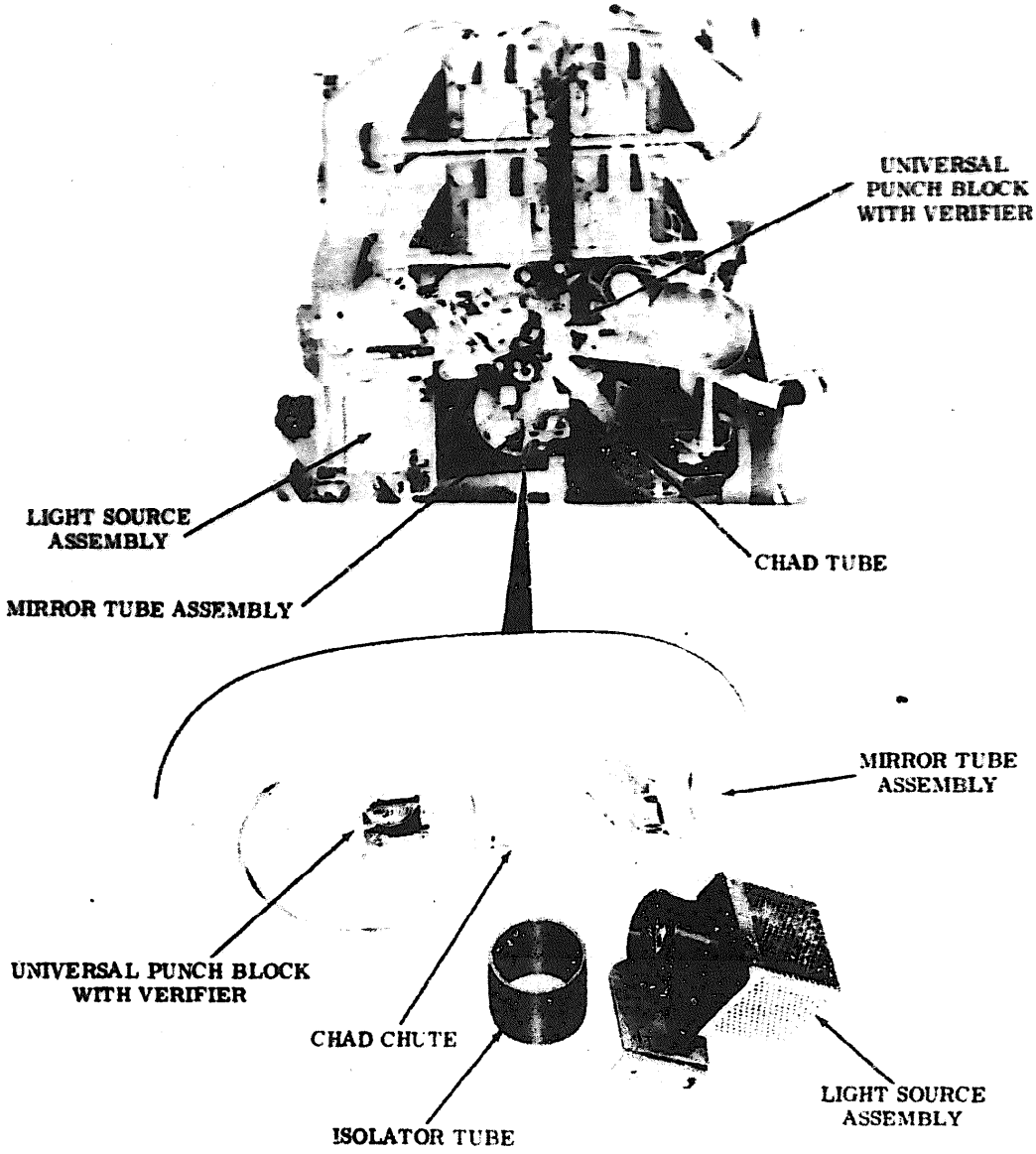


Figure 8 - Eight-Level Punch Unit With Photoelectric Reader, Front View

(2) Remove only those wire leads, from the connector (TP173579) located at the top of the main casting, that are part of the punch cable (light sensor). Use the following chart for wire and pin number identification during disassembly and reassembly operations:

PUNCH BLOCK CABLE (LIGHT SENSOR)		
PIN NUMBER (CONNECTOR TP173579)	WIRE COLOR	CODE LEVEL
18	Black	Common
2	Brown	1
4	Red	2
6	Orange	3
45	White-Green	Feed
8	Yellow	4
10	Green	5
12	Blue	6
14	Purple	7
47	Slate	8

(3) Remove the nut (TP112626), lockwasher (TP2669), and screw (TP74014) from the lower left punch block mounting position.

(4) while holding the punch block with one hand, remove the screw (TP153442), lockwasher (TP2669), and flat washer (TP34422) from the upper right mounting position.

(5) Carefully tilt the punch block away from the punch pin links.

(6) Remove the punch block and cableassembly ***from the unit with one hand, while*** guiding the cable assembly with the other hand.

(7) Adjust the punch pin backstop bracket to retain the punch pins while the punch block assembly is removed from the unit.

UNIVERSAL PUNCH BLOCK (Figure 3)

3.05 To remove the universal punch block, ***follow*** steps 3, 4, 5, ***and 7 in 3.04.***

PUNCH BACKUP **MECHANISM** (Figure 9)

3.06 Remove the gear guard (TP302746) by removing its **two** *screws* (TPl51722), lockhers (TP2191), and flat **washers** (TP7002).

3.07 **To remove the tape guide assembly** (Figures 9 and 10):

(1) Lift the formed end of the tape guide torsion spring (TP320366) off its spring post and allow it to rest on the tape guide assembly lug just to the left of the spring post.

(2) Rotate the tape guide assembly clockwise until the feed pins of both feed wheels are cleared.

(3) Pull the tape guide assembly off its pivot post.

To remove the backup mechanism from the main casting (Figures 9 and 11):

(1) Manually release the torque from the drive spring (TP149833) in steps. Raise and lower the antireversal disc pawl (TP149834) allowing only a small portion of the torque to unwind at a time.

CAUTION: *IF* **TORQUE FROM** *A* **FU**LLY WOUND DRIVE SPRING IS SUDDENLY **RELEASED, PERMANENT DAMAGE TO SPRING WILL RESULT. SPRING TENSION SHOULD BE RELEASED IN STEPS AT THE ANTIREVERSAL DISC PAWL.**

(2) After torque is released, loosen only the *screw* (TP152893) securing the end of the drive spring, under flat washer (TPP25011) located on the feed wheel drive gear, and free the drive spring end.

(8) Remove the drive belt (TP309561) from the pulley (TP195795) on the drive shaft **assembly** by loosening the setscrews **(TP80706)** and removing the pulley.

(4) While holding the backup mechanism **with** one hand remove the two screws (TP151631), lockwashers (TP2191), and flat washers (TP7002) securing the backup mechanism to the main casting.

(5) *Carefully eas***e the backup mechanism out** of the unit whi**le disconnecting the escape**ment pawl (TPl**77815) from the feed link** (TP149811).

3.09 To remove the trip **magnet assembly** (Figure 11):

(1) Remove the two s**crews (TP151631) and** lockwashers (TP21**91) holding the magnet** bracket **(T**P320373) **to the rear plate** (TP3202**04).**

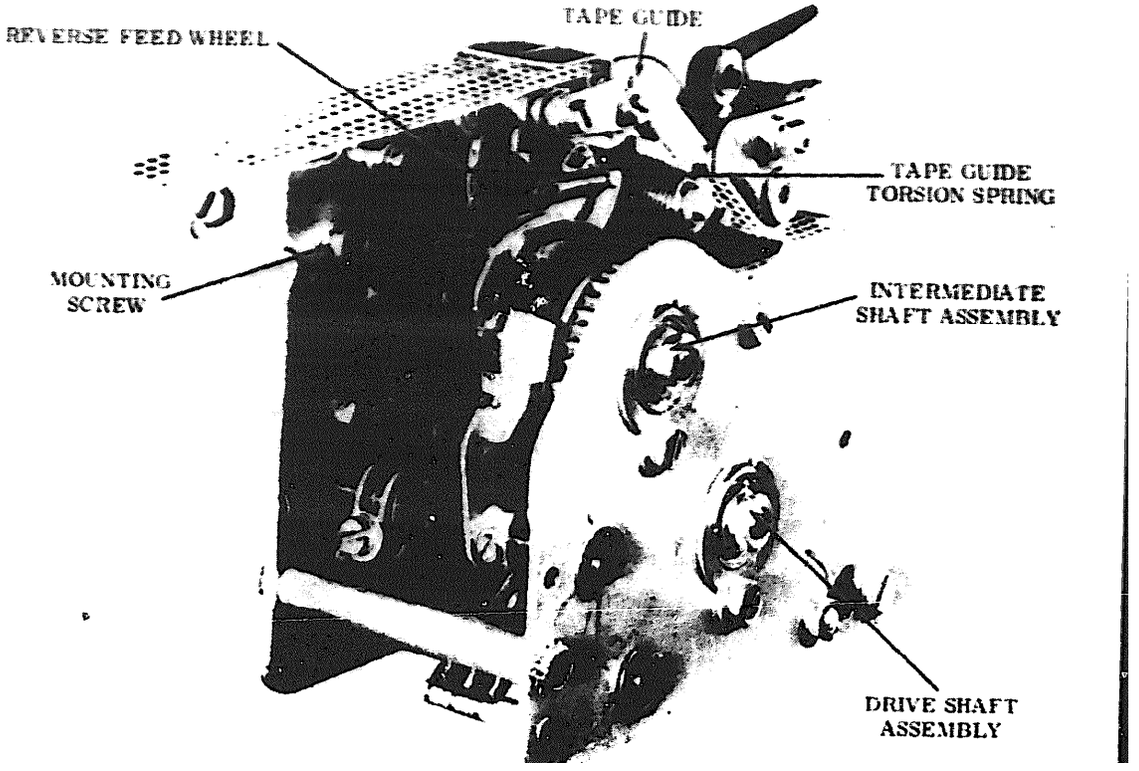


Figure 9 - Punch Backup Mechanism, Left Front Oblique

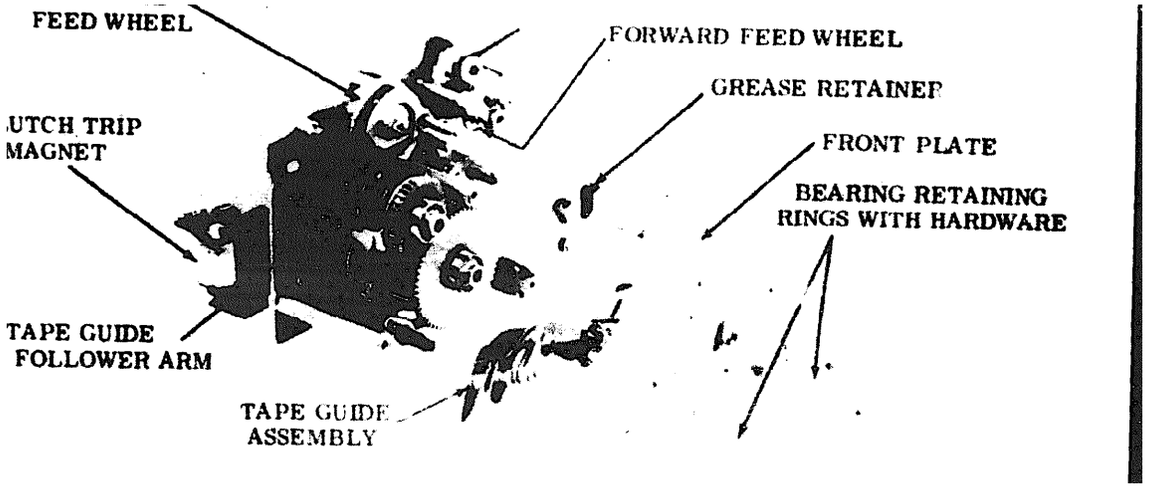


Figure 10 - Punch Backup Mechanism, Front Plate Removed

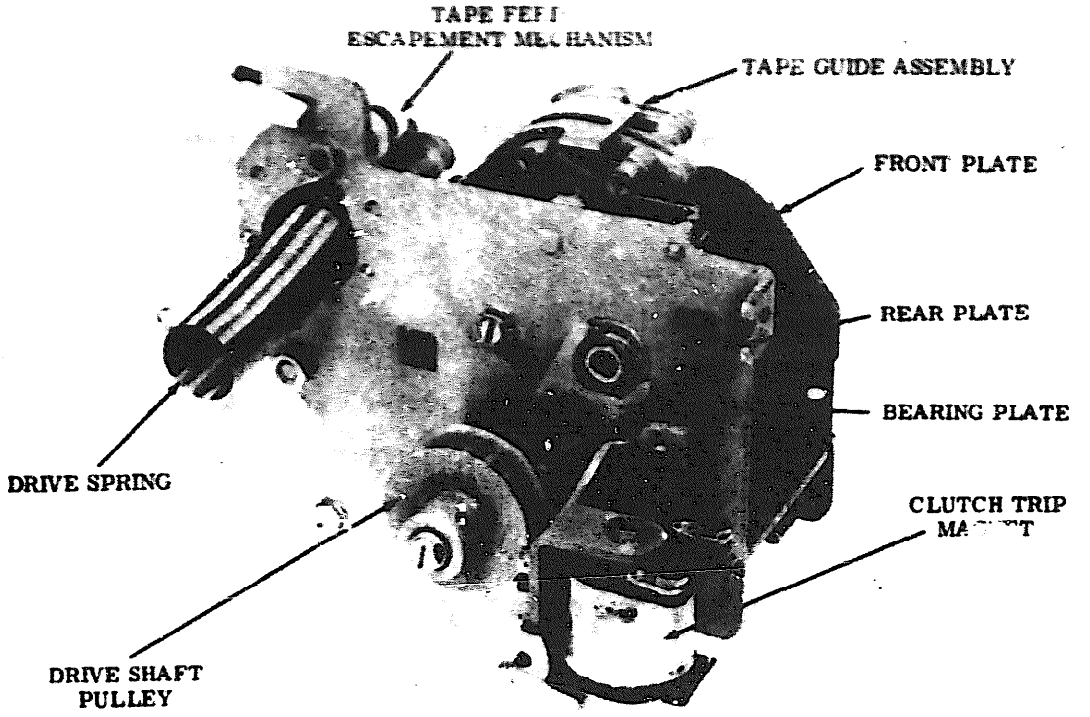


Figure 11 - Punch Backup Mechanism, Rear View

(2) Remove the magnet assembly by sliding the armature bail (TP320370) **out of the lever (TP320374).**

3.10 To separate the front and rear plates (Figure 10):

(1) Remove the detent lever spring (TP55669).

(2) **Remove** the magnet **lever (TP320374) by loosening its clampscrew (TP151442) and** sliding it **off the shaft (TP320327).**

(3) Remove the two bearing retainers **(TP156588)** on the front plate.

[4) On the front plate, remove the two screws **(TP151630) and lockwashers (TP107116)** that retain the **front plate to the spacer posts (TP320308).**

(5) On the rear plate (TP320304), remove the one screw and **lo&washer that hold the tic bar (TP303032).**

(6) While holding the clutch stop levers (TP320328), latchlevers (TP320329), and the detent lever (TP320331) away from the cams and clutches, pull the front plate forward to separate it from the rear plate.

3.11 To **reassemble the front and rear plates, hold the tape lid switch lever (TP303034)** slightly counterclockwise so **that** the ***operating*** **post of the tape guide cam follower arm** (TP320339)fits into **the proper hole in the lever. Then, reverse the disassembly procedures given in 3.10.**

3.12 To remove the tape **guide cam follower arm assembly (TP320339), remove the retaining ring (TPll9851) that secures it to the eccentric post (TP320338).**

3.13 To remove **the drive shaft assembly (TP320380) (Figure 10):**

(1) Remove the **screw (TP151637) and lockwasher (TP3640) from the sleeve (TP320365)** located **at the pulley end of the shaft.**

(2) While holding the drive shaft assembly, remove the screw (TP151630) and lockwasher (TP2191) securing the bearing clamp (TP156619) and plate (TP156832) to the rear plate.

(3) Remove the drive shaft assembly.

3.14 To remove the intermediate shaft assembly (TP320378) (Figure 10):

(1) While holding the intermediate shaft assembly, remove the screw (TP151630) and lockwasher (TP2191) securing the bearing clamp (TP156619) and plate (TP156832) to the rear plate.

(2) Remove the intermediate shaft assembly.

3.15 Remove the reverse feed wheel assembly by removing the retaining ring (TP119651) holding it on the pivot post.

3.16 To remove the drive spring (TP149833) (Figure 11):

(1) Loosen the drive spring clampscrew located in the center of the drive spring.

(2) Remove the drive spring by sliding its formed end out of the hole in the clamp bushing (TP177883).

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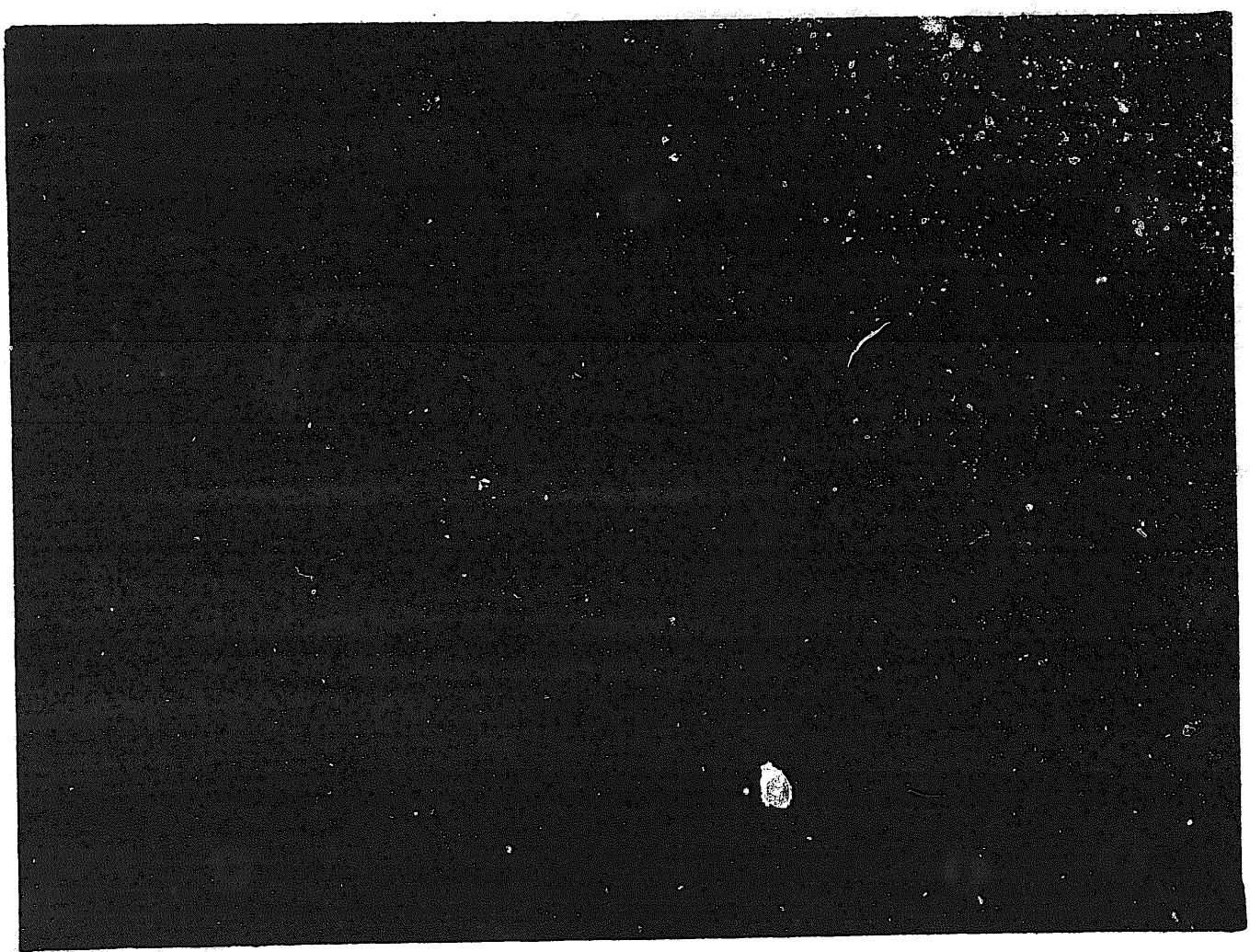

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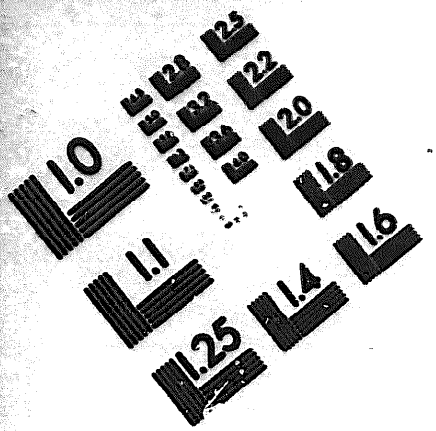

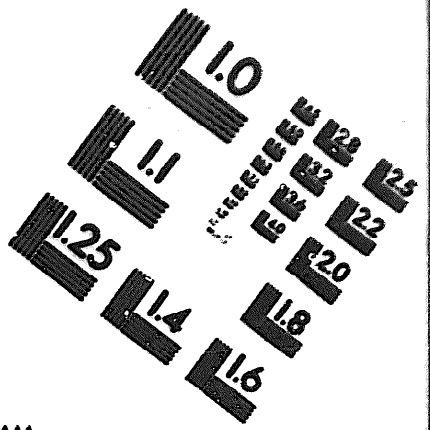

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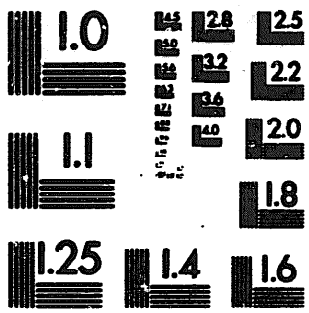

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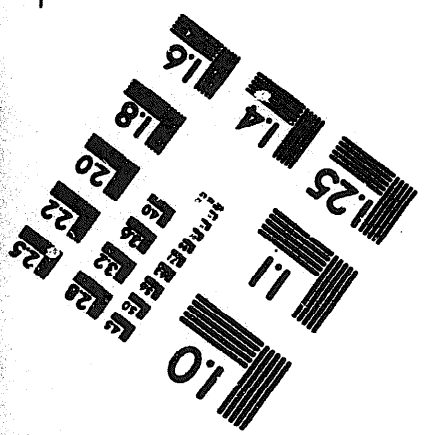

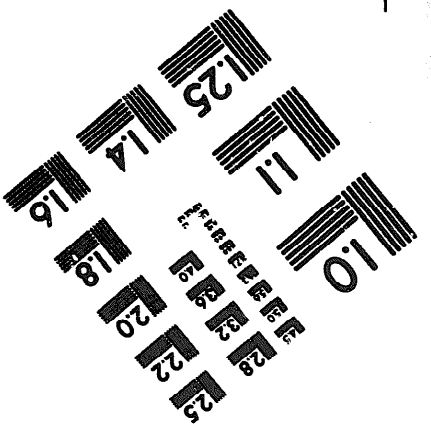

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