43 TELEPRINTER 5-LEVEL PAPER TAPE PUNCH ASSEMBLY

ADJUSTMENTS AND SPRING TENSIONS

CONTENTS

		PAGE
1.	GENERAL	1
2.	TOOLS REQUIRED	1
3.	PUNCH ADJUSTMENTS	2
	Armature bank and magnet pole	2
	Armature latch surface	3
	Bail and pin penetration	4
	Magnet bank position	6
	Tape bias spring	7
	Punch feed wheel axial alignment	8
	Clock circuit card	9
	Transport detent spring	10
	Feed pawl-pole face gap	11
	Transport drive eccentric	12
	Rachet wheel and feed pawl	13
	Punch ten to the inch (TTI) (preliminary)	14
	Punch ten to the inch (final)	15
	Tape entry guide	16
4.	SPRING TENSIONS	17
	SPRING IDENTIFICATION	18

1. GENERAL

1.01 This section provides punch adjustments and spring tensions.

1.02 Whenever this section is reissued, the reason will be listed in this paragraph.

1.03 Tensions are checked with a spring scale held at the angle shown in the illustration.

1.04 After an adjustment is complete, tighten any screws or nuts loosened to make the adjustment.

1.05 Reference in the procedure to left or right, up or down, and top or bottom, etc, refer to the punch in its normal operating position.

1.06 Adjustments should be checked and performed when a trouble indicates a specific adjustment may be out of tolerance or when an adjustment is disturbed to enable a part to be removed or replaced.

1.07 Spring tension checks should be performed when a trouble indicates a possible defective spring or to verify proper part numbers.

1.08 Springs that do not meet the tension requirements should be replaced.

1.09 When ordering, replaceable parts or components, unless otherwise specified, prefix each part number with the letters "TP" (ie, TP410045).

2. TOOLS REQUIRED

2.01 Refer to Maintenance Tools Section 570-005-800 for a complete listing of various types of hand tools available for maintenance of Teletype Corporation equipment.

2.02 The following tools may be required when performing adjustments or spring tension checks. Most of these items should normally be present in standard maintenance tool kits.

Part No.	Tools
73404	Wrench, Tommy
82711	Scale, 64 ounce Spring
94647	Screwdriver, 3-1/2" Blade
98631	Scale, 50 Gram Spring
100982	Screwdriver W/Clip
104457	Wrench, Hex Key (0.050)
110443	Scale, 8 ounce Spring
110444	Scale, 32 ounce Spring
117781	Gauge Set
124682	Wrench, Hex Key (1116)
125752	Wrench, 3/16" Socket
129534	Wrench, 3/16" and 1/4" Open End
129536	Wrench, 7/16" and 1/2" Open End
142554	Hook, Pull Spring
142555	Hook, Push Spring
149836	Punch Block Cleaner

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Part No.	Tools
153835	Wrench, 5/16" and 3/8" Open End
159841	Wrench, Hex Key (0.093)
302990	Gauge, Tape

3. PUNCH ADJUSTMENTS

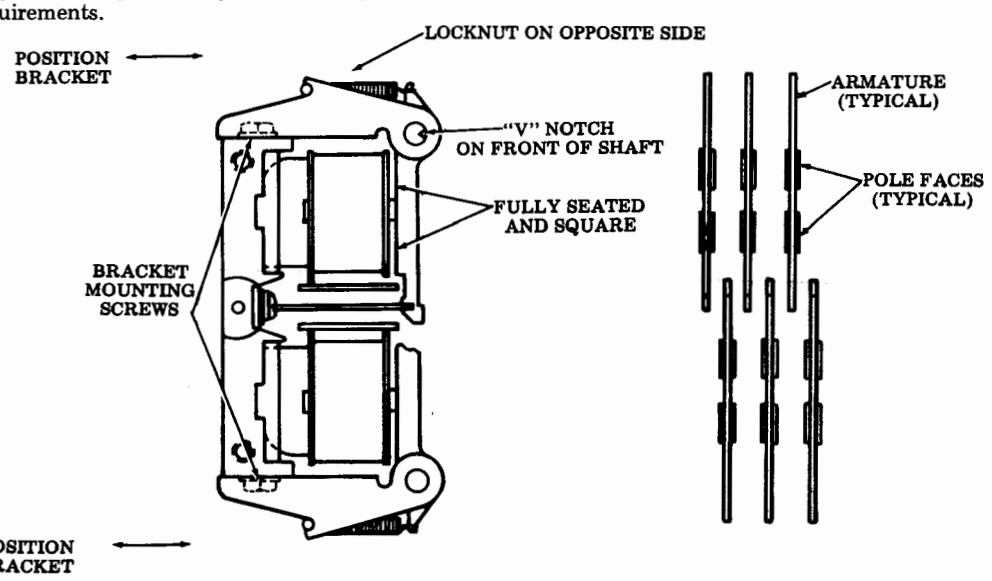
ARMATURE BANK AND MAGNET POLE

(The magnet bank assembly should be removed from unit to check this adjustment and the Armature Latch Surface.)

Requirement 1
All armatures shall remain fully seated in their guide post slots during normal operation of the magnet assembly.

Requirement 2
All armatures shall be centered, parallel to, and square with their respective magnet poles in the fully attracted position.

To Adjust
With the armature bank bracket mounting screws friction tight and armature held manually in their fully attracted position against their respective magnet poles, position the bracket to meet the requirements.



Note: Before making this adjustment the upper armature eccentric guide post should be oriented so that its "V" notch is at three o'clock when viewing magnet assembly from No. 2 armature end as shown. If not, loosen guide post lock nut and rotate "V" notch to three o'clock position.

Related adjustment: Magnetic bank position.

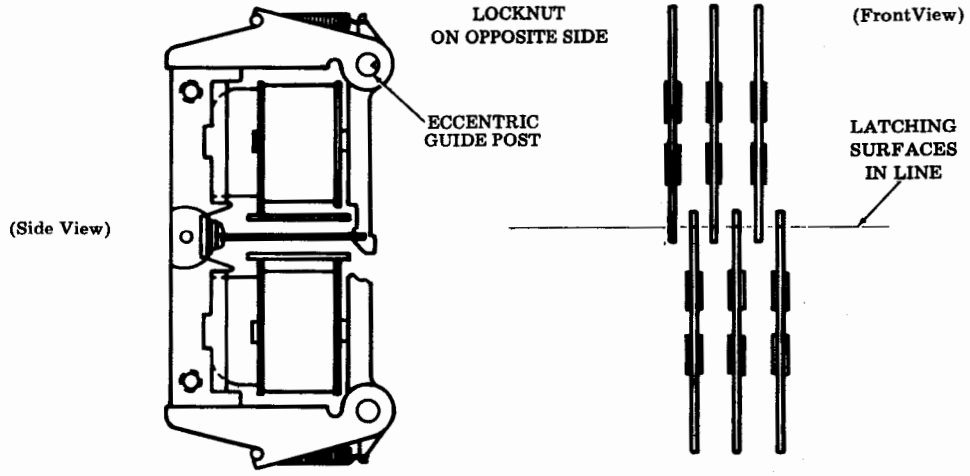
ARMATURE LATCH SURFACE

(Magnet bank assembly removed from unit.)

Requirement
The latching surfaces of all armatures of the upper and lower magnet banks shall be in line in their fully attracted position, as gauged by eye.

To Check
Lay straight edge along latching surfaces and observe alignment by eye.

To Adjust
With the upper armature eccentric guide post lock nut friction tight, rotate the guide post to meet the requirement.



Note: Utilize a 73404 tommy wrench in the guide post adjusting hole to effect rotation.

Recheck ARMATURE BANK AND MAGNET POLE adjustment and refine, if necessary.

BAIL AND PIN PENETRATION

Note: It is recommended that these adjustments be made before the magnet bank is installed (if it has been removed). The selector levers must be in engagement with the punch pins. However, the adjustment can be made in the same manner with a fully assembled unit (magnet back installed).

Step 1: Bail Eccentric Position

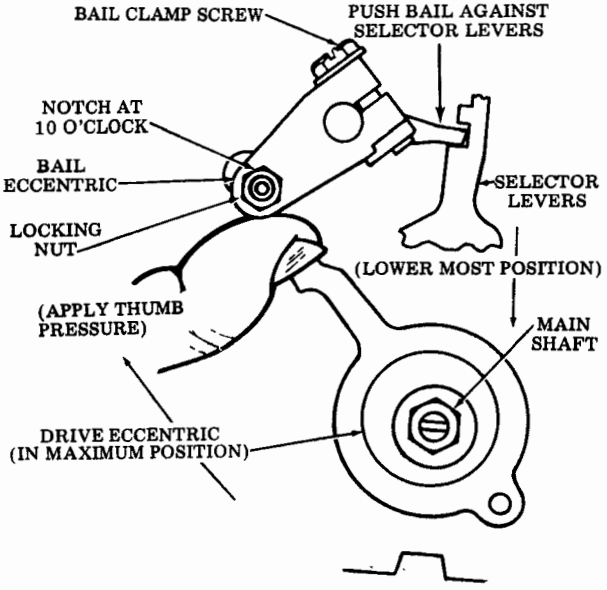
Requirement
The notch on the bail eccentric shall be oriented, as gauged by eye, to 10 o'clock as indicated in the figure below.

To Adjust
With the locking nut friction tight rotate the eccentric to meet the requirement. Tighten the locking nut.

Step 2: Bail Adjustment

Requirement
When the drive eccentric passes through its maximum position, as indicated in the figure below, the bail shall drive the selector levers to their lowest position without allowing the bail to bottom on the selector levers. If you can feel the bail bottom on the selector levers readjustment is necessary.

To Adjust
With the bail clamp screw loose and the selector levers selected; (this occurs automatically before the magnet bank is installed. In a fully assembled unit this is done by energizing the magnets or manually depressing the armatures) apply thumb pressure on the bail eccentric towards the 10 o'clock position as shown. This assures that the drive eccentric is at its maximum position. While maintaining this pressure force the bail down against the selector levers. Tighten the bail clamp screw.



Step 3: Pin Penetration Adjustment

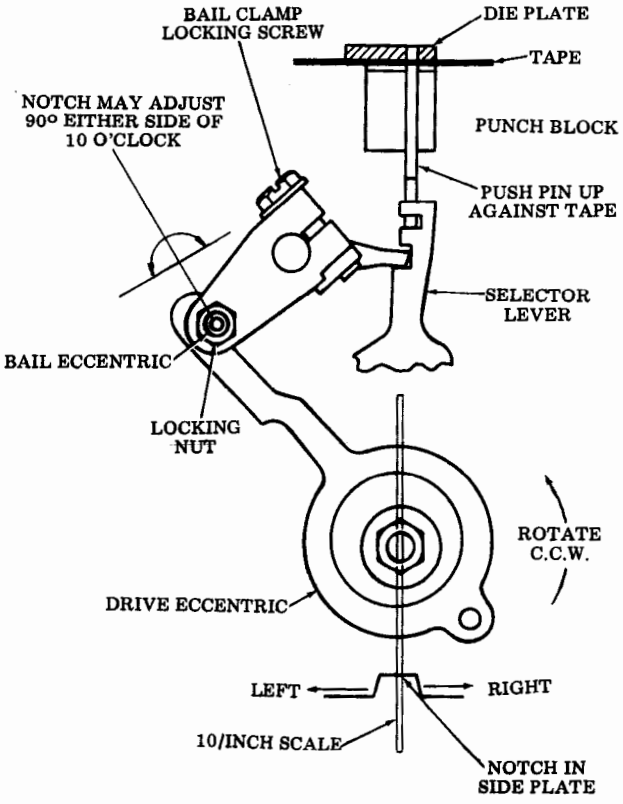
Requirement

With a piece of 0.004 blank paper tape in the punch and the selector levers selected rotate the mainshaft counterclockwise when viewed as shown. When resistance is felt the tape is up against the die plate ready to be punched. At this position a "10 inch scale" when placed in the slot of the mainshaft shall align, as gauged by eye, with the notch in the bottom of the side plate. Also punch holes in tape to verify.

To Adjust

Loosen bail clamp screw and with the bail eccentric locking nut friction tight proceed as follows: If the scale aligned to the right of the notch, rotate the bail eccentric clockwise to increase penetration. If the scale aligned to the left of the notch, rotate the bail eccentric counterclockwise to decrease penetration. (Rotate the bail eccentric in increments of five degrees or less.) Tighten the bail eccentric locking nut making sure that the bail does not rotate. Leave the bail clamp screw loose and repeat the bail adjustment (Step 2).

Related adjustment: Magnetic bank position.



MAGNET BANK POSITION

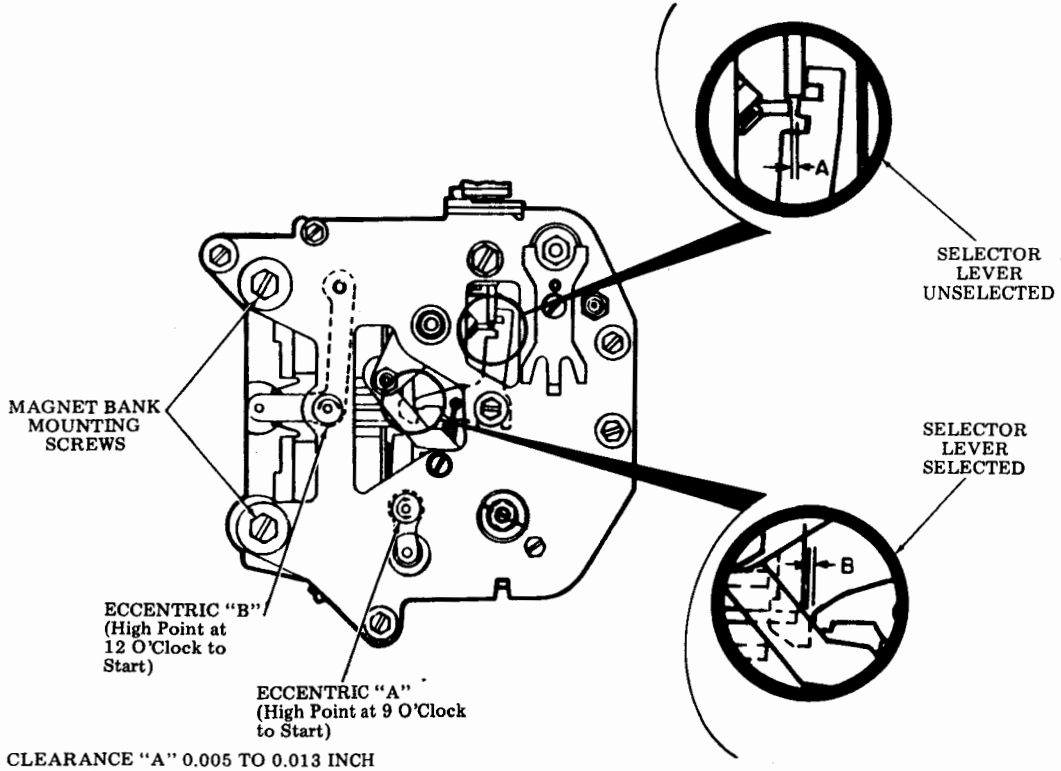
Requirement 1:

When the armatures are not energized, the clearance between the bail and selector levers should be
Min 0.005 inch---Max 0.013 inch
as shown by clearance "A". Confirm minimum gap by biasing selector levers to left at their pivot and visually check for clearance between bail and selector levers at "A".

To Adjust
With mounting screws friction tight, and eccentric "A" at nine o'clock rotate eccentric, as needed, to meet requirements. Tighten mounting screws and recheck requirement.

Requirement 2:
When the armatures are fully seated on their respective pole faces and selector levers in the "selected" position, there should be
Min 0.005 inch---Max 0.015 inch
clearance between the armature tip and the selector levers as shown by "B".

To Adjust
With mounting screws friction tight and eccentric "B" at 12 o'clock, rotate eccentric "B" as needed, to meet requirements. Tighten mounting screws and recheck requirements.



CLEARANCE "A" 0.005 TO 0.013 INCH
CLEARANCE "B" 0.005 TO 0.015 INCH

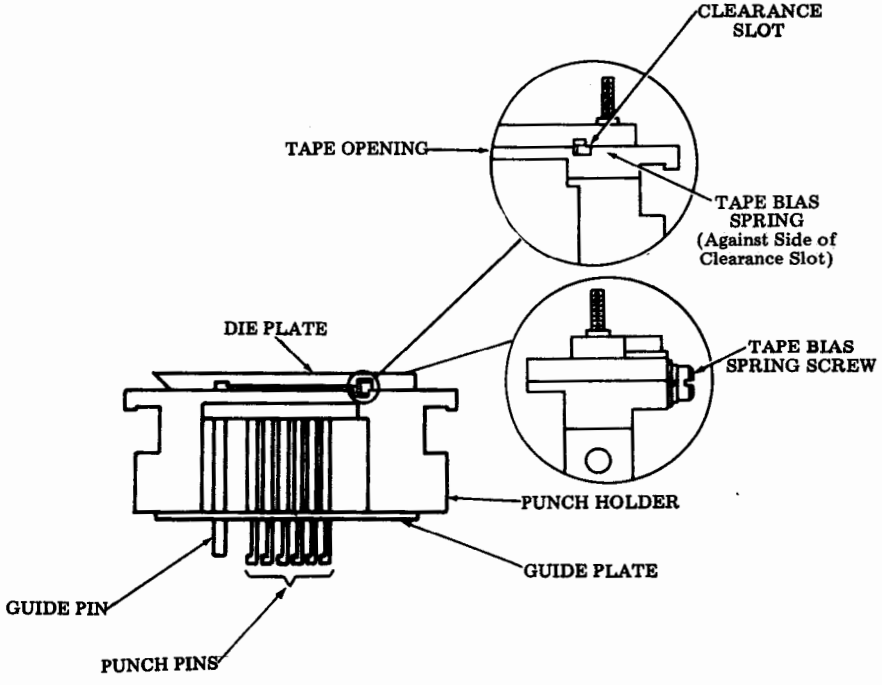
TAPE BIAS SPRING

Requirement

The tape bias spring shall bias the tape toward the left of the punch block in order to maintain alignment of the perforated holes (visually checking a three or four foot perforated tape), there shall be no wavering of the perforations with respect to the edge of tape.

To Adjust

Remove the tape lid and the tape entry guide. Loosen the spring mounting screw and position the spring such that it rests against the side of the clearance slot in the die plate and is symmetrical (not rubbing top or bottom) about the tape opening in the assembly.



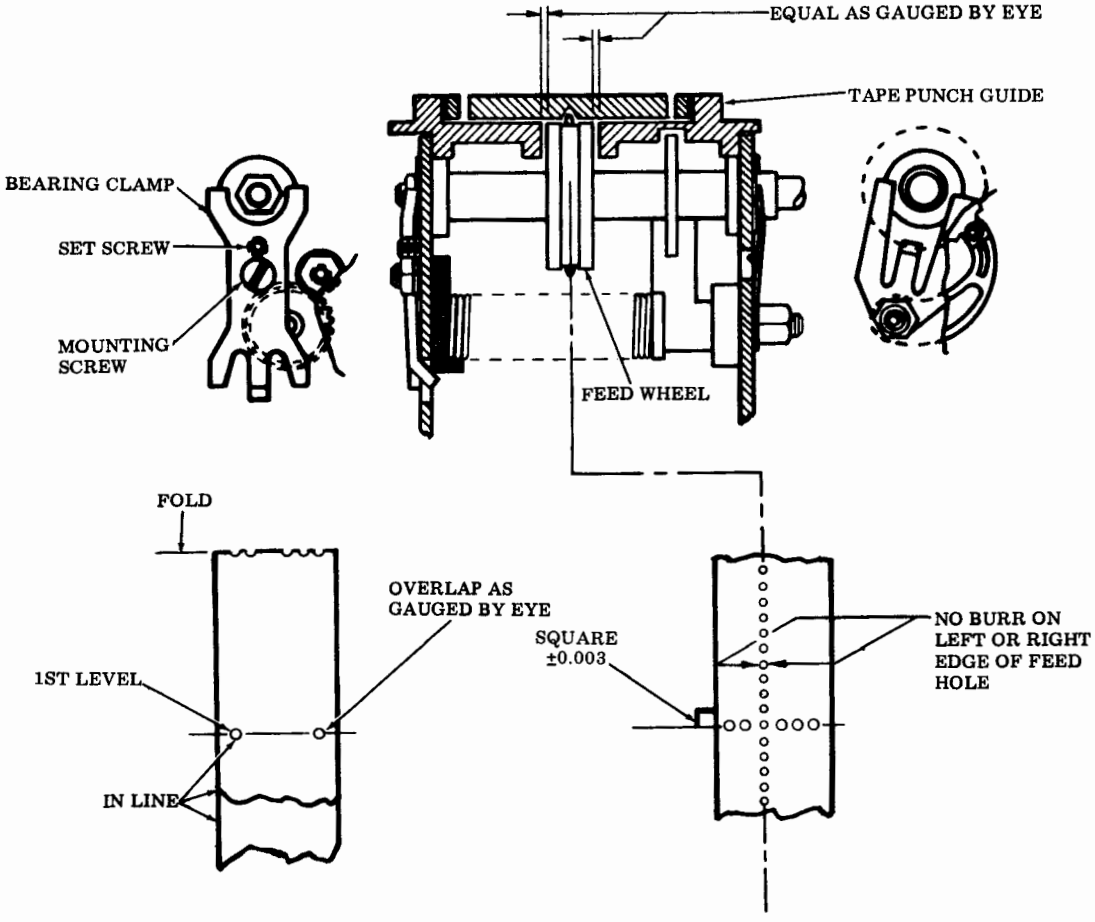
PUNCH FEED WHEEL AXIAL ALIGNMENT

Requirement 1
The feed wheel shall be centered, as gauged by eye, in the opening in the tape punch guide.

Requirement 2
There shall be no burr on the left or right edge of the feed holes of a perforated tape and the code holes shall lie square within ±0.003.

To Check
Perforate a length of tape and examine it for burrs. Fold the tape with edges and 1st level holes in line. The 5th level shall overlap, within requirement, as gauged by eye.

To Adjust
Loosen the mounting screw on the bearing clamp and adjust the setscrew in or out as needed. Tighten the mounting screw and recheck requirement.



CLOCK CIRCUIT CARD

Requirement

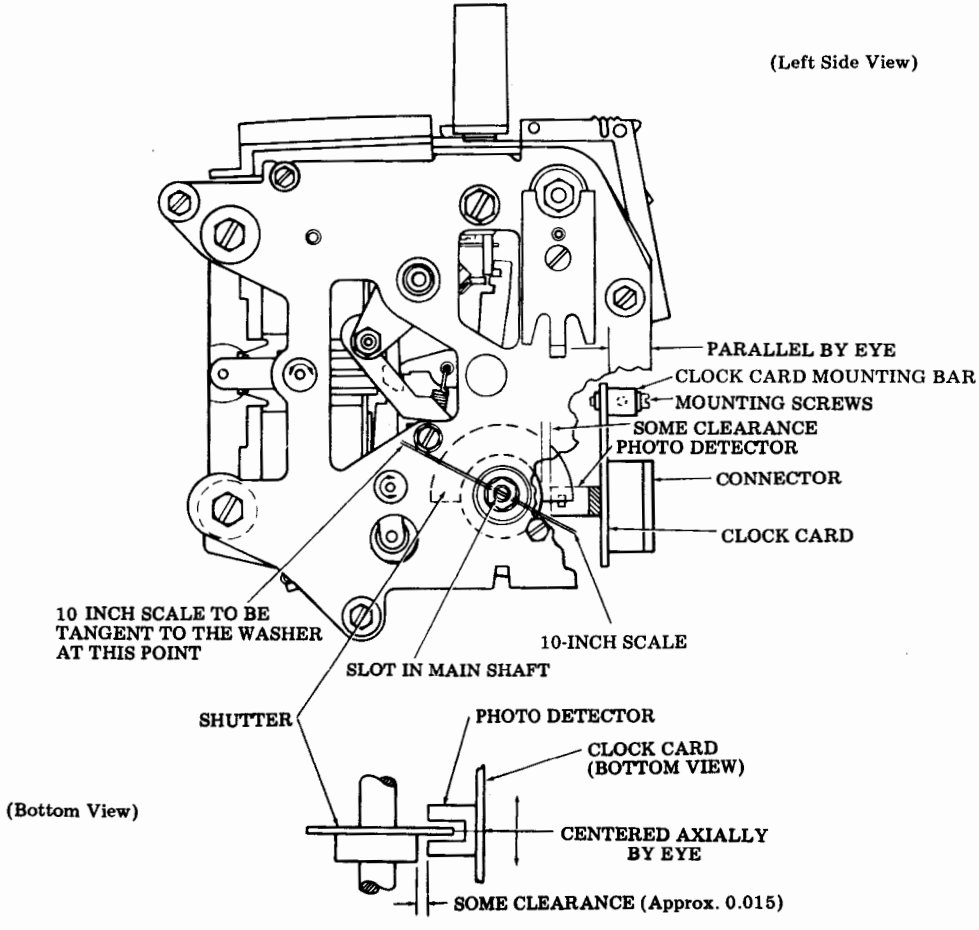
There will be some clearance between the hub of the shutter and the face of the photo detector and the shutter shall be centered axially in the photo detector as gauged by eye.

To Check

With a Ten to The Inch (TTI) scale in the slot of the mainshaft rotate the mainshaft until the scale lines up with the edge of the washer.

To Adjust

Position the clock card mounting bar such that the card is parallel to the front edge of the side plates and there is some clearance between the hub of the shutter and the face of the photo detector. With the clock circuit card mounting screws friction tight and a TTI scale in the slot of the mainshaft, line up the scale with the edge of washer. Adjust clock card up or down as required so that the edge of the shutter is centered radially in the photo detector when the TTI scale is lined up with the edge of the washer as shown below. Make sure the shutter width is centered axially by eye in the photo detector. Tighten the clock card mounting screws. Recheck requirements.



TRANSPORT DETENT SPRING

(Tape lid and housing removed to check)

Requirement

With the detent roller fully seated in the detent wheel the force required to start motion of the detent roller away from the detent wheel should be

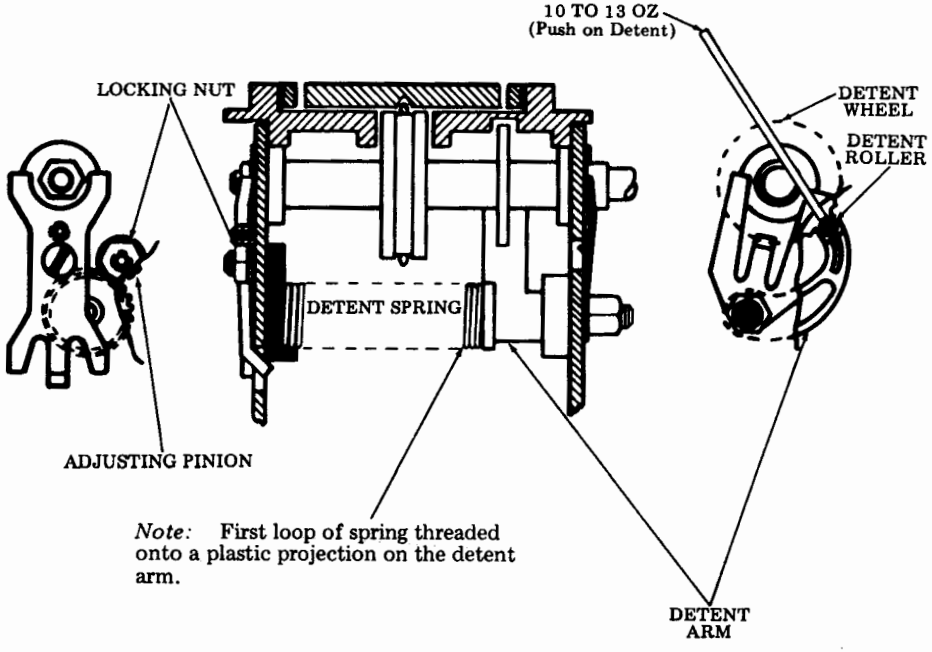
Min 10 ounces---Max 13 ounces

(use 32 ounce scale).

To Adjust

With the locking nut friction tight rotate the pinion with a 1/16 inch allen key to meet requirement. Tighten locking screw and recheck requirement.

Note: Be careful not to over tighten spring.



FEED PAWL-POLE FACE GAP

Requirement 1

With the feed pawl tooth seated in a ratchet wheel notch there shall be a 0.005 to 0.010 inch gap between the lower pole face and feed pawl at the point of least clearance. (Check at several places 90 degrees apart on ratchet wheel.)

Requirement 2

With the feed pawl tooth seated in a ratchet wheel notch, the gap between the upper pole face and feed pawl shall be equal to or greater than the lower pole face and feed pawl gap. (Check at several places 90 degrees apart on ratchet wheel.)

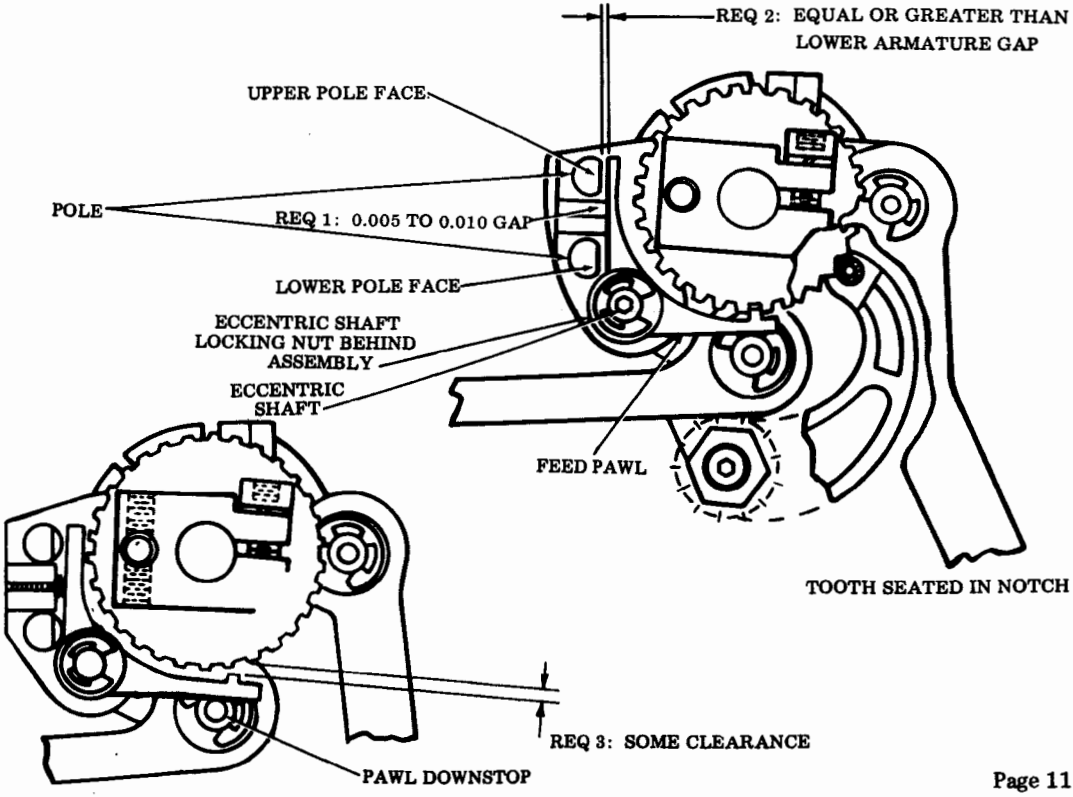
Requirement 3

With the feed pawl resting against its downstop, there shall be some clearance between the face of the feed pawl tooth and the ratchet wheel as gauged at eye throughout one complete revolution of the ratchet wheel.

To Adjust

With locking nut friction tight and feed pawl tooth held seated in ratchet wheel notch by slight pressure opposite pawl tooth, rotate the eccentric shaft clockwise until gaps at both pole faces are maximum. From this point rotate eccentric shaft counterclockwise to meet Requirements 1, 2, and 3. Tighten eccentric shaft locking nut and recheck requirements.

Caution: Rotation of the eccentric feed pawl shaft is limited. Attempted 360 degree rotation will cause the pawl to jam against the magnet poles and backstop. This may result in damage to the transport assembly.



TRANSPORT DRIVE ECCENTRIC

Requirement

Rotation of the transport drive eccentric between Top Dead Center (TDC) and Bottom Dead Center (BDC) shall move the feed pawl tooth a distance of one tooth on the ratchet wheel.

To Check

If the requirements of the ratchet wheel and feed pawl engagement adjustments (punch and reader) are met, the requirements of this adjustment are met. If those requirements are not met, determine if the eccentric throw of the adjustment is either too great or too little as follows:

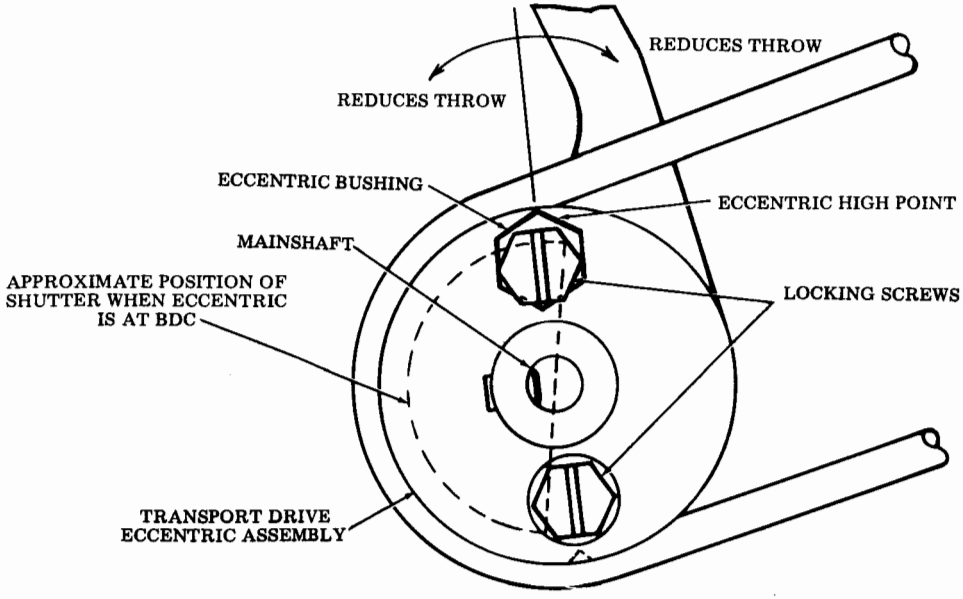
With eccentric drive at TDC, lift pawl away from ratchet and (with ratchet detented) allow the pawl to reengage observing the point at which it rests on the tooth or drops into the notch. Repeat at BDC. Engagement should be the same.

(a) If pawl engagement at BDC is too far left adjust eccentric for reduced throw.
(b) If pawl engagement at BDC is too far right adjust eccentric for increased throw.

To Adjust

Loosen the transport drive eccentric locking screws to a friction tight condition and rotate the transport drive eccentric bushing, noting the high point as shown below, as needed to meet the requirement. Tighten the locking screws.

Note: This adjustment will affect the ratchet wheel and feed pawl engagement adjustment. (Both punch and reader.) It may be necessary to refine this adjustment if the requirements of the ratchet wheel and feed pawl engagement adjustments cannot be met, however, those adjustments do not affect this adjustment.



RATCHET WHEEL AND FEED PAWL ENGAGEMENT

Requirement

When the transport drive eccentric is at Top Dead Center (TDC) and at Bottom Dead Center (BDC) the feed pawl tooth shall fall freely into the respective notches on the ratchet wheel. (Engagement should be checked at four places approximately 90 degrees apart on the ratchet wheel.)

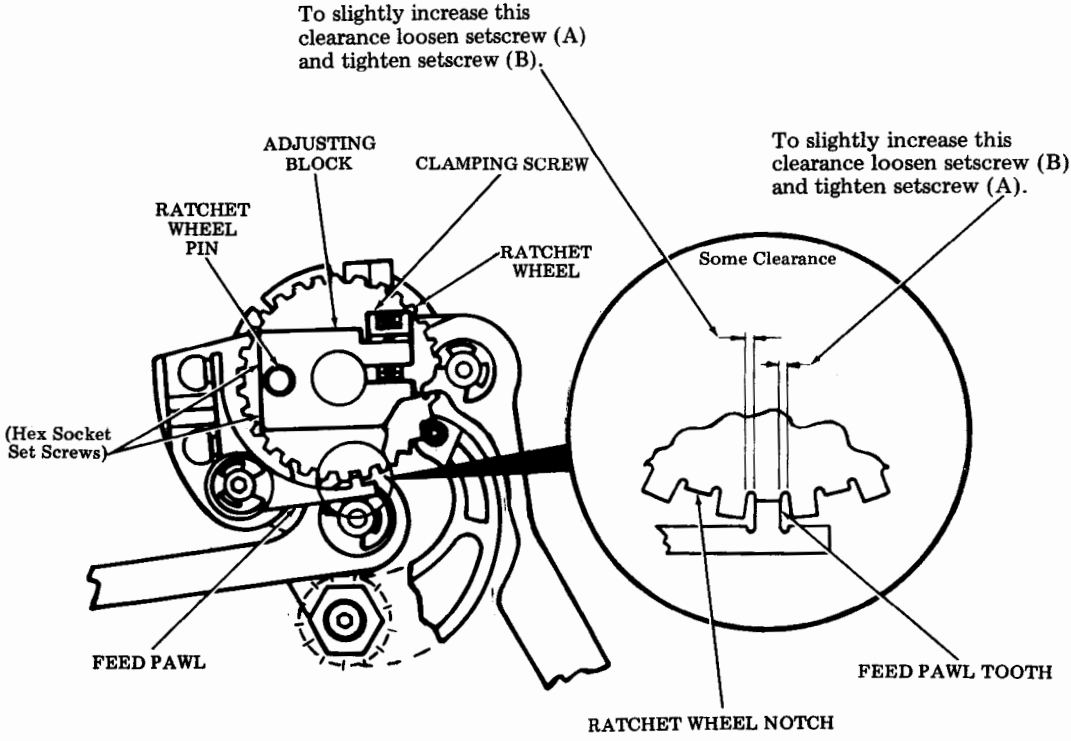
To Adjust

(a) If the feed pawl tooth does not fall freely into the ratchet wheel notch, at both TDC and BDC, the position of the feed wheel relative to the feed pawl may only need refinement. This is accomplished by moving the hex socket screws in the adjusting block against or away from the pin in the ratchet wheel as needed. When one screw is loosened the other must be tightened to insure a rigid assembly.

(b) If the adjustment cannot be refined using the hex socket screws, adjust them to center of the ratchet wheel pin in the ratchet wheel hole. Then, with the adjusting block clamping screw loose rotate the mainshaft to TDC. Engage the feed pawl tooth and hold it centered in a notch in the ratchet wheel. Tighten the screw. Refine (a) if necessary.

(c) Rotate the mainshaft to BDC and check requirement. Refine (a) if necessary.

Note: The transport drive eccentric adjustment will affect this adjustment.



PUNCH TEN TO THE INCH (TTI) (PRELIMINARY)

Note: The preliminary adjustment should be made only if the final TTI requirement cannot be met.

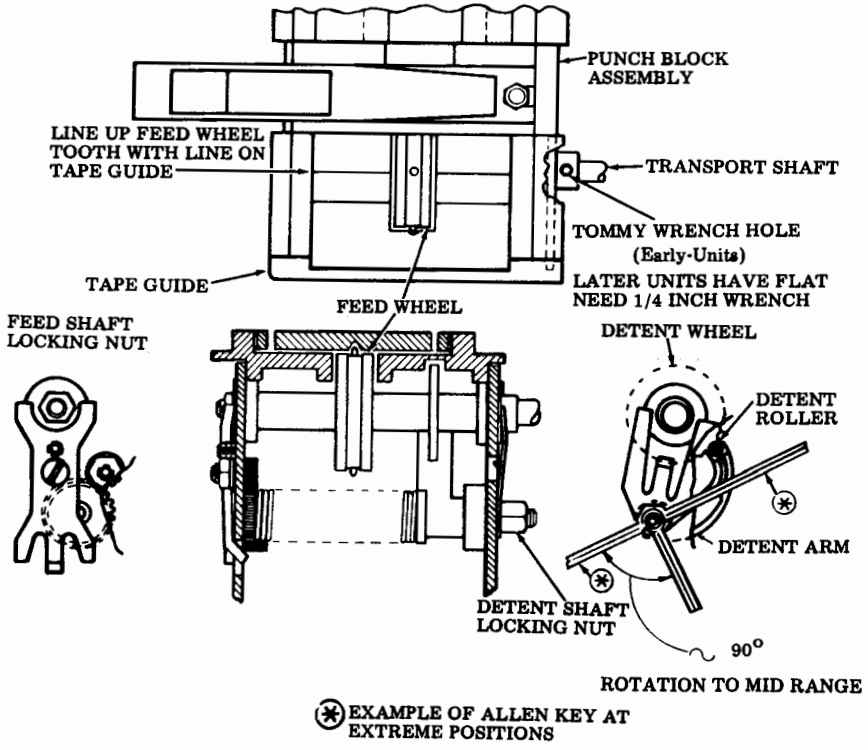
Requirement
Detent eccentric to be at midrange.

To Adjust
With the detent shaft locking nut and locking screw (on later units) friction tight and the detent roller seated in the detent wheel use a 1/16 inch allen key to move the detent wheel to one extreme of its adjustment. (Observe feed wheel to determine the extreme). Then rotate the allen key 180 degrees and observe the other extreme. Now set the adjustment to midrange by rotating the allen key approximately 90 degrees between the extremes. Tighten locking nut.

Hint: Set eccentric so that clockwise rotation of allen key causes clockwise rotation of feed wheel.

Requirement
With the detent roller seated in the detent wheel a feed wheel tooth shall line up with line on the tape guide as gauged by eye.

To Adjust
Loosen the feed shaft locking nut. (Use 1/4 inch socket and tommy wrench on early units or 1/4 inch open end wrench on later model feed shaft flat). While the detent roller remains seated in the detent wheel, rotate the feed wheel until requirement is met. Tighten locking nut.



PUNCH TEN TO THE INCH (FINAL)

Requirement

The reperforator shall produce tape which conforms to the 302990 tape gauge at 300 wpm.

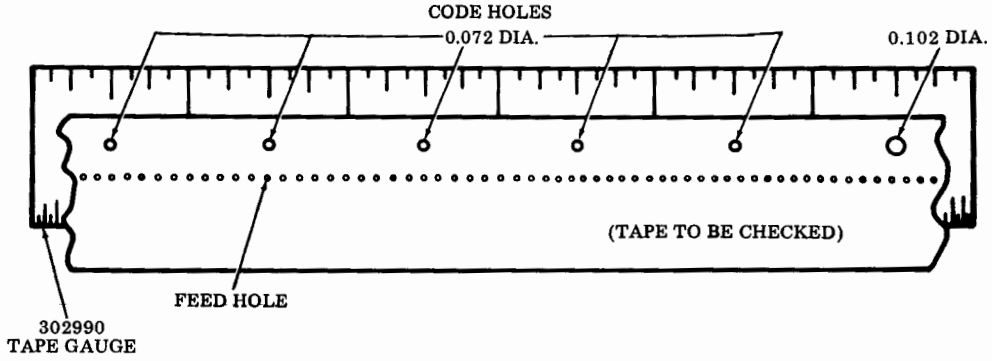
To Measure

Perforate a test pattern using self-test message (SPA1-3) at least 5 inches long. Place the tape over the 302990 tape gauge so that the first number two code hole in the tape is concentric with the first (0.072) holes in the tape gauge. (See Note.) The next four (0.072) holes in the tape gauge shall be visible through the number two code holes in the tape and the last (sixth) number two code hole in the tape shall be entirely within the 0.102 diameter hole in the tape gauge. This adjustment should be made with the tape coming from a 1000 foot supply roll routed through the tape tensioning system. Favor long TTI if a loose tape is used instead of routing through the tape tension system and coming from a 1000 foot roll of tape.

Note: The first five holes in the gauge are the same size as the code holes in the tape (0:072 inch diameter) but the sixth hole in the gauge is larger (0.102 inch diameter). This arrangement allows +0.015 inch variation in the ten to the inch spacing over five inches.

To Adjust

With the detent shaft locking nut friction tight and the detent roller seated in the detent wheel put a 1/16 inch allen key into the end of the eccentric detent shaft (see PUNCH TEN TO THE INCH (TTI) (PRELIMINARY) and adjust the feed wheel to meet requirement. (If the TTI is short the feed wheel must move away from the punch block. If the TTI is long the feed wheel must move toward the punch block). Tighten nut and recheck requirement. Check RATCHET WHEEL AND FEED PAWL ENGAGEMENT and refine, if necessary, To Adjust (c).



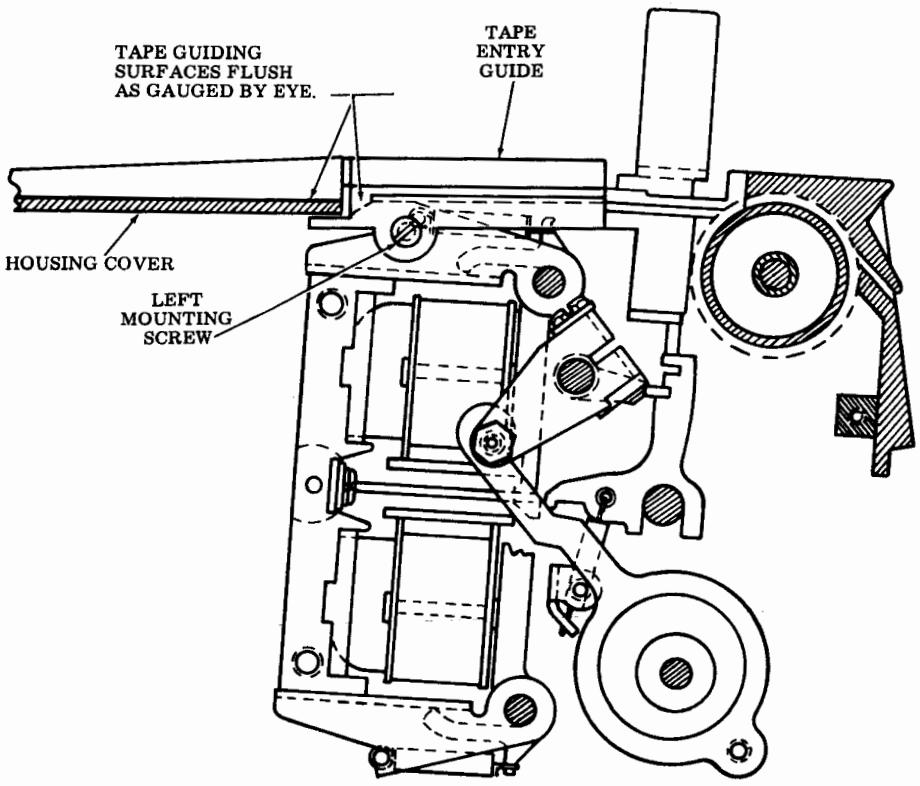
TAPE ENTRY GUIDE

Requirement

The tape guiding surface of the tape entry guide shall be flush with the tape guiding surface of the housing cover.

To Adjust

With the tape entry guide mounting screws loose, place unit in housing. Put cover in place and observe alignment. Remove cover and adjust tape entry guide up or down to meet requirement. Tighten right mounting screw. Replace cover and check requirement. Readjust, if necessary. Remove cover, lift unit for access to left mounting screw, and tighten left screw.



4. SPRING TENSIONS

Punch Block Assembly

Note: Remove punch block assembly from perforator unit to perform this check.

- With the punch pin slots facing the guide pin and with a spring scale (push-pull).
- Maximum total force to move all pins—3 ounces.

This requirement must be met anywhere along the punch pin travel in the perforator unit.

Punch Selector Return Springs (9 Places)

(With punch block assembly removed from unit.)

With selector lever resting on armature (unselected), apply spring force at top of lever perpendicular to center line of punch pins. It should take 20 to 30 grams to start lever moving.

Transport Pawl Return Spring

Measure at top of pawl as shown, it should take 21 to 25 grams to bias pawl so the tooth is seated in ratchet wheel.

Punch Transport Shaft

With spring scale push on shaft from left side of unit until bearing is flush with left side plate, as seen by eye. Minimum 32 ounces — maximum 48 ounces.

Punch Armature Return Springs (9 Places)

With a spring scale hooked to one end of the spring, pull spring to installed length. Minimum two ounces (57 grams) — maximum two ounces (86 grams).

SPRING IDENTIFICATION