TELETYPESETTER®

BULLETIN 5B

ADJUSTMENTS and LUBRICATION for the STANDARD PERFORATOR

FAIRCHILD
GRAPHIC EQUIPMENT
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

221 FAIRCHILD AVENUE, PLAINVIEW, L.I., N.Y.

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INTRODUCTION

The maintenance of Teletypesetter equipment requires a certain amount of mechanical ability and, therefore, should only be attempted by personnel who have this ability.

Fairchild Graphic Equipment maintains a school for the purpose of training our customers' personnel in the maintenance of Teletypesetter equipment and it is strongly recommended that all personnel assigned to the maintenance of Teletypesetter equipment attend the complete course; there is no tuition charge for this service.

This Bulletin is meant to supplement, not to replace, the maintenance training which is available at the Teletypesetter school.

LIST OF EFFECTIVE PAGES

OCTOBER, 1963

Page Number	Change In Effect
TITLE Page	CHANGE 1
A	CHANGE 1
B	ORIGINAL
1	CHANGE 1
2 TO 9	ORIGINAL
10	CHANGE 1
11 TO 23	ORIGINAL
24	CHANGE 1
25 TO 43	ORIGINAL
44 TO 47	CHANGE 1
48 TO 53	ORIGINAL

The above list indicates the effective pages as of the date of issue.

When a change takes place in any of the following pages, this page likewise changes.

CONTENTS

Page No.

DESCRIPTION OF STANDARD PERFORATOR 1

PARTS LOCATION

a. Keyboard Base (top view) 2
b. Keyboard Base (bottom view) 3
c. Perforator and Count Selector Bars 4
d. Main Shaft 5
e. Counting Shaft 6
f. Stop Pin Selecting Code 7
g. Punch Unit 8
h. Spacing Rack 9
i. Six Unit Code Chart 10

ADJUSTMENTS

a. General 11
b. Alphabetical Adjustment Index ..... 12, 13 & 14
c. Instructions:
(1) Removing Count Selector Bar Assembly 15
(2) Replacing Count Selector Bar Assembly 15
(3) Removing Perforator Selector Bar Assembly 15
(4) Replacing Perforator Selector Bar Assembly 15
(5) Removing Justification Pointer Rack Assembly 29
(6) Replacing Justification Pointer Rack Assembly 30
(7) Removing and Replacing Punch Unit Assembly 37
(8) Removing and Replacing Punch Block Assembly 38
(9) Removing and Replacing Counting Shaft Assembly 23

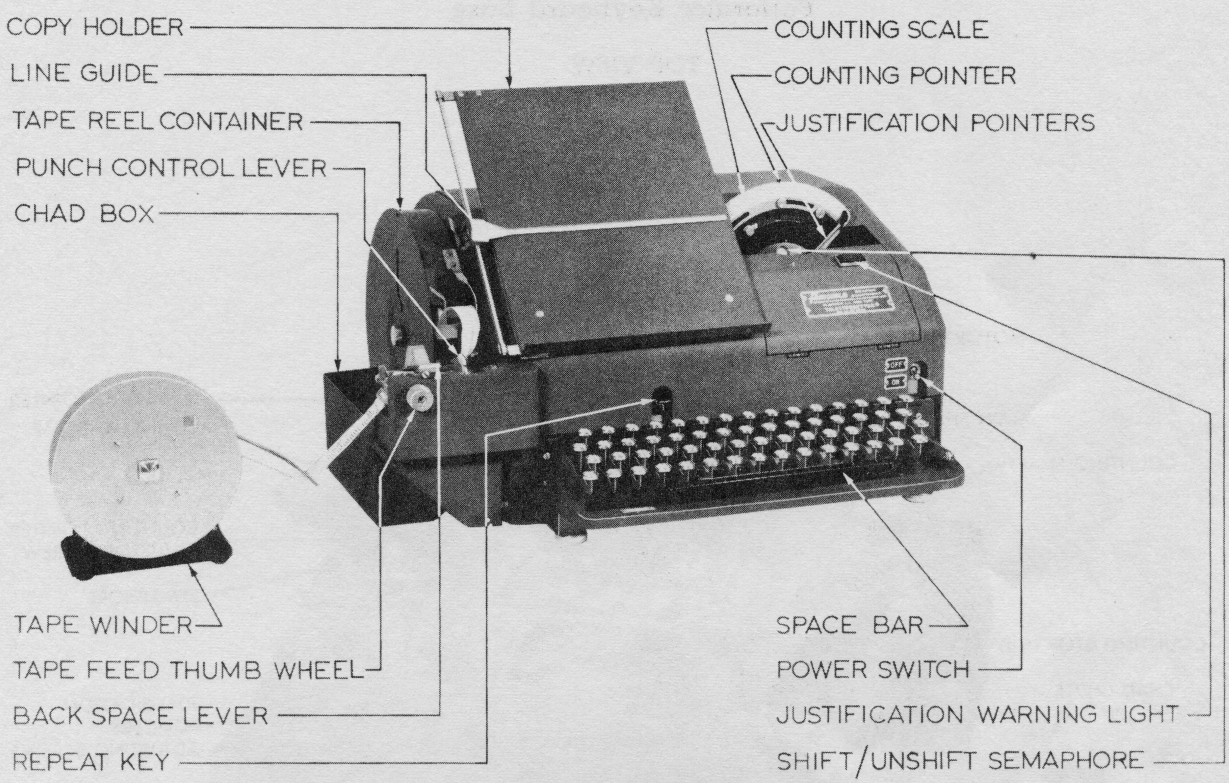
ELECTRICAL CLUTCH TRIP ..... 44 to 47

TROUBLE SHOOTING (SYMPTOMS) ..... 48, 49 & 50

LUBRICATION CHART ..... 51 & 52

KEYBOARD TOUCH 53

Description of Teletypesetter Standard Perforator



The Teletypesetter Perforator is a motor driven typewriter-like machine providing complete facilities for keyboard operation of justified line copy in perforated tape form. Tape may be prepared for setting all types of composition with unit font matrices from 5½ to 12 point type.

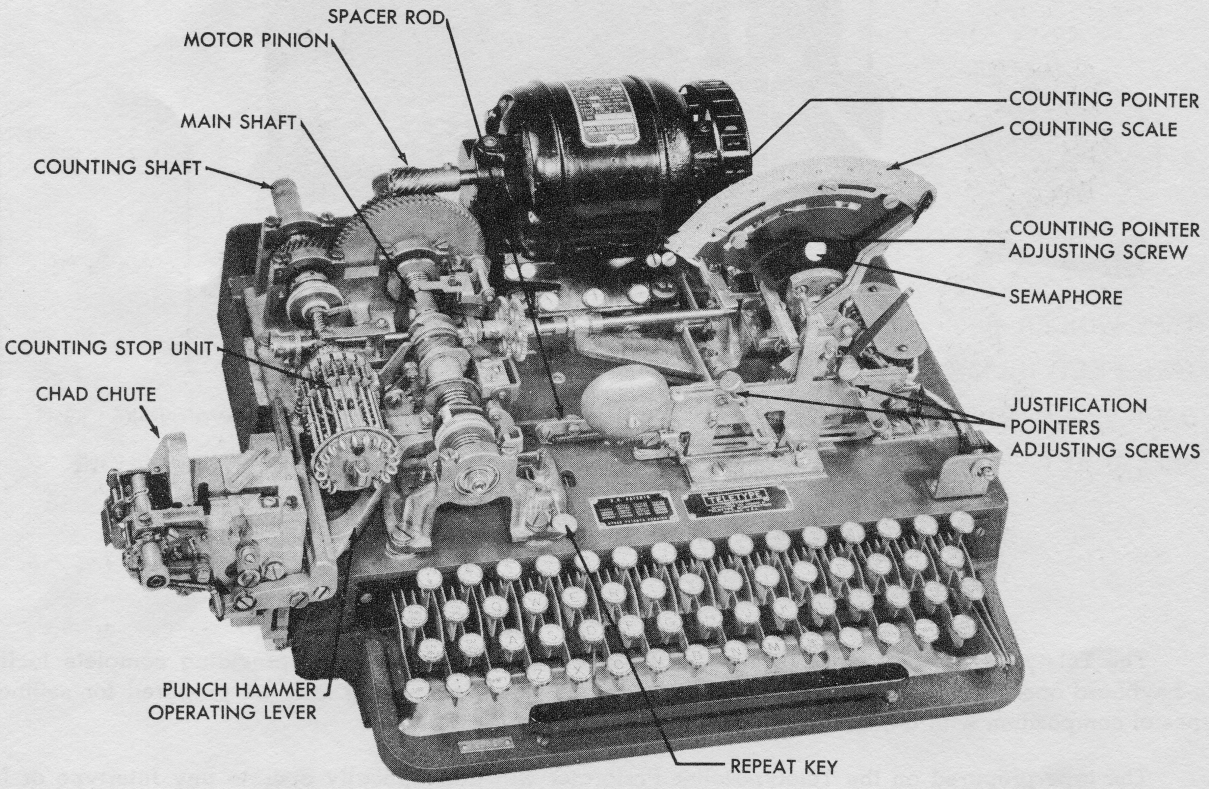
The tape prepared on the Teletypesetter Perforator will automatically operate any Intertype or Linotype slug linecasting machine equipped with a Teletypesetter Operating Unit. The tape may also be used for transmission of news or text matter to a distant location where it may be duplicated in perforated tape form or page copy.

It has a touch system layout with the fastest keyboard ever designed for linecasting machine operation. This compact keyboard has, besides the regular alphabetical and numerical keys, additional keys to control the fixed spacing and various other functions of the linecasting machine.

In addition to the keys and a tape perforating mechanism, the perforator contains a counting pointer and space band justification pointers which automatically indicate the width of each character and the minimum and maximum expansion limits of the space bands so that the operator can readily determine when the line will justify on the Linecasting Machine.

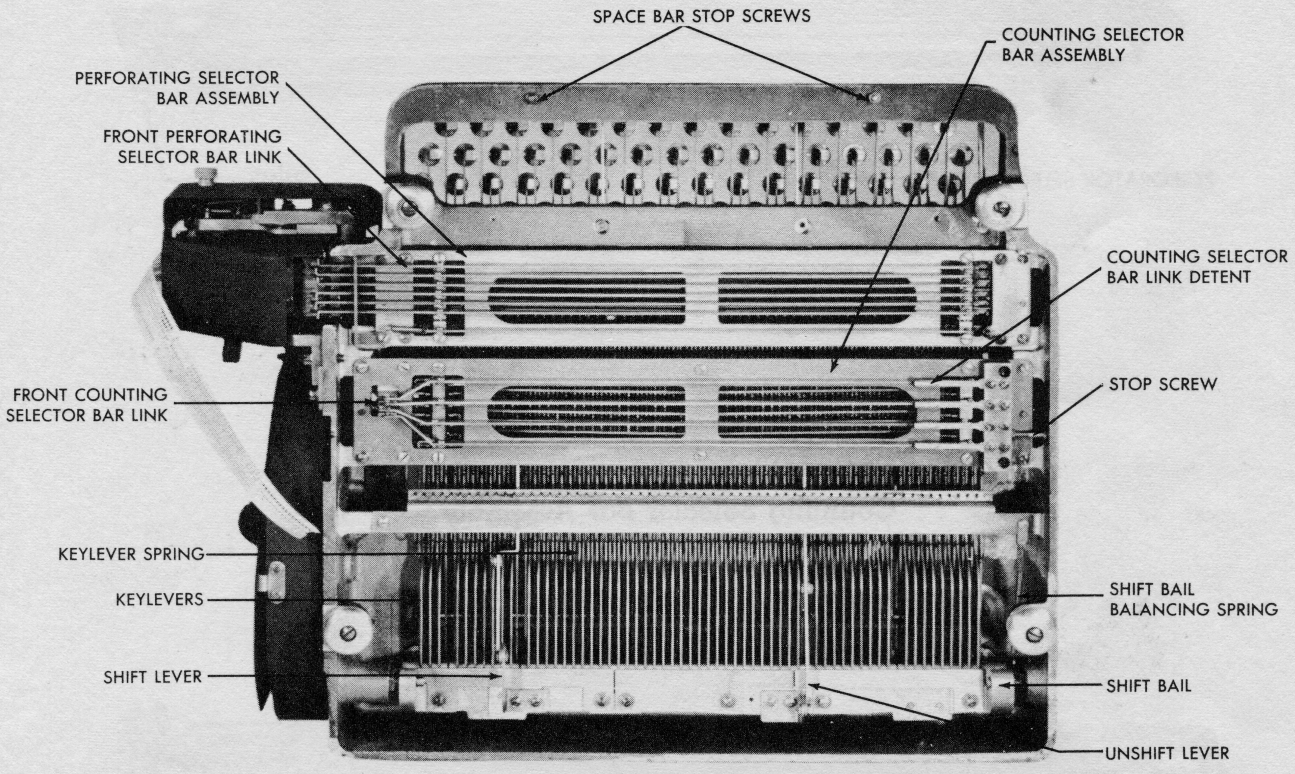
Perforator Keyboard Base

TOP VIEW

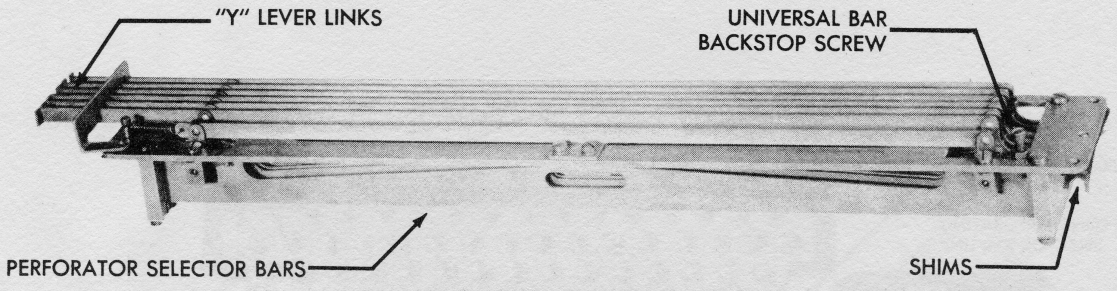


Perforator Keyboard Base

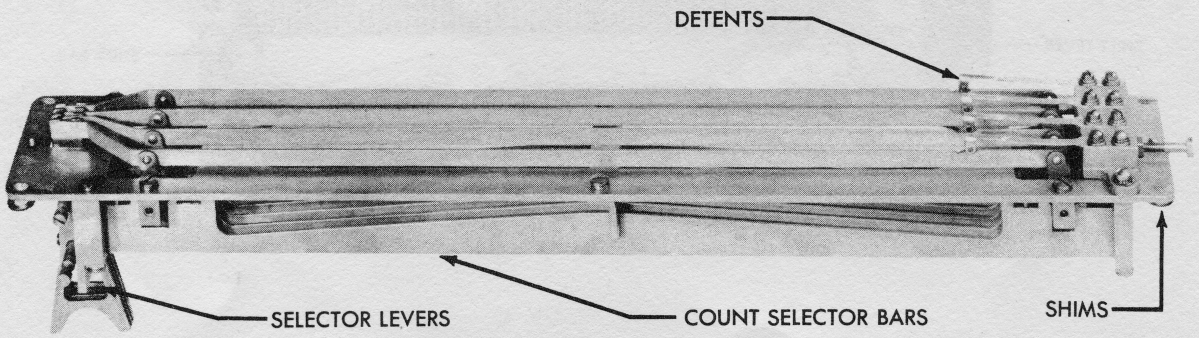
(Bottom View)



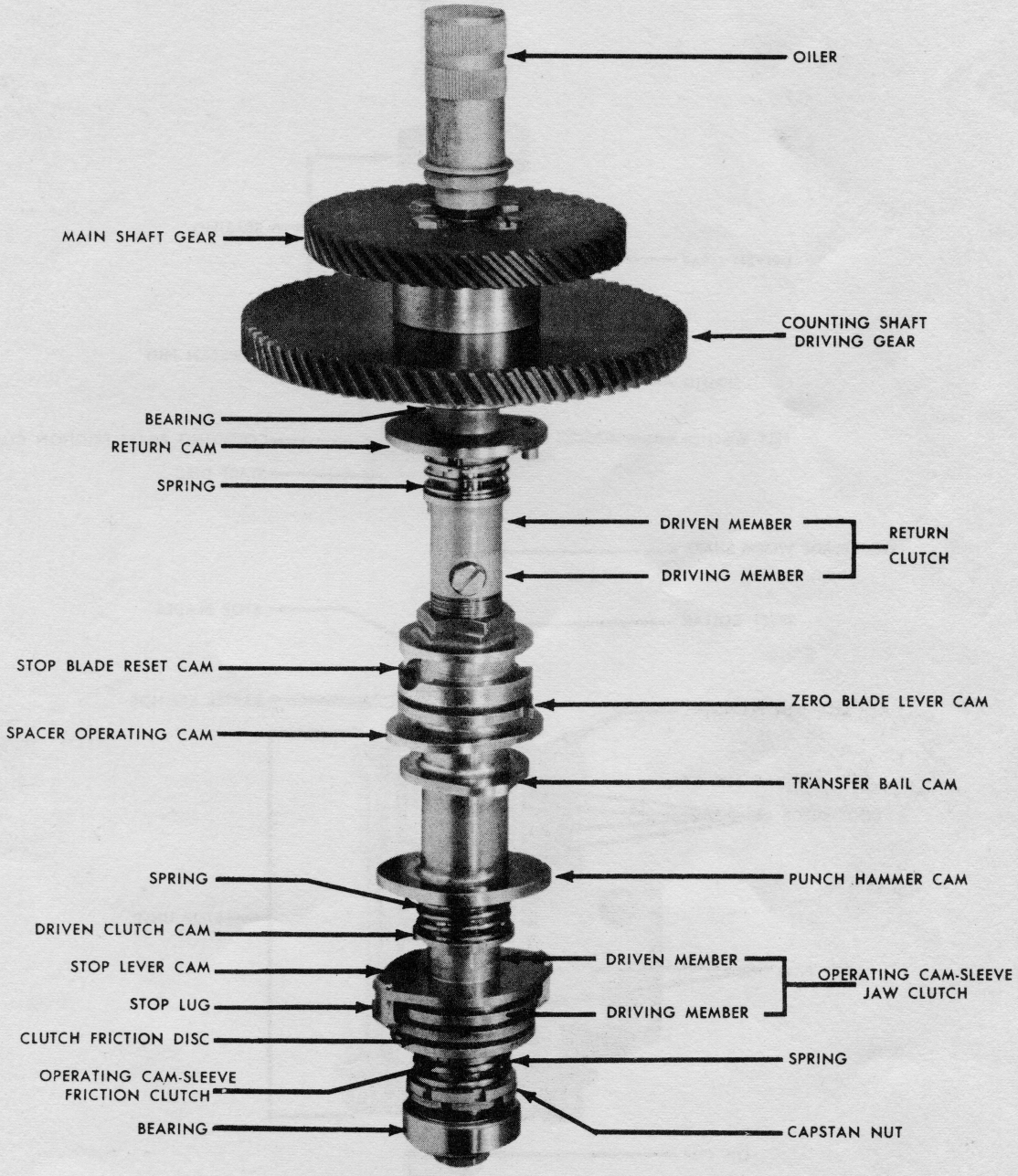
Perforating Selector Bar Assembly



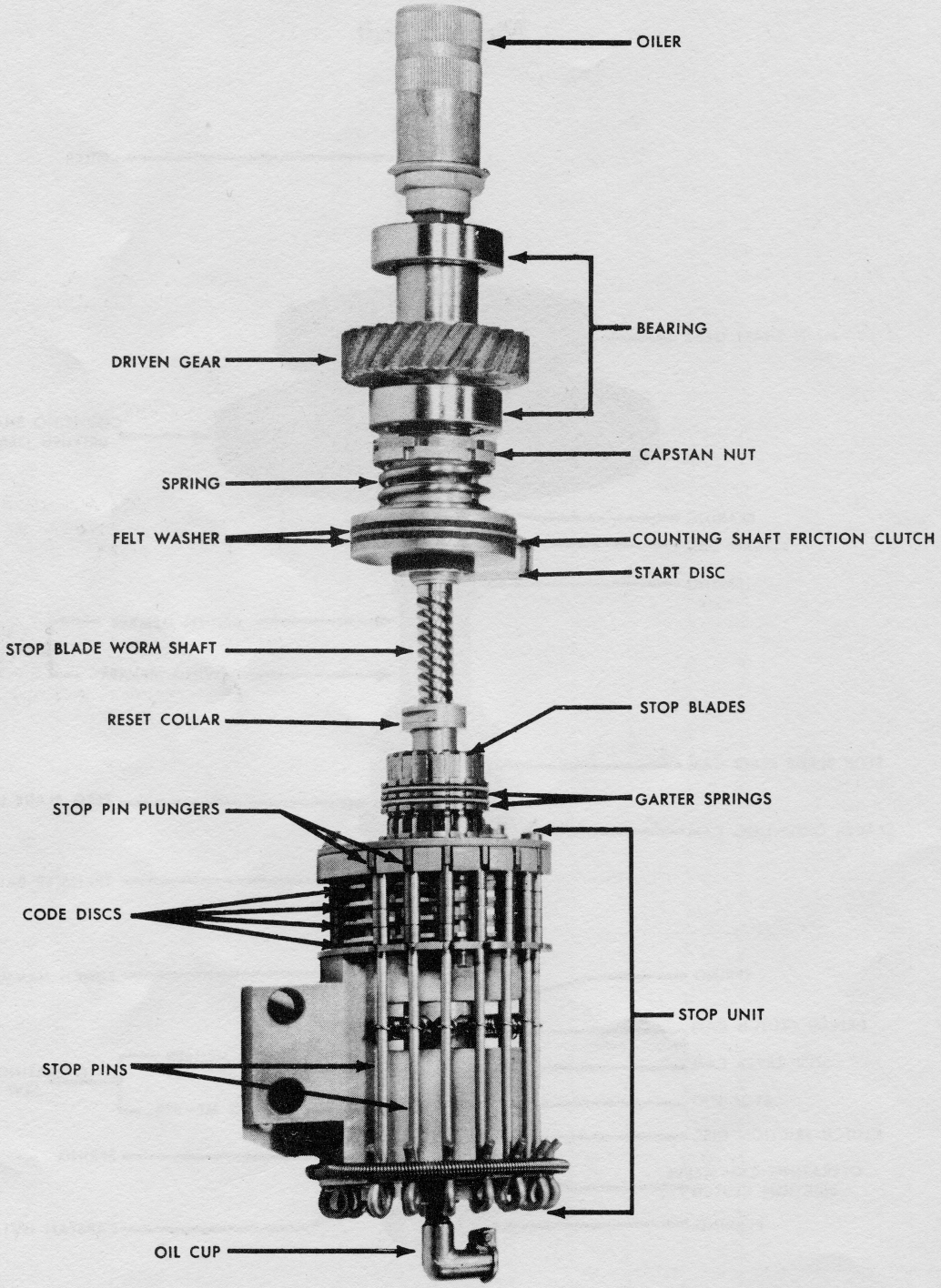
Counting Selector Bar Assembly



Main Shaft

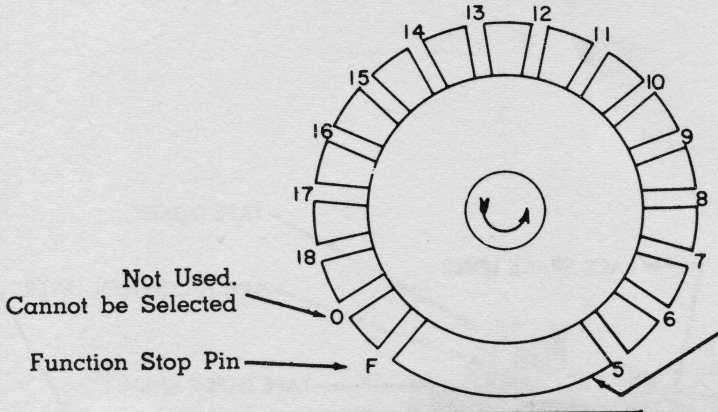

OILER
MAIN SHAFT GEAR
COUNTING SHAFT DRIVING GEAR
BEARING
RETURN CAM
SPRING
DRIVEN MEMBER
DRIVING MEMBER
RETURN CLUTCH
STOP BLADE RESET CAM
ZERO BLADE LEVER CAM
SPACER OPERATING CAM
TRANSFER BAIL CAM
SPRING
PUNCH HAMMER CAM
DRIVEN CLUTCH CAM
STOP LEVER CAM
DRIVEN MEMBER
DRIVING MEMBER
OPERATING CAM-SLEEVE JAW CLUTCH
STOP LUG
CLUTCH FRICTION DISC
SPRING
OPERATING CAM-SLEEVE FRICTION CLUTCH
BEARING
CAPSTAN NUT

Counting Shaft



Lever down means circle in hole

Stop Pin Selecting Code
Used On Teletypesetter Perforators



CODE DISCS				5–18 UNITS	
1	2	3	4	UNIT VALUE	STOP PIN SELECTED
①	②	③	④	5	5
①				6	6
①	②			7	7
①	②	③		8	8
①		③		9	9
	②			10	10
		③		11	11
①	②		④	12	12
①			④	13	13
	②	③		14	14
	②		④	15	15
①		③	④	16	16
	②	③	④	17	17
		③	④	18	18
			④	–	–
				–	–

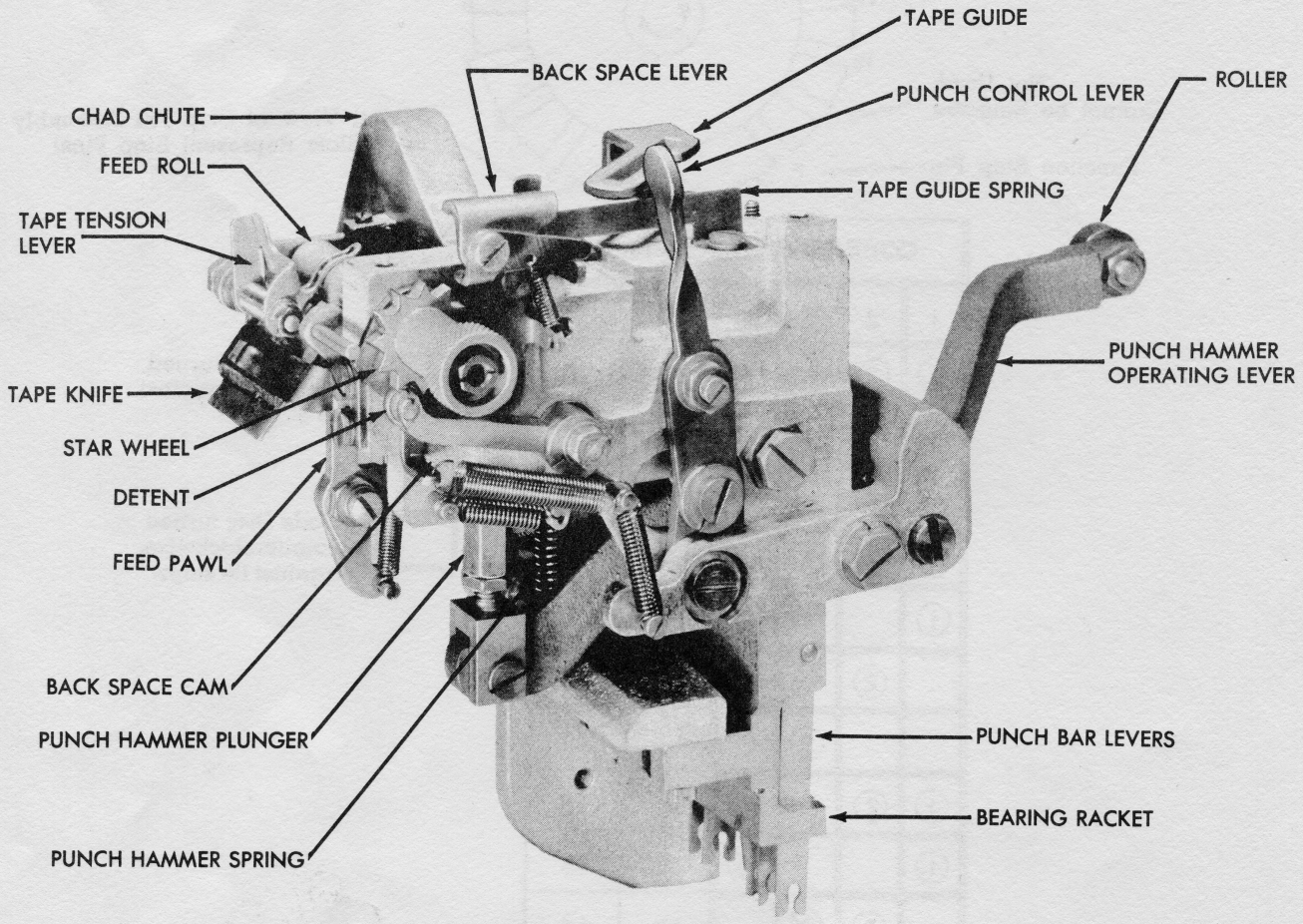
FUNCTION STOP PIN SELECTED ON TWO COMBINATIONS

NOTES:
No. 1 Code Disc is in front.

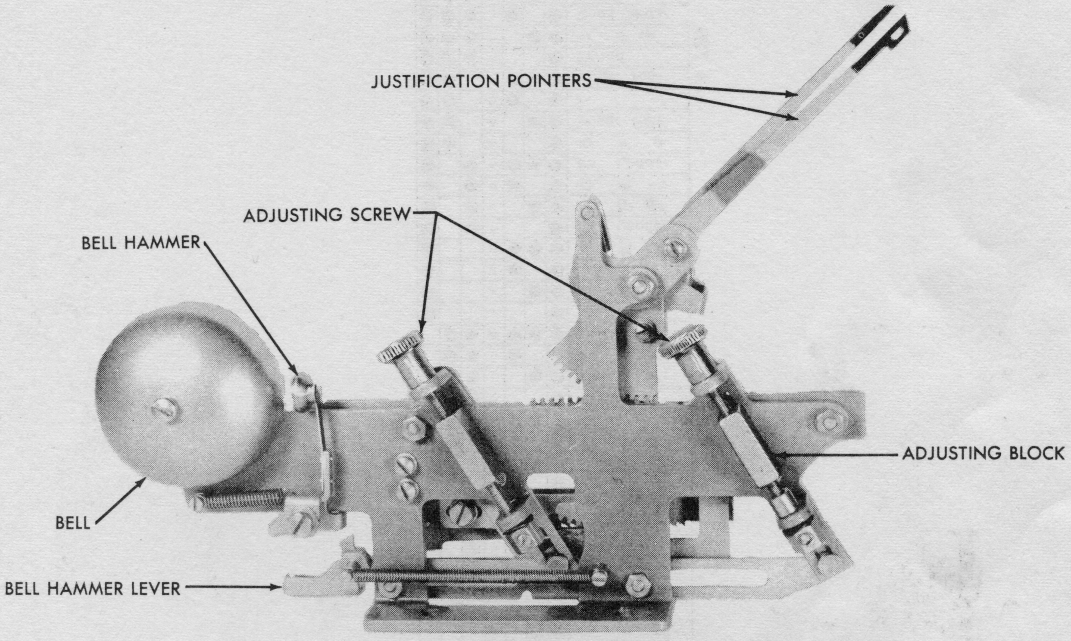
Code Disc turned clockwise against its stops.

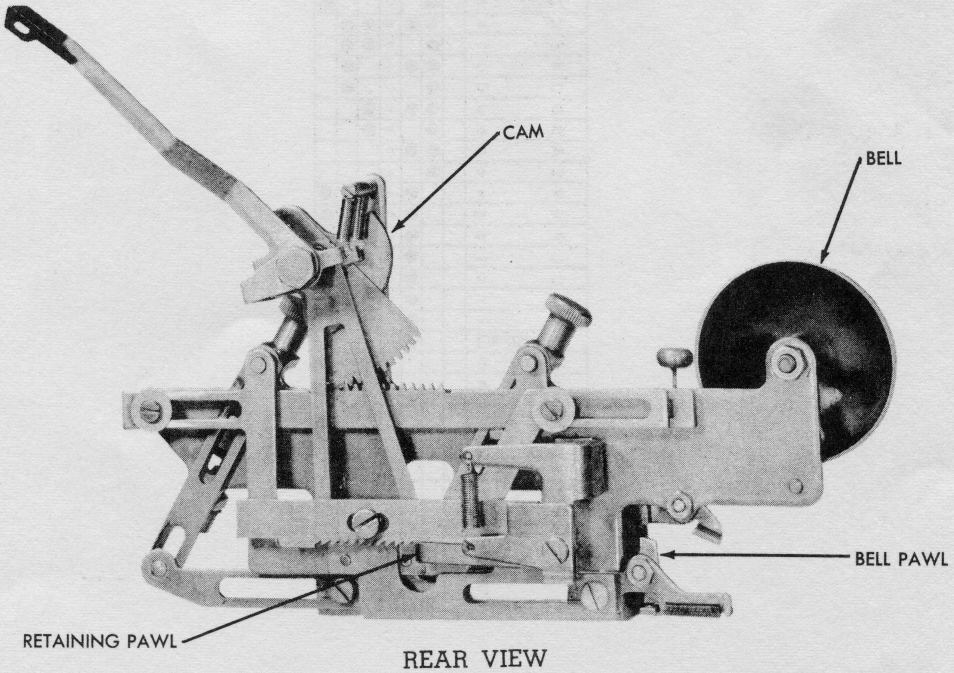
Code Disc turned counterclockwise against its stops.

Punch Unit


TAPE GUIDE
BACK SPACE LEVER
PUNCH CONTROL LEVER
ROLLER
CHAD CHUTE
FEED ROLL
TAPE GUIDE SPRING
TAPE TENSION LEVER
PUNCH HAMMER OPERATING LEVER
TAPE KNIFE
STAR WHEEL
DETENT
FEED PAWL
BACK SPACE CAM
PUNCH HAMMER PLUNGER
PUNCH BAR LEVERS
BEARING RACKET
PUNCH HAMMER SPRING

Justification Pointer Spacing Rack





REAR VIEW

6-Unit Code Chart

TS 729

| SHIFT / UNSHIFT | Tape Feed | t | Return | o | Space Band | n | h | m | Elevate | i | r | c | l | p | g | v | e | a | s | u | d | j | f | k | z | w | y | q | b | Shift | x | Unshift | Thin Space | 3 ¾ ? ⅜ | PF or L.M. | $! | Add-Thin Space | Em Space | 8 | 7 ⅞ & | ↑ → | - @ ½ | * 4 | Bell | Comma | Quad Left | En Space | Q. R. or U.M. | 5 ⅝ ff | ( ) | √Rule Em Sp | 2 ¼ ff | Em Leader | 9 ¾ gl | 0 ? | En Leader | 6 & fy | Upper Rail | : ; | Lower Rail | Period | 1 ⅛ ff | Quad Center | Rub Out |
|---|---|---

Adjustments

General:

All adjustments are listed in the sequence followed for complete readjustment of the Perforator. This fact should be kept in mind when a single adjustment is made. As numerous adjustments are inter-related, it is essential that each one be made in the sequence given, and if one adjustment is changed, it is necessary to check related adjustments.

All adjustments should be made at the midpoint between the tolerance limits whenever possible. This is only a *recommendation* and not a *limitation* of the adjustment tolerances specified herein. Adjustments made within limit values required shall be considered satisfactory.

EXAMPLE: If an adjustment requirement specifies a clearance of .010" to .030" between two levers, a .010" feeler gauge shall pass freely through the gap between the levers. A .030" feeler gauge shall *not* pass between the levers, shall perceptibly rub in the clearance between the levers, or shall cause a movement in one or the other or both of the levers when the .030" feeler gauge is inserted between the levers involved in the adjustment requirement.

In cases where the term "some clearance" is used the requirement shall be considered met if light can be seen between the parts involved, or if some perceptible movement in one or the other of the parts involved can be felt or seen.

When it is necessary to readjust any part which is held or locked by clamping screws, mounting screws or lock nuts, be sure to loosen the locking device. After readjustment is completed, be sure to reset and tighten the locking device.

Spring tension values given in this Bulletin were derived from measurements made with Teletypesetter spring scales. These spring scales are calibrated for use in a vertical "pull" position. When used in any other position, the reading is an indicated value. In order to obtain the proper spring tension readings, the spring scales which are included in the Teletypesetter Bulletin tool list should be used.

NOTE: In all Figures of this Bulletin, fixed pivot points are designated by solid black circles.

Alphabetical Adjustment Index

Adjustment Number	Description	Page Number
88	Backspace Cam Spring Tension	40
86	Backspace Pawl Spring Tension	40
68	Bell Hammer Lever Eccentric	33
70	Bell Hammer Lever Spring Tension	34
71	Bell Pawl Spring Tension	34
51	Counting Pointer Clutch Release Lever	29
44	Counting Pointer Clutch Spring Compression	27
45	Counting Pointer Clutch Spring Tension	27
63	Counting Pointer Return Spring Arm Position	32
1	Counting Selector Bar Assembly Shims	15
64	Counting Pointer Return Spring Tension	32
29	Count Selector Bar Assembly Position	22
3	Count Selector Bar Link Detents	16
32	Counting Shaft End Play	24
41	Counting Shaft Friction Clutch Torque	26
66	Eccentric Screw	33
58	Intermediate Pawl Latch	31
57	Intermediate Pawl Latch Spring Tension	30
65	Intermediate Pawl Spring Tension	33
73	Justification Pointers Return Spring Tensions	35
10	Keylever Spring Tension	18
39	Left Counting Cross Shaft	26
40	Left Counting Cross Shaft End Play	26
54	Left Justification Pointer Returned Position	29
11	Motor Position	18
21	Non-Repeat Latch Spring Tension	20
14	Operating Cam Sleeve Friction Clutch	19
12	Operating Cam Sleeve Jaw Clutch	18
13	Operating Cam Sleeve Jaw Clutch Spring Tension	18
2	Perforating Selector Bar Assembly Shims	15
74	Pivot Adjusting Block Screws Friction	35
83	Punch Bar Levers Bearing Bracket	39
84	Punch Bar Levers Detent	39
85	Punch Bar Levers Detent Spring Tension	39
87	Punch Control Bail Spring Tension	40
80	Punch Hammer Operating Lever	38
79	Punch Hammer Pivot Screws	37
81	Punch Hammer Spring Tension	38
82	Punch Hammer Stop Screw	38
78	Punch Unit	37

Alphabetical Adjustment Index (Continued)

Adjustment Number	Description	Page Number
33	Reset Collar Lever	24
56	Reset Lug	30
50	Retaining Pawl Release Lever	28
53	Retaining Pawl Spring Tension	29
46	Return Actuating Lever	27
49	Return Bail Spring Tension	28
15	Return Clutch Lever Unit Bracket	19
16	Return Clutch Throwout Lever	19
47	Return Clutch Throwout Lever Spring Tension	28
48	Return Clutch Throwout Lever Trip-Off Pawl Spring Tension	28
17	Return Clutch Spring Tension	19
43	Right Counting Cross Shaft End Play	26
42	Right Counting Cross Shaft	26
7	Shift and Unshift Brackets	17
6	Shift and Unshift Lever Bearing Bracket	17
4	Shift Bail	16
9	Shift Bail Balancing Spring Tension	17
8	Shift Bail Detent Spring Tension	17
5	Shift Bail Stop Plate	16
77	Shift Indicating Semaphore	36
75	Signal Lamp Contacts	36
76	Signal Lamp Contacts Operating Lever Spring Tension	36
59	Space Bar Lever Extension Guide Plate	31
60	Space Bar Lever Extension Spring Tension	31
67	Space Bar Stops	33
55	Spacer Rod	30
62	Spacer Rod Spring Tension	32
61	Spacing Feed Pawl Spring Tension	32
52	Spacing Rack	29
72	Spacing Rack Slide Return Spring Tension	34
20	Stop Lever Cam Roller Eccentric Screw	20
24	Stop Lever Latch Adjusting Screw	21
19	Stop Lever Latch Spring Tension	20
25	Stop Lever Latch Upstop Screw	21
18	Stop Lever Spring Tension	20
38	Stop Pin Spring Tension	25
27	Stop Unit Bracket	22
91	Tape Feed Pawl	41
95	Tape Feed Pawl Backspace Deflecting Plate	42

Alphabetical Adjustment Index (Continued)

Adjustment Number	Description	Page Number
92	Tape Feed Pawl Spring Tension	41
89	Tape Feed Roll Bearing Plate	41
93	Tape Feed Roll Detent Final	42
96	Tape Feed Roll Detent Lever Spring Tension	43
97	Tape Guide	43
90	Tape Stripper Plate	41
94	Tape Tension Lever Spring Tension	42
98	Tape Tension Spring	43
30	Transfer Bail Arm	23
28	Transfer Bail Bracket	22
26	Transfer Bail Bracket Alignment	22
31	Transfer Bail Spring Tension	23
99	Trip Arm	44
22	Universal Bar Backstop Screw	21
23	Universal Bar Spring Tension	21
36	Zero Cam Lever Adjusting Screw	25
37	Zero Lever Upstop Screw	25
35	Zero Lever Spring Tension	24
34	Zero Lever Stop Screw	24

In order to make or check the following adjustments, remove the Perforating Selector Bar Assembly.

Instructions for Removing Selector Bar Assembly

Position the Perforator on its back so that it is resting on the motor casting. Remove bottom plate by backing off the four screws that hold the feet to the base casting and slide the base plate to the right.

Remove the four screws (1269) that mount the Perforator selector bar assembly and tilt the assembly slightly to remove it from the Perforator base.

1 COUNTING SELECTOR BAR ASSEMBLY SHIMS

NOTE: Remove perforating selector bar assembly.

Requirement—(a) Hold front (top) counting selector bar link to the right. Clearance between front counting selector bar and lugs on counting code keylever. Min. .015"—Max. .030" with play taken up in maximum direction.

Requirement—(b) Depress "B" character keylever. Front (top) counting selector bar link locked, all other selector bar links should be locked, or may have a lateral play Max. .020".

To Adjust—By means of shims and half shims raise, lower, or tilt counting selector bar assembly. The number of half shims for the front end to be equal, as well as the rear end.

Instructions for Replacing Selector Bar Assembly

Re-install selector bar assembly. Check to see that the selector bar links engage their respective vertical levers on the punch unit, and that the release plunger (85003) engages the working edge of the universal bar rocker arm. Secure the assembly to the Perforator base with the four screws (1269).

Position the guide (91741) that lines up the selector bar links on the left hand side so that the links move freely without binding in the guide.

If the release plunger fails to trip the main shaft clutch when a keylever is depressed then the engaging surface of the universal bar rocker is not positioned properly.

2 PERFORATING SELECTOR BAR ASSEMBLY SHIMS

NOTE: Replace perforating selector bar assembly, being careful not to damage trip off plunger.

Requirement—(a) Depress a central keylever in bottom row. Front perforating selector bar link locked, all other perforating selector bar links should be locked or have a lateral play of not more than .020". All counting selector bar links should be locked or have a lateral play of not more than .030".

Requirement—(b) Recheck foregoing requirement using end keylevers in third row.

To Adjust—By means of shims and half shims raise, lower, or tilt perforating selector bar assembly. The number of half shims for the front end to be equal, as well as the rear end.

Instructions for Removing Count Selector Bar Assembly

With the Perforator on its back so that it is resting on the motor casting, remove the bottom plate by backing off the four screws that hold the feet to the base casting and slide the base plate to the right. Remove the four mounting screws (1269) that mount the count selector bar assembly.

Instructions for Replacing Count Selector Bar Assembly

Secure the assembly to the Perforator base with the four mounting screws (1269), before tightening the mounting screws be sure the count selector bar assembly is positioned to the right so that the adjusting screw (78028) is against the base casting. Replace the Base Plate.

3 COUNTING SELECTOR BAR LINK DETENTS

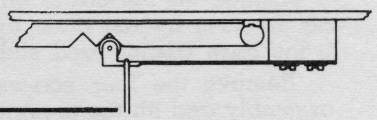
Requirement—(a) Each counting selector bar link detent roller should ride an equal distance into the right and left notches in counting selector bar links, and detent rollers should ride fully on their links.

To Adjust—Position the detent springs by means of their elongated mounting holes.

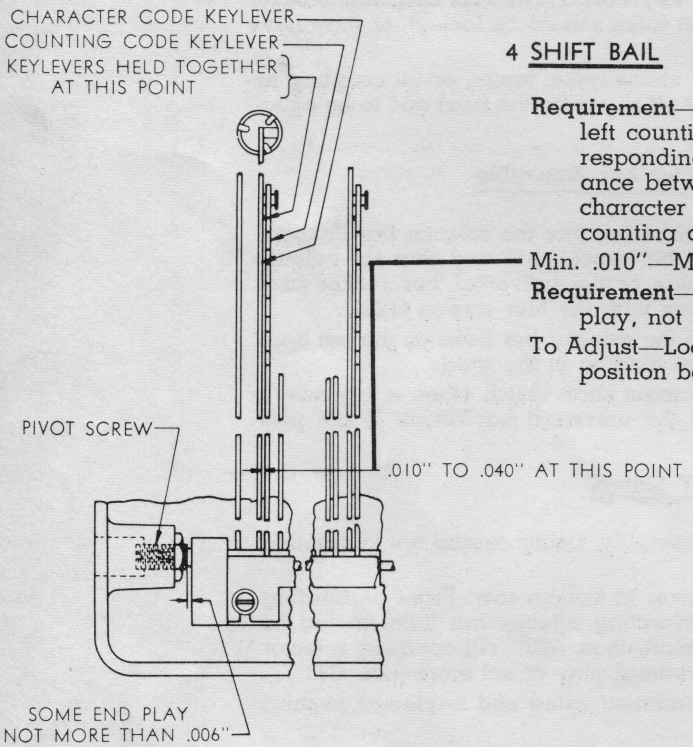
Requirement—(b) Check tension in one and then the other notch in counting selector bar links.

Use 8 oz. scale.

Min. 1 oz.—Max. 1½ ozs. to start detent moving.



NOTCHED DETENT ROLLER



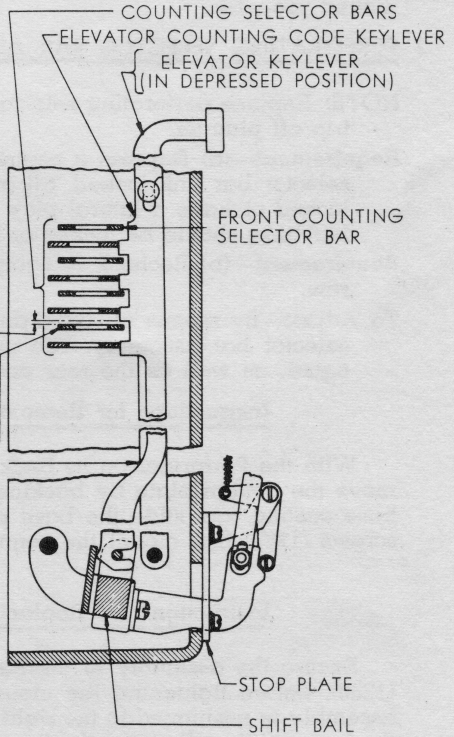
4 SHIFT BAIL

Requirement—(a) Hold forward end of extreme left counting code keylever against its corresponding character code keylever. Clearance between counting code keylever and character keylever at point in the bend of counting code keylever.

Min. .010"—Max. .040" (Check right end)

Requirement—(b) Shift bail should have end play, not more than .006".

To Adjust—Loosen shift bail pivot lock nuts and position bail.



5 SHIFT BAIL STOP PLATE

Remove shift spring

Requirement—Shift bail in shift position, depress elevator keylever. Clearance between second (from rear) counting selector bar and lug on elevator counting code keylever that is immediately to the front of that selector bar.

Min. .055"—Max. .065".

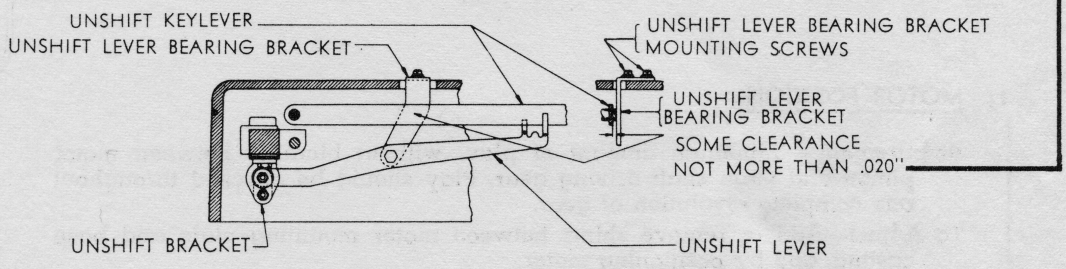
To Adjust—Loosen shift bail stop plate mounting screws and position plate.

Forward for more clearance

6 SHIFT AND UNSHIFT LEVER BEARING BRACKET

Requirement—Min. Some clearance Max. .020" between unshift lever bearing bracket and unshift keylever. This also applies to the shift lever bearing bracket and shift keylever.

To Adjust—Position shift and unshift lever bearing brackets.

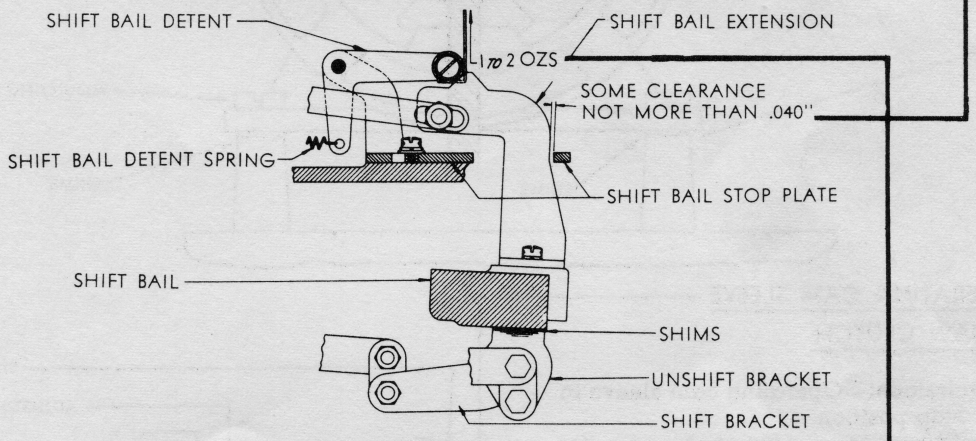


7 SHIFT AND UNSHIFT BRACKETS

Requirement—Depress shift keylever (using 16 to 32 ozs. key pressure). Hold shift bail extension lightly for maximum clearance between rear edge of shift bail extension and shift bail stop plate.

Min. Some clearance Max. .040". Check this same clearance between front edge of shift bail extension and shift bail stop plate when unshift keylever is depressed.

To Adjust—Add shims between shift bail and shift and unshift brackets to decrease clearances, remove shims to increase clearances.
NOTE: Shift and unshift levers should engage their keylevers and the connecting links must have no binds. (Position brackets).



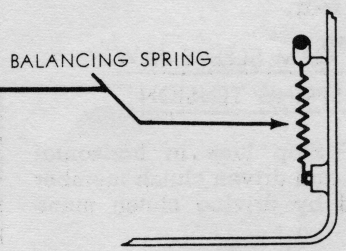
8 SHIFT BAIL DETENT SPRING TENSION

Requirement—Pull vertically upward.

Use 8 oz. scale.

Min. 1 oz.—Max. 2 ozs. to start detent moving.

9 SHIFT BAIL BALANCING SPRING TENSION



Requirement—Unhook shift bail balancing spring. Shift bail in shift position (rear).

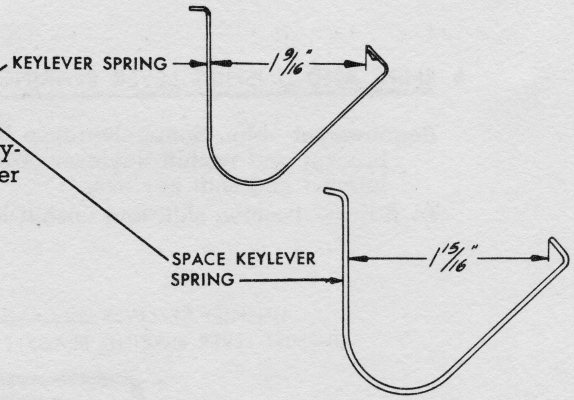
Use 32 oz. scale.

Min. 9 ozs.—Max. 11 ozs. to stretch the spring to installed length.

10 KEYLEVER SPRING TENSION

Requirement—The opening between ends of space keylever spring should be 1-15/16", all other keylever springs 1-9/16".

To Adjust—Bend the springs.

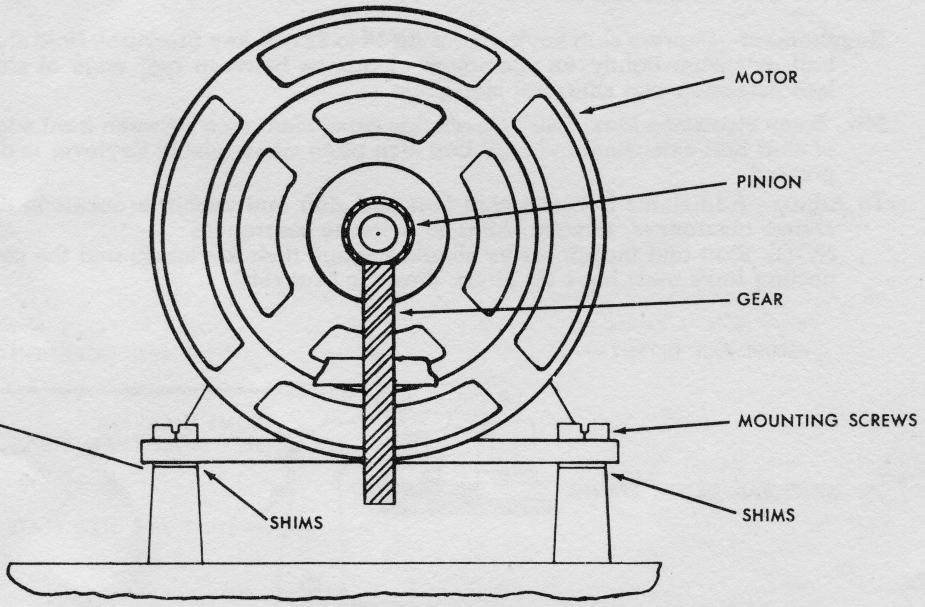


11 MOTOR POSITION

Requirement — Minimum amount of play, without binding, between motor pinion and main shaft driving gear. Play should be checked throughout one complete revolution of gear.

To Adjust—Add or remove shims between motor mounting plate and base casting, and by positioning motor.

NOTE: The same number of shims should be used under each corner of the motor.



12 OPERATING CAM SLEEVE JAW CLUTCH

Requirement—Operating cam sleeve in stop position.

Min. .006"—Max. .010" at closest point between clutch teeth.

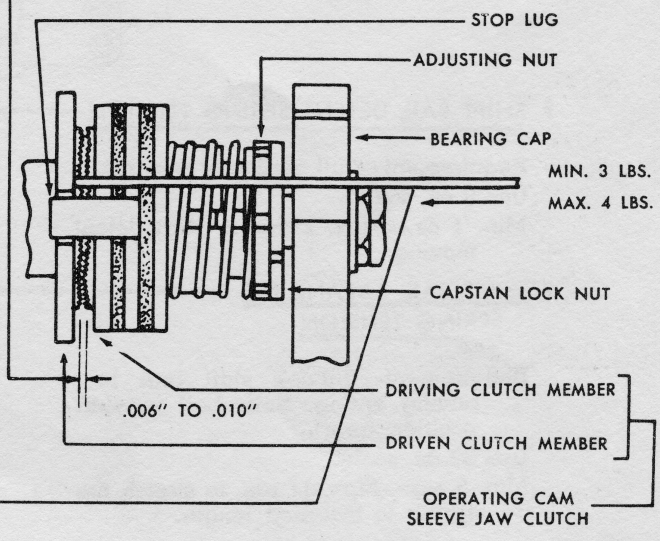
To Adjust—Loosen bearing mounting screws and push main shaft to the front or rear.

13 OPERATING CAM SLEEVE JAW CLUTCH SPRING TENSION

Requirement— Stop lugs in horizontal position and driven clutch member engaged by driving clutch member.

Use 12 lb. scale.

Min. 3 lbs.—Max. 4 lbs. to just separate clutch members.



14 OPERATING CAM SLEEVE FRICTION CLUTCH

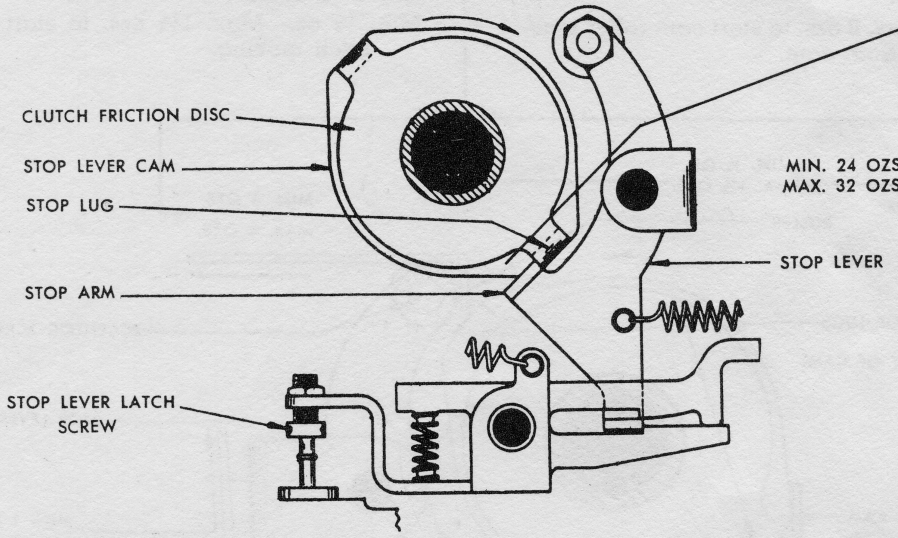
CAUTION: While checking this tension, hold left end of stop lever latch down to prevent accidental engaging of clutch jaw teeth, which might result in injury to the fingers.

Requirement—Motor running for 10 minutes and clutch disengaged.

Use 32 oz. scale.

Min. 24 ozs.—Max. 32 ozs. to just move clutch backward from stop position.

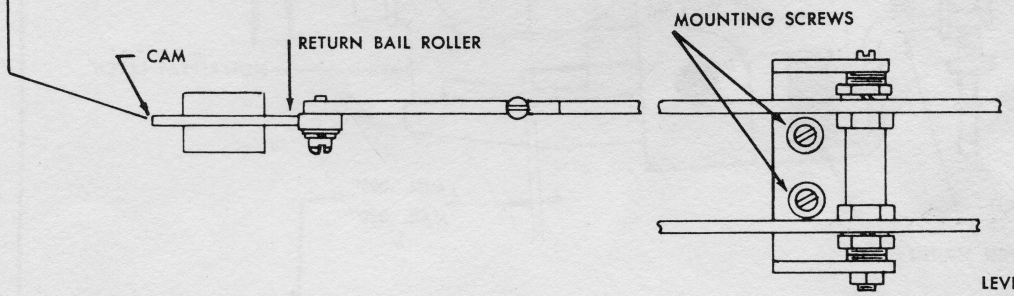
To Adjust—Loosen capstan nut lock nut and position capstan nut.



15 RETURN CLUTCH LEVER UNIT BRACKET

Requirement—Return bail roller should ride fully on its cam.

To Adjust—Locate return clutch lever unit bracket by means of its mounting screws. It may be necessary to remove motor in order to make this adjustment.



16 RETURN CLUTCH THROWOUT LEVER

Requirement—Return clutch in stop position and shoulder on driven member held against end of return clutch throwout lever.

Min. .015"—Max. .020" between teeth of driven and driving clutch member at closest point.

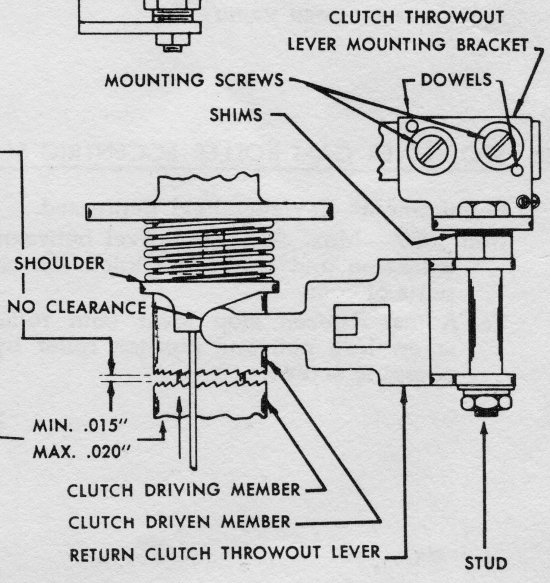
To Adjust—Add or remove shims on the clutch throwout lever stud.

17 RETURN CLUTCH SPRING TENSION

Requirement—Return clutch engaged and return clutch throw-out lever held away from clutch.

Use 32 oz. scale.

Min. 9 ozs.—Max. 12 ozs. to just separate clutch teeth.



18 STOP LEVER SPRING TENSION

Requirement—Stop lever roller on stop lug of cam.

Use 8 oz. scale.

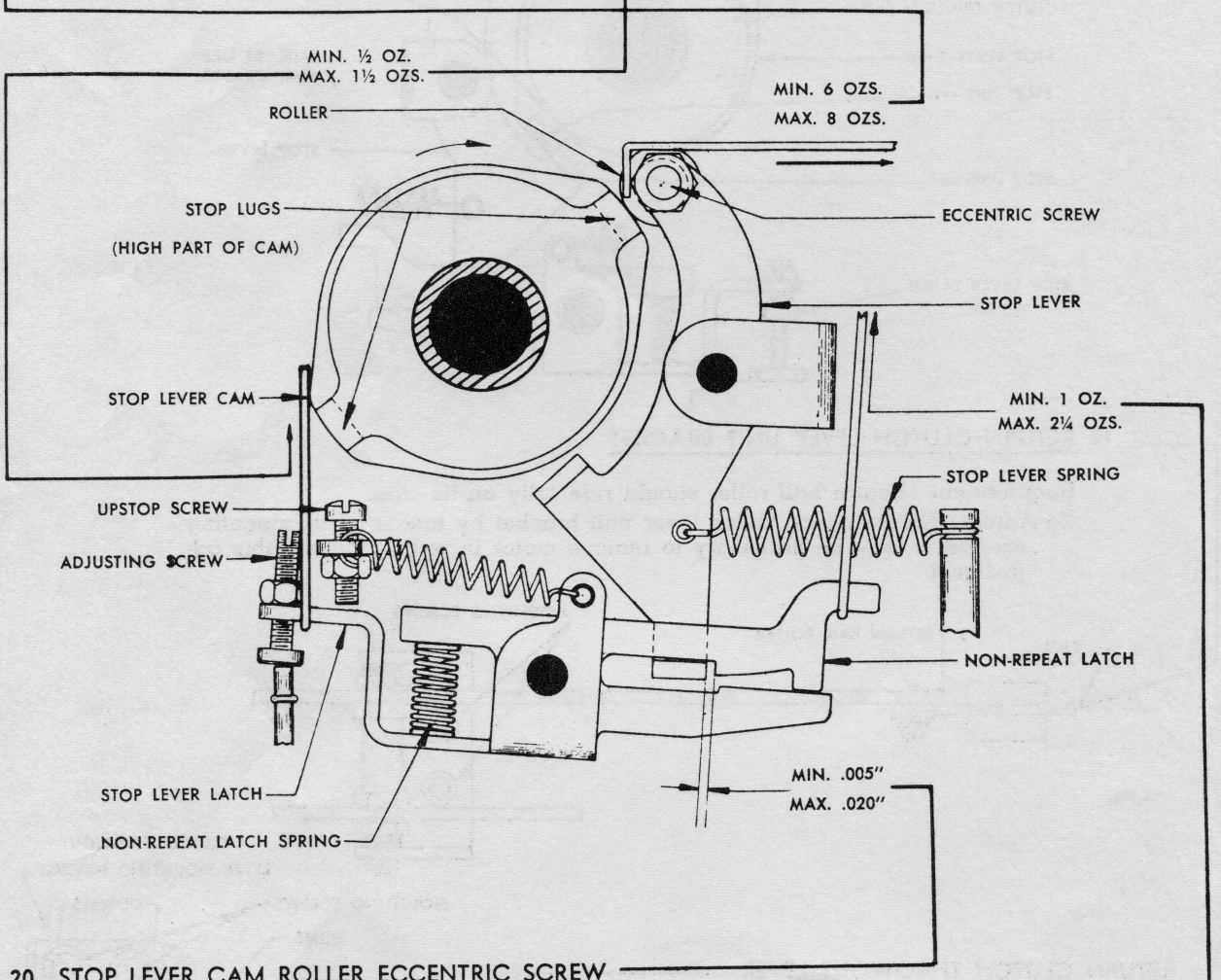
Min. 6 ozs.—Max. 8 ozs. to start cam roller moving away from cam.

19 STOP LEVER LATCH SPRING TENSION

Requirement—Stop lever roller on a stop lug of cam.

Use 8 oz. scale.

Min. ½ oz.—Max. 1½ ozs. to start stop lever latch moving.



20 STOP LEVER CAM ROLLER ECCENTRIC SCREW

Requirement—Keylever held depressed.

Min. .005"—Max. .020" overtravel between stop lever extension and non-repeat latch. Check both high parts of cam.

To Adjust—Loosen stop lever cam roller eccentric screw lock nut, and position roller by means of eccentric screw.

21 NON-REPEAT LATCH SPRING TENSION

Requirement—Stop lever roller on stop lug of cam.

Use 8 oz. scale.

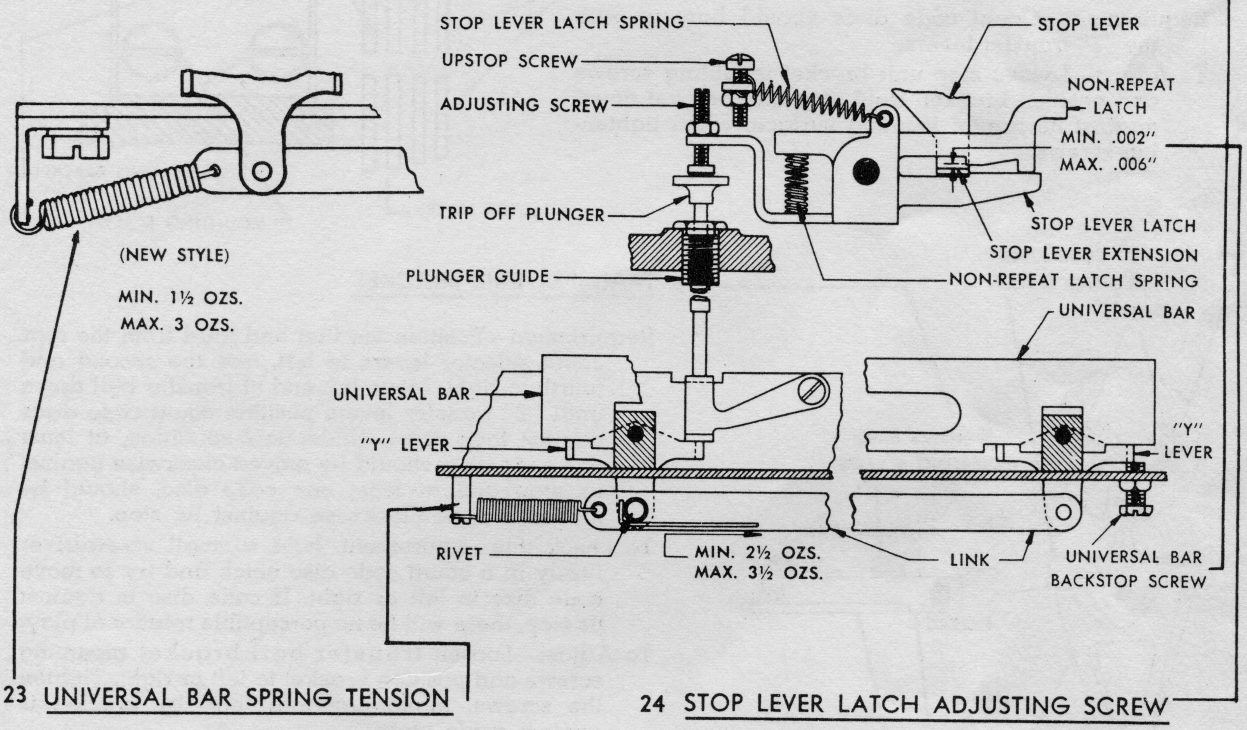
Min. 1 oz.—Max. 2¼ ozs. to start non-repeat latch moving.

22 UNIVERSAL BAR BACKSTOP SCREW

NOTE: In order to check this adjustment, it will be necessary to remake it.

Requirement—Back off universal bar backstop screw. With "R", "Y", and "5" keylevers held depressed at the same time, turn universal bar backstop screw in until it just touches universal bar Y lever. Then turn screw in approximately two-thirds of a turn and tighten lock nut.

Recheck the "Stop Lever Latch Adjusting Screw Adjustment"



23 UNIVERSAL BAR SPRING TENSION

Requirement—Trip main clutch by depressing a keylever.

Use 8 oz. scale.

Min. 1½ ozs.—Max. 3 ozs. to just start link moving.

NOTE: When spring connects to spring post (Old Style) instead of spring bracket, Min. 2½ ozs.—Max. 3½ ozs. to start link moving.

24 STOP LEVER LATCH ADJUSTING SCREW

Requirement—Operating cam sleeve in stop position.

Min. .002"—Max. .006" between lower surface of non-repeat latch and upper surface of stop lever extension.

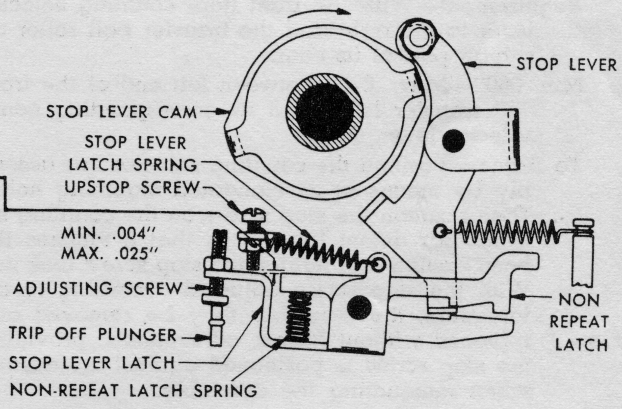
To Adjust—Loosen stop lever latch adjusting screw lock nut and position adjusting screw.

25 STOP LEVER LATCH UPSTOP SCREW

Requirement—Keylever held depressed.

Min. .004"—Max. .025" between upstop screw and stop lever latch. Check one keylever on each end and one in the center.

To Adjust—Loosen upstop screw lock nut and position screw.



26 TRANSFER BAIL BRACKET ALIGNMENT

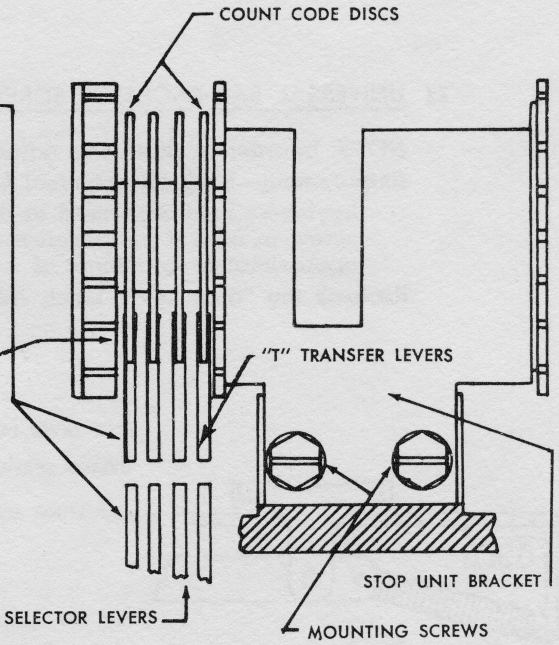
Requirement—"T" transfer levers should line up with the count selector levers.

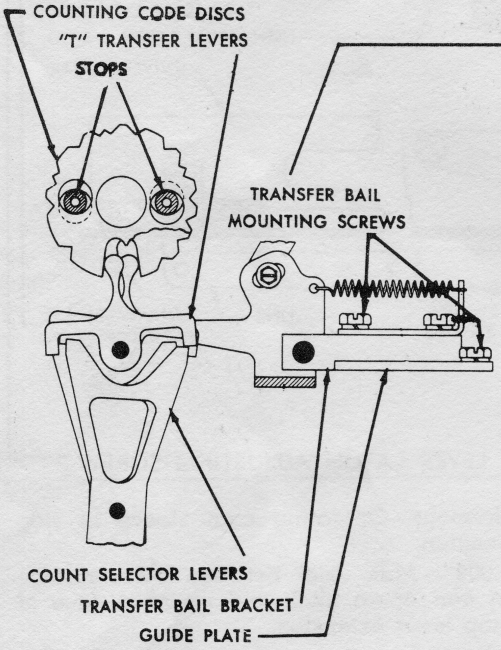
To Adjust—Loosen transfer bail bracket and guide plate mounting screws and position bracket. Guide plate will maintain front to rear position of transfer bail, while the bail bracket is adjusted left to right for the transfer bail bracket adjustment.

27 STOP UNIT BRACKET

Requirement—Count code discs should line up with the "T" transfer levers.

To Adjust—Loosen stop unit bracket mounting screws and position bracket. Hold stop unit bracket down against horizontal locating surface, when tightening screws.





28 TRANSFER BAIL BRACKET

Requirement—Position the first and third from the rear count selector levers to left, and the second and fourth to right. Move left end of transfer bail down until "T" transfer levers position count code discs against their stops. Under this condition, at least one code disc, should be moved clockwise against its stop and at least one code disc, should be moved counter-clockwise against its stop.

To check this requirement, hold a small screwdriver firmly in a count code disc notch and try to move code disc to left or right. If code disc is against its stop, there will be no perceptible rotational play.

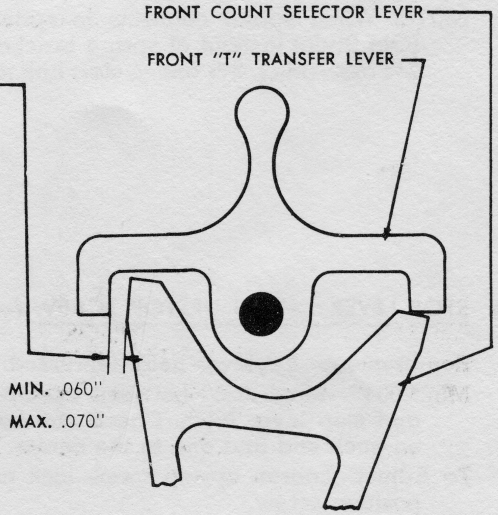
To Adjust—Loosen transfer bail bracket mounting screws and position bracket to left or right. Tighten the screws, making certain that the bracket is against guide plate.

29 COUNT SELECTOR BAR ASSEMBLY POSITION

Requirement—With the front (top) counting selector lever to the right and the transfer bail roller on a high part of its cam.

Min. 060"—Max. .070" between left end of the front "T" transfer lever and its corresponding count selector lever.

To Adjust—Position the counting selector bar assembly by means of its elongated mounting holes. Then position the stop screw on the counting selector bar detent bracket so that it touches the base casting and tighten the stop screw lock nut. With the stop screw adjusted according to the foregoing, the assembly may be removed and replaced without further adjustments, providing the stop screw is positioned against the casting when remounting the assembly.



Instructions for Removing and Replacing the Counting Shaft

Remove the four (85471) screws that mount the two bearing caps (123722) from the rear of the counting shaft. The counting shaft pulls apart where worm shaft slips through washer and into sleeve at center of drive arm.

Remove pilot screw (6814) in reset collar lever (86215). Loosen set screw (6807) which holds zero lever shaft (3248) in place and withdraw shaft.

Depress any key (to release clutch) and turn top of motor fan forward until reset collar is to extreme rear of its travel. Then turn set collar (86090) —and shaft—to slip reset collar off bottom pivot pin in reset collar. Entire worm shaft can then be pulled to rear far enough to apply new garter spring over the end of the worm shaft assembly. Or, if desired, by a little twisting and maneuvering, the entire worm shaft assembly can be completely removed from the Perforator.

Replace the worm shaft so that the stop blade assembly is positioned firmly inside the count index assembly, at the same time the lower pivot screw (6814) of the reset collar lever should fit into the reset collar. Replace the top pivot screw (6814) of the reset collar lever into the reset collar. Replace zero lever spring.

The rear section of the counting shaft should be replaced so that the drive arm (85331) fits into the start disc (85324). Be sure the felt washer is in between these two parts.

Replace zero lever shaft (3248) and tighten set screw (6807). Replace the two bearing caps (123722) and mounting screws (85471).

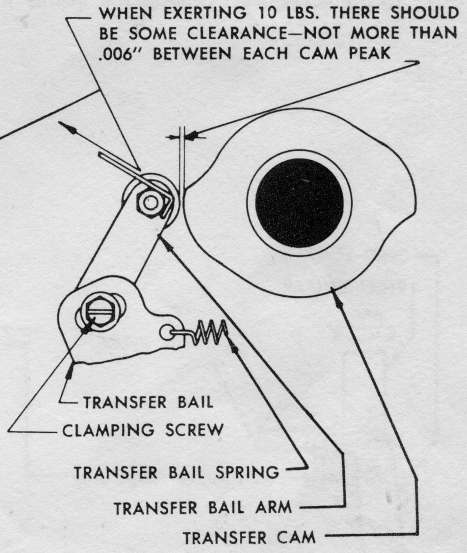
Check the following:

Counting Shaft End Play Adjustment

30 TRANSFER BAIL ARM

Requirement—The first and third from rear count selector levers to left, and second and fourth to right, rotate motor fan until transfer bail roller rests on a high part of its cam. Hook a 12 lb. scale over transfer bail roller shoulder screw nut and pull at right angles to transfer bail arm with a pull of 10 lbs. There should be some clearance not more than .006" between each cam peak and roller.

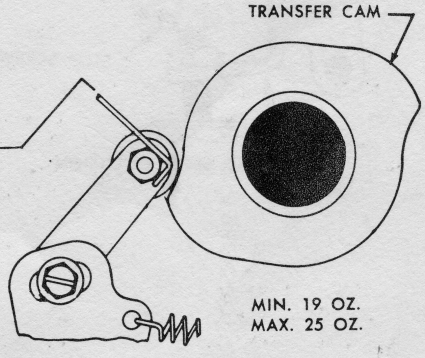
To Adjust—Loosen transfer bail arm clamping screw and position the arm.

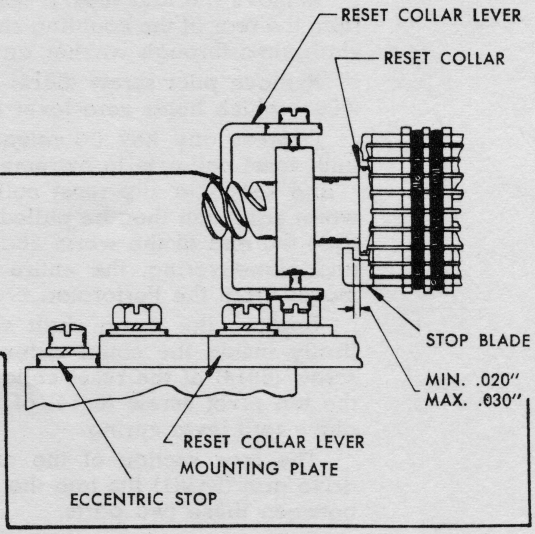


31 TRANSFER BAIL SPRING TENSION

Requirement—Operating cam sleeve in stop position. Use 32 oz. scale.

Min. 19 ozs.—Max. 25 ozs. to just start roller moving away from cam.





32 COUNTING SHAFT END PLAY

Requirement—No perceptible end play.

To Adjust—Loosen two bearing cap mounting screws and position rear section of counting shaft.

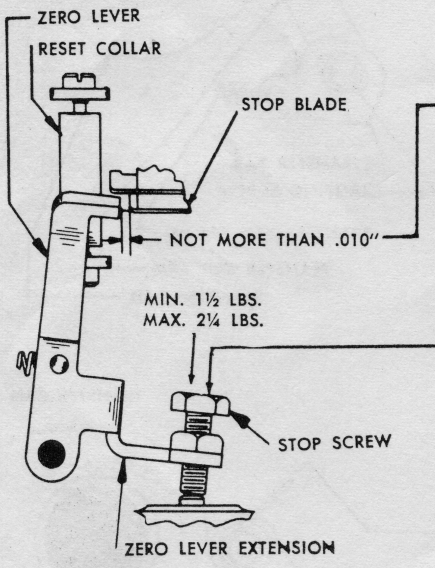
33 RESET COLLAR LEVER

Requirement—Reset collar lever roller on high part of cam. Play taken up in collar and lever for maximum clearance.

Min. .020"—Max. .030" between all stop blades and the rear side of reset collar. Check both peaks of cam.

To Adjust—Back off eccentric stop and mounting plate screws and position plate.

NOTE: When play in collar is taken up in the minimum direction, check for some clearance.



34 ZERO LEVER STOP SCREW

Requirement—Manually hold stop blade that is in front of zero lever in its forward detent position, there should be some clearance not more than .010" between zero lever and forward detented stop blade. Check all blades.

To Adjust—Postion zero lever stop screw.

35 ZERO LEVER SPRING TENSION

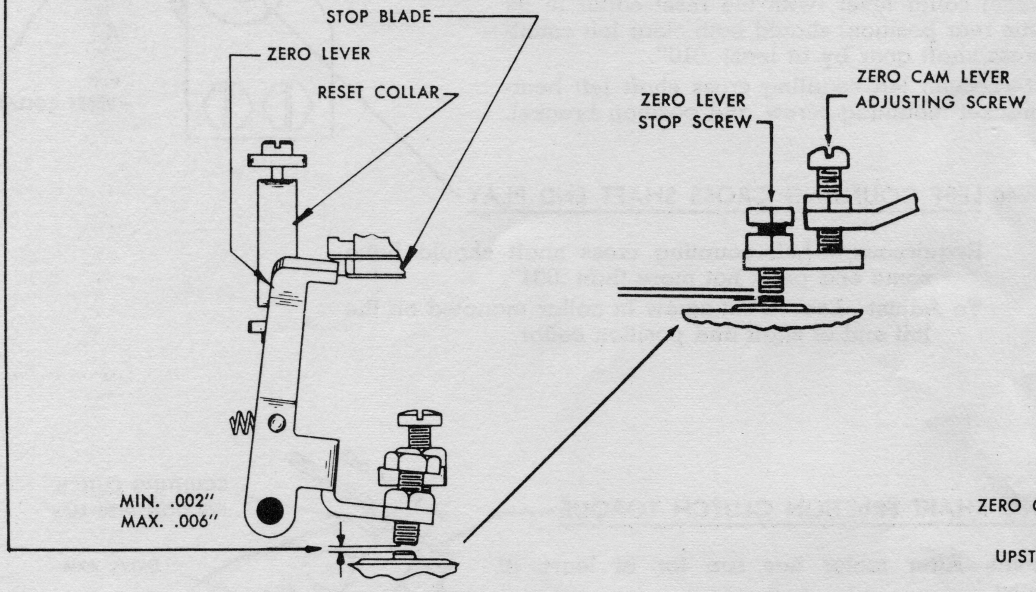
Requirement—Zero cam lever on low part of cam. Push down on stop screw.

Use 12 lb. scale.

Min. 1½ lbs.—Max. 2¼ lbs. to start zero lever moving.

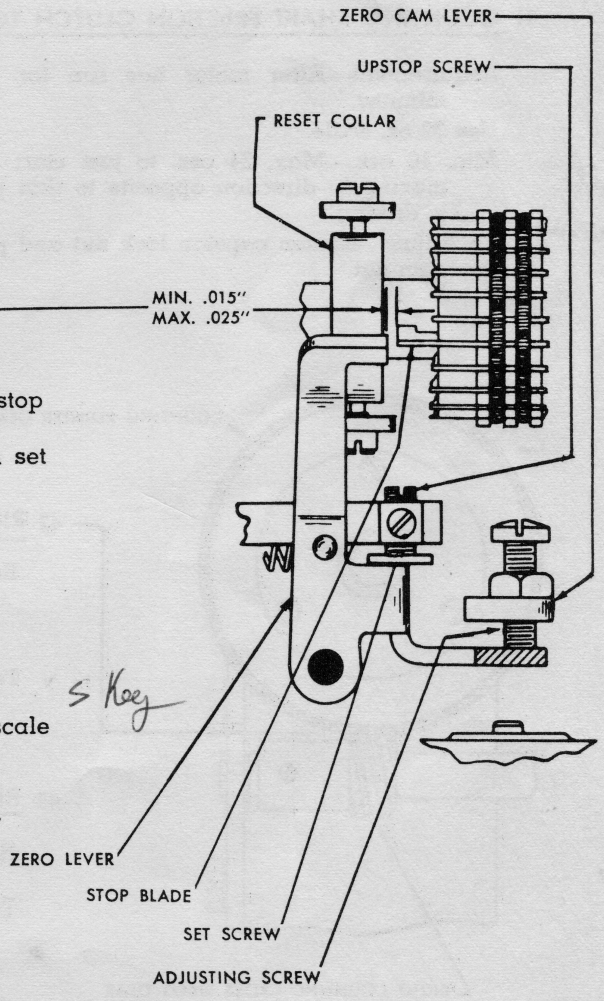
36 ZERO CAM LEVER ADJUSTING SCREW

Requirement—Zero cam lever on peak of cam.
Min. .002"—Max. .006" between zero lever stop screw and its stop. Check both peaks of cam.
To Adjust—Position zero cam lever adjusting screw.



37 ZERO LEVER UPSTOP SCREW

Requirement—Zero cam lever on low part of cam.
Min. .015"—Max. .025" between zero lever and stop blades (in rear position).
To Adjust—Position zero lever upstop screw with set screw loosened.



38 STOP PIN SPRING TENSION

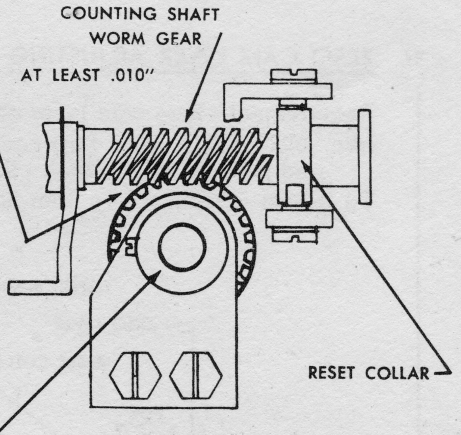
Requirement—Stop pin in selected position. Hook scale on stop pin, front of center guide disc.
Use 32 oz. scale.
Min. 6 ozs.—Max. 10 ozs. to start each pin moving.

39 LEFT COUNTING CROSS SHAFT

Requirement—(a) There should be a minimum amount of play (without binding) between left counting cross shaft gear and counting shaft worm gear. Check for one complete revolution of shaft. The shaft should also be free in its bearings without any tendency to bind.

Requirement—(b) The counting shaft friction drive arm and reset collar lever (with the reset collar in its extreme rear position) should both clear left counting cross shaft gear by at least .010".

To Adjust—Loosen left counting cross shaft left bearing bracket mounting screw and position bracket.



40 LEFT COUNTING CROSS SHAFT END PLAY

Requirement—Left counting cross shaft should have some end play, not more than .004".

To Adjust—Loosen set screw in collar mounted on the left end of shaft and position collar.

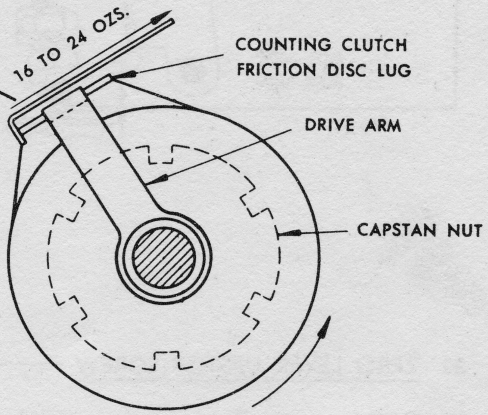
41 COUNTING SHAFT FRICTION CLUTCH TORQUE

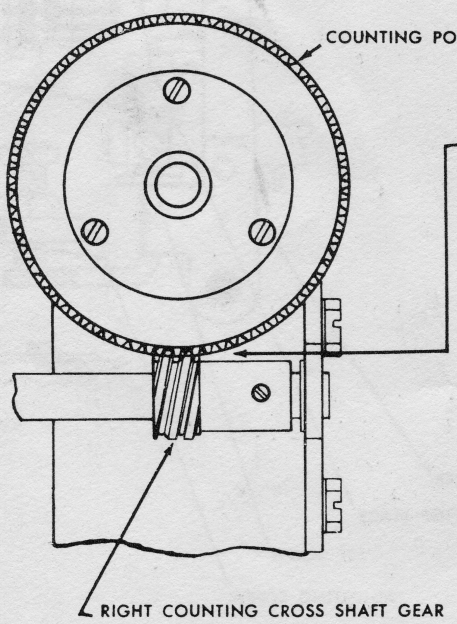
Requirement—After motor has run for at least 10 minutes.

Use 32 oz. scale.

Min. 16 ozs.—Max. 24 ozs. to just start friction disc moving in direction opposite to that which motor is driving.

To Adjust—Loosen capstan lock nut and position capstan nut.





42 RIGHT COUNTING CROSS SHAFT

Requirement—Minimum amount of play without binding between the shaft worm and the counting pointer gear. Try one complete revolution of the gear.

To Adjust—Position the height of the right end bearing bracket of the right counting cross shaft by means of its elongated mounting holes.

43 RIGHT COUNTING CROSS SHAFT END PLAY

Requirement—Right counting cross shaft should have some end play, not more than .004".

To Adjust—Position the collars located on either side of the left bearing by means of their set screws.

44 COUNTING POINTER CLUTCH SPRING COMPRESSION

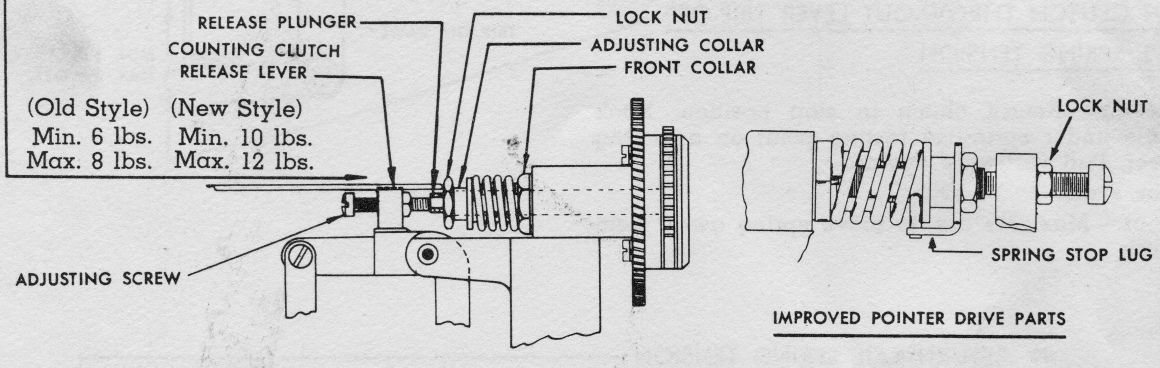
Requirement—Return bail roller on low part of cam, matrix counting pointer moved to right end of scale.

Use 12 lbs. scale.

Min. 10 lbs.—Max. 12 lbs. to release pointer (New Style)

Min. 6 lbs.—Max. 8 lbs. to release pointer (Old Style)

To Adjust—Hold adjusting collar with a wrench, and loosen lock nut on release plunger. Then with a wrench, applied to flats at rear end of the plunger, rotate plunger clockwise to increase tension or counter-clockwise to decrease tension.



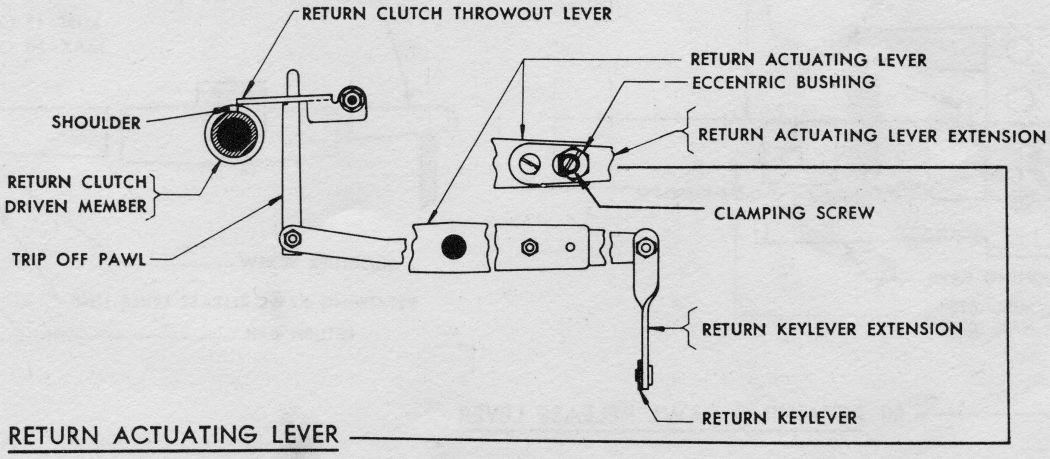
IMPROVED POINTER DRIVE PARTS

45 COUNTING POINTER CLUTCH SPRING TENSION

Requirement—Return bail roller on high part of its cam, apply push end of the 12 lb. scale to end of the lug on spring stop. (Rotate stop counter-clockwise to increase tension, clockwise to decrease spring tension). At a pressure of 3 to 3½ lbs. tighten lock nut tightly enough to hold this pressure requirement. Hold adjusting collar with a wrench and make final tightening of lock nut.

Recheck this adjustment by applying the push end of a 12 lb. scale to the end of spring which engages spring stop. It should require 3 to 3½ lbs. to start spring moving away from spring stop.

Recheck counting pointer clutch spring compression



46 RETURN ACTUATING LEVER

Requirement—Motor running, depress "RET" keylever very slowly. Return clutch should engage at same time, or slightly before the operating cam sleeve jaw clutch engages.

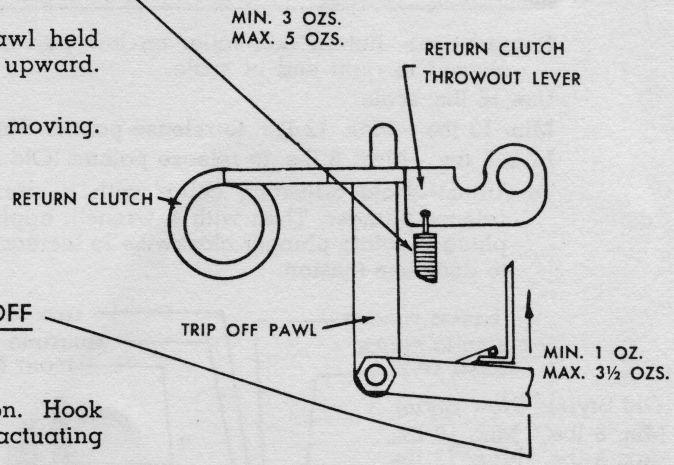
To Adjust—Loosen return actuating lever clamping screw and position eccentric bushing.

47 RETURN CLUTCH THROW-OUT LEVER SPRING TENSION

Requirement—Throw-Out cam and trip-off pawl held clear of throw-out lever. Pull vertically upward.

Use 8 oz. scale.

Min. 3 ozs.—Max. 5 ozs. to start throw-out lever moving.



48 RETURN CLUTCH THROW-OUT LEVER TRIP-OFF PAWL SPRING TENSION

Requirement—Return clutch in stop position. Hook scale under spring at resting point on actuating lever. Pull vertically upward.

Use 8 oz. scale.

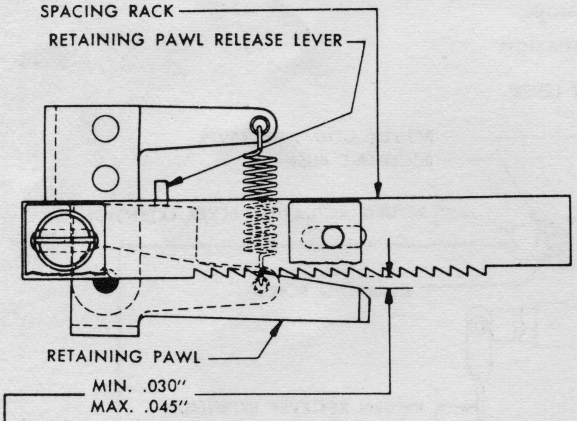
Min. 1 oz.—Max. 3½ ozs. to move spring away from lever.

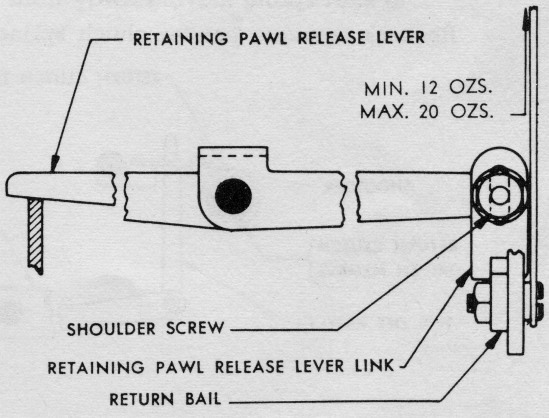
49 RETURN BAIL SPRING TENSION

Requirement—Return bail cam roller on low part of cam. Hold retaining pawl release lever link away from return bail. Hook scale on shoulder screw and pull vertically upward.

Use 32 oz. scale.

Min. 12 ozs.—Max. 20 ozs. to start bail moving.





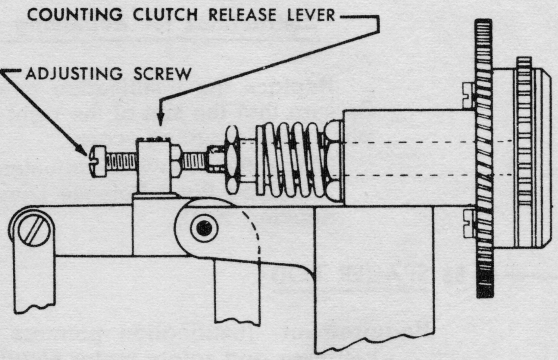
50 RETAINING PAWL RELEASE LEVER

Requirement—Return bail roller on high part of cam.

Min. .030"—Max. .045" between retaining pawl and teeth on spacing rack.

To Adjust—Position retaining pawl release lever link.

51 COUNTING POINTER CLUTCH RELEASE LEVER



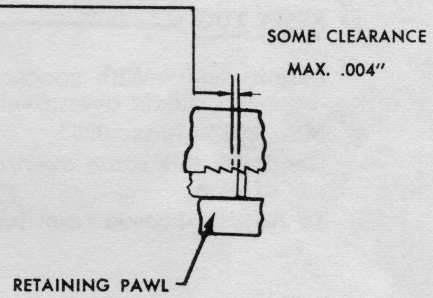
NOTE: It will be necessary to remake this adjustment in order to check it.

Requirement—Counting pointer clutch release lever adjusting screw backed off and return bail roller on high part of its cam, move counting pointer to extreme right position and advance adjusting screw until pointer is released, allowing it to return to its starting position. Advance adjusting screw approximately one-half turn more and tighten lock nut.

Instructions for Removing the Justification Pointer Rack Assembly

Remove the two 6810 screws that mount the justification pointer rack assembly. The assembly is now free to be removed. This assembly may be cleaned and lubricated as an entire assembly.

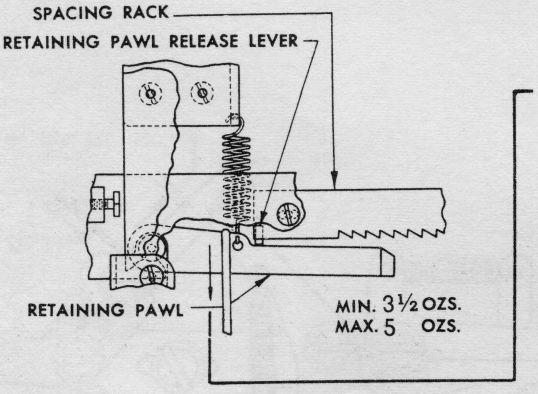
52 SPACING RACK



Spaceband justification rack removed.

Requirement—Spacing rack in returned position, there should be some clearance not more than .004", between retaining pawl and second full tooth (third notch) on spacing rack. Check to see that pawl does not bind on point of tooth as it is withdrawn.

To Adjust—Loosen spacing rack clamping screw and position rack.



53 RETAINING PAWL SPRING TENSION

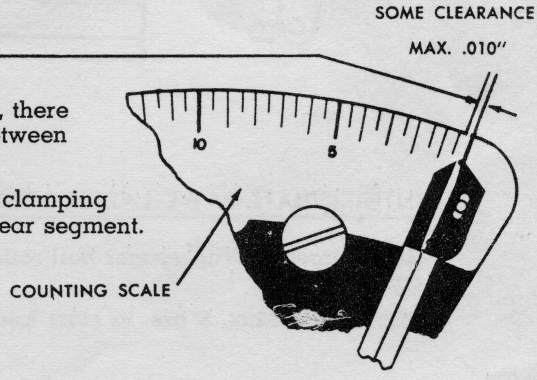
Spaceband justification rack removed.

Requirement—Spacing rack in returned position.

Use 8 oz. scale.

Min. 3½ ozs.–Max. 5 ozs. to start pawl moving.

54 LEFT JUSTIFICATION POINTER RETURNED POSITION



Requirement—Spaceband pointers in returned position, there should be some clearance not more than .010" between ends of pointers.

To Adjust—Position left hand pointer by means of clamping screw which fastens the left hand pointer to the gear segment.

Instructions for Replacing the Justification Pointer Rack Assembly

Replace the justification pointer rack assembly with the two 6810 screws. Be sure that the slot of the right hand justification pointer is positioned over the pin on the counting scale.

Check the following adjustments:
Retaining Pawl Release Lever
Spacing Rack

55 SPACER ROD

Requirement—Justification pointers in returned position, depress space bar keylever and rotate motor slowly by hand. The feed pawl should engage the spacing rack and cause the third tooth from the left end of the spacing rack to overtravel retaining pawl

Min .004"—Max. .012".

Check this overtravel on both high parts of cam. Rotate motor and depress space bar twelve times and see that each tooth on the spacing rack overtravels the retaining pawl.

To Adjust—Loosen spacer rod clamping screws and adjust length of spacer rod.

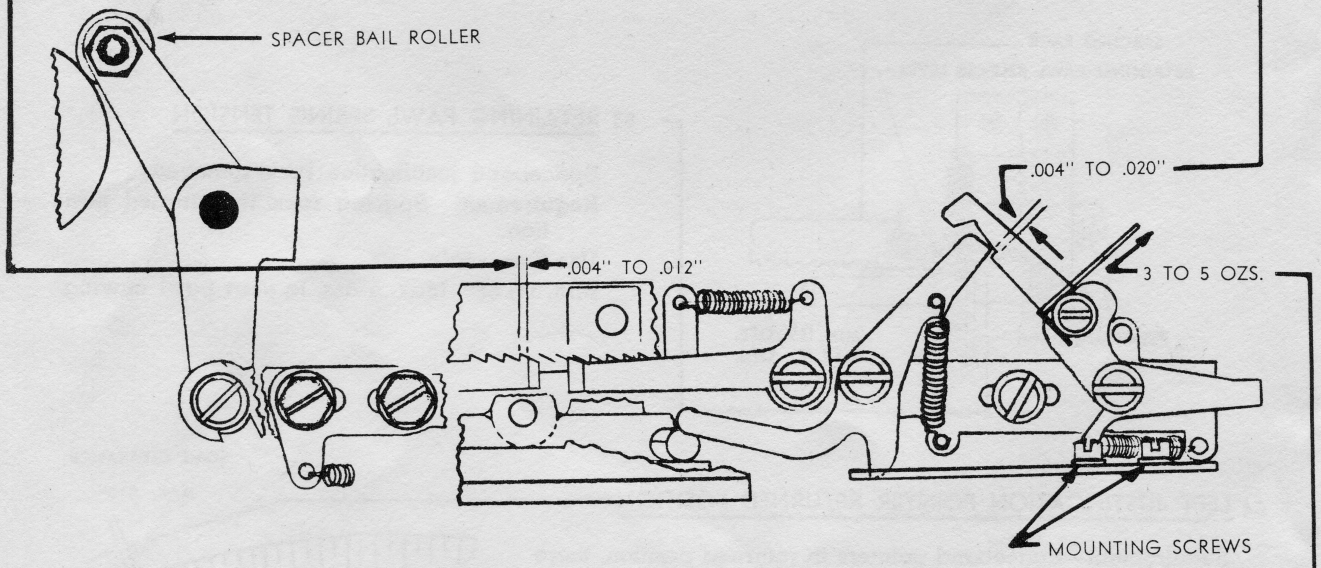
56 RESET LUG

Requirement—With spacer bail roller on a high part of cam, intermediate pawl should overtravel latching surface of its latch.

Min. .004"—Max. .020".

Check for this same overtravel with spacer bail roller on opposite high part of cam.

To Adjust—Loosen reset lug mounting screws and position the lug.



57 INTERMEDIATE PAWL LATCH SPRING TENSION

Requirement—With spacer bail roller on high part of cam.

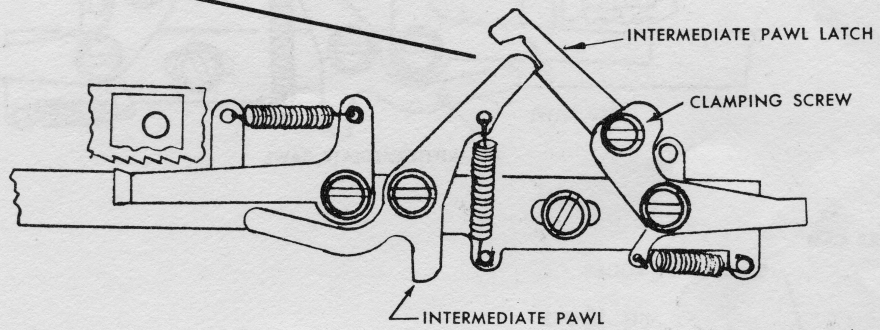
Use 8 oz. scale.

Min. 3 oz.—Max. 5 ozs. to start latch moving.

58 INTERMEDIATE PAWL LATCH

Requirement—Operating cam sleeve in its stop position, depress space bar slowly. The intermediate pawl should release at the same time or slightly before operating cam sleeve jaw clutch stop lever is released.

To Adjust—Loosen intermediate pawl latch clamping screw and position latch.

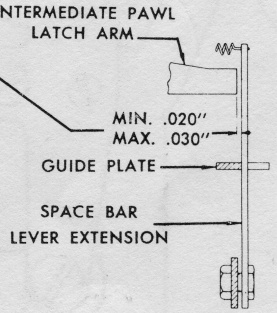


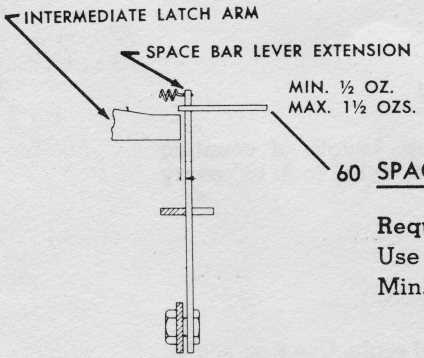
59 SPACE BAR LEVER EXTENSION GUIDE PLATE

Requirement—Spacer bail roller on a high part of its cam, depress space bar to its stops.

Min. .020"—Max. .030" between end of intermediate pawl latch arm and space bar lever extension. Check both high parts of cam.

To Adjust—Loosen guide plate mounting screws and position guide plate.





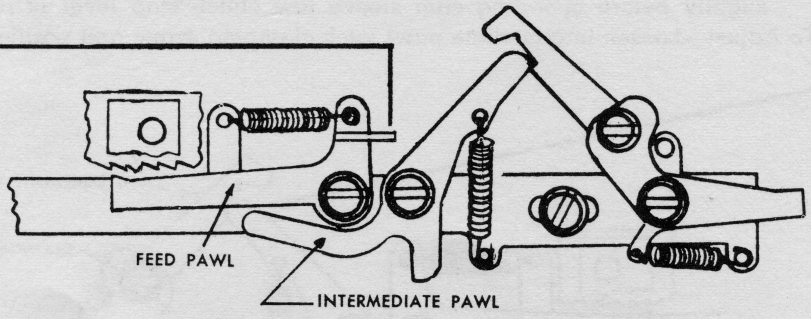
60 SPACE BAR LEVER EXTENSION SPRING TENSION

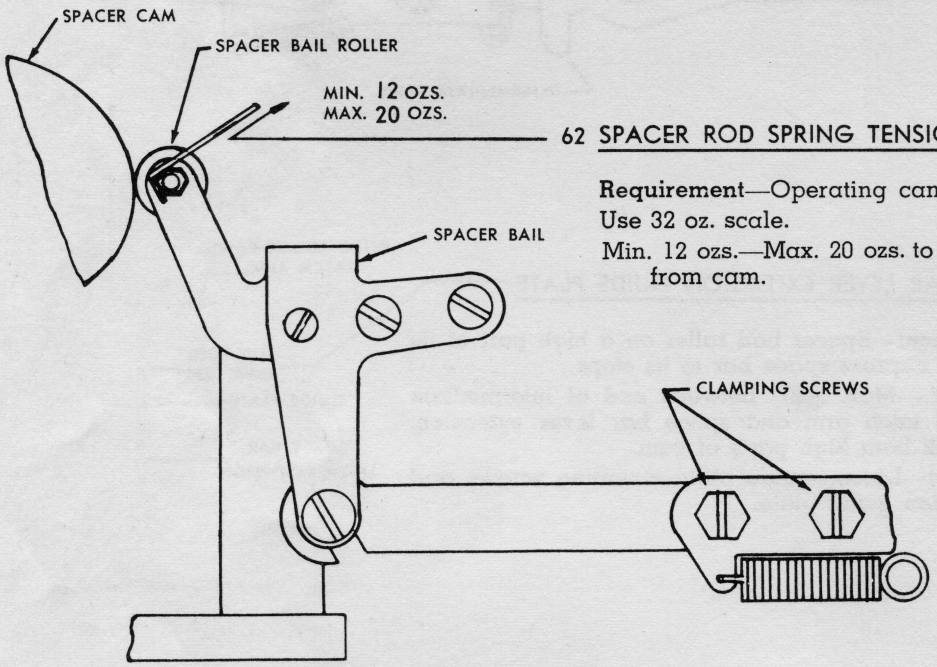
Requirement—Operating cam sleeve in its stop position. Use 8 oz. scale.

Min. ½ oz.—Max. 1½ ozs. to start extension moving.

61 SPACING FEED PAWL SPRING TENSION

Requirement—Intermediate pawl latched.
Use 8 oz. scale.
Min. 1 oz.—Max. 3 ozs. to start feed pawl moving away from vertical extension on intermediate pawl.





62 SPACER ROD SPRING TENSION

Requirement—Operating cam sleeve in stop position.
Use 32 oz. scale.
Min. 12 ozs.—Max. 20 ozs. to start roller moving away from cam.

63 COUNTING POINTER RETURN SPRING ARM POSITION

Requirement—Counting pointer against right hand stop. Length of counting pointer return cord should be such that spring arm is 1/16" to 3/16" away from spring post.

64 COUNTING POINTER RETURN SPRING TENSION

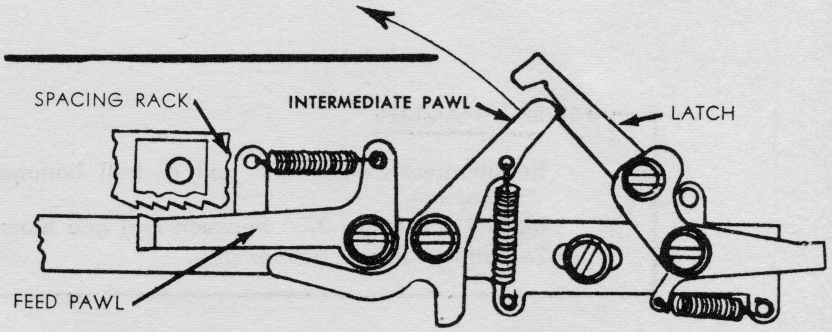
Requirement—Counting Pointer approximately in center of scale. Use 8 oz. scale.
Min. 3 ozs.—Max. 5 ozs. to start arm moving.

65 INTERMEDIATE PAWL SPRING TENSION

Requirement—Spacer bail roller on high part of cam, intermediate pawl latch held away.

Use 8 oz. scale.

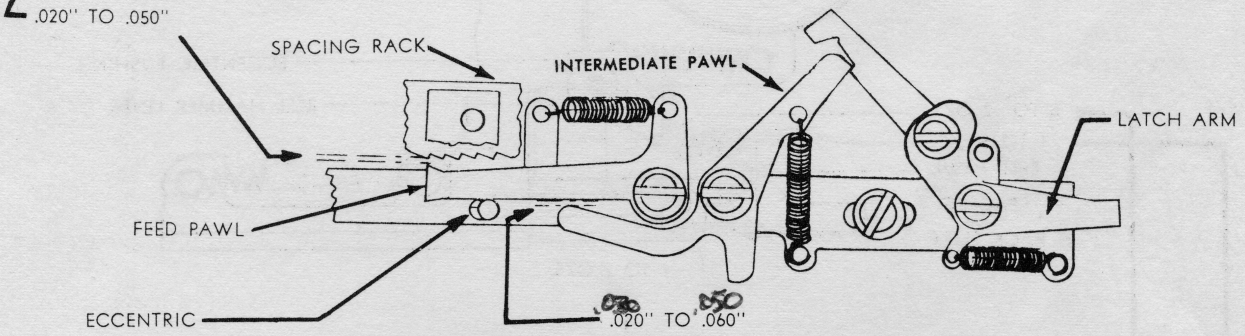
Min. 3 ozs.—Max. 5 ozs. to start pawl moving.



66 ECCENTRIC SCREW

The eccentric screw should be adjusted to provide a clearance of from .020" to .050" between feed pawl and spacing rack and a clearance of from .020" to .060" between feed pawl and intermediate pawl.

.030 – .050



67 SPACE BAR STOPS

(For location of parts refer to Page 2).

Requirement — When the space bar keylever is depressed near keylever guide.

Min. .015"—Max. .025" between space bar and the stops.

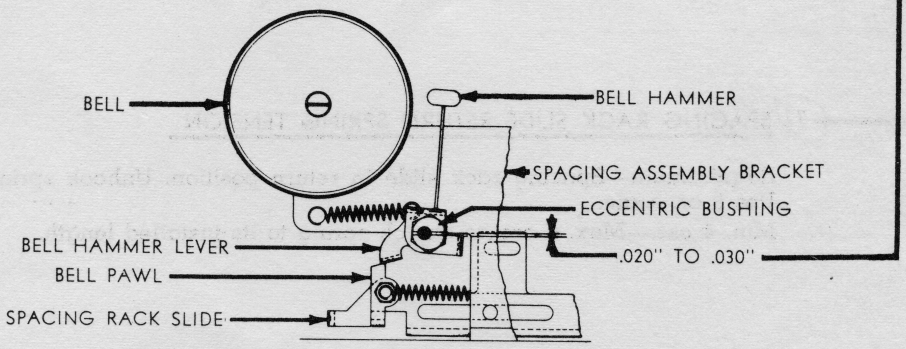
To Adjust—Loosen each stop lock nut and position stops.

68 BELL HAMMER LEVER ECCENTRIC

Requirement—Justification pointers advanced eight spaces.

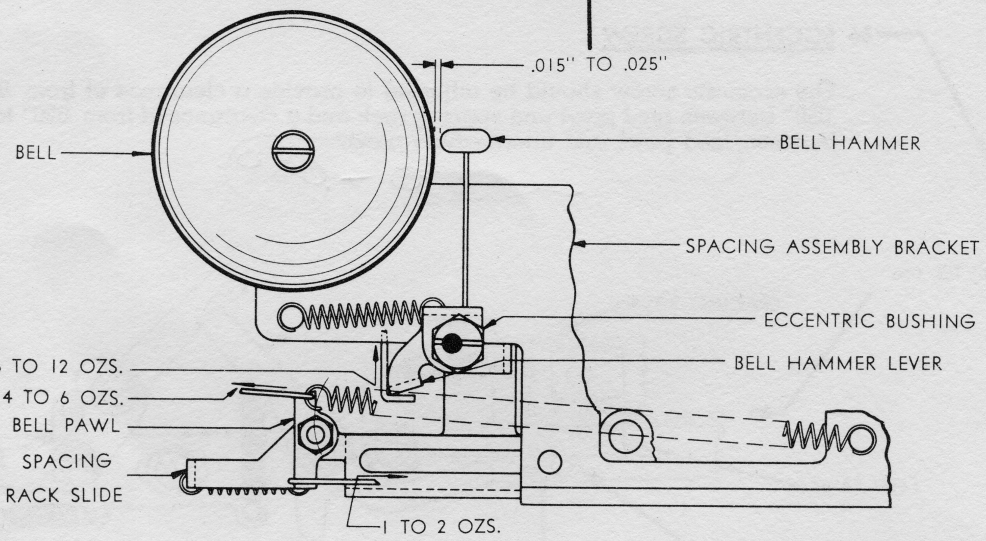
Min. .020"—Max. .030" between upper right end of bell hammer lever and lower edge of spacing bracket.

To Adjust—Loosen mounting screw and position eccentric bushing.



69 BELL HAMMER

Requirement—With right end of bell hammer lever against lower edge of bracket.
Min. .015"—Max. .025" between bell and hammer.
To Adjust—Bend hammer arm.



70 BELL HAMMER LEVER SPRING TENSION

Requirement—With right end of bell hammer lever against lower edge of bracket.
Use 32 oz. scale.
Min. 6 ozs.—Max. 12 ozs. to start lever moving.

71 BELL PAWL SPRING TENSION

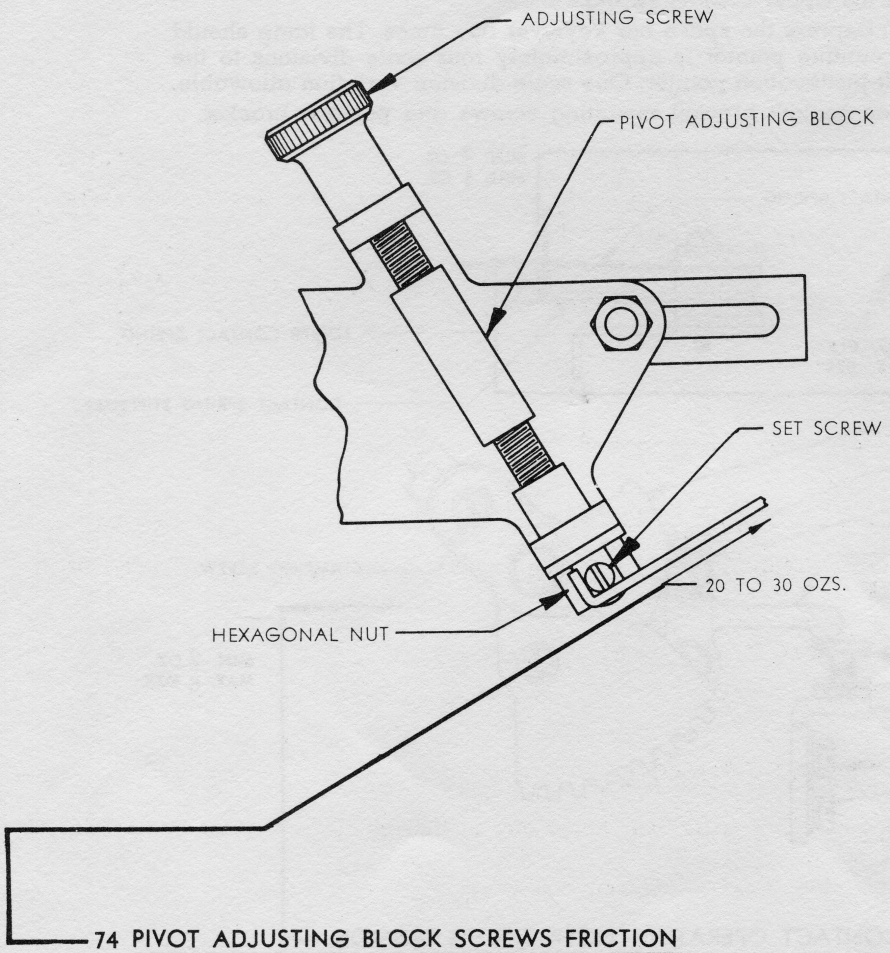
Requirement—Hook scale over lower end of bell pawl.
Use 8 oz. scale.
Min. 1 oz.—Max. 2 ozs. to start pawl moving.

72 SPACING RACK SLIDE RETURN SPRING TENSION

Requirement—Spacing rack slide in return position. Unhook spring.
Use 8 oz. scale.
Min. 4 ozs.—Max. 6 ozs. to stretch spring to its installed length.

73 JUSTIFICATION POINTERS RETURN SPRING TENSIONS

Requirement—Justification pointers in return position unhook upper ends of springs.
Use 8 oz. scale.
Min. 2½ ozs.—Max. 4½ ozs. pull to installed length for each spring.



74 PIVOT ADJUSTING BLOCK SCREWS FRICTION

Requirement—Pivot adjusting blocks near centers of their screws.
Use 32 oz. scale.
Min. 20 ozs.—Max. 30 ozs. to start each adjusting screw turning.
To Adjust—Loosen hexagonal nut screw and position nut.

75 SIGNAL LAMP CONTACT

CAUTION: Disconnect the Perforator power plug when checking this requirement.

NOTE: When checking the following requirements, see that the front contact lever swivel cam clamping screw is in the center of elongated hole in cam. Also see that pivot adjusting blocks are centrally located on their screws.

Requirement—(a) Counting pointer and spaceband justification pointers in returned position.

Use 8 oz. scale.

Min. 3 oz.—Max. 4 oz. to start lower contact spring moving away from its stiffener.

To Adjust—Remove lower contact spring from contact assembly and bend it.

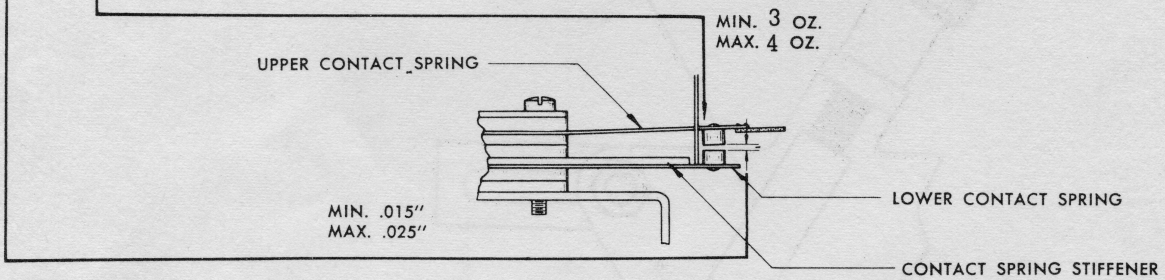
Requirement—(b) Counting pointer and spaceband justification pointers in returned position.

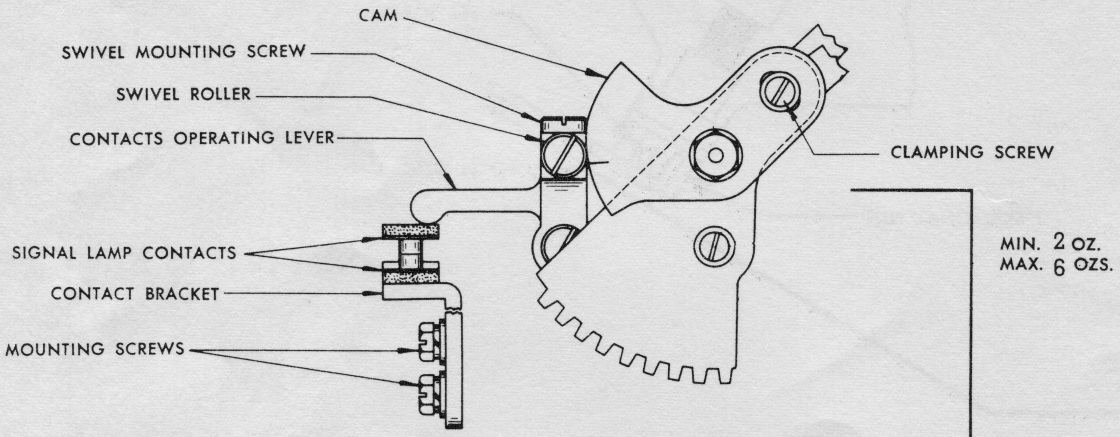
Min. .015"—Max. .025" gap between contact points.

To Adjust—Bend the upper contact spring.

Requirement—(c) Depress the space bar keylever five times. The lamp should light when counting pointer is approximately four scale divisions to the left of the left justification pointer. One scale division variation allowable.

To Adjust—Loosen contact bracket mounting screws and position bracket.





76 SIGNAL LAMP CONTACT OPERATING LEVER SPRING TENSION

Requirement—Justification pointers in returned position.

Use 8 oz. scale.

Min. 2 oz.—Max. 6 ozs. to start lever moving.

77 SHIFT INDICATING SEMAPHORE

Requirement—Semaphore should show all red **when shift bail is in shift position** and all white when in unshift position.

To Adjust—Loosen semaphore connecting link and position link.

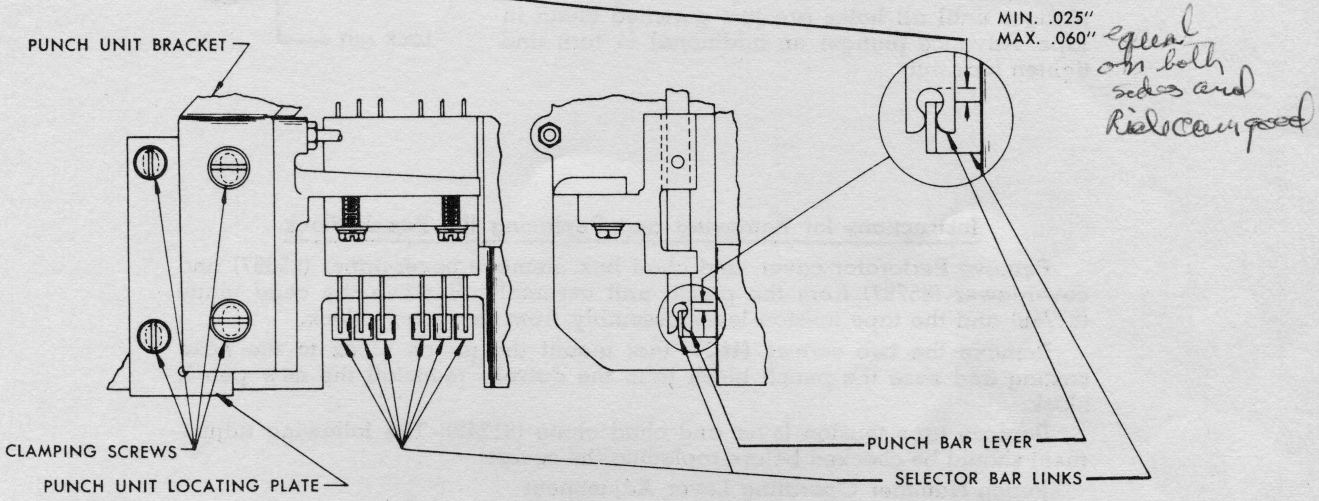
78 PUNCH UNIT

Requirement—The punch hammer operating lever roller should ride fully on cam and the roller screw should clear bail bracket (unoperated position).

Min. .025"—Max. .060" clearance between upper edges of front and rear selector bar links and tops of slots in their respective punch bar levers.

NOTE: In mounting punch unit, see that clearance between front selector bar link and its punch bar lever is approximately equal (within 1/64") to clearance between rear selector link and its punch bar lever.

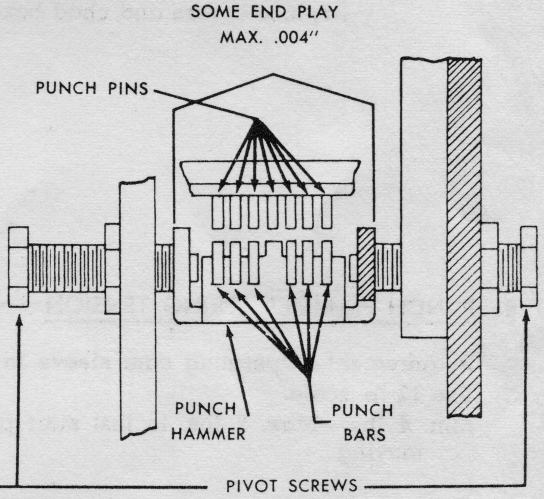
To Adjust—Loosen punch unit bracket and locating plate mounting screws and position bracket. Then position the locating plate securely against bracket.



79 PUNCH HAMMER PIVOT SCREWS

Requirement—Punch hammer in its lower (unoperated) position, punch bars should line up under their respective punches when viewed from left end of Perforator. Some end play, not more than .004".

To Adjust—Loosen punch hammer pivot screws lock nuts and position pivot screws.



Instructions for Removing and Replacing the Punch Unit Assembly

Remove the cover-upper (85367) and cover-lower (85797) from the punch unit. (Before removing the punch unit be sure to note if the assembly is positioned against the locating plate. If the assembly is not positioned properly then it will be necessary to remake all punch unit adjustments after replacing punch unit assembly.) Remove the two mounting screws (8185) that position the punch unit assembly to the Perforator base. By slightly twisting to the front, the entire assembly may be removed.

Replace the punch unit assembly being sure that the punch levers are positioned over the selector bar links and that the punch unit assembly is positioned within the locating plate attached to the base casting. Replace covers.

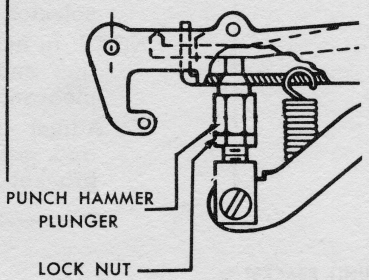
Check the following:

Punch Unit Adjustment

80 PUNCH HAMMER OPERATING LEVER

NOTE: To check this adjustment, it will be necessary to remake it.

Loosen punch hammer stop screw lock nut and back off screw. Connect power cord to proper power supply. With the punch control lever in the "ON" position (to left) and with tape inserted in the punch block, operate the "RUBOUT" keylever. Loosen punch hammer operating lever adjustable plunger lock nut and back off plunger until there is a failure of perforations in the tape. Continue to operate the "RUBOUT" keylever and advance plunger until all holes are just punched clean in tape. Advance plunger an additional ¼ turn and tighten lock nut.



Instructions for Removing and Replacing the Punch Block

Remove Perforator cover, and chad box. Remove cover-upper (85367) and cover-lower (85797) from the punch unit assembly. Remove the chad chute (81748) and the tape tension lever assembly from the punch block.

Remove the two screws (1026) that mount the punch block to the base casting and ease the punch block from the dowels, re-install the new punch block.

Replace tape tension lever and chad chute (81748). The following adjustment should be checked before replacing the covers:

Punch Hammer Operating Lever Adjustment

Replace covers and chad box.

81 PUNCH HAMMER SPRING TENSION

Requirement—Operating cam sleeve in stop position.

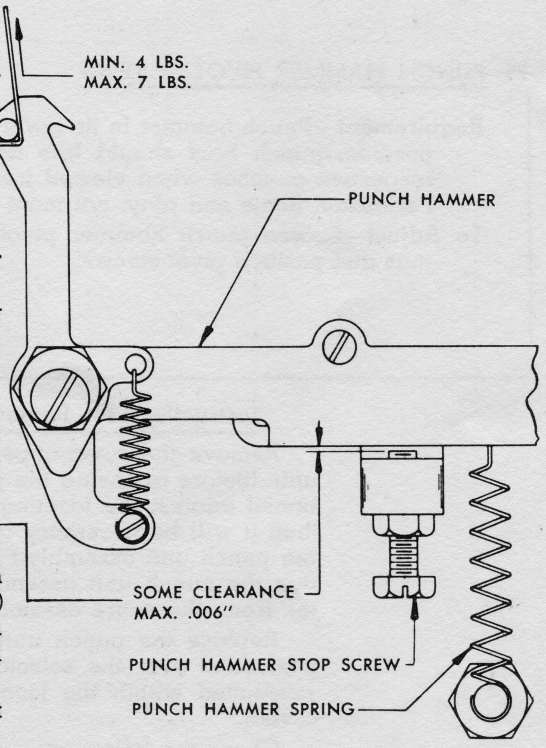
Use 12 lb. scale.

Min. 4 lbs.—Max. 7 lbs. to just start punch hammer moving.

82 PUNCH HAMMER STOP SCREW

Requirement—Operating cam sleeve in stop position and punch control lever in "ON" position, (to left) there should be some clearance, not more than .006", between punch hammer stop screw and punch hammer.

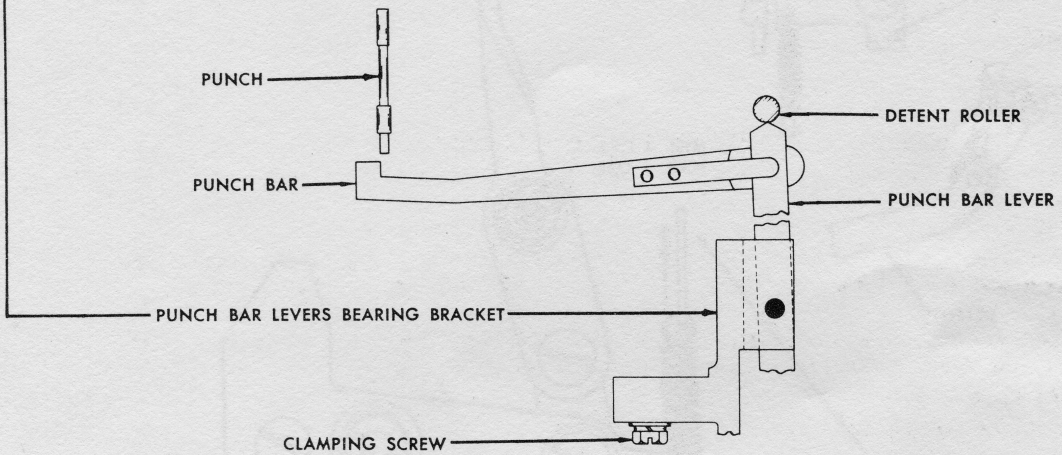
To Adjust—Loosen punch hammer stop screw lock nut and position stop screw.



83 PUNCH BAR LEVERS BEARING BRACKET

Requirement—With three fingers of the right hand, hold depressed "R", "Y", and "5" keylevers in such a manner that the three keylevers lock each other. (This may be checked by observing that the right or left edges of the six punch bar levers are aligned.) Under this condition, right edges of the projections of punch bars should align with left edges of the punch pins. This may be checked mechanically as follows: Set up the foregoing condition and trip main clutch by manually lifting left end of stop lever latch. If adjustment is correct at least one and not more than two code perforations should be perforated on each side of feed hole.

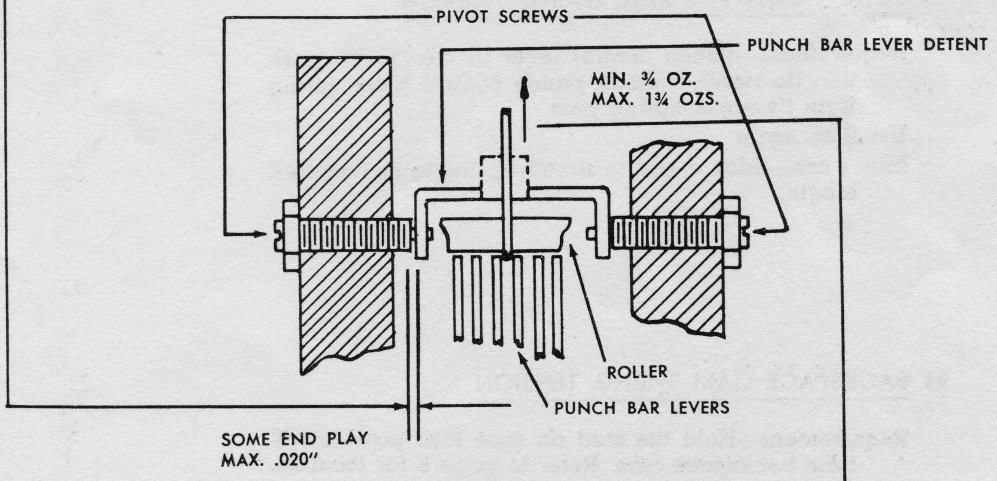
To Adjust—Loosen punch bar levers bearing bracket mounting screws and position the bracket.



84 PUNCH BAR LEVERS DETENT

Requirement—Center punch bar lever detent roller over the six punch bar levers, detent bracket should have some end play not more than .020".

To Adjust—Position detent bracket by two pivot screws.



85 PUNCH BAR LEVERS DETENT SPRING TENSION

Requirement—Hold the "Rubout" keylever fully depressed.

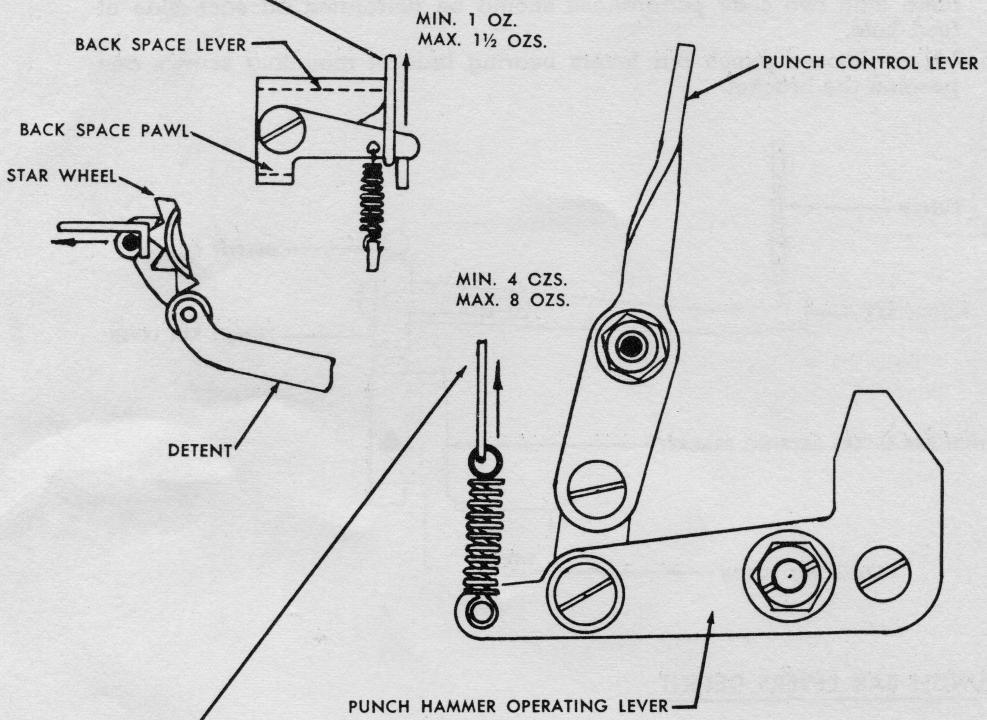
Use 8 oz. scale.

Min. ¾ oz.—Max. 1¾ ozs. to start detent moving.

86 BACKSPACE PAWL SPRING TENSION

Use 8 oz. scale.

Min. 1 oz.—Max. 1½ ozs. to start pawl moving away from its stop.



87 PUNCH CONTROL BAIL SPRING TENSION

Requirement—Punch control lever in the "OFF" position (to right), unhook punch control lever spring from its upper spring post.

Use 8 oz. scale.

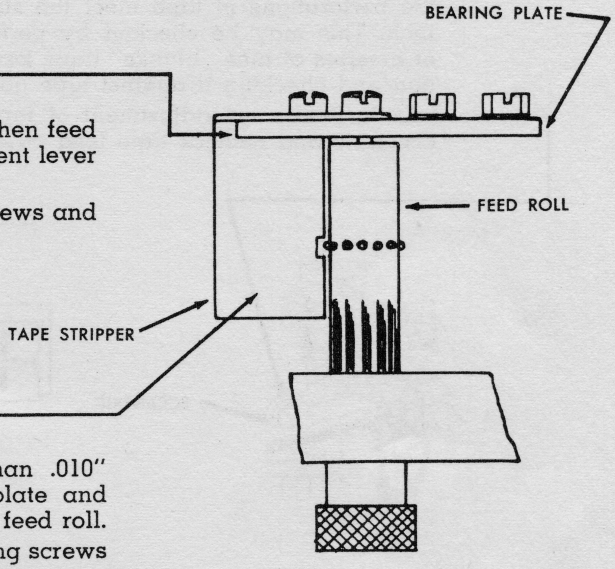
Min. 4 ozs.—Max. 8 ozs. to stretch spring to its installed length.

88 BACKSPACE CAM SPRING TENSION

Requirement—Hold the stud on tape feed pawl away from backspace cam. Refer to page 8 for location.

Use 8 oz. scale.

Min. 3 ozs.—Max. 5 ozs. to start cam moving.



89 TAPE FEED ROLL BEARING PLATE

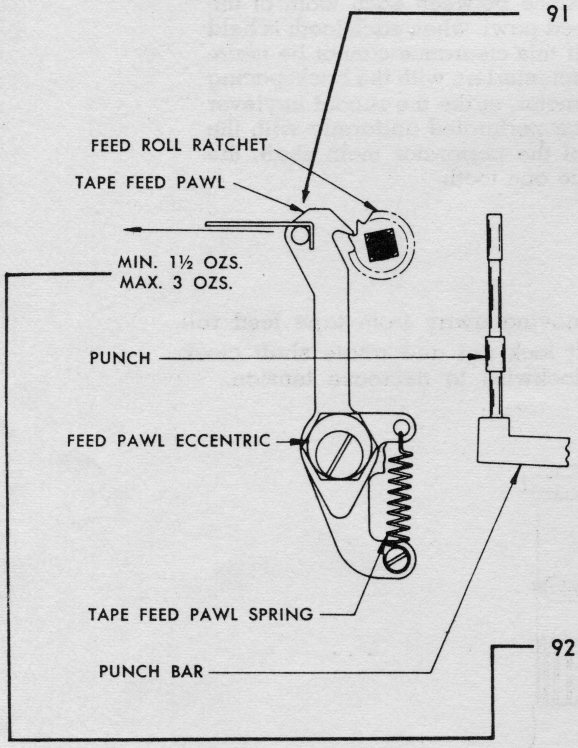
Requirement—Feed roll should rotate freely when feed pawl, tape tension lever, and feed roll detent lever are held away from feed roll.

To Adjust—Loosen bearing plate mounting screws and position plate.

90 TAPE STRIPPER PLATE

Requirement—Some clearance, not more than .010" between upper edge of tape stripper plate and feed roll. Try one complete revolution of feed roll.

To Adjust—Loosen tape stripper plate mounting screws and position plate.



91 TAPE FEED PAWL Critical

Requirement—Main shaft rotated until selected punch bars just touch ends of punches. Tape feed pawl should engage a tooth on feed roll ratchet without overtravel.

To Adjust—Loosen feed pawl eccentric mounting nut and screw and position feed pawl by means of the eccentric.

92 TAPE FEED PAWL SPRING TENSION

Requirement—Cam sleeve in stop position.

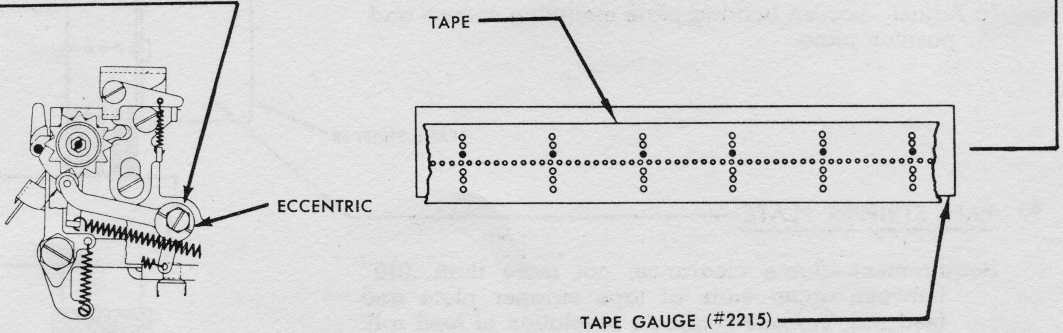
Use 8 oz. scale.

Min. 1½ ozs.—Max. 3 ozs. to start pawl moving away from tape feed roll.

93 TAPE FEED ROLL DETENT FINAL

Requirement—Refine tape feed roll detent adjustment if necessary so that the perforations in tape meet the standard spacing of ten holes to the inch. This may be checked by perforating a length of tape consisting of a series of nine "blanks" (tape key) followed by a "Rubout" combination and checking it against tape gauge (catalog No. 2215).

To Adjust—Refine the adjustment of tape feed roll detent by means of its eccentric and recheck tape feed pawl adjustment.



Instructions for Installing and Adjusting Feed Pawl Backspace Deflecting Plate (No. 132063)

Attach feed pawl backspace deflecting plate (No. 132063) to punch assembly (No. 119872) with upper knife screw No. 8543. Fasten plate using hole of longer leg, with concave portion of plate facing assembly.

To Adjust—If necessary, bend deflecting plate (132063) to meet the following requirements.

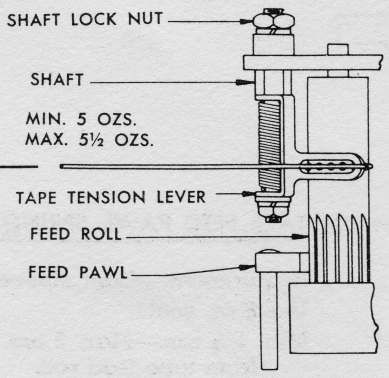
Perforator punch lever turned to "ON" position and main clutch shaft in stop position—there should be a minimum of clearance between each tooth of the feed roll ratchet and the engaging edge of the feed pawl, when each tooth is held opposite the engaging edge of the feed pawl. If this clearance cannot be maintained, some contact is permissible, but should not interfere with the backspacing of the feed roll ratchet. Turn on the perforator motor, strike the rubout keylever and depress the repeat key. The tape should be perforated uniformly with the rubout combination, and for each revolution of the perforator main shaft, the feed roll ratchet should be observed to advance one tooth.

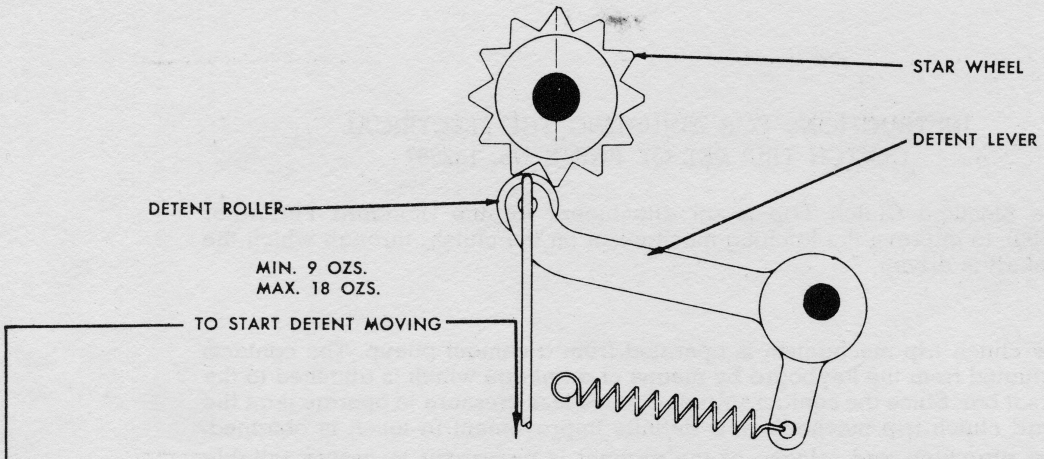
94 TAPE TENSION LEVER SPRING TENSION

Use 8 oz. scale.

Min. 5 ozs.—Max. 5½ ozs. to start lever moving away from tape feed roll.

To Adjust—Loosen tape tension lever shaft lock nut and rotate shaft clockwise to increase tension or counter-clockwise to decrease tension.



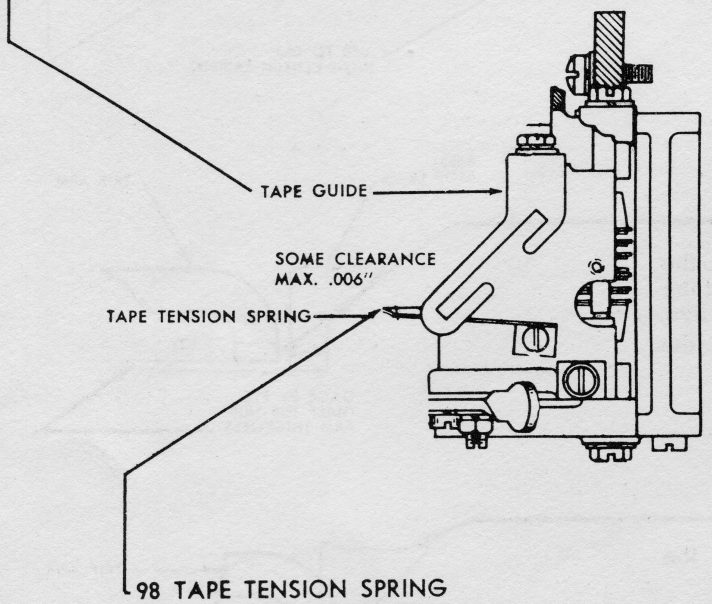


96 TAPE FEED ROLL DETENT LEVER SPRING TENSION

Requirement—Detent roller between two teeth on star wheel.
Use 32 oz. scale.
Min. 9 ozs.—Max. 18 ozs. to start the roller moving away from star wheel.

97 TAPE GUIDE

Requirement—The tape guide should be parallel to top casting, and as far to right as possible.
To Adjust—Loosen tape guide mounting screws and position guide.



98 TAPE TENSION SPRING

Requirement—Some clearance, not more than .006" between spring and plate over which tape rides.
To Adjust—Loosen tape tension spring mounting screw and position spring.

INSTRUCTIONS FOR ADJUSTING THE ELECTRICAL CLUTCH TRIP SET OF PARTS No. 132887

The Electical Clutch Trip is an attachment for the Standard Perforator (TPE 200), to improve the latching mechanism on the clutch, through which the main shaft is driven.

The clutch trip mechanism is operated from a contact pileup. The contacts are actuated from the keyboard by means of a linkage which is attached to the universal bar. Since the contact spring requires less pressure to operate than the standard clutch trip mechanism, a definite improvement in touch is obtained.

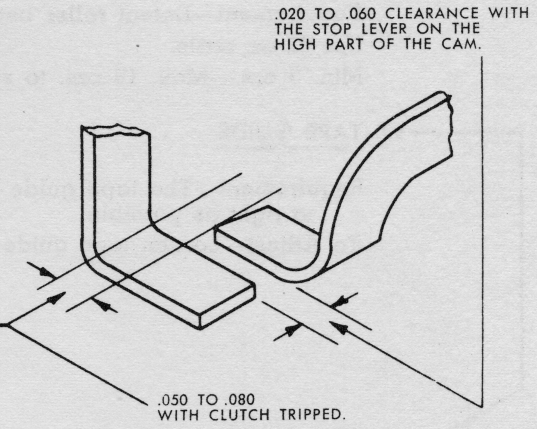
Fast attraction and release of the magnet is necessary to assure reliable performance under rapid keyboard operation. This is accomplished by the use of a capacitor circuit. This circuit is shown on Page 46.

99 TRIP ARM

Requirement—With the stop lever cam roller on the high part of the cam, the stop lever extension should overtravel the trip arm.

Min. .020"—Max. .060"

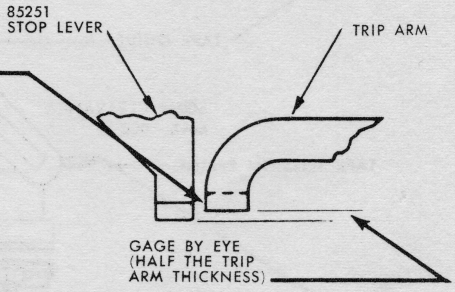
To Adjust—Position magnet bracket with the trip arm tripped. There should be .050" to .080" clearance between the stop lever and the trip arm.



100 DOWNSTOP ADJUSTMENT

With the 85251 stop lever blocked by the trip arm, the stop lever should engage approximately half the thickness of the trip arm as gauged by the eye.

To adjust—adjust the downstop screw and lock the setting with the locknut.

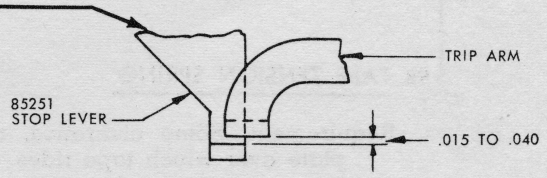


101 MAGNET BRACKET

Requirement—With the trip arm tripped, and the armature held against the magnet core.

Min. .010"—Max. .035" between the bottom edge of the trip arm and the top edge of the stop lever latching surface.

To Adjust—loosen the two screws on top of bracket. Add or remove shims.



102 CONTACT ADJUSTMENT

Note: This adjustment is made at the factory and should require readjustment only when contact assembly is disturbed. It will be necessary to check the following adjustment:

(a) The center contact should rest on the left hand contact with a pressure of 1 to 1½ ozs. At the same time, the right hand contact spring should rest against its stop with a pressure of 1 to 1½ ozs. (See figure 8.)

(b) With the center contact resting on the left hand contact, there should be .010" to .015" clearance between the center and the right hand contact. Adjust by bending right hand contact spring stop.

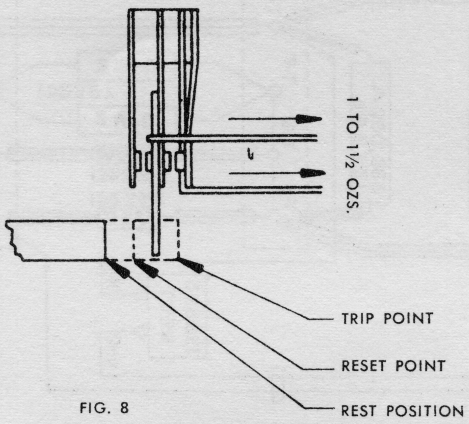


FIG. 8

103 LUBRICATION

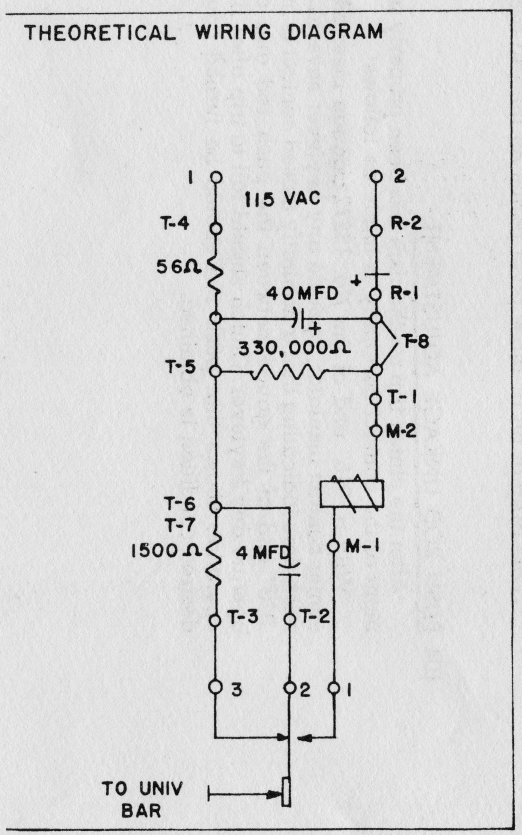
One drop of oil at three pivot points on the trip arm.

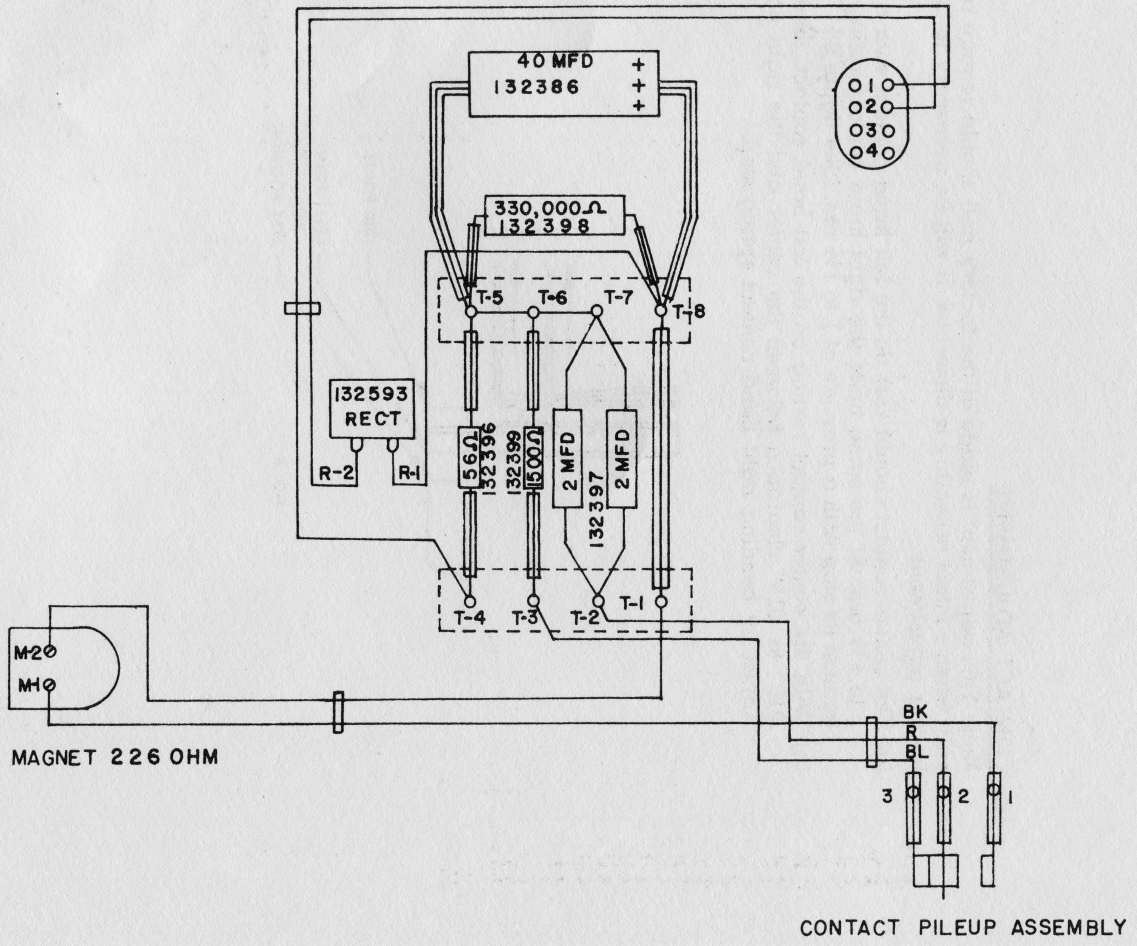
104 PUSH ROD LINKAGE ADJUSTMENT:

After the clutch trip mechanism has been properly installed, the final adjustment of the contact assembly is made as follows:

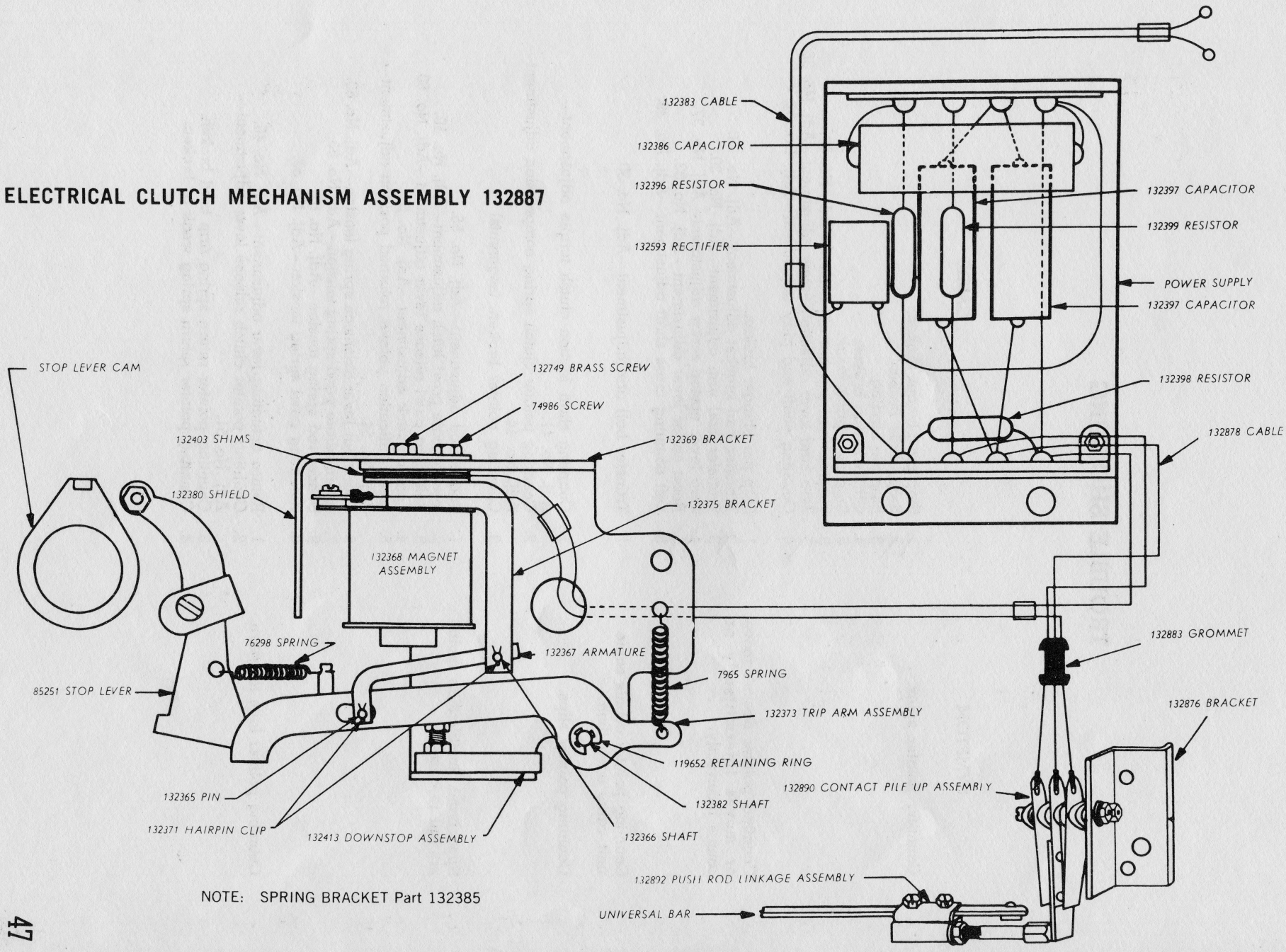
With a .015" end of the No. 132774 gauge inserted between push rod and center contact insulator, operate any keylever several times; clutch should trip each time indicating that a normally closed contact is made each time. With the .020" end of the gauge between the push rod and center contact insulator, operate any keylever. Clutch should fail to trip after first operation. Continued operation shows that push rod should be turned counter-clockwise until the desired condition is obtained.

ACTUAL WIRING DIAGRAM ELECTROMAGNETIC CLUTCH TRIP-UNIT (132887)





ELECTRICAL CLUTCH MECHANISM ASSEMBLY 132887



NOTE: SPRING BRACKET Part 132385

TROUBLE SHOOTING

SYMPTOM	CAUSE
Counting pointer spins.	1. Stop pin plunger broken. 2. Stop blade broken. 3. Stop pin binding. 4. Garter spring broken. 5. Stop pin spring weak. 6. Transfer bail bracket adjustment—Adj. No. 28. 7. Zero cam lever adjusting screw adjustment—Adj. No. 36. 8. Counting shaft end play adjustment—Adj. No. 32.
Counting pointer doesn't move or moves intermittently or counts incorrectly.	1. Stop pin plunger broken. 2. Transfer bail bracket adjustment—Adj. No. 28. 3. Transfer bail arm adjustment—Adj. No. 30. 4. Zero lever upstop screw adjustment—Adj. No. 37. 5. Reset collar lever adjustment—Adj. No. 33. 6. Left counting cross shaft adjustment—Adj. No. 39.
Counting pointer counts same unit value each time.	1. Transfer bail arm adjustment—Adj. No. 30.
Counting pointer slips.	1. Counting shaft friction clutch torque adjustment—Adj. No. 41. 2. Counting pointer clutch spring compression adjustment—Adj. No. 44. 3. Counting pointer broken. (segments)
Spaceband justification pointers fail to operate.	1. Spacer rod adjustment—Adj. No. 55. 2. Intermediate pawl latch adjustment—Adj. No. 58. 3. Retaining pawl release lever adjustment—Adj. No. 50. 4. Spacing rack adjustment—Adj. No. 52. 5. Left justification pointer returned position adjustment—Adj. No. 54. 6. Space bar lever extension spring tension—Adj. No. 60. 7. Intermediate pawl spring tension—Adj. No. 65. 8. Spacer rod spring tension—Adj. No. 62. 9. Retaining pawl spring tension—Adj. No. 53.
Counting pointer fails to return.	1. Return actuating lever adjustment—Adj. No. 46. 2. Counting pointer clutch release lever adjustment—Adj. No. 51. 3. Counting pointer return spring arm cord broken. 4. Counting pointer return spring weak or broken.

TROUBLE SHOOTING

SYMPTOM	CAUSE
Counting pointer fails to move on first key stroke.	1. Excessive gear backlash. 2. Left and right cross shafts end play—Adj. Nos. 40 and 43. 3. Pointer release plunger front and rear collars play (should be min.)
Tape fails to perforate properly	1. Punch hammer operating lever adjustment—Adj. No. 80. 2. Punch block cutting ability poor (should be replaced with a new or reconditioned block) 3. Chads backed up into chad chute. 4. Punch bar levers bearing bracket adjustment—Adj. No. 83. 5. Punch hammer pivot screws adjustment—Adj. No. 79.
Tape fails to feed or does not feed properly.	1. Tape feed pawl adjustment—Adj. No. 91. 2. Tape feed roll detent final adjustment—Adj. No. 93. 3. Tape tension lever spring tension—Adj. No. 94. 4. Tape feed roll bearing plate adjustment—Adj. No. 89. 5. Punch hammer operating lever adjustment—Adj. No. 80. 6. Punch hammer stop screw adjustment—Adj. No. 82. 7. Punch hammer spring tension—Adj. No. 81. 8. Tape feed pawl spring tension—Adj. No. 92. 9. Tape feed roll detent lever spring tension—Adj. No. 96. 10. Tape binds in tape container. 11. Roll of tape inserted upside down. 12. Remove rubber buffer (83413).
Tape weaves.	1. Tape tension spring adjustment—Adj. No. 98.
Main clutch and keyboard fail, or timing off (heavy touch, lock-ups, etc.).	1. Universal bar backstop screw adjustment—Adj. No. 22. 2. Stop lever latch adjusting screw adjustment—Adj. No. 24. 3. Stop lever cam roller eccentric screw adjustment—Adj. No. 20. 4. Stop lever latch upstop screw adjustment—Adj. No. 25. 5. Selector bar assembly parts binding or dirty (clean periodically). 6. Trip-off plunger binding. 7. Stop lever and stop lever latch binding. 8. Operating cam sleeve friction clutch adjustment—Adj. No. 14. 9. Stop lever and stop lever latch spring tensions heavy or weak—Adj. Nos. 18 and 19. 10. Stop lever latching extension or non-repeat latch have burrs. 11. Keylever spring tensions weak—Adj. No. 10. 12. Count selector bar assembly adjustment—Adj. No. 29. 13. Perforator selector bar assembly adjustment—Adj. No. 2.
Keystroke doubles.	1. Worn edges on stop lever, stop lever latch, or non-repeat latch. (Worn parts should be replaced.)

TROUBLE SHOOTING

SYMPTOM	CAUSE
Spaceband Pointers fail to return.	1. Return actuating lever adjustment—Adj. No. 46. 2. Retaining pawl release lever adj.—Adj. No. 50. 3. Reset lug adjustment—Adj. No. 56. 4. Justification pointers return spring tension—Adj. No. 73. 5. Spacing rack slide return spring tension—Adj. No. 72. 6. Intermediate pawl latch spring tension—Adj. No. 57.
Perforator fails to shift or unshift properly.	1. Counting selector bar assembly shims adjustment (if min.)—Adj. No. 1. 2. Shift bail adjustment—Adj. No. 4. 3. Shift bail stop plate adjustment—Adj. No. 5. 4. Shift and unshift brackets adjustment—Adj. No. 7. 5. Shift bail balancing spring tension—Adj. No. 9. 6. Shift bail detent spring tension—Adj. No. 8. 7. Key levers spring tension—Adj. No. 10.
Signal lamp fails to operate, or does not operate correctly.	1. Lamp burned out. 2. Signal lamp contacts adjustments—Adj. No. 75.
Excessive noise or vibration.	1. Motor position adjustment—Adj. No. 11. 2. Perforator cover not positioned properly. 3. Counting scale bent. 4. Justification pointer not attached to pin on counting scale.

GENERAL LUBRICATION SPECIFICATIONS

Unless otherwise specified, one or two drops of oil at each of the places indicated (1 to 94 inclusive) will be sufficient. Use oil for lubrication at all of the places listed below, except where the use of grease is specified.
Oil both loops of all helical springs that exert a nominal tension of less than 2½ pounds. Apply grease to both loops of all helical springs that exert a nominal tension of 2½ pounds or more. Apply thin film of grease on all cams and gears.

An atomizer may be used to spray a light film of oil on springs or parts requiring complete lubrication. The following lubricants are suggested for use on all Teletypesetter equipment:

KS-7470 Oil, Part No. 88970—1 Qt.; Part No. 88971—1 Gal.
KS-7471 Grease, Part No. 88973—1 Lb.

For best operating results the Teletypesetter Standard Perforator should be thoroughly cleaned and lubricated approximately every month unless otherwise specified. To clean and lubricate individual assemblies the following procedure is recommended:

(a) Remove Perforator covers.
(b) Remove the two screws (8185) that mount the punch unit assembly and remove the punch unit assembly.
(c) Remove the two screws (6810) that mount the justification pointer rack and remove the justification pointer rack.
(d) Remove the two bearing caps (123722) that position the counting shaft.
(e) Remove the rear section of the shaft.
Be sure that the small felt washer and bearing sleeve are removed with the shaft.
(f) Remove the pilot screw (6814) in reset collar lever (86215). Unhook zero lever spring.
Loosen set screw (6807) which holds the zero lever shaft (3248) in place and withdraw shaft. Depress any key (to release clutch) and turn top of motor fan forward until reset collar is to extreme rear of its travel. Then turn reset collar (86090)—and shaft—to slip reset collar off bottom pivot pin in reset collar. By a little twisting and maneuvering the entire worm shaft assembly can be completely removed from the Perfor
(g) Remove the motor pinion.
(h) Remove the two bearing caps (123722) that position the main shaft.
Lift the main shaft out of engagement from its related levers, reinstall roller (85784) and roller (85261) if they came off when the shaft was removed.

The individual parts and assemblies should be cleaned and the excessive oil removed. Carbon tetrachloride or other non-inflammable cleaning fluid may be used for cleaning.

After cleaning and lubricating the assemblies of the Standard Perforator, the procedure for reassembling the Perforator is as follows:

(a) Mount the main shaft and the counting shaft.
(b) Replace bearing caps.

Check the following adjustments:

MAIN CLUTCH ADJUSTMENT
(Operating Cam Sleeve Jaw Clutch Adjustment)

With the operating cam sleeve in the stop position (the driven clutch member fully cammed out of mesh with the driving clutch member), the clutch teeth should be separated by from .006" to .010". This clearance may be obtained by loosening the four screws which hold the main shaft bearing caps and adjusting the position of the main shaft to the front or rear.

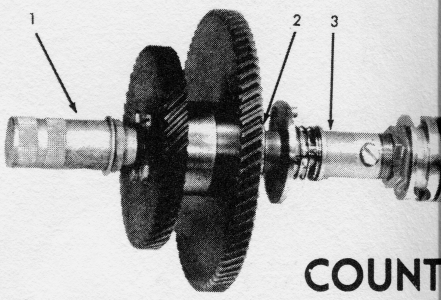
COUNTING SHAFT END PLAY ADJUSTMENT

The counting shaft should have no perceptible end play. To adjust, position the rear section of the counting shaft by means of the four screws which hold the counting shaft bearing caps.

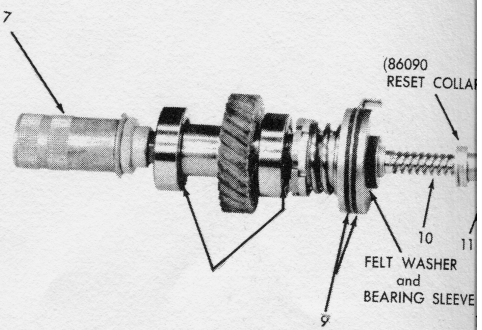
(c) Replace motor pinion.
(d) Replace reset collar lever pilot screw, zero lever shaft (tighten set screw), and rehook spring.
(e) Replace justification pointer rack.
(f) Replace punch unit (position the punch unit bracket securely against the locating plate).
(g) Replace covers.

1. Oil Plug (at rear of shaft)—remo
2. Ball Bearings—two places.
3. Return Clutch Sliding Member—o
4. Operating Clutch Sliding Member
5. Operating Clutch Felt Washer
6. Driven Clutch Cam and Followe
7. Oil Plug (at rear of shaft)—remo
8. Ball Bearings—two places.
9. Counting Clutch Felt Washers—s
10. Stop Shaft Worm and Gear—gre
11. Stop Blades—all points of contac
12. Stop Pins—all points of contact.
13. Code Discs—all points of contac
14. Stop Pin Plungers.
15. Stop Pin Rollers.
16. Oil Cup (at front of unit)—fill w

MAIN S

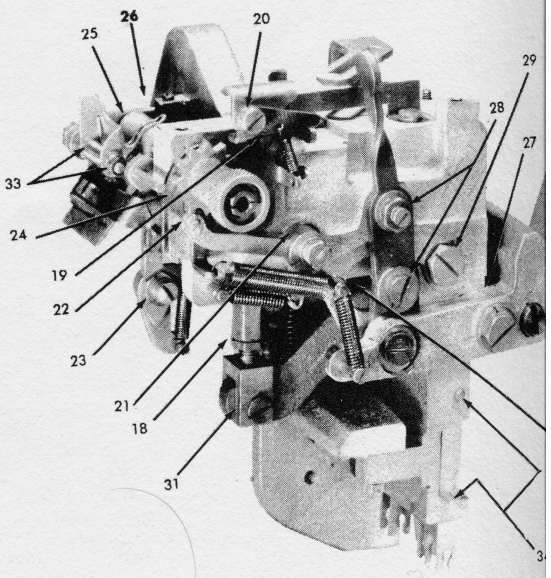


COUNT



(TWICE WEEKLY)

PUNCH



LUBRICATION

ON SPECIFICATIONS

drops of oil at each of the places indi-
ent. Use oil for lubrication at all of the
use of grease is specified.
rt exert a nominal tension of less than
ops of all helical springs that exert a
Apply thin film of grease on all cams

light film of oil on springs or parts
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t.; Part No. 88971—1 Gal.
-1 Lb.

Standard Perforator
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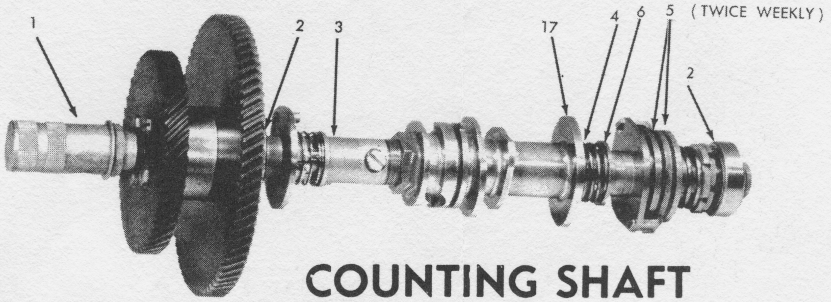
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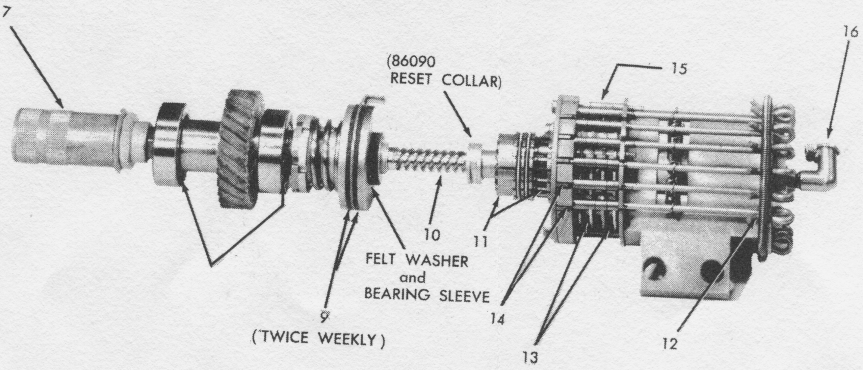
t bracket securely

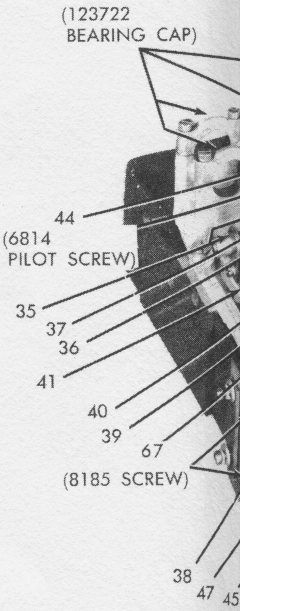
1. Oil Plug (at rear of shaft)—remove and fill with oil.
2. Ball Bearings—two places.
3. Return Clutch Sliding Member—oil freely.
4. Operating Clutch Sliding Member—oil freely.
5. Operating Clutch **Felt** Washers—saturate with oil **twice weekly.**
6. Driven Clutch Cam and Follower—grease.
7. Oil Plug (at rear of shaft)—remove and fill with oil.
8. Ball Bearings—two places.
9. Counting Clutch Felt Washers—saturate with oil **twice weekly.**
10. Stop Shaft Worm and Gear—grease.
11. Stop Blades—all points of contact.
12. Stop Pins—all points of contact.
13. Code Discs—all points of contact.
14. Stop Pin Plungers.
15. Stop Pin Rollers.
16. Oil Cup (at front of unit)—fill with oil.

MAIN SHAFT

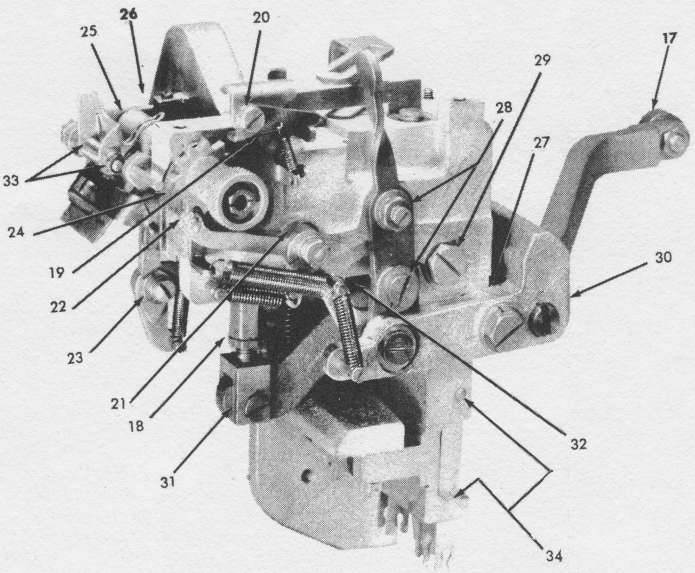


COUNTING SHAFT





PUNCH UNIT



17. Punch Hammer Roller—grease.
18. Punch Hammer Adjusting Nut.
19. Back Space Lever—in the guides.
20. Back Space Pawl—at the shoulder screw.
21. Detent Eccentric Bushing.
22. Detent Roller.
23. Feed Pawl Eccentric Bushing.
24. Feed Pawl Release Cam.
25. Feed Roll Bearing.
26. Punch Block Oil Hole.
27. Punch Control Bail Pivots—two places.
28. Punch Control Lever Pivots and Joints.
29. Punch Hammer Bearings—two places (inside).
30. Punch Hammer Lever Shaft—two oil holes.
31. Punch Joint Bearings—two places.
32. Punch Bars—all points of contact.
33. Tape Tension Lever Bearings—two places.
34. Vertical Levers—all points of contact.

LUBRICATION CHART

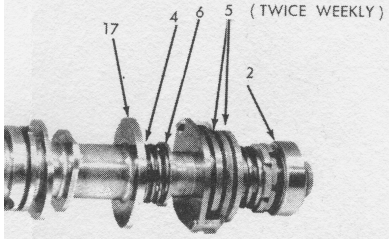
ıove and fill with oil.

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er—oil freely.
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nove and fill with oil.

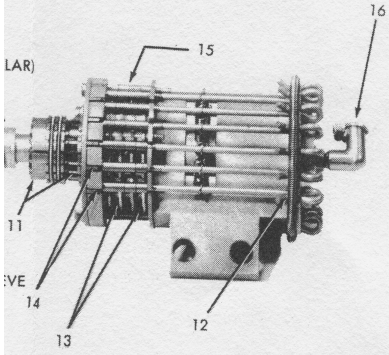
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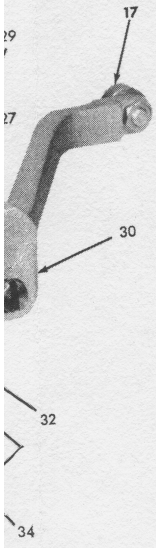
SHAFT



TING SHAFT



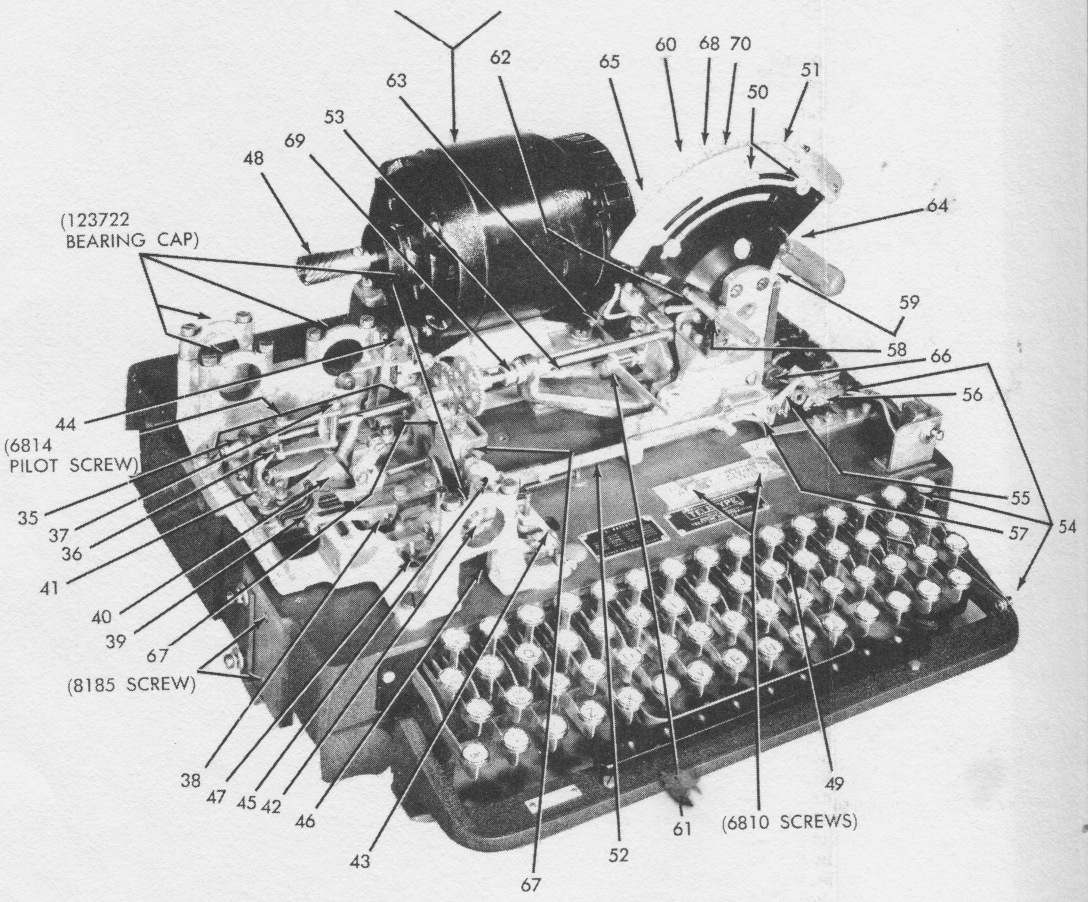
H UNIT



PERFORATOR BASE

(Sealed Bearing Motor) Dismantle — clean and repack bearings every three years.

(Motor Equipped with Oilers) Dismantle — clean and apply grease to oilers every year.

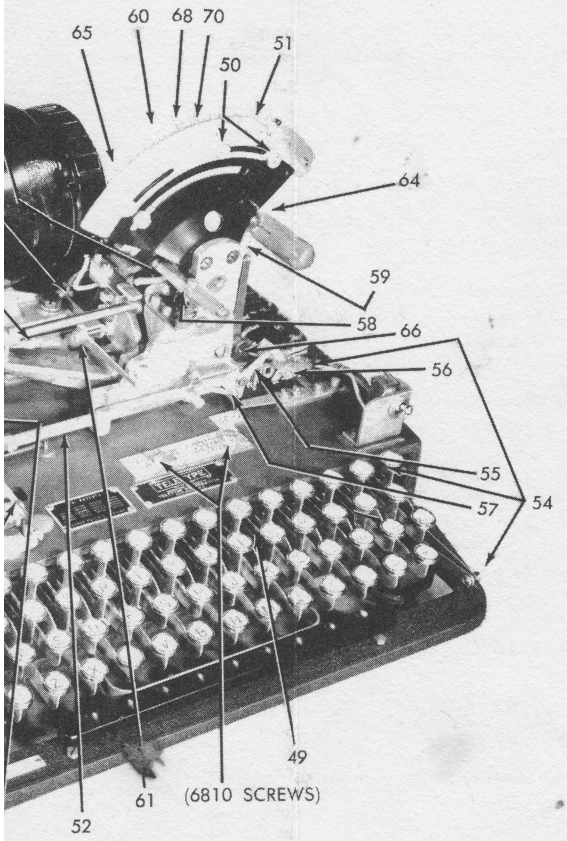


17. Punch Hammer Roller—grease.
18. Punch Hammer Adjusting Nut.
19. Back Space Lever—in the guides.
20. Back Space Pawl—at the shoulder screw.
21. Detent Eccentric Bushing.
22. Detent Roller.
23. Feed Pawl Eccentric Bushing.
24. Feed Pawl Release Cam.
25. Feed Roll Bearing.
26. Punch Block Oil Hole.
27. Punch Control Bail Pivots—two places.
28. Punch Control Lever Pivots and Joints.
29. Punch Hammer Bearings—two places (inside).
30. Punch Hammer Lever Shaft—two oil holes.
31. Punch Joint Bearings—two places.
32. Punch Bars—all points of contact.
33. Tape Tension Lever Bearings—two places.
34. Vertical Levers—all points of contact.
35. Cross Shaft Bearings—two places.
36. Reset Collar Lever—all points of contact.
37. Reset Collar Lever Bearings—two places.
38. Transfer Bail Bearings—two places.
39. "T" Transfer Levers—all points of contact.
40. Zero Cam Bail Bearings—two places.
41. Zero Lever Bearings—two places.
42. Non-Repeat Latch—all points of contact.
43. Repeat Key Bearing.
44. Return Clutch Throw-out Lever Bearings—two places.
45. Stop Lever Bearings—two places.
46. Stop Lever Latch—all points of contact.
47. Trip-off Plunger—in the guides.
48. Motor Pinion—grease.
49. Space Bar Loop Bearings—two places.
50. Indicator Scale Guides.
51. Pointer Bracket—oil hole.
52. Spacer Rod—all points of contact.
53. Return Actuating Lever Bearing Points.
54. Space Bar Lever Extensions—at the guide.

T

BASE

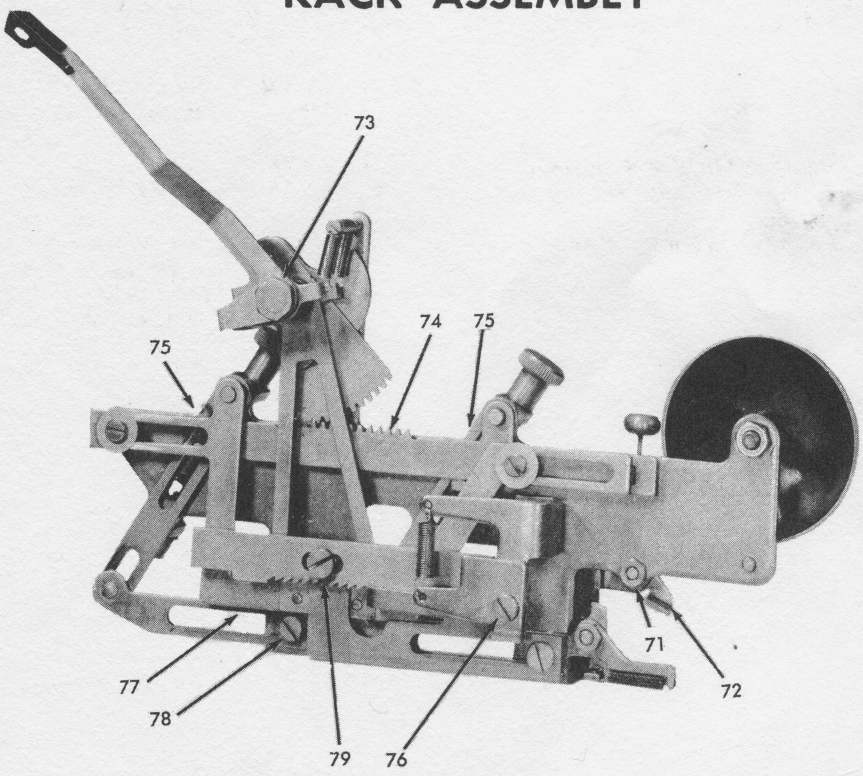
otor Equipped with Oilers)
smantle — clean and apply
ease to oilers every year.



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et Collar Lever—all points of contact.
et Collar Lever Bearings—two places.
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Transfer Levers—all points of contact.
Cam Bail Bearings—two places.
Lever Bearings—two places.
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Lever Latch—all points of contact.
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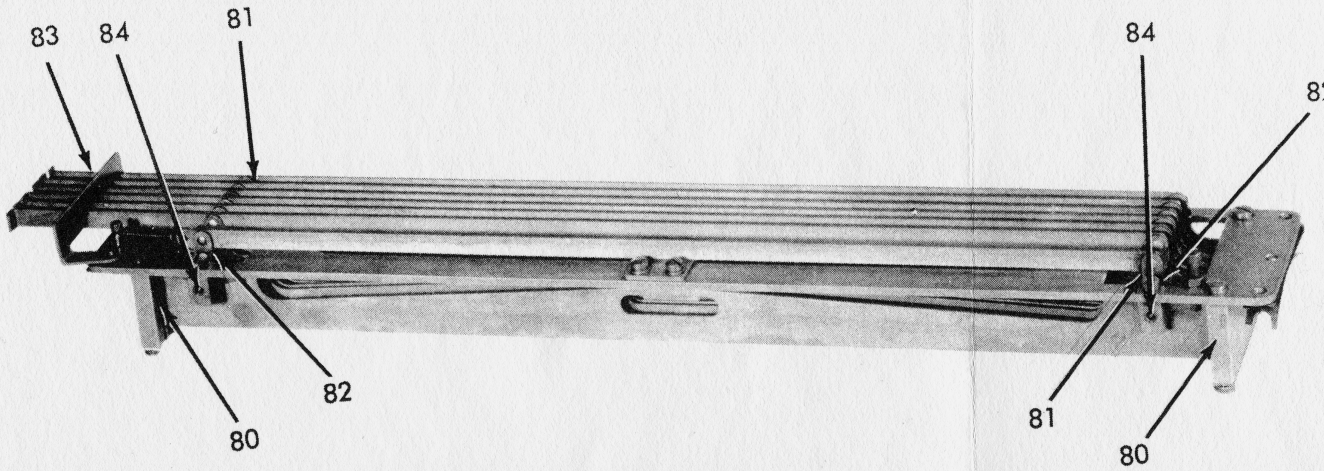
55. Intermediate Pawl—all points of contact.
56. Intermediate Pawl Latch—all points of contact.
57. Feed Pawl Bearing.
58. Swivel and Rollers—bearing points.
59. Semaphore Linkages—all points of contact.
60. Release Lever Bearings.
61. Retaining Pawl Release Lever Bearings.
62. Contact Lever Bearings—two places.
63. Return Bail Bearings.
64. Semaphore Bearings.
65. Vertical Link Bearings.
66. Spring Arm Bearings.
67. Spacer Bail Bearings and Roller.
68. Shift Detent Bearing and Roller.
69. Counter Shaft Bearing.
70. Adjusting Collar—at prongs.

JUSTIFICATION POINTER RACK ASSEMBLY



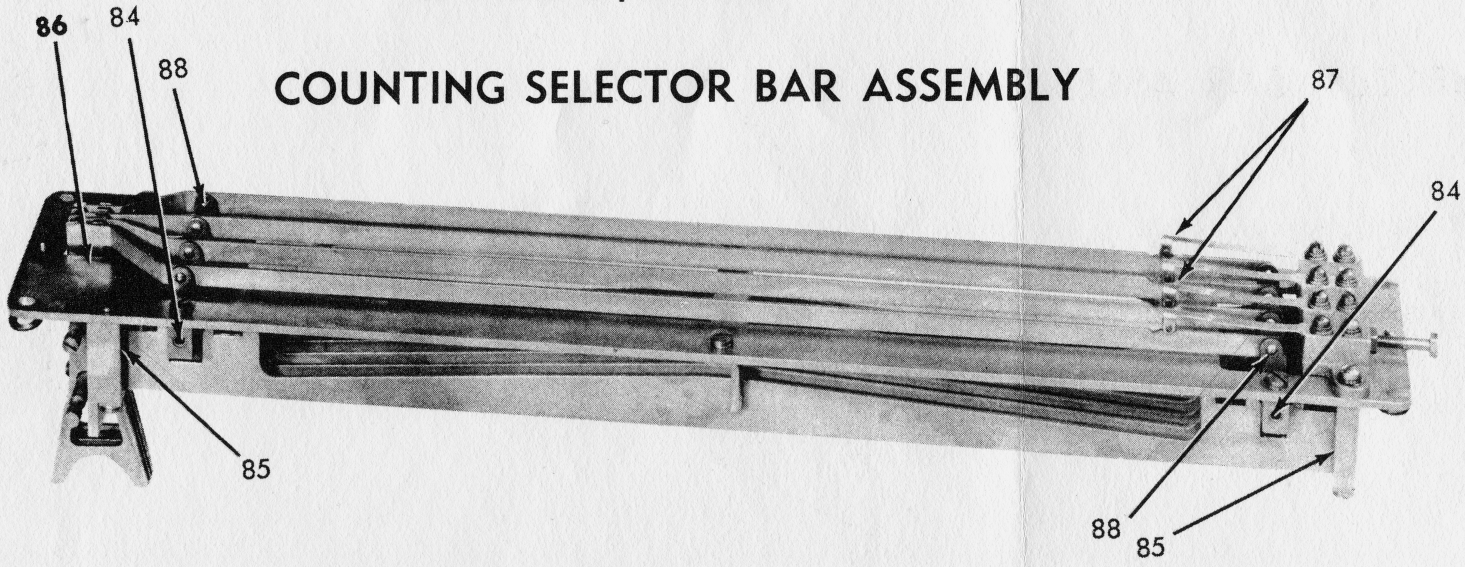
71. Bell Hammer Eccentric Bushing.
72. Bell Pawl—at the stud.
73. Justification Pointers—all points of contact.
74. Left Pointer Rack—all points of contact.
75. Pivot Adjusting Blocks—at guides.
76. Retaining Pawl Bearings.
77. Right Pointer Rack—all points of contact.
78. Space Rack Slide—all points of contact.
79. Spacing Rack—all points of contact.

PERFORATING SELECTOR BAR ASSEMBLY



80. Perforating Selector Bars—in the slots.
81. Selector Bar Links—all points of contact.
82. Selector Bar Links Bearings.
83. Selector Bar Links Guides.
84. "Y" Levers—all points of contact.

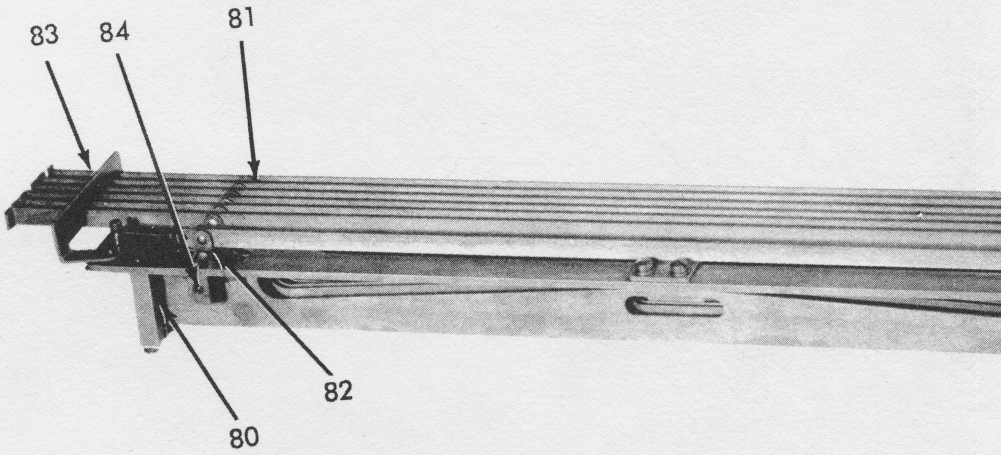
COUNTING SELECTOR BAR ASSEMBLY



85. Counting Selector Bars—in the slots.
86. Counting Selector Levers—all points of contact.
87. Detent Rollers.
88. Counting Selector Bar Links Bearings.

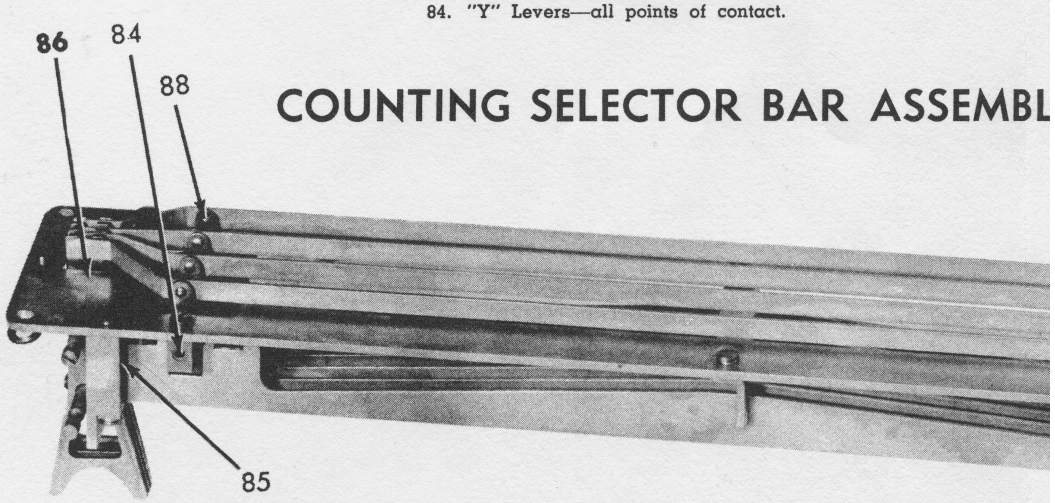
LUBRICATIO

PERFORATING SELECTOR BAR ASSE



80. Perforating Selector Bars—in the slots.
81. Selector Bar Links—all points of contact.
82. Selector Bar Links Bearings.
83. Selector Bar Links Guides.
84. "Y" Levers—all points of contact.

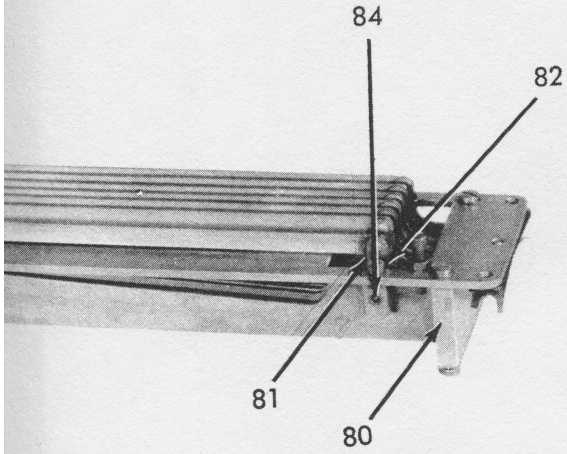
COUNTING SELECTOR BAR ASSEMBL



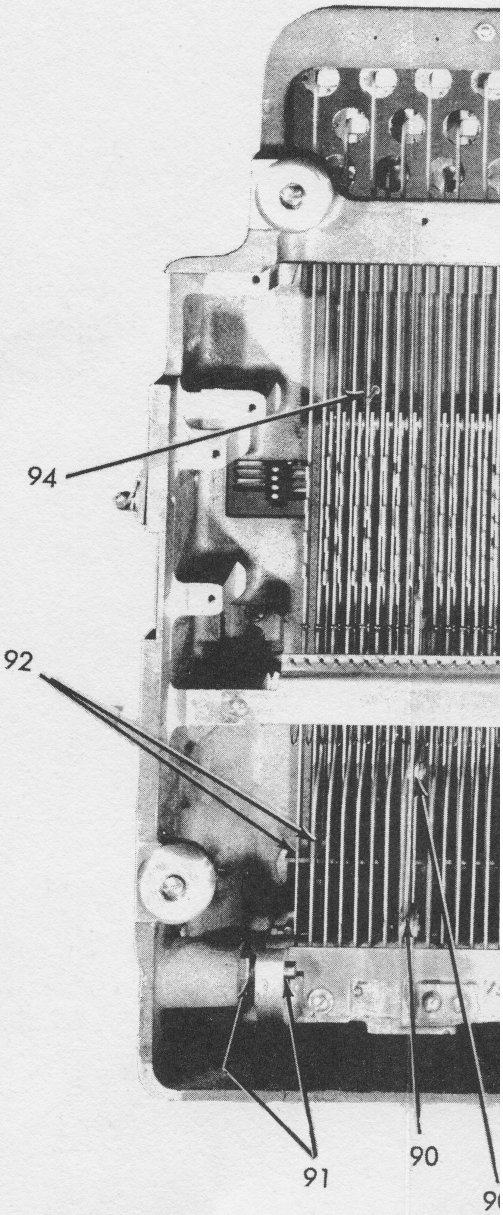
85. Counting Selector Bars—in the slots.
86. Counting Selector Levers—all points of contact.
87. Detent Rollers.
88. Counting Selector Bar Links Bearings.

CATION CHART

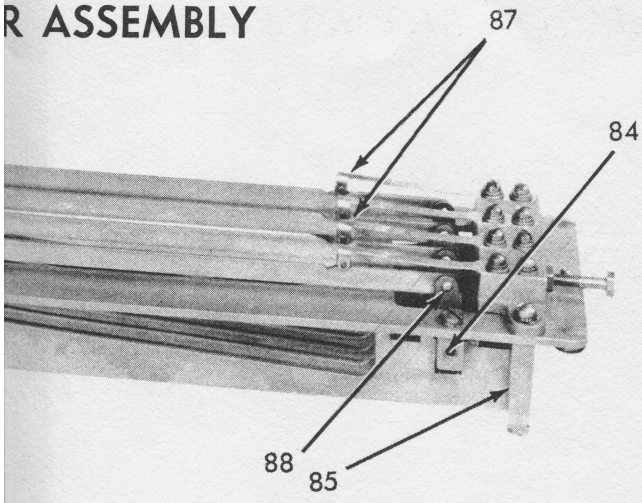
BAR ASSEMBLY



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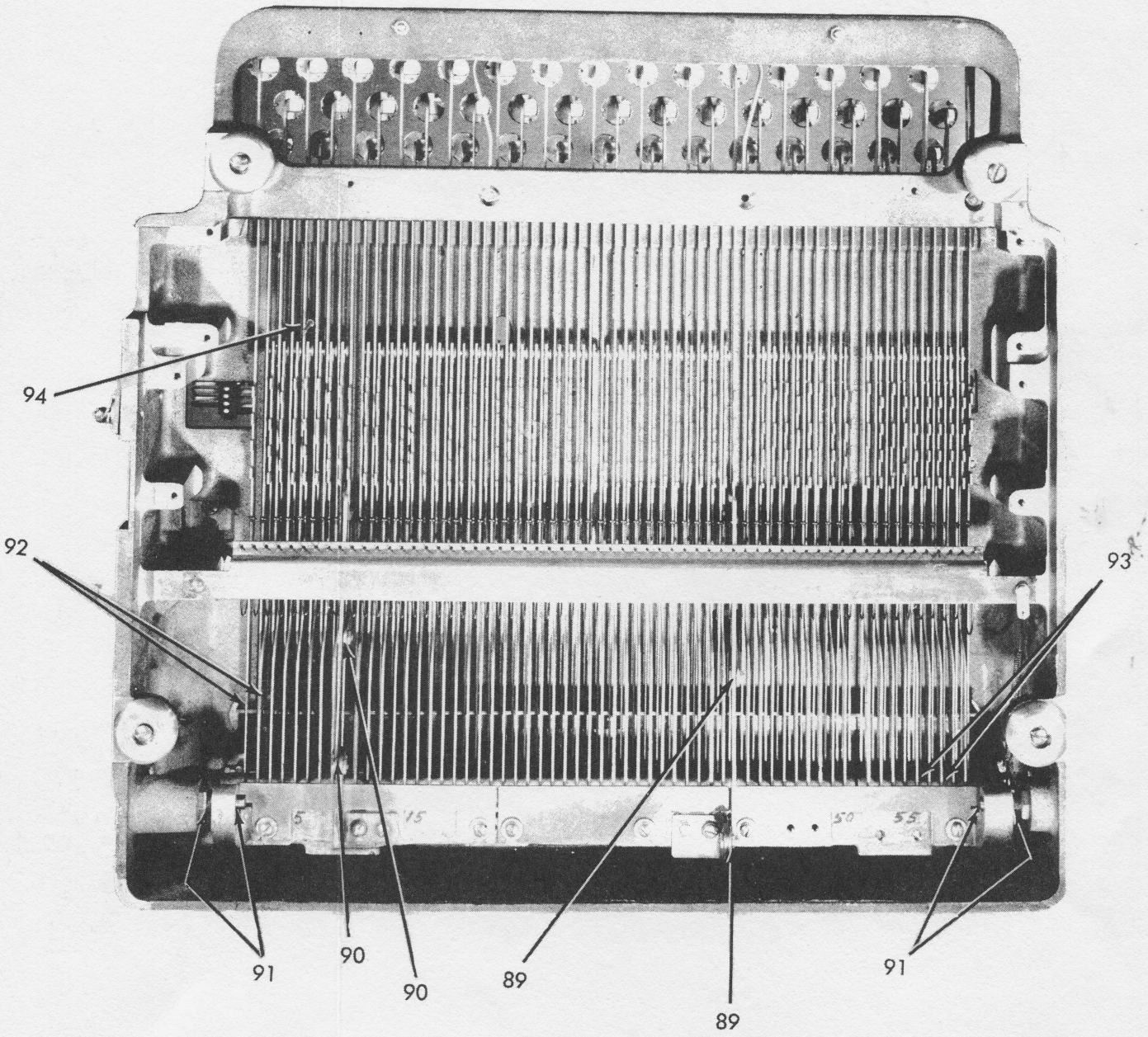


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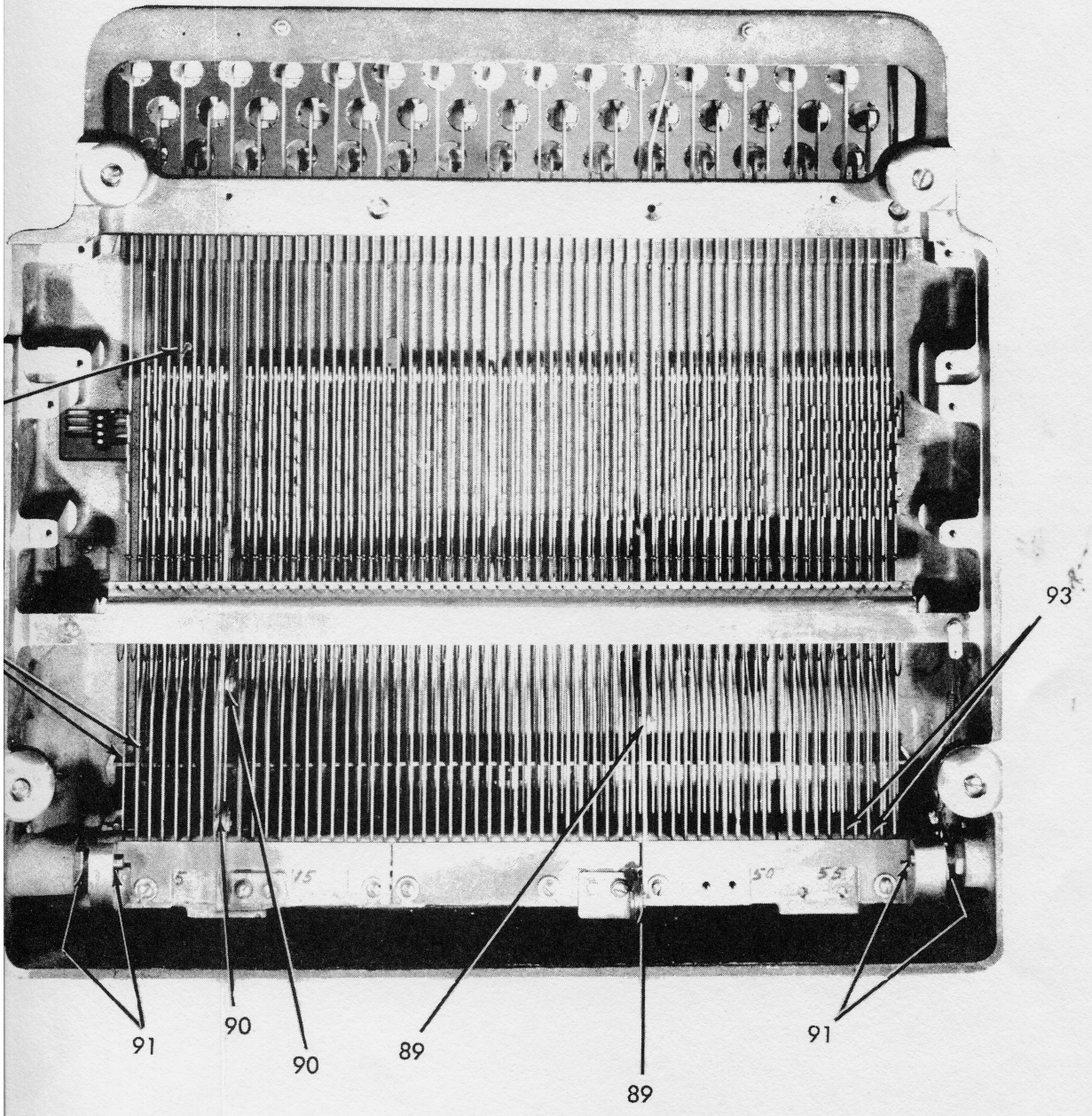
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PERFORATOR BASE



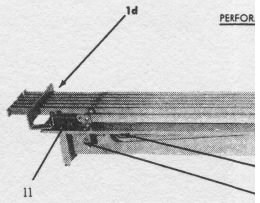
89. Unshift Linkages—all points of contact.
90. Shift Linkages—all points of contact.
91. Shift Bail Bearings—two places.
92. Key Levers—in rear guide comb.
93. Key Levers—in shift bail.
94. Trip-off Plunger—in the guide.

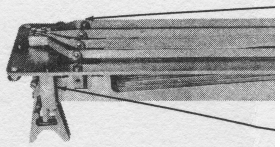
PERFORATOR BASE



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94. Trip-off Plunger—in the guide.

TELETYPESETTER PERFORATOR KEYBOARD TOUCH (DEPRESSION)





The frequent complaint of Teletypesetter Perforator Operators is that of keyboard touch. Heavy keyboard touch or depression may be divided into two areas:

(a) The psychlogical factors pertaining to the human reactions of the Perforator Operator.

(b) The actual mechanical operation with respect to keystroke depression.

In some cases, the Perforator Operator will complain of heavy touch simply to put the machine at fault rather than realize that his or her finger dexterity is not completely up to proper requirements at the time. This usually occurs at the beginning of the week or after long periods of perforating. It has been noted that on numerous occasions the touch of the Perforator has been improved in the mind of the Operator by nothing more than a display of sympathetic interest by the maintenance personnel.

If the complaint of heavy touch by the Operator is justified, then it is advisable to recheck various Perforator adjustments.

The following pages will be of benefit in the location of adjustments, proper procedure for maintenance pertaining to adjustments affecting the keyboard touch, and also various suggestions that may help correct heavy keyboard touch.

The Sequence of Adjustments for Reducing Keyboard Touch is as follows:

1. Remove perforating selector bar assembly, dismantle and clean thoroughly.

1a. Check all perforating selector bar "Y" levers for binds. The perforating selector bar links should ride freely in their guides.

1b. Remove all roughness, polish if necessary. Perforating selector bars should operate freely in their guides.

1c. Straighten perforating selector bars if bowed.

1d. Perforating selector bar links should not bind in the guide comb.

2. Remove counting selector bar assembly, dismantle and clean thoroughly.

2a. Check all counting selector bar "Y" levers for binds. The counting selector bar links should ride freely in their guides.

2b. Remove all roughness, polish if necessary. Counting selector bars should operate freely in their guides.

2c. Straighten counting selector bars if bowed.

3. **Keylever Spring Tension**

   The openings between the ends of all keylever springs should be 1-9/16", except the space bar keylever spring which should be 1-15/16". These requirements may be obtained by bending the spring. Do not compress keylever spring to lighten the touch of the keylever.

4. Rollers should be free of binds. (Remove all dust and foreign matter.)

5. **Saturate felt washers twice a week.**

6. Trip-off plunger should operate freely in its guide.

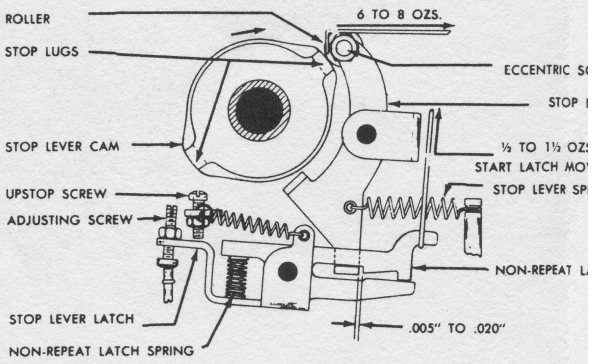
7. Punch bar levers and selector bar links should operate freely in their guide.

8. All keylevers must be free of binds.

9. **Main Clutch Adjustment (Operating Cam Sleeve Jaw Clutch Adjustment)**

   With the operating cam sleeve in the stop position (the driven clutch member fully cammed out of mesh with the driving clutch member), the clutch teeth should be separated by from .006" to .010" at the closest point. This clearance may be obtained by loosening the four screws which hold the main shaft bearing caps and adjusting the position of the main shaft to the front or rear.

(Refer to corresponding number on Illustration for Adjustment location.)



OR KEYBOARD TOUCH ON)

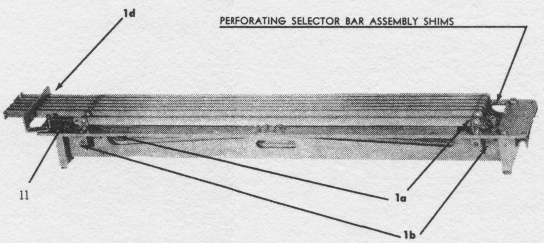
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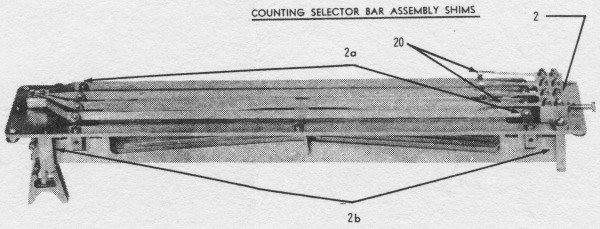
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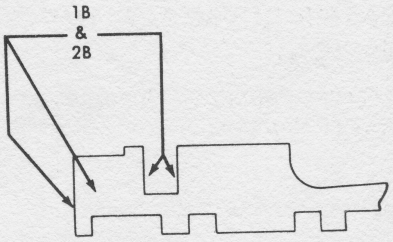
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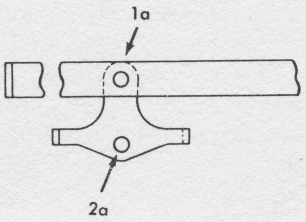
the location of adjustments, proper djustments affecting the keyboard may help correct heavy keyboard







SELECTOR BAR



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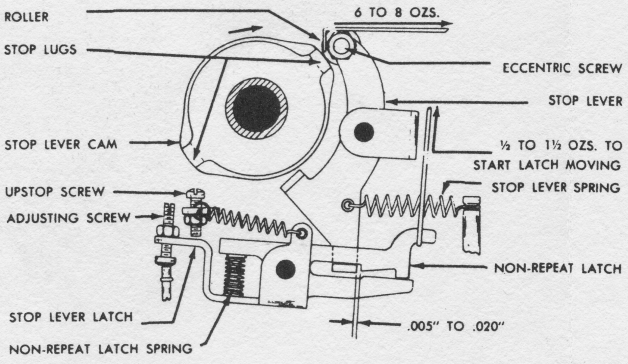
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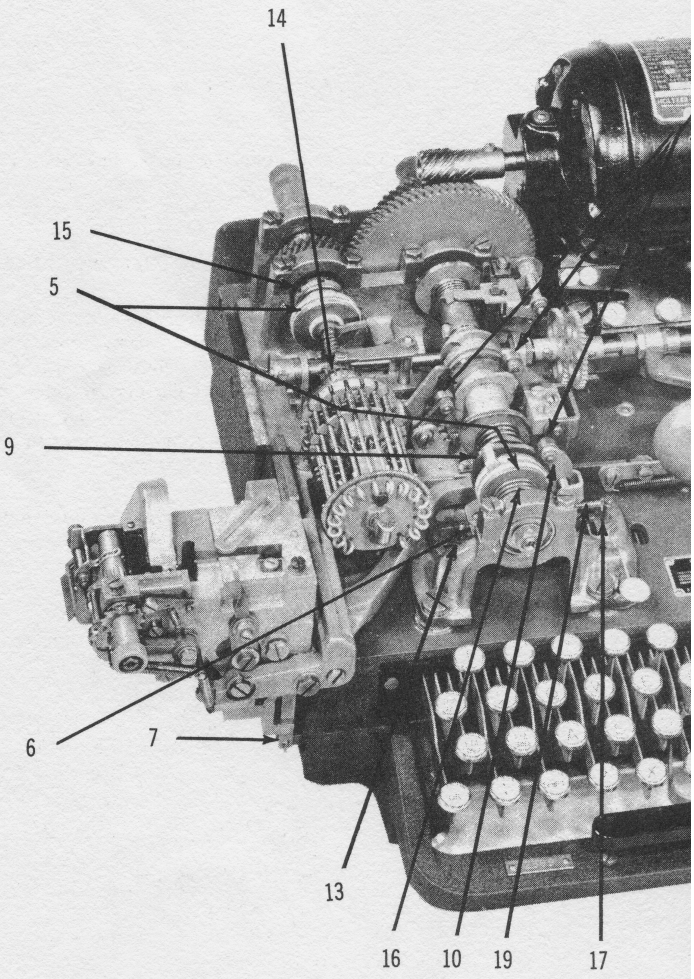
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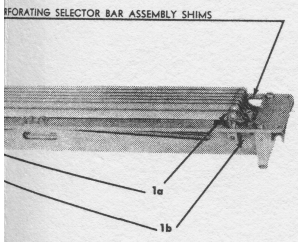
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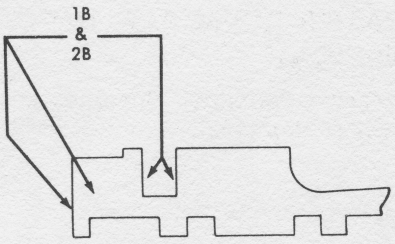
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(Refer to corresponding number on Illustration for Adjustment location.)

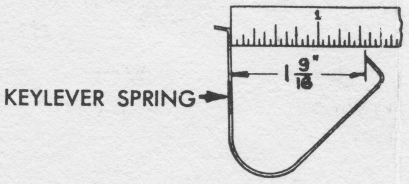


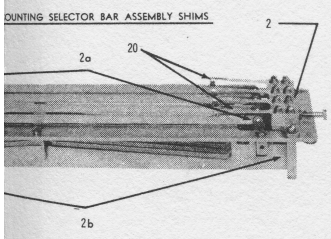


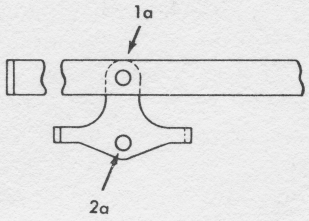


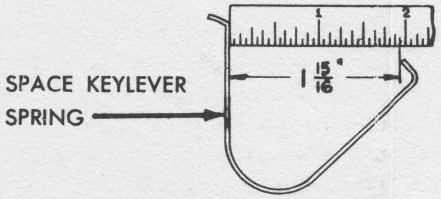


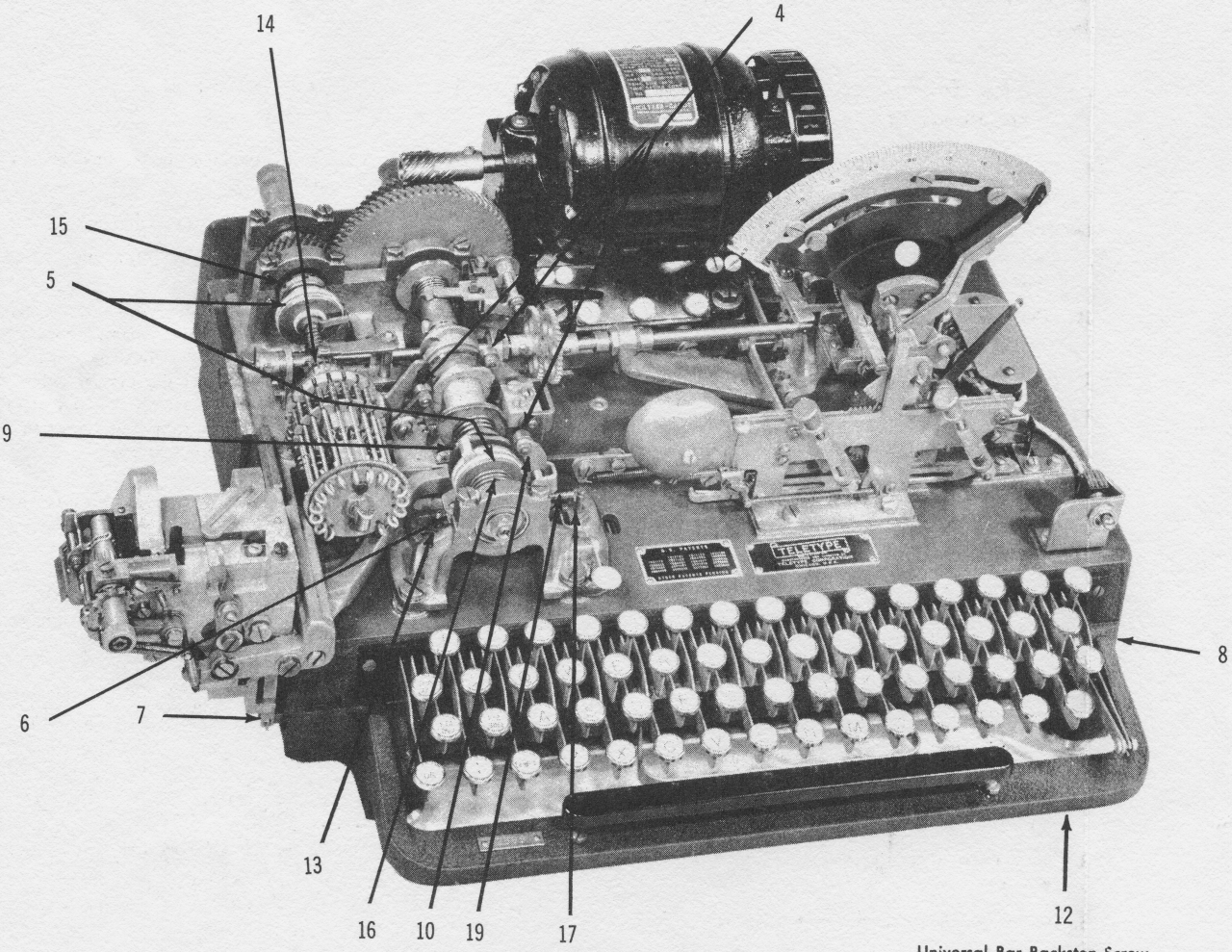
SELECTOR BAR











Universal Bar Backstop Screw Adjustment (located underneath)

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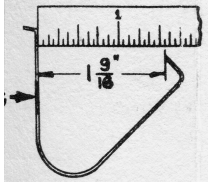
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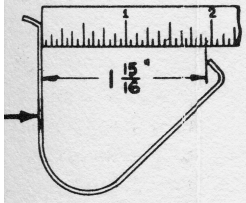
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10. **Stop Lever Cam Roller Eccentric Screw Adjustment**

With a keylever held depressed, and the stop lever cam roller first on one of the stop lugs which form the high part of its stop lever cam, the stop lever extension should overtravel the non-repeat latch by from .005" to .020". Check for this same clearance with the cam roller on the opposite stop lug. These requirements may be obtained by means of the eccentric screw and lock nut which mount the roller.

11. **Universal Bar Spring Tension**

Trip the main clutch by depressing a keylever. With an 8 oz. scale hooked over the rivet, which connects the left universal bar "Y" lever with the link, pull to the right in line with the link. It should require from 2-1/2 to 3-1/2 ozs. to just start the link moving.

12. **Universal Bar Backstop Screw Adjustment**

Back off the universal bar backstop screw. With the "R," "Y," and "5" key levers held depressed at the same time, turn the universal bar backstop screw in until it just touches the universal bar "Y" lever. Then turn the screw in approximately two-thirds of a turn, and tighten the lock nut.

13. **Stop Lever Latch Adjusting Screw Adjustment**

With the operating cam sleeve in the stop position, and all the keylevers in their unoperated positions, there should be from .002" to .006" clearance between the non-repeat latch and the upper surface of the stop lever extension. To meet this requirement, adjust the stop lever latch adjusting screw.

14. **Counting Shaft End Play Adjustment**

The counting shaft should have no perceptible end play. To adjust, position the rear section of the counting shaft by means of the four screws which hold the counting shaft bearing caps.

15. **Counting Shaft Friction Clutch Adjustment**

Hook a 32 oz. scale on the counting clutch friction disc lug, and pull at right angle to the lug. It should require from 16 to 24 ozs. to just start the friction disc moving in a direction opposite to that which the motor is driving it. Adjust the tension by means of the clutch spring capstan nut and capstan lock nut.

16. **Operating Cam Sleeve Friction Clutch Adjustment**

CAUTION: While taking this tension, hold down the left end of the stop lever latch to prevent accidental engaging of the clutch jaw teeth, which might result in injury to the fingers.

With the motor running and the clutch disengaged, hook a 32 oz. scale under the stop lug that is engaging the stop lever. It should require from 24 to 32 ozs. just to move the clutch backward from the stop position.Adjust by means of the adjusting nut and then tighten the capstan lock nut.

17. **Stop Lever Spring Tension**

With the stop lever cam roller on a high part of its cam, hook an 8 oz. scale over the roller screw nut and pull horizontally. It should require 6 to 8 ozs. to start the cam roller moving away from its cam.

18. **Non-Repeat Latch Spring Tension**

With the stop lever roller on a high part of its cam, hook an 8 oz. scale under the right end of the non-repeat latch and pull up. It should require from 1 to 2-1/4 ozs. to start the non-repeat latch moving.

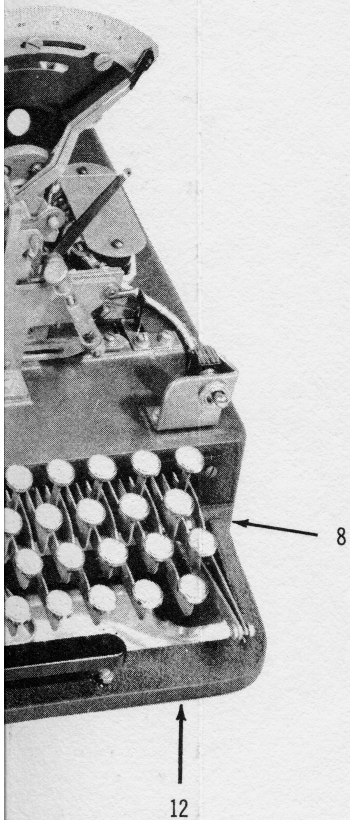
19. **Stop Lever Latch Spring Tension**

With the stop lever roller on a high part of its cam, hook an 8 oz. scale under the stop lever latch just to the right of the adjusting screw, and pull vertically upward. It should require from 1/2 to 1-1/2 ozs. to start the stop lever latch moving.

20a. **Counting Selector Bar Link Detents Adjustment**

Each counting selector bar link detent roller should ride an equal distance into the right and left notches in the counting selector bar links, and the detent rollers should ride fully on their links. To adjust, position the detent springs by means of their elongated mounting holes.

20b. With the detent roller first in one and then in the other notch in the counting selector bar links, hook an 8 oz. scale over the detent spring just to the right of the roller and pull at right angle to the spring. It should require 1 to 1-1/2 ozs. to start the detent spring moving. Bend the detent springs, if necessary, to meet this requirement.



Universal Bar Backstop Screw Adjustment (located underneath)