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SECTION A – MAINTENANCE INSTRUCTIONS

1. INTRODUCTION

Routine maintenance of the Model 444 Teleprinter should be carried out between periods of operation stated in Table 1. These periods apply to machines operating in temperate climates or similarly conditioned environments. Machines operated in intemperate conditions will require more frequent maintenance, so the periods should be adjusted accordingly.

2. COUNTER UNIT

A counter unit, mounted above the keyboard, records the total number of revolutions of the main drive shaft. The counter is used to ensure correct periods between maintenance. It must be noted that the counter records the exact hours of operation of the motor, not of the remainder of the machine, particularly if the auto-start facility is removed or inhibited.

TABLE 1 MAINTENANCE SUMMARY

MAINTENANCE	PERIODS OF OPERATION *	
	50 BAUDS	75 BAUDS
Short Term	1000 hours or 1 year	660 hours or 1 year
Long Term (Overhaul)	5000 hours or 5 years	3300 hours or 5 years

* Whichever occurs first

NOTE A machine operated at both 50 and 75 bauds since its previous maintenance should receive attention after the period of operation specified for a 75 baud machine.

3. SHORT TERM MAINTENANCE

When the machine has been in operation for the short term period stated in Table 1, carry out the following maintenance.

General

- 3.1 Disengage the signal and power plugs from their external sockets.
- 3.2 Lift off the machine cover and remove the machine from the base tray (Part 2).

- 3.3 Inspect the mechanism for the following faults.

- (a) Visual damage
- (b) Insecurity of component mounting
- (c) Lubrication failure or corrosion
- (d) Charring, overheating or spark erosion caused by tracking of electrical currents
- (e) Bad insulation or badly made electrical connections

- 3.4 Using a soft brush remove all traces of paper fluff, dust and tape cuttings from the machine. Clear the typefaces with a stiff brush paying particular attention to small closed loops such as A and 8.

- 3.5 Inspect the ink ribbon for wear, and renew the ribbon if necessary.

- 3.6 Remove the covers from the keyboard transmitter and tape reader transmitter. Inspect the transmitter and send/receive contacts and reface them as necessary. If the contacts are badly pitted it is recommended that they be renewed.

- 3.7 Implement the Short Term lubrication instructions of Section B. Wipe off all traces of superfluous lubricant with a clean cloth, ensuring that the platen, platen rollers, ribbon guides and all tape guides are clean and dry. Particular attention should be paid to the transmitter and send/receive contacts to ensure that oil or other foreign matter is not present. Fit the covers to the keyboard transmitter and tape reader transmitter.

Governed Motor Fig. 3.1

- 3.8 Remove the motor unit from the machine main base, take off the unit cover, the brush and slip ring cover and the unit base plate (Part 5).

- 3.9 Inspect the motor brushes as follows.

- (a) Lift the retaining arm and withdraw the brush.
- (b) Brush out all carbon dust from the brush boxes and surrounding area.
- (c) Measure the brushes for length and renew them if the length is less than 0.7 inch.
- (d) Fit the brushes and retain them by the retention arm.
- (e) Ensure that the pigtails are properly connected to the appropriate terminals.

NOTE It is important that brushes manufactured from different materials are not mixed on the same armature. To ensure that this does not occur check that the reference numbers etched on the brushes are identical.

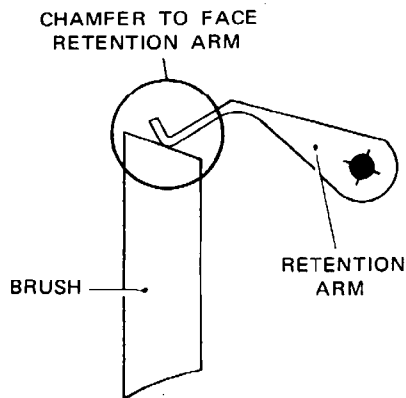


Fig. 3.1 MOTOR BRUSH RENEWAL

3.10 Inspect the governor brushes as follows.

- (a) Remove the two retaining springs.
- (b) Lift out the two brush arms.
- (c) Brush out all carbon dust from the vicinity of the brush seatings.
- (d) If necessary fit new brushes.
- (e) Fit the brush arms and the retaining springs.
- (f) Ensure that the pigtails are properly connected to the appropriate connections.

3.11 Using a stiff brush, remove all carbon dust from the slots between the commutator segments. Clean the surface of the commutator with a soft dry cloth. Do not attempt to remove the smooth black glaze on the surface, as this indicates a healthy condition and is important for good commutation.

3.12 Fit the unit base plate and the brush and slip ring cover.

3.13 Remove the cover from the components panel. Inspect the on-speed relay contacts and reface them as necessary. Ensure that the contacts and surrounding area are clean and free from carbon dust.

3.14 Fit the components panel cover.

3.15 Fit the motor top cover.

3.16 Assemble the motor unit to the machine main base.

3.17 Assemble the machine to the main base tray.

3.18 Engage the power and signal plugs with their external sockets.

3.19 Depress any key on the keyboard to start the motor, and check the motor speed (Part 4, Section 2).

3.20 Test the operation of all keys and special facilities (as answer-back, two colour print, tape reader and tape punch). If any character fails to print or any facility fails to operate correctly, inspect the relevant parts and ensure that their adjustments conform to the instructions in Part 4.

4. OVERHAUL

When the machine has been in operation for the long term period stated in Table 1, carry out the following overhaul.

4.1 Dismantle the machine according to the instructions in Part 5, Section A.

4.2 Overhaul the individual units as follows.

- (a) Dismantle the unit according to the instructions in Part 5, Section B. Discard all lubricating felts and circlips as they are removed.
- (b) Where appropriate check the main camshaft and individual unit bearings for roughness and end play. Renew them where necessary.
- (c) Inspect all electrical contacts and polish or renew them as necessary.
- (d) Examine all wiring for faulty insulation and re-terminate or renew the cableforms as necessary.
- (e) Using white spirit and a dry cloth or soft brush, remove all traces of dirt or old lubricant from the remainder of the dismantled parts. Examine thoroughly all working components for wear and damage, and renew them as necessary.

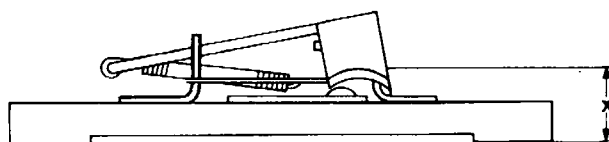
NOTE Oil impregnated components that have been treated with white spirit must be re-soaked in lubricant before assembly. The method to be adopted is as follows.

- (1) Soak the components for 15 minutes in a bath of Creed Lubricant No. 9 heated to 110°C , then quickly transfer them to a bath of similar but cold lubricant for a further 15 minutes.
- (2) Where facilities for the above procedure are unobtainable, the components should be immersed in cold lubricant (Creed No. 9) for a period of not less than 24 hours.

Synchronous Motor Fig. 3.2

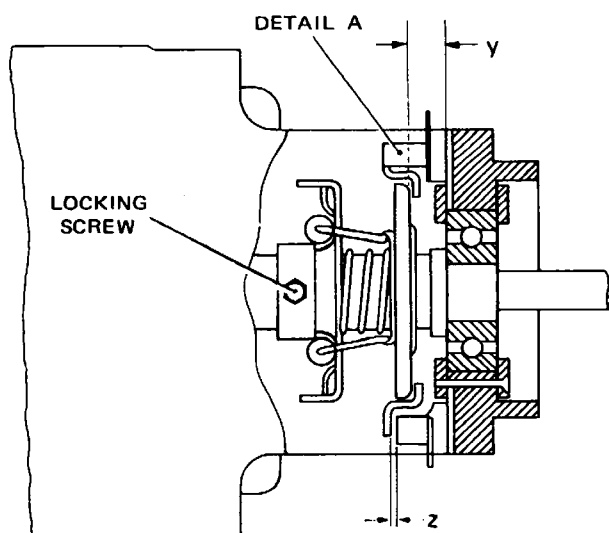
4.3 Check the correct functioning of the start contacts as follows.

- (a) Remove the securing screw and nuts, and withdraw the start contacts (upper set) and on-speed contacts (lower set).
- (b) Using a rule, check each assembly to ensure that dimension x is 0.3 ± 0.015 inch when the switch just operates.



Dimension x = 0.3 ± 0.015 inch

DETAIL A



Dimension y = $\frac{1}{4}$ inch

Dimension z = 0.010 inch minimum

Fig. 3.2 START SWITCH SETTING

- (c) Check the position of the switch actuator mechanism on the shaft and ensure that dimension y is $\frac{1}{4}$ inch. If necessary slacken the locking screw and adjust.
- (d) Fit the start contacts and on-speed contacts.
- (e) Ensure that dimension z is not less than 0.010 inch.
- (f) Connect a suitable power supply to the motor and ensure that the motor starts and the start switch blade operates smartly at approximately 75% full speed. Check that the plastic disc rotates clear of the switch lever when at full speed.
- (g) Disconnect the power supply and check that the start switch blade returns to the reset position just before the armature stops.

Governed Motor

4.4 Examine the surface of the commutator for wear or pitting and if necessary reface it as follows.

- (a) Mount the armature between centres of a lathe, skim the commutator surface with a knife edge tool taking care to remove only sufficient metal as is necessary to clean up the surface. The minimum diameter to which the commutator may be reduced is 1.25 inch.
- (b) Remove all burrs from the commutator slots.
- (c) Check that the mica between the segments is 0.025 inch below the surface of the commutator and that this depth extends over the whole width of the brush track. Undercut each slot that does not meet this requirement and then carefully remove all insulating material from the sides of any slot so treated.
- (d) If necessary polish the surface with very fine glasspaper (do not use emery paper).
- (e) If necessary renew the motor and governor brushes.
- (f) Inspect the governor contacts for pitting and renew them if necessary.
- (g) Ensure that the motor unit is clean and free from carbon dust. After assembly of the unit check the motor speed according to the instructions in Part 4, Section 2.

SECTION B – LUBRICATION INSTRUCTIONS

1. INTRODUCTION

Correct and regular lubrication of the Model 444 Teleprinter will ensure maximum reliability and component life. The periods of operations between which the machine should be lubricated are stated in Section A. Described below are the lubricants used and their points of application. The illustrations included at the end of this section show oil holes, felts and other components that require correct lubrication for trouble free running.

Lubricant	Point of Application
Creed No. 9 oil	Felt pads and washers
	Oil holes
	Pins and pivots
	Lightly loaded working surfaces
Creed No. 7 grease	Gears
	Heavily loaded working surfaces
	Spring anchors.

2. AFTER INSTALLATION

The machine is lubricated on initial assembly, but a long period in storage or subjection to heat or vibration during transit may result in the drying out of lubricant on some bearing surfaces. For this reason the machine should be inspected after installation to ensure that adequate lubricant is present. If necessary lubricate the machine according to the Short Term instructions.

5. LONG TERM LUBRICATION

After the long term period of operation apply lubricant according to the short term instructions and additionally as specified below.

Lubricant	Point of Application
Creed No. 7 grease	Needle roller bearings fitted to:
	Print bail assembly
	Transmitter unit camshaft
	Main camshaft
	Tape punch – feed lever assembly
	Tape punch – clutch and punch lever assembly
	Tape punch – drive arm assembly
	Thrust race fitted to:
	Feed unit camshaft
	Transfer unit camshaft

3. SPECIFIED LUBRICANTS

Two types of lubricant are used throughout the machine. These are as follows.

Creed No. 7 (TA 1331) – A soft Lithium-based grease

Equivalents:

Shell Alvania No. 1

Castrol Spheerol AP. 1

Creed No. 9 (TA 1333) – A thin deodorized oil for general use

Equivalent:

Shell Tellus T127 with
0.15% by weight of
Givaudin Deodall No. 1

4. SHORT TERM LUBRICATION

After the short term period of operation apply lubricant to all parts of the machine as follows.

NOTE After completion of lubrication, use a clean dry cloth to remove any superfluous lubricant. In particular, ensure that the transmitter contacts, electro-magnet pole faces, platen, platen pressure rollers, ribbon guides and all tape guides are uncontaminated and are clean and dry.

TABLE 2 KEY TO LUBRICATION SYMBOLS

3.3

No. 7 grease on gears



No. 7 grease on spring anchors



No. 9 oil on cams



No. 9 oil on felts



No. 9 oil on working surfaces



No. 9 oil in oil holes



No. 9 oil on pins and pivots



No. 7 grease on working surfaces

LUBRICATE SPARINGLY
IN THIS AREA TO AVOID
CONTAMINATING THE
ELECTROMAGNET

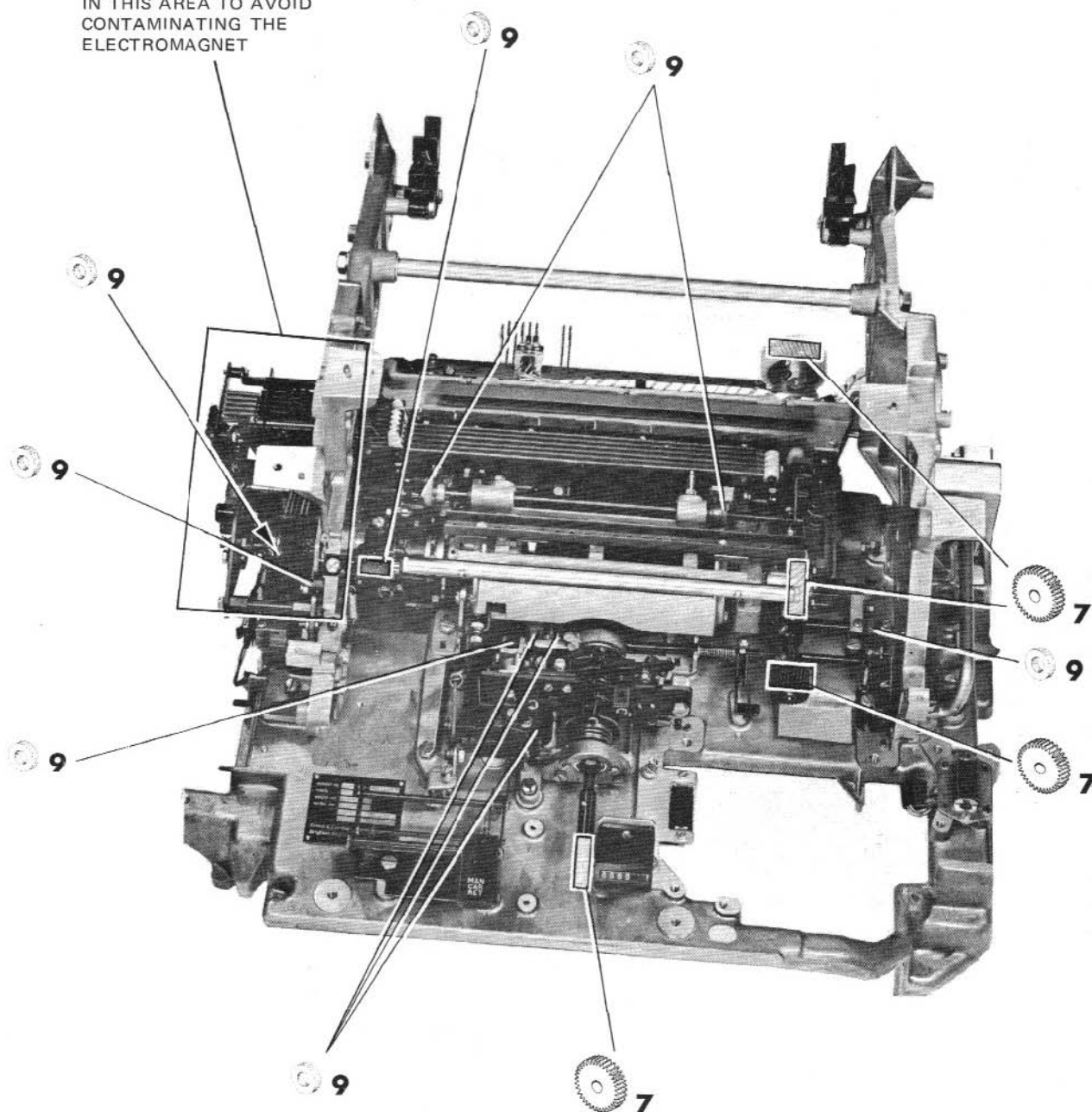


Fig. 3.3 MACHINE BASIC ASSEMBLY

3.4

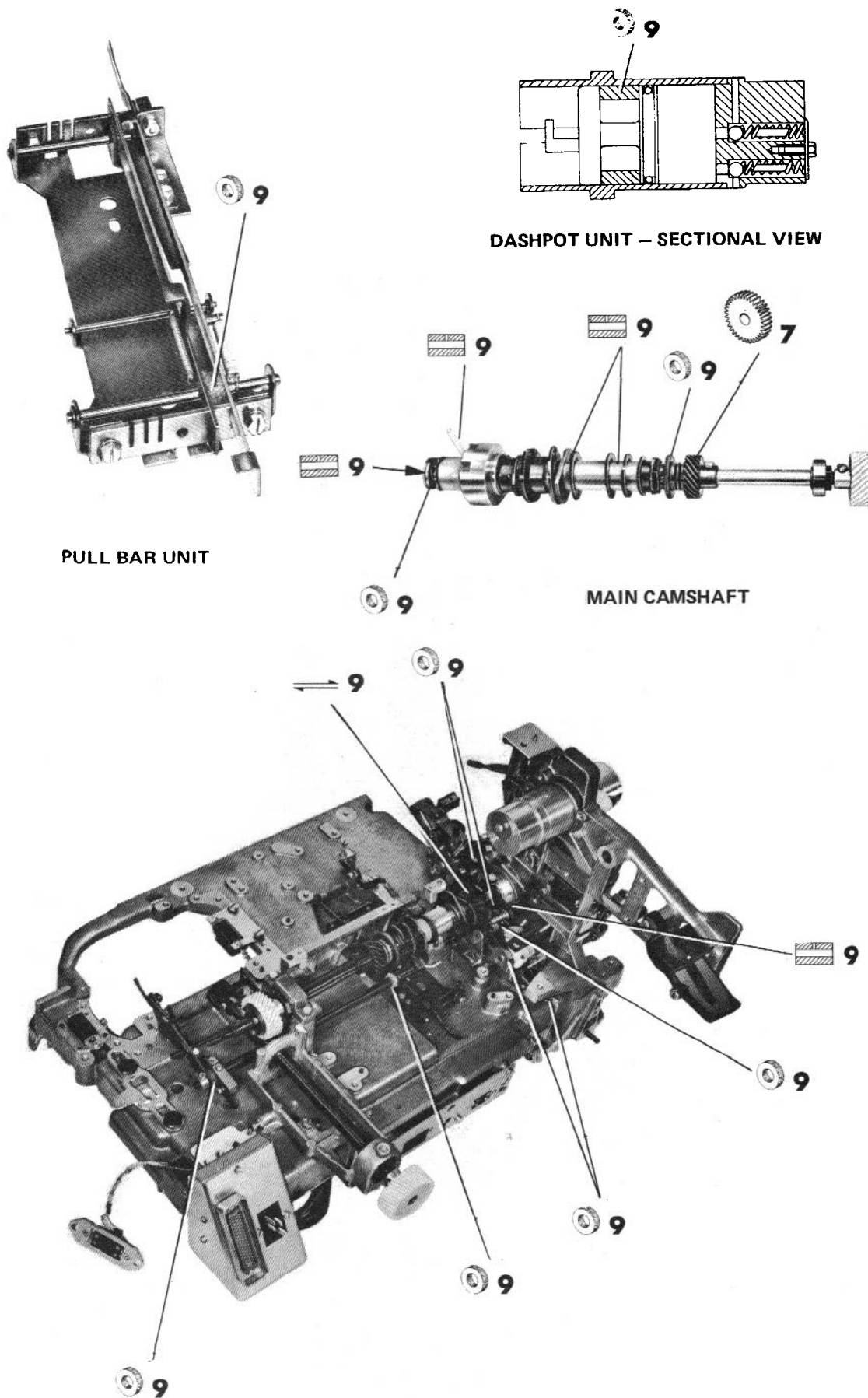


Fig. 3.4 MAIN BASE

3.5

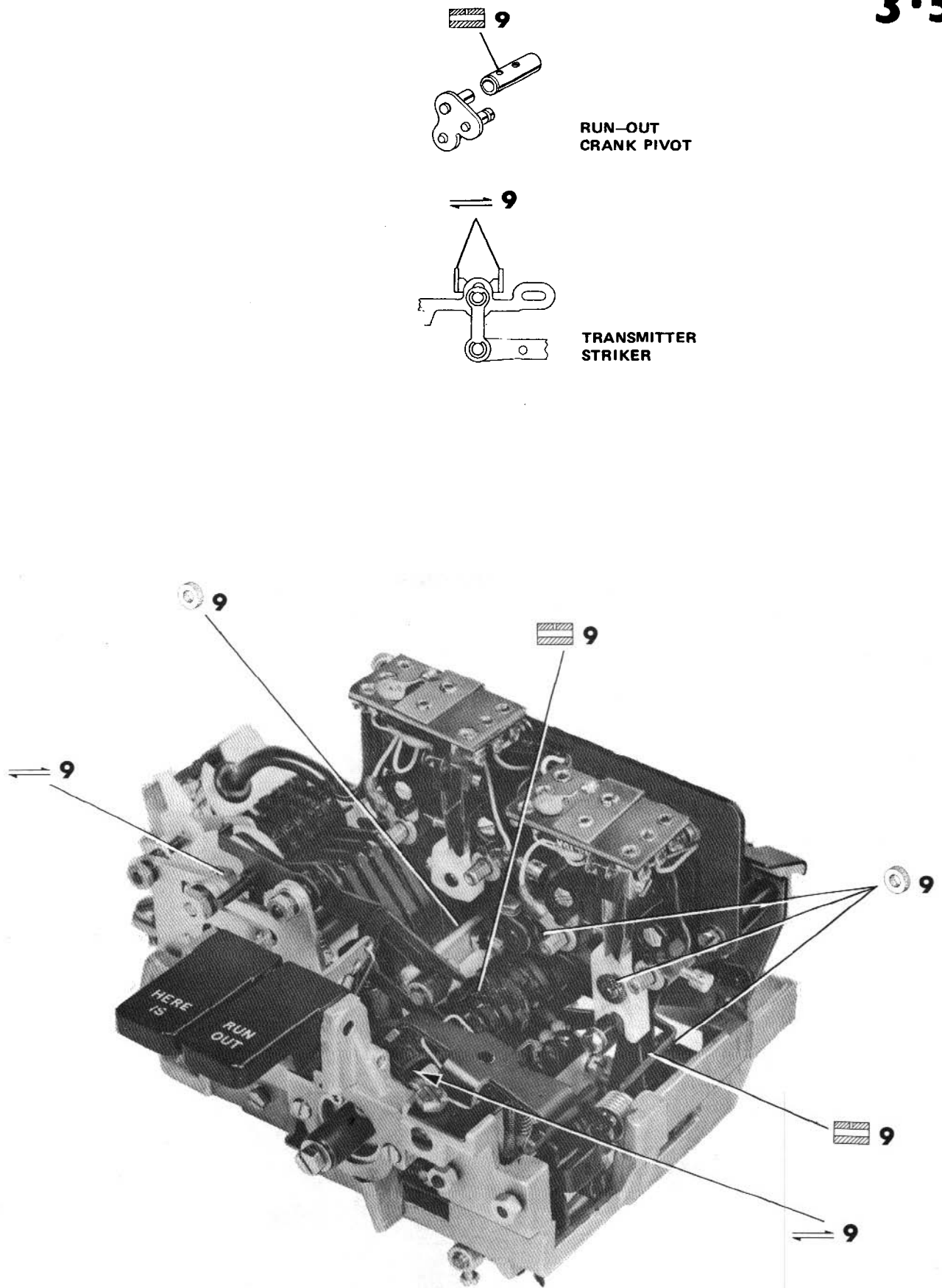


Fig. 3.5 TRANSMITTER UNIT

3.6

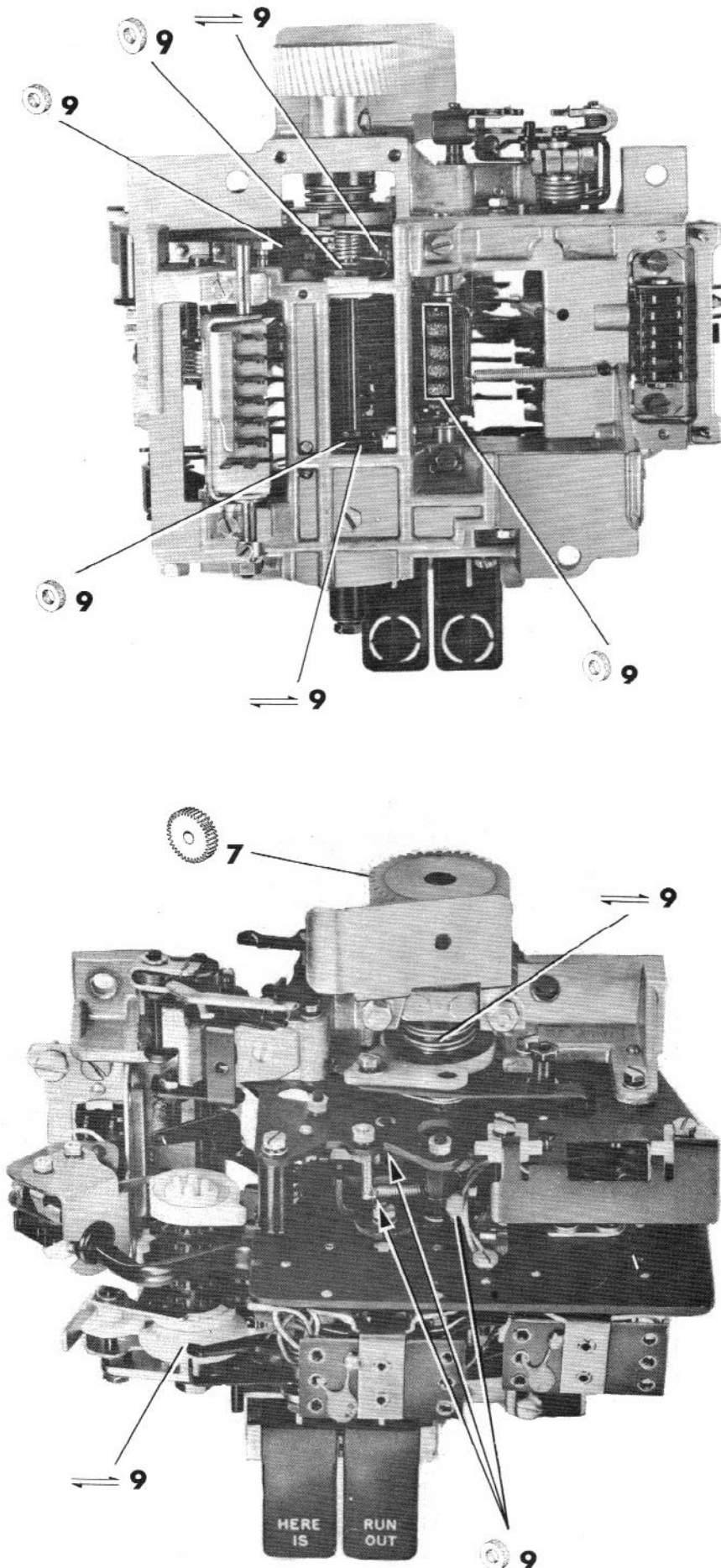


Fig. 3.6 TRANSMITTER UNIT

3.7

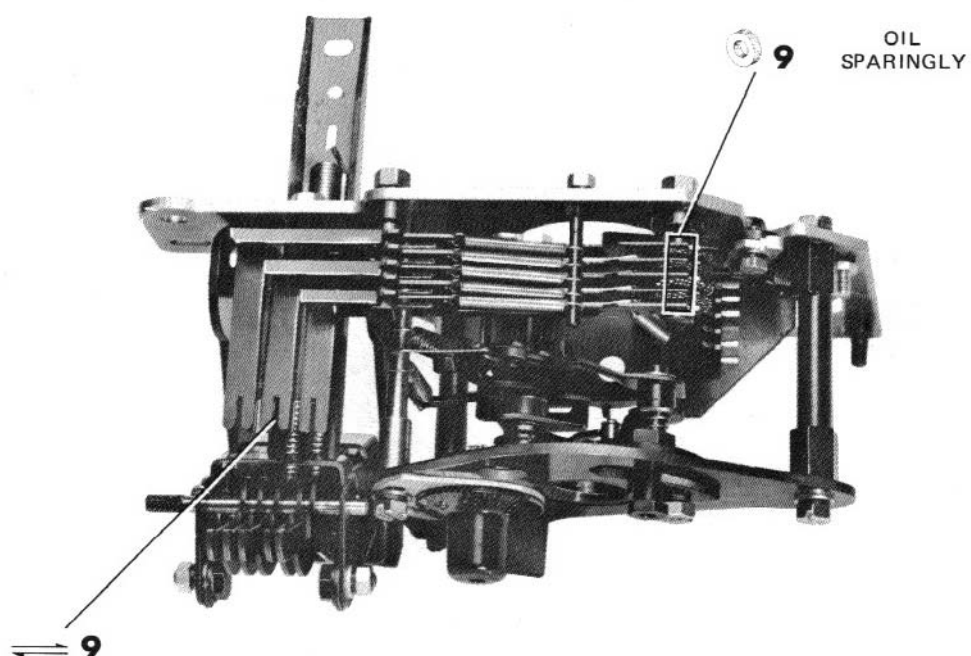
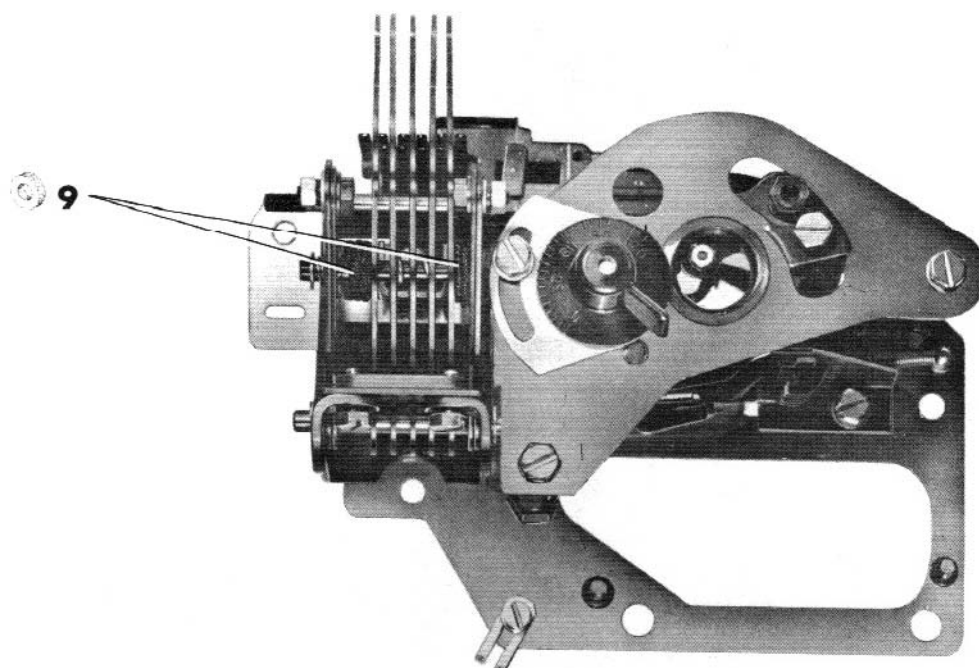


Fig. 3.7 SELECTOR UNIT

3.8
3.9

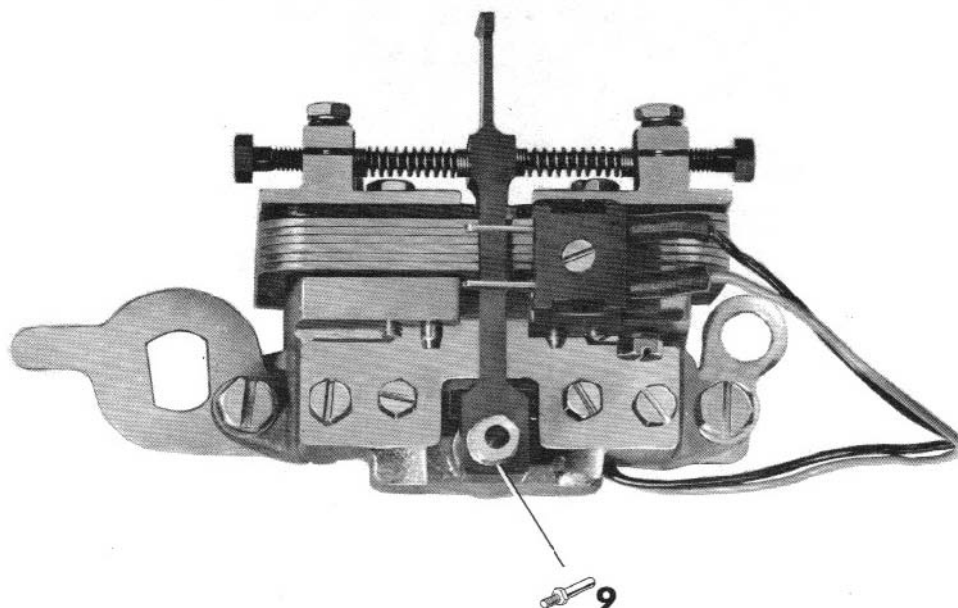


Fig. 3.8 ELECTROMAGNET UNIT

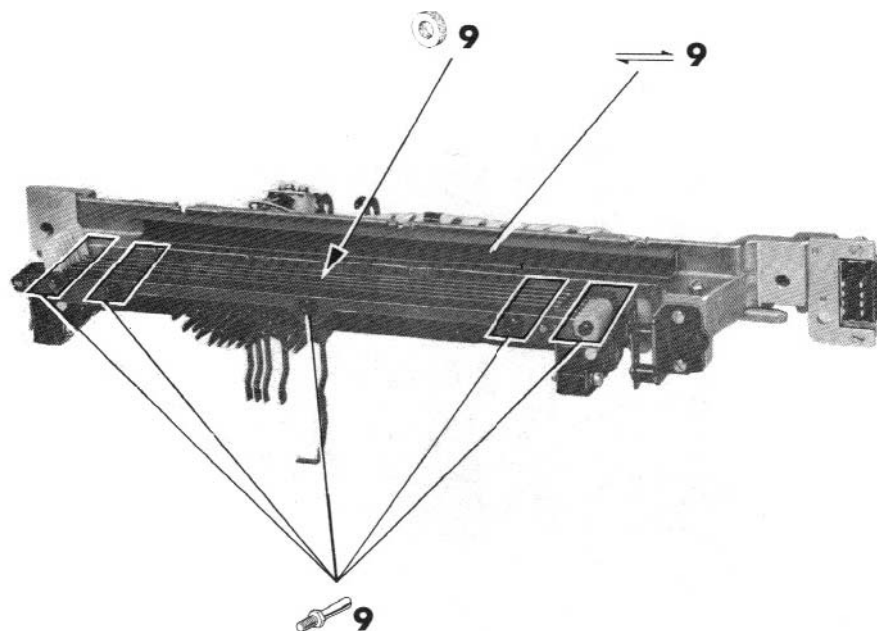
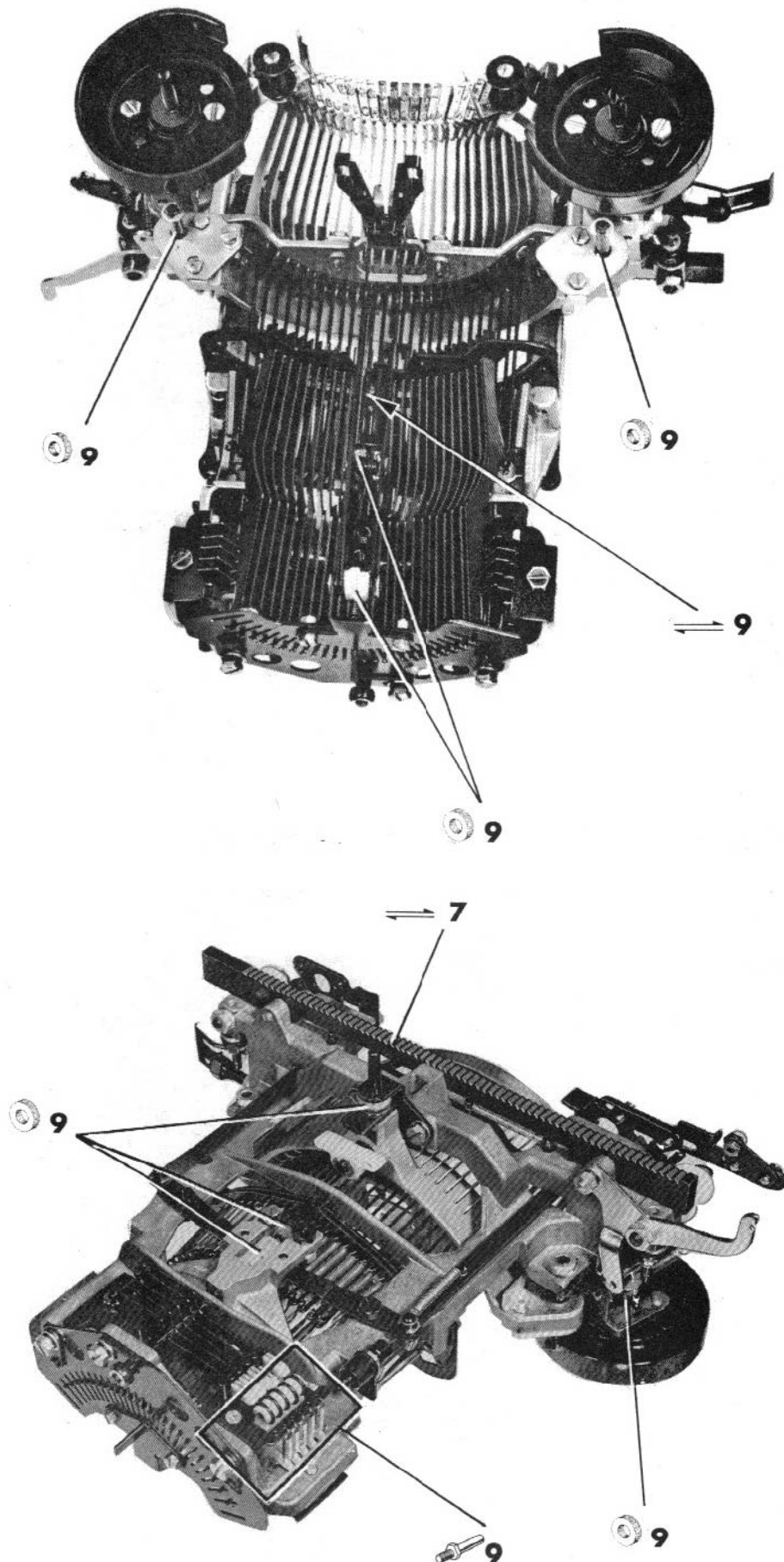


Fig. 3.9 CODE CONTROL UNIT

3·10**Fig. 3.10 TYPE CARRIAGE AND RIBBON UNIT**

3.11

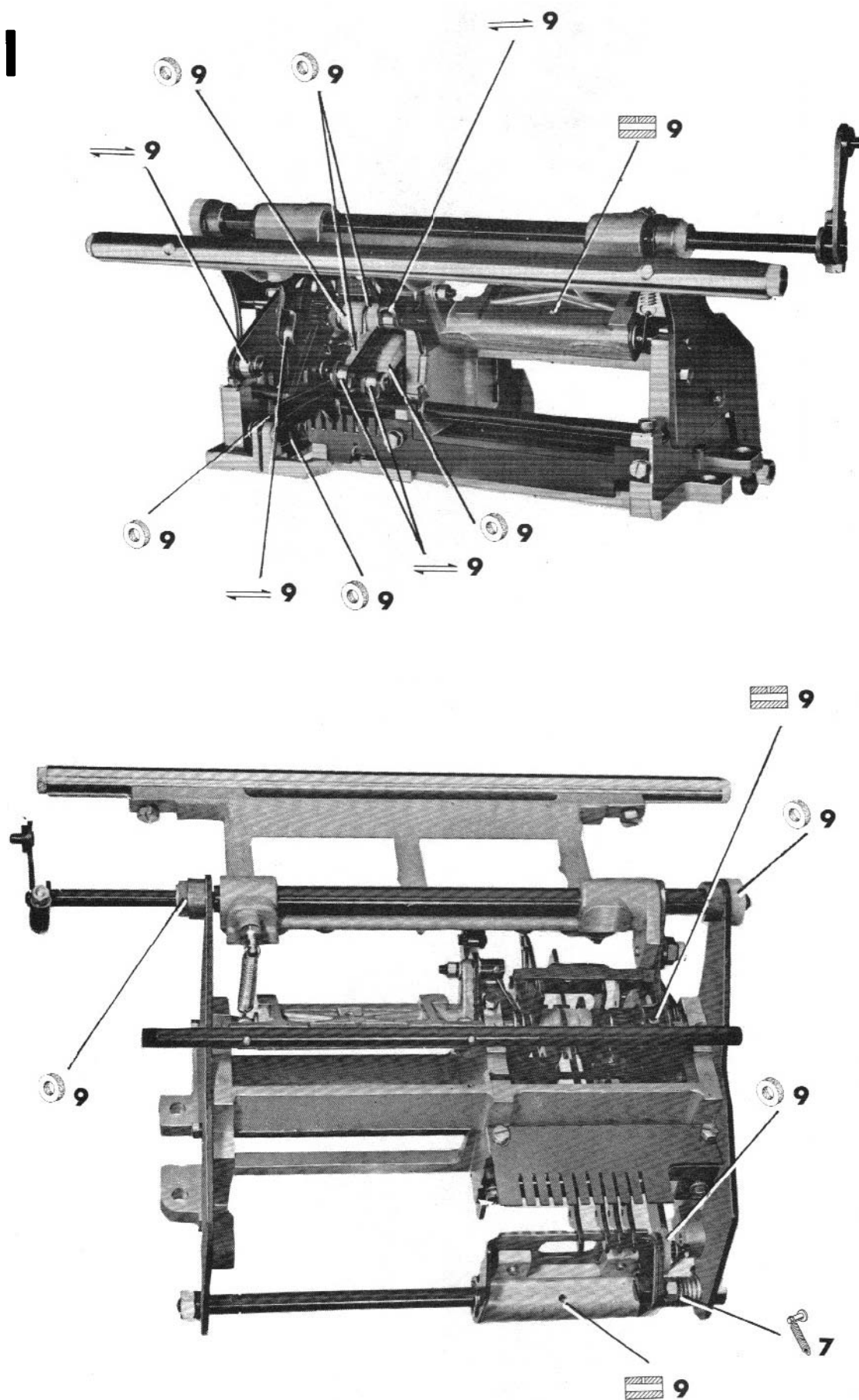
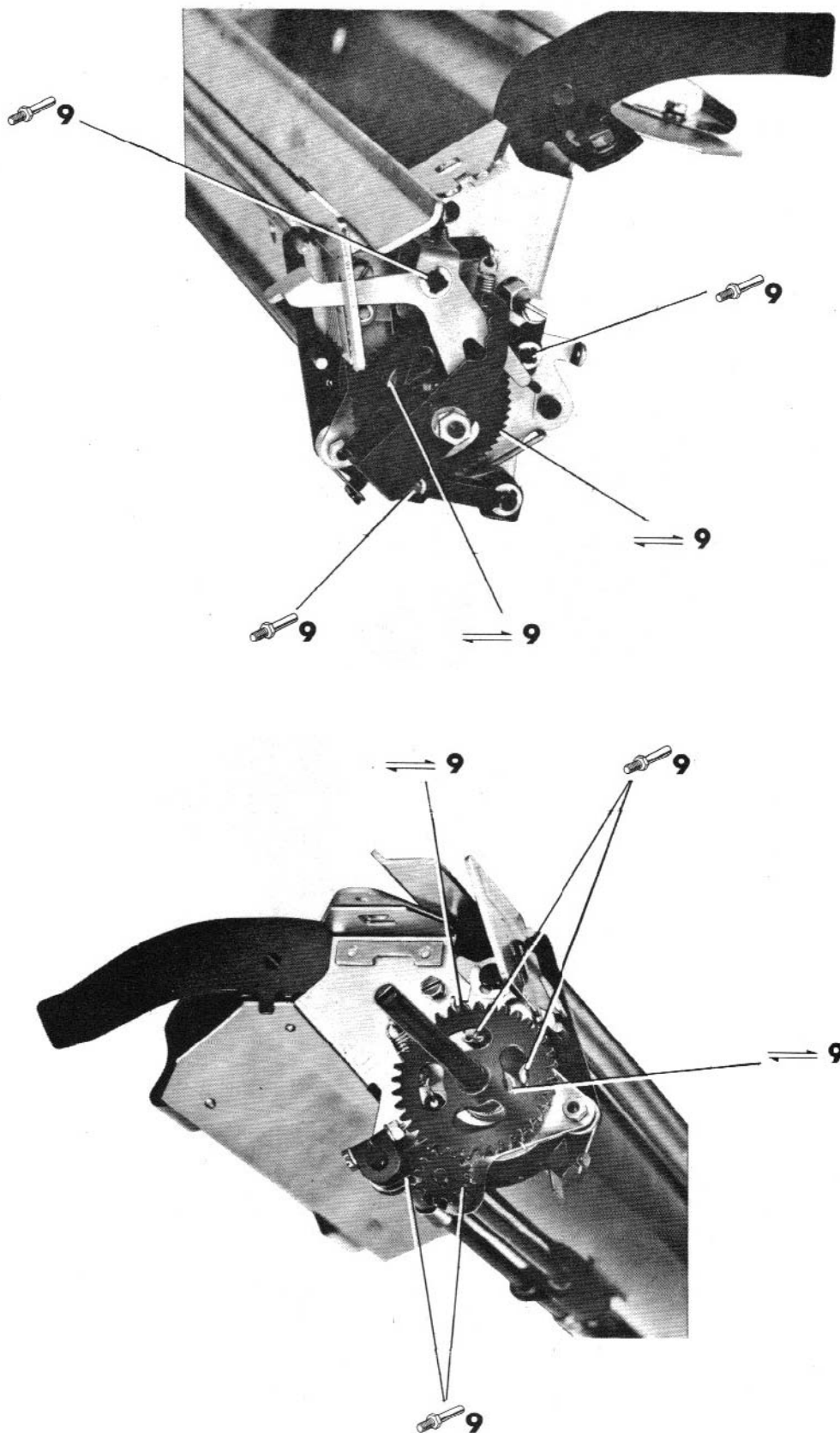


Fig. 3.11 FUNCTION UNIT

3.12**Fig. 3.12 PLATEN UNIT**

3.13

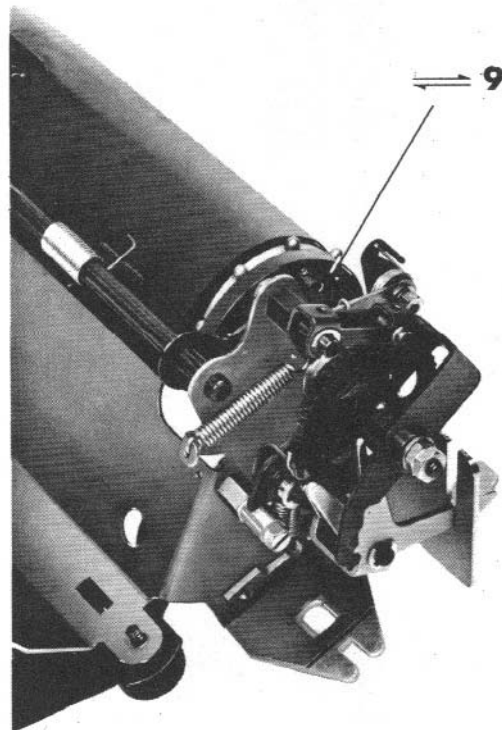
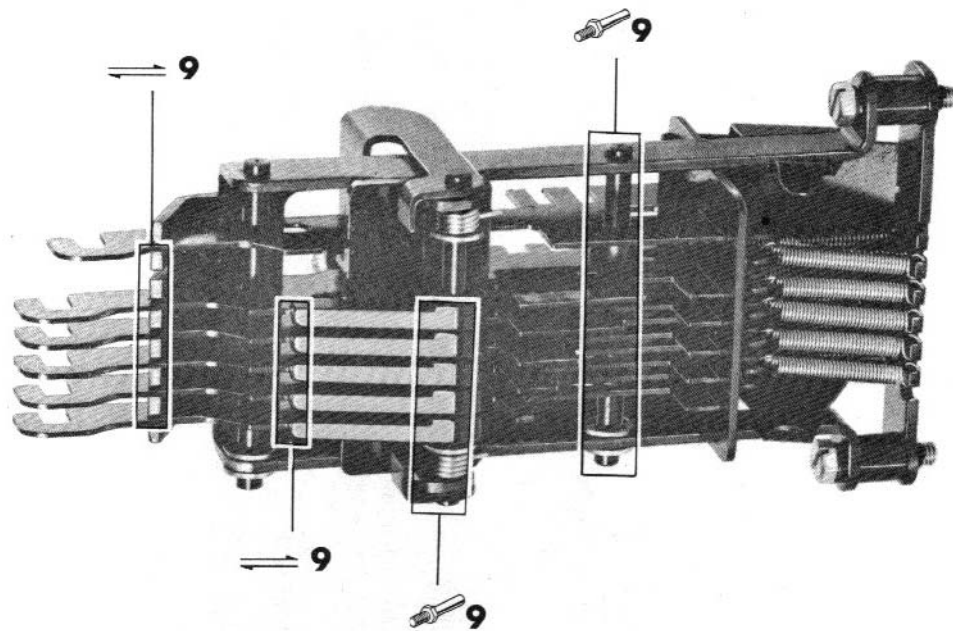
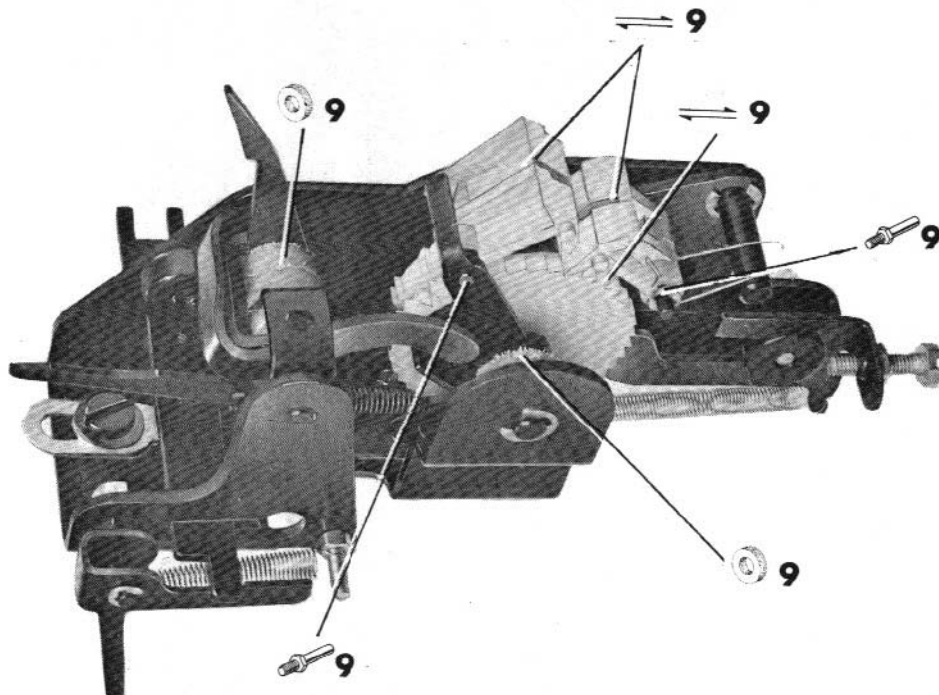


Fig. 3.13 ADDITIONAL LUBRICATION – SPROCKET PLATEN

3-14
3-15**Fig. 3.14 LINK UNIT****Fig. 3.15 MOTOR CONTROL SWITCH**

3-16

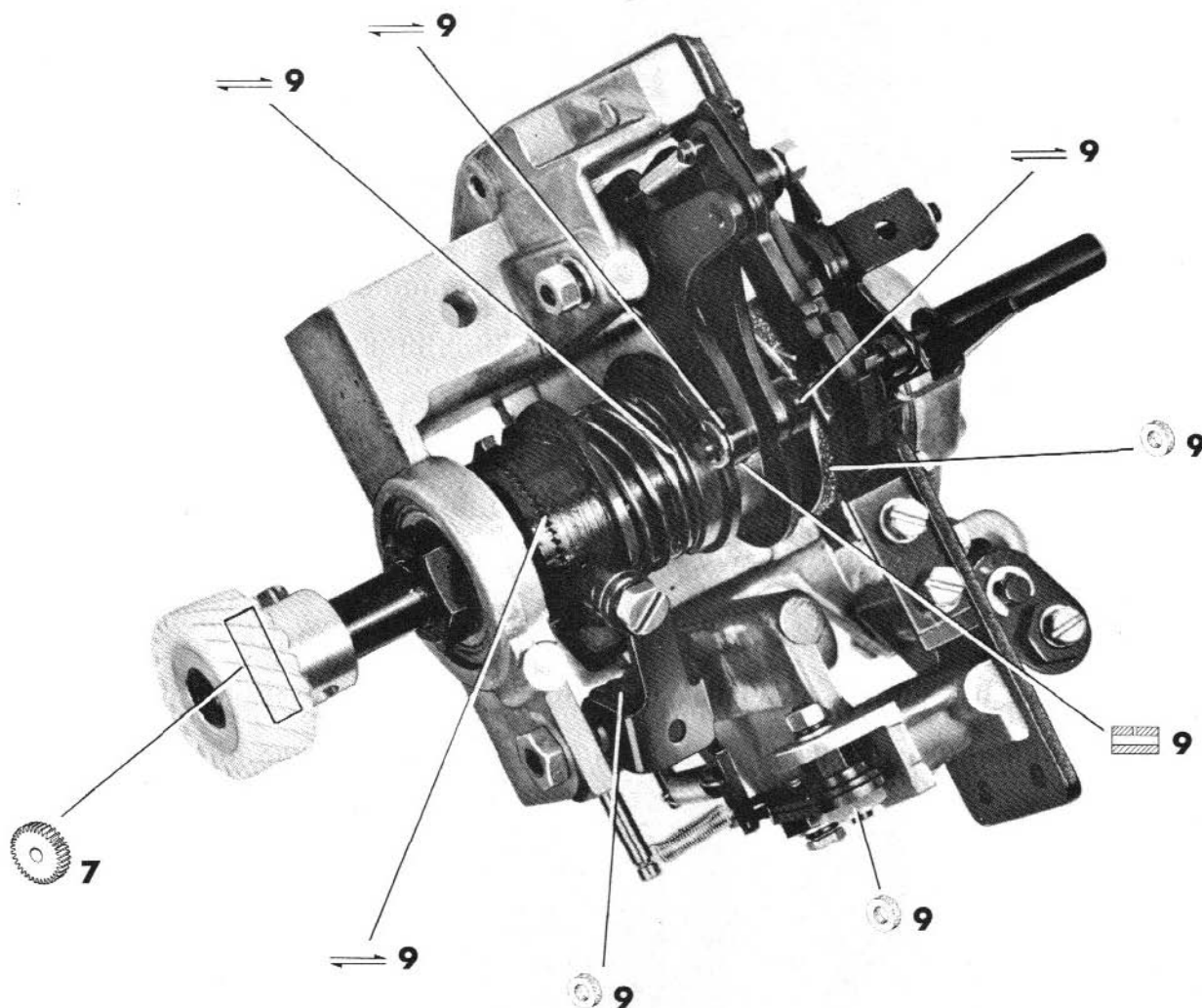


Fig. 3.16 FEED UNIT

3.17

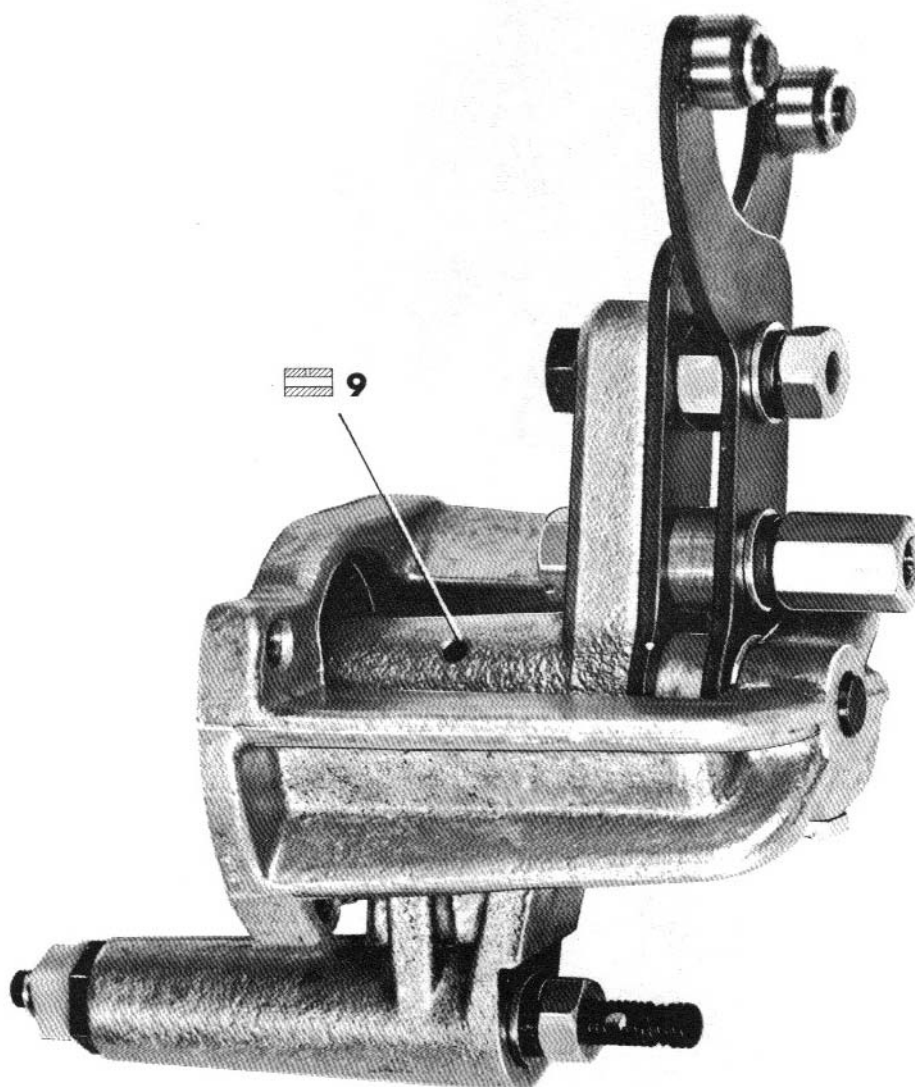


Fig. 3.17 PUNCH DRIVE ARM

3.18

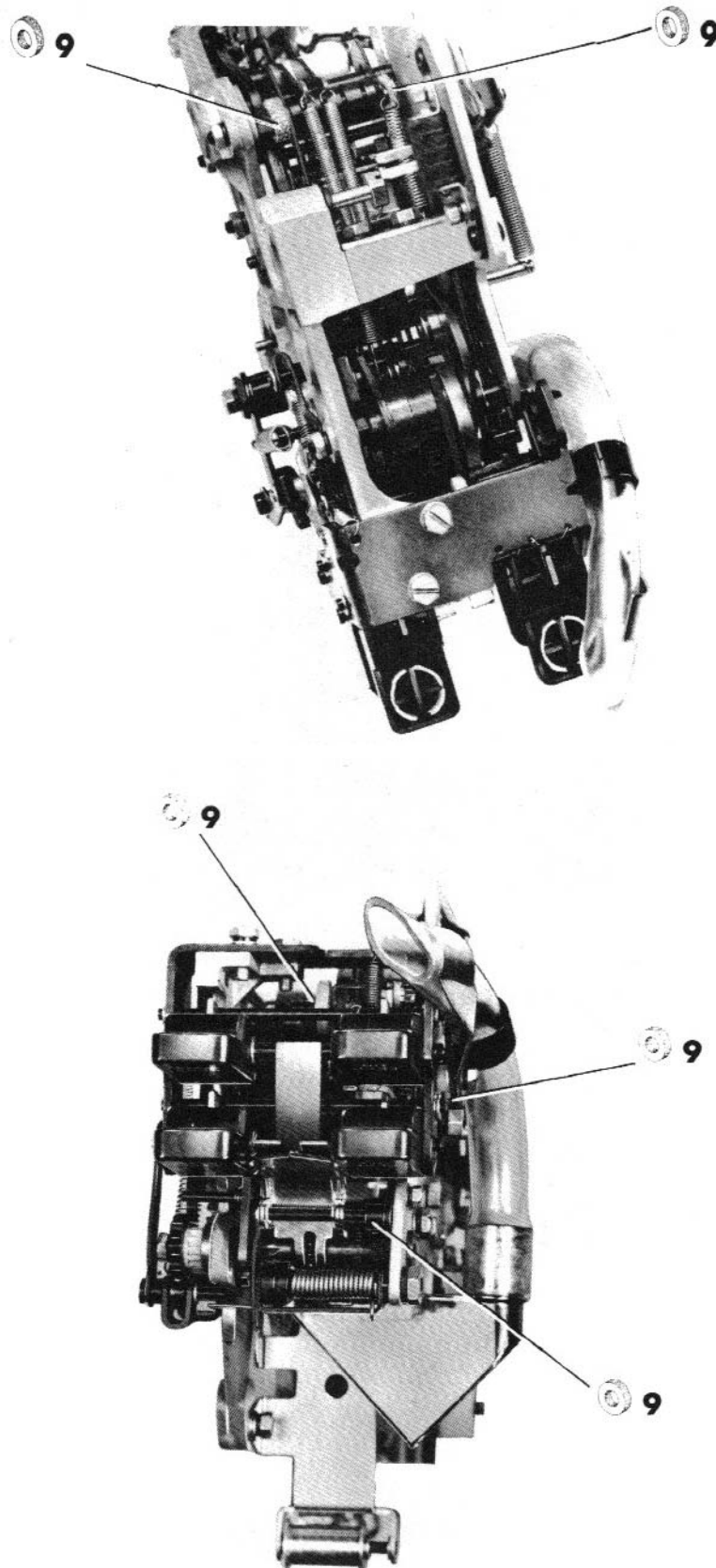
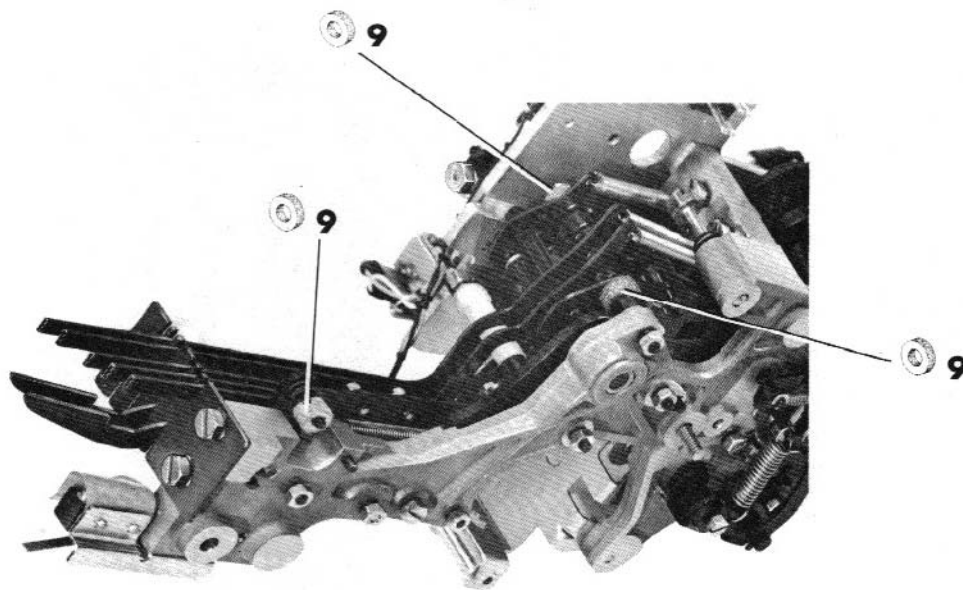
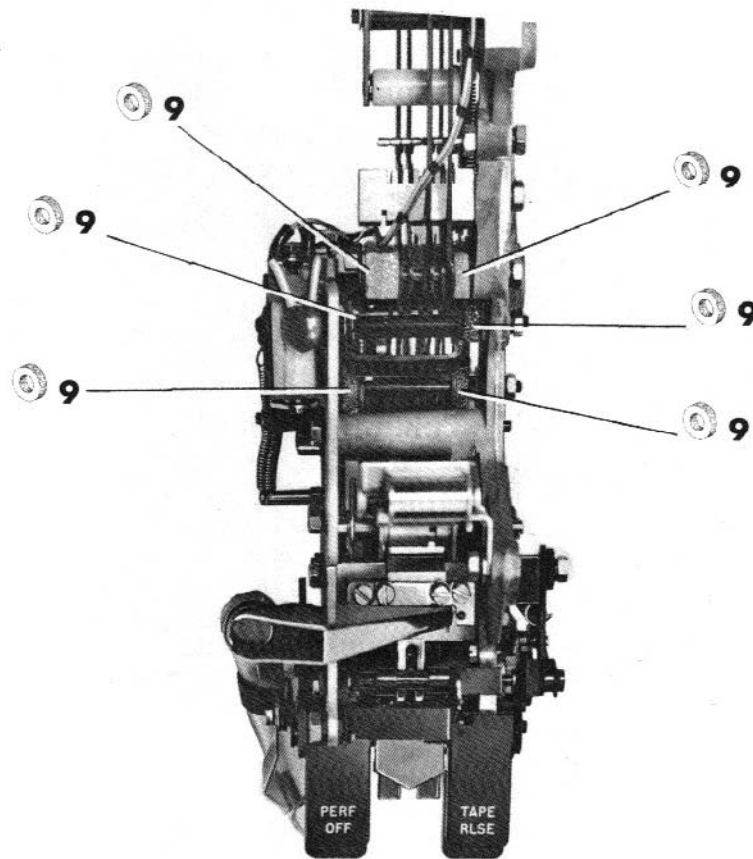


Fig. 3.18 PUNCH UNIT

3.19**Fig. 3.19 PUNCH UNIT**

3.20

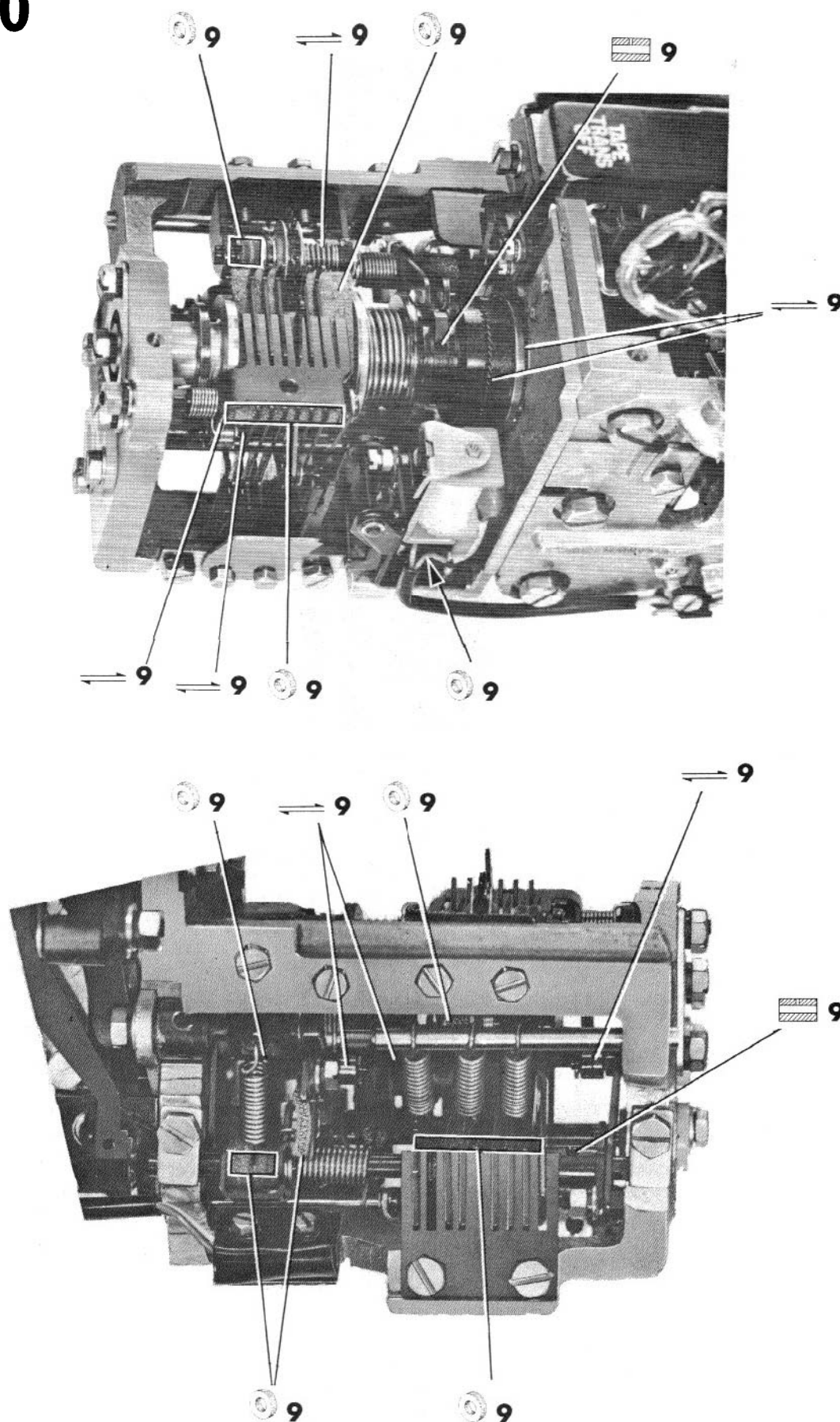


Fig. 3.20 TAPE READER UNIT

3.21

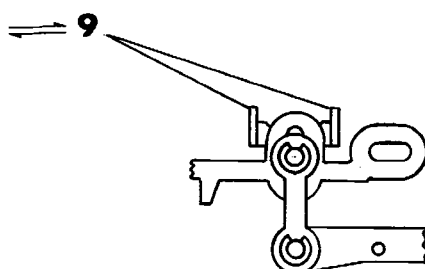
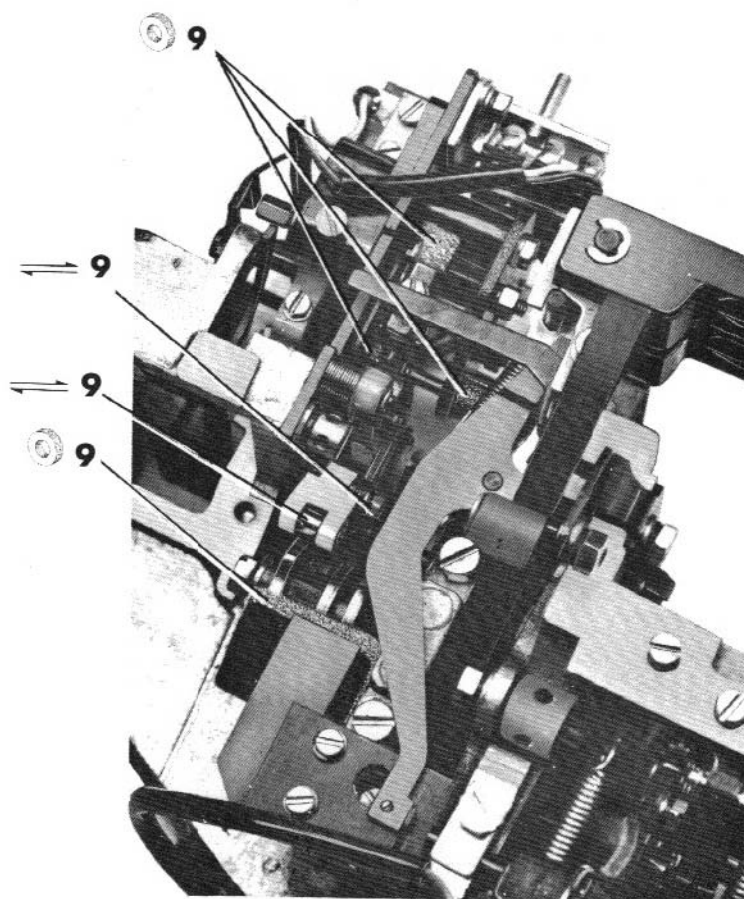


Fig. 3.21 TAPE READER UNIT

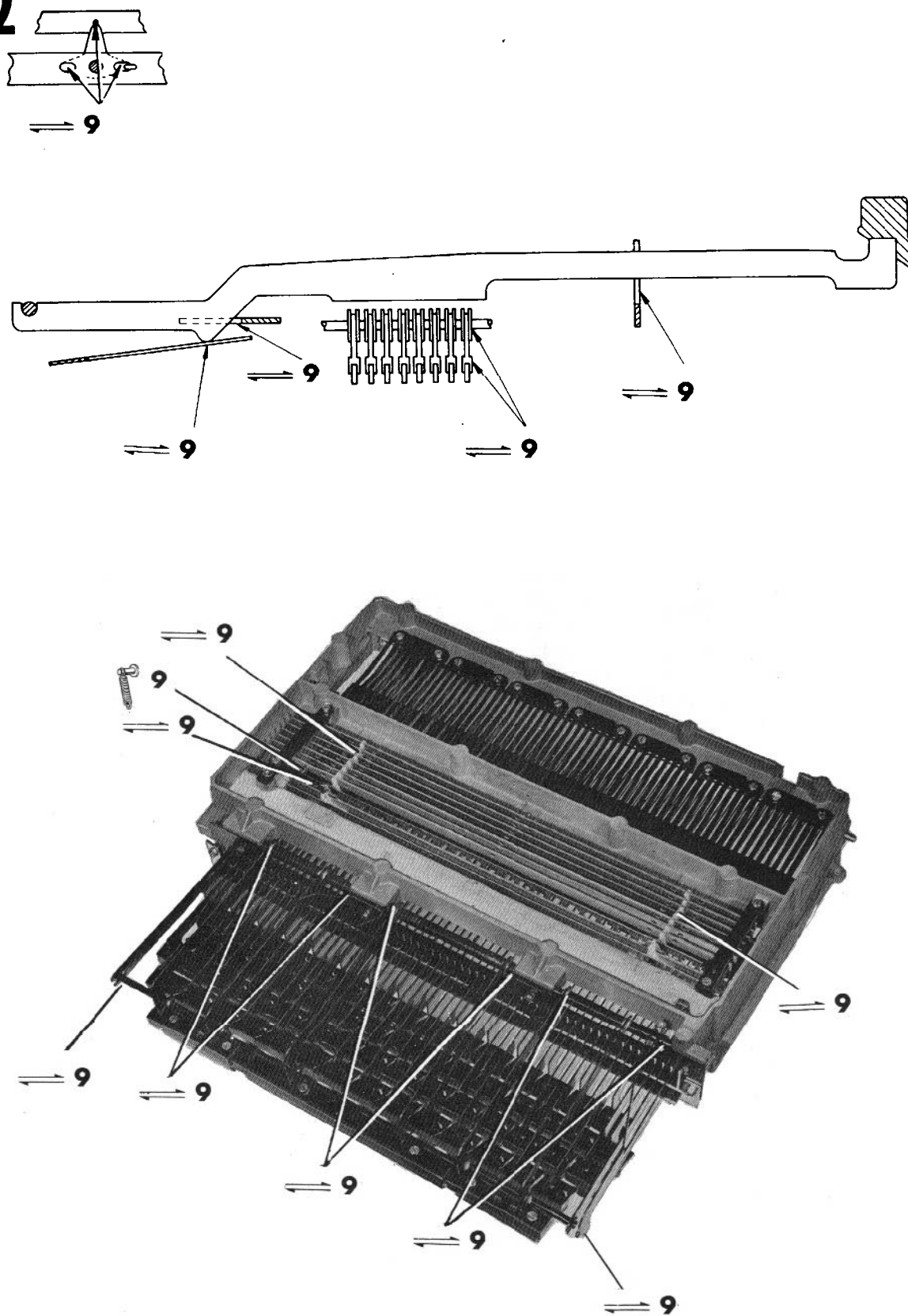
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Fig. 3.22 KEYBOARD UNIT