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Colin Hinson
In the village of Blunham, Bedfordshire.

REPERFORATING ATTACHMENT

(Nos. 7 and 54 Teleprinters)

MAINTENANCE INSTRUCTIONS

(Issued..... April, 1959)

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INTRODUCTION

This second edition of Instruction Book R/5 contains full adjustment, dismantling and assembling, spring tension and lubrication instructions for reperforating attachments fitted to No. 7 and No. 54 teleprinters with either 'N' or 'CT' keyboards.

These maintenance instructions should be used in conjunction with Booklets 78 or 54 (for the No. 7 or No. 54 teleprinter receivers) and Booklets 47K or CTK/78 (for the 'N' or 'CT' keyboards).

For a detailed technical description of the Reperforating Attachment reference should be made to Bulletin 26 (December, 1954).

HOW TO USE THIS BOOK

This book contains, in effect, two maintenance schedules, one for 'short-term' maintenance visits and one for 'long-term' major overhauls.

To avoid extensive repetition the shortened version of these schedules has been given in Part I of the book, the common material being placed in Part II. This material is called for in the schedules, when required, by cross-references.

Thus, whether you have to carry out a routine maintenance check or a major overhaul, read the appropriate section in Part I. You will find that any information in Part II that you need will be called for at the proper time.

PART I

MAINTENANCE INSTRUCTIONS

A. AFTER EACH 300 HOURS OF OPERATION

1. Cleaning and Lubrication

1.1 Remove all visible dust and loose paper chads from the machine.

1.2 Carry out the appropriate section of the lubrication instructions on page 20. Remove all surplus oil and grease.

2. Adjustments

2.1 Carry out the 'asterisked' checks of the adjustment instructions on pages 6 to 13.

2.2 In addition to 2.1, check the following points:–

(a) That the five selector bars and the push rod move freely and return smoothly.

(b) That the force to completely return each selector is less than 2½ ozs. (71 gms.).

(c) That the force to completely return the trip plunger is less than 3½ ozs. (99 gms.).

(d) That the force to just move the selector bars, measured at the ends of selector levers N, Fig. 4, is 3½ - 5 ozs. (99-142 gms.).

(e) That the force to just move the push rod N, Fig. 2, measured at the face of trip lever E, Fig. 4, is 6 - 7½ ozs. (170-213 gms.).

2.3 If necessary, lubricate the parts indicated in 2.2. Adjust the spring tensions as required.

3. Punches and Die Plates

3.1 Perforate a length of tape and examine the feed and code holes. If they are ragged, remove the punches from the punch block as described in section 6 of the dismantling and assembling instructions on page 16.

N.B.: When removing the punches from the punch block, note their relative positions so that they may be replaced in the channels from which they were removed.

3.2 Insert the punches, individually, into a lapping block (TA.1056, as provided in the tool kit). Keeping a careful check on the length of the punches, sharpen them on a fine stone until a keen edge is restored.

3.3 Examine the condition of the die plates and replace them if they are badly worn.

3.4 Re-assemble the punch block head by following the dismantling and assembling instructions in the reverse order. Ensure that the recesses of the punches are correctly engaged with the punch withdrawing bracket. Check adjustments 6 and 25 on pages 7 and 13 respectively.

4. Feed Hole Pitch

4.1 Perforate a length of tape and check the pitch of the feed holes over a minimum length of ten inches. The pitch should remain constant over this length within a tolerance of half a feed hole pitch.

4.2 If necessary, adjust the machine as described in adjustment 27 (page 13) to correct the pitch within the required limits.

B. AFTER EACH 3,600 HOURS OF OPERATION

5. Cleaning and Checking

5.1 Remove all the perforating attachments and dismantle them. Thoroughly clean with petrol or white spirit.

5.2 Carefully check each unit for wear, paying special attention to the condition of the punches and die plates. Sharpen the punches if necessary, and replace the die plates if badly worn.

6. Lubrication and Adjustment

6.1 Re-assemble the attachment and lubricate it in accordance with the instructions on page 20, taking care, while the units are still dismantled, to lubricate those points which are inaccessible when the whole machine is assembled.

6.2 Adjust the machine in accordance with the adjustment instructions on pages 6 to 13.

PART II

ADJUSTMENT INSTRUCTIONS

A. PERFORATOR UNIT

***1. Punch Block Vertical Play** (Fig. 15)

Check

1.1 Depress any key and turn the motor by hand, press down on the left-hand end of the punch block and check the clearance between roller A, Fig. 15, and cam D, throughout the half-revolution of cam D.

1.2 Depress the key again and repeat 1.1 for the other half-revolution. Roller A should not bind against the cam at any point, and the clearance between roller A and cam D should not be greater than .006 in. (.15 mm.) at any point.

Action

1.3 If either of the above conditions is not satisfied turn the cam D to its tightest point, i.e. to where the cam roller A is either binding against or is closest to cam D. Slacken capstan headed screw B and adjust eccentric C, until the clearance between the cam roller and the cam is an estimated .001 in. (.03 mm.). Tighten screw B.

2. Clutch Detents (Fig. 1)

Check

2.1 Remove the keyboard from the machine and remove the punch block unit from the keyboard. With pawl E, Fig. 1, resting against the vertical face of the right-hand detent F, check that the clearance between screw H and the tail of detent F, i.e. dimension 'a', is .022 - .028 in. (.56 - .71 mm.).

Action

2.2 If this is not so, slacken nut J and adjust screw H to obtain the required clearance. Tighten nut J.

Check

2.3 Repeat check 2.1 for left-hand detent B and screw R.

Action

2.4 If dimension 'a' is not satisfied, slacken clamp nut Q and adjust screw R to obtain the required condition. Tighten nut Q.

3. Retention Pawls (Figs. 2 and 3)

Check

3.1 Turn the camshaft by hand until pawl E, Fig. 3, engages with left-hand detent B. Continue to turn the camshaft against the tension of spring V until the tail of the pawl is pressed firmly against the cam.

3.2 Check that the clearance 'b' between the tail of the rear retention pawl and the cam is .002 - .004 in. (.05 - .10 mm.).

3.3 Turn the cam pawl E into engagement with detent F, Fig. 2, and repeat check 3.2 for the front retention pawl.

Action

3.4 If either of these checks is not satisfied, slacken nut L, Fig. 3, which clamps the two eccentrics, and adjust the eccentrics to give the required clearances, adjusting the rear eccentric first. Tighten clamping nut L.

4. Trip Adjusting Arm (Fig. 1)

Check

4.1 With the cam pawl E, Fig. 1, clear of the detents B and F, hold the right-hand extension of detent F against screw H, and the right-hand extension of detent B against the stop foot D in the adjustable plate on detent F.

4.2 Check that clearance 'c' between screw R and the left-hand extension of detent B is .002 - .007 in. (.05 - .18 mm.).

Action

4.3 If dimension 'c' is not satisfied, release screw K and, by means of eccentric G, adjust the plate to obtain the condition. Tighten screw K and replace the punch block unit on the keyboard.

5. Location of Punch Block Unit (Figs. 4 and 6)

Check

5.1 With the keyboard off the machine, move the front three selector bars H, J and K, Fig. 4, towards the left of the machine, by means of the selector levers N, and insert a pin P of .125 in. (3.18 mm.) diameter in the slots of the selector bars. Release the levers so that the pin is held by the bars against the anvil rack O.

5.2 Rotate the perforator cam until the punch block head is down. Check that the ends of the punches are seated fully on the ends of the selector anvils.

Action

5.3 If this is not so, slacken screw M, Fig. 6, and rotate eccentric N away from the punch block unit back plate. Release the unit fixing screws.

5.4 Adjust the position of the punch block unit so that the condition in 5.2 is obtained. Secure the unit in position with the fixing screws. Rotate eccentric N into contact with the punch block unit back plate and clamp the eccentric with screw M. Replace the keyboard on the machine.

6. Anvil Bracket Height and Punch Withdrawing Bracket (Figs. 6 and 7)

Check

6.1 With the cam pawl arrested by one of the detents, and with the punch block head held up as high as it will go to take up vertical play, check that the punches H, Fig. 6, can be moved upwards by an estimated .002 - .008 in. (.05 - .20 mm.) before they are arrested by the punch withdrawing bracket J.

N.B.: This check may best be made by means of a pair of tweezers, inserted through the 'window' of the withdrawing bracket from the left-hand end of the unit.

6.2 With the punch block head held fully up, check that a feeler gauge of .028 in. (.71 mm.) can be inserted between the lower ends of the punches and the top of the anvil block. Check that a feeler gauge of .044 in. (1.12 mm.) cannot be inserted.

N.B.: (1) If the punches have been re-ground, these dimensions should be reduced by the amount by which the punches have been shortened.

(2) The dimensions in paragraph 6.2 represent the permissible limits for dimension 'd' + 'e', Fig. 6. Dimension 'e' cannot be measured directly, as the punches yield on inserting the gauge.

Action

6.3 If either of the checks detailed in paragraphs 6.1 and 6.2 are not satisfied, release clamp screw K, Fig. 6. Hold the punch block up as high as it will go and turn eccentric L slowly clockwise until the punches are pulled down against the bottom guide plate by the punch withdrawing bracket J.

N.B.: Care should be taken not to force the punches down against the guide plate when eccentric L is turned.

6.4 Continue to hold the punch block up, and measure the clearance at 'e', noting its size.

6.5 If this is between .026 - .036 in. (.66 - .91 mm.) (see note (1) after paragraph 6.2 above), turn the eccentric L anti-clockwise until an extra .002 - .008 in. (.05 - .20 mm.) can be inserted at 'e'. Clamp eccentric L with screw K.

6.6 If the clearance 'e' is not between .026 - .036 in. (.66 - .91 mm.), turn eccentric L until the punch withdrawing bracket J is fully raised. Slacken screws N, Fig. 7, and remove the two screws E and plate M. Add or remove shims (part No. 1947/277) at D to make dimension 'e' as measured in paragraphs 6.3 and 6.4 correct. Replace M and clamp it with screws E. With the anvil bracket seating down on plate M, tighten screws N. Repeat the checks detailed in 6.3 and 6.4. If satisfactory, carry out adjustment 6.5.

***7. Tape Feed** (Fig. 5)

Check

7.1 With the retention lever B, Fig. 5, and the feed pawl T out of engagement with their respective wheels, check that the tape feed spindle spins freely.

Action

7.2 If this is not so, trace and remedy the cause of the tightness. Complete freedom of movement is essential.

Check

7.3 With the cam pawl arrested by one of the detents, and with the punch block in the normal rest position, check that the feeding face of feed pawl T nearly touches the bottom of a tooth in feed wheel A.

7.4 Repeat for all 16 teeth of the feed wheel, making sure that the retention roller B is fully home in the retention wheel at each tooth. It should be just possible to move the feed pawl away from the feed wheel without fouling the last tooth fed.

Action

7.5 If these conditions are not satisfied, release clamp screws O and position the feed pawl T to give the required condition. Tighten screws O.

Check

7.6 Release the cam detent and turn the perforator camshaft, by hand, until the punch block head is down. Check that feed pawl T falls into the next tooth sufficiently far to feed one tooth when the punch block is lifted.

Action

7.7 If this is not so, slacken nut P and adjust screw Q to obtain the required condition. Clamp screw Q with nut P.

Check

7.8 With perforated tape in the punch block, turn feed wheel A backwards until it is arrested by feed pawl T engaging in the last tooth fed. Release the wheel which should then return smartly under the influence of retention lever B. Repeat for all 16 teeth of the retention wheel.

Action

7.9 If the feed wheel does not return smartly on all 16 teeth, check the retention wheel tooth form and concentricity. Check also that the retention lever roller revolves when the retention wheel is rotated. Replace if necessary. Check the tension of spring PG.7074A.

***8. Back Space Key** (Fig. 5)

Check

8.1 Depress the back space key and check that the back space pawl engages the first tooth to the right of the centre line of the back space ratchet wheel A, Fig. 5, and feeds the wheel backwards one tooth.

Action

8.2 If this is not so, slacken the nut clamping eccentric E and turn the eccentric to adjust the height of the back space pawl so that, when the back space key is depressed, the pawl engages with the correct tooth. Tighten the clamping nut.

8.3 Slacken screw G and adjust the eccentric so that the backwards feed is correct. Tighten screw G.

***9. Tape Feed Latch** (Fig. 9)

Check

9.1 Check that the slot between the tines F, Fig. 9, of the tape guide is centrally disposed about the feed wheel teeth. With the perforated tape in the punch block, disengage the feed pawl and retention lever from the spindle, which should then turn freely. Check that slight pressure, applied to the tips of the tines, causes a drag on the spindle.

N.B.: These checks are only preliminary checks. A final check, with the motor running, is given in adjustment 27 on page 13.

Action

9.2 If either of the above checks (or the check in adjustment 27) is not satisfied, remove spring B, slacken nut A and turn eccentric screw R until latch S is disengaged from frame N, as shown at point T, Fig. 9 (inset).

9.3 Slacken screws P and, pressing the tape guide lightly onto the rollers, slide it backwards and forwards until it is positioned concentrically with respect to the rollers, ensuring, at the same time, that the slot is disposed centrally about the feed wheel teeth. Tighten screws P.

9.4 Replace spring B. Insert two thicknesses of tape punched with feed holes and adjust eccentric screw R until, with the tape guide resting on the tape, the vertical face of latch S is just touching the frame, as shown at point T, Fig. 9. Clamp the eccentric with nut A.

9.5 Remove one thickness of tape. Slacken screws P again and move the guide towards the frame until the tips of the tines of the guide touch the tape, ensuring that the slot is still centrally disposed about the feed wheel teeth. Tighten screws P.

B. TRIP MECHANISM FOR MACHINES FITTED WITH OVERLAP CAM UNIT (S.3750)

***10. Trip Push Rod** (Fig. 10)

Check

10.1 With the traversing link in its extreme forward position, i.e. in the position nearest the keyboard, check that the engagement 'm', Fig. 10, between the push rod C and the trip lever G, is .073 - .083 in. (1.8 - 2.1 mm.).

Action

10.2 If this is not so, unclamp eccentric B and adjust the position of throwout lever J to obtain the required dimension. Secure eccentric B.

Check

10.3 With the machine in the rest position, pull out the function cam detent and hold out the selector detent. Turn the machine slowly by hand until the chopper lever has just dropped into engagement for the fourth time.

10.4 Check that the push rod clears the top of the trip lever G by .010 - .015 in. (.25 - .38 mm.), i.e. dimension 'k' (see inset to Fig. 10).

Action

10.5 If this is not so, slacken screw F and adjust the position of the push rod to obtain dimension 'k'. Tighten screw F.

***11. Trip Lever** (Fig. 10)

Check

11.1 Return the machine to the position in which the traversing link is fully forward, i.e. towards the keyboard.

11.2 Check that the clearance between the push rod C and trip lever G, i.e. dimension 'g', Fig. 10, is .030 - .040 in. (.76 - 1.0 mm.).

Action

11.3 If this is not so, unclamp eccentric H and adjust trip lever G to obtain the required clearance. Secure eccentric H.

12. Plunger Casting (Fig. 4)

Check

12.1 Check that the five plungers C, Fig. 4, line up with the selector levers N.

Action

12.2 If this is not so, slacken the three screws B and adjust the casting vertically to obtain the required condition. Clamp screws B.

***13. Trip Cable** (Figs. 2 and 4)

Check

13.1 With the traversing link in the forward position, i.e. towards the keyboard, and with the perforator cam arrested by one of the detents, insert a .028 in. feeler gauge between the trip plunger and trip lever E, Fig. 4. This should not move the perforator detents.

13.2 Remove the .028 in. gauge and replace it by a .038 in. gauge. The detents should now move slightly.

N.B.: These checks are an indirect way of checking clearance 'f', Fig. 2, since this clearance cannot be seen.

Action

13.3 If either of these conditions is not satisfied, adjust the trip adjusting arm O, Fig. 2, in the following manner:-

(a) Slacken locknuts D, Fig. 4, and move back the trip cable well clear of the trip lever E.

(b) Move the push rod N, Fig. 2, to the left until it is stopped by the rack in the A/B unit. Holding the push rod in this position, adjust the trip cable forward until all play in the trip system is taken up. Tighten locknuts D, Fig. 4.

(c) Slacken screw P, Fig. 2, and adjust eccentric A until, when a .044 in. feeler gauge is inserted between the trip plunger and trip lever E, Fig. 4, the detents do not move, and when a .055 in. feeler gauge is inserted they do move. Tighten screw P.

(d) Slacken locknuts D again and readjust the trip cable to satisfy the conditions in checks 13.1 and 13.2.

(e) Check, by operating the machine by hand, that the perforator unit is correctly tripped.

14. Selector Cables (Fig. 4)

Check

14.1 Remove the punch block unit from the perforator. Depress the 'Letters' key and rotate the motor governor, by hand, until the five selector bars are set in their punching position.

14.2 Check that the selector bars satisfy dimension 'h', Fig. 4.

Action

14.3 If they do not, slacken screws A and adjust the selector cables to obtain the required contidion. Clamp the cables with screws A, taking care that the Bowden inner wires are not thereby pinched by the outer cases.

C. TRIP MECHANISM FOR MACHINES FITTED WITH ORIENTATION CAM UNIT (S.2866B)

***15. Trip Push Rod** (Fig. 10)

Check

15.1 With the traversing link fully forward, i.e. towards the keyboard, check that the engagement 'm', Fig. 10, between push rod C and trip lever G is .073 - .083 in. (1.8 - 2.1 mm.).

Action

15.2 If this is not so, unclamp eccentric B, and position the throwout lever J to obtain the required dimension. Secure eccentric B.

Check

15.3 With the machine in the rest position, pull out the barrel cam detent. Turn the machine slowly, by hand, until the striker blade is just fully out after setting the second finger. Check that there is a clearance of .010 - .015 in. (.25 - .38 mm.), i.e. dimension 'k', Fig. 10 (inset), between push rod C and the top of trip lever G.

Action

15.4 If this is not so, slacken screw F, and adjust the push rod C so that dimension 'k' is obtained. Tighten screw F.

***16. Trip Lever** (Fig. 10)

Check

16.1 Turn the machine, by hand, until the traversing link is in its extreme forward position. Press the push rod C, Fig. 10, lightly towards trip lever G, and check that the clearance 'g' is .003 - .008 in. (.08 - .20 mm.).

Action

16.2 If this is not so, slacken eccentric H and, holding push rod C lightly towards lever G, adjust eccentric H until dimension 'g' is satisfied. Secure eccentric H and check adjustments 15.1 and 15.3.

17. Plunger Casting (Fig. 4)

Check

17.1 Check that the five plungers C, Fig. 4, line up with the selector levers N.

Action

17.2 If this is not so, slacken the three screws B and adjust the casting vertically to obtain the required condition. Clamp screws B.

***18. Trip Cable** (Figs. 4 and 10)

Check

18.1 With the traversing link in its extreme forward position, and with the perforator detent held firmly into engagement with the cam pawl, check that there is a small amount of movement, not exceeding .010 in. (.25 mm.), available at lever G, Fig. 10, before the trip cable becomes 'solid'.

Action

18.2 If this is not so, slacken locknuts D, Fig. 4, and adjust the trip cable in its mounting block to obtain the required condition. Tighten locknuts D.

19. Selector Cables (Fig. 4)

Check

19.1 Remove the punch block unit from the perforator. Depress the 'Letters' key and rotate the motor governor, by hand, until the five selector bars are set in their punching position.

19.2 Check that the selector bars satisfy dimension 'h', Fig. 4.

Action

19.3 If they do not, slacken screws A and adjust the selector cables to obtain the required condition. Clamp the cables with screws A, taking care that Bowden inner wires are not thereby pinched by the outer cases.

D. PERFORATOR SUPPRESSOR MECHANISMS

20. Suppression of 'WRU' Combination (Figs. 10 and 11)

Check

20.1 Depress the 'WRU' key and turn the machine, by hand, until the 'WRU' bellcrank drops. Continue to turn the machine and check that the trip rod C, Fig. 10, clears the trip lever G.

Action

20.2 If it does not, return the machine to the rest condition. Select any combination other than 'WRU' and turn the machine once more to the rest condition. Slacken the nut securing the screw P, Fig. 11, and turn screw P until lever Q leaves eccentric stop A.

20.3 Unscrew screw P again until lever Q just touches eccentric A. Unscrew screw P a further ½-1 complete turn. Secure the clamping nut on screw P.

21. Suppression of A/B Transmission (Fig. 11)

Check

21.1 With lever Q, Fig. 11, against eccentric A and lever O resting against lever Q, check dimension 'q'. This should be .048 - .054 in. (1.2 - 1.4 mm.).

Action

21.2 If this is incorrect, slacken screw MM. With levers Q and O in the positions described in 21.1, adjust lever N on rod M to obtain the required dimension. Tighten screw MM.

22. Suppression of 'Bell' Combination (Figs. 10 and 12)

Check

22.1 Depress the 'Bell' key and turn the machine, by hand, until the 'Bell' bellcrank drops. Continue to turn the machine and check that the trip rod C, Fig. 10, clears the trip lever G.

Action

22.2 If it does not, return the machine to the rest condition. Select any combination other than 'Bell', and turn the machine once more to the rest condition. Slacken the nut clamping screw B, Fig. 12, and turn screw B until lever L leaves eccentric A.

22.3 Turn screw D until lever L just touches eccentric A. Unscrew B 1¼ - 1¾ complete turns. Secure the nut clamping screw B.

23. Answer Back Release (Figs. 13 and 14)

Check

23.1 With the cam unit and the A/B unit in the rest condition, check that there is a clearance of .010 - .015 in. (.25 - .38 mm.), i.e. dimension 'r', Fig. 14, between the edge of the cutaway in the trip lever M and the face of the latch N.

Action

23.2 If this is not so, slacken screw S and adjust hook R to hold the release shaft B lightly against the side of lever T. Clamp screw S.

23.3 Slacken the nut securing the eccentric pin Q, Fig. 13. Adjust the position of eccentric Q to give the clearance 'r'. Secure the nut on eccentric Q.

E. TAPE ROLL HOLDER

N.B.: This section applies only to tape roll holders fitted to No. 7 Teleprinters.

24. Tape Exhaust Alarm (Fig. 16)

Check

24.1 Remove the tape reel. Move the follower cam roller B, Fig. 16, until it reaches the required 'warning' radius from the centre of the reel. The alarm should just operate as it reaches this radius.

Action

24.2 If these conditions are not satisfied, slacken screw D and hold the follower arm roller B at the required radius. With contact lever E tripped, slowly raise the contact lever until its edge is just touching the edge of the latch A. Maintaining this condition, tighten clamping screw D.

F. ADJUSTMENTS WITH THE MOTOR RUNNING

***25. Anvil Bracket Height** (final check)

Check

25.1 Perforate a length of tape and check the depth of punching. This should be such that the tape is fully perforated, but without signs of dragging (shown by elongated holes). The holes should be cleanly cut, without any chads still attached.

Action

25.2 If this is not so, add or remove shims as in adjustment 6. Check adjustments 6, 7, 8 and 12 or 17. Perforate another length of tape and re-check the depth of punching.

26. Damping Springs (Fig. 8)

Check

26.1 A simple check of the adjustment of the damping springs is not available. It is, therefore, advisable to carry out adjustments 26.2 and 26.3 at intervals of 900 hours of operation.

Action

26.2 Depress keys E, T, K, L, Z and 'Letters Shift' and determine which key produces the noisiest operation of the perforator unit. Adjust the tension of the damping spring K, Fig. 3, by means of nuts G and H, until the noise of the perforator unit, when perforating the noisiest combination, is a minimum.

26.3 Clamp the spring adjuster J securely in position with locknuts G and H.

***27. Feed Hole Pitch** (Fig. 5)

Check

27.1 Perforate a length of tape and examine the feed holes for regularity and length of pitch. The nominal pitch is $\frac{1}{10}$ in. with an accuracy of half a feed hole pitch in ten inches of tape.

Action

27.2 If the pitch is irregular, carry out adjustments 9.2 to 9.5, page 9.

27.3 If the pitch is regular, but the cumulative variation over ten inches is greater than half a feed hole pitch, slacken screw C, Fig. 5, and move the retention lever B backwards or forwards, by turning eccentric D, until the required condition is obtained. The feed wheel should be turned *anti-clockwise* to *increase* the pitch and *clockwise* to *decrease* it. Tighten screw C.

N.B.: Whenever the retention lever is adjusted it will be necessary to re-adjust the feed pawl as described in adjustment 7 on page 8.

DISMANTLING AND ASSEMBLING INSTRUCTIONS

N.B.: When the machine has been dismantled in accordance with the following instructions, it may be re-assembled by following them in the reverse order. Attention should then be given to the notes on assembly procedure which are placed in brackets immediately below the instructions to which they refer.

Screws which are painted red are set in the factory and should not be touched.

A. TO DISMANTLE INTO UNITS

1. Perforator Unit (Figs. 17, 20, 22 and 23)

1.1 Pull out the teleprinter motor and signal plugs. Lift off the dust cover, or silencing cover if fitted, and slide the rubber cuttings distributor tube from chute A, Fig. 20. With the punch head free of tape, remove the keyboard, taking care that the plungers of the trip and selector cables are not lost when the ends of the cables are freed from contact with the selector levers on the anvil bracket.

1.2 Take up the tension of the inner damping spring AH, Fig. 17, by applying a spring hook to the upper end of the spring. Remove the screw and release the spring. Compress the outer spring AJ until it can be released from its seating well in the punch block casting. Withdraw AJ from AH.

1.3 Remove the three punch block unit fixing screws from the rear of the keyboard back plate. Press the punch withdrawing bracket B, Fig. 23, to the left, out of engagement with the recesses in the punches, hold the feed pawl A, Fig. 22, out of engagement with the feed ratchet, and lift off the complete punch block unit.

(**N.B.:** When assembling:-

(a) The left-hand fixing screw of the keyboard should be placed in its hole in the keyboard casting before the punch block unit is assembled. If this in not done, difficulty will be experienced in inserting the screw in its hole after the punch block unit is assembled.

(b) Turn each punch so that the recessed portion faces the punch withdrawing bracket. Engage the bracket in the recesses before securing the punch block unit to the keyboard.)

1.4 Remove the two fixing screws L, Fig. 22, and lift the anvil bracket off the keyboard.

2. Trip Link and Push Rod (Fig. 25)

2.1 Lift off the retention collars at K, O and P, Fig. 25. Release the spring from the left-hand end of the trip push rod S, taking care not to lose the spring links. Raise the push rod clear of engagement with its guide rack T, and withdraw it from the pivot block J.

2.2 Lift the link assembly L from the pivot block J and the pivot O.

3. Trip Cable (Figs. 25 and 26)

3.1 Remove the two nuts U, Fig. 25, and release the trip cable V from its anchorage to the combination head. Remove the bolt securing the clamp bracket W, and lift V from its anchorage to the main base. The removal of this bolt also releases the selector cable B.

3.2 Release the trip cable from its second clamp bracket J, Fig. 26. Remove the nut H, and withdraw the trip cable from the support block D.

4. Selector Cable and Levers (Figs. 25 and 26)

4.1 Remove the two screws which secure the cable support block F, Fig. 25, to its mounting bracket on the combination head frame C. Lift off the block and its attached 5-wire cable B.

4.2 Release the selector cable K, Fig. 26, from its base mounted clamp bracket A.

Remove the top screws C, from the cable support block D, and slacken the bottom screw F. Slide the block upwards, to release it from screw F, and remove the complete selector cable with its support blocks.

4.3 Remove the fixing screws for the selector lever guide rack I, Fig. 25, and withdraw the rack from engagement with the levers.

4.4 Remove the five selector levers H from their common pivot.

(**N.B.**: When assembling, the selector levers should be replaced on the pivot in their original order.)

B. TO DISMANTLE INDIVIDUAL UNITS

5. Punch Block Unit (Figs. 17 and 20)

5.1 Slacken the two fixing screws D, Fig. 20, for the cuttings chute A and slide the chute from under them. Remove the screws C and E and lift off the punch block head. (Note: instructions for dismantling the punch block head are given in paragraph 6.)

5.2 Unscrew the four sets of nuts and washers which secure the front plate (shown dotted in Fig. 17) at the points N, V, W and AA. Remove the plate, taking care not to lose any shims which may lie between the camsleeve end face S and its front bearing in the plate.

5.3 Remove the collars from pivots V and W. Turn the cam until the roller K is clear of the left-hand detent X, and lift off both detents X and T from their pivots, together with their common spring. Remove the spring.

(**N.B.**: It should not be necessary to remove the collars (not shown) which position the detents on their pivots, but if this is done, the collars should be so replaced, when assembling, that the detents lie centrally with respect to the cam pawl.)

5.4 Disengage the two springs O from their common anchor pin, and remove the nut and washers from pivot P. Remove the following parts from the pivot:-

(a) Front eccentric collar
(b) Front retention pawl R
(c) Washer
(d) Rear retention pawl
(e) Rear eccentric collar

5.5 Lift the cam sleeve and camshaft from their rear bearing, taking care not to lose any shims which may be present. Press the cam pawl L backwards against its circular flat spring, and withdraw the sleeve S from the shaft.

5.6 Push out the pivot pin M from the side of the cam remote from the pawl, and remove the pawl and pawl spring.

(**N.B.**: When assembling, replace the pawl in such a way that the tail of the pawl spring engages in the groove in the upper surface of the pawl.)

5.7 Remove the metal guard plates which cover the gear wheels of the intermediate shaft Q (guards not shown). Remove the screws and spring washers which secure the shaft bearing blocks to the perforator back plate, and lift off the complete assembly of shaft, bearing blocks and gear wheels.

5.8 Slide off the collar Z and lift the complete punch block casting off pivot AA.

5.9 Release the spring from the tail of the tape feed retention lever AB. Raise the roller of the lever clear of retention wheel C and slide AB from its pivot.

5.10 Remove the clamping screw and washer H and the capstan headed eccentric screw from the retention lever adjustment plate I. Lift the plate from its pivot.

5.11 Knock out the pivot of the retention lever adjustment plate I from the side furthest away from the plate and remove the flanged tape roller G, taking care not to lose the shims which lie between the flanges of the roller and the punch head casting.

(**N.B.**: When assembling, position the roller by means of the shims so that the tape is centralised about the punches.)

5.12 Remove the screw which secures the vertical tape guide J to the punch head casting, followed by the guide.

6. Punch Block Head (Figs. 17, 18, 19, 20 and 21)

6.1 Release the spring M, Fig. 20, from the tape guide frame L, and the spring N from the guide frame latch K.

6.2 Remove the pivot screw from the tape guide frame L, which also secures the tail of support bracket N, Fig. 18. Remove the two screws G and J from the underside of the punch block head and lift off the tape guide latch with its associated bracket.

6.3 Remove the remaining pivot screw, which secures the tape guide frame L, Fig. 20. Lift off the frame, taking care not to lose the washer which lies between the guide frame and the casting.

6.4 Remove the two screws J, followed by the tape guide H. Remove the two pivot screws which secure the stripper spring AL, Fig. 17, and lift off the spring.

6.5 Unscrew the two screws B, Fig. 19, which secure the cover plate C of the punch block assembly, and lift off:-

(a) Cover plate C
(b) Two die plates D (the lower of these has a chamfered edge to allow easy entry of the paper tape)
(c) Tape guide plate A
(d) Four die plates Q
(e) Five message punches O, and the feed hole punch.

6.6 Remove the two screws M, from the underside of the punch head, followed by the four guide plates N.

(N.B.: When assembling, replace the guide plates N and die plates D and Q in 6.5 so that the cut away corner is towards the feed wheel knob. Ensure that the punches are free to move after tightening screws B and M. It is advisable to tighten these screws alternately, a little at a time.)

6.7 Remove the four fixing screws for the feed wheel shaft bearing blocks A and D, Fig. 21, and lift off the complete feed wheel shaft assembly.

6.8 Slide the left-hand bearing block A from the shaft, taking care not to lose the shims that may be fitted between the bearing block and the tape roller.

6.9 Remove nut K from the end of the feed wheel shaft, followed by:-

(a) Special washer L
(b) Feed wheel knob J
(c) Back space ratchet G
(d) Retaining pin H
(e) Feed ratchet M
(f) Retention sprocket F

(N.B.: When assembling, place the two ratchets G and M shoulder to shoulder, with ratchet G feeding clockwise and ratchet M anti-clockwise, as viewed from the feed wheel knob side.)

6.10 Knock out pin N, which secures the ratchet bush E to the feed wheel shaft. Remove the bush, followed by the right-hand bearing block D and shims C, if fitted.

(N.B.: When assembling, ensure that the bearing blocks A and D are positioned as shown in Fig. 21.)

7. Anvil Bracket (Figs. 22, 23 and 24)

7.1 Remove the fixing screws of the bracket which carries the feed pawl adjusting screw V, Fig. 23, followed by the bracket. Disengage the pawl return spring from the tail of the back space key Y, and remove screws T with their washers and spring washers, followed by feed pawl A together with its supporting bracket. Separate the pawl and bracket by removing the pivot screw W.

7.2 Remove the screw P, followed by the pivot bracket Q and back space key Y. Slide the back space key assembly from its pivot and dismantle the eccentric D, thus separating key sections B and C.

(N.B.: Careful note should be taken of the method used in assembling the springs of the compliant members, and they should be similarly arranged when re-assembling.)

7.3 Remove the two pivot screws which secure the punch withdrawing bracket B, Fig. 23. Detach the two bracket springs and lift off the bracket.

7.4 Lift off the retaining collar A, Fig. 24, followed by the five selector levers B and their separators, from the common pivot. Note the order of assembly so that they may be replaced in their original order.

7.5 Lift off the retaining collar E and trip lever F, together with the felt lubricating washer and two spacing bushes.

7.6 Release the L-shaped bracket D, followed by the trip rod. Remove the guide rack from the casting.

7.7 Unscrew the two fixing screws for the selector and trip mounting plate C, Fig. 23, and lift off the plate.

7.8 Remove the retaining collar K, followed by the trip throwout lever J and its spring H.

7.9 Slacken the clamp nuts of spring adjuster S, Fig. 22, and slide out the adjuster together with spring U.

(**N.B.**: When the machine is assembled, it will be necessary to adjust spring U with the motor running, as described in adjustment 26 on page 13.)

7.10 Release the two upper anvil bar springs (one shown at G, Fig. 23) from the spring anchor post. Remove one spring clip from the anvil rack pin and slide the pin from the anvil guide rack. Unscrew the spring anchor post and anvil bar retaining screw F and, commencing with the anvil bar E, lift out each bar in turn, releasing the lower anvil bar springs before removing their associated anvil bars.

(**N.B.**: When assembling, it is important to replace each anvil bar in the guide slot from which it was removed.)

7.11 Release the anvil bar guide racks from the casting, taking care not to lose any shims which may lie between the racks and casting. Remove the eccentric stop E, Fig. 22.

8. Trip Cable

8.1 Slide the hollow plungers from the ends of the cable. Reverse one plunger and push it back into its cable end. This will cause the inner wire core to protrude from the remote end, thus enabling it to be withdrawn for lubrication.

9. Selector Cable (Figs. 25 and 26)

9.1 Remove the two screws R, Fig. 25, and separate the two sections F and Q of the support block, to facilitate the cleaning and lubrication of the plunger channels. The cable should not be removed from section Q.

9.2 Slacken the five screws B, Fig. 26, withdraw the five cables from the support block D, and remove the outer sheath K from the cables. Withdraw the inner wire core for cleaning and lubrication.

(**N.B.**: When assembling, the cables should be operated in turn from the plungers G, Fig. 25, and re-inserted into the block D, Fig. 26, in accordance with the numbering given in Figs. 25 and 26. The screws B should not be tightened sufficiently to constrict the cable cores.)

10. Suppression Unit (Figs. 28 and 29)

Note: The suppression unit differs slightly according to whether it is fitted to a No. 7 or No. 54 teleprinter. Some units in the field may also be without the parts required for one or both of the following facilities:-

(a) 'WRU' signal suppression
(b) 'Bell' signal suppression

The following instructions apply to units fitted to the No. 7 teleprinter and with the parts required for both the above facilities.

10.1 With the keyboard off the teleprinter, remove the motor from the main base.

10.2 Remove the screw G, Fig. 29, which secures the shaft bearing bracket A to the main base.

10.3 Release the spring K, Fig. 28, the screw E and the two nuts H and J.

10.4 Lift off the complete shaft assembly shown in Fig. 29, including the suppression unit front plate C and the forward bearing bracket A, by withdrawing the shafts B and F from their bushes D and E.

(**N.B.**: If the shaft mechanism is dismantled, note the positions of the levers a locating collars in order to facilitate adjustments after assembly.)

10.5 Remove the 'WRU' signal suppression lever D, Fig. 28, followed by the slotted gui rack B.

10.6 Slide from their pivots:-

(a) Reperforator trip lever N
(b) Intermediate A/B trip suppression lever L
(c) Reperforator trip throwout lever A
(d) Bell signal suppression lever F

10.7 Release the suppression unit back plate M from the combination head frame.

(**N.B.**: Before assembly, replace any parts showing signs of wear.)

SPRING TENSIONS

N.B.: References are to figures in this booklet.

Spring No.	*Reference*	*'On-machine' checks*
PG.2123	Fig. 9 – V	**Stripper Spring Lift Spring:** force, applied at the 'tear-off' plate end of the stripper spring to just move the spring, should be 2-3 ozs. (57-85 gms.).
PG.3057	Fig. 3 – V	**Cam Pawl Spring:** force required to press pawl back against cam seating, with gauge held horizontally, should be 3½-4 ozs. (99-113 gms.).
PG.7074A	Fig. 17 – on tail of AB.	**Retention Lever Spring:** force applied at the tail of lever AB, and at right-angles to it, to just lift the roller from the bottom of the retention wheel notch, should be 14-15 ozs. (397-425 gms.).
PG.7345	Fig. 1 – C	**Detent Spring:** with detent F resting against pawl E (as shown in Fig. 1), a force of 4-6 ozs. (113-170 gms.) applied to the top of detent B should just move detent F clear of the pawl.
PG.7388A	Fig. 20 – M	**Tape Guide Spring:** force required to lift the frame L from its fully lowered position, measured at the tip of tail I, with latch K lifted off, should be 1¼-1½ lbs. (567-680 gms.).

		Compression	*Pressure*
PG.5036	Fig. 8 – F	1⅞ – 1⅜ ins. (47.6 – 34.9 mms.)	4 – 4½ lbs. (1.81 – 2.04 Kgs.)
		Extension	*Tension*
PG.7029	Fig. 22 – J	55/64 – 1 5/32 ins. (21.8 – 29.4 mms.)	1 lb. 14 ozs. – 2 lbs. 2 ozs. (850 – 964 gms.)
PG.7041	Fig. 27 – F	⅝ – 1 1/16 ins. (15.9 – 27 mms.)	2½ – 3½ ozs. (71 – 99 gms.)
PG.7070	Fig. 2 – U	15/32 – 29/32 in. (11.9 – 23 mms.)	3 – 3½ ozs. (85 – 99 gms.)
PG.7072	Fig. 2 – on R/H end of N	13/16 – 1 31/64 ins. (20.6 – 37.7 mms.)	9½– 10½ ozs. (269 – 298 gms.)
PG.7078	Fig. 9 – C	25/32 – 1 1/16 ins. (19.9 – 27 mms.)	9 – 11 ozs. (255 – 312 gms.)
PG.7100	Fig. 17 – O	⅝ – 27/32 ins. (15.9 – 21.4 mms.)	3 – 3½ ozs. (85 – 99 gms.)
PG.7152	Fig. 8 – K	1 13/32 – 1 25/32 ins. (35.7 – 45.3 mms.)	3 lbs. 11 ozs.– 4 lbs. 1 oz. (167 – 184 Kgs.)
PG.7186	Fig. 23 – two springs of B	7/16 – 35/64 in. (11.1 – 13.9 mms.)	6 – 7 ozs. (170 – 198 gms.)
PG.7322	Fig. 22 – on tail of Key Y	37/64 – 15/16 in. (14.7 – 23.8 mms.)	12 – 13 ozs. (340 – 369 gms.)
PG.7378	Fig. 23 – G	9/16 – ⅞ in. (14.3 – 22.2 mms.)	3 – 4 ozs. (85 – 113 gms.)
PG.7391	Fig. 12 – M Fig. 13 – H	1 – 1 3/16 ins. (25.4 – 30.2 mms.)	2 lbs. 4 ozs. – 2 lbs. 10 ozs. (1.02 – 1.20 Kgs.)

LUBRICATION INSTRUCTIONS

The lubrication instructions, together with their respective diagrams, are given in figures 30 to 34.

All numbered points that are placed in a *circle* should be lubricated *each 300 hours of operation.*

All numbered points that are placed in a *square* should be lubricated *when dismantling the machine.*

Each point should be lubricated with:-

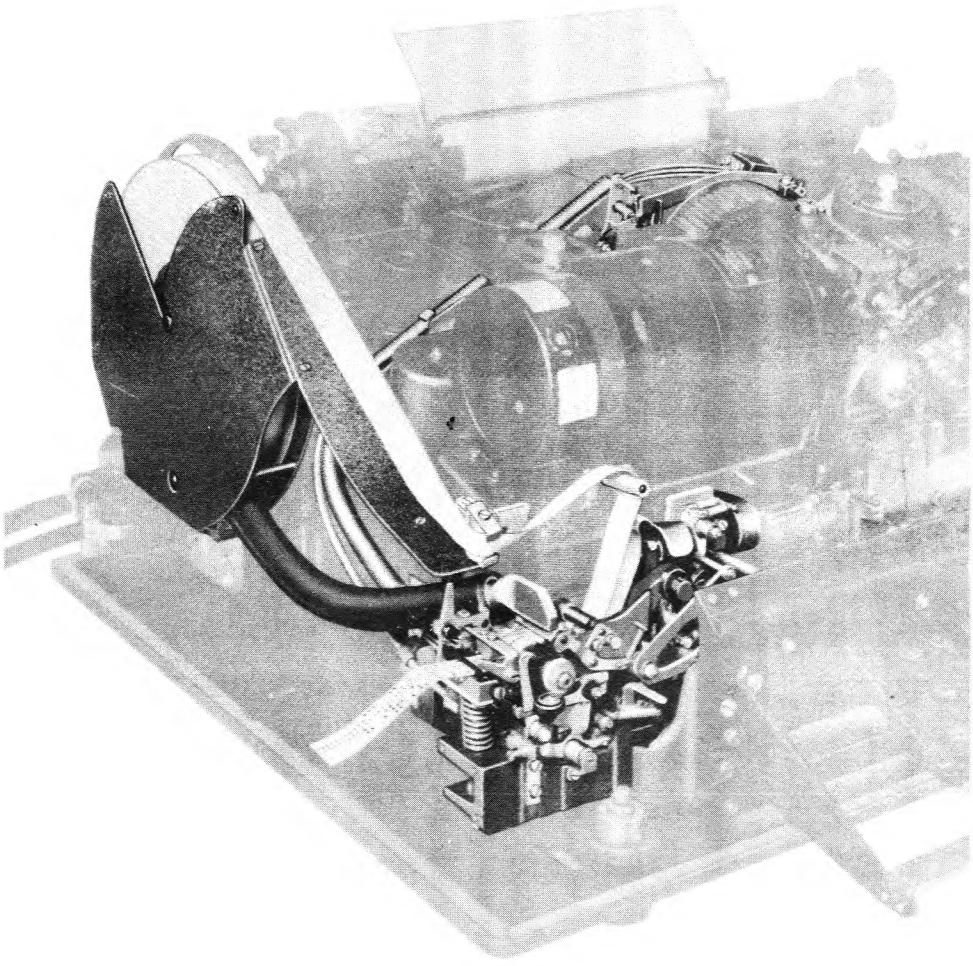
Creed No. 2 Lubricant – medium oil, such as:-

(a) Tapla oil 30 (Shell oil C.Y.2.)

(b) Wakefield Castrol XL.

(c) G.P.O. oil No. 14.

It should be noted that all machines are properly lubricated before they leave the factory, but it should also be remembered that some oil is likely to be lost in transit and in storage. It is, therefore, important to lubricate all new machines before they are put into service.



THE REPERFORATING ATTACHMENT

(Model 54 Teleprinter)

DIAGRAMS

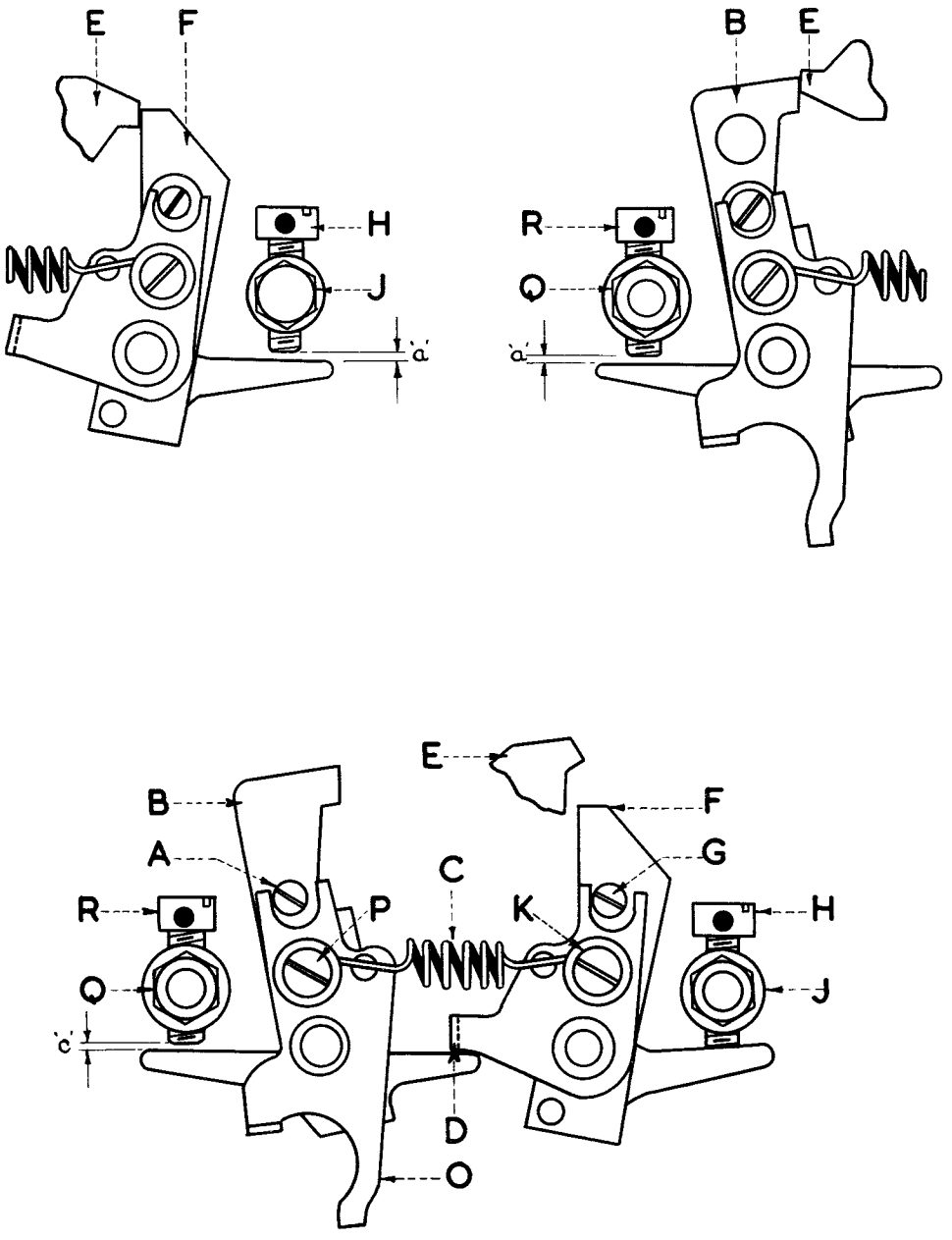


FIG. 1

DIMENSIONS

'a' { .022 — .028 ins. / .56 — .71 mm.

'c' { .002 — .007 ins. / .05 — .18 mm.

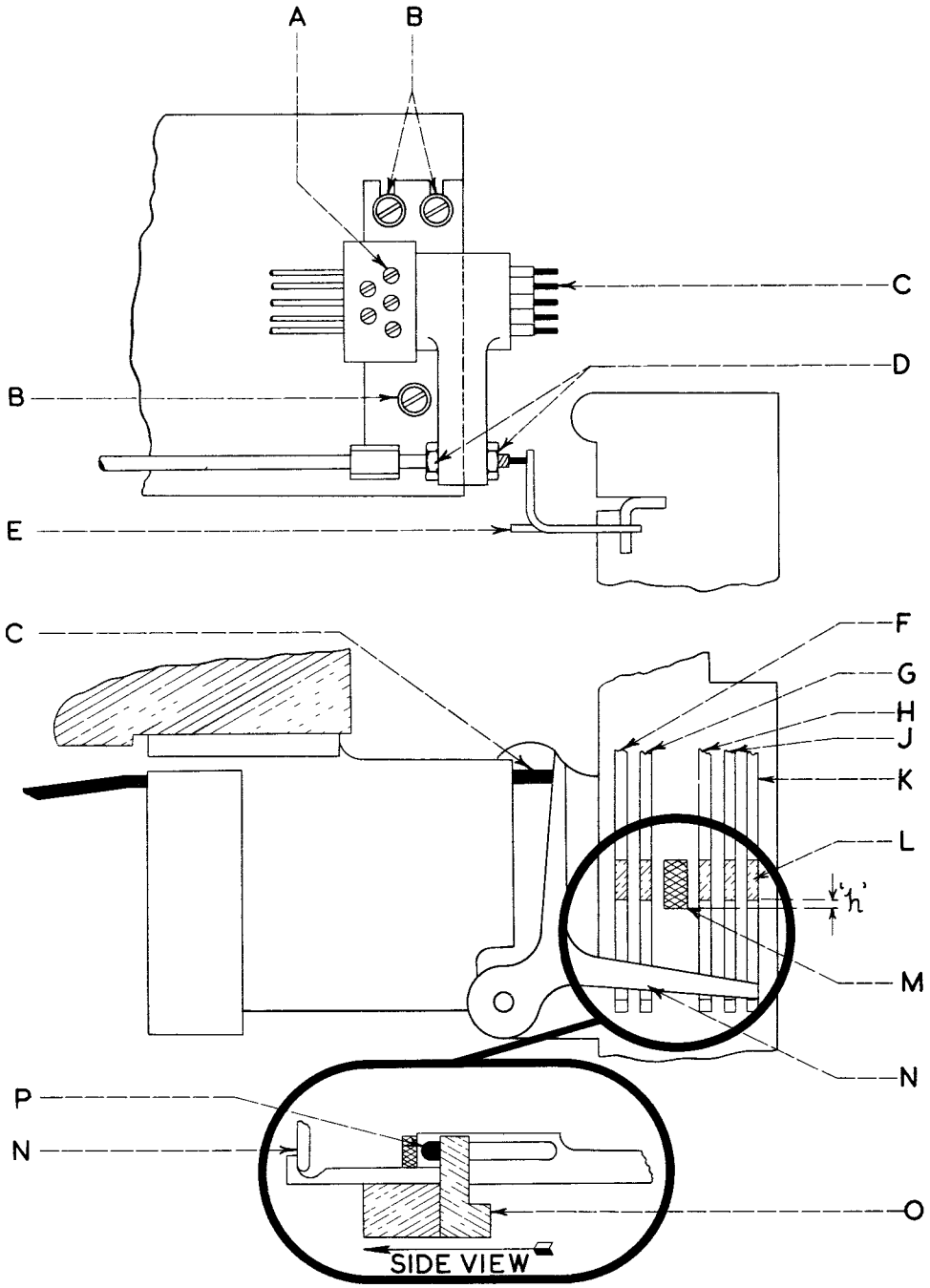


FIG. 4

DIMENSION

'h' { .030 — 040 ins.
.76 — 1.02 mm.

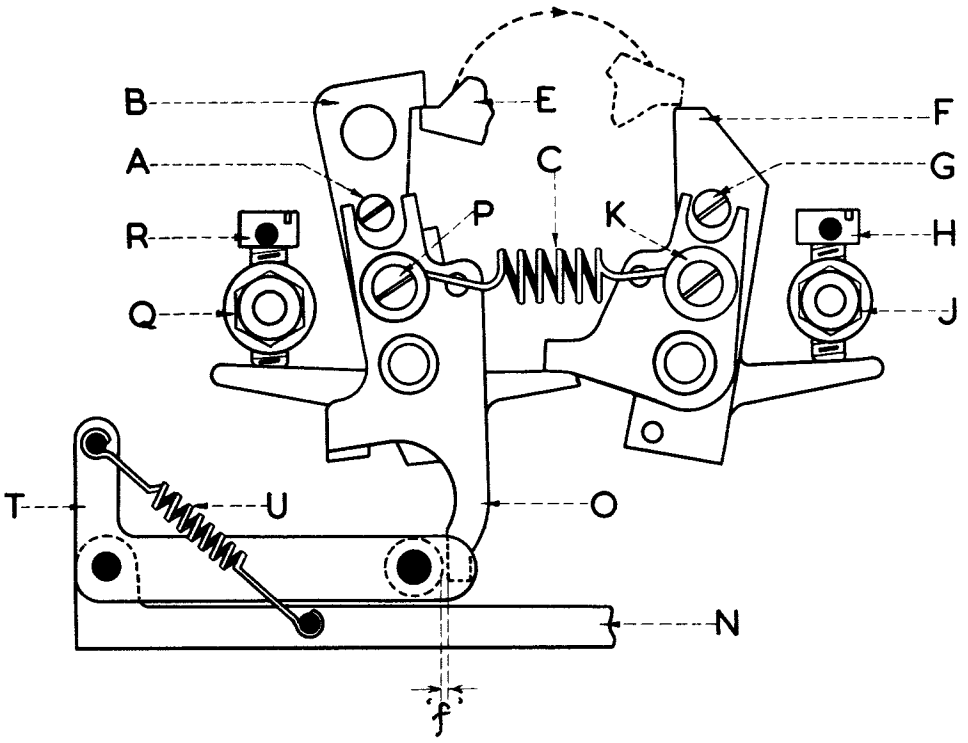


FIG. 2

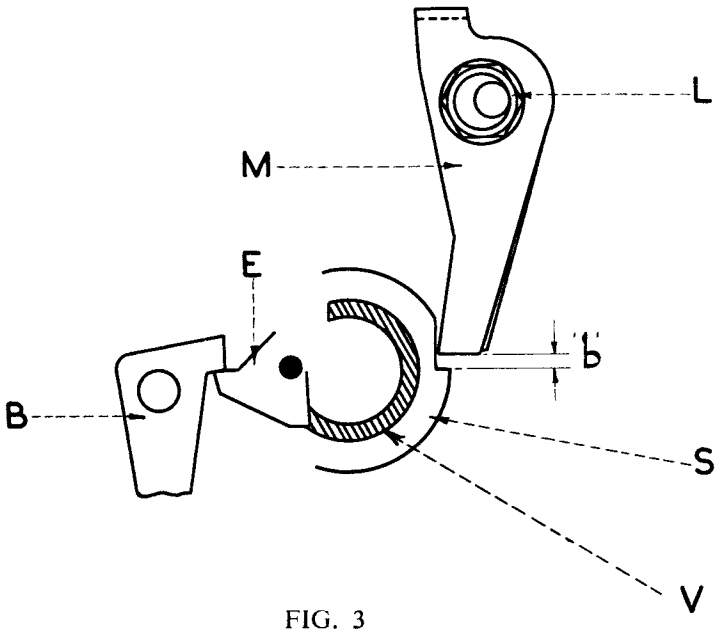


FIG. 3

DIMENSION

'b' { .002 — .004 ins.
.05 — .10 mm.

'f' = SEE TEXT

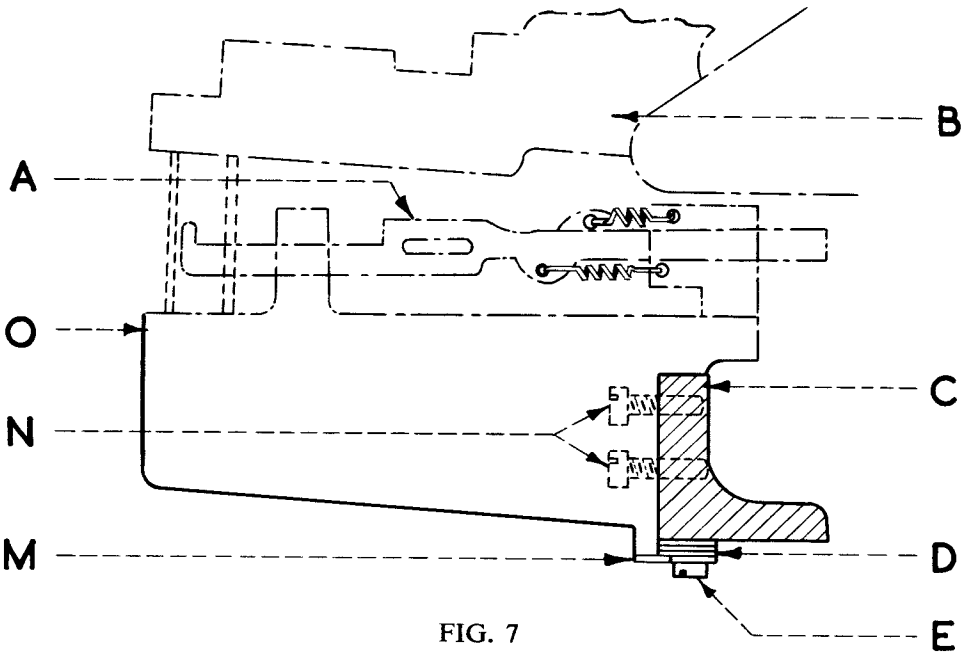


FIG. 7

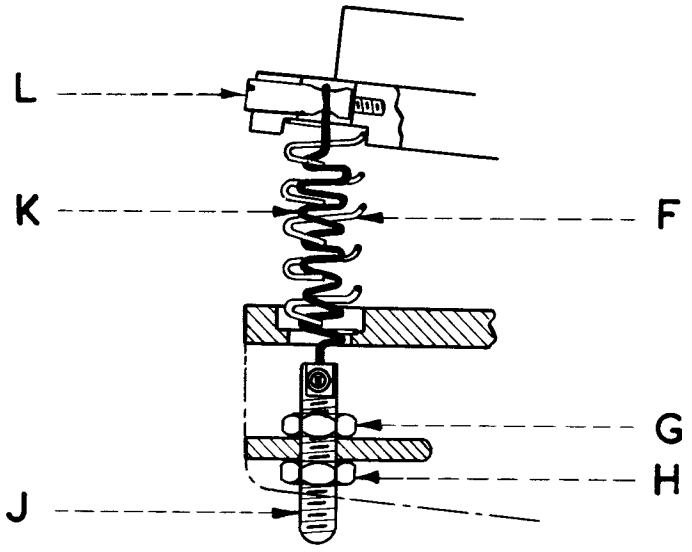


FIG. 8

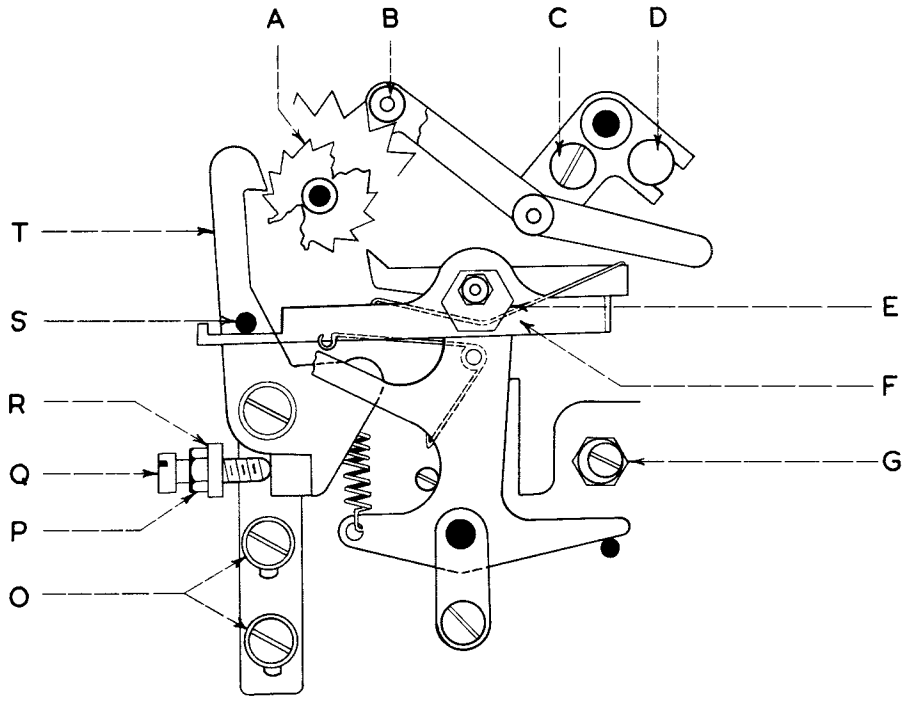


FIG. 5

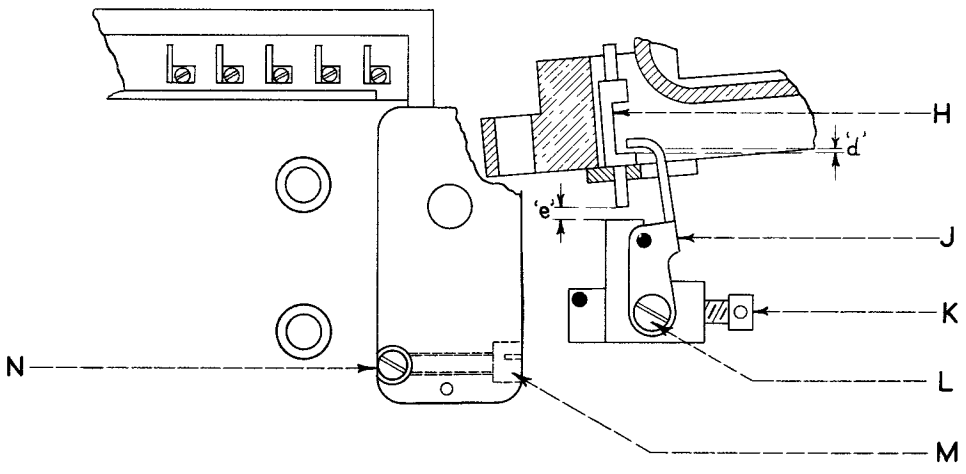


FIG. 6

DIMENSIONS

'd' { .002 — .008 ins. / .05 — .20 mm.

'e' { .026 — .036 ins. / .66 — .91 mm.

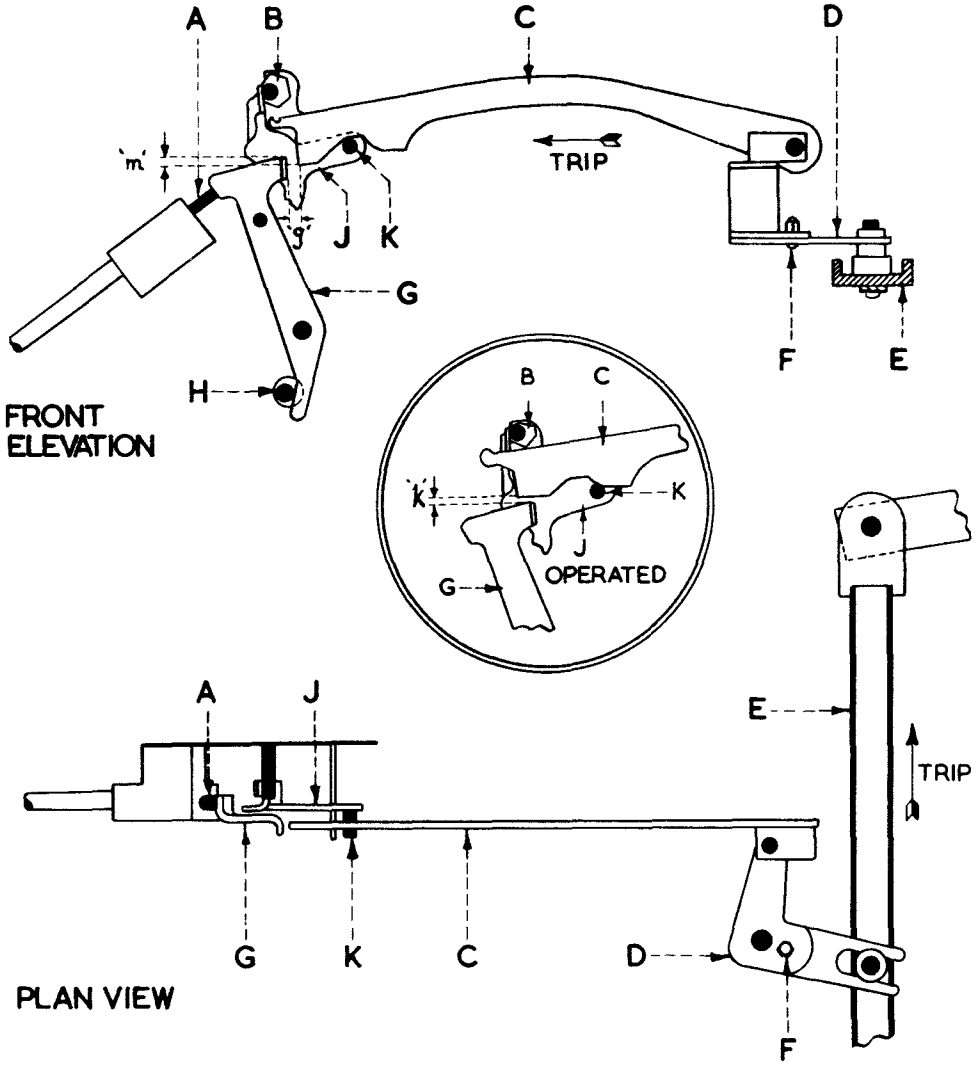


FIG. 10

DIMENSIONS

'k' { .010 — .015 ins. / .25 — .38 mm. } 'm' { .073 — .083 ins. / 1.8 — 2.1 mm. }

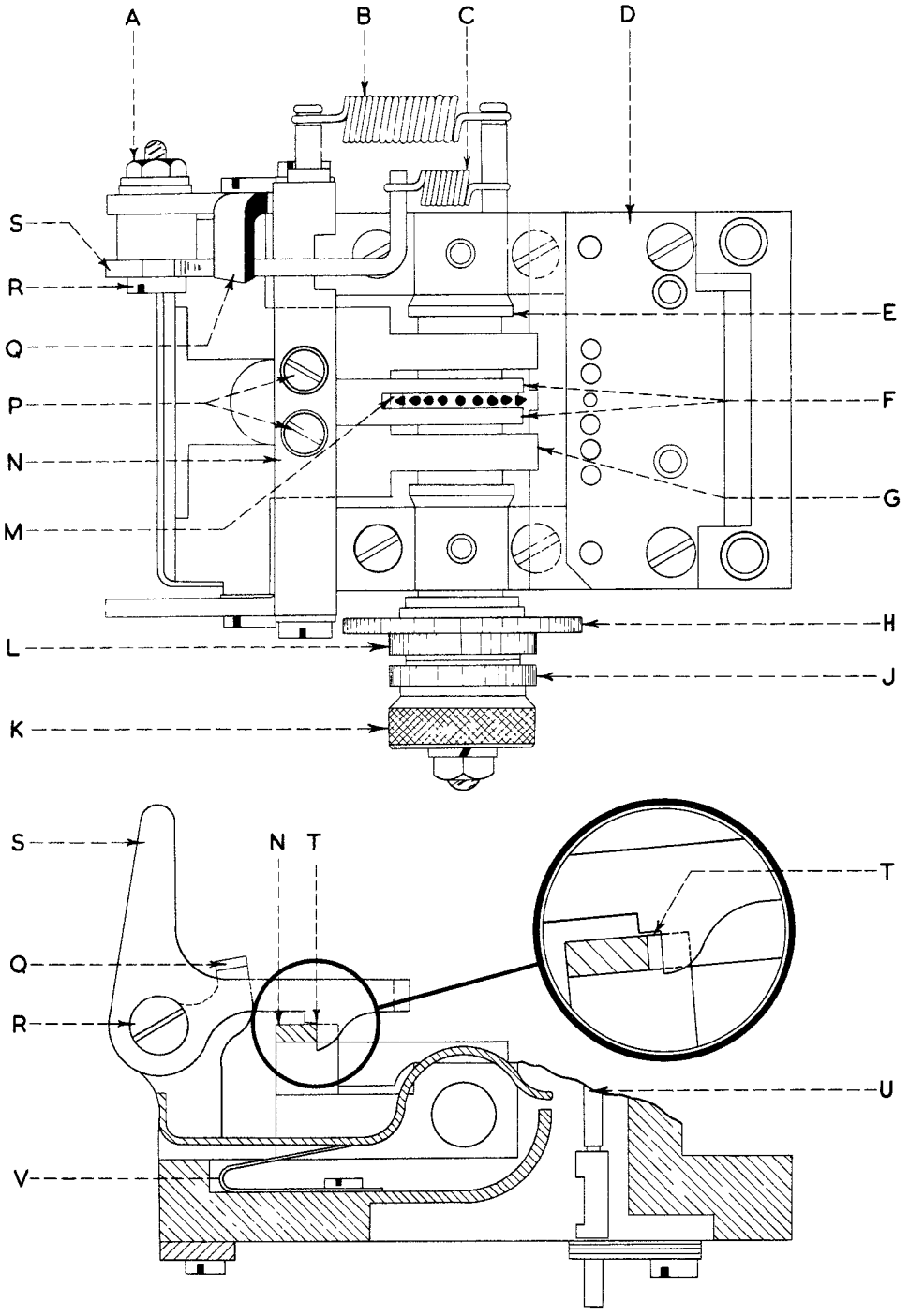


FIG. 9

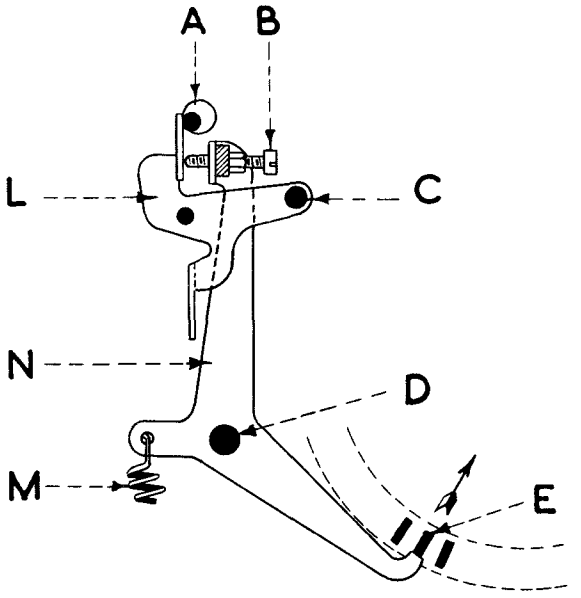


FIG. 12

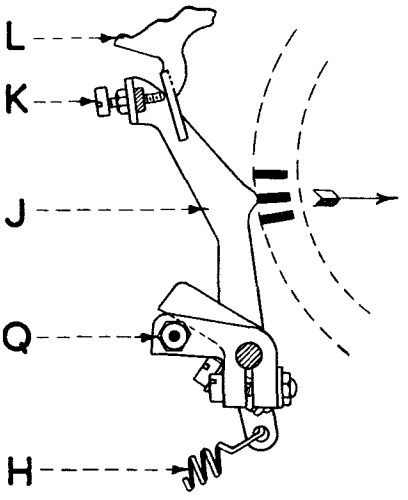


FIG. 13

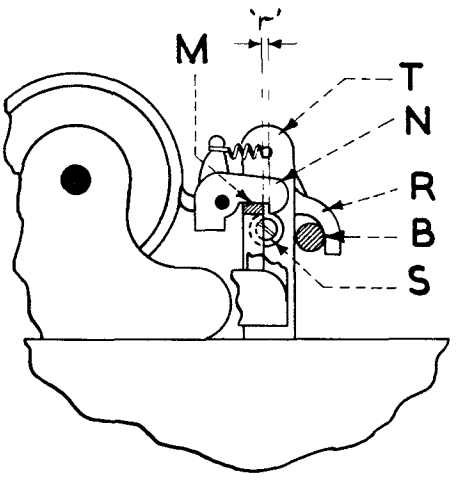


FIG. 14

DIMENSION

'r' { .010 — .015 ins.
{ .25 — .38 mm.

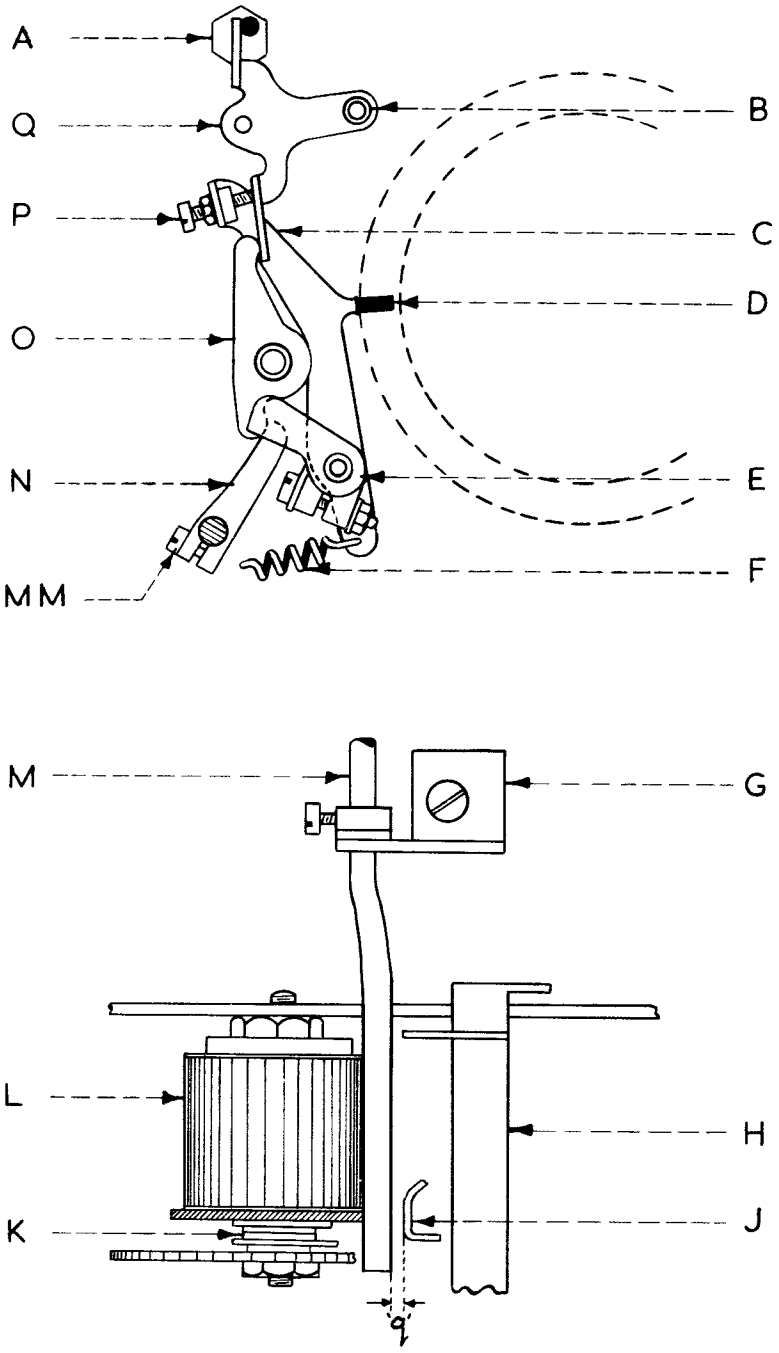


FIG. 11

DIMENSION

'q' { 048 — .054 ins.
1.2 — 1.4 mm.

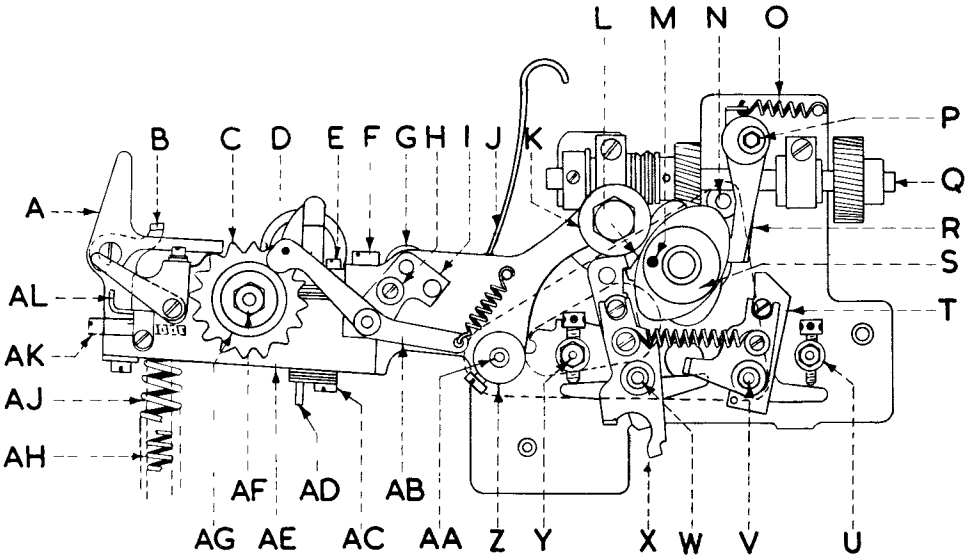


FIG. 17

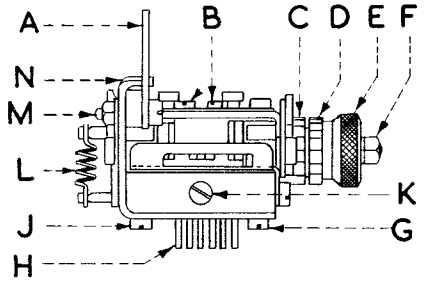


FIG. 18

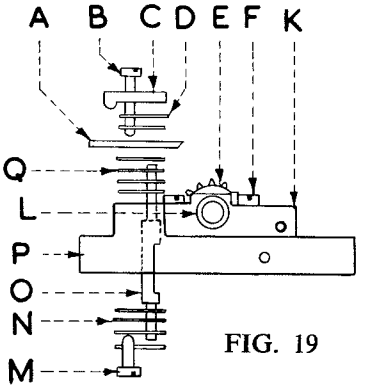


FIG. 19

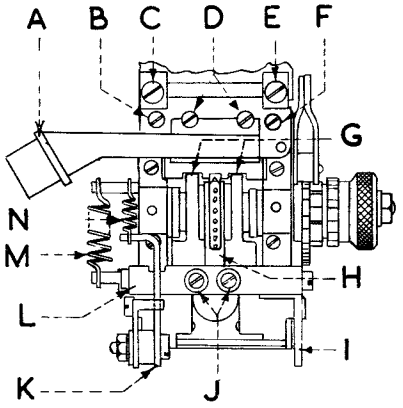


FIG. 20

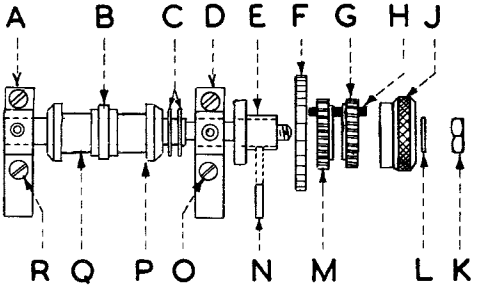


FIG. 21

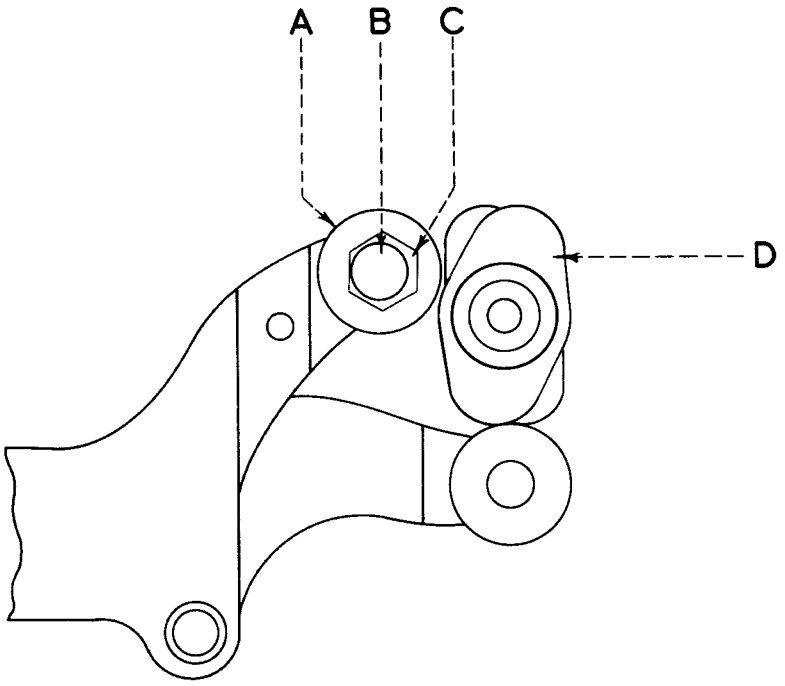


FIG. 15

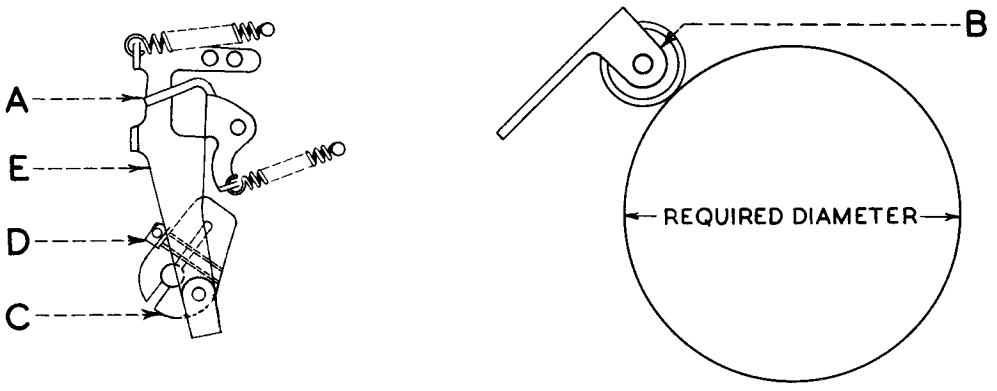


FIG. 16

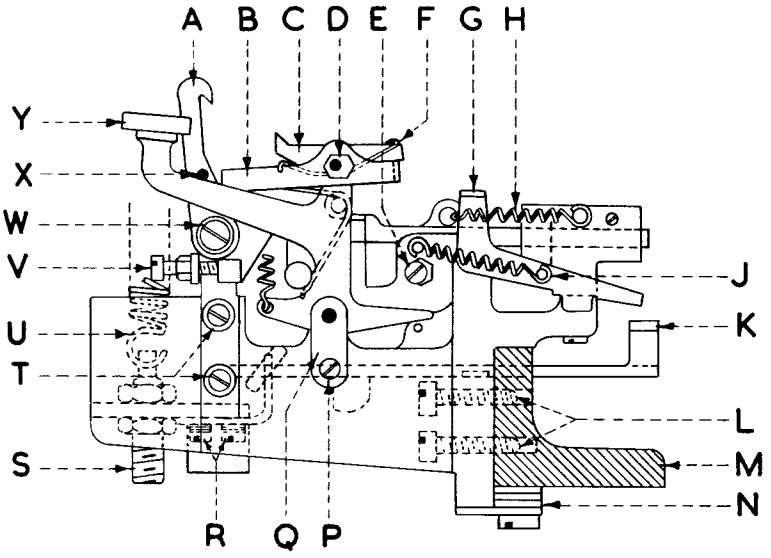


FIG. 22

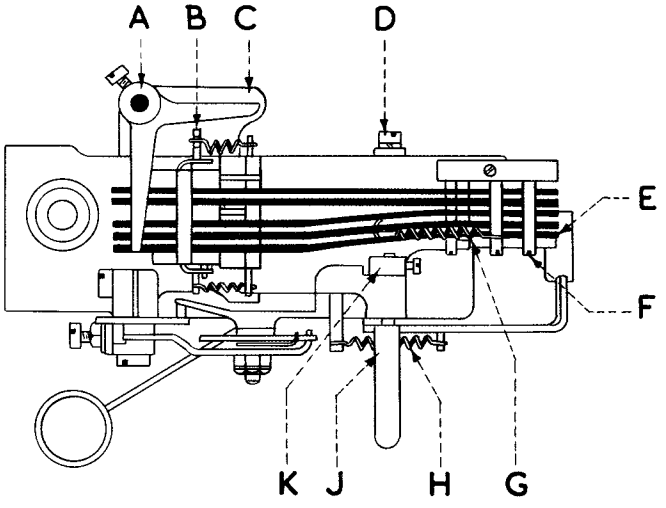


FIG. 23

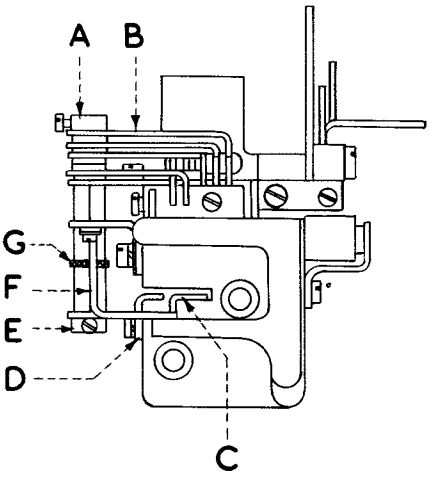


FIG. 24

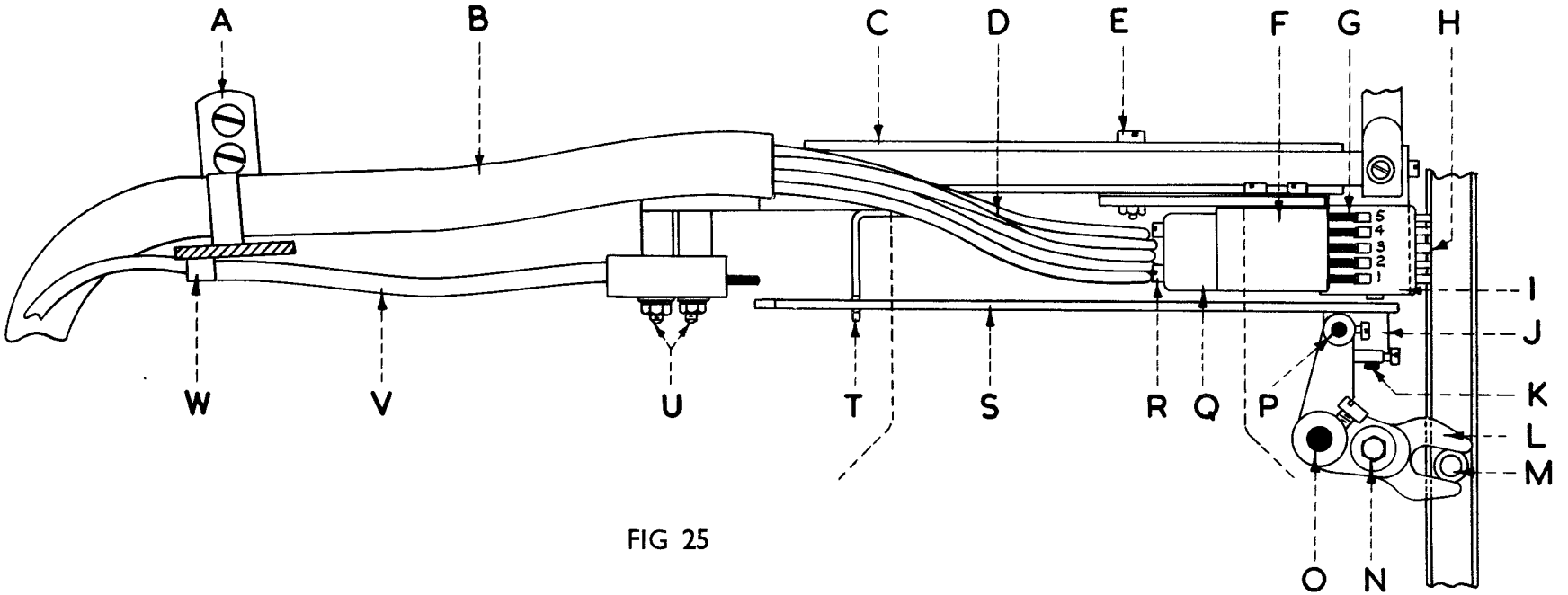


FIG 25

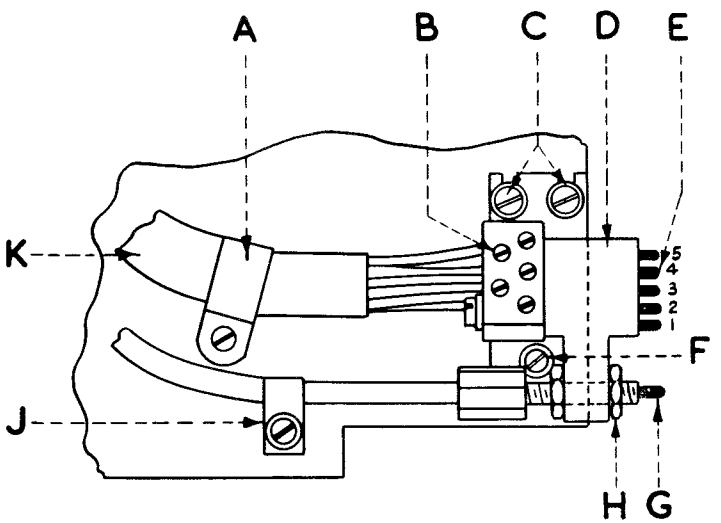


FIG. 26

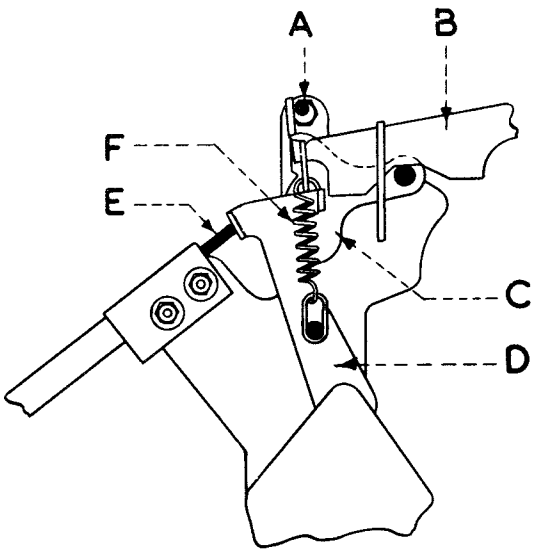


FIG. 27

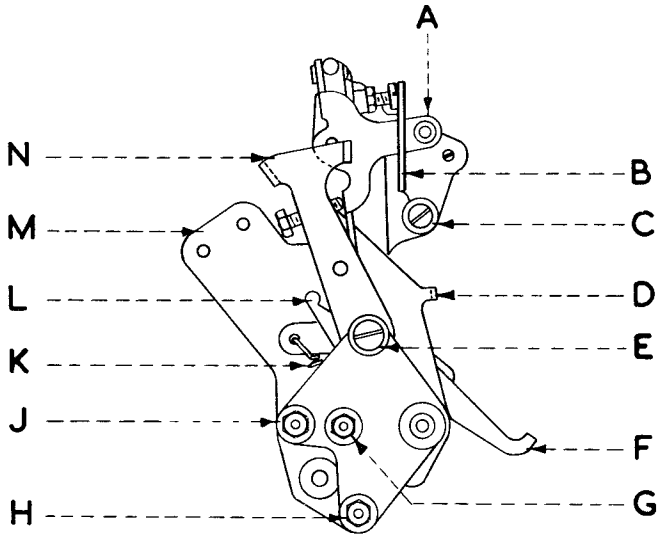


FIG. 28

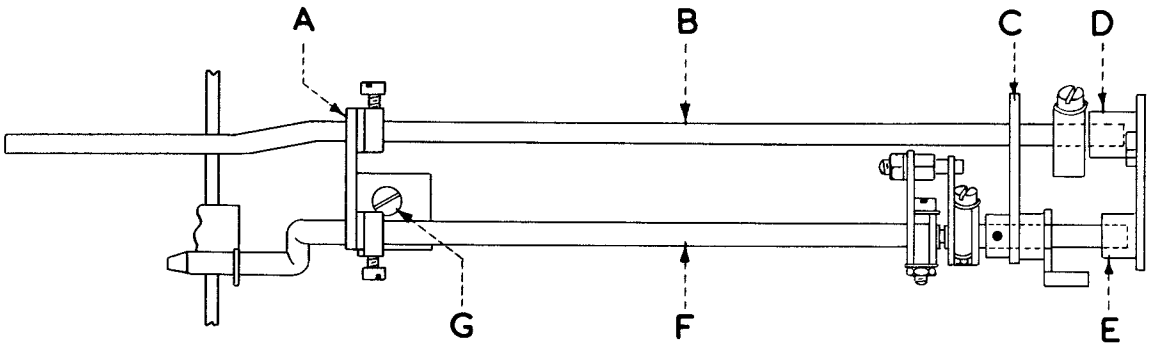
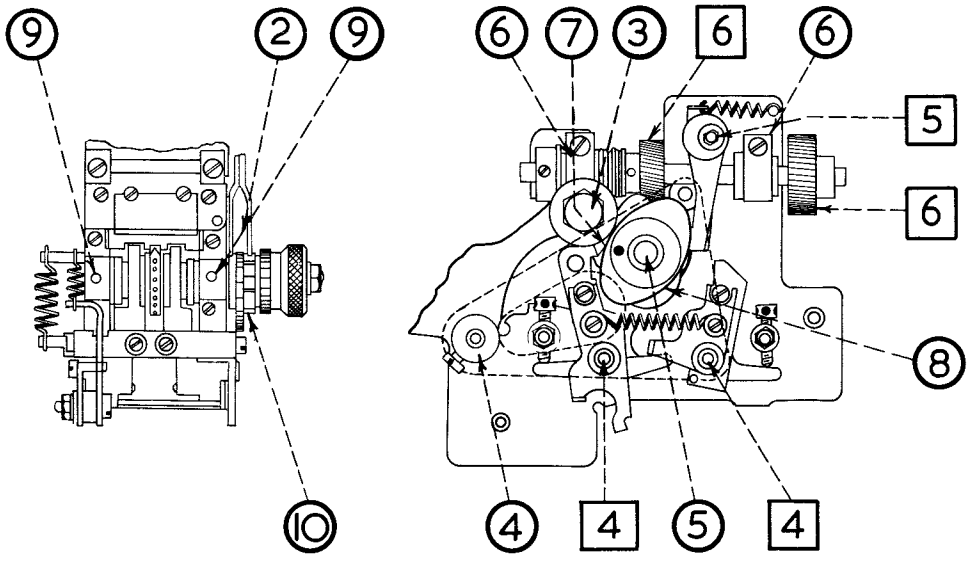


FIG. 29

LUBRICATION INSTRUCTIONS

No. 2 LUBRICANT.



EACH 300 HRS.

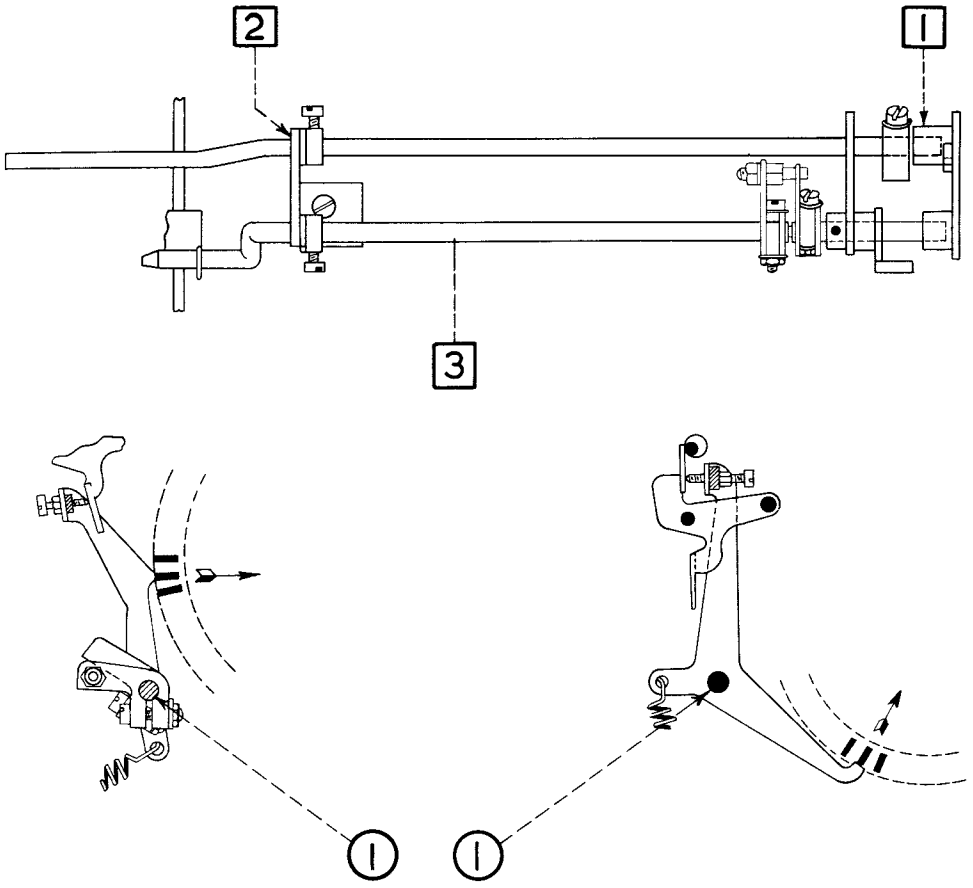
- (2) RETENTION ROLLER
- (3) BEARINGS OF UPPER & LOWER CAM ROLLERS
- (4) MAIN PUNCH BLOCK PIVOT
- (5) CAMSHAFT OIL HOLE
- (6) INTERMEDIATE SHAFT BEARING BLOCKS
- (7) CAM PAWL & ENGAGING FACE
- (8) ALL CAM TRACKS
- (9) BEARING BLOCK OIL HOLES
- (10) FORWARD & BACK FEED RATCHETS

WHEN DISMANTLING

- [4] DETENT PIVOTS
- [5] RETENTION PAWLS & PIVOT
- [6] INTERMEDIATE SHAFT GEAR WHEELS

FIG. 31

LUBRICATION INSTRUCTIONS
No. 2 LUBRICANT.



EACH 300 HRS.

(1) THROWOUT LEVER BEARING BUSH OIL HOLES

WHEN DISMANTLING

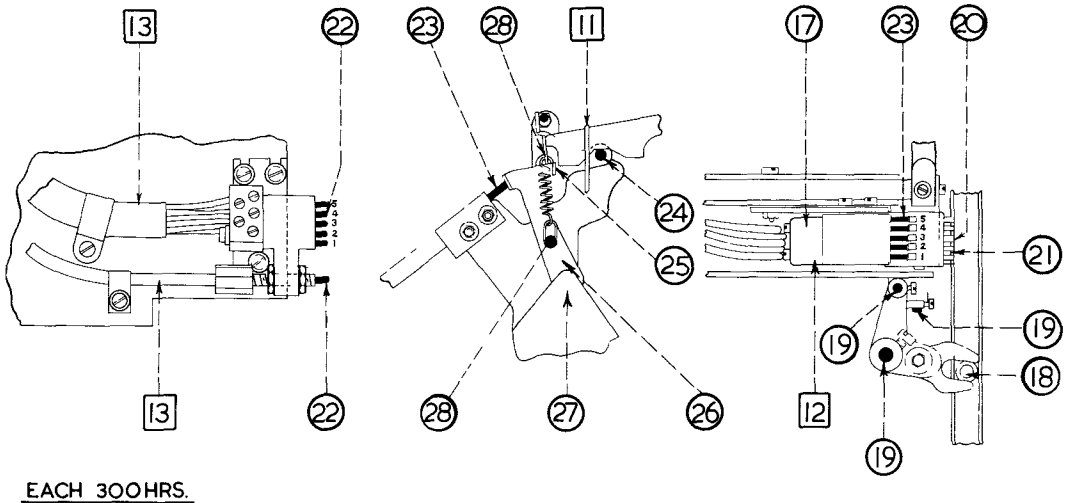
[1] REAR PIVOT BUSH OIL HOLE

[2] FRONT BEARING SURFACES

[3] BEARING POINTS OF A/B ROCKSHAFT

FIG. 30

LUBRICATION INSTRUCTIONS
No. 2. LUBRICANT



EACH 300HRS.

- (17) SELECTOR CABLE CHANNELS IN SUPPORT BLOCK SECTION
- (18) TRIP ROLLER
- (19) PUSH ROD LINK PIVOTS
- (20) SELECTOR LEVER HORIZ. & VERT. GUIDE RACK SLOTS
- (21) COMB EXTENSION/SELECTOR LEVER FRICTION FACES
- (22) TRIP & SELECTOR CABLE PLUNGERS IN SUPPORT BLOCK
- (23) TRIP & SELECTOR CABLE PLUNGERS
- (24) THROWOUT LINK LEVER ROLLER
- (25) PUSH ROD / TRIP LEVER FRICTION FACES
- (26) TRIP LEVER STOP PIN
- (27) TRIP LEVER BEARING BUSH OIL HOLE
- (28) SPRING ANCHOR RINGS

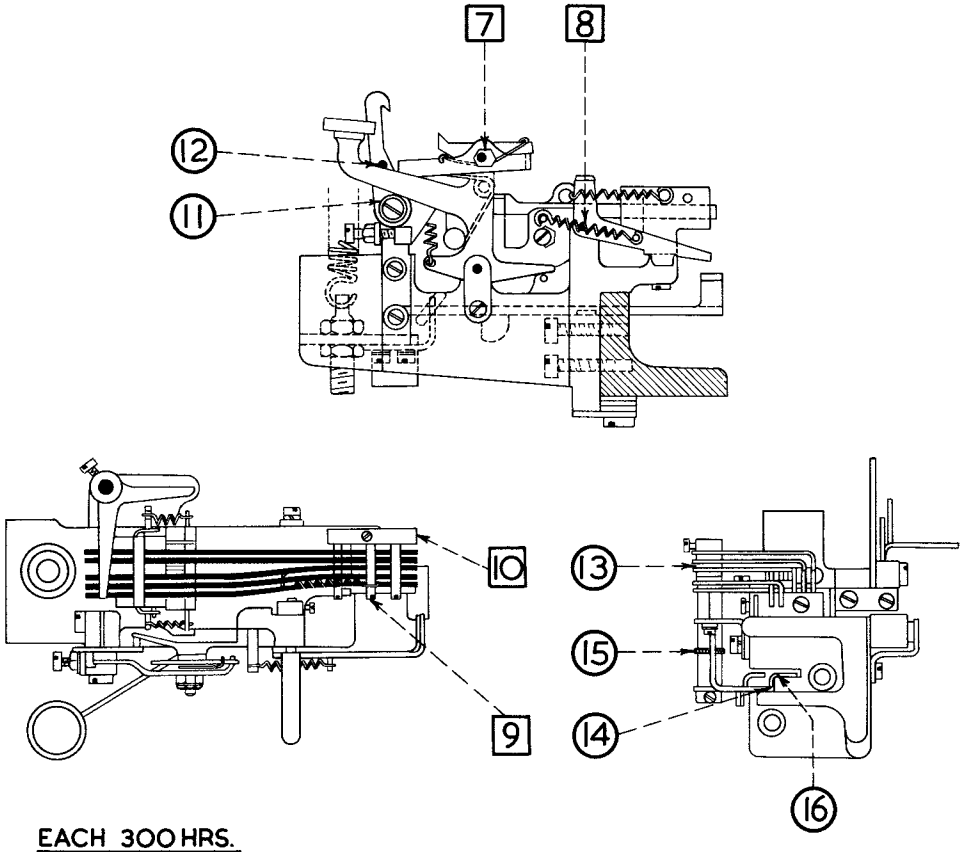
WHEN DISMANTLING

- [11] GUIDE RACK SLOT
- [12] SELECTOR CABLE PLUNGERS
- [13] WIRE CORES OF TRIP & SELECTOR CABLES

FIG. 33

LUBRICATION INSTRUCTIONS

No.2 LUBRICANT.



EACH 300 HRS.

(11) TAPE FEED PAWL PIVOT
(12) TAPE FEED PAWL THROWOUT PIN
(13) SELECTOR LEVERS PIVOT
(14) TRIP LEVER/TRIP BAR FRICTION FACES
(15) FELT LUBRICATION WASHER
(16) GUIDE RACK SLOTS FOR TRIP BAR

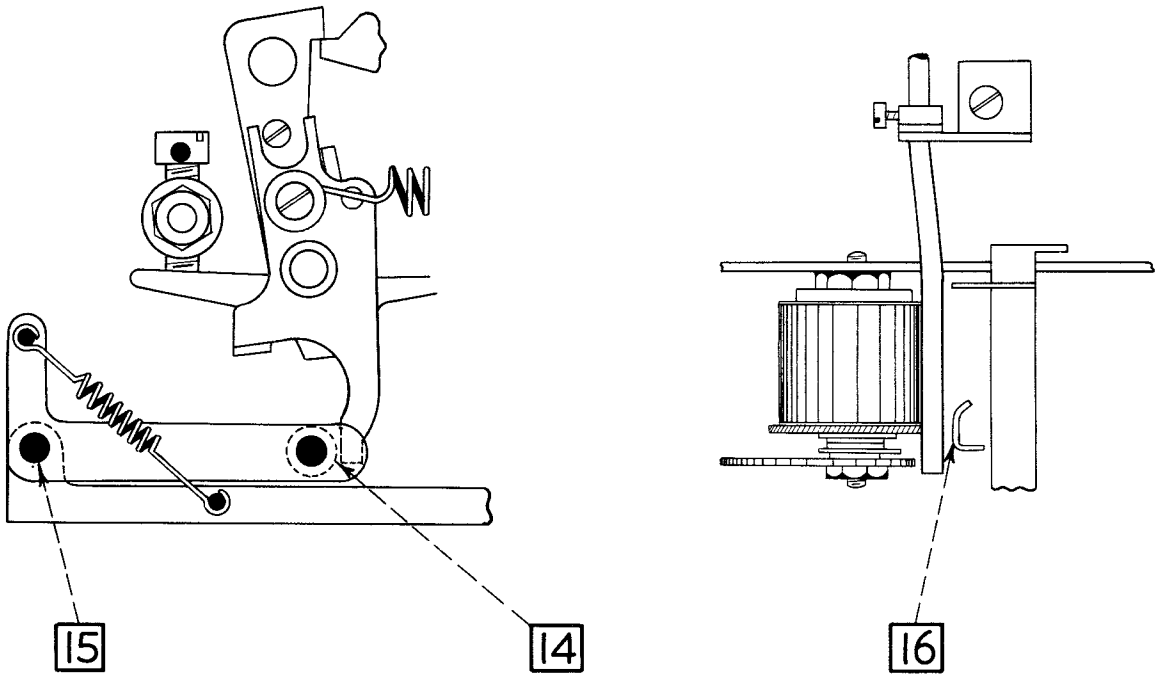
WHEN DISMANTLING

[7] BACK SPACE PAWL ECCENTRIC PIVOT
[8] TRIP THROWOUT LEVER PIVOT
[9] ANVIL BAR SPRING ANCHOR POINTS
[10] ANVIL BAR GUIDE RACK SLOTS

FIG. 32

LUBRICATION INSTRUCTIONS

No.2 LUBRICANT.



WHEN DISMANTLING

- [14] DETENT/TRIP LINK FRICTION FACES
- [15] TRIP LINK PIVOT
- [16] A/B SUPPRESSION TRIP ROD FRICTION FACE
- [ ] ALL SPRING ANCHOR POINTS

FIG. 34