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Colin Hinson
In the village of Blunham, Bedfordshire.

INSTRUCTION BOOK NO. 47R
(4th EDITION)

creed

model 47 – TAPE TELEPRINTER (RECEIVER)

maintenance instructions

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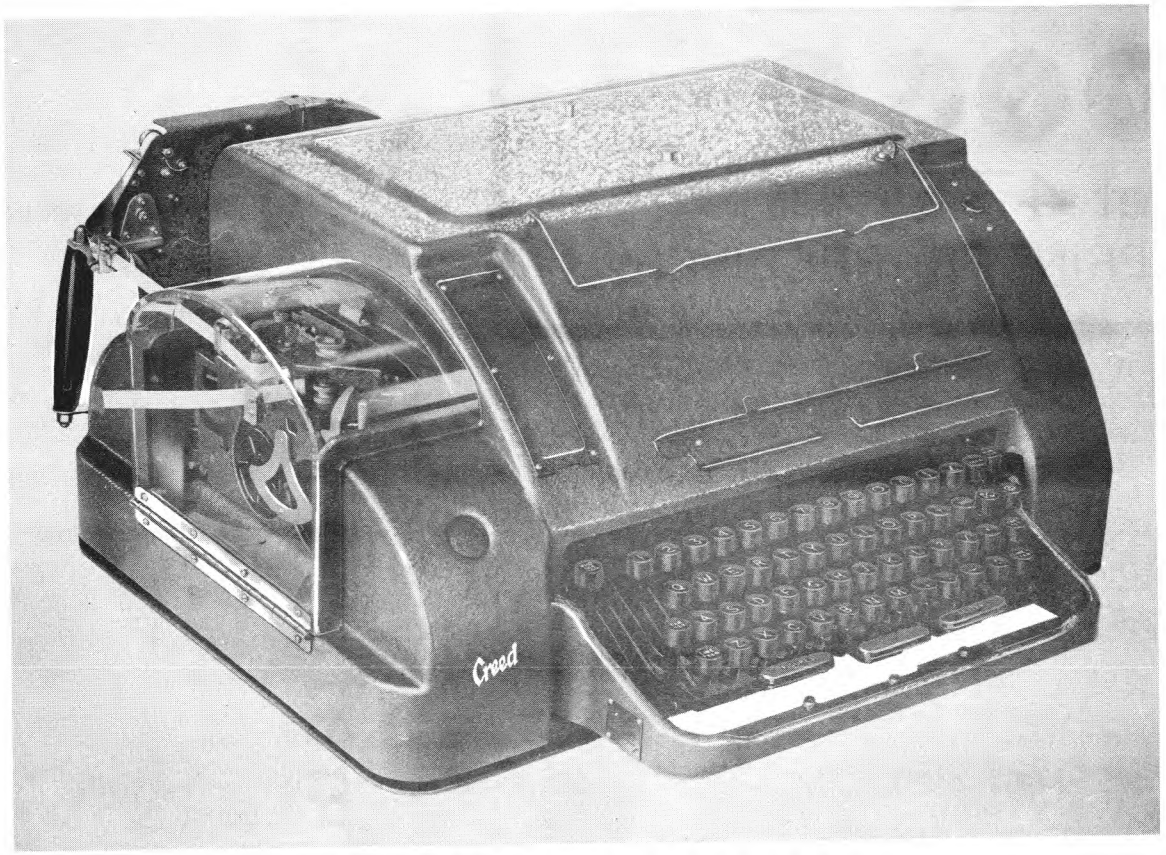


FIG. 1 MODEL 47 TAPE TELEPRINTER

CONTENTS

INTRODUCTION

This instruction manual applies to the receiving parts of the Model 47 Teleprinter only. Instructions covering the keyboard part of the machine are provided separately in the following publications:–

1. Instruction Booklet No. 47K: applicable to the 'N' (non-storage) keyboard.

2. Instruction Booklet No. CTK/78: applicable to the 'CTK' (Commercial Typewriter) keyboard.

This edition includes the information previously issued in Technical Information Supplements Nos. 2 and 37. These two publications are therefore cancelled.

References to the electromagnet and tape units are to the current versions, i.e. S.2848A and S.2850B respectively. Earlier versions of these units are no longer in general production, and in consequence are not covered in this booklet.

A. ELECTROMAGNET AND CAM UNIT

1. Electromagnet Armature Bearings (Figs. 2 and 3)

Note: This instruction need only be carried out at major overhaul periods, i.e. when the unit is off the machine.

1.1 Slacken the four screws C, Fig. 2, and remove the electromagnet cover.

1.2 Check that the top of the armature is approximately level with the top of the field laminations with an estimated vertical play of .003 – .005 in. (.08 – .13 mm.). Check also that the movement of the armature from side to side is symmetrical with respect to the pole faces.

1.3 If either of the above conditions is not satisfied, remove the electromagnet from the main base and carry out Instructions 1.4 – 1.10.

1.4 Unhook the rear bias spring and the spring attached to the rear of the adjustable magnet. Remove the screw and washer securing the retaining plate and remove the plate together with its collar. Unhook the remaining front spring. Remove the screw securing the safety plate and remove the plate. Lift off the field unit.

1.5 By means of the top and bottom adjustment screws J, Fig. 3, set the armature to its correct height and secure the screws with their locknuts.

1.6 Slacken the four screws K securing the upper and lower armature bearing blocks so that the armature pivots are free to move laterally.

1.7 Swing the armature clockwise and adjust the lateral position of the bearing blocks so that the armature touches diagonally opposite pole faces. Tighten screws K sufficiently to prevent free lateral movement of the armature.

1.8 Swing the armature anti-clockwise. If it again touches both diagonally opposite pole faces, the correct adjustment has been obtained and the four screws K may be tightened.

1.9 If the armature touches only one pole face, measure the gap between the armature and the other pole face. Slacken the four screws K and adjust the bearing blocks until the gap is reduced by half. Tighten screws K.

1.10 Re-assemble the electromagnet by carrying out Instruction 1.4 in the reverse order. Fit the electromagnet cover and tighten screws C, Fig. 2.

2. Magnet Bias and Field Strength (Fig. 2)

2.1 Disconnect the electromagnet armature from the trip shaft by removing screw E. If the machine is set up for single-current operation, remove the bias spring.

2.2 With no current in the operating magnet windings, check the force, measured in front of the armature stop plate D, required to move the armature from side to side. This force should be:–

(a) 9 – 11 ozs. (255 – 312 gms.) for double-current operation.

(b) 7 – 9 ozs. (198 – 255 gms.) for single-current operation.

2.3 The forces in the two directions should not differ by more than 1 oz. (28 gms.). Note the actual values obtained, as they will be required in Instruction 7.

2.4 If these values are present, re-connect the armature to the trip link by fitting screw E so that it engages with the block on the end of the link.

2.5 If the above values are not present, adjustments 2.6 – 2.8 should be carried out.

2.6 Slacken screw A and turn screw B until the forces are equal within 1 oz. (28 gms.). Clamp screw B with screw A.

2.7 Adjust the field strength to within the prescribed limits by slackening locknut G and turning knurled screw H. When the correct field strength is achieved, tighten locknut G.

2.8 Connect the armature to the trip shaft by fitting screw E.

3. Receiving Cam Sleeve (Fig. 5)

3.1 Check that the cam sleeve rotates freely without sufficient end play to be detected by hand. This end play should not exceed .0015 in. (.038 mm.).

3.2 If necessary, adjust the nuts M on the end of the camshaft until the required condition is achieved.

3.3 Check that the pawls engage their ratchets with a clean, lively action, and independently of one another.

3.4 If this is not the case, check that the pawls are not distorted and that they are free of dirt or grease.

4. Trip Shaft (Figs. 4 and 5)

4.1 Check that trip shaft C pivots freely with a minimum of end play.

4.2 If necessary, adjust the cone-pointed pivot of the trip shaft.

5. Finger Setting Blade (Vertical Adjustment) (Figs. 4 and 5)

Note: This instruction provides a coarse static check and adjustment procedure for the setting blade height. A more sensitive, dynamic adjustment is provided in Section G.

5.1 Move the electromagnet armature to the 'spacing' position, i.e. towards the rear of the machine, and commence to turn the machine slowly by hand. Immediately after the receiving cam is released, return the armature to the 'marking' position and continue to turn the machine until the finger setting blade P, Fig. 5, *just* touches the setting pin N when the pin is opposite the middle finger.

5.2 Check that the centre of blade P strikes across the centre of pin N.

5.3 If this is not so, slacken screw A, Fig. 4 which clamps trip shaft lever B to the trip shaft C, and holding the electromagnet armature in the 'marking' position, turn the trip shaft until the finger setting blade P, Fig. 5, is central with respect to pin N. Tighten screw A, Fig. 4.

5.4 Move the electromagnet armature to the 'spacing' position, and continue to turn the machine by hand. Check that blade P, Fig. 5, clears pin N.

6. Pilot Cam Detent (Fig. 4)

6.1 Hold the armature against the 'spacing' stop and check that pilot detent cam lever F clears the lug on pilot cam G by .013 – .017 in. (.33 – .43 mm.), i.e. dimension 'a'.

6.2 If necessary, slacken screw D and position block E on trip shaft C until dimension 'a' is set up.

7. Reaction on Armature (Figs. 4 and 5)

7.1 With the electromagnet armature connected to the trip shaft C, Fig. 4, check that the forces to move the armature from side to side are equal and reduced by not more than 2 ozs. (57 gms.) from the values obtained in Instruction 2.

7.2 If this is not so, wedge the armature centrally in the armature stop gap with feeler gauges, remove screws Q, Fig. 5, and the upper blade guide.

7.3 Apply a twist and/or set to the striker blade P between point X and pivot H until the lower face of the blade lies flat without detectable pressure on the lower blade guide. Replace the upper blade guide and screws Q.

7.4 Remove the feeler gauges from the armature stop gap and repeat check 7.1.

8. Receiving Cam Detent (Figs. 6, 10 and 11)

8.1 Set the sliding frame of the orientation device to '50' on the scale. Rotate the receiving cam until the pawls are fully engaged by the detent. Withdraw the detent from the pawls, allowing them to drop into engagement with the cam ratchets. Release the detent so that it comes to rest against the ends of the pawls as in Fig. 11.

8.2 Try to insert the narrower, .047 in. end of Adjustment Tool TA.1123A between the centre of the lug on retaining ring R, Fig. 10, and sickle lever T, as shown at G. It should be possible to do this without moving lever T.

8.3 Repeat this procedure with the wider, .053 in. end of the tool and check that this time lever T is moved.

8.4 If either of the above conditions is not satisfied, slacken capstan-headed screw S, Fig. 6, and, by means of the screwdriver adjustment, adjust the relative positions of detent R and sickle lever T, Fig. 10. Tighten screw S, Fig. 6.

9. Retention Lever (Fig. 6)

9.1 Disengage the detent from the pawls and rotate the cam slightly so that a spring balance may be applied to each pawl engagement face at F1. It should require 2½ – 3½ ozs. (71 – 99 gms.) to press the pawls back against the cam seating.

Note: If new springs are fitted, this tension will be in the region of 3 – 4 ozs. (85 – 113 gms.).

9.2 As the freedom of the pawls has already been checked in Instruction 3.3, it will be necessary, if check 9.1 is not satisfied, to change the pawl springs.

9.3 Complete the rotation of the cam until it is arrested again by the detent. Depress the pawls by means of a thin blade, in the direction indicated by the arrow F1 in Fig. 6, without moving the cam. Check that there is an estimated clearance of .002 – .004 in. (.05 – .10 mm.), i.e. dimension 'c', between the pawls and the detent.

9.4 If this is not so, slacken the clamping screw of eccentric pivot F, and, holding the retention lever G down against the cam profile, turn pivot F by means of a suitable spanner, until dimension 'c' is set up. Tighten the clamping screw of pivot F.

10. Setting Pin (Fig. 5)

10.1 Turn the machine by hand and move the electromagnet armature so that the blade P strikes finger-setting pin N, setting the five fingers in turn. Check whether the pin is central with each finger when it is at the fully set position. Check also that, in any selecting position, there is no danger of the pin fouling an adjacent unselected finger as it withdraws from pushing a finger forward.

10.2 If this condition is not satisfied, slacken capstan-headed screw L and adjust the position of setting pin N by sliding the bearing springs along the traversing link until the required conditions are obtained. Tighten screw L.

Note: When carrying out this adjustment care should be taken to ensure that pin N remains at right angles to the traversing link and does not foul on the edge of the slot in the link.

11. Finger Setting Blade (Horizontal Adjustment) (Figs. 5 and 7)

11.1 Turn the machine by hand and move the electromagnet armature so that each of the five fingers J, Fig. 7, in turn is set by the setting blade P, Fig. 5.

11.2 Check the clearance 'd', Fig. 7, between the fifth finger and either the stop plate H or the resetting link, whichever is closer to the fingers. This dimension should be .003 – .020 in. (.08 – .51 mm.).

11.3 If necessary, slacken screw H, Fig. 5, and re-position the setting blade P with respect to its cam lever, until dimension 'd', Fig. 7, is set up. Tighten screw H, Fig. 5.

12. Finger Springs (Fig. 7)

12.1 Remove the tape reel holder. Rotate the machine by hand until the fingers are fully lowered. Remove the traversing link.

12.2 Check that a force of 3 – 5 ozs. (86 – 143 gms.), i.e. F2, is required to set each finger inwards when applied in the direction of the arrow.

12.3 If the above condition is not present, remove the finger damping springs and check them by carrying out the following procedure:–

(a) Place the springs on a flat surface so that their ends are touching the surface.

(b) Check that a force of 6 – 7 ozs. (170 – 198 gms.), applied to the centre of each spring, causes the spring to flatten out against the surface.

12.4 If any spring does not meet this requirement it should be replaced by a new spring.

12.5 Replace the traversing link.

13. Finger Lift (Fig. 8)

13.1 Remove the tape reel holder. Set up the 'N' combination (– – 34 –) and turn the machine by hand until the fingers are in their uppermost position and the selected bellcrank has dropped into the slot in the combination discs.

13.2 Check whether the clearance between the bellcrank and the left-hand side of the slot (viewing the slot from the bellcrank lifting collar end of the combination head) is greater than .012 in. (.30 mm.) and whether the clearance between the bellcrank and the right-hand side of the slot is greater than .006 in. (.15 mm.).

13.3 Check also that there is a minimum of .006 in. (.15 mm.) clearance between the shoulder of the finger plunger and the underside of the finger block.

13.4 If adjustment is necessary, turn the cam until the fingers are lowered, release clamp screw AL and adjust the finger lift by means of eccentric AM. Clamp screw AL.

14. Comb Stop Plate (Fig. 13)

Note: This adjustment should only require attention at major overhaul periods.

14.1 Turn the machine by hand and set up an all spacing combination. Continue to turn until the bellcrank lifting lever has just released the combs and the comb extensions B have dropped.

14.2 Slacken screw C and allow the comb stop plate D to drop. Raise the plate, until it just touches the lowest of the comb extensions B, this condition being detected by a slight movement of the extension. Tighten screw C.

15. Finger Re-setting (Figs. 7 and 15)

15.1 Check that when the fingers are re-set there is a minimum clearance of .015 in. (.38

mm.) between the fingers and the ends of the comb extensions, i.e. dimension 'e', Fig. 7.

15.2 Check also that, when the fingers are fully re-set, they are free to move at least .005 in (.13 mm.), i.e. dimension 'k', Fig. 15.

15.3 If either of these conditions is not obtained, slacken screws J, and re-position plate K. Tighten screws J.

16. Bellcrank Lift (Figs. 13 and 14)

16.1 Set up the 'N' combination (– – 34 –) on the fingers and turn the machine by hand until the 'N' bellcrank falls.

16.2 Hold the bellcrank lifting collar E, Fig. 13, as far away from the combination head as possible to take up any backlash, and check that there is a clearance of .006 – .008 in. (.15 – .20 mm.), i.e. dimension 'j', between the fallen bellcrank A and the lifting collar E.

16.3 If this is not so, slacken screw H, Fig. 14, and, with the machine set up as in 16.1, adjust the bellcrank lifting lever eccentric F until dimension 'j', Fig. 13, is satisfied. Tighten screw H, Fig. 14.

16.4 Return the machine to the rest condition, then to the position where all the bellcranks are fully lifted. Lift each comb extension B, Fig. 13, in turn and ensure that it returns to its rest position snappily when released.

16.5 Check that the force required to lift each bellcrank, applied at the typehead end, is between 1 – 1¾ ozs. (28 – 50 gms.).

16.6 If either of the checks given in 16.4 or 16.5 is not satisfied, and if no other cause can be found, the bellcrank return spring should be replaced.

B. PRINTING MECHANISMS

17. Type Retaining Springs (Fig. 24)

17.1 Select a type which is approximately in line with the anchor point of one of the retaining springs. Check that the force, applied in the direction of the arrow F3, necessary to ***just*** move the type is 7 – 8 ozs. (198 – 227 gms.).

17.2 Repeat this check with the two remaining springs.

17.3 If any spring appears to be weak, it should be replaced by a new spring.

17.4 If the force to move the type is too high, it may be due to a bent type, bent type rack, rough edges or dirt.

18. Typehead Latch Engagement (Fig. 26)

N.B. This adjustment should not normally require attention. It should be checked only when doubt exists whether there are the correct number of shims behind the clutch body, or if it is suspected that the latch engagement may not be correct for any other reason.

18.1 Set up the 'N' combination (– – 34 –) and turn the machine by hand until the typehead latch has latched on to the fallen bellcrank.

18.2 Press the typehead towards the combination head and check that the latch/bellcrank engagement is .050 – .065 in. (1.27 – 1.65 mm.), i.e. dimension 's'.

18.3 Add or remove shims PW.5558 behind the typehead until dimension 's' is satisfied.

19. Typehead End-play (Fig. 24)

N.B. The abutment stop locating this adjustment is painted red and ***should not normally be disturbed.*** If, however, new parts are fitted to the typehead, or the typehead latch engagement altered, the end-play should be checked and, if necessary, adjusted.

19.1 Check that the typehead end-play is .001 – .004 in. (.03 – .10 mm.). This may be checked by touch, but if a more accurate method is required the following procedure should be adopted:–

(a) Remove screw A, Fig. 24, the typehead support bracket D and the typehead.

(b) Remove the typehead from the typehead spindle, using the special clamp and support plate TA.1118.

(c) Re-assemble the typehead spindle and bracket D to the machine and, ensuring that bracket D is located by its abutment, tighten screw A.

(d) Press the typehead spindle towards the combination head and check that there is a clearance of .001 – .004 in. (.03 – .10 mm.) between the shoulder of the spindle and the bearing of support bracket D.

19.2 If the typehead end-play is not within the above limits, slacken screws A and B and position abutment C until it locates bracket D in the position which gives the correct end-play. Tighten screws A and B.

20. Typehammer (Fig. 9)

20.1 With the machine in the rest position, slacken screw BU and extract pin BV, thereby disconnecting the hammer shackle.

20.2 Ensure that the inner type rack is free of distortion.

20.3 Hold the typehammer against stop R and adjust the stop until a clearance of .010 – .015 in. (.25 – .38 mm.), i.e. dimension 'f', is obtained between the hammer head and the rear face of the type rack U. Clamp stop screw R in this position with its lock-nut and re-connect the hammer shackle.

20.4 Set up the 'N' combination (– – 34 –) and turn the machine by hand until the 'N' bell-crank falls. Continue to turn the machine until the typehead locates and latches on the fallen bellcrank.

20.5 Adjust nuts X until there is a clearance of $\frac{1}{16}$ in. (1.6 mm.), i.e. dimension 'g', between hammer head T and the rear face of the types W.

20.6 Slacken screws Y and adjust spring Z until hammer head T is in alignment with the centre of the type W. Make the screws Y finger tight. Remove the typehammer from the machine and fully tighten screws Y. Rotate the rod AA until the spring enclosed in the shackle is fully compressed, then unscrew the rod by approximately three turns, replace on the machine and secure with the retaining plate.

C. TAPE UNIT

21. Ribbon Feed Pawl Spring Anchor (Fig. 16)

21.1 Remove the tape unit from the machine.

21.2 Check that when feed pawl T is fully engaged with a tooth of either feed wheel it does not touch the side of the large hole in bias arm C.

21.3 With the unit at rest, check the force necessary to move feed pawl T out of engagement with its feed wheel.

21.4 Move the feed pawl to its alternative position and repeat 21.3 above. These forces should be equal.

21.5 Move change-over lever H to its alternative position and operate the feed mechanism by depressing lever W. Check that feed pawl T moves over to its alternative position with a free and snappy action.

21.6 If necessary, slacken screws E and position plate F until conditions 21.2 – 21.5 are satisfied. Tighten screws E.

22. Ribbon Reversing Lever (Fig. 16)

22.1 Push the ribbon change-over lever H to its alternative position.

22.2 Operate the feed mechanism slowly by hand by depressing lever W, until the projection on lever G engages with the lower edge of change-over lever h. Check this engagement.

22.3 Continue to feed the mechanism so that the feed pawl T moves over to the alternative feed wheel.

22.4 Repeat 22.1 and 22.2. Compare the two engagements and, if necessary, equalise them by slackening screw R and re-positioning plate S. Tighten screw R.

23. Feed Lever Stop Screw (Fig. 16)

Note: The position of stop screw U is set at the factory assembly stage and should not normally need attention. The adjustment should be checked however, when the machine is overhauled.

23.1 Slacken the locknut of screw U and withdraw the screw until feed lever V is resting on the casting.

23.2 With the retaining pin of the ribbon feed retaining pawl N fully engaged with a tooth of feed wheel A, screw in screw U until the feed pawl T is fully engaged with the third tooth back from the retaining tooth.

23.3 Withdraw screw U a further 6½ – 7 turns and clamp with its locknut.

24. Operating Lever (Figs. 16 and 17)

24.1 With the feed lever V, Fig. 16, resting on its stop screw U, slacken the locknut of screw AE, Fig. 17, and adjust the latter so that, when operating lever W, Fig. 16, is resting against it under the action of its spring, there is a clearance of .010 – .020 in. (.25 – .51 mm.), i.e. dimension 'm', Fig. 17, between the flat of pin AF and the permissive feed pawl AG. Tighten the locknut of screw AE.

25. Tape Gripper Lever Stop Screw (Fig. 17)

25.1 Slacken locknut AD and screw in screw AC as far as it will go.

25.2 Hold lever AA to the right, i.e. in the direction of the arrow, so that pin AB is in contact with the edge of the hole in the casting. Adjust screw AC until it *just* touches lever AA, then give the screw an additional turn so that pin AB is moved clear of the edge of the hole in the casting. Clamp screw AC in this position with locknut AD.

26. Trip Arm Pivot (Figs. 17, 18 and 19)

26.1 Slacken screw F, Fig. 18, and adjust eccentric pin A so that, with a .031 in. feeler gauge between lever AA, Fig. 17, and screw AC, the vertical edge C, Fig. 18, of trip arm D is *just* touching the top of seeker H, Fig. 19. Tighten screw F, Fig. 18.

Note: The inner throw of eccentric pin A should be used to avoid any

fouling between the pivot and the traversing link when the unit is on the machine.

27. Reset Lever (Fig. 17)

27.1 Hold lever AA against screw AC, slacken screw AH and adjust reset lever Z so that it clears lever AA by .003 – .006 in. (.08 – .15 mm.), i.e. dimension 'l'. Tighten screw AH.

28. Pressure Roller Arm (Figs. 16 and 17)

28.1 Slacken screw AJ, Fig. 17, and position stop bracket P, Fig. 16, so that, when pressure roller arm Y, Fig. 17, is moved in an anti-clockwise direction in order to release the tape, it cannot foul ink ribbon guide X. Tighten screw AJ.

29. Platen (Figs. 20 and 21)

29.1 Replace the unit on the receiver. Slacken screw K, Fig. 21, and adjust eccentric B, Fig. 20, so that the platen face is vertical when the latch is fully engaged with the eccentric. Tighten screw K, Fig. 21.

29.2 Remove the ink ribbon and paper tape. Slacken screws J and adjust the position of platen assembly M to give a clearance of .057 – .067 in. (1.4 – 1.7 mm.) between the platen and the face of the types. Tighten screws J.

30. Ink Ribbon Feed (Fig. 21)

30.1 Remove the ink ribbon spools, select any feeding combination and turn the machine by hand until the traversing link is in its maximum forward position.

30.2 Adjust screw L until the retaining pawl R on the ribbon unit *just* falls behind a tooth on the ribbon ratchet wheel S. Check that the feed lever can be moved a little further and is not jammed. Check also that the feed is satisfactory on both ratchet wheels.

31. Tape Feed (Fig. 21)

31.1 Select any feeding combination and turn the machine by hand until the traversing link is in its fully forward position. Slacken screw N and move plate P, which carries the retaining pawl R, as far anti-clockwise as possible.

31.2 Holding the tape feed spindle against the feed pawl H, move plate P in a clockwise direction until it tends to move the tape feed spindle, retract slightly and tighten screw N.

32. Tape Feed Alarm Lever (Fig. 20)

32.1 Unlatch the tape unit. Rotate the machine by hand until the traversing link is fully forward, i.e. towards the tape unit.

32.2 Slacken the locking nut of screw G and adjust the latter until lever A is *just* resting against pin B. Unscrew screw G half a turn and clamp with its locking nut.

32.3 Continue to turn the machine by hand until it comes to rest.

33. Tape Feed Alarm Contacts (Fig. 20)

33.1 With the tape unit still unlatched, slacken screw E (under the main base) and adjust the switch until contact blade D is clear of the buffer block F by .010 in. (.25 mm.), i.e. dimension 'n'. (This can best be seen through the aperture in the switch mounting plate). Tighten screw E.

D. CONTROL LEVER UNIT

34. Control Levers (Fig. 22)

34.1 Remove the tape unit, the typehammer bracket, typehead and typehead front bearing block. With the control levers in their unoperated positions, loosen screws D, Fig. 22, and adjust plate E until the underside of the outer right-hand control lever is in the same plane as the underside of the outer left-hand control lever. Tighten screws D. (When only two right-hand control levers are fitted, proceed as above, making the adjustment with respect to the lower of the two levers).

34.2 Slacken screw F and adjust the stop plate G so that the upper edge of the feed throw-out lever H, which is resting against plate G, is held clear of the lower face of the outer control levers by .010 – .015 in. (.25 – .38 mm.), i.e. dimension 'p'. Tighten screw F. (When only two right-hand control levers are fitted, the above adjustment must be made to the lower of the two levers.)

34.3 Set up the 'Letters' combination (12345) and turn the machine by hand until the 'Letters' bellcrank falls. Slacken locknut L and adjust screw K until it is clear of the throw-out lever H by .003 – .006 in. (.08 – .15 mm.), i.e. dimension 'q'. Tighten nut L. Replace the typehead, taking care to engage its coupling spring correctly with the clutch band. Replace the typehead bearing block, making sure that the abutment plate is touching the control lever casting. Replace the tape unit.

35. Throwout Lever Height (Figs. 12 and 22)

35.1 Set up any printing combination and turn the machine by hand until the printing cycle is completed and the machine returns to the rest condition. Check that the top of the feed throwout rod N, Fig. 22, is .020 – .030 in. (.51 – .76 mm.) below the lower face of the permissive feed pawl H, Fig. 12. If this is not so, slacken screw J, Fig. 22, and adjust the pivot of rod N until the above dimension is present. Tighten screw J. Replace the typehammer bracket, holding it with a torque applied in a clockwise direction when tightening the fixing screws. Replace the typehammer.

35.2 Set up any non-feed combination, e.g. 'Letters', and turn the machine by hand so that it completes one cycle of operations and returns to the rest condition. Check that there is a clearance of $\frac{1}{8}$ in. (3.2 mm.) between the side of permissive feed pawl H, Fig. 12, and pin N, i.e. dimension 'h'. If this is not so, slacken the screw clamping bracket M, Fig. 22, so that it is friction tight, and adjust the bracket until dimension 'h', Fig. 12, is satisfied. Turn the machine through a further cycle of operations and check that lever H, Fig. 12, falls against the side of pin N as it moves forward. Tighten the screw clamping bracket M, Fig. 22.

36. 'Bell' Contact Lever (Fig. 23)

36.1 Remove the keyboard if it is not already removed. With the receiver pre-set to print in the figures case, select the 'Bell' combination (12 – 4 –) and turn the machine by hand until the bellcrank drops and allows its control lever to operate.

36.2 Check that the lower contact of the 'Bell' contact set (under the main base) is lifted clear of the ceramic buffer block by .015 – .020 in. (.38 – .51 mm.). If necessary, slacken screw AU and, with the lever AV in contact with the fallen bellcrank, adjust the position of lever AW by means of the screwdriver slots until the above condition is satisfied. Tighten screw AU.

36.3 With the bellcranks unoperated, ensure that lever AW is clear of its plunger.

E. STARTER SWITCH

37. Manual Operation (Fig. 28)

37.1 Depress the red 'Stop' button to ensure that the unit is in the rest condition.

37.2 Check that there is an engagement of .015 – .020 in. (.38 – .51 mm.), i e. dimension 'u', between contact latch E and the contact-operating bar.

37.3 If this is not so, slacken screw F and adjust eccentric G until dimension 'u' is achieved. Tighten screw F

38. Automatic Operation (Figs. 29 and 30)

38.1 Slacken the screw AO, Fig. 29, so that lever AP is friction tight on rod BY.

38.2 Slacken the screw securing collar AZ. Hold rod BY lightly to the left to take up backlash without stressing spring BZ, Fig. 30, and adjust the endways position of lever AP, Fig. 29, so that the edge of the spring S lines up with the left-hand side of detent lever Q (see inset i). Clamp lever AP lightly by means of screw AO.

38.3 Move collar AZ so that it touches lever AP and tighten its set screw.

38.4 Move the electromagnet armature to the 'marking' position. Slacken the screw clamping collar CD, Fig. 30. Slacken screw AO, Fig. 29, slightly and, with the 'Stop' button fully depressed, position lever AP radially so that spring S *just* touches the toe of detent lever Q. Ensure that lever AP is still in contact with collar AZ and tighten screw AO.

38.5 Move the electromagnet armature to the 'spacing' position. Fully depress the 'Stop' button and hold collar CD, Fig. 30, in contact with its operating claw. Position shaft BY, Fig. 29, so that spring S clears the left-hand side of the detent lever by not more than $\frac{1}{32}$ in. (.8 mm.), i.e dimension 'v', inset ii, and tighten the clamping screw of collar CD, Fig. 30.

F. TAPE REEL HOLDER

39. Location of Unit (Figs. 31 and 32)

39.1 With the cover on the machine, slide the tape reel holder on to its bracket at the rear of the machine.

39.2 Adjust the position of screw AC, Fig. 31, by means of the two locknuts until the tape guide bracket AD is held clear of the cover by approximately $\frac{1}{16}$ in. (1.6 mm.), i.e. dimension 'w'.

39.3 If necessary, adjust the screw AG, Fig. 32, to prevent any rocking motion of the tape reel holder and lock in that position with locknut AH.

40. Tape Brake Mechanism (Fig. 25)

40.1 Slacken the nut securing pin N until it is friction tight.

40.2 Turn the tape reel holder upside down. Adjust the position of pin N in its slot until, with the intermediate lever M engaging with the tape jockey J at L, and the brake lever E at P, dimension 'r' is $\frac{1}{32}$ – $\frac{1}{16}$ in. (.8 – 1.6 mm.). Ensure that the brake pad G is clear of the tape wheel under these conditions and tighten the nut securing pin N.

40.3 In order to obtain the above adjustment it may be necessary to turn the brake pad G round through 90 or 180 degrees.

G. ADJUSTMENTS WITH THE MOTOR RUNNING

41. Receiving Cam Detent (Figs. 6 and 10)

41.1 With the motor running, insert the smaller end (of diameter .047 in.) of Adjustment Tool TA.1123A between lever T, Fig. 10, and the lug on retaining ring R, ensuring that the pin rests in the middle of the lug. Check that detent R, Fig. 6, is not withdrawn from the pawls.

41.2 Repeat this check, using the larger end (.053 in.) of the adjustment tool and check that this causes the detent to withdraw from the pawls.

41.3 If these conditions are not present, refine Adjustment 8.

42. Finger Setting Blade

42.1 With the motor running and the electromagnet armature against its marking stop, insert a .013 in. (.33 mm.) feeler gauge between the armature and the spacing stop and hold the feeler gauge against the stop by means of the armature. If the receiving cam detent has not already released, release it and check that all-marking combinations only are set up on the fingers.

42.2 Repeat the above procedure with a .009 in. (.23 mm.) feeler gauge. This time all-spacing combinations only should be set up on the fingers.

42.3 If either of the above checks is not satisfied, re-adjust the height of the finger-setting blade as given in Adjustment 5 and re-check Adjustments 6 and 7.

43. Typehammer Shackle

43.1 Check that the printing is neither too heavy nor too light.

43.2 If this is not so, remove the typehammer from the machine and adjust the tension of the shackle spring until the printing is satisfactory. Replace the typehammer on the machine.

44. Typehead Clutch Torque

44.1 Select the letter 'J' on the combination head, so that the typehead clutch latches on the 'J' bellcrank with the large gap in the types uppermost.

44.2 Apply a 0 – 12 oz. spring balance to the typehead by placing the hook of the balance over a type and tension the balance to read 6 ozs. (170 gms.). Hold the balance firmly in this position.

44.3 Depress the space bar or move the electromagnet to space and check that the spring balance now reads 7 – 9 ozs. (198 – 255 gms.).

44.4 If the reading is too high and a new clutch lining has just been fitted, the machine should be run continuously until the clutch pressure is reduced to within the limits specified in 44.2 above.

44.5 If the reading is incorrect, and a new clutch lining has not been recently fitted, check the clutch band and lining for wear and other causes of incorrect pressure.

45. Motor Speed

45.1 Test the speed of the motor with a 125 d.v.s. fork stroboscope (TA.1117). The stroboscopic image is obtained from the governor cover, which is painted with five equally-spaced white stripes. If the stroboscopic image appears to be stationary, the motor speed is correct. If it appears to move in a clockwise or anti-clockwise direction, then the speed is too fast or slow respectively.

45.2 If the speed is incorrect, the cause may be in the voltage of the mains supply, a break or short-circuit in the governor circuit, the governor contacts or in the governor speed adjustment. As the speed of the motor is accurately set before leaving the factory, the adjustment should not be altered unless it is definitely proved that the fault does not lie elsewhere. Hence, check:–

(a) the voltage of the supply;

(b) the governor contacts;

(c) the governor circuit. This may be quickly done by holding the magnet armature in the marking position and short-circuiting the governor brush connections. In the case of series or universal motors, the speed should increase to considerably above its governed value, and the motor may have to be switched off before the speed will decrease. (Great care must be exercised to ensure that the magnet armature does not move from the marking stop while the test is being made). In the case of the shunt motor, the speed should decrease to below its governed value.

45.3 If the items checked in 45.2 are correct but the speed is incorrect, the tension of the governor spring must be altered. Insert a small screwdriver through the hole in the governor cover and turn the governor spring adjusting screw in a clockwise direction to increase the speed, or in an anti-clockwise direction to decrease the speed. It will be found that one complete turn of this screw will alter the speed by approximately 30 r.p.m.

H. SINGLE-CURRENT ADJUSTMENTS

N.B. (a) The adjustment for the magnet field strength, i.e. adjustment 2.2(b), produces optimum results only on circuits employing a signalling supply of 60 – 120 volts and 40 mA. receive current. If an adjustment for voltages and currents outside this range is required, it will be necessary either to experiment or to apply to Creed and Company for a special investigation to be made.

(b) Different adjustment procedures are given in the following instructions for short and long lines. By a 'short' line will be meant one whose capacitance is less than that of 20 km. of 20-lb./loop mile copper underground cable. A 'long' line, correspondingly, will be one whose capacitance is greater than this. If there is any doubt as to whether the line is 'short' or 'long' according to the above definition, adjustment procedure 48 should be followed, which is provided to cover this case.

(c) It is assumed that the source of signals for these adjustments is either a T.D.M.T. (or other high-grade source) or a correctly adjusted keyboard transmitter. The measurement of receiver tolerance is assumed to be made with the orientation device. If a T.D.M.T. is used for this purpose, however, the orientation device lever should initially be set at 50.

(d) If no keyboard is fitted to the receiver, or if one is fitted but no local record is required, the 'long line' procedure should be followed irrespective of the length of the line.

46. Short Lines

46.1 Check that the electrical connections are for single-current working.

46.2 Set the orientation lever to 15.

46.3 Determine the approximate setting for the bias spring adjustment by transmitting a succession of Rs from the ***local*** transmitter and increasing the tension of the bias spring from zero until correct selection just occurs.

46.4 Refine adjustment 46.3 as follows. Determine the lowest setting of the orientation lever for which the receiver correctly selects both 400 Rs and 400 Ys. Let this setting be x_1.

46.5 Move the orientation lever towards 100. Determine the highest setting of the lever for which the receiver correctly selects both 400 Rs and 400 Ys. Let this setting be y_1.

46.6 Increase the bias spring tension in steps of two or three divisions and repeat the tests in 46.4 and 46.5 until $y_1 - x_1$ is a maximum. Lock the adjustment with the clamp nut.

46.7 Repeat adjustments 46.4 and 46.5 for signals from the ***distant*** transmitter. Let the upper and lower settings of the orientation lever in this case be y_2 and x_2.

46.8 Set the orientation device lever in the centre of the range found in 46.7, i.e. on $\frac{1}{2}(x_2 + y_2)$.

47. Long Lines

47.1 Carry out adjustments 46.1 and 46.2.

47.2 Determine the approximate setting for the bias spring adjustment by transmitting a succession of Rs from the distant transmitter and increasing the tension of the bias spring from zero until correct selection just occurs.

47.3 Refine adjustment 47.2 as follows. Determine the lowest setting of the orientation lever for which the receiver correctly selects both 400 Rs and 400 Ys. Let this setting be x_2.

47.4 Move the orientation lever towards 100. Determine the highest setting of the lever for which the receiver correctly selects both 400 Rs and 400 Ys. Let this setting be y_2.

47.5 Increase the bias spring tension in steps of two or three divisions and repeat the tests in 47.3 and 47.4 until $y_2 - x_2$ is a maximum. Lock the adjustment with the clamp nut.

47.6 Set the orientation lever in the centre of the range found in 47.5, i.e. on $\frac{1}{2}(x_2 + y_2)$.

48. Lines of Unknown characteristics

48.1 Adjust the bias spring tension to give maximum tolerance to ***distant*** signals as in adjustments 47.1 – 47.5.

48.2 Check the margin to ***local*** signals as in adjustments 46.2 – 46.5.

48.3 If the local margin is adequate, centralise the orientation lever to the settings for ***distant*** signals found in 48.1.

48.4 If the local margin is inadequate, increase the bias spring tension two or three divisions of the bias adjustment nut.

(a) If the local margin is thereby increased, the receiver should be adjusted as for 'short' lines, i.e. in accordance with adjustment 46.

(b) If the local margin is decreased still further, the line is too long (i.e. the line capacitance is too great) for satisfactory operation.

49. Short Lines (Alternative Method)

N.B. The 'short lines' procedure given in adjustment 46 is designed to give optimum results. The following simpler procedure may be used, however, in cases where a slight loss of distant margin (not more than 5 per cent) can be tolerated.

49.1 Place the machine in a purely resistive circuit, e.g. in the base workshop.

49.2 Transmitting signals from a T.D.M.T. or a correctly adjusted keyboard transmitter, adjust the bias spring tension until the optimum margin is obtained for successions of 400 Rs and 400 Ys. Clamp the bias adjustment locknut.

49.3 Place the machine in the line circuit in which it normally operates.

49.4 Measure the margin to signals from the *distant* end and centralise this by means of the orientation device.

I. DOUBLE-CURRENT ADJUSTMENTS

50. Margin Measurement and Centralisation (without T.D.M.T.)

50.1 Check that the electrical connections are for double-current operation.

50.2 Check the adjustment of the keyboard transmitter which is to be used as a source of signals.

50.3 Connect the output of the transmitter to the receiver (e.g. by working the transmitter and receiver 'in local').

50.4 Transmit a succession of Rs and move the orientation lever towards zero to determine the lowest position for which the receiver correctly registers 400 transmitted characters.

50.5 Leaving the orientation lever in the position found in the last adjustment, transmit 400 Ys. If the machine fails to select correctly, move the lever towards 100 until the receiver *just* selects correctly. Note the reading, i.e. the orientation setting for which the receiver *just* correctly selects 400 Rs and 400 Ys. Let this setting be x.

50.6 Move the orientation lever past 50 towards 100 and determine, as in 50.4 – 50.5, the highest orientation setting for which the receiver correctly selects 400 Rs and 400 Ys. Let this setting be y.

50.7 The difference between x and y provides an approximate measure of the receiver tolerance. If this is less than the required amount, the adjustment of the machine should be checked.

50.8 Set the orientation lever in the centre of the range determined in 50.7, i.e. on $\frac{1}{2}(x + y)$. Check that this position is between 40 and 60. If this is not so, check the machine adjustments.

51. Margin Measurement and Centralisation (with T.D.M.T.)

51.1 Check that the electrical connections are for double-current working.

51.2 Connect the receiver to the T.D.M.T. and set the orientation lever on 50.

51.3 Transmit a succession of Rs and slowly turn the control knob on the T.D.M.T. so as to shorten the start signal. Determine the shortest start signal for which the receiver correctly registers 400 transmitted characters.

51.4 Leaving the margin control knob in this position, transmit 400 Ys. If the machine fails to select correctly, lengthen the start signal until it *just* selects correctly. Note this reading, i.e. the percentage shortened start signal for which the receiver correctly registers 400 Rs and 400 Ys. Let it be x per cent.

51.5 Slowly turn the margin control knob in the opposite direction and determine, as in 51.3 and 51.4, the longest start signal for which the receiver correctly registers 400 Rs and 400 Ys. Let this be y per cent.

51.6 If x and y are unequal, the setting of the orientation lever should be changed and tests 51.3 to 51.5 repeated until they are equal.

(The correction to be applied to the orientation device setting is as follows:–

(1) If the bias is towards shortened start, move the orientation lever towards zero by ½(x – y) divisions.

(2) If the bias is towards lengthened start, move the orientation lever towards 100 by ½(y – x) divisions.

It may be necessary to repeat these corrections.)

SPRING TENSIONS

1. Jockey Lever (Fig. 23)

Check that the force necessary to move the jockey lever AY, applied at the point AX, is 2 – 3 ozs. (57 – 85 gms.) in each direction.

2. Striker Lever (Fig. 5)

Check that the force required to move striker pin N is 3 ozs. (85 gms.).

3. Governor Brushes (Fig. 27)

A force of 3 – 4½ ozs. (85 – 128 gms.), applied in the direction of arrow F5, should ***just*** move either brush from its stop D.

By increasing force F5 to 5 ozs., the brush should move to within $\frac{1}{16}$ in. (1.6 mm.) of the face of connection panel A.

4. Typehead (Fig. 24)

Check that a force of 7 – 8 ozs. (198 – 227 gms.), applied as shown at F3, ***just*** moves the type from its rest position against the retaining plate springs.

The latch arm Q should move freely under the action of its spring with a maximum end-play of .002 in. (.05 mm.). A force of 1½ – 3 ozs. (43 – 99 gms.), applied as shown at F4, should ***just*** move the latch from its rest position.

5. Typehead Clutch Torque

Move the electromagnet armature to the 'spacing' position. With the motor switched off, apply a 0 – 12 oz. spring balance to the typehead by placing the hook of the balance rod over a type pad so that the typehead is prevented from rotating when the motor is switched on. The type 'J' is usually the best type to choose for this purpose. Hold the balance firmly in this position. Switch on the motor and check that the spring balance is now reading between 7 – 9 ozs. (198 – 255 gms.).

6. Orientation Clutch Torque

With the motor running, lift the pilot cam lug off the pilot cam detent with the hook of a spring balance. Hold it away from the cam detent with the spring balance tangential to the clutch. The force required to ***just*** prevent the pilot cam from rotating should be 9 – 11 ozs. (255 – 312 gms.). (This value is equivalent to a torque of 325 – 400 gm. cms. (4.5 – 5.5 oz. ins.)).

7. Retention Lever Spring (Fig. 6)

Check the force, applied to the screwhead which is situated directly above the roller, necessary to lift the retention lever G clear of its cam. This force should be 2 – 2¼ lbs. (.9072 – 1.014 Kg.).

CIRCUITS AND CIRCUIT DIAGRAMS

A. SIGNAL CIRCUIT

The signal circuit is given in Fig. 33. The lower part of the figure shows the approximate physical positions of the circuit components as viewed from the underside of the main base.

Component references common to both parts of the figure have been used in order to simplify fault tracing. The names and values of the components are set out in a table below the diagrams.

Strapping block S provides a means of connecting a signal-shaping network J, consisting of a 330 ohms resistor + 0.5 micro-farad capacitor, across the electromagnet for double-current operation. If the machine is to be used on single-current circuits it is essential to render network J inoperative by disconnecting the strap between terminals S1 and S2.

Strapping block T enables the tongue of the transmitter contacts to be connected internally to the 'send' contact of the send/receive switch when the circuit requirements are such that an incoming line has to be switched between the local transmitter and receiver.

In the components identification diagram, both strapping blocks are shown with their straps in the disconnected position. In the circuit diagram the straps are represented by broken lines.

Fig. 34 shows schematically the connections to the 25-way chassis-mounted plug.

B. MOTOR CIRCUIT

The standard motor units for the Model 47 Teleprinter are as follows:–

1) The KBE motor – a fixed voltage AC/DC series-wound motor. AC/DC conversion is achieved by changing the connections on a strapping-block which is fixed to the motor casing.

2) The KBF motor – a fixed voltage series-wound motor, supplied either for AC or DC in accordance with customers' requirements.

When a motor is required to operate on a d.c. supply of less than 50 volts, series-governing is undesirable because of the heavy armature currents involved. In such cases, a shunt-wound motor is used and shunt-governing employed, that is, the armature and field coils are arranged in parallel, the governing resistor being in series with the field coils. A shunt-type governor S.1933 must be employed with this arrangement.

The motor circuit and approximate physical positions of the motor circuit components are shown in Fig. 35. If the machine is fitted with a keyboard, and an end-of-line indicator lamp is required, it is connected, as shown, across terminals L1 and L2 via the 2-way connecting block W.

The AC/DC strapping arrangements for the KBE motor are shown at A.

LUBRICATION INSTRUCTIONS

All machines are properly lubricated before they leave the factory, but during transit or storage some oil may be lost. It is recommended that before putting any machine into service it should be checked and, if necessary, re-lubricated.

The lubrication requirements will vary, depending upon the conditions under which each machine is used. The 300-hour schedule set out below is based on the requirements of a machine operating under average conditions, and is intended as a guide only.

At routine maintenance periods, those points in the 300-hour schedule which are marked with an asterisk should receive attention. The remainder should be checked and re-lubricated where necessary.

Over-lubrication is undesirable as excess oil tends to collect dust which may, in time, cause faults. It is advisable, therefore, to remove any superfluous lubricant before putting the machine back into service.

Note: All references to figures in the following instructions are to those given in Part List No. 1047R (3rd Edition).

AFTER EACH 300 HOURS OF OPERATION

No. 1 LUBRICANT

1. Lubricate the following points:–

Tape-Roll Holder Unit

(a) Pivots of tape guide rollers AT, AV and BA) Fig. 28
(b) Main bearing of tape wheel M)

No. 2 LUBRICANT

1. Fill all oil holes and oil cups, paying particular attention to the following:–

Cam Unit

*(a) Oil hole in cam sleeve AW)
*(b) Oil cup on reservoir H) Fig. 7
*(c) Sump of comb finger-block BW)
*(d) Oil cup on finger-setting blade lever BP)
*(e) Oil holes in camshaft bearings AO and AY) Fig. 8
*(f) Oil cup and oil hole on traversing link Y)
*(g) Oil cup on comb-setting lever BT)
*(h) Oil hole in bush of pilot-cam detent AL, Fig. 9

Combination Head

*(j) Oil cup on bellcrank lifting collar U, Fig. 15

Tape Unit

*(k) Oil hole in pivot bush of ribbon-feed pawl AO)
*(l) Oil hole in pivot bush of ribbon-feed lever AN) Fig. 24
(m) Oil hole in pivot bush of ribbon change-over lever AY)
*(n) Oil hole in pivot bush of tape feed lever V)

Control Lever Unit

(p) Oil hole in pivot bush of A/B control lever AW, Fig. 17
(q) Oil hole in pivot bush of A/B operating lever T, Fig. 12

Main Base

(r) Oil hole in pivot bush of paper-failure alarm resetting-lever E, Fig. 27

Gear Unit

*(s) Oil holes in gear shaft bearings, Fig. 19.

2. Lubricate all felts and wicks, paying particular attention to the following:–

Cam Unit

*(a) Pivots of detent-lever link AQ, Fig. 10
*(b) Roller of retention lever BE, Fig. 8

Combination Head

(c) Oil-wick for bellcrank bearing N, Fig. 15

Typehead

(d) Typerack lubricator H, Fig. 14

Control Lever Unit

(e) Lubricator AF in feed throwout rod guide bracket, Fig. 17

3. Lubricate all pivots, friction faces and couplings, paying particular attention to the following:–

Electromagnet

(a) Trip-shaft trunnion AS, Fig. 23

Cam Unit

*(b) Cam-sleeve lever rollers)
*(c) Cam tracks of cam-sleeve AW)
*(d) Pivots of cam detent BH) Fig. 7
*(e) Tape Unit operating roller AF)
*(f) Pivots of finger-resetting link lever BZ)
*(g) Pawls AW2, ratchet AU and thrust washer AV)
*(h) Cone pivots of trip shaft BL)
*(j) Striker-blade guides BL2 and BL4) Fig. 8
*(k) Guides of finger-setting pin Y3)
*(l) Pivot of finger-resetting trip bellcrank Y9)
*(m) Pivot of cam release lever X) Fig. 10
*(n) Roller on orientation link Q)

Combination Head

*(p) Bellcrank lifting-block AJ2, Fig. 8
*(q) Engagement face of bellcrank-lifting collar U, Fig. 15

Typehead

*(r) Clutch lining AF, Fig. 15
*(s) Pivot of latch W, Fig. 14
*(t) Clutch-band engagement with typehead driving spring R, Fig. 13
(u) Typehead bearings AD, Fig. 15, and C, Fig. 11.

Tape Unit

*(v) Pivots and engagement faces of pivot blocks V4)
*(w) Tape feed ratchet AD and its pawls)
(x) Pivot of alarm trip-arm BR5) Fig. 24
(y) Pivot and engagement faces of tape-alarm seeker (on V))
(z) Pivot of tape roller AA, Fig. 25
(aa) Pivot and engagement faces of tape throw-out pawl S1, Fig. 26

Typehammer

*(ab) Pivot M and engagement surfaces between spring S and hammer head R)
(ac) Typehammer lever pivot bush L)
(ad) Shackle pivot H) Fig. 22
(ae) Bush of hammer link bearing block A)

Control Lever Unit

(af) Pivots of all control levers
(ag) Pivot of feed throw-out rod Z)
(ah) Pivot of feed throw-out lever X) Fig. 17
(aj) Spring AX of A B control lever AW)

No. 5 LUBRICANT

1. Apply a smear of grease to the following parts:–

Cam Unit

*(a) Detent faces of pilot cam AU, Fig. 9
*(b) Point of engagement between orientation link spring R and pilot cam AU, Fig. 10
(c) Teeth of helical gear AP, Fig. 7

Gear Unit

(d) Teeth of all gears

Tape Unit

(e) Teeth of ribbon-feed wheels AV and AW, Fig. 25

Typehammer

(f) Typehammer overthrow stop AM, Fig. 17
(g) Shock absorber spring G, Fig. 22

AFTER EACH 3,600 HOURS OF OPERATION

Dismantle and clean the machine. Lubricate all points as given in the above schedule, with the following additions:–

No. 2 LUBRICANT

1. Soak the parts containing the following oil-impregnated bushes in the lubricant for 2 – hours:–

Electromagnet

(a) Armature bearings D, Fig. 23

Cam Unit

(b) Bearings inside cam-sleeve AW, Fig. 7
(c) Bushes in camshaft bearings AO and AY, Fig. 8
(d) Bushes in release lever bracket W) Fig. 10
(e) Clutch plates AT and AV)

Combination Head

(f) Clutch bearing AD, Fig. 15

Tape Unit

(g) Bearing of seeker lift-plate (not shown)
(h) Bearing of tape-feed roller AL) Fig. 24
(j) Pivot bush of ribbon-feed lever AN)
(k) Bearings of ribbon-feed wheels AV and AW, Fig. 25
(l) Bearing of reset-lever U6)
(m) Bush of platen BG) Fig. 26
(n) Bearing in platen support-plate BJ)

Gear Unit

(p) Gear shaft bearings in main casting A) Fig. 20
(q) Bearing in idler gear casting U)

Typehead

(r) Thrust washer in collar AA, Fig. 14
(s) Bush in bearing bracket D, Fig. 11

No. 4 LUBRICANT

1. Clean the following ballraces with white spirit, dry well, and re-pack with the lubricant:–

(a) Combination Head – ballrace AA, Fig. 15
(b) Motor – ballraces (2)

LUBRICANTS

The following lubricants are recommended and may be obtained from Creed and Co. Ltd.:–

No. 1 Lubricant (TA.1095) – Thin oil, such as:

(a) Shell Clavus Oil 17 (formerly Shell JY.1)
(b) Wakefield Magna R.S. Oil
(c) G.P.O. Oil No. 12

No. 2 Lubricant (TA.1096) – Medium oil, such as:

(a) Shell Talpa Oil 30 (formerly Shell CY.2)
(b) Wakefield Castrol XL
(c) G.P.O. Oil No. 14

No. 4 Lubricant (TA.1097) – Grease, such as:

(a) Shell Alvania 3

No. 5 Lubricant (TA.1098) – Grease, such as:

(a) Shell Mytilus A
(b) Mobilgrease No. 2

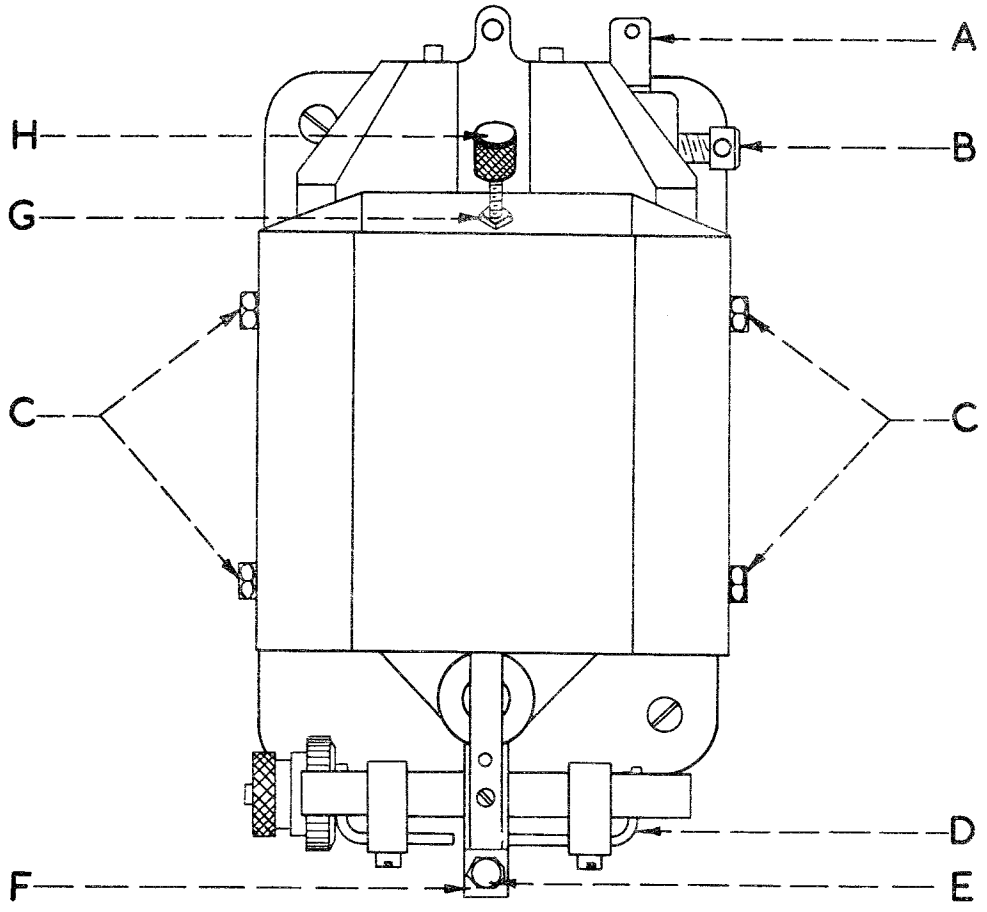


FIG. 2

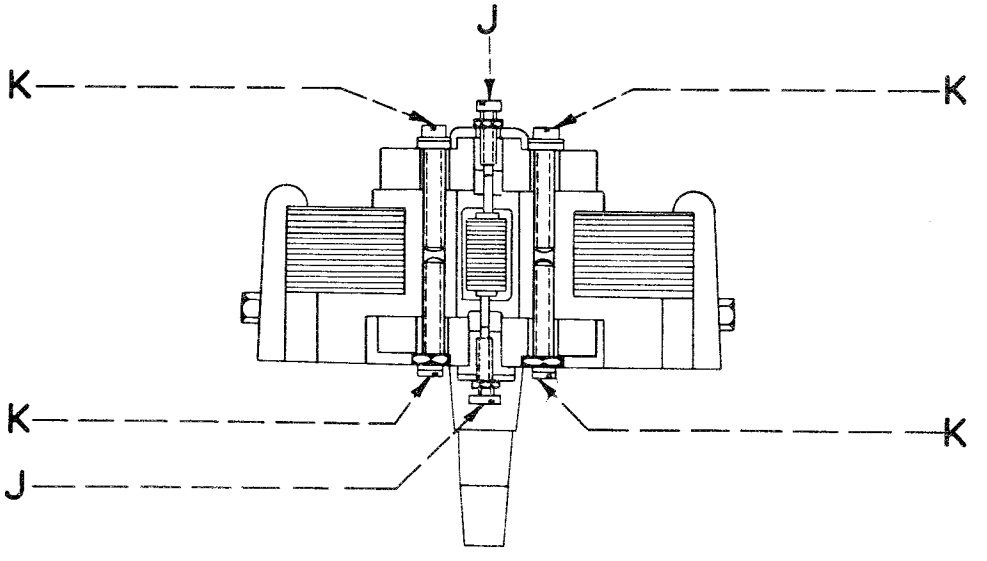


FIG. 3

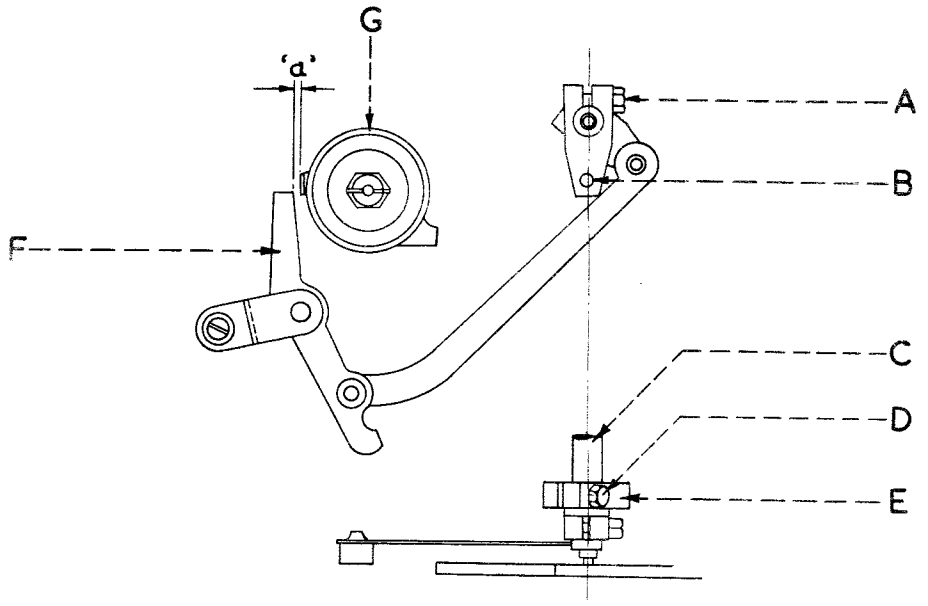


FIG. 4

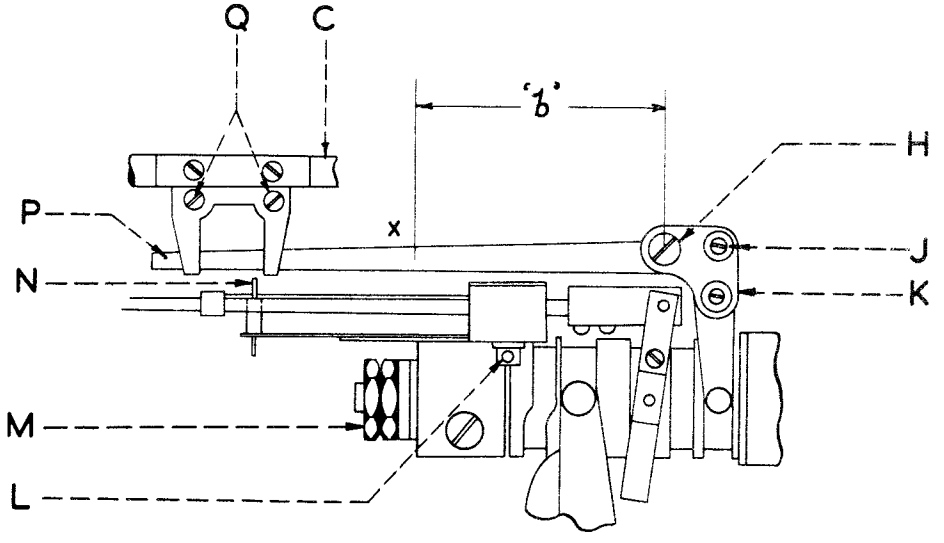


FIG. 5

DIMENSIONS

'a' = {.013 – .017 in. / .33 – .43 mm. 'b' = {2.0 ins. / 5.0 cm.

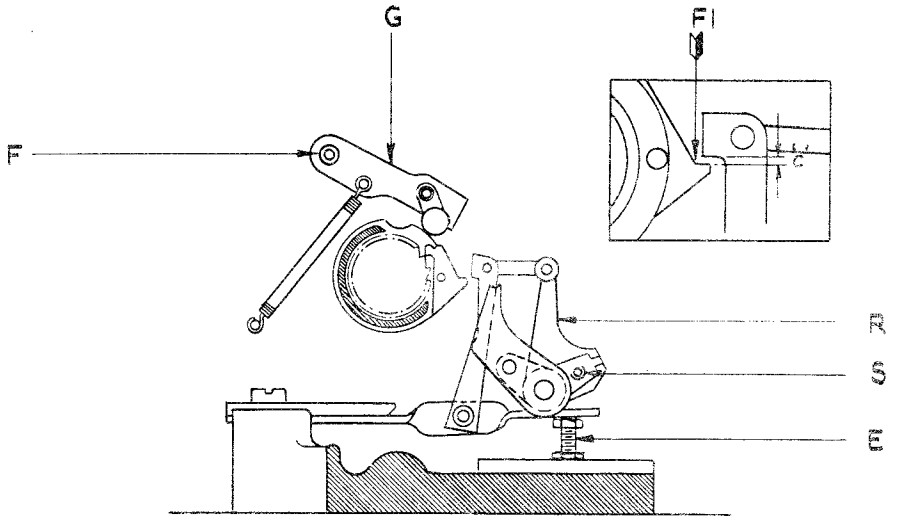


FIG. 6

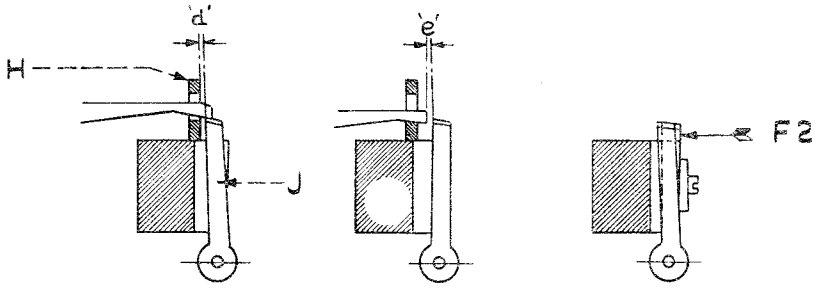


FIG. 7

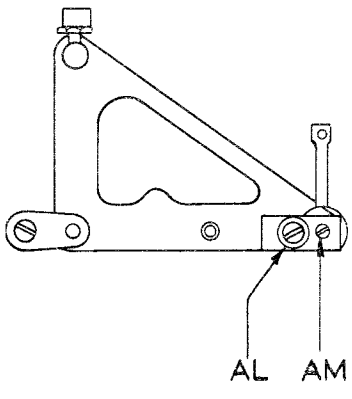


FIG. 8

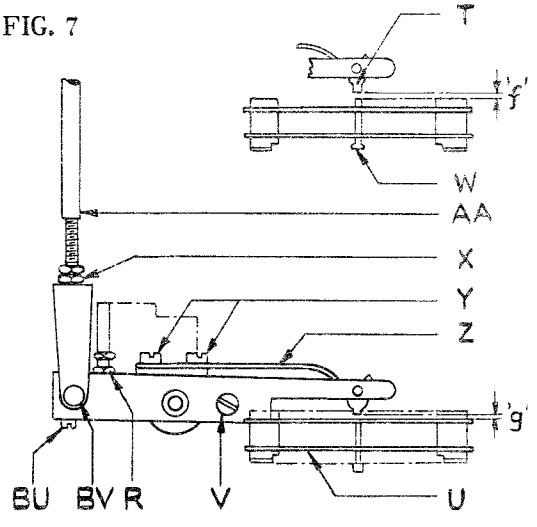


FIG. 9

DIMENSIONS

'c' = { .002 – .004 in. / .05 – .10 mm. } 'd' = { .003 – .020 in. / .08 – .51 mm. }

'e' = { .015 in. / .38 mm. } Min. 'f' = { .010 – .015 in. / .25 – .38 mm. }

'g' = { 1/16 in. / 1.6 mm. }

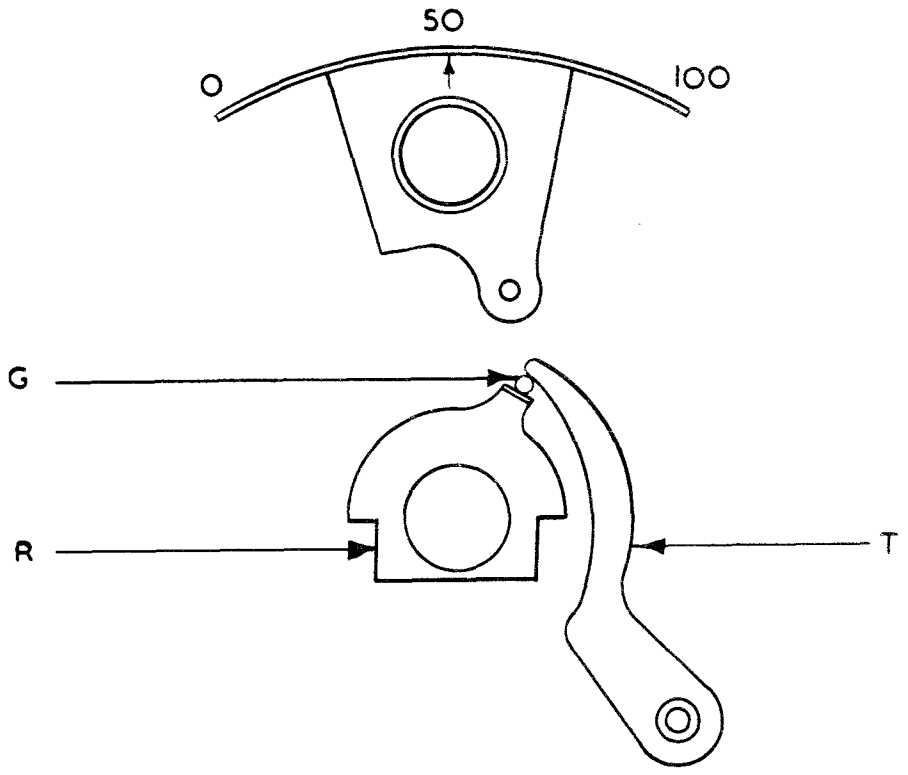


FIG. 10

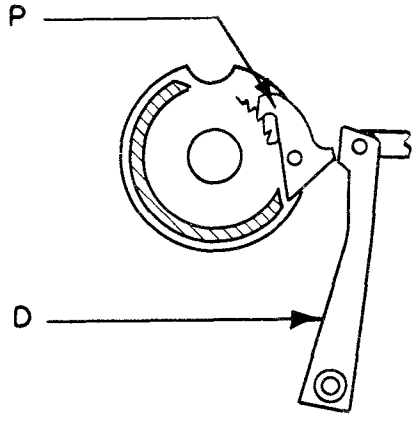


FIG. 11

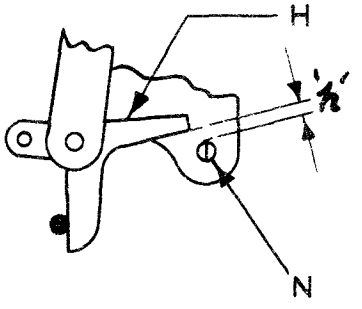


FIG. 12

DIMENSION

'h' = $\begin{cases} \frac{1}{8} \text{ in.} \\ 3.2 \text{ mm.} \end{cases}$

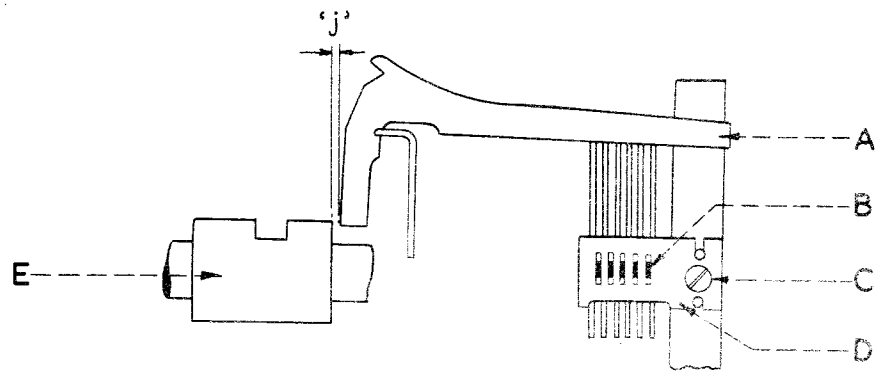


FIG. 13

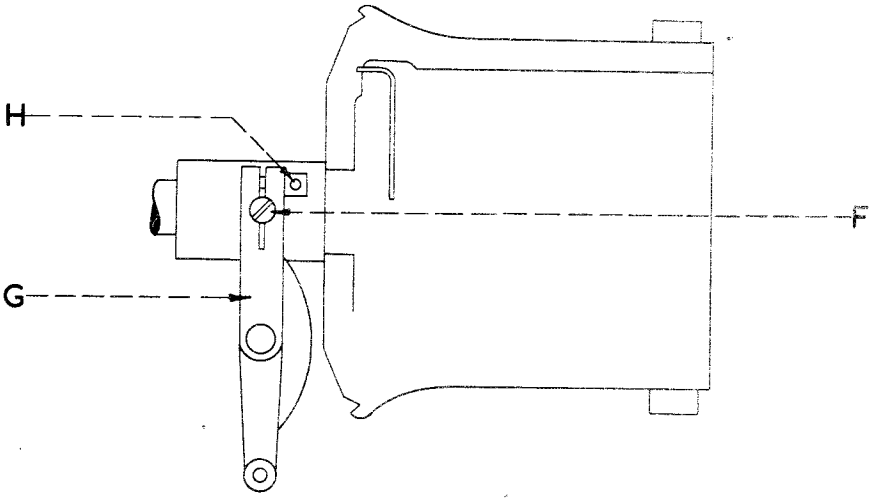


FIG. 14

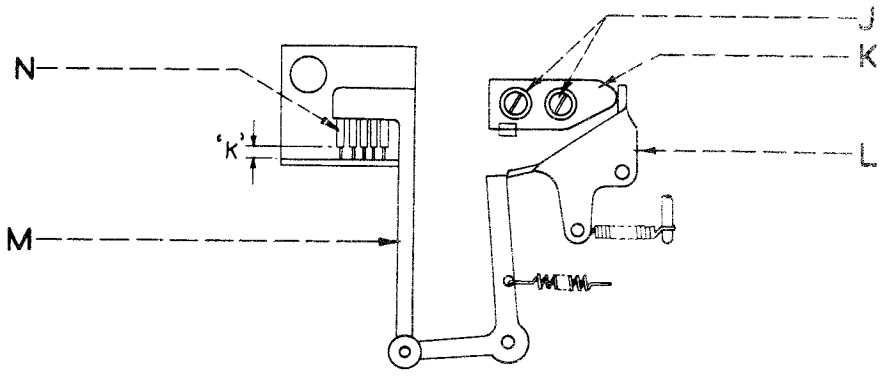


FIG. 15

DIMENSIONS

'j' = { .006 – .008 in. / .15 – .20 mm. } 'k' = { .005 in. / .13 mm. } Min.

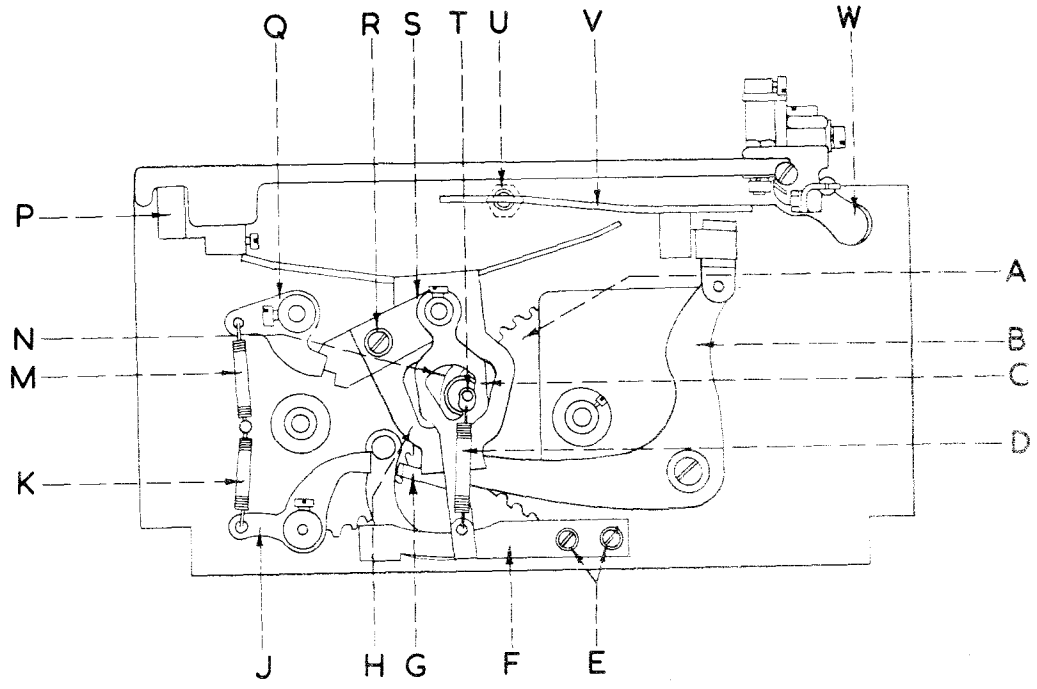


FIG. 16

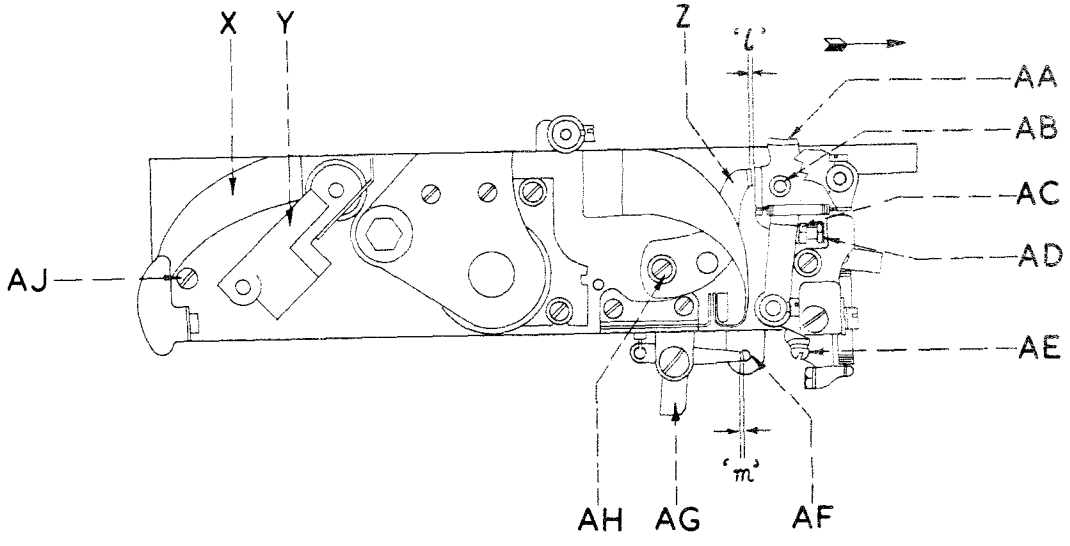


FIG. 17

DIMENSIONS

'l' = {.003 – .006 in. / .08 – .15 mm.} 'm' = {.010 – .020 in. / .25 – .51 mm.}

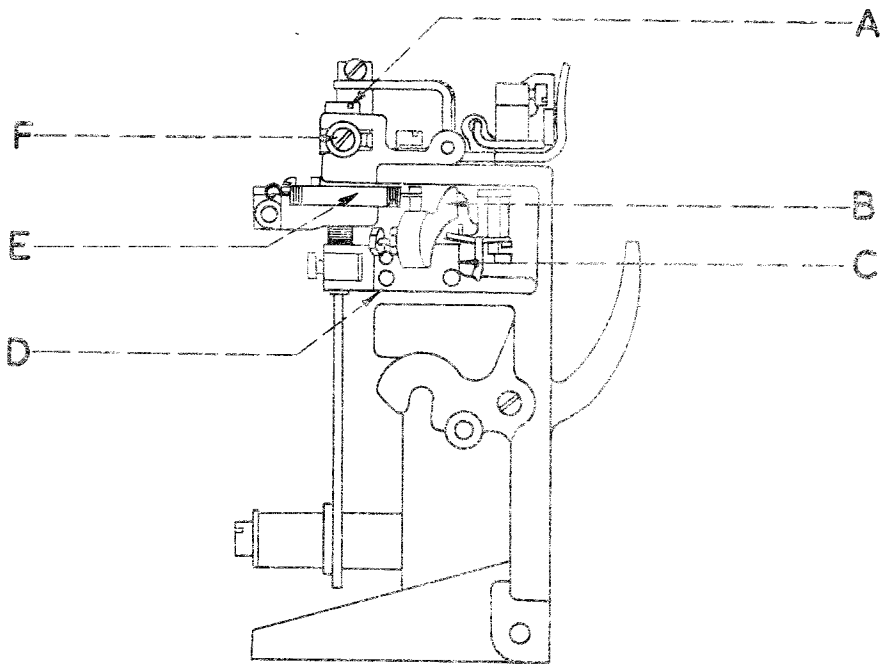


FIG. 18

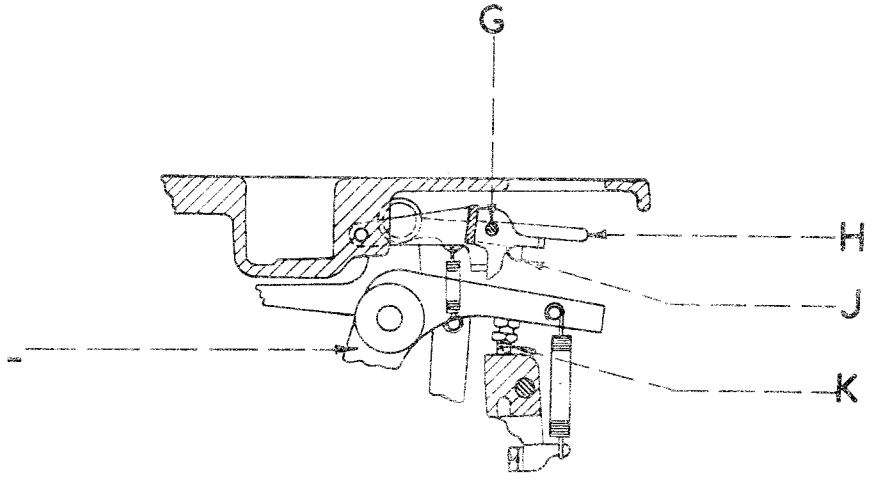


FIG. 19

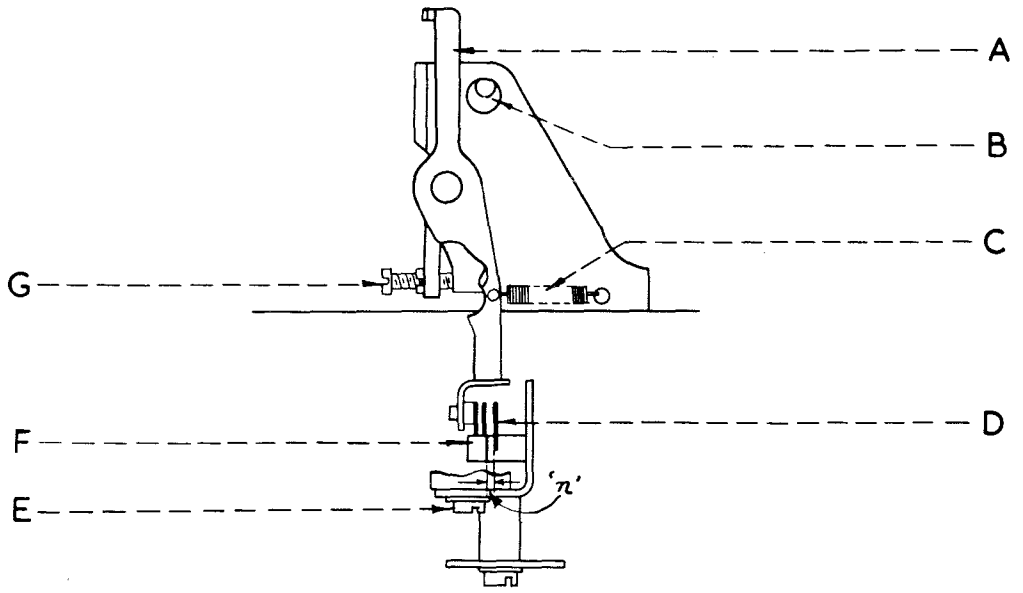


FIG. 20

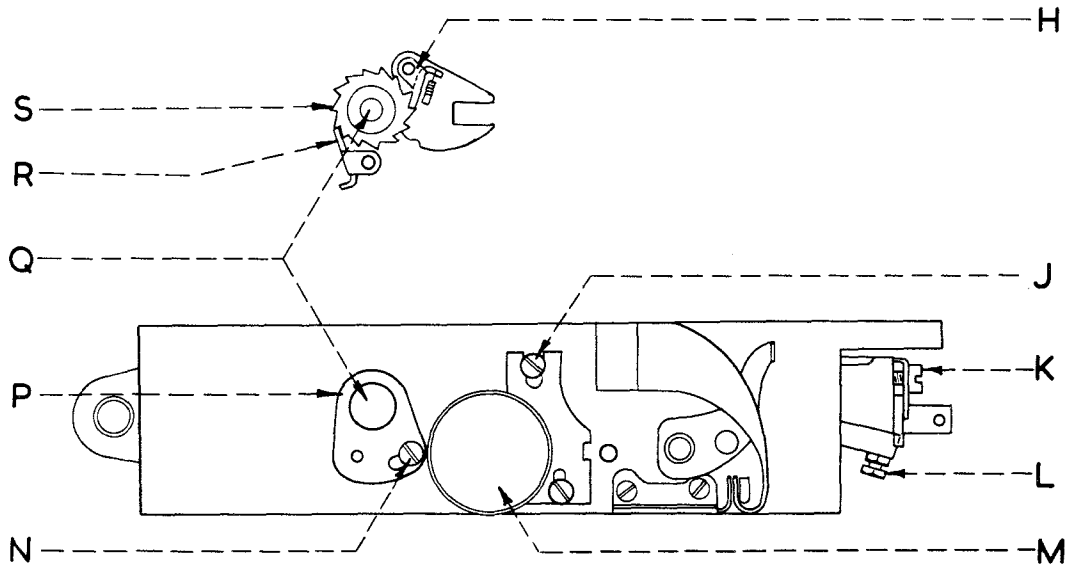


FIG. 21

DIMENSION

'n' = {.010 in. / .25 mm.

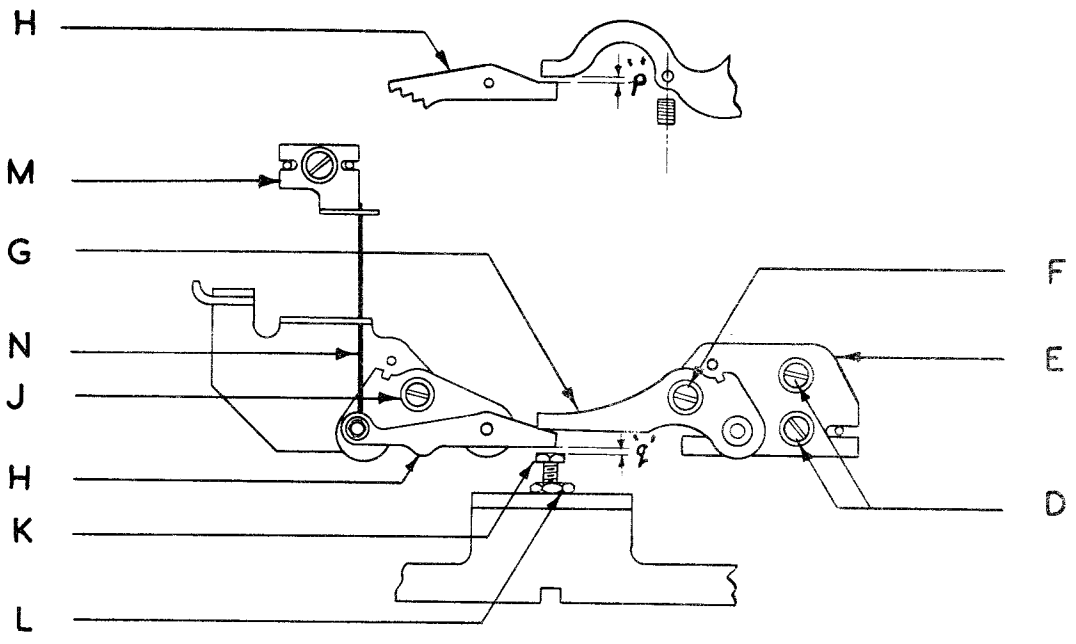


FIG. 22

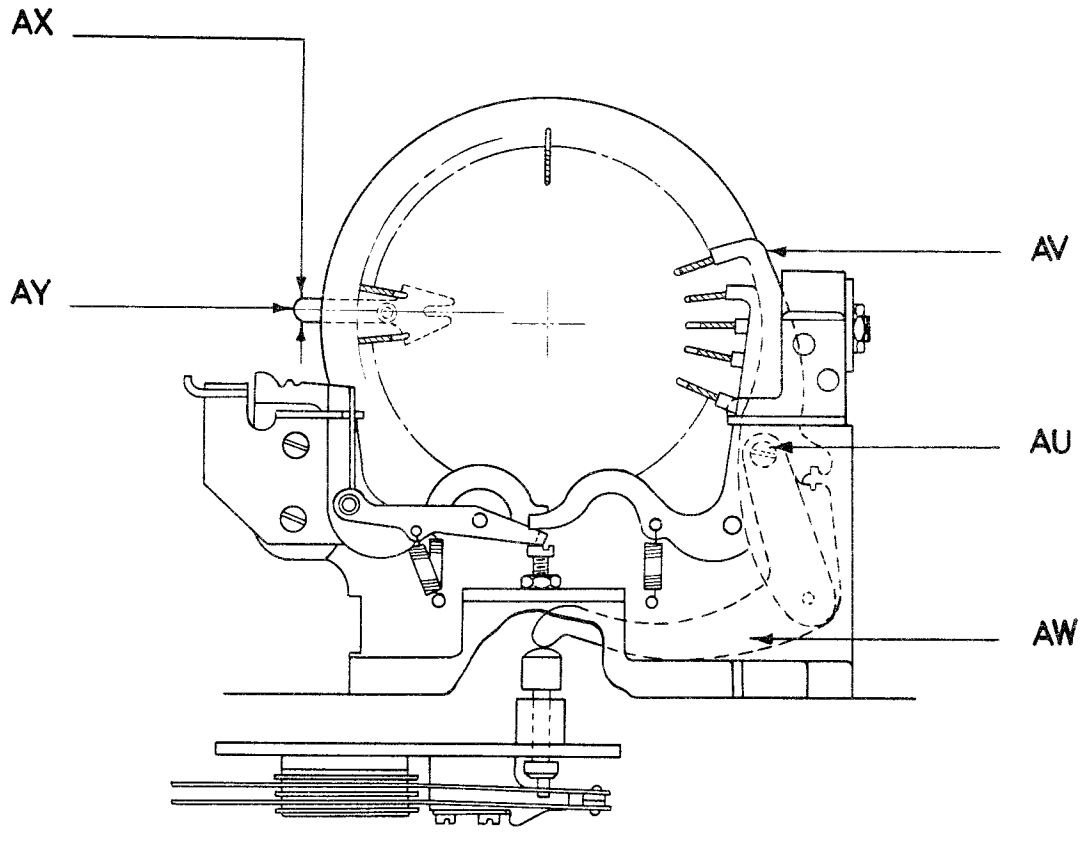


FIG. 23

DIMENSIONS

'p' = {.010 – .015 in. / .25 – .38 mm. 'q' = {.003 – .006 in. / .08 – .15 mm.

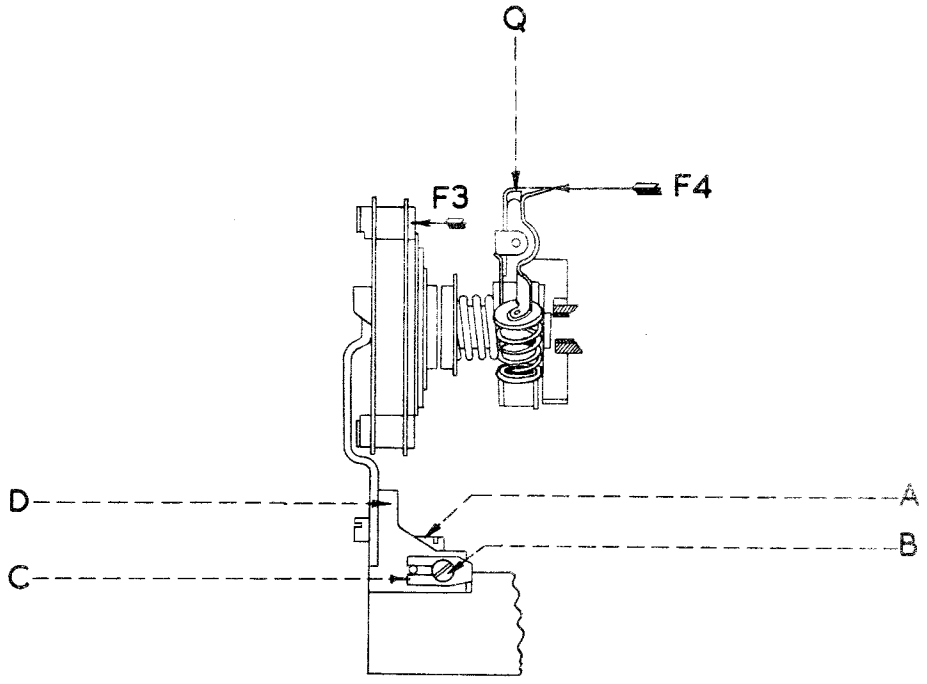


FIG. 24

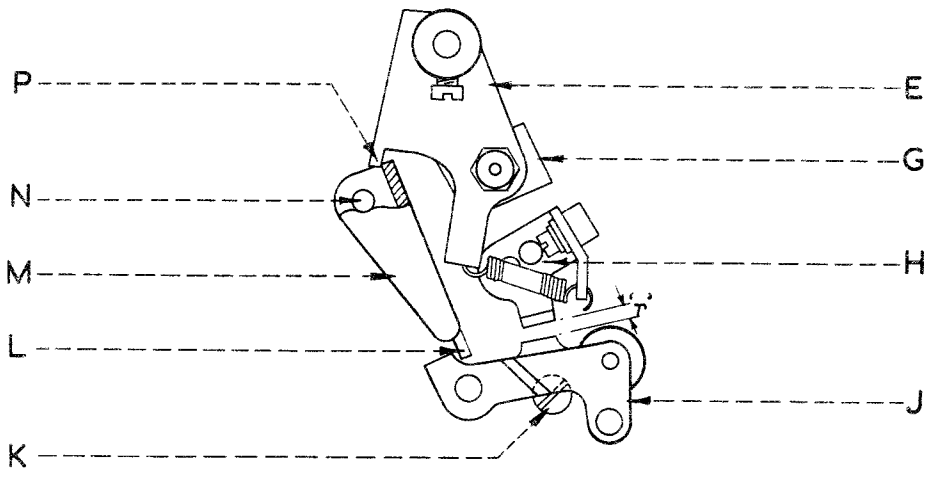


FIG. 25

DIMENSION

'r' = $\begin{cases} 1/32 - 1/16 \text{ in.} \\ .8 - 1.6 \text{ mm.} \end{cases}$

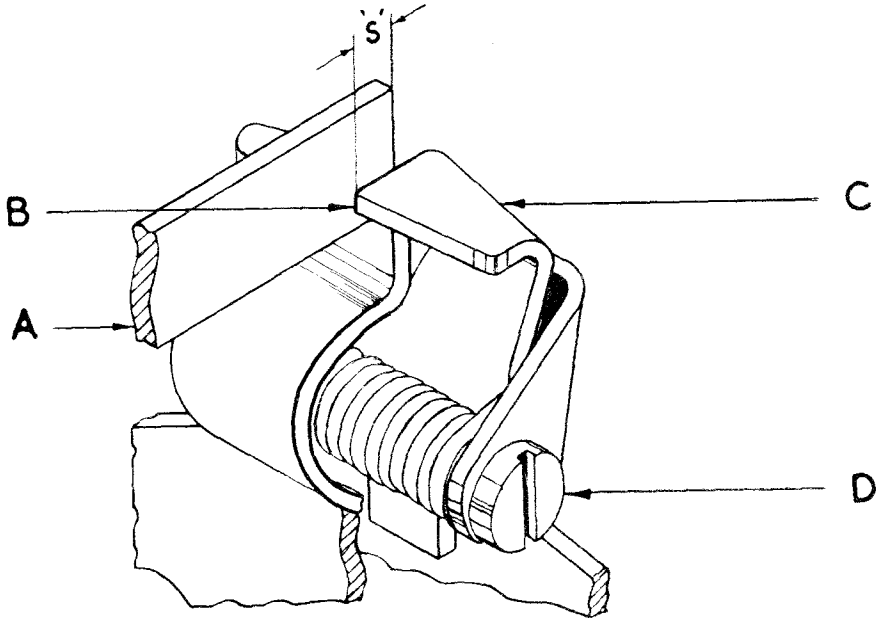


FIG. 26

DIMENSION

's' = {.050 – .065 in.
{1.27 – 1.65 mm.

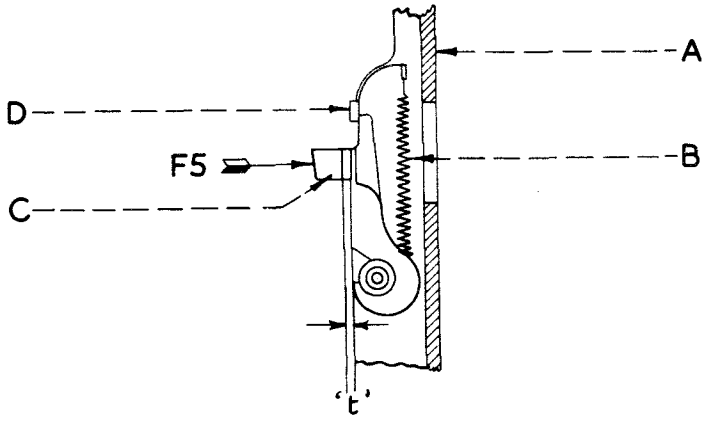


FIG. 27

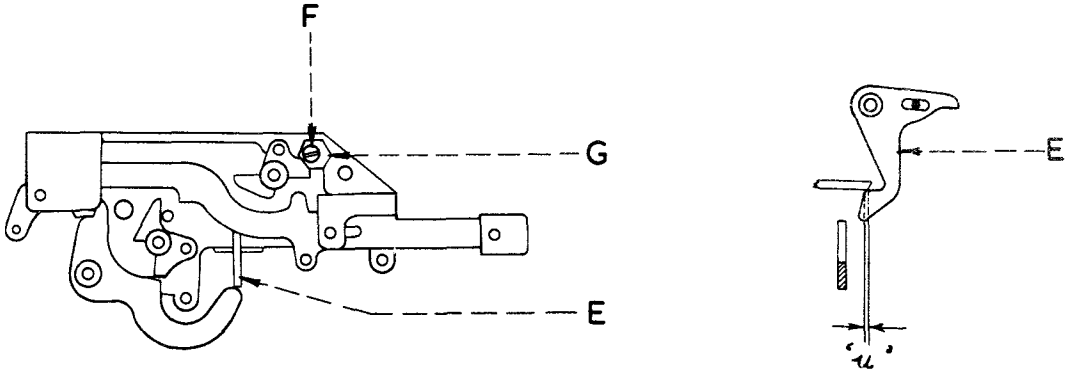


FIG. 28

DIMENSIONS

't' = { 1/16 in. / 1.6 mm. } 'u' = { .015 – .020 in. / .38 – .51 mm. }

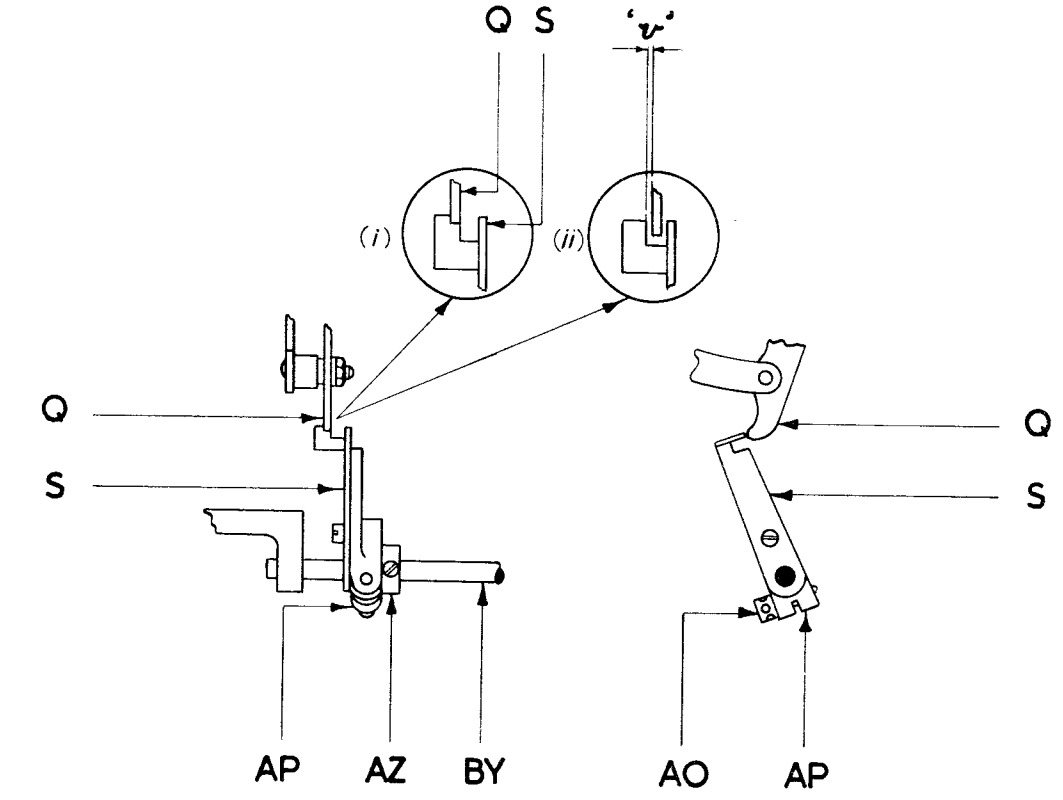


FIG. 29

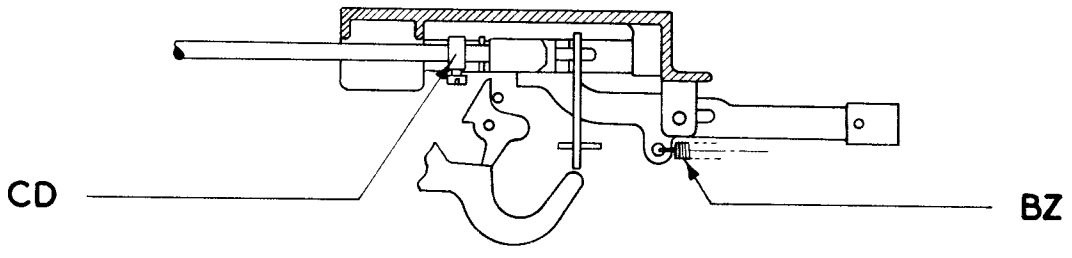


FIG. 30

DIMENSION

'v' = $\begin{cases} 1/32 \text{ in.} \\ .79 \text{ mm.} \end{cases}$ Max.

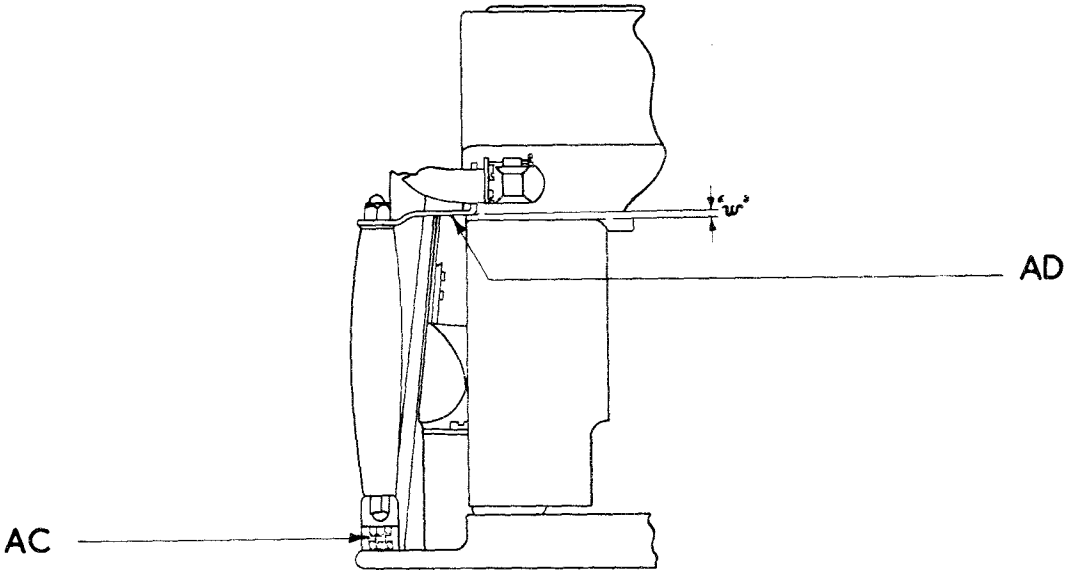


FIG. 31

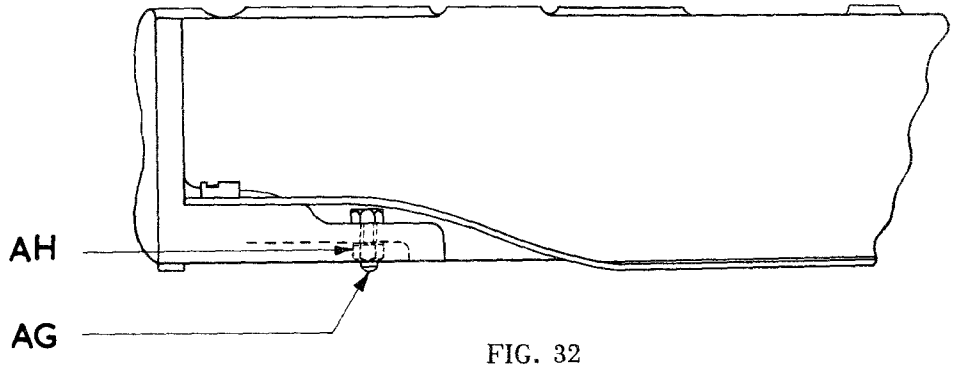
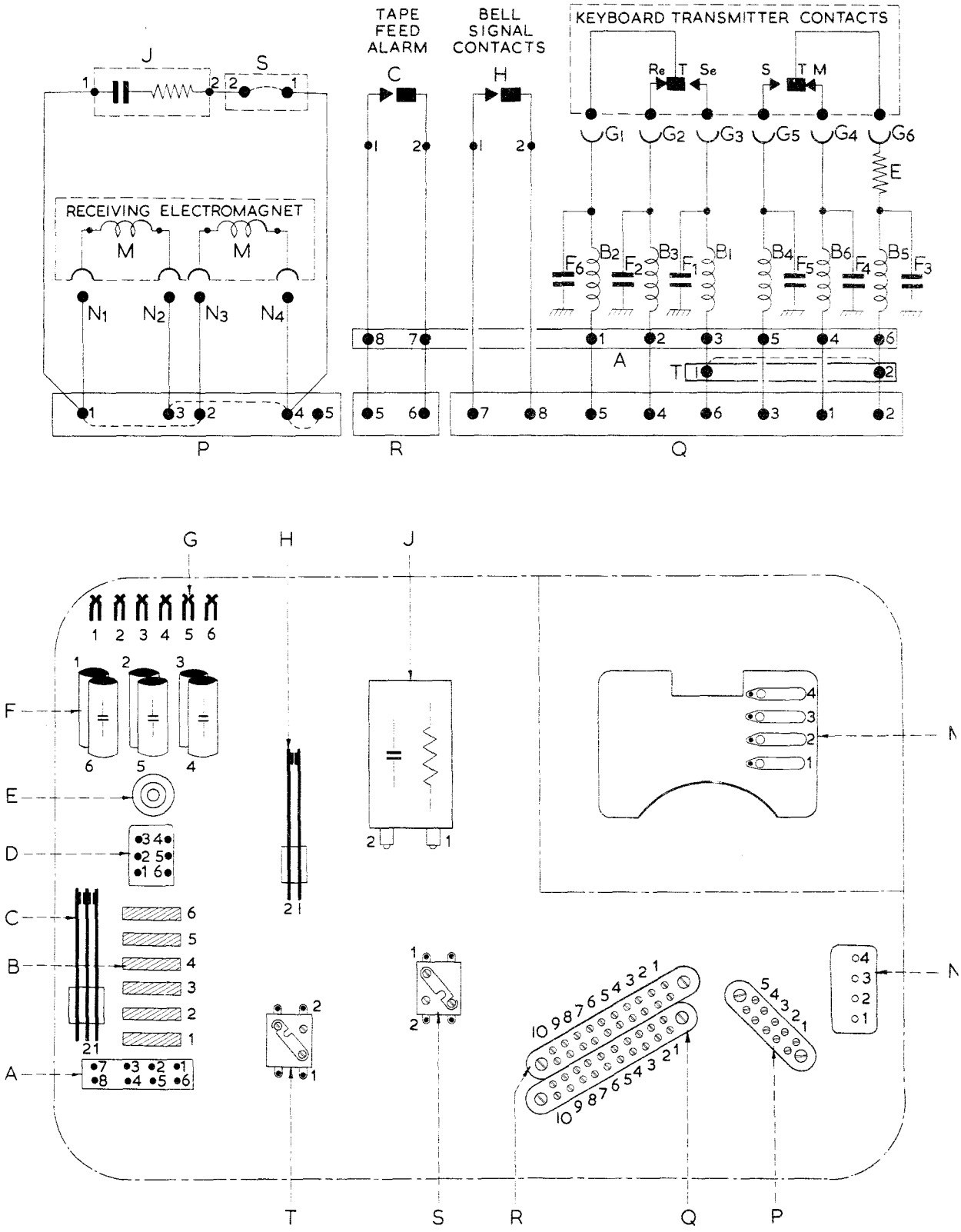


FIG. 32

DIMENSION

'w' = { 1/16 in. / 1.6 mm.



A	TERMINAL STRIP 8-WAY	G	TRANSMITTER JACK	P	TERMINAL BLOCK 'C' 5-WAY
B	INDUCTORS 500 μH	H	BELL SIGNAL CONTACTS	Q	TERMINAL BLOCK 'B' 10-WAY
C	TAPE FEED ALARM CONTACTS	M	RECEIVING ELECTROMAGNET	R	TERMINAL BLOCK 'A' 10-WAY
D	TERMINAL STRIP 6-WAY	J	SIGNAL-SHAPING NETWORK UNIT 330 Ω + 0·5 μF	S	STRAPPING BLOCK
E	RESISTOR 220 Ω			T	STRAPPING BLOCK
F	CAPACITORS 0·01 μF	N	CONNECTION BLOCK 4-WAY		

FIG. 33 SIGNAL CIRCUITS WIRING DIAGRAM

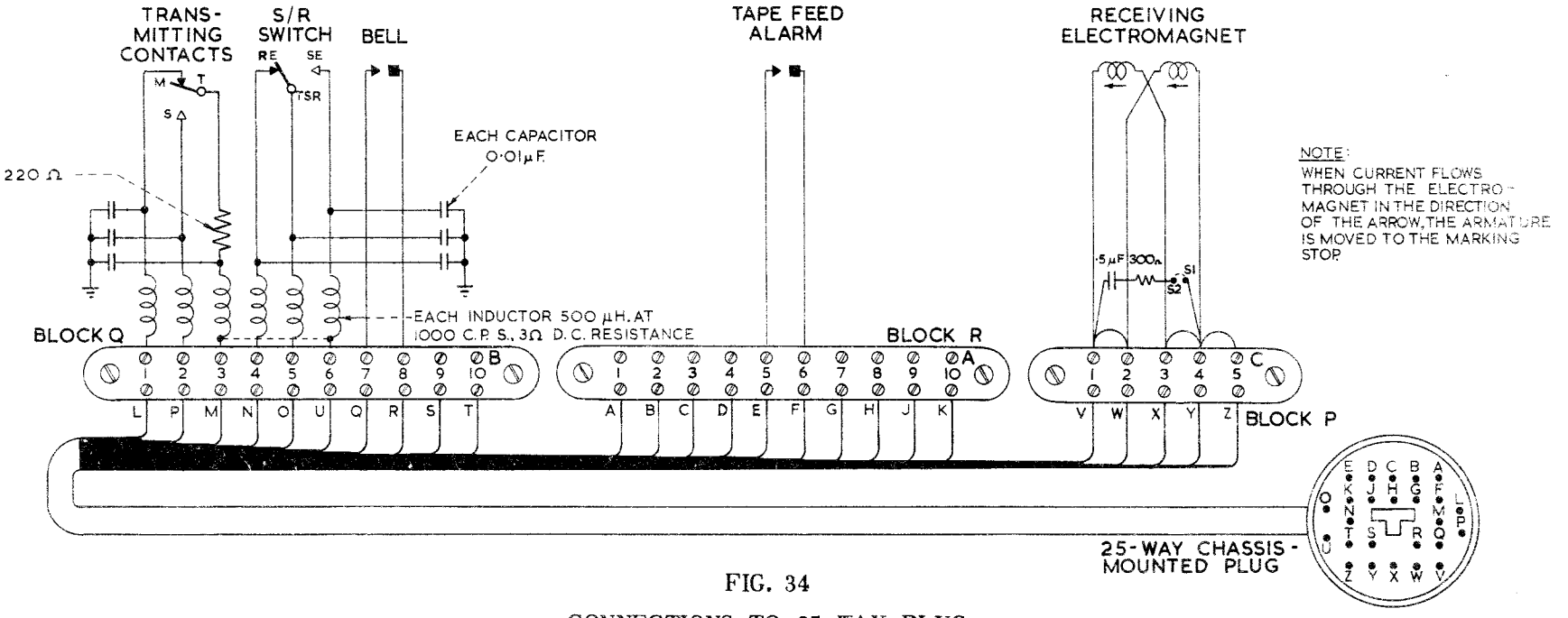
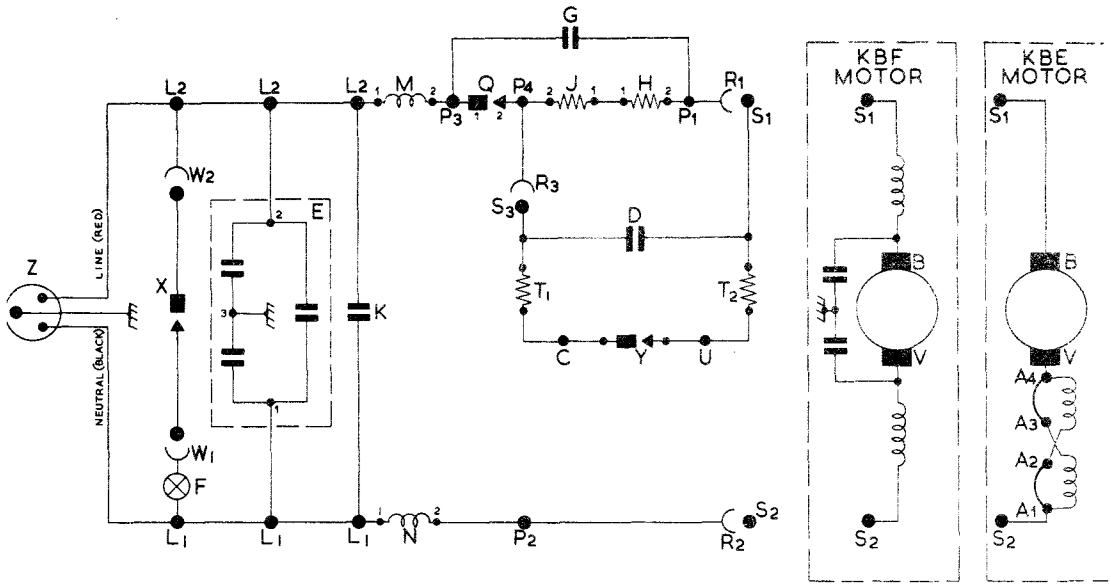
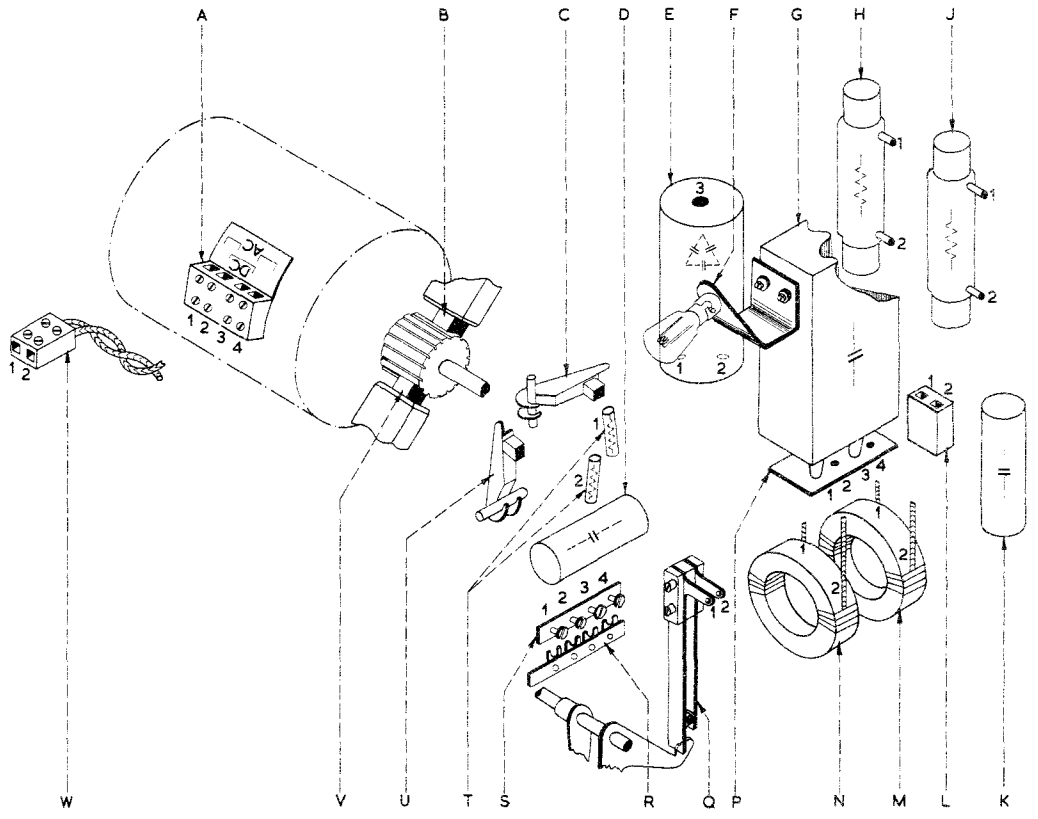


FIG. 34

CONNECTIONS TO 25–WAY PLUG





A	STRAPPING BLOCK 4-WAY	K	CAPACITOR 0·01 μF	T	RESISTORS	K.B.E. MOTOR 136–250V.	K.B.E. MOTOR 85–135V.	K.B.F MOTOR
B	MOTOR BRUSH	L	CONNECTING BLOCK 2-WAY		T_1	3·5Ω	1·7Ω	5Ω
C	GOVERNOR BRUSH	M	INDUCTOR 1mH.		T_2	3·5Ω	1·7Ω	—
D	CAPACITOR 0·1 μF.	N	INDUCTOR 1mH.	V	MOTOR BRUSH			
E	CAPACITOR 0·25+0·1+0·1 μF	P	CONNECTING STRIP 4-WAY	W	CONNECTING BLOCK 2-WAY			
F	END-OF-LINE INDICATOR LAMP	Q	MOTOR STARTER SWITCH	X	E.O.L.I. CONTACTS (ON KEYBOARD)			
G	CAPACITOR 0·5 μF.	R	SPADE CONNECTOR 4-WAY	Y	GOVERNOR CONTACTS			
H	GOVERNOR RESISTORS 500Ω EACH FOR 180–250V.	S	CONNECTING STRIP 4-WAY	Z	MAINS PLUG (VIEWED FROM PINS)			
J	GOVERNOR RESISTORS 120Ω EACH FOR 90–155V.	U	GOVERNOR BRUSH					

FIG. 35 MOTOR CIRCUIT

COMBN Nº	LETTERS CASE	FIGURES CASE	START	CODE ELEMENTS 1	2	3	4	5	STOP
1	A	–		■	■				■
2	B	?		■			■	■	■
3	C	:			■	■	■		■
4	D	WHO ARE YOU?		■			■		■
5	E	3		■					■
6	F	OPTIONAL		■		■	■		■
7	G	OPTIONAL			■		■	■	■
8	H	OPTIONAL				■		■	■
9	I	8			■	■			■
10	J	BELL		■	■		■		■
11	K	(		■	■	■	■		■
12	L	)			■			■	■
13	M	•				■	■	■	■
14	N	,				■	■		■
15	O	9					■	■	■
16	P	0			■	■		■	■
17	Q	1		■	■	■		■	■
18	R	4			■		■		■
19	S	'		■		■			■
20	T	5						■	■
21	U	7		■	■	■			■
22	V	=			■	■	■	■	■
23	W	2		■	■			■	■
24	X	/		■		■	■	■	■
25	Y	6		■		■		■	■
26	Z	+		■				■	■
27	CARRIAGE RETURN						■		■
28	LINE FEED				■				■
29	LETTERS			■	■	■	■	■	■
30	FIGURES			■	■		■	■	■
31	SPACE					■			■
32	ALL SPACING								■

MARK ELEMENT ■
SPACE ELEMENT □

FIG. 36 INTERNATIONAL TELEGRAPH ALPHABET No.