INSTRUCTION BOOKLET No. 92

MODEL 92 FIVE-WIRE TAPE READER

AND

S.3921 TAPE READER UNIT

MAINTENANCE INSTRUCTIONS

Creed & Company Limited

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Printed . . . May, 1957

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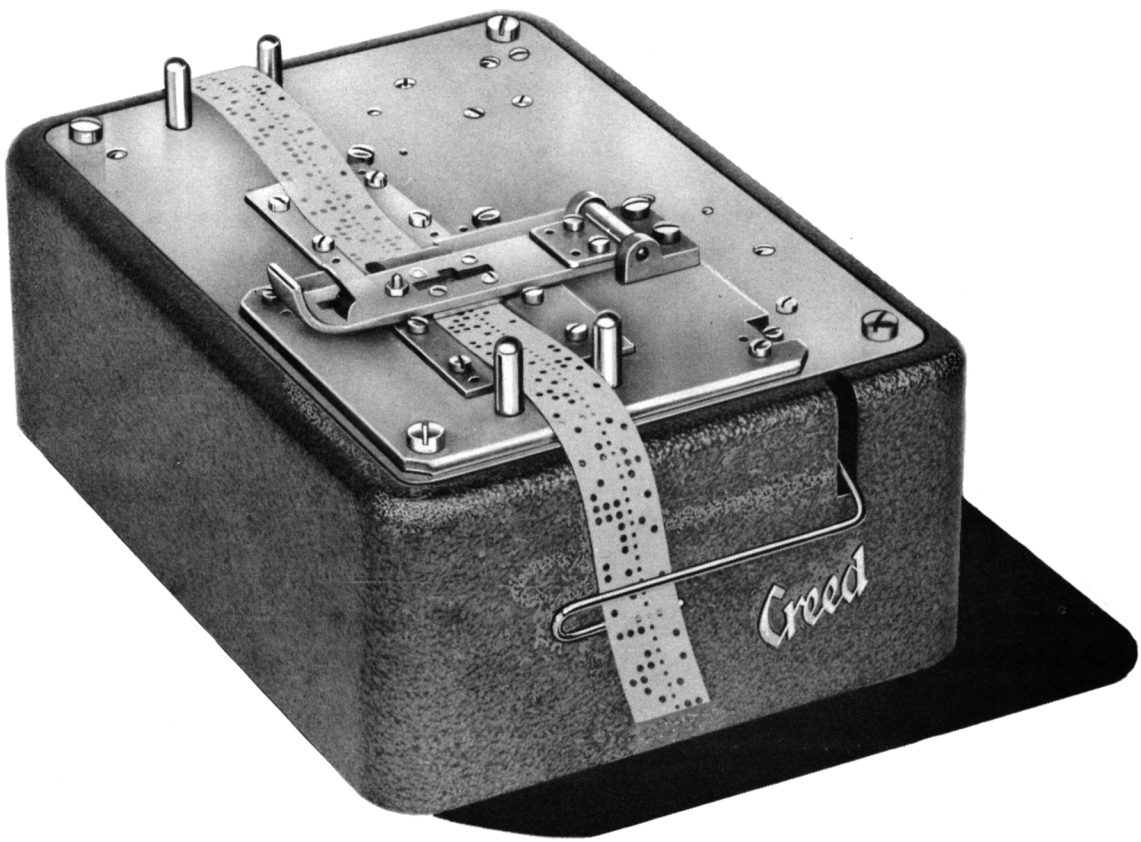

MODEL 92 FIVE-WIRE TAPE READER

INTRODUCTION

The instructions in this booklet apply without qualification to both the Model 92 5-wire Tape Reader, and the S.3921 Tape Reader Unit, as the two units are identical except for a cover.

The Model 92 Tape Reader is supplied as an independent machine; the S.3921 Tape Reader Unit, which lacks the cover, is for incorporation into other apparatus.

ADJUSTMENT INSTRUCTIONS

1. **Tape Retaining Plate** (Figs. 1 and 2)

Check

1.1 With the tape retaining plate C closed, check that the tips of the reading levers are centrally disposed with respect to the corresponding holes in the tape shoe B.

Action

1.2 Adjust, if necessary, by slackening screws G, moving the tape retaining plate C until the correct position is achieved and tightening screws G.

Check

1.3 With the tape retaining plate closed, check that there is a clearance of .008 – .010 in. (.20 – .25 mm.), i.e. dimension 'a', between the tape shoe B and the cover plate D.

Action

1.4 To adjust, slacken the locknut of stop screw H and turn the latter until dimension 'a' is satisfied. Clamp stop screw H with its locknut.

2. **Feed Shaft End Play** (Fig. 4)

Check

2.1 Check that there is a maximum of .002 in. (.05 mm.) end play on the feed shaft.

Action

2.2 If necessary, slacken screw B and move collar C until a minimum of end play is present. Tighten screw B.

3. **Detent Roller** (Fig. 5)

Check

3.1 Check that the roller on the detent lever J is vertically in line with the centre of the feed wheel shaft.

Action

3.2 If necessary, slacken the clamping nut of pivot H and move the pivot until the correct position is achieved. Clamp pivot H with its locknut.

4. **Tape Feed Wheel** (Figs. 1 and 4)

Check

4.1 Place a length of tape, previously perforated with an 'all-punching' combination, into the reader, but do not close the tape retaining plate. Hold the tape engaged with the feed wheel and pull the tape gently in the opposite direction to that of the feed.

(**N.B.**: This slight tension on the tape ensures that there is no slackness present. It is important not to apply too great a tension as this will cause the feed wheel to move.)

4.2 Check that the tips of the reading levers are positioned centrally with respect to the holes in the tape, and that both edges of the tape clear the tape guides A, Fig. 1, by an equal amount.

Action

4.3 If either of these conditions is not satisfied, slacken screws A, Fig. 4, until friction tight, and re-position the feed wheel until both requirements are met. Tighten screws A.

5. **Feed Magnet Armature Pivot** (Fig. 6)

Check

5.1 With the feed unit off the reader, press the armature against the magnet core. In this position there should be a gap of .006 – .010 in. (.15 – .25 mm.), i.e. dimension 'd', between the armature Q and the yoke N.

Action

5.2 Adjust, if necessary, by slackening screws M and moving pivot clamp P until dimension 'd' is set up. Tighten screws M.

6. **Armature Return Spring** (Figs. 7 and 8)

Check

6.1 With the feed unit in position on the reader, stand the reader on its side, so that the feed pawl is uppermost. Disconnect the pawl spring and

position the pawl so that it is clear of the ratchet wheel J and the pawl backstop L.

6.2 Lift the feed contact stud clear of the armature extension E, and, by applying a tension gauge to the latter (at the stud operating point), check that a force of 170 – 190 grams, i.e. force F_1, causes the armature to move to the magnet core. Refit the pawl spring unless action is required.

Action

6.3 To adjust, slacken screw D and raise or lower spring anchor plate B until the correct tension is achieved. Tighten screw D and refit the pawl spring.

7. **Feed Magnet Position** (Figs. 5 and 8)

Check

7.1 Insert a .004 in. (.1 mm.) feeler gauge between the armature G, Fig. 8, and the magnet core. Press the armature towards the core so that the gauge is gripped and dimension 'f' is set up. In this position ensure that the feed wheel is in its rest position (i.e. with the roller on detent lever J, Fig. 5, fully engaged between two teeth of detent wheel G), and check that the feed pawl is located at the bottom of a tooth of ratchet wheel J, Fig. 8.

Action

7.2 If adjustment is necessary, slacken screws F, Fig. 5, and position the magnet until the correct conditions are obtained. Tighten screws F.

8. **Feed Pawl Stop** (Fig. 8)

Check

8.1 With the unit set up as in Instruction 7.1, check that the feed pawl is in contact with the pawl stop L.

Action

8.2 If this is not so, slacken screws K until friction tight and re-position the pawl stop L. Tighten screws K.

(**Note:** As the tape retaining plate catch is also secured by these screws, care should be taken not to allow the catch to become slack.)

9. **Pawl Retaining Bracket** (Figs. 4, 7 and 8)

Check

9.1 With the armature in the rest position, check that there is a clearance of .029 – .031 in. (.74 – .80 mm.), i.e. dimension 'e', Fig. 7, between the armature F and the centre of the magnet core.

Action

9.2 Adjust this clearance by slackening screws D, Fig. 4, and moving the pawl retaining bracket C, Fig. 7, until dimension 'e' is set up. Tighten screws D, Fig. 4.

(**Note:** Care should be taken to keep the abutment face of bracket C, Fig.7, parallel to the arm A).

Check

9.3 Lift the arm A, Fig. 8, until it is *just* touching the projection H on the pawl retaining bracket C. Check that, with the arm A held in this position, there is a clearance of .006 – .010 in. (.15 – .25 mm.), i.e. dimension 'f', between the armature G and the magnet core.

Action

9.4 If necessary, 'set' projection H to satisfy this condition.

10. **Reading Lever Height** (Fig. 9)

Check

10.1 Open the tape retaining plate and check that the tips of the reading levers T are level and .028 – .030 in. (.71 – .76 mm.), i.e. dimension 'g', above the surface of the cover plate.

Action

10.2 Raise or lower the levers by slackening screws R and turning the contact screws S. Tighten screws R when the correct height is obtained on all levers.

11. **Contact Clearance** (Fig. 9)

Check

11.1 Check that there is a clearance of .010 – .014 in. (.25 – .35 mm.) between the contacts of each contact lever (including the 'Tape Out' lever), and its corresponding contact screw P.

Action

11.2 To adjust, slacken screws Q and turn contact screws P until the correct clearance is set up between each pair of contacts. Tighten screws Q.

x)

12. **Feed Contact Clearance** (Fig. 5)

Check

12.1 With the magnet armature in the rest position, check that there is a clearance of .023 – .027 in. (.58 – .69 mm.), i.e. dimension 'c', between the feed contacts.

x) see next page.

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CROYDON - ENGLAND

T.I.S. No. 60
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(Issued August 1957)

AMENDMENT TO BOOKLET NO. 92

(Model 92 and S.3921 Tape Readers)

Amendment No. 1

On page 4 of Booklet No. 92, immediately after adjustment 11, insert the following new adjustment:-

'11A. Feed Contact Pressures

Check

11A.1 With the magnet armature in the rest position, check that a force of 60 - 70 grams applied to the 'make' contact spring, in line with the contacts, causes the spring to move away from its buffer.

Action

11A.2 If necessary, re-tension the 'make' spring against its buffer, using a spring adjusting tool or 'duckbill' pliers.

Check

11A.3 Check that a force of 50 - 60 grams, applied to the lever spring, in line with the contact-operating stud, causes the latter to move away from the armature extension.

Action

11A.4 If this is not so, re-tension the lever spring against the armature extension until the correct pressure is present.'

Action

12.2 If this is not so, slacken screws L and position the contact mounting bracket K until dimension 'c' is set up. Tighten screws L.

13. Contact and Reading Lever Spring Pressures

Check

13.1 Insert a length of non-perforated tape into the reader and close the tape retaining plate. Each reading lever contact should now be in contact with its contact screw P.

13.2 Check that a force of 9 – 15 grams (20 – 30 grams in the case of the 'Tape Out' contact lever), applied to the end of each contact lever N in turn, causes the contacts to break. Remove the tape.

Action

13.3 If this is not so, a new contact lever return spring Z should be fitted.

Check

13.4 Hold each contact lever N in turn clear of its respective reading lever T and check that a force of 140 – 160 grams (180 – 220 grams in the case of the 'Tape Out' lever), i.e. Force F_2, applied to the reading lever T, causes the latter to move.

Action

13.5 If necessary, 'set' the spring anchor plate M to give this tension.

Check

13.6 Check that a force of 9 – 15 grams applied to the ends of each contact lever N, moves the lever away from its contact screw S.

Action

13.7 Adjust by refining the 'set' of spring anchor plate M, re-checking Adjustment Instruction 13.4 to ensure that the Force F_2 is still within the stated limits. If both conditions cannot be satisfied, it will be necessary to fit a new reading lever return spring Y.

14. Tight-Tape Contact Assembly (Fig. 10)

Check

14.1 Operate the tight-tape arm C so that the knife A moves forward to strike the contact operating stud. Check that the contact operating stud H is resting on a level portion of the knife A, i.e. is not on the chamfered face.

Action

14.2 If this is not so, slacken screws D, move the contact assembly E to the

correct position and tighten screws D.

15. **Tight-Tape Contact Pressures** (Fig. 11)

Check

15.1 With the mechanism in the same position, check that contact spring L is exerting a pressure of 55 – 65 grams against its buffer K, and that stud H is exerting a pressure of 25 – 35 grams against knife A.

Action

15.2 If necessary, re-tension springs L and/or J by using a spring adjuster or a pair of 'duckbill' pliers.

16. **Tight-Tape Contact Gap** (Fig. 11)

Check

16.1 With the mechanism as before, check that there is a clearance of .010 – .015 in. (.25 – .35 mm.), i.e. dimension 'h', between the contacts.

Action

16.2 Adjust this clearance if necessary by ' setting ' the buffer K.

17. **Tight-Tape Arm Pressure** (Fig. 10)

Check

17.1 With the mechanism in the rest position, check that a force of 70 – 90 grams, applied as shown at F_3, causes the tight-tape arm C to move.

Action

17.2 If this is not the case, remove springs B and G and check them against the table of spring tensions on page 9. If necessary, replace one or both of the springs.

DISMANTLING AND ASSEMBLING INSTRUCTIONS

1. Remove the three screws securing the cover plate to the main plate and remove the cover plate.

2. Disconnect the wiring to the contact lever assembly, having noted the colour and position of each wire.

3. Disconnect the reading and contact lever return springs, having noted their respective positions.

4. Remove the four countersunk screws supporting the contact lever assembly and remove the latter.

5. Remove the two countersunk screws securing the pivot block to the main plate and remove the block complete with reading and contact levers.

6. Disconnect the wiring to the feed unit, noting the colour and position of each wire.

7. Remove two screws securing the feed contact assembly to the feed unit and swing the assembly clear.

8. Unscrew the two screws securing the feed unit to the main plate and remove the unit.

   (**N.B.**: On assembly, carry out Adjustment Instruction No. 5 before refitting the unit to the main plate).

9. Remove the screws securing the feed shaft assembly to the main plate and lift clear, taking care not to lose any shims which may be between the assembly and the main plate.

   (**Note:** When assembling, check that the feed wheel J, Fig. 3, is flush to .008 in. (.2 mm.) underflush, i.e. dimension 'b', with respect to the cover plate D. If this is not so, it will be necessary to add or remove shims Nos. 3221/143 (.004 in.) or 3921/83 (.008 in.) between the feed shaft assembly E and the main plate.)

10. Remove the two screws securing the contact assembly to the tight-tape mechanism and swing the assembly clear.

11. Remove the two screws securing the tight-tape mechanism to the main plate and lift the mechanism clear.

LUBRICATION INSTRUCTIONS

N.B.: Although all units are lubricated before leaving the factory, there is a possibility that some oil may be lost in transit and in storage.

It is therefore advisable to lubricate the unit before putting it into service.

AFTER EVERY 100 HOURS OF OPERATION

No. 2 Lubricant

Lubricate the following points:-

(1) Reading lever guides
(2) Detent lever pivot
(3) Detent wheel teeth
(4) Feed wheel shaft bearings
(5) Armature pivot
(6) Detent roller pivot
(7) Feed pawl pivot
(8) Reading lever pivots
(9) Contact lever pivots
(10) Ratchet wheel teeth
(11) Lower engagement faces of reading levers
(12) Feed contact operating stud
(13) Pivots of tight-tape mechanism
(14) 'V' of tight-tape pivot bracket.

CREED LUBRICANTS

No. 2 Lubricant – Medium Oil, such as:-

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

SPRING TENSIONS

Spring No.	*Reference*	*Method of Measurement*	*Tension*
3921/12	B, Fig. 10	Force to give an extension of 15/64 in. (6 mm.)	3½ – 4½ ozs. (99 – 128 gms.)
3921/13	G, Fig. 10	Force to give an extension of 1/4 in. (6.4 mm.)	15 – 17 ozs. (425 – 480 gms.)
3921/35	Z, Fig. 9	Force to give an extension of 15/64 in. (6 mm.)	1/2 oz. (14 gms.)
3921/132	Similar to Z, Fig. 9 (Tape-Out contact)	Force to give an extension of 7/32 in. (5.6 mm.)	1¼ – 1¾ ozs. (35 – 50 gms.)
3921/36	Y, Fig. 9	Force to give an extension of ¼ in. (6.4 mm.)	5¾ – 6 ozs. (163 – 170 gms.)
3921/131	Similar to Y, Fig. 9 (Tape-Out Lever)	Force to give an extension of 11/32 in. (8.7 mm.)	7½ – 7¾ ozs. (213 – 220 gms.)
3921/58	X, Fig. 8	See Adjustment Instruction 6	–
3921/74	Not shown (Feed Pawl Spring)	Force to move feed pawl clear of ratchet teeth	20 – 40 gms.
3921/130	W, Fig. 5	Force to give an extension of 11/32 in. (8.7 mm.)	7 – 9 ozs. (198 – 255 gms.)

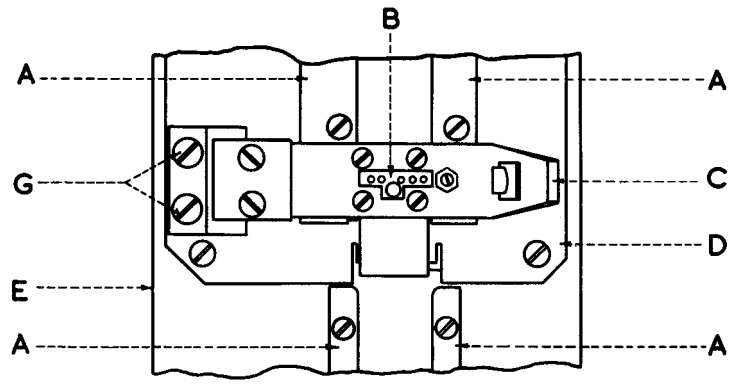


FIG. 1

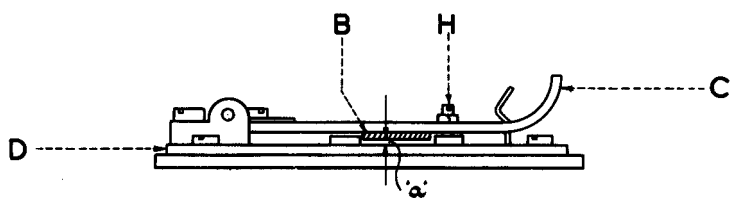


FIG. 2

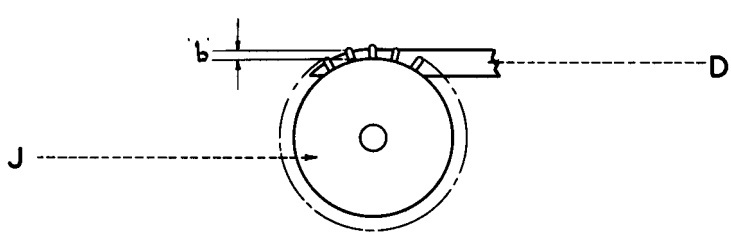


FIG. 3

DIMENSIONS

'a' = { ·008 — ·010 in. / ·20 — ·25 mm. }

'b' = { ·000 — ·008 in. / ·00 — ·20 mm. }

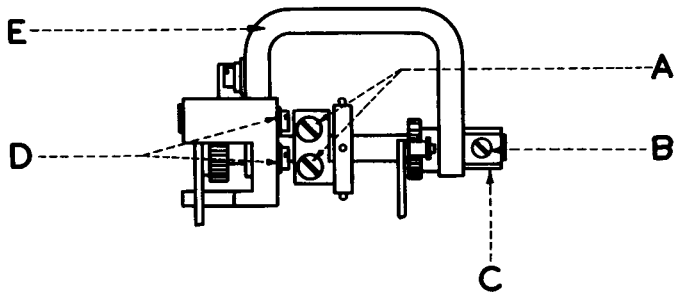


FIG. 4

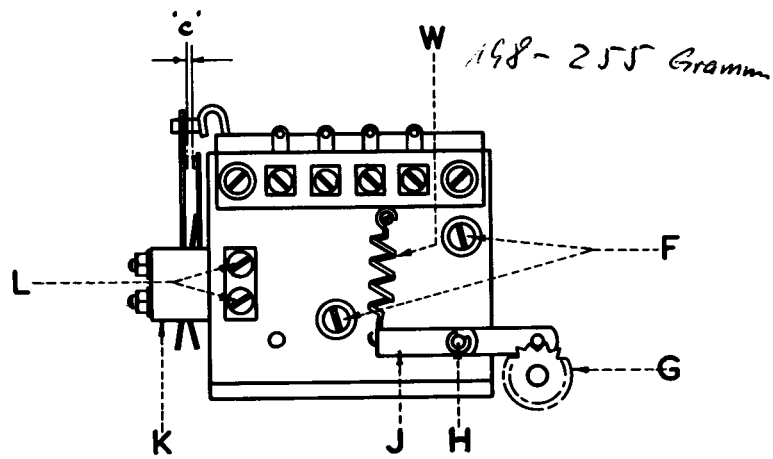


FIG. 5

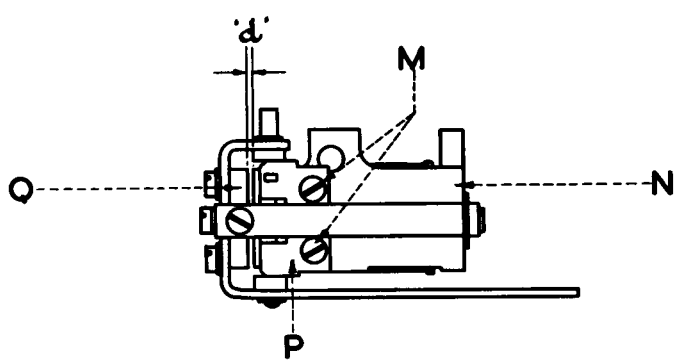


FIG. 6

DIMENSIONS

'c' = { ·023 — ·027 in. / ·58 — ·69 mm. }

'd' = { ·006 — ·010 in. / ·15 — ·25 mm. }

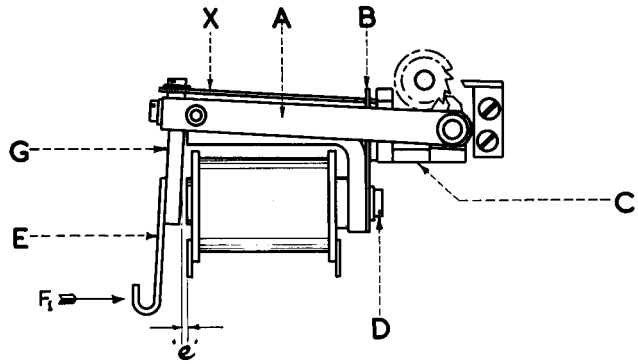
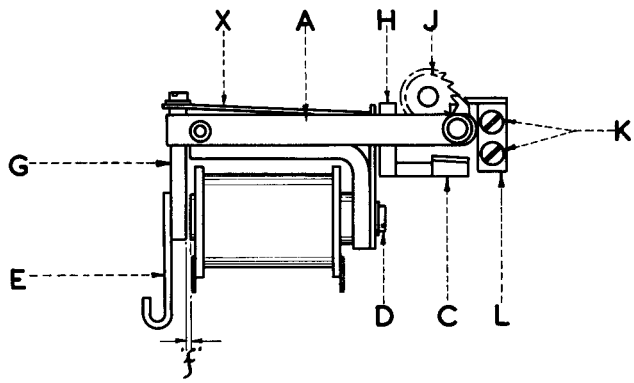


FIG. 7



170 - 190 FIG. 8

Grams

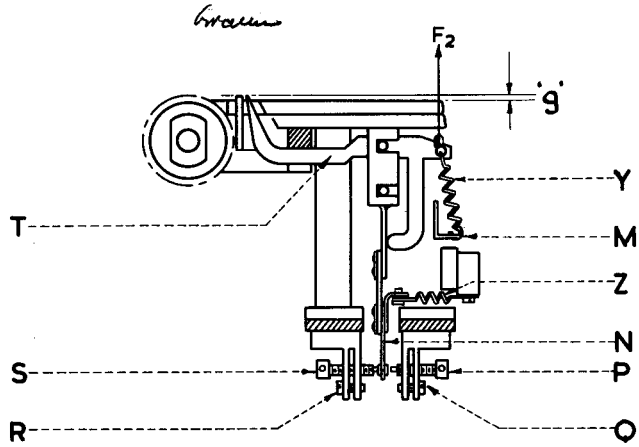


FIG. 9

DIMENSIONS

'e' = { ·029 — ·031 in. / ·74 — ·80 mm. } 'f' = { see text } 'g' = { ·028 — ·030 in. / ·71 — ·76 mm. }

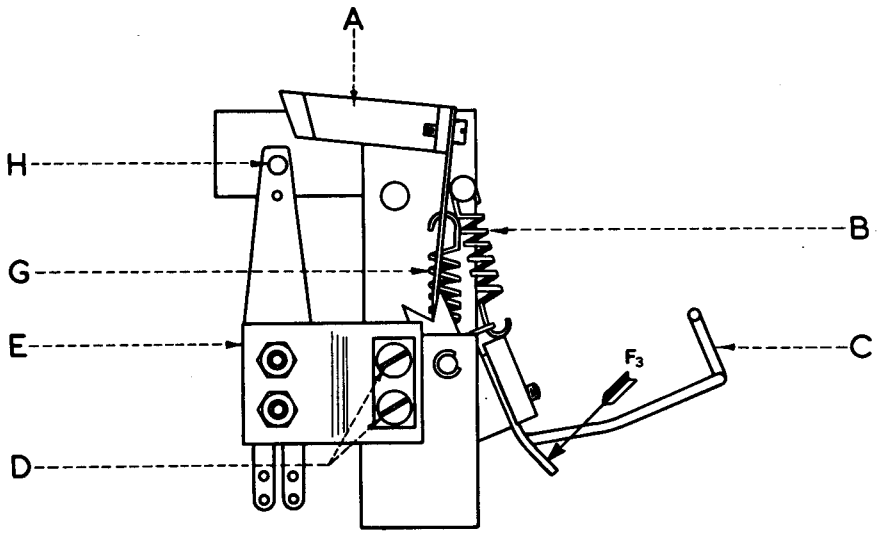


FIG. 10

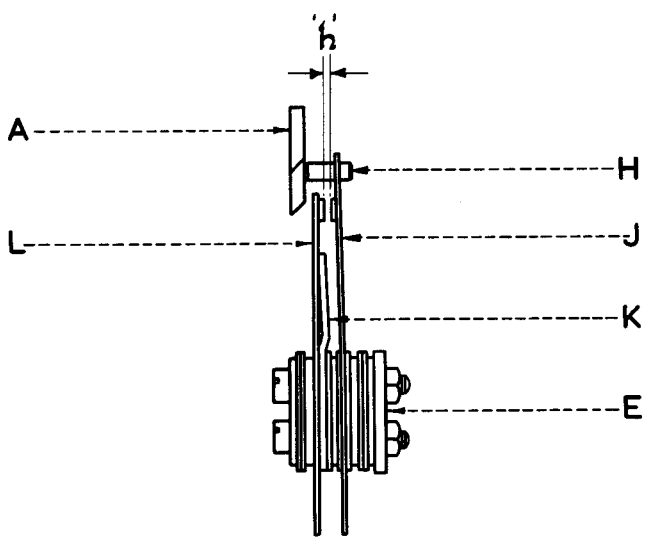
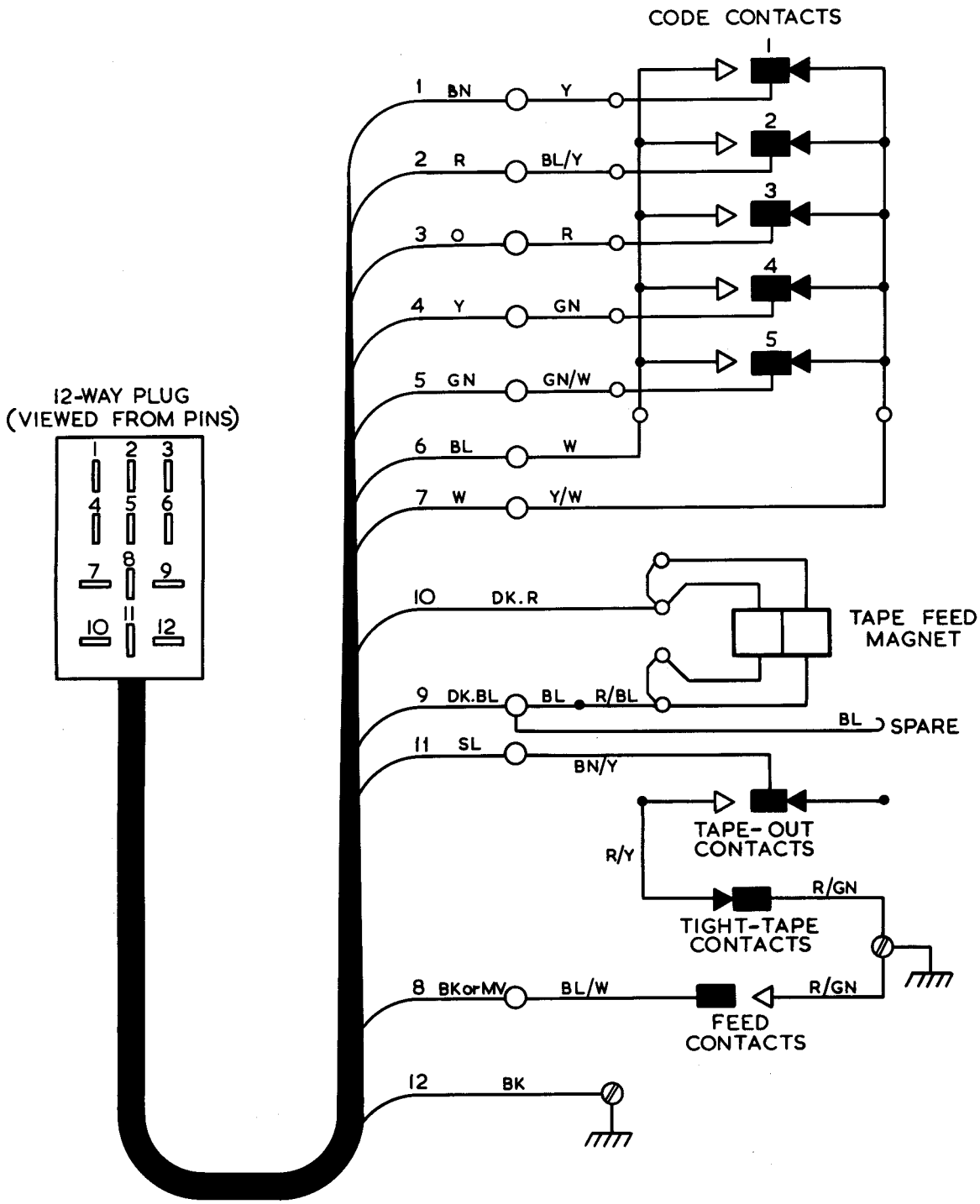


FIG. 11

DIMENSION

$$\text{'h'} = \begin{cases} \cdot 010 - .015 \text{ in.} \\ \cdot 25 - \cdot 38 \text{ mm.} \end{cases}$$



WIRING SCHEMATIC
MODEL 92 AND S.3921 TAPE READERS

Printed in England 750/0557/18178/L.L