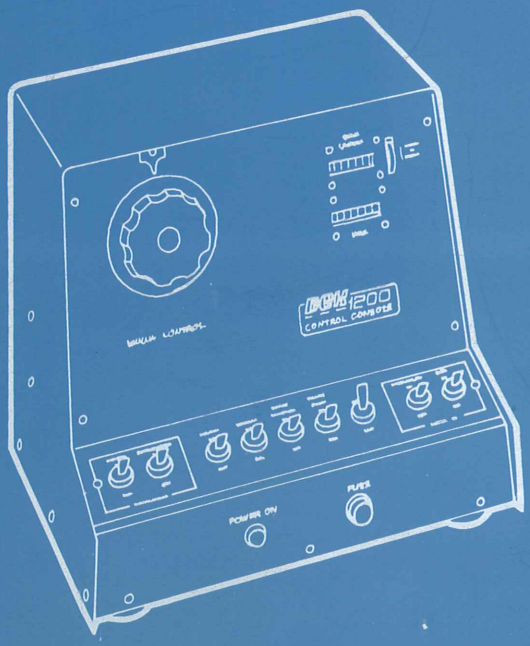
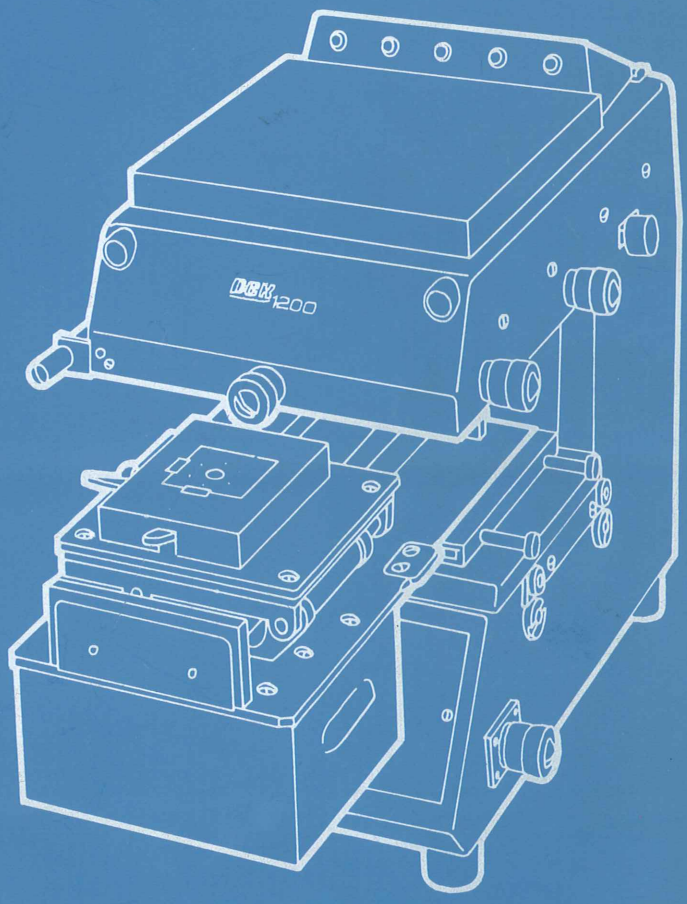
# DEK 1200
## THICK FILM PRINTER

# OPERATION AND SERVICE MANUAL

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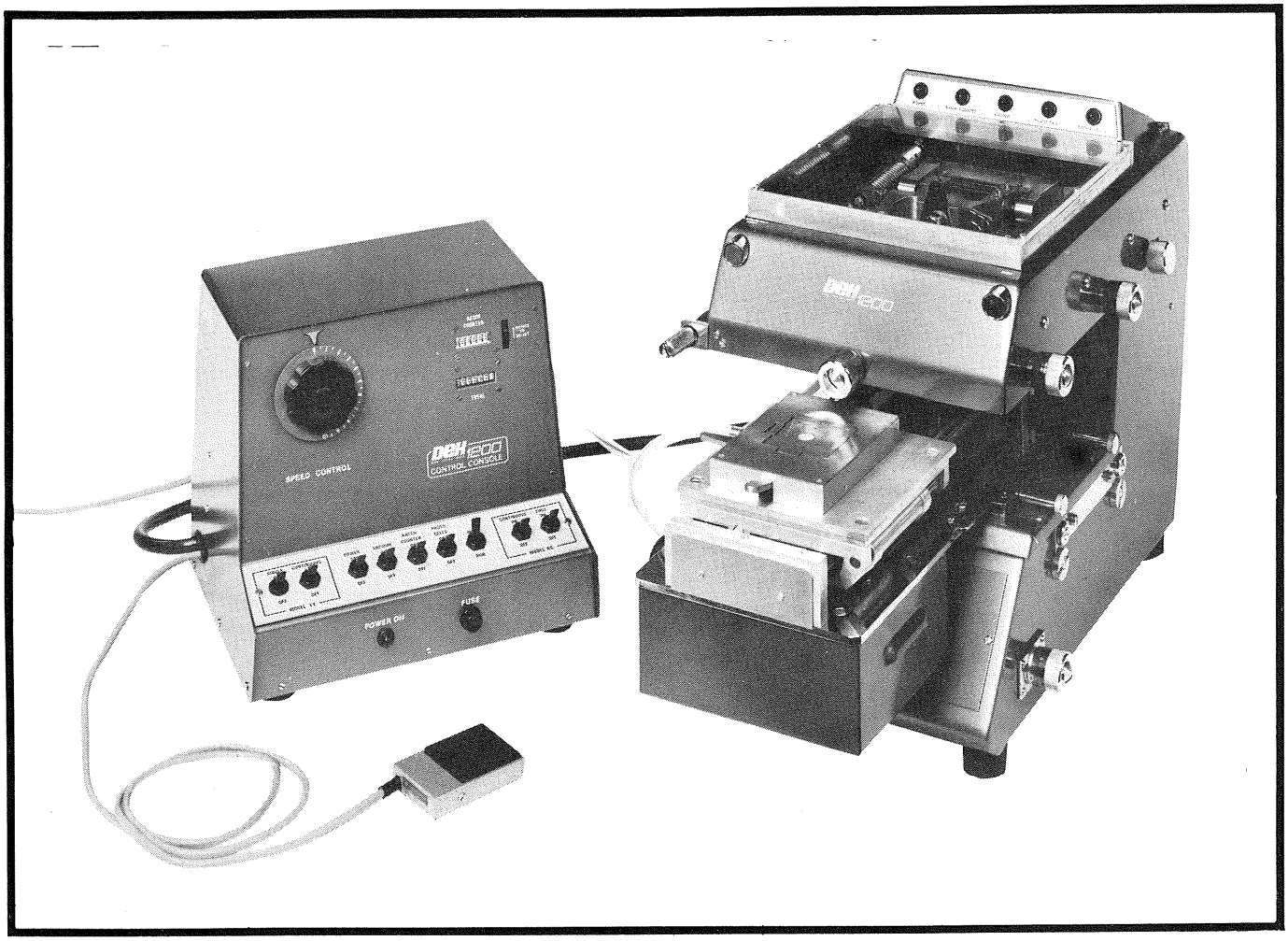



Fig 1

# Introduction

The DEK 1200 has been specially designed for printing metal compounds and resists for thick film and related microelectronic work. All movements are controlled by precise mechanical means, and all, including the printhead, are driven by a built-in electric motor, to give a high standard of repeatability. The D E K 1200 is capable of very high yields, with very close tolerance and fine line work.

All that is required is a good quality screen, printing medium suitable for the particular application, and careful setting up of the 1200 before commencing printing. The operator can then achieve a high rate of output with the minimum of effort, having only to make sure that the machine is fed with substrates and that the supply of printing medium is maintained.

Setting up is simple and straightforward, following step-by-step instructions given in this Manual. If this is done correctly, very few problems will be encountered.

If any difficulties do arise, DEK will always give advice and recommendations on screens and printing mediums, based on many years of practical experience of the needs of the electronics industry, and DEK's continuous test printing programmes using the latest materials and techniques.

# Installation

Assembling 1200 Printer and 1200 Control Console

The basic DEK 1200 consists of the Printer (A) and its Control Console (B). These work in conjunction with substrate feed systems which are designed for particular applications: there are separate Operation Manuals for each type of system. In this Manual, the R S Unit (C) is the one described and illustrated, and for which full instructions are given.

A 1 Place Printer on a bench at a suitable height for the operator (approximately 75 cm/30 in). No fixing is required.

A 2 Note fixing of rigid plastic cover (1) on top of Printer, which only fits one way round and is held in position by the hinged indicator light panel (2). The cover prevents foreign matter from contaminating the printing medium and also reduces evaporation of the solvent in the medium.

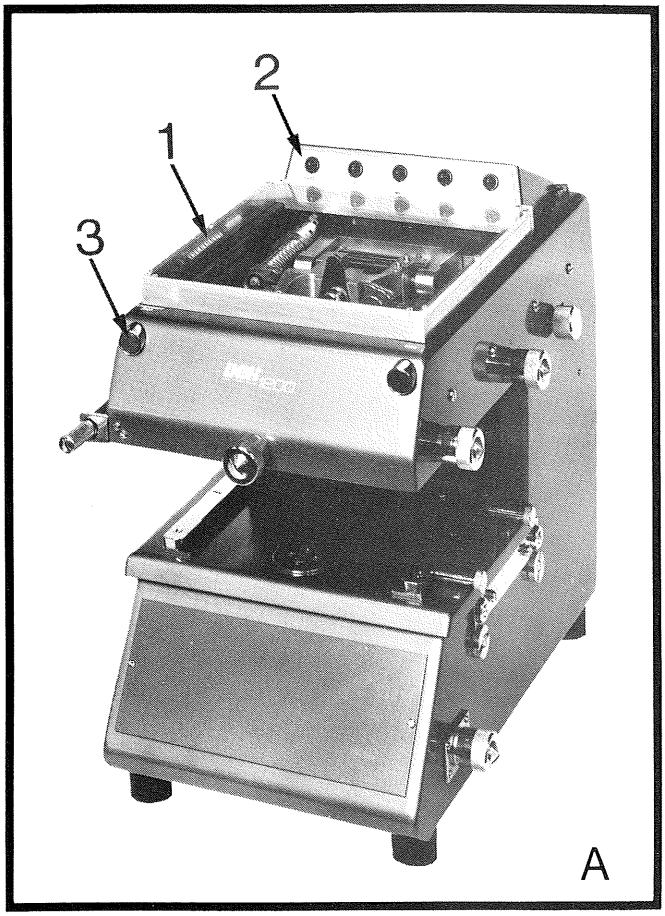



Fig 2

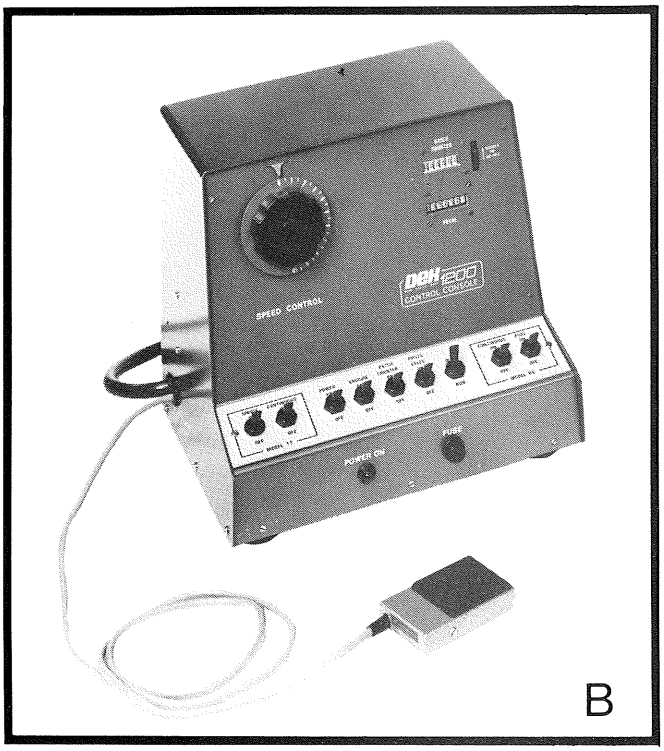



Fig 2

A 3 Check position of auxiliary drive belt (4) at rear of Printer behind panel. It should be eased down off its drive pulley and all fittings and wiring, until it is resting clear of all cams and switches and other moving parts.

The belt is a standard fitment for use with auxiliary equipment, but is not needed for any of the purposes covered by this Manual.

A 4 Take special note of EMERGENCY STOP button (3) on front of Printer. This can be used at any time.

All moving parts stop immediately EMERGENCY STOP button is pressed once. When ready to restart machine, press button a second time.

A 5 Place Control Console on either side of Printer.

It is usually more convenient for the Console to be on the left, because most operator's controls are on the right side of the Printer.

A 6 Fit plastic tubing from Control Console over union (5) on Printer (Fig 4).

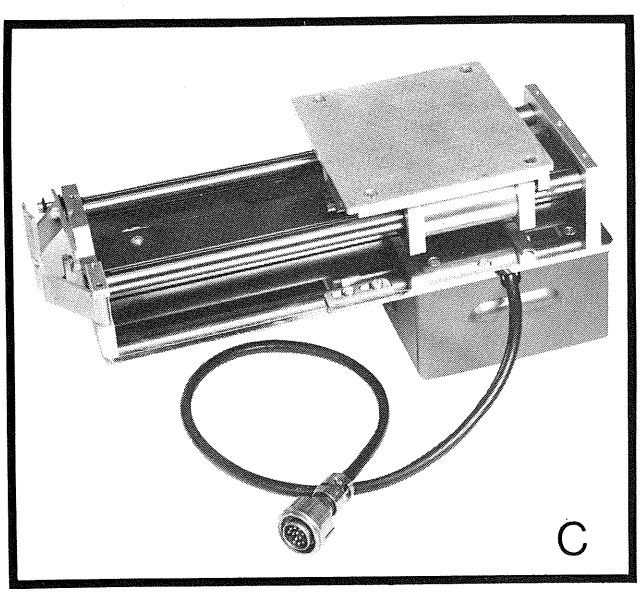



Fig 2

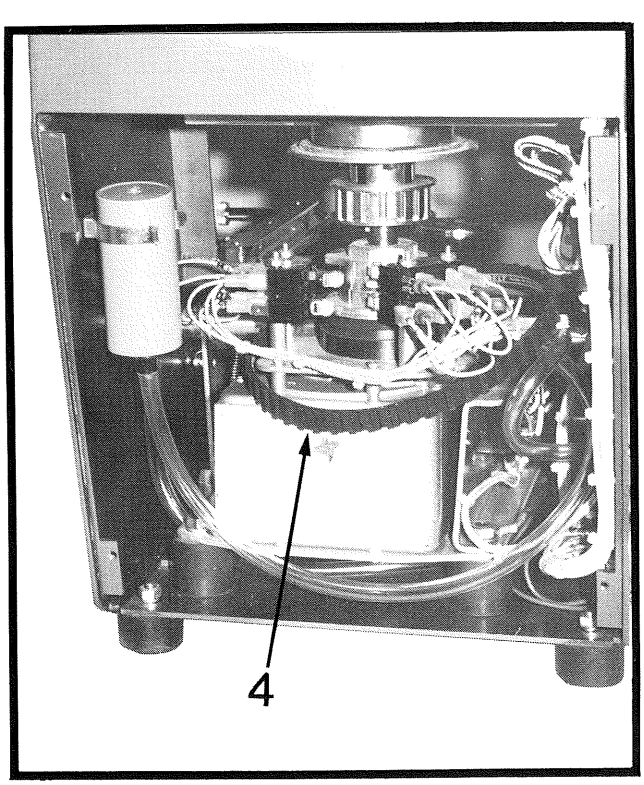



Fig 3 .

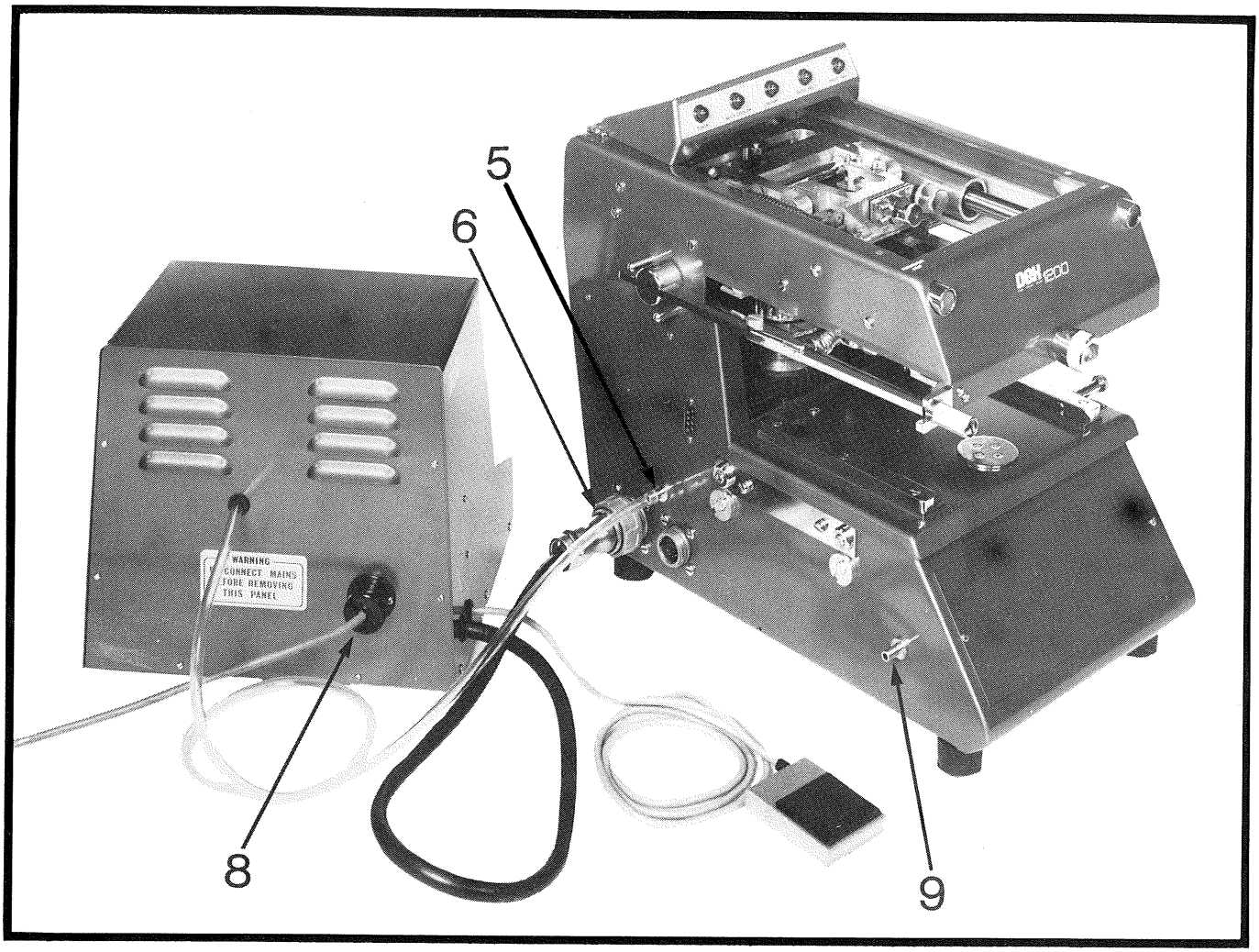



Fig 4

A 7 Connect Control Console output (6) to socket on left side of Printer.

Note that plugs and sockets on 1200 equipment have internal plastic keyways which prevent incorrect connection. They will fit only in one position and can then be secured by turning their clamp ring, which should be firmly tightened by hand.

A 8 Check position of Control Console switches. Set INCH/RUN switch to INCH, and all other switches to OFF. Turn SPEED CONTROL fully clockwise to give slowest speed.

A 9 Using plug supplied in socket (8) and a length of 3 core insulated cable, connect Control Console to mains supply (normally 220/240 volt 50 Hz single phase, except for machines supplied to special order). Check correctness of supply before connecting.

Checking operation of controls (Fig 5)

A 10 Put POWER switch of Control Console to ON. Check POWER ON light comes on. If it does not, check 3 amp fuse on front panel.

IMPORTANT

Do NOT use a fuse of higher rating than 3 amp, as this could cause permanent damage to switch contacts or transformer if a short circuit occurred.

A 11 Check POWER light on indicator panel on Printer also comes on. If it does not, check that EMERGENCY STOP button has not been pressed (see Operation 4). If it has, press it a second time to release it. If light still does not come on, check plug/socket connection has been correctly made.

A 12 Press INCH button on Printer, and machine should start. It will stop immediately it is released.

This button is frequently used during setting up, whenever the printhead needs moving to a particular position.

A 13 Set INCH/RUN switch to RUN. The machine will now complete the print cycle which was started by using the INCH button, and it will then stop.

A 14 Put SINGLE switch on PRINTHEAD section to ON, and hold in this position for a moment.

The switch is spring-loaded and will automatically return to OFF when released. The printhead, comprising squeegee mechanism and ink distributor blade, will complete one cycle, stopping at the commencement of the print stroke.


Fig 5

A 15 Set CONTINUOUS switch on PRINT-HEAD section to ON. The printhead will now run continuously until the circuit is broken by one of the following:

1) Operation of EMERGENCY STOP button
2) Moving POWER switch to OFF
3) Moving INCH/RUN switch to INCH
4) Removal or failure of fuse on Control Console
5) Failure of rectifier on main motor assembly
6) Loss of power supply

Notes

The recommended way to stop the machine, except during setting up or in an emergency, is to put the CONTINUOUS switch to OFF. This ensures that all mechanisms complete their cycles, leaving the printhead at its normal starting point.

The MODEL RS switches on the Control Console are not operative until the R S Unit is fitted to the Printer. This is dealt with later, starting at Operation A 21.

A 16 With CONTINUOUS switch at ON and the machine running, check EMERGENCY STOP button by pressing it once to stop the machine, and again to restart it.

A 17 Check SPEED CONTROL by turning it anticlockwise to increase speed and clockwise to reduce it. Check that machine will start with control set for slowest speed.

The maximum speed of the 1200 is set during manufacture to the maximum efficient printing speed: that is, the fastest output coupled with maximum yield. Do not attempt to interfere with the range of speeds set.

A 18 With machine still running, set VACUUM switch to ON and check indicator light comes on. Place a finger over the union (9) and check vacuum is on during print stroke (squeegee lowered and moving from front to rear of machine) and off during remainder of print cycle.

A 19 Set BATCH COUNTER switch to ON and check that indicator light comes on. Check that batch counter and total counter are working and increase by one for each complete print cycle. Return BATCH COUNTER switch to OFF and batch counter to zero by rotating the wheel beside it upwards. Note that total counter continues to operate after batch counter is switched off.

Shutting off machine

A 20 Return CONTINUOUS switch to OFF so that machine completes its cycle. Then return INCH/RUN switch to INCH, and move printhead to the rear until it is at the end of the print stroke. Turn POWER switch to OFF. Finally, check that all other switches are at OFF.

Note

If the PHOTOCELLS switch is put to ON it will illuminate the indicator light marked PHOTOCELL 1 on the Printer, but has no other effect on 1200 systems with hand feed. Photocell circuitry is fitted to automatic feed systems only.

Installing R S Unit (Fig 6)

The R S Unit is a hand feed system with a sliding work-table mounted on linear bearings. The table is positioned under the printing screen automatically to a high degree of accuracy, and during printing is held positively against its own stop to prevent any movement in any direction. This gives very good repeatability at all operating speeds. Its movements are integrated with those of the printhead and are controlled automatically from the Console.

This integrated control system is set up during manufacture and in normal use will operate continuously for long periods without need for adjustment. Maintenance instructions will be found in Section E.

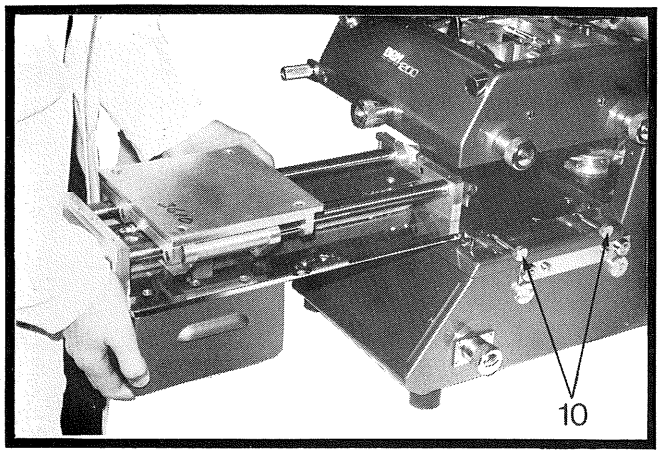



Fig 6

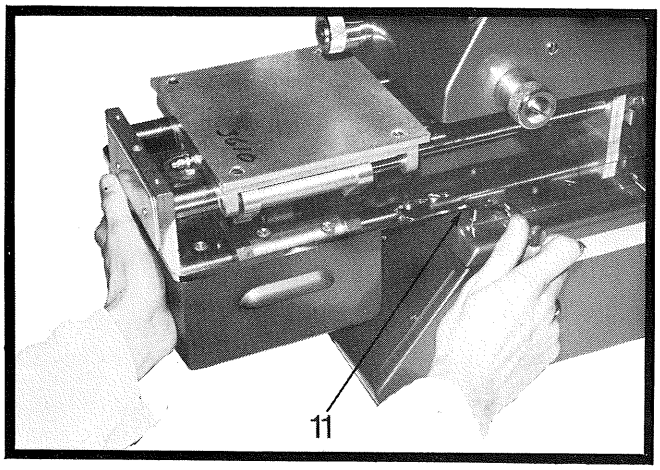



Fig 7

A 21 Check that all switches are at OFF and that INCH/RUN switch is at INCH.

A 22 Slacken two knurled screws (10) on guide rails.

A 23 Slide large flat plate of R S Unit beneath guide rails and push right home until stops (11) are against ends of guide rails. Keep R S Unit pressed firmly in and tighten knurled screws alternately until both are right home. Inspect stops to check that they have not moved away from ends of guide rails; if they have, slacken screws and repeat fitting sequence.

It is important to get this position correctly set, but the procedure is completely straightforward if the screws are used alternately and very lightly until completely home, when they can be tightened fully.

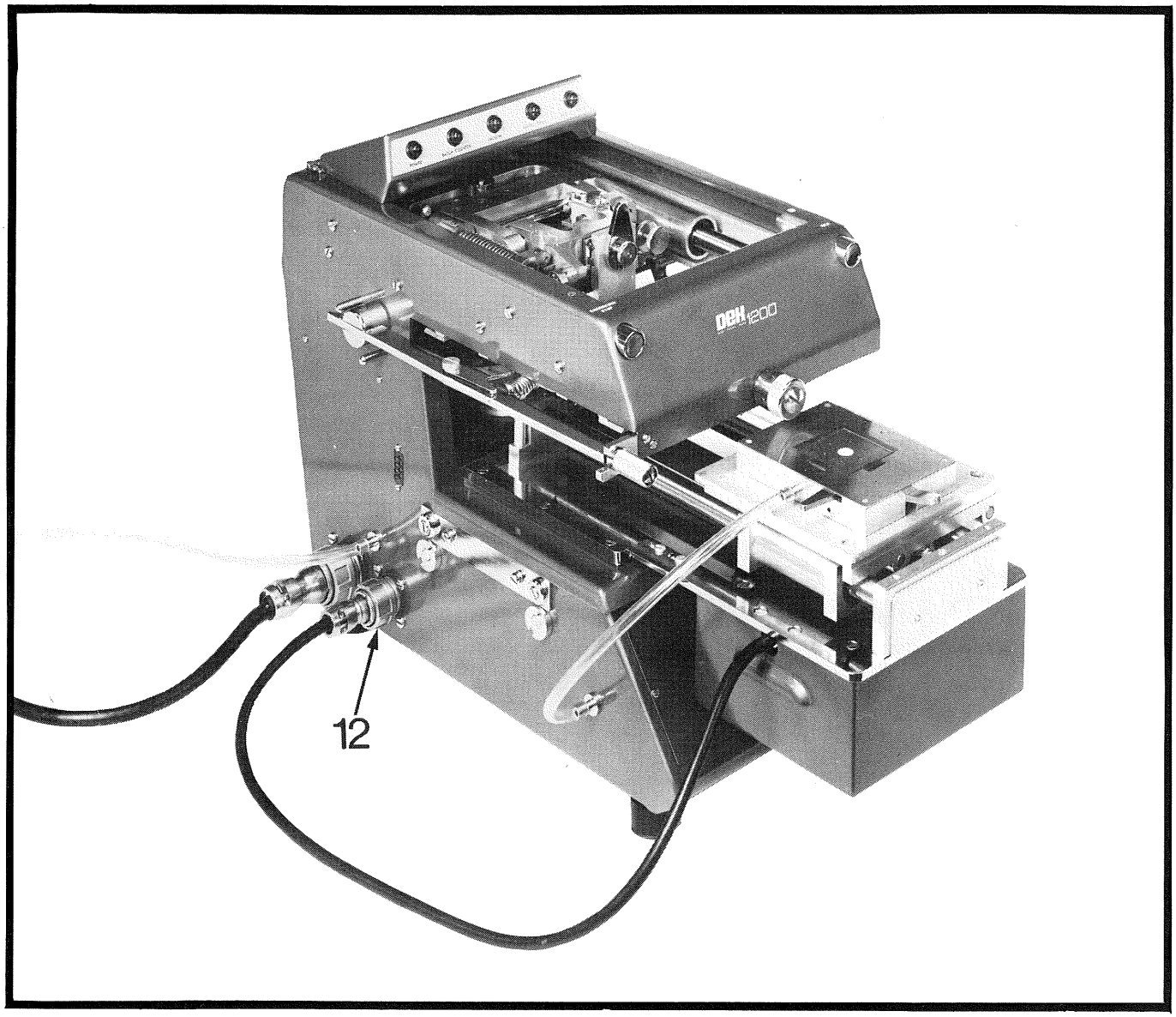



Fig 8

Connecting up R S Unit (Fig 8)

A 24 Connect plug (12) to its socket on Printer.

They have plastic keyways to prevent incorrect connection. They will fit only in one position, and can then be secured by the clamp ring.

The photograph shows a work-piece holder in position, with vacuum tube connected. This is dealt with later.

A 25 Put POWER switch to ON and INCH/RUN switch to RUN. If worktable on R S Unit is not fully out in its loading position, machine will complete one cycle and stop.

Checking R S Unit

A 26 Put FOOTSWITCH switch on R S section of Control Console to ON. Press footswitch, and machine should complete one cycle and stop.

The sequence is:

Worktable moves into Printer and is stopped by a fibre cushion, which moves aside to allow a separate friction drive to locate table against a positive fixed stop.

The print stroke then takes place.

This completed, the squeegee and ink distributor blade on the printhead move back towards the front of the Printer and at the same time the worktable returns rapidly to the front for unloading and reloading.

A 27 Set CONTINUOUS switch on MODEL R S section of Control Console to ON. Machine will operate continuously in the sequence described above. Let machine run continuously for approximately five minutes, to prove satisfactory functioning of the system. Return CONTINUOUS switch to OFF, and machine will complete cycle and stop.

Note

When POWER switch is at ON, and INCH/RUN switch is at RUN, accidental movement of the R S worktable will cause the machine to start and to run through one complete cycle, even if all other Control Console switches are at OFF. No adverse effect is caused by this.

A 28 Return all switches to OFF and INCH/RUN switch to INCH.

SAFETY FEATURE

Because the R S table is driven through a friction clutch, if there is any restriction to its movement, no injury to the operator nor damage to the equipment will be caused.

# Setting up

Setting up the DEK 1200 and the R S Unit is simple and straightforward if the instructions given in this Section are followed exactly and systematically. Correct setting up is essential if the full potential of the equipment is to be realised, and the benefits of high yield at high rates of production achieved.

Long experience has shown quite conclusively that poor quality results or difficult working are almost always caused by the screen not being of sufficiently high quality, or by the type of screen or printing medium being unsuitable for the work. A 1200 system which has been properly set up is precisely controlled throughout the printing sequence and is very seldom the source of any trouble.

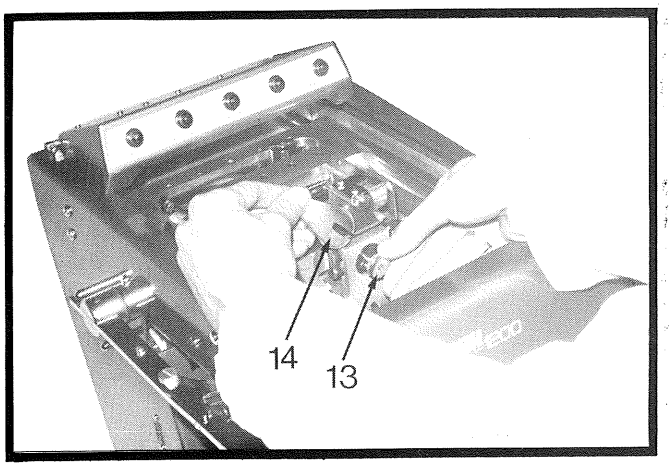



Fig 9

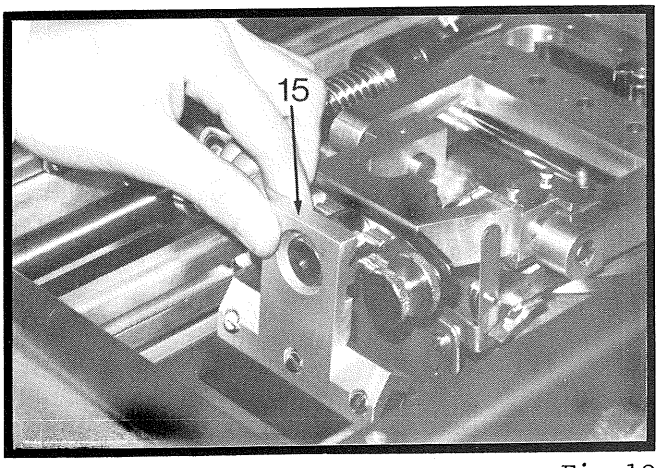



Fig 10

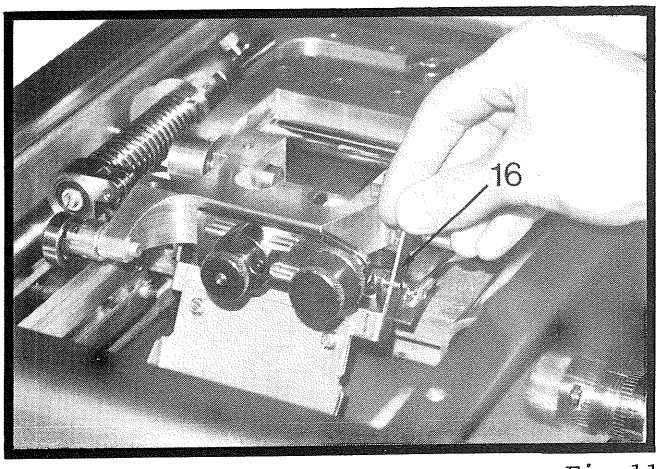



Fig 11

Removal of squeegee and ink distributor blade (Fig 9, 10 and 11)

B 1 Remove rigid plastic cover from top of machine. Check POWER switch is at OFF.

B 2 Slacken knurled nut (13), and remove slotted washer (14).

B 3 Slide squeegee assembly (15) off spigot and lift away.

B 4 Grip extended arm (16) of ink distributor blade between thumb and forefinger, tilt until clear of slot, slide it off its two pivots, and lift away.

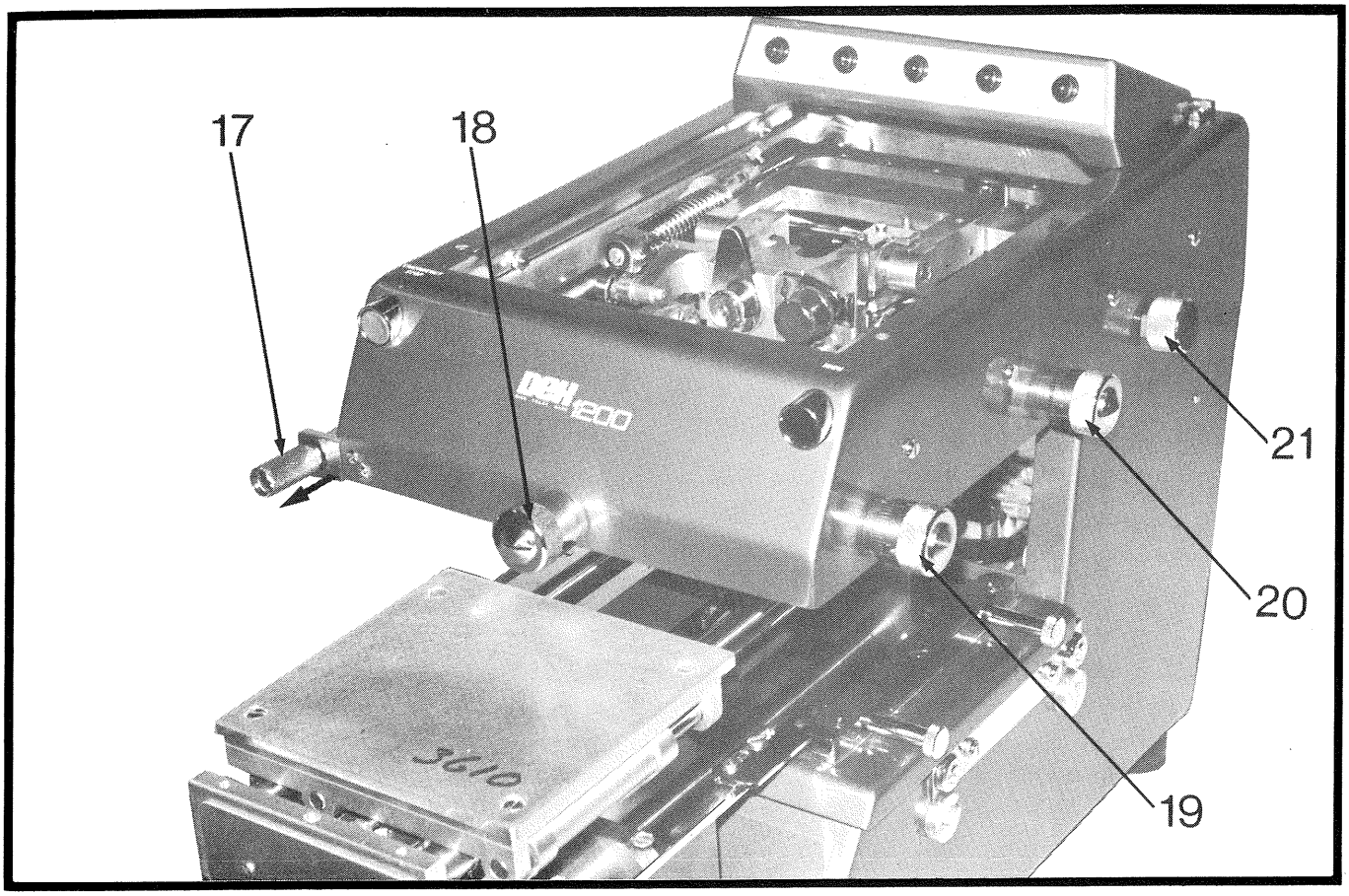



Fig 12

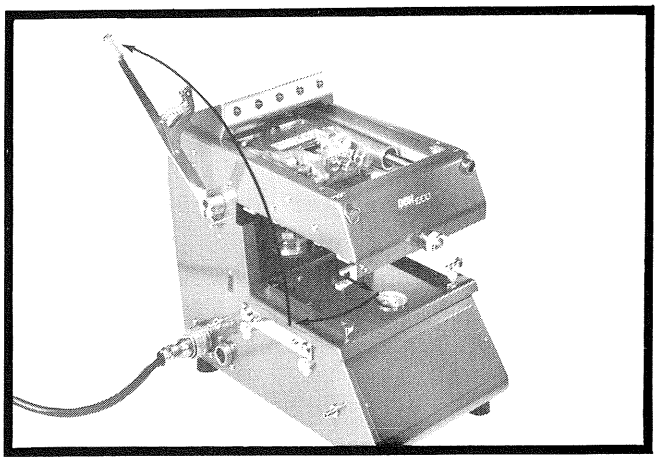
Removal of screen chase (Fig 12, 13 and 14)

B 5 Push knurled knob (21) towards rear of machine and downwards into its holding slot.

B 6 Pull knurled sleeve (17) clear of latch, move arm FULLY to left and then upwards until it reaches its stop.

These two controls apply pressure to the chase, against the rear and the left sides respectively. This keeps the chase constantly spring-loaded against the screen positional controls (18), (19) and (20).

B 7 Slide chase to left and lift away from side of machine.



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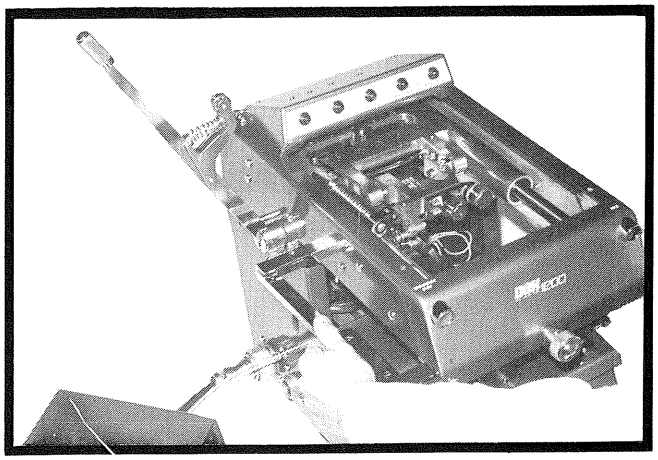

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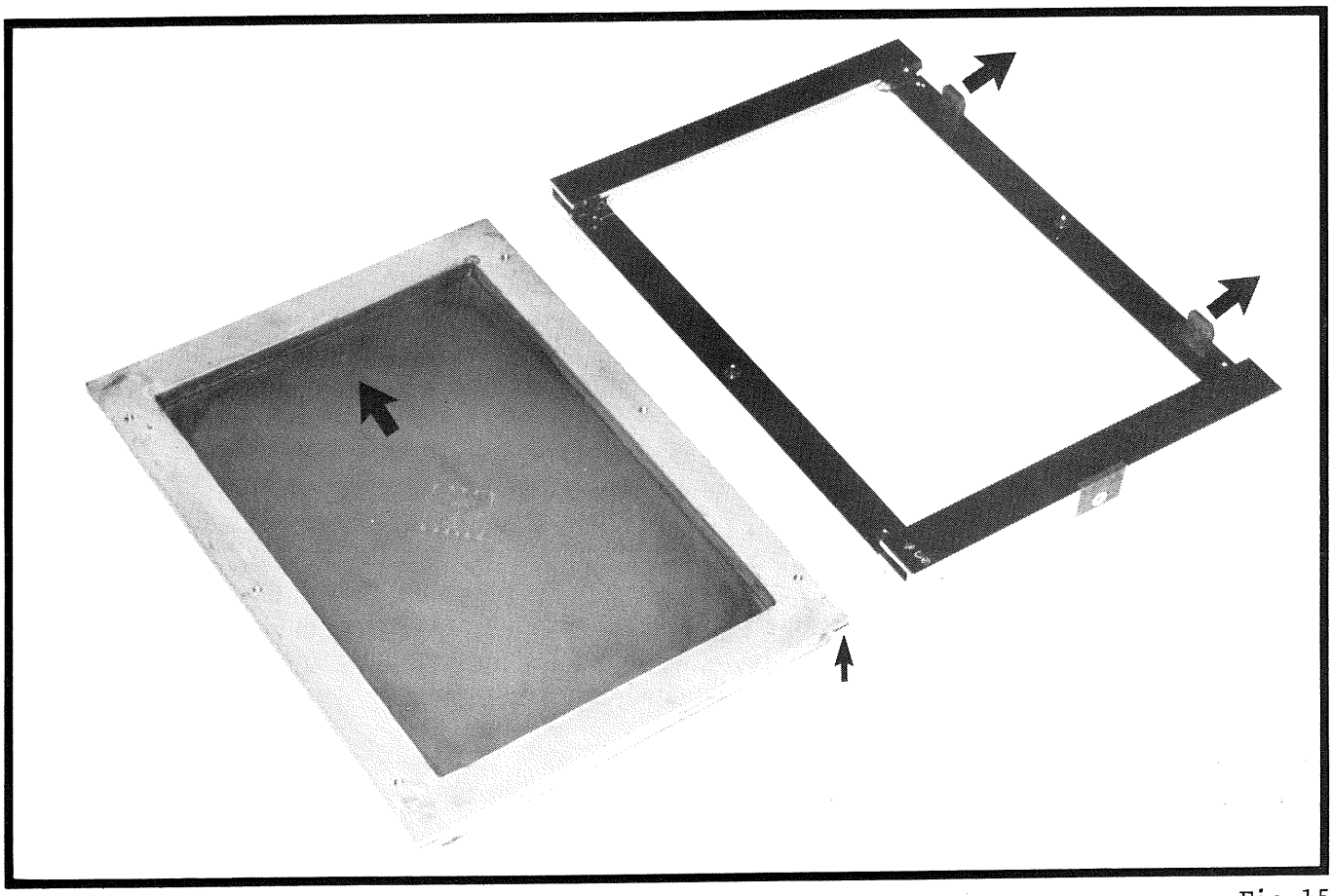


Fig 15

Assembling screen and chase (Fig 15, 16 and 17)

B 8 Select screen to be used and place it on a clean flat surface. Its flange face should be uppermost and its image the correct way round.

If surface is uneven, one end of screen should be propped up slightly to prevent possible damage to the screen and its image.

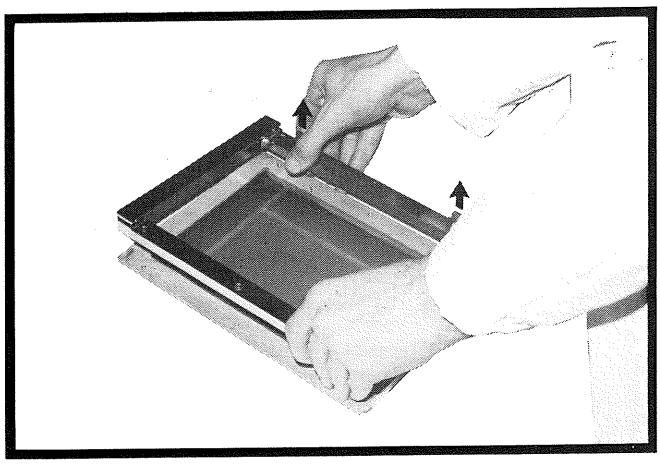


Fig 16

B 9 Place chase on top of screen with its two lugs on the right hand side and pointing upwards.

B 10 Screw chase down on to screen with six Allen screws, using key provided in tool kit.

Alignment is made easier by fitting two screws first, in opposite corners, and by not tightening down fully until all six are in position.

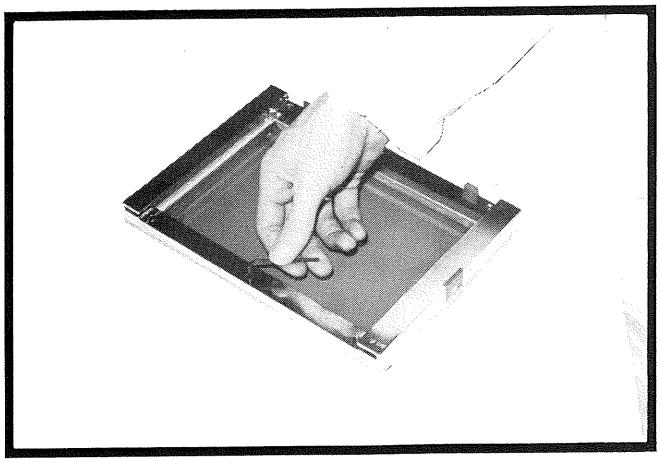


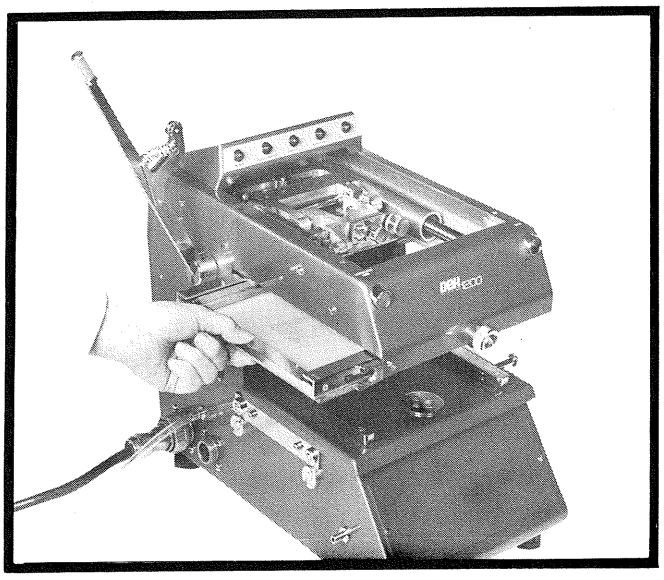
Fig 17

Loading screen into Printer (Fig 18, 19 and 20)

B 11 With two lugs on the right and pointing upwards, load chase and screen into machine by fitting its slots over machine guides and pushing home fully against stops on right hand side.

B 12 Lower arm (22) and move it to right. Pull out knurled sleeve, press arm to right to overcome spring pressure, and release sleeve into latch.

Screen is now spring-loaded against side adjusting screws (23) and (24).



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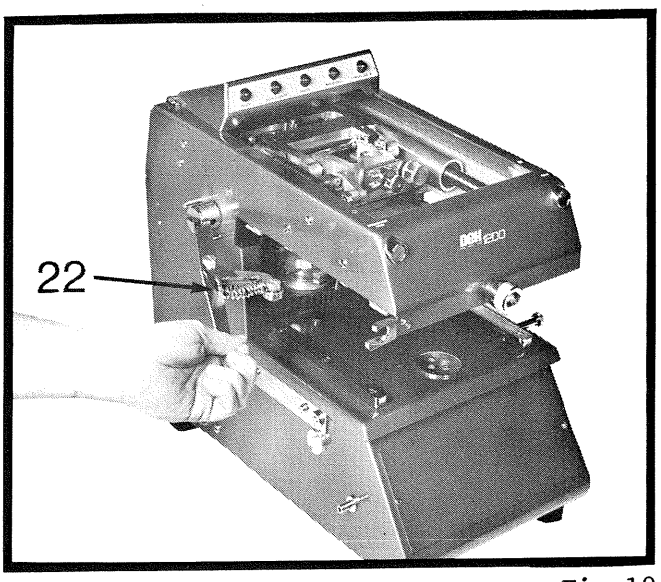


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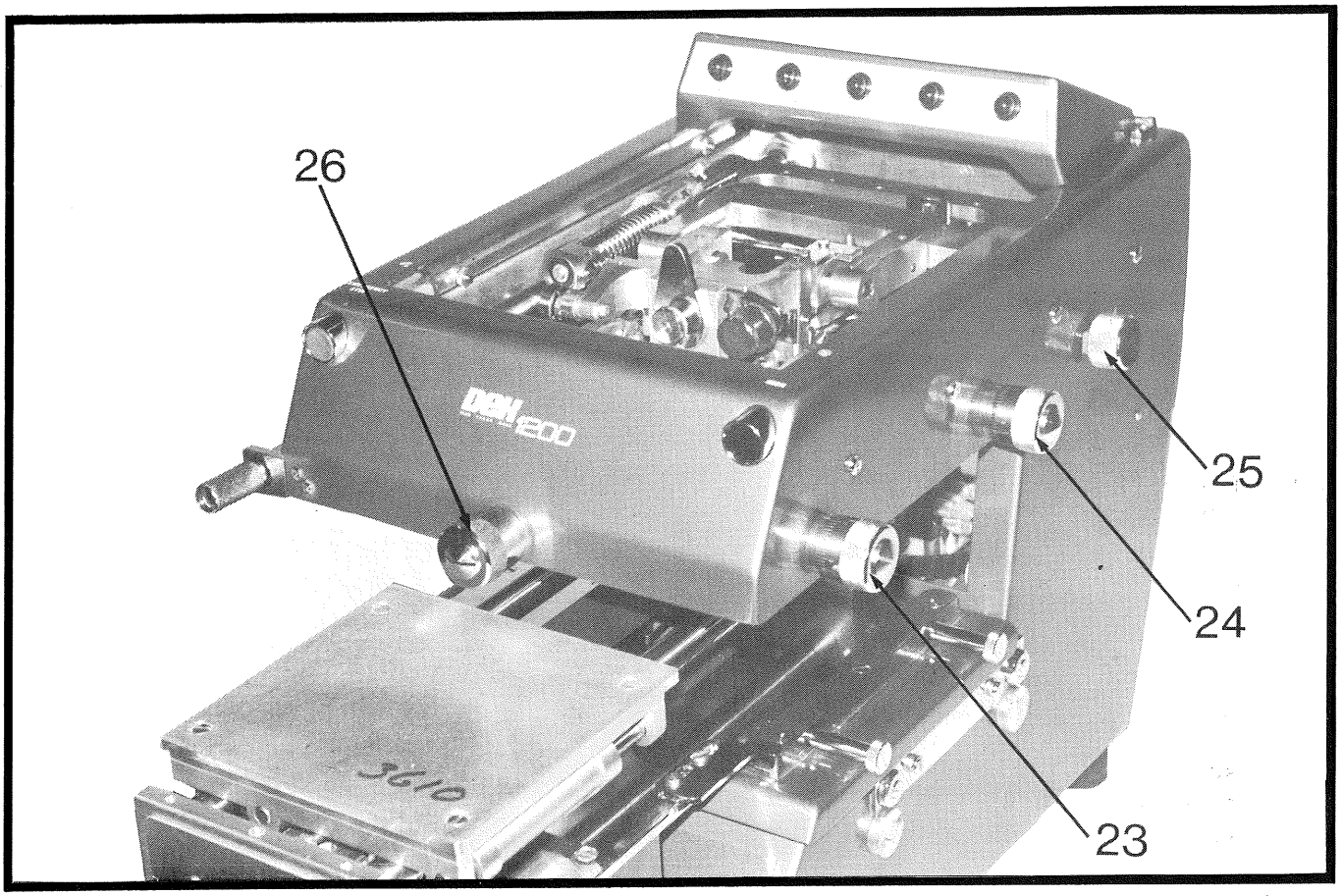



Fig 20

B 13 Release knurled knob (25) by pushing slightly towards rear of machine, lifting it to clear latch, then releasing it forwards.

Screen is now spring-loaded against front adjusting screw (26). It is important to follow operations B 12 and B 13 in the sequence given, to ensure screen is located correctly.

B 14 Set all three adjusting screws so that three red rings are just visible on each collar.

This positions the screen centrally, to provide the maximum possible adjustment in all directions.

Fitting workholder (Fig 21, 22, 23, 24 and 25)

Notes

A workholder will be required, designed specifically for the workpieces to be printed. Many different designs are possible; the ones shown in the illustrations are typical, and take either 1 in x 1 in or 2 in x 2 in substrates.

Dek Printing Machines Limited offer a design and manufacturing service for customers; or in the case of organisations which have facilities for making such special fixtures themselves, will give advice on the techniques which have been found to be the most suitable for screen printing.

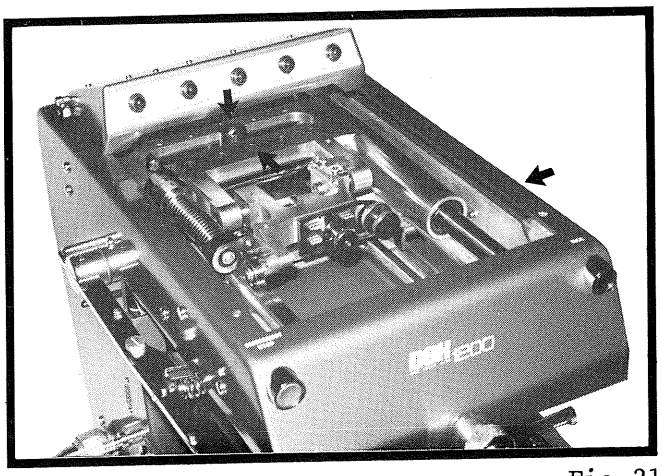


Fig 21

B 15 Put POWER switch to ON and INCH/RUN switch to INCH. Turn SPEED CONTROL fully clockwise, to obtain slowest speed.

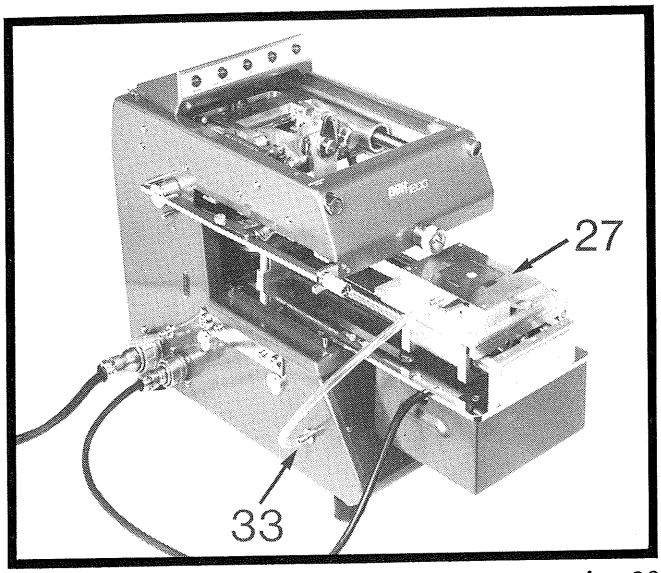



Fig 22

B 16 Using INCH button, move squeegee mechanism to rear of machine until ramp rises to lift blade off screen. The roller bearing should then be at the centre of the slot (bottom dead centre).

This action permits the screen image to be seen properly, and the R S Unit worktable to be moved forward by hand against its fixed stop in the correct printing position.

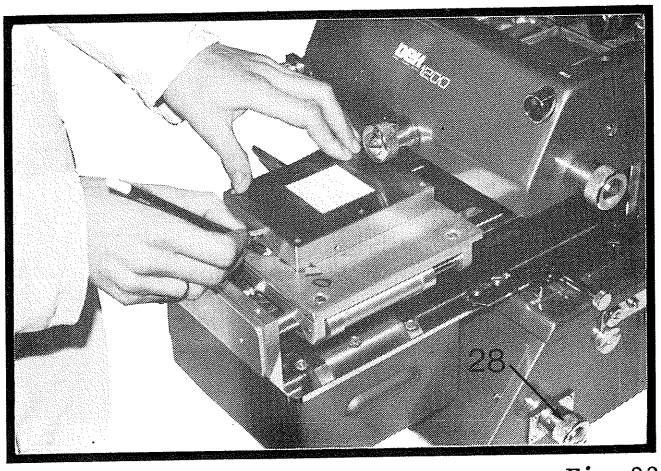



Fig 23

B 17 Return POWER switch to OFF.

B 18 Rest workholder (27) on worktable with vacuum union to the left. Load a workpiece into the workholder.

B 19 Turn height adjusting screw (28) until worktable is at its lowest point.

B 20 Slide worktable into machine until it is up against its fixed stop.

B 21 Turn height adjusting screw (28) clockwise until surface of workholder is approximately 0,75 mm/ 0.030 in from the screen.

B 22 Position workholder until workpiece is as nearly as possible in correct position under screen image.

If a previously printed workpiece is available, use this as a guide.

B 23 Without disturbing this position, carefully pull out worktable on its slide bars, clear of machine. Steady workholder in position, and with a soft, sharply pointed pencil, mark its position along two adjacent edges.

B 24 Take off workholder and place upside down on clean flat surface. Fix two strips of double sided tape on its underside as shown in Fig 24. Remove protective backing from tape.

This is an alternative, and simpler, method than dowelling.

B 25 Reverse workholder and reposition it, slightly tilted, with its edges located on the two pencil lines. Lower gently; check position is correct. Then press down workholder to secure firmly.

Do not use tips of screwdrivers or other tools to remove a workholder, as this scores the worktable. Use a block of wood slightly shallower than the workholder as a rest for the lever used, which can be pushed in the recess below one of the arms projecting from the holder.

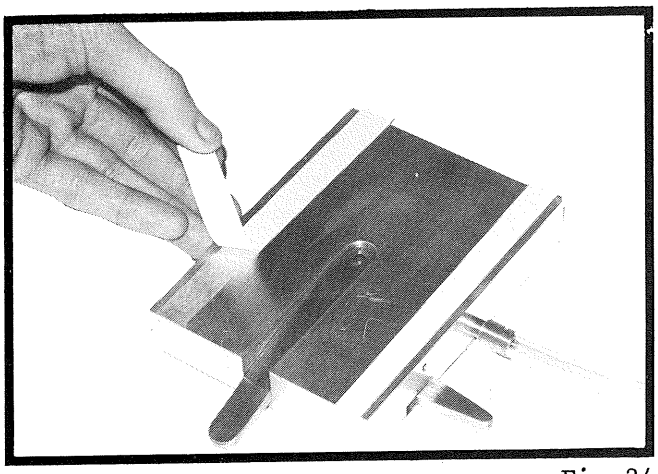


Fig 24

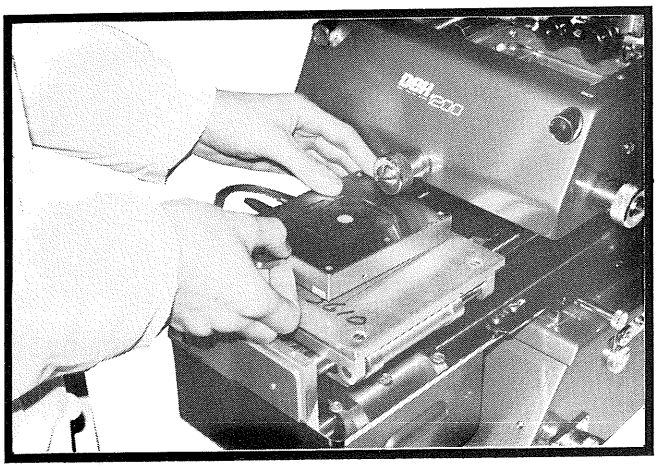


Fig 25

Positioning screen image (Fig 26)

B 26 Push table back into machine until it is against its fixed stop.

B 27 Position screen image as required over workpiece, using the three adjusting screws as follows:

1) To move screen towards rear of machine, turn front screw (29) clockwise;

2) To move screen to the left, turn two screws (30) and (31) clockwise;

3) To swivel screen, turn two screws (30) and (31) in opposite directions.

Setting workholder-to-screen gap (Fig 27)

B 28 Adjust gap between workholder and screen to suit the printing conditions. Normally, the gap should be:

1) 1 mm/0.040 in for a nylon screen;

2) 0,9 mm/0.035 in for a polyester screen;

3) 0,6 mm/0.025 in for a stainless steel screen in good condition.

B 29 Obtain a piece of plastic or a substrate of the required thickness to use as a gauge, and place it on surface of workholder.

B 30 Adjust worktable height by means of adjusting screw (32) until gauge just touches screen.

B 31 Remove card and pull worktable out, clear of Printer.

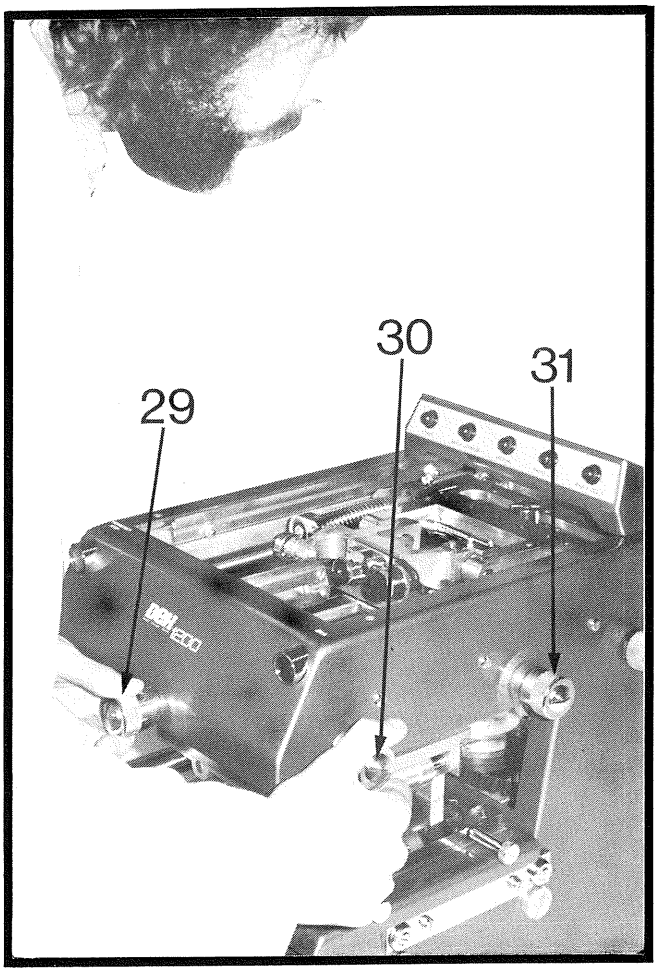



Fig 26

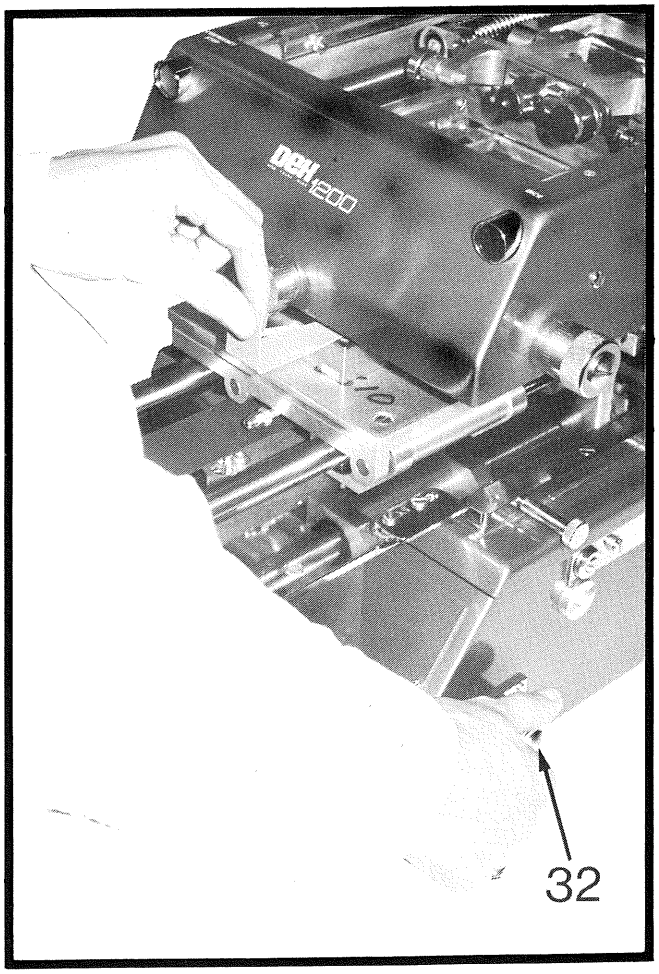



Fig 27

Connecting vacuum tube (Fig 22)

B 32 Connect one end of shorter of two vacuum tubes supplied to union (33) on Printer, and connect other end to union on side of workholder.

Checking squeegee

Note

All Printers are set up in the factory and test printed. Therefore settings need only be checked to ensure they have not altered in transit.

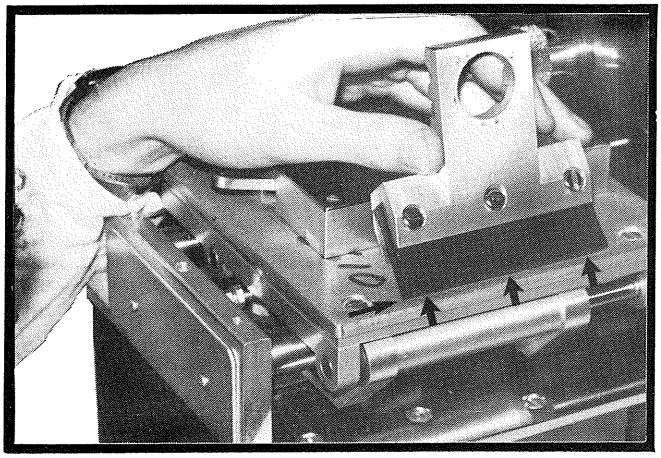


Fig 28

B 33 Check flatness of squeegee blade in its holder by resting its edge along an absolutely flat surface, such as top of worktable. Rest it lightly, do not apply pressure (Fig 28).

B 34 Examine closely the printing edge of squeegee blade. It should be sharp, not rounded.

IMPORTANT

Squeegees supplied for the DEK 1200 are robust and long lasting, but they must be examined regularly. A straight, flat, sharp-edged blade is ESSENTIAL for high quality printing.

A blade can often be straightened by refitting in its holder. When one edge becomes worn and rounded, the blade can be reversed, or a new one fitted.

B 35 To reverse a blade or fit a new one, remove screws and withdraw blade from holder. When assembling, tighten screws lightly and manipulate blade so that it is parallel with its holder and flat and straight. Then tighten screws fully, but do not overtighten. Finally, recheck for flatness and straightness.

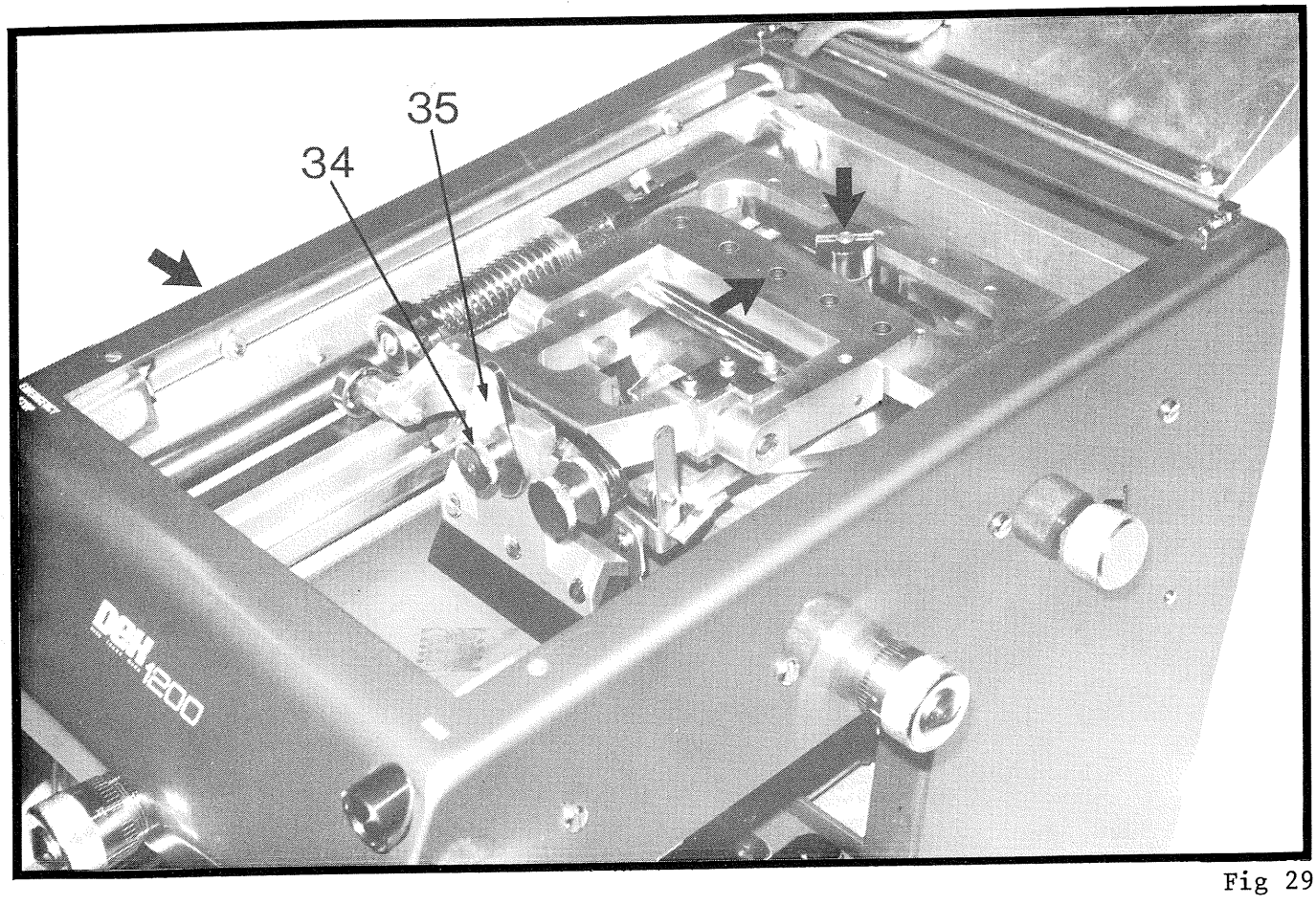



Fig 29

Setting up squeegee (Fig 29)

B 36 Set POWER switch to ON, and INCH/RUN switch to INCH. Set SPEED CONTROL knob fully clockwise, to give the slowest speed.

B 37 Using INCH control, move squeegee mechanism to rear of Printer until lifting ramp operates. Put POWER switch to OFF.

B 38 Unscrew knurled nut (34) 1 to 2 turns. Remove slotted washer (35) upwards.

B 39 Place squeegee assembly over spigot so that pins fit into grooves; this positions squeegee automatically in the correct position.

B 40 Replace slotted washer and tighten knurled nut. Remove screen.

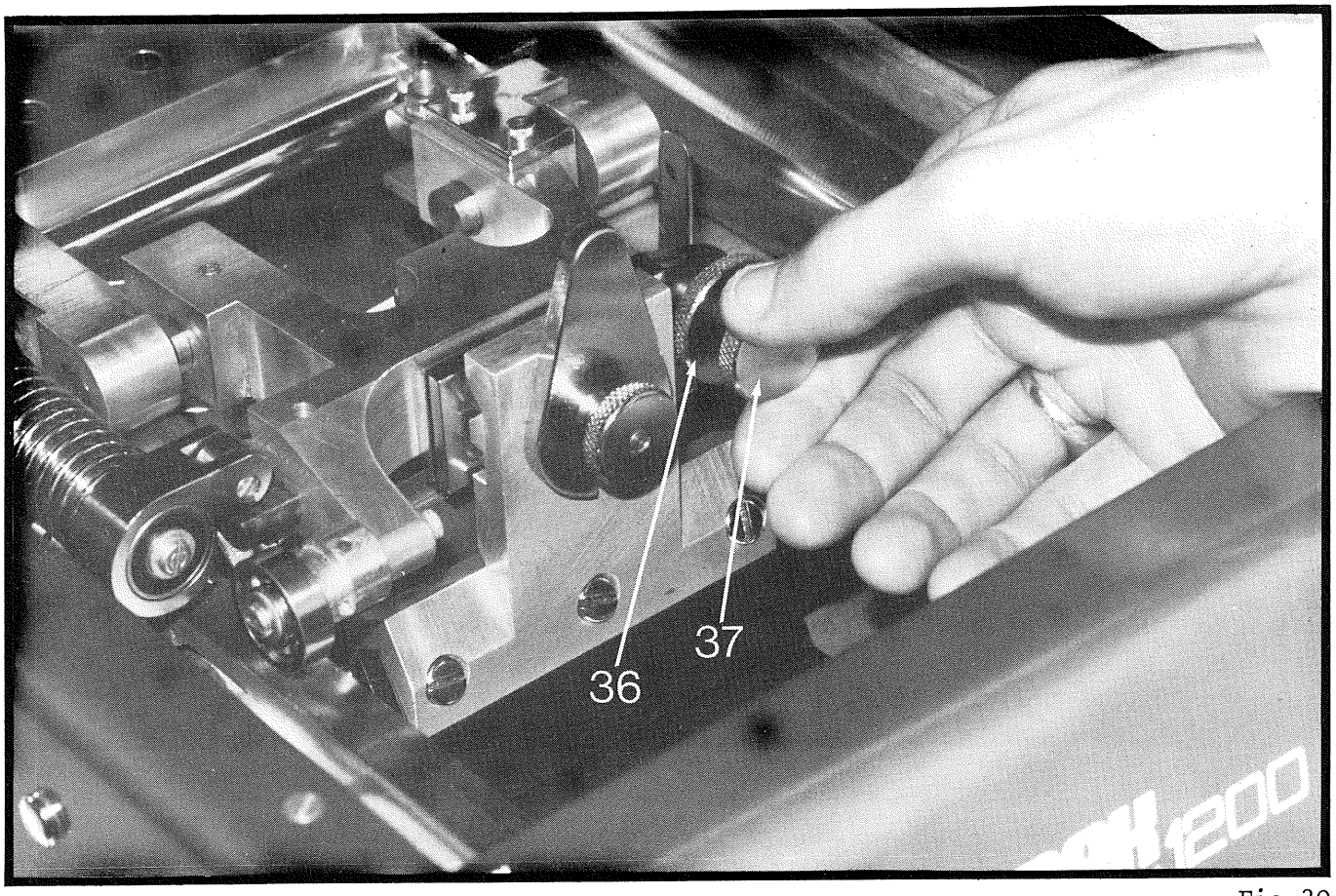



Fig 30

Adjusting parallelism of squeegee (Fig 30)

B 41 Press on slotted washer to tilt squeegee slightly. Take a sight along surface of workholder and check that gap between surface and edge of blade is even right across. Lower blade and check that its edge touches all the way along at exactly the same moment.

B 42 If blade edge is not parallel to surface, slacken locking nut (36) and turn knurled screw (37) to adjust.

B 43 Tighten locking nut and recheck parallelism. Replace screen.

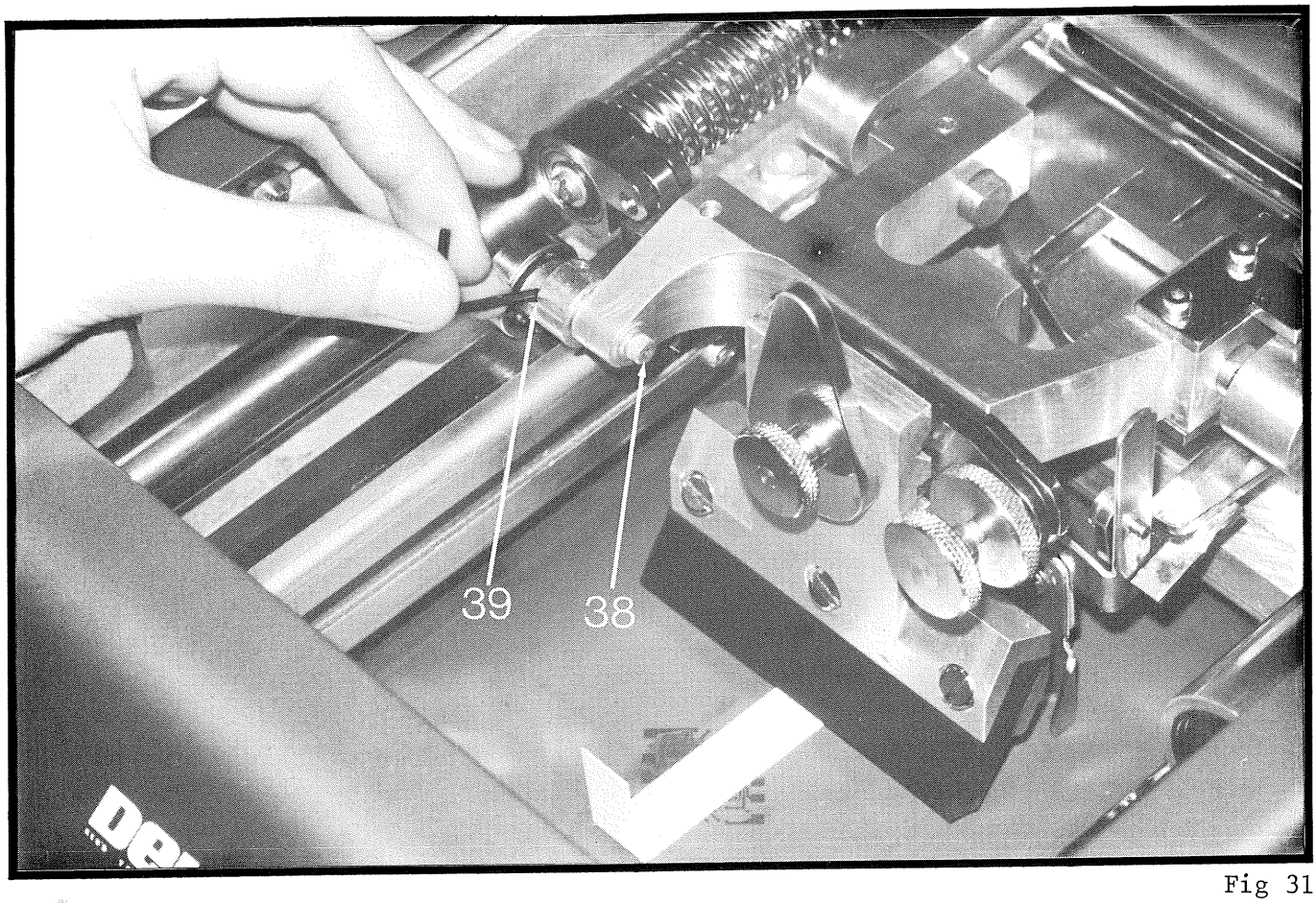



Fig 31

Siebdruck

Adjusting squeegee-to-screen gap (Fig 31)

B 44 The gap between squeegee and screen should be 1 mm/0.040 in, or smaller. This can conveniently be checked by a strip of plastic, or a substrate of the correct thickness, placed under the squeegee.

B 45 Slacken clamping screw (38) with Allen key provided in tool kit.

B 46 Using smaller Allen key provided, through hole in eccentric (39), rotate eccentric until squeegee just touches plastic strip without deflecting screen.

B 47 Tighten locking screw. Remove Allen keys and plastic strip.

B 48 Remove squeegee, distributor blade and screen.

B 49 Use INCH control to move printhead to dropped (print stroke) position. Switch POWER to OFF and replace squeegee assembly.

B 50 Lift squeegee by hand and push in R S table.

B 51 Check that squeegee edge is below level of holder when released. If it is not, recheck workholder-to-screen gap (Operations 28 onwards).

B 52 Remove squeegee. Replace screen and chase.

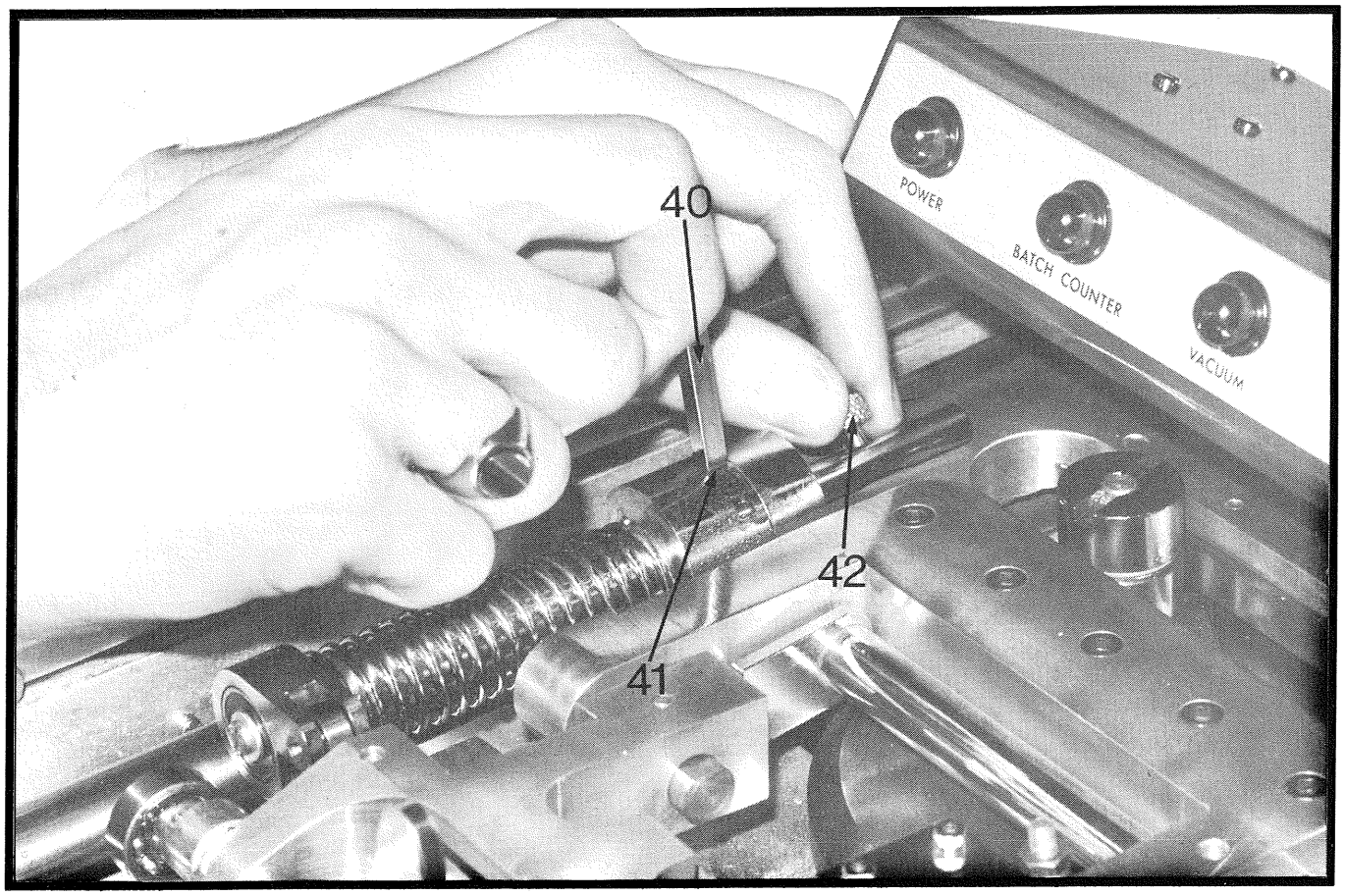



Fig 32

Setting squeegee pressure (Fig 32)

B 53 Put POWER switch to ON, and use INCH control to position printhead until it is moving forward on the flooding stroke. Tilting back indicator light panel will improve access.

B 54 Inch printhead further until squeegee is lowered in print stroke position. Place tommy bar (40) from tool kit in slotted collar (41).

B 55 Holding tommy bar, withdraw plunger (42). Squeegee pressure may now be adjusted by moving tommy bar to left to reduce pressure or right to increase it. Release plunger in selected position.

Pressure adjustment is in a series of positive steps given by the plunger engaging in holes in the slotted collar. A typical squeegee pressure is 3 kg/7 lb, and this is given approximately by position 5. Exact pressure can be gauged with a spring balance attached to knurled nut which holds the squeegee in position.

Setting ink distributor blade (Fig 33, 34 and 35)

B 56 Remove squeegee and ink distributor blade. Slacken screws on ink distributor blade so that its bottom section can just be slid up and down by hand.

B 57 Fit blade into position. It is entered on the slant, the holes engaged over the pivots, then lowered into its slot.

B 58 With POWER switch to ON, use INCH control to move printhead to the start of the flooding stroke. Turn power OFF.

B 59 Place two strips of thin paper under ink distributor blade.

The backing paper from the double sided tape is suitable.

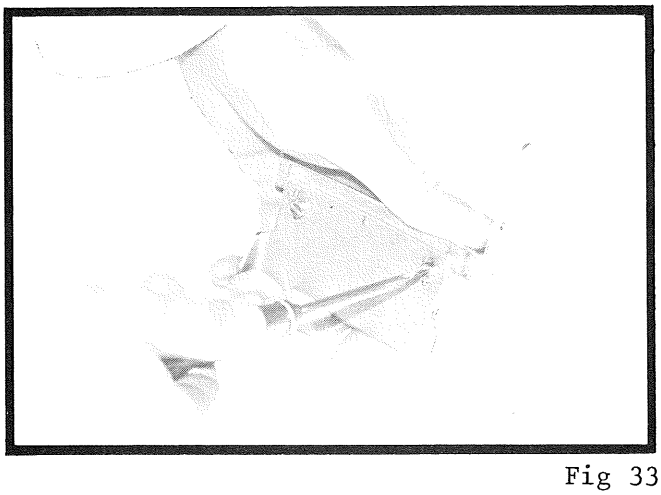


Fig 33

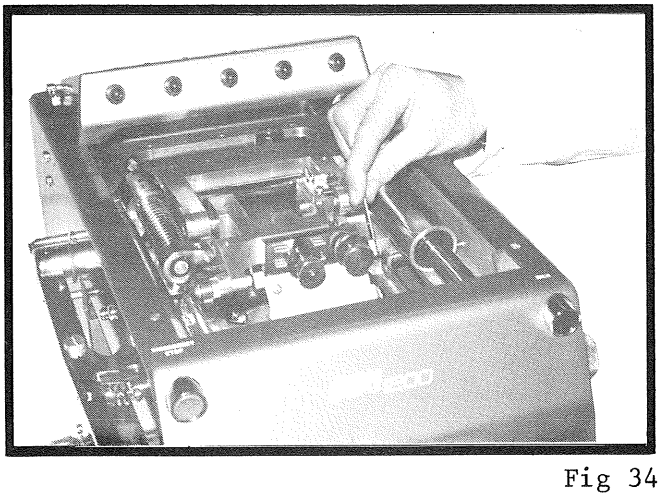


Fig 34

B 60 Slacken lock nut with spanner provided in tool kit. Use Allen key in grub screw (43) to adjust height of blade so that paper strips are just gripped by blade.

B 61 Adjust bottom section of blade, if necessary, so that both paper strips are gripped equally.

B 62 Remove blade without disturbing setting and tighten screws. Replace in machine, and recheck as above.

B 63 Remove strips of paper and refit squeegee.

B 64 Slide R S table into Printer by hand.

B 65 Set POWER switch to ON, and use INCH control to bring squeegee into print stroke position. Squeegee will drop and depress screen into contact with workholder.

Before this operation is carried out, the setting of screen-to-workholder gap (Operations B 28 onwards) and squeegee pressure (Operations B 54 onwards) must have been carried out.

B 66 Switch power OFF. Turn Allen key (43) anticlockwise until ink distributor blade clears screen by approximately 1 mm/0.040 in.

B 67 Tighten locknut and remove Allen key. Remove squeegee.

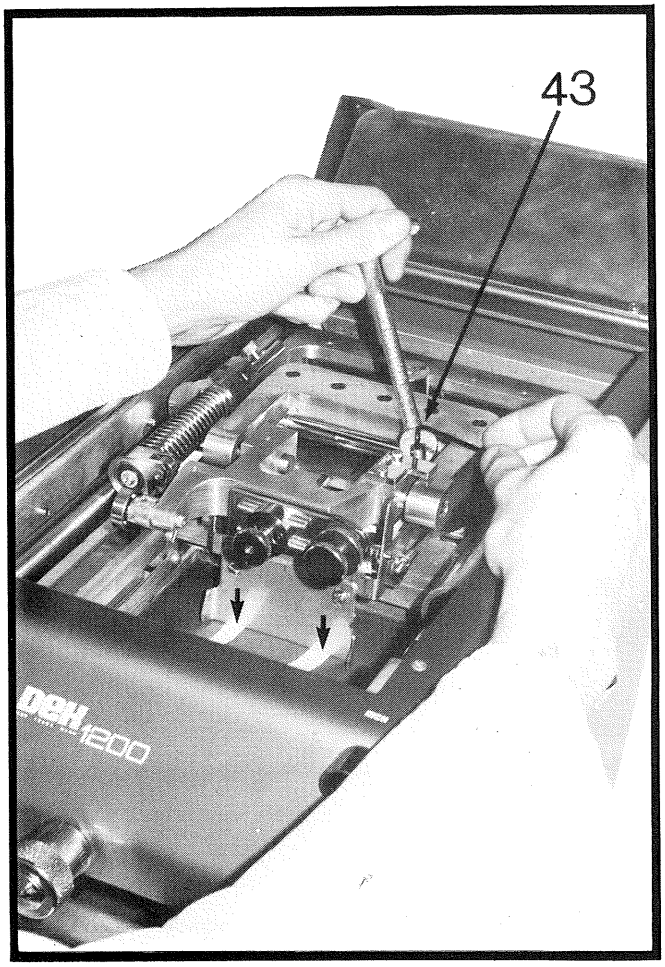



Fig 35

Setting length of print stroke (Fig 36 and 37)

From a printing point of view, the print stroke should be as long as possible, provided that the squeegee is fully supported throughout the length of the stroke.

B 68 Set POWER switch to ON, and inch printhead to front of machine at top dead centre position, lined up with central screws (Fig 36). Switch power off.

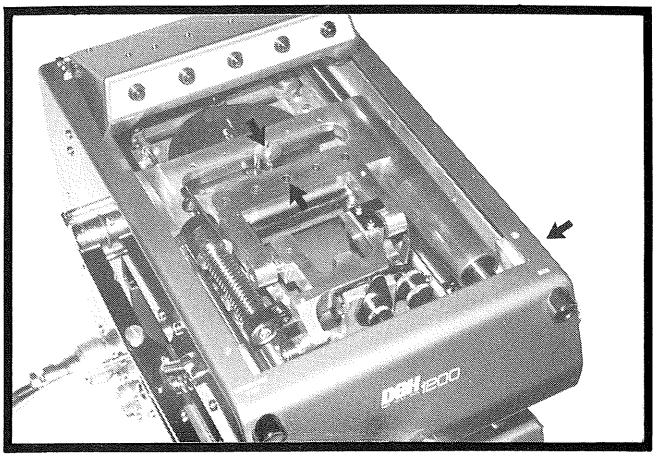


Fig 36

B 69 Unlock slotted nut (44) by means of stroke adjusting tool (45) from tool kit, turning it anti-clockwise.

B 70 Move printhead to back of machine, by hand, and then bring it forward until ink distributor blade clears the screen image by 6 mm/$\frac{1}{4}$ in. Lock up slotted nut.

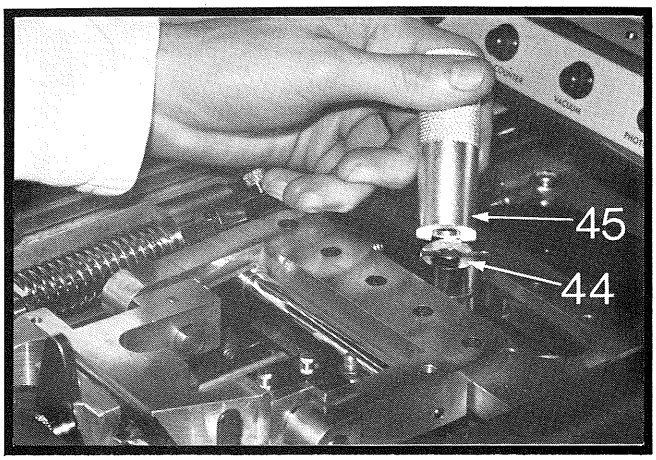



Fig 37

B 71 With power on, inch printhead to rear of machine to bottom dead centre position (Fig 38).

B 72 Replace squeegee and check that printing edge has passed well clear, beyond the print image (Fig 39). If it has not, repeat the procedure and lengthen the print stroke.

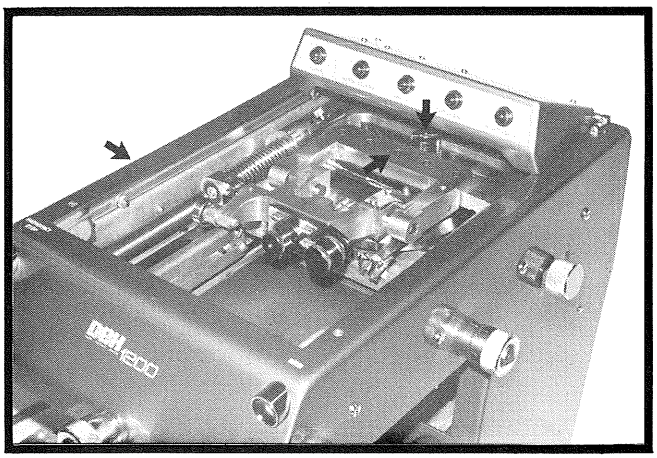


Fig 38

B 73 Repeat the above check. Withdraw table by hand.

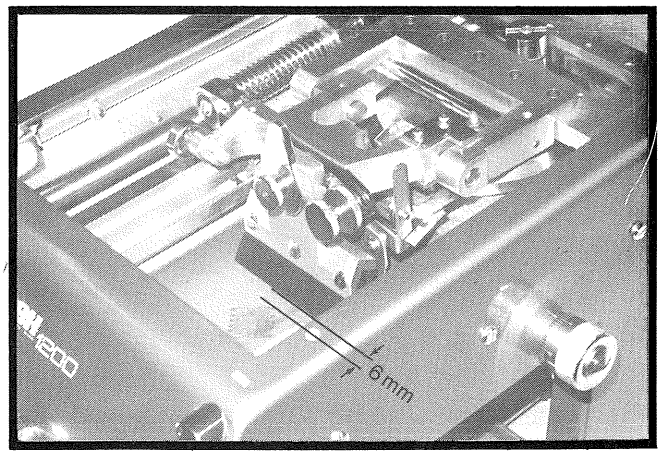



Fig 39

# Printing

C 1 First, squeegee pressure must be released (Fig 40). Place tommy bar (40) from tool kit in slotted collar (41). Withdraw plunger (42), turn tommy bar to left and release plunger into next indexing hole.

C 2 Repeat operation in steps until there is no pressure on squeegee.

C 3 Turn tommy bar to the right by one notch to replace a slight pressure, release plunger in this first position. Remove squeegee.

C 4 Select and prepare the printing medium to be used.

C 5 Apply printing medium to screen, in front of or beyond the image (Fig 41).

C 6 Set POWER switch to ON and inch distributor blade forward until there is just room to fit the squeegee.

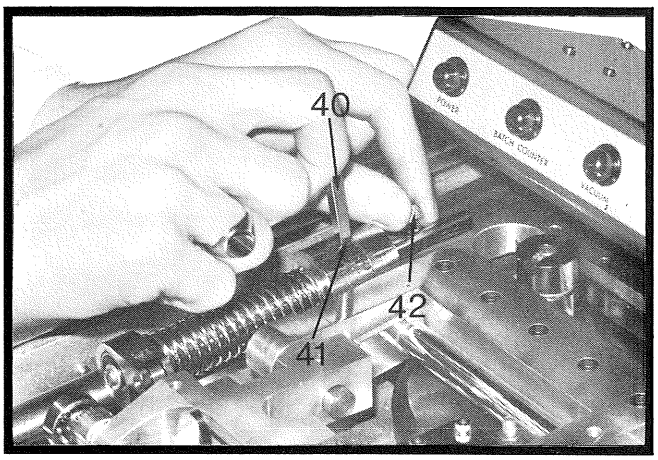



Fig 40

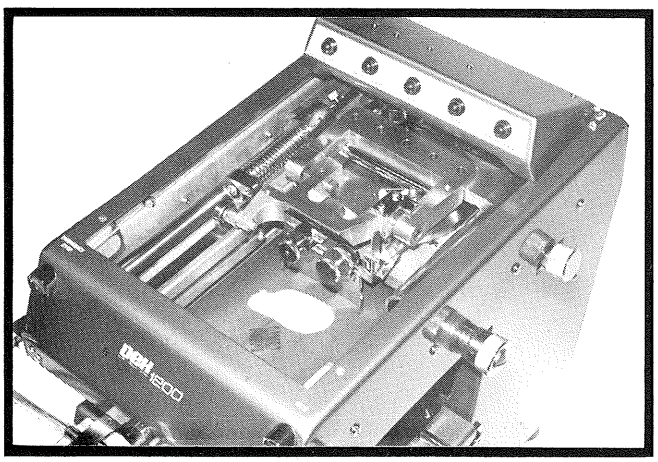


Fig 41

C 7 Switch power OFF. Fit squeegee to printhead.

C 8 Turn POWER switch to ON, VACUUM to ON, INCH/RUN to RUN, FOOTSWITCH to ON.

C 9 Place foot-operated switch in convenient position.

C 10 Press footswitch and then press EMERGENCY STOP button when end of print stroke is reached, with squeegee at rear of machine. Switch power OFF.

C 11 If screen has been wiped clean over entire width of squeegee blade, squeegee is correctly set parallel (Fig 42).

C 12 If screen is not wiped clean at all, increase squeegee pressure. Fig 43 shows the screen not wiped, and the substrate not printed.

Always increase pressure by one notch at a time. The most satisfactory printing quality is obtained when squeegee pressure is JUST sufficient to meet the above requirements, plus one notch increase.

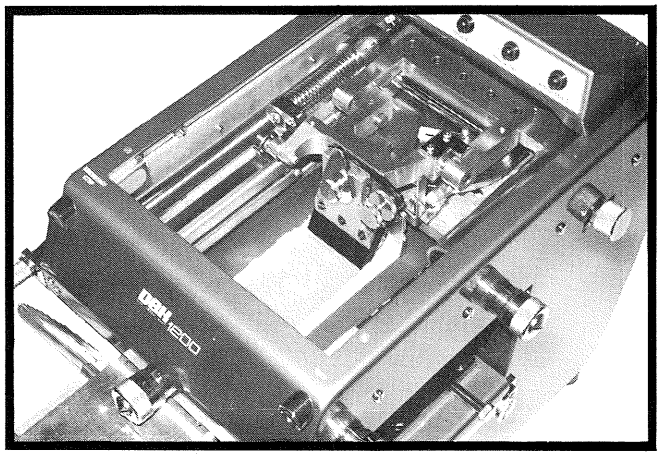


Fig 42

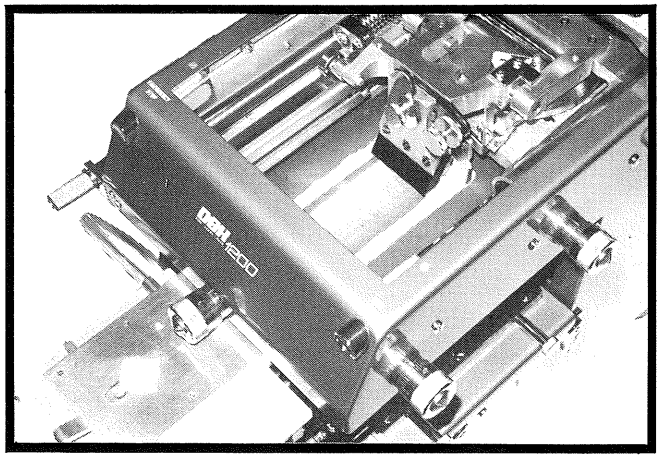


Fig 43

C 13 If squeegee is wiping clean on one side only (Fig 44), it is not parallel with the screen surface and workpiece. Adjust as follows (Fig 45):

1) Slacken knurled locking nut (36);

2) Turn knurled screw (37) very slightly, clockwise to lower right hand side, anticlockwise to lower left hand side;

3) Tighten locking nut.

Note

The example in the photograph is exaggerated for clarity. Even slight lack of parallelism must be corrected, if accurate deposit thickness is to be obtained.

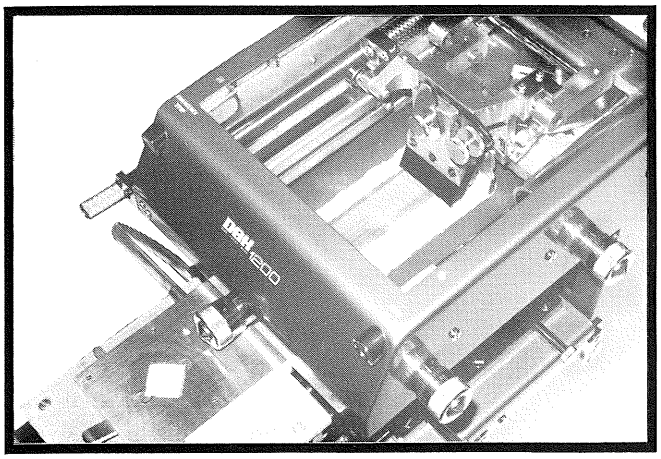


Fig 44

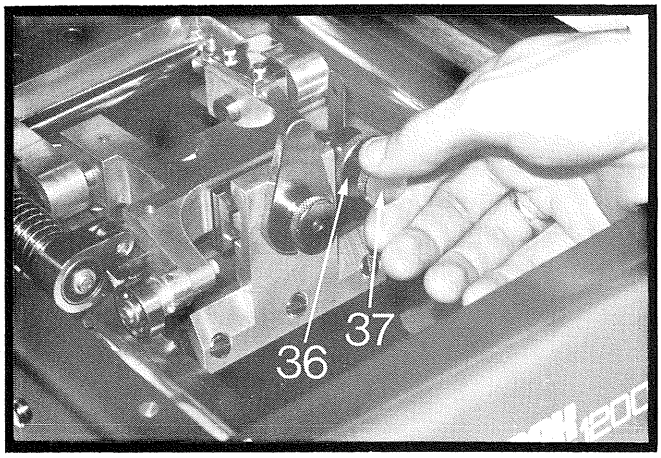



Fig 45

C 14 Switch power on and depress EMERGENCY STOP button again so that machine completes print cycle.

C 15 Replace component (or wipe it clean) and repeat Operation C 13, until squeegee is parallel and wipes screen clean.

C 16 To improve quality of print with particularly viscous printing mediums, and for very fine lines (say, 100 micron), it may be necessary to further increase squeegee pressure and to reduce printing speed.

C 17 Place rigid plastic cover in position, to prevent contamination of printing medium and evaporation of its solvent.

C 18 Check position of image on component and adjust as necessary.

C 19 Set SPEED CONTROL to suit working conditions.

C 20 Switch on batch counter and print number of components required.

# After printing

As soon as a print run is completed, it is essential to clean the screen, squeegee and ink distributor blade thoroughly.

Used with care, good screens can have a very long life.

D 1 Put all switches to OFF and INCH/RUN to INCH.

D 2 Place a sheet of absorbent paper on a clean flat surface.

D 3 Remove rigid plastic cover.

D 4 Remove squeegee.

D 5 Remove ink distributor blade.

D 6 Remove screen and place face down on the paper.

D 7 Using a palette (or push) knife, remove excess printing medium from screen and replace in container (Fig 46).

D 8 Using the recommended solvent for the printing medium in use, pour a suitable quantity into the screen so that it dissolves the residue of the medium not removed by the knife.

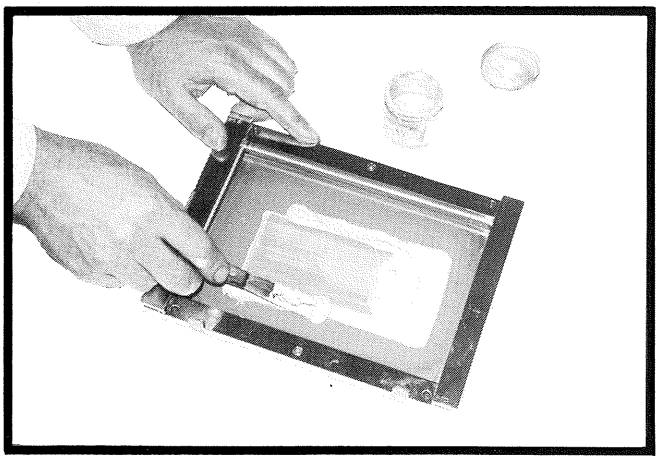


Fig 46

D 9 Remove excess medium from squeegee and ink distributor blade. Wipe them clean with clean fluffless material and solvent.

D 10 Using clean material, mop up the solvent which has not dissolved the remaining printing medium in the screen.

D 11 Using a new piece of clean material, moistened with solvent, wipe clean BOTH sides of the screen.

Section E

# Maintenance

The operation of the R S Unit and the printhead on the Printer is synchronised by a system of cams, switches and microswitches, coordinated by the Control Console.

It is not necessary to understand the precise function of every component in order to adjust and maintain the 1200 System, but some functional information is given in parts of these instructions wherever this will give a better understanding of the nature of the work being carried out.

After very long periods of use, or in the event of accidental damage, some parts may need renewing. Where appropriate, therefore, additional information on dismantling and reassembly has been included. As a rule, if instructions are not given for any item, it may be assumed that these tasks must be carried out by an approved service engineer, and that it is not recommended that the work be attempted by the customer.

Operation of cams, switches and microswitches

E 1 Note that the cams on the gearbox spindle are referred to as 1, 2, 3, and 4 respectively, numbered from the top. Similarly, the associated microswitches are referred to by their cam number.

Without R S Unit

E 2 When the R S Unit is disconnected, the FOOT and CONTINUOUS switches of the R S section of the Control Console are inoperative. Microswitches 1 and 2 are also inoperative.

E 3 Cam 4 has three functions: it has the vacuum chamber attached and determines the timing of the vacuum; it operates the solenoid in the TOTAL counter; when the BATCH counter is switched on, it also operates the solenoid for that counter. Timing of the vacuum is important, whereas timing of the counters is not important, but there are certain conditions which must be met (Operations E 95 and E 96).

E 4 Running of the main motor is controlled by the following circuits:

1) The circuit of the INCH button is independent of all switches and microswitches except the POWER switch and EMERGENCY STOP button. It is protected by the fuse on the front of the Control Console, as are all other circuits.

2) The INCH/RUN switch on the Console is open in the INCH position and closed in the RUN position.

3) The circuit of microswitch 3 passes through the INCH/RUN switch and it is opened by the rise of cam 3 and closed by its fall. Therefore, if the squeegee is not at the front of the machine when the INCH/RUN switch is put to RUN, the machine will complete that cycle and stop when the rise of cam 3 operates the microswitch.

4) To start another cycle, the microswitch must be bypassed until the fall of cam 3 has closed the microswitch 3 circuit. This can be done either by using the INCH button, or by holding the spring-loaded SINGLE cycle switch in the PRINTHEAD section against its loading for a moment.

5) The CONTINUOUS cycle switch in the PRINTHEAD section also bypasses microswitch 3, which then becomes inoperative.

With R S Unit connected

E 5 When the R S Unit is connected, all the microswitches and cams become operative. The INCH button and SINGLE and CONTINUOUS cycle switches are not affected by the addition of the R S Unit.

E 6 The R S Unit itself contains two microswitches, under the belt guard. The one at the loading position 5 is connected in series with the INCH/RUN switch and microswitch 1.

E 7 The FOOT switch and the CONTINUOUS switch on the R S section of the Console both bypass microswitch 5.

E 8 Cam 2 reverses the direction of rotation of the R S motor by operating microswitch 2.

E 9 The R S motor runs when all the following conditions apply:

1) POWER switch at ON and INCH/RUN switch at RUN;

2) Microswitch 1 closed by fall of cam 1,

3) Microswitch 5 is bypassed by the CONTINUOUS or FOOT switches in the R S section of the Console.

Note

If the worktable is pushed away from its loading position a sufficient distance to allow microswitch 5 to close, the motor will start and a complete print cycle will take place.

E 10 When worktable reaches the print position, microswitch 6 is closed, bypassing microswitch 3 and causing the main motor to start.

E 11 The resulting rise of cam 1 and cam 2 reverses microswitches 1 and 2, but this has no effect at this stage.

E 12 In the meantime, the R S motor is still running against the friction clutch, to ensure positive location of the worktable, until the fall of cam 1 reverses microswitch 1. This reverses the R S motor and the worktable returns.

E 13 When the worktable reaches the loading position, the R S motor stops (unless CONTINUOUS switch is on).

E 14 Before the main motor stops, the fall of cam 2 must have reversed microswitch 2 so that the R S motor will run in the forward direction when it is restarted.

E 15 If cam 2 reverses microswitch 2 before the worktable reaches its loading position, the Printer will run continuously. When this occurs, it is usually because the main motor is running too fast (see Operations 109 onwards).

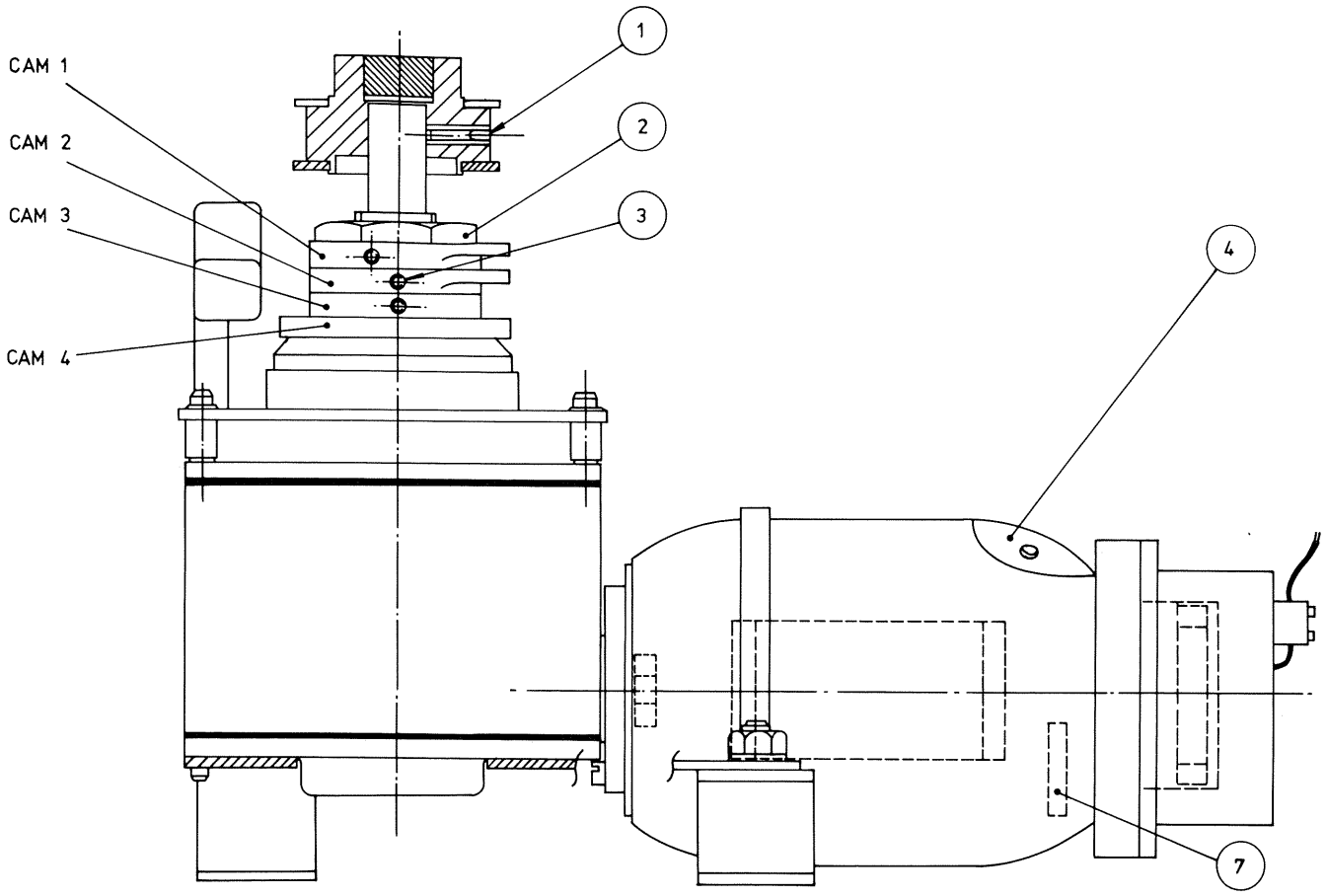



Fig 47

Setting the cams (Fig 47)

E 16 Adjustment of the cams can be carried out after slackening grub screws (3) and large nut (2).

There are engraved lines to show their (approximate) relative settings.

E 17 Cam 4 should be set so that vacuum operates during print cycle. Vacuum should commence at top dead centre (Fig 36).

E 18 Cam 3 should be set so that squeegee mechanism stops at front of machine, 18-22° before top dead centre.

E 19 Cam 2 should be checked at the slowest speed setting. The microswitch cam follower should be just clear of the fall of cam 2 when the main motor stops at the end of the print cycle.

E 20 Cam 1 is set so that the R S motor reverses at bottom dead centre. When printing, ensure that screen is clear of work before table returns.

E 21 After completing cam settings, tighten grub screws and large nut.

Main motor and gearbox (Fig 47 and 48)

The main motor is a shunt wound, dc electric motor, operated on a mains input of 220/240 V ac through a rectifier housed beside the motor. The input to the motor is a constant 200 V dc to the field, whilst the armature voltage is variable according to the speed required, being controlled by the variable transformer in the Control Console. The armature voltage should not exceed 200 V dc. Reversing the polarity of either the field or armature input will reverse the direction of rotation of the motor.

When it becomes necessary to remove the motor, the procedure is as follows:

E 22 Disconnect the power supply.

E 23 Remove the rear cover, held by four cheesehead screws.

E 24 Mark the timing position of the drive coupling. Then slacken the grub screw (1) and push the drive coupling downwards on the gearbox spindle.

E 25 Disconnect the snap connections on the four microswitches (46).

E 26 Disconnect from the tag board the three wires (47) which lead from the rectifier.

E 27 Disconnect the vacuum pipes at the unions on the timing chamber (48).

E 28 The motor and gearbox are seated on four rubber pads. Tip the machine over sideways and remove two of the screws that screw into the steel cores of the rubber pads. Supporting the motor, tip the machine over the other way and remove the two remaining screws. Set machine upright.

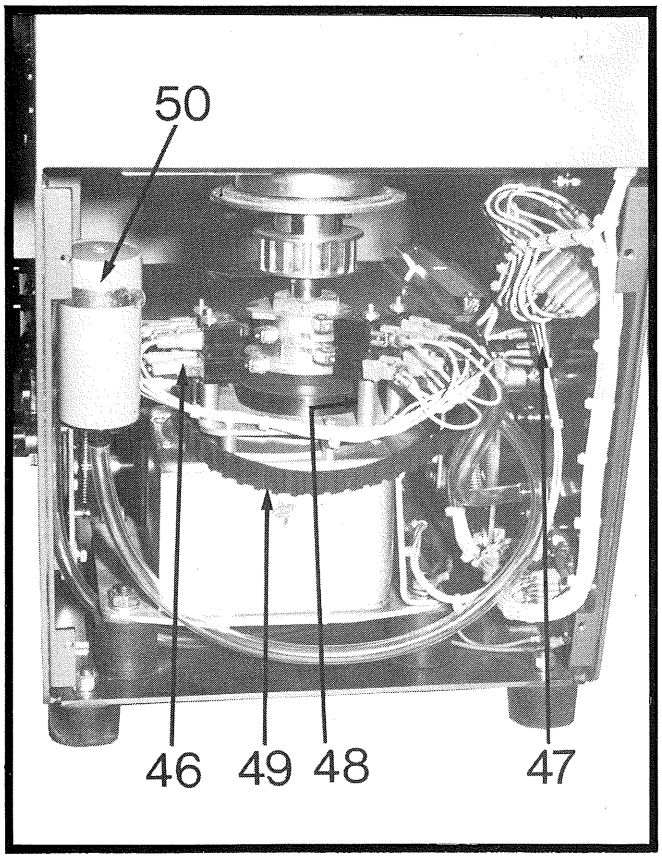



Fig 48

E 29 Slide the complete motor unit out of the rear of the machine.

E 30 When replacing the motor unit take care not to trap a vacuum pipe. The vacuum pipe from the union at the front of the machine (Fig 49) should pass under the gearbox from side to side and not diagonally under the motor. It is easier to connect the vacuum pipes up before the motor unit is in position.

E 31 Locate the drive coupling (in the correct timing position) before tightening the four screws under the machine.

E 32 Check the timing position again before tightening the grub screw in the drive coupling.

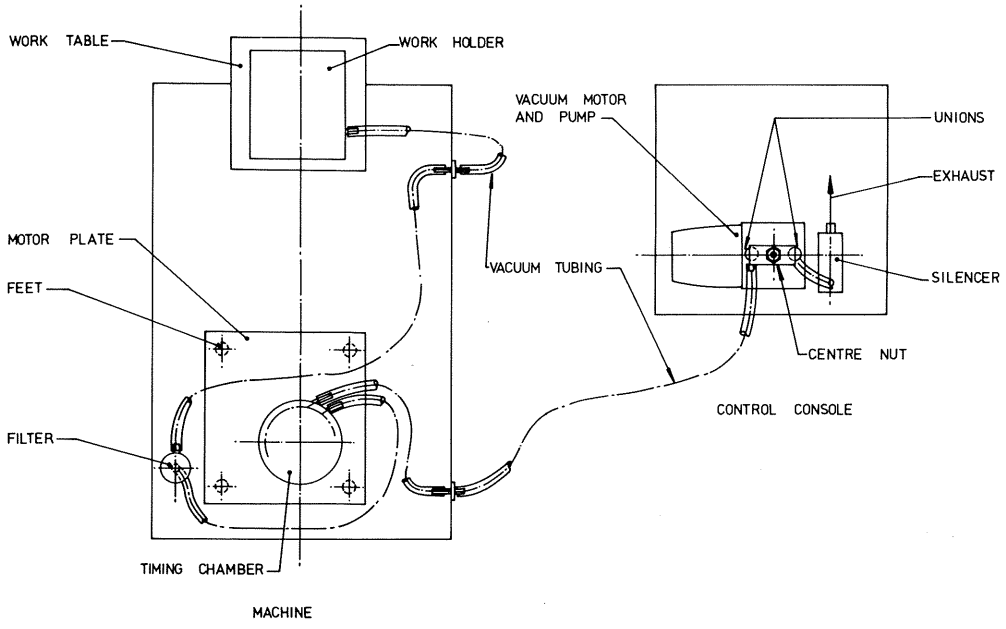



Fig 49

E 33 Insert and tighten the four screws into the motor seating pads. (To assist alignment of drive shafts the motor may be run before the screws are tightened.)

E 34 Replace the snap connections according to the wiring diagram.

E 35 Ensure that the rubber drive belt (49) does not interfere with the cams or microswitches.

E 36 Replace the vacuum filter (50) in its clip.

E 37 Replace the rear cover and secure with four screws.

E 38 Check operation and timing of machine. If it is 180° out of phase the drive coupling has been located 180° out of position.

Main motor brushes (Fig 47)

E 39 After 300,000 print cycles it is advisable to check the carbon brushes on the main motor (there are no brushes on the R S motor).

E 40 Remove the main motor and gearbox as described under Operations E 22 to E 29. Using a Philips screw driver, remove the two plastic covers (4).

E 41 The two brushes (7) are now accessible. If they are underflush with the holder they should be replaced.

1) Remove the spring. Remove the worn brush if necessary.

2) Replace with new brush, reload spring.

3) Repeat for second brush.

E 42 Replace plastic covers.

E 43 Replace motor in machine as described under Operations E 29 to E 38.

Main motor brake

E 44 In order to stop the machine abruptly and to prevent over-run, a braking mechanism is fitted to the main motor. The brake consists of two copper brake shoes which are spring loaded against a friction drum on the end of the motor spindle. The brake shoes are released by a solenoid every time the motor starts. This braking system will last for several million print cycles and should a replacement be necessary it is recommended that a replacement motor and gearbox unit should be installed, as described under Operations E 22 to E 38.

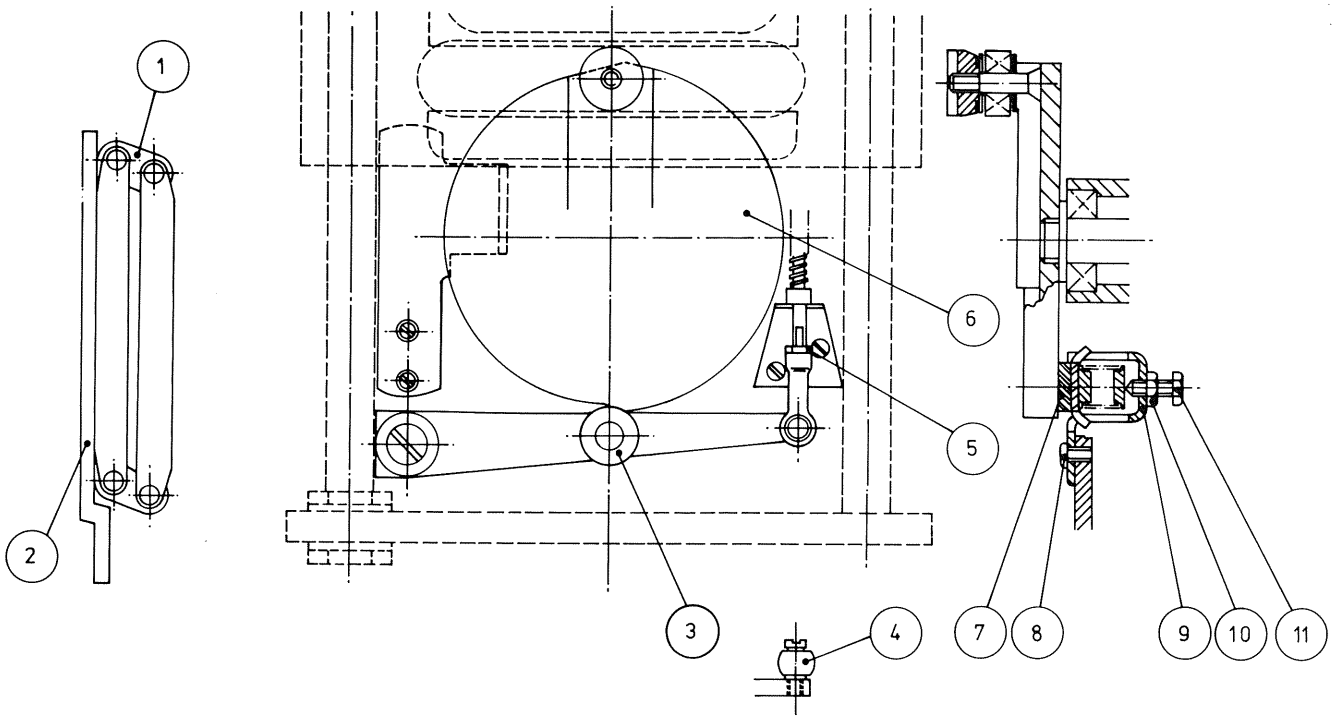



Fig 50

Squeegee mechanism (Fig 50, 51, 52 and 53)

The squeegee mechanism is driven through a flexible rubber coupling. Its disconnection is explained in Operation E 24.

E 45 The drive coupling that fits in the rubber coupling is attached to a shaft which runs in bearings. The threaded end of the shaft is screwed into the squeegee drive cam (6) and pinned.

E 46 Into a dovetailed slot in the drive cam is fitted a plate containing a roller bearing offset from the centre of the shaft. The amount of offset is adjustable according to the length of stroke required (see setting up instructions Section B). The roller bearing runs between two precision ground strips which are accurately set in the squeegee mechanism to eliminate backlash.

E 47 The rotation of the drive cam causes the the carriage to reciprocate very smoothly on the linear bearings running on rigid parallel rails. The linear bearings are prepacked with grease and should never need attention.

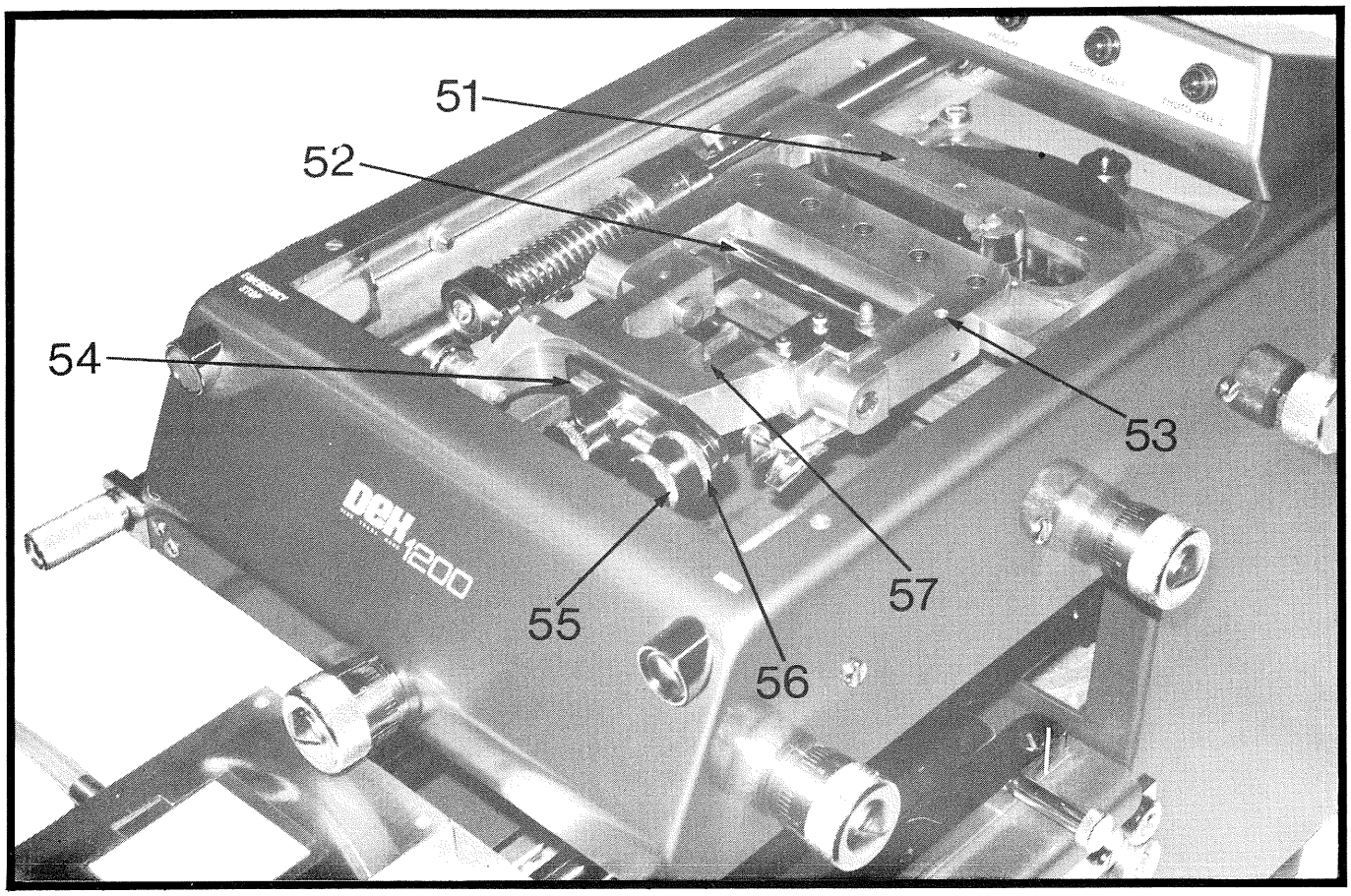



Fig 51

E 48 The squeegee head is attached by five screws (51).

E 49 The distributor blade is fitted on two pins on a pair of arms attached to a pivot bar (52). To remove the pivot bar, remove squeegee head, slacken grub screw (53) and remove brass pivot.

E 50 The squeegee is located on two parallel pins (54) which are rotated by an eccentric knob (55) to adjust parallelism of squeegee. When the lock nut (56) is slackened there should still be some resistence to movement of the eccentric due to the friction washer. The effectiveness of the washer is adjusted by a self locking nut (57).

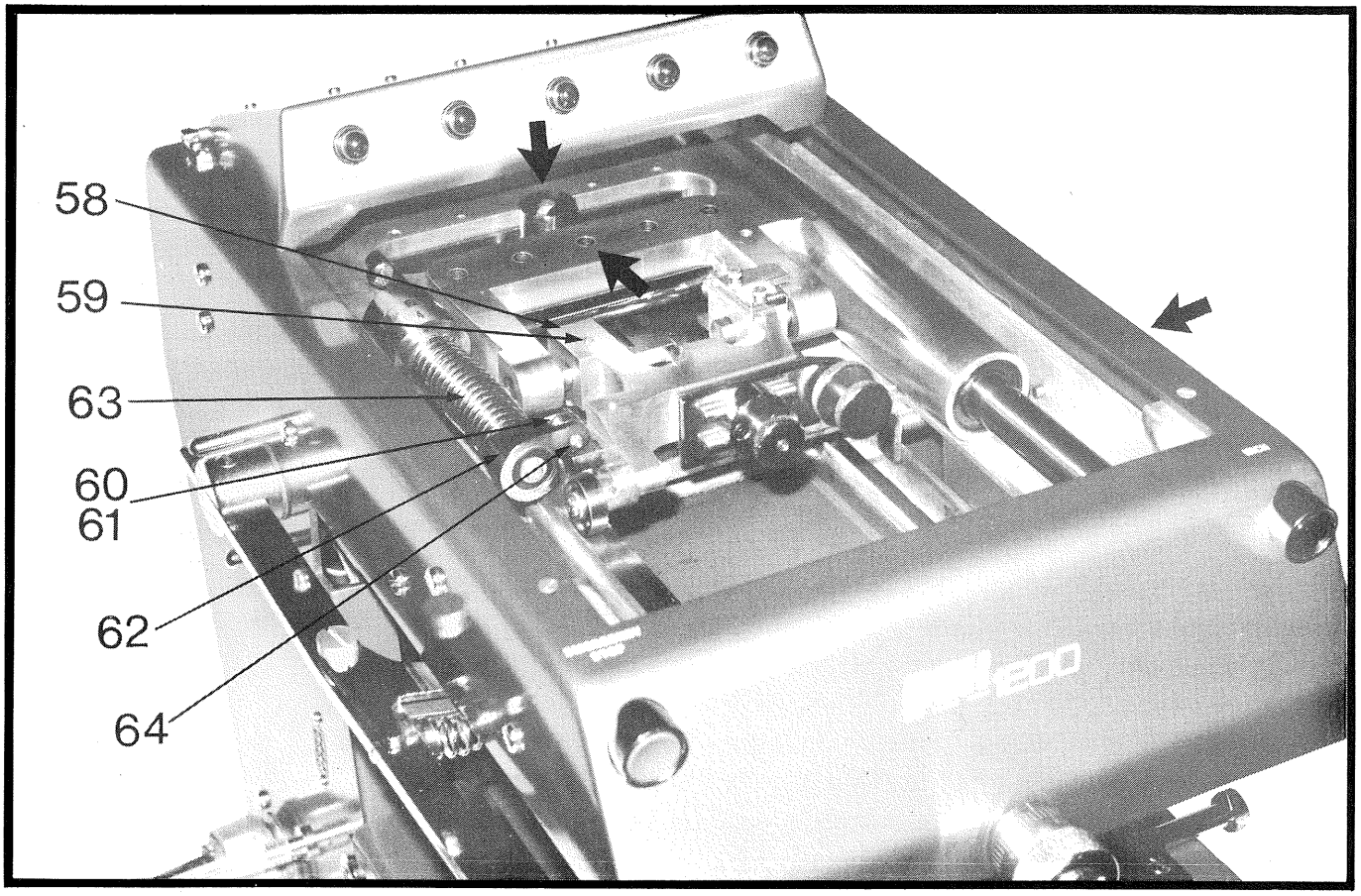



Fig 52

E 51 The squeegee pivots on two shouldered shafts (58). The lateral position can be altered by slackening two grub screws (59). It should be set so that the roller (60) applying pressure to squeegee is in contact with pad (61). Ensure that this pad does not interfere with the collar (62). End play should be just eliminated by sliding the shouldered shafts (58) towards the sides of the machine and locking up the grub screws. Ensure that squeegee is quite free to drop.

E 52 The torsion spring (63) applying squeegee pressure can be removed by removing the screw in the end of shaft (64) and removing the collar (62).

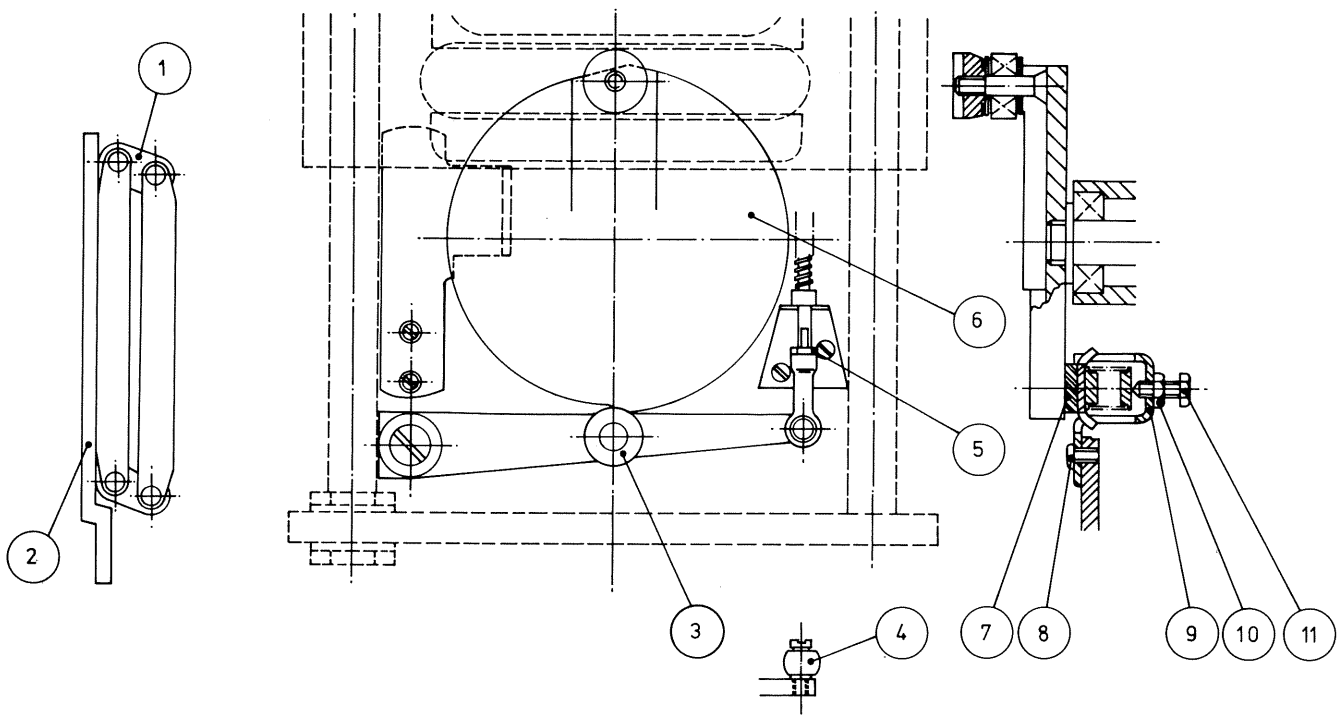



Fig 53

E 53 The squeegee is lifted by a ramp (2) attached to two pivot arms and operated by an adjustable rod attached to a lever. The lever is actuated by the squeegee drive cam and the cam follower (3).

E 54 The correct setting for the adjustable rod is such that when the squeegee is raised the pivot arms (1) are nearly vertical. Check that when the squeegee has dropped the cam follower (3) is just clear of the cam.

E 55 The rod is adjusted by disconnecting ball coupling (4), slackening lock nut (5) and turning the ball coupling.

Friction damper (Fig 53)

E 56 A friction damper (7) is incorporated under the squeegee drive cam (6) to ensure smooth operation. With the power disconnected and the rear cover removed, the pressure of the damper pad can be altered by adjusting lock nut and screw (10 and 11).

To remove or replace the friction pad proceed as follows:

E 57 Stop machine with squeegee mechanism at front of machine and disconnect power supply.

E 58 Remove rear cover.

E 59 Slacken lock nut (10). Turn screw (11) to release spring pressure.

E 60 Remove two screws (8). Tilt bracket and lower through aperture to remove.

E 61 Replace worn friction pad if necessary.

E 62 Hold friction pad spring and pressure pad in position in the bracket (9). Pass the longer end of the bracket up through the aperture with the right hand holding it together.

E 63 Then hold the friction pad in position with the left hand from the top of the machine whilst the screws are inserted and tightened.

E 64 Adjust screw to give sufficient damping and tighten lock nut.

E 65 Replace rear cover.

Screen adjusting knobs

The tightness of the screen adjusting knobs can be varied as follows:

E 66 Wind out adjusting knob 13 mm/$\frac{1}{2}$ in and using Allen key tighten or slacken the threaded sleeve.

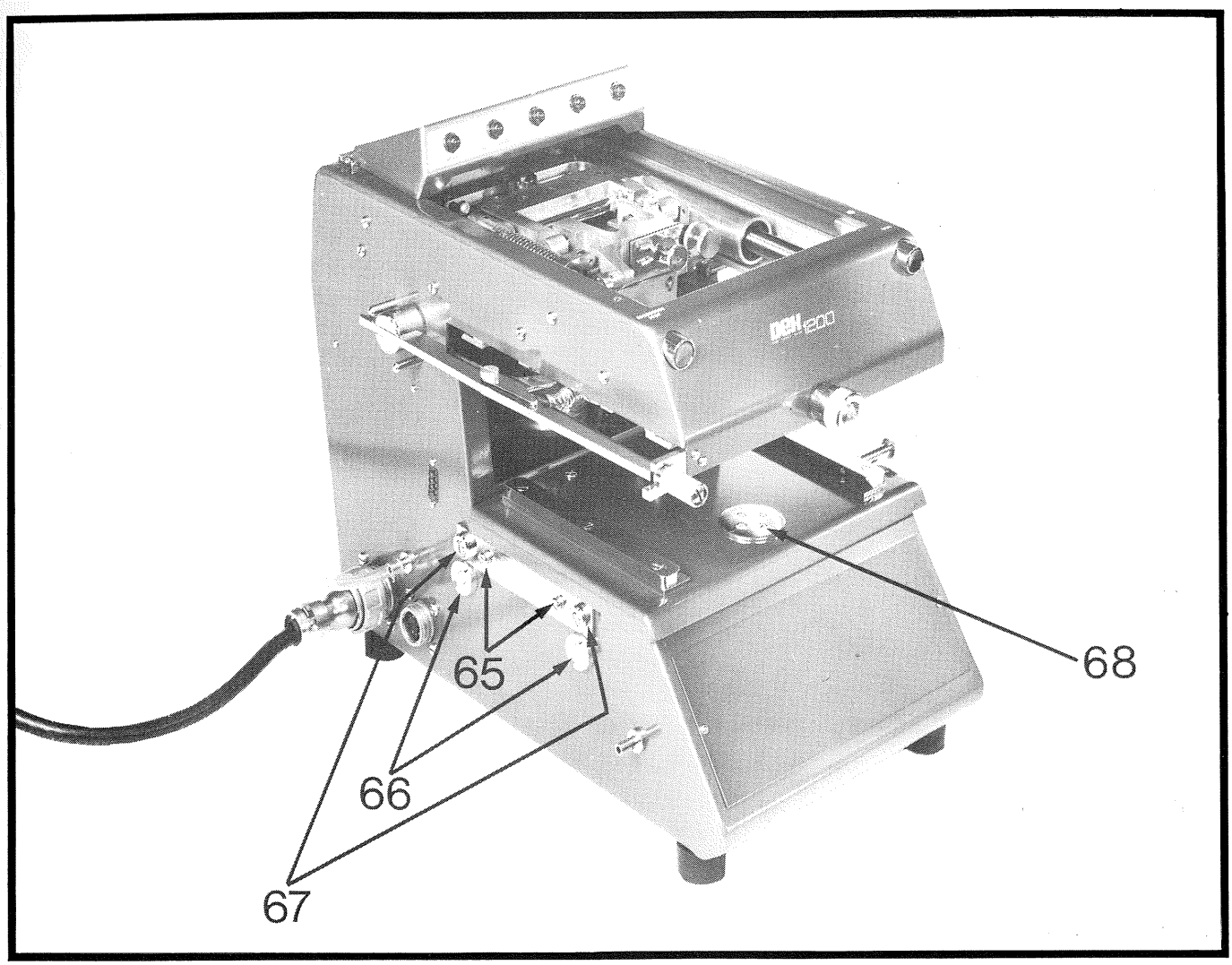



Fig 54

Printer platform (Fig 54)

The Printer platform contains the guides into which a feed system is located. The platform is set in the factory so that the feed system, being delivered with the machine, is parallel with the screen. The height adjustment knob is connected to a worm and worm wheel which rotates an eccentric pin. This pin operates a double swinging arm mechanism containing bearings which move in a plane which has parallel motion. The platform is seated on the bearings and any movement in the horizontal plane is prevented by three vertical steel pins which slide, with the platform, in brass bushes. The procedure for testing the parallelism of the platform is as follows:

E 67 Load screen into machine.

E 68 Position workholder on table. Raise platform until workholder is just clear of screen.

E 69 Test parallelism by deflecting screen at each corner of workholder with a finger, or by using a suitable feeler gauge. An error of 0,12 mm/0.005 in over the area of the workholder is permissible.

E 70 Slacken two screws (65) on left side of machine.

E 71 Slacken outer screws (67) and screws in centre of eccentric (66).

E 72 Using stroke adjusting tool, turn eccentric until short end of slot is uppermost and table is at its lowest point. Raise each corner of table as required until it is parallel with screen.

E 73 When table is parallel, retighten two screws (65). This will be found easier with an assistant, as screws on right hand side should be prevented from turning.

E 74 Recheck parallelism of workholder as before. Then tighten all other screws.

E 75 If the height adjustment becomes sluggish, slacken four screws (68), alter height adjustment to free pin in bush, then retighten screws.

Control Console (Fig 55)

The Control Console houses the main controls, and most components are accessible after removing the rear panel. First disconnect the mains supply. The wire connections are soldered and any replacements are best made by an approved service engineer.

E 76 Space is available for a low-voltage transformer for use with photocells, as an optional extra fitted when required for use with special feed systems.

E 77 The total counter and batch counter are screwed to front of Console in front of photo cells unit.

E 78 Also attached to front of Console is the variable transformer (5) that controls the voltage through the rectifier to the main motor armature.

E 79 Screwed to the base of Console are the vacuum pump, motor and condenser which are mentioned below under 'vacuum system'.

E 80 A 3 amp 240 volt cartridge fuse (25 mm length) is housed in a holder at the front of the Console. The fuse is a push fit in the holder and is screwed into the Console against a spring loaded contact.

IMPORTANT

The fuse rating of 3 amp should on no account be exceeded. If a larger fuse is used, and a short circuit occurs, switch contacts can become welded or variable transformer windings damaged.

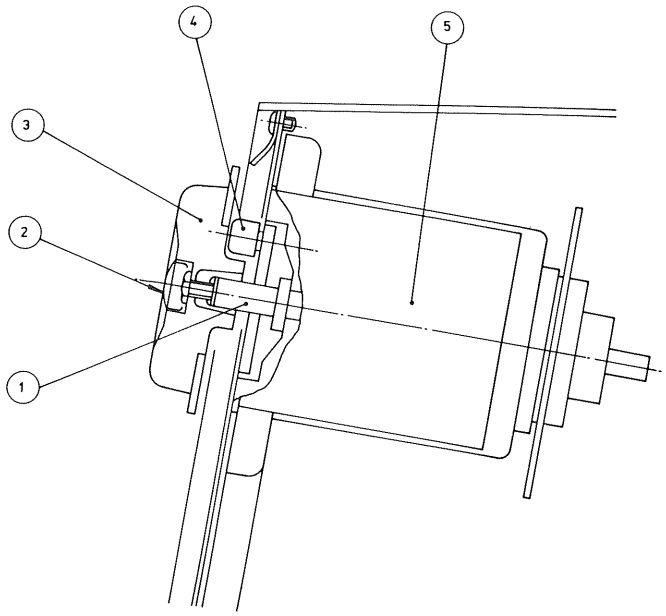



Fig 55

E 81 All the switches employed in the Console are double pole switches. The single switch on the PRINTHEAD section of the Console automatically returns to off. Access to the switches is obtained by removing two screws and connecting wires. The wires are soldered on to the terminals.

E 82 The POWER ON indicator light is independent of the fuse and is accessible in the same way as the switches. Its terminals are soldered.

Indicator panel on Printer (Fig 56)

E 83 The indicator panel houses five neon indicator lamps. The one marked photo cell 2 is not connected to a switch and is therefore spare. To replace an indicator lamp, open the hinged panel and remove two screws and nuts (69).

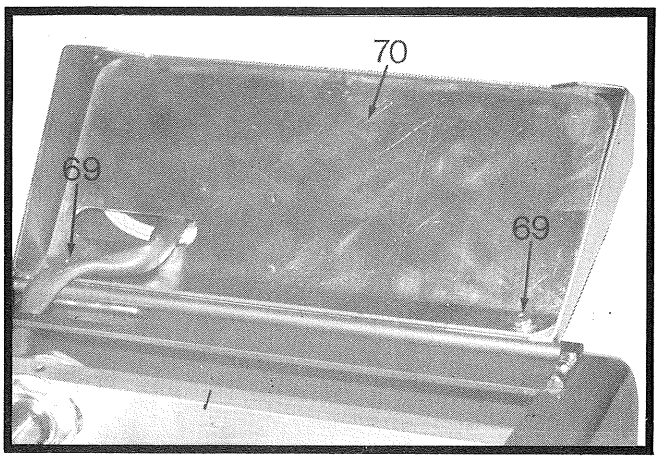



Fig 56

E 84 Remove inside cover plate (70).

E 85 Remove nut securing faulty lamp to the panel.

E 86 Using a soldering iron remove the necessary wires and re-solder replacement lamp.

E 87 Lock up securing nut and replace cover plate.

Vacuum system (Fig 49)

E 88 A vacuum pump, driven by a 220/240 V ac electric motor is housed in the Control Console together with a capacitor and silencer. All are accessible by removing the rear panel of the Console.

E 89 The unions on the vacuum pump can be set at any angle by slackening the centre nut. The vacuum tube connections are shown in Fig 49.

E 90 A filter is housed in a spring clip (50, Fig 48) in the rear of the basic machine. This is accessible by removing the rear cover of the machine.

E 91 The tube from the side of the filter passes under the gearbox from side to side between the front feet and back feet of the motor assembly. (It must not pass directly under the motor since it is liable to be crushed by it.) It is then connected to the union on the inside of the front of the machine.

E 92 The tubing connected to the union on the underside of the filter passes across the rear of the gearbox and is connected to either one of the unions on the timing chamber.

E 93 The tube from the other timing chamber union is connected to the union on the inside at the rear of the machine.

E 94 The vacuum is operative for half a revolution of the gearbox spindle and the timing should coincide with the print stroke of the machine. The timing is altered by slackening the large nut and the Allen screw in cam 4, and revolving the cam on to which is attached the vacuum timing chamber.

Batch counter and total counter

E 95 The counters are operated by cam 4. Note that the timing of cam 4 is set to suit the vacuum timing but the counter solenoids should not be energised when machine completes cycle.

E 96 Batch counter should not be zeroed when counter solenoids are energised as this may cause misalignment of end digit.

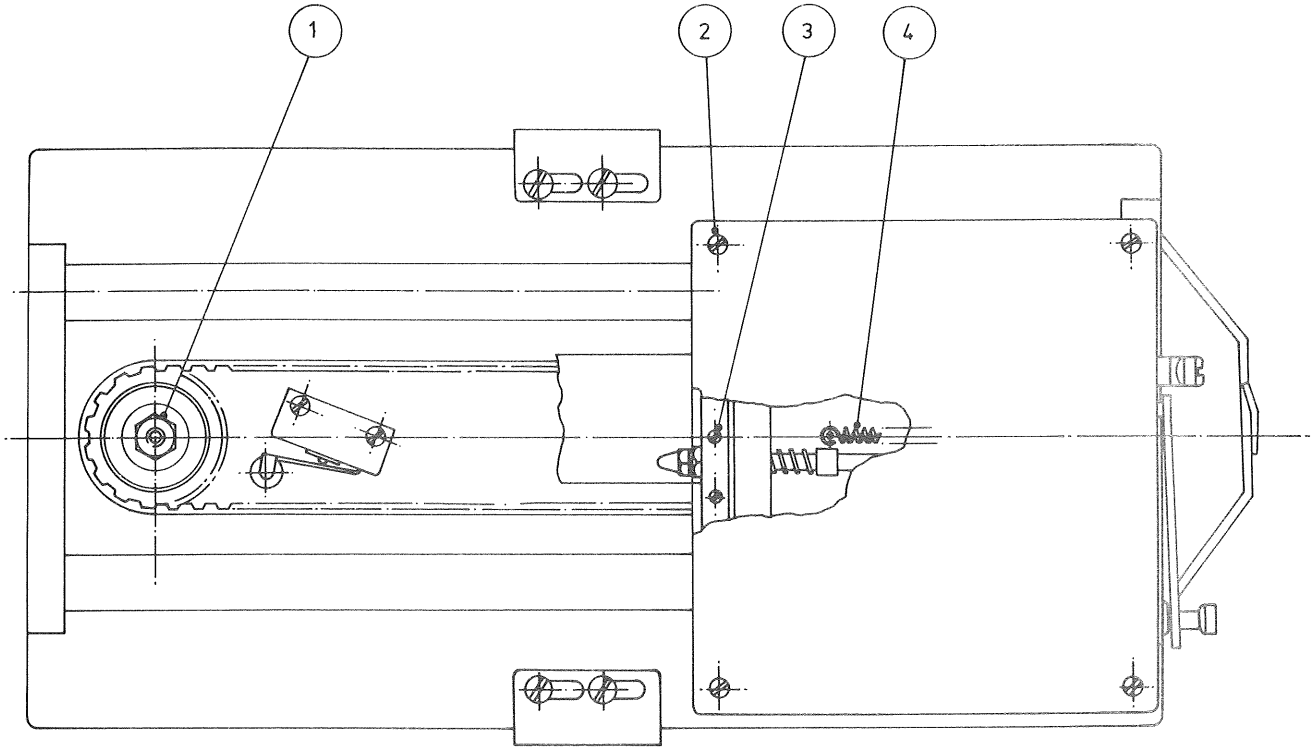



Fig 57

R S Unit (Fig 57 and 58)

The R S Unit consists of a carriage which slides in linear bearings on rigid circular rails. On to the carriage is mounted a table which also runs in linear bearings on a smaller pair of rails. The table is held against a fixed stop in the print position by a spring underneath the table. A workholder is secured to the table to suit the component being printed.

The drive is supplied by a 230/250 V ac reversible electric motor via a reduction gearbox, a friction clutch, a splined pulley and a flexible drive belt which is attached to the carriage.

E 97 The friction clutch is contained in a splined pulley and consists of two friction pads held in contact with pressure pads that are keyed to the gearbox spindle. The pressure is applied by a spring under a recessed washer secured by a nut (1).

E 98 The motor, gearbox and capacitor are accessible by removing the cover (71) secured by three screws.

E 99 Under the belt guard are two microswitches. Microswitch 5 at the loading end stops the R S motor when the carriage returns (providing the R S CONTINUOUS switch is not at ON.) Microswitch 6 at the print end starts the main motor to commence the print stroke (see cams, switches and microswitches, Operations E 1 onwards).

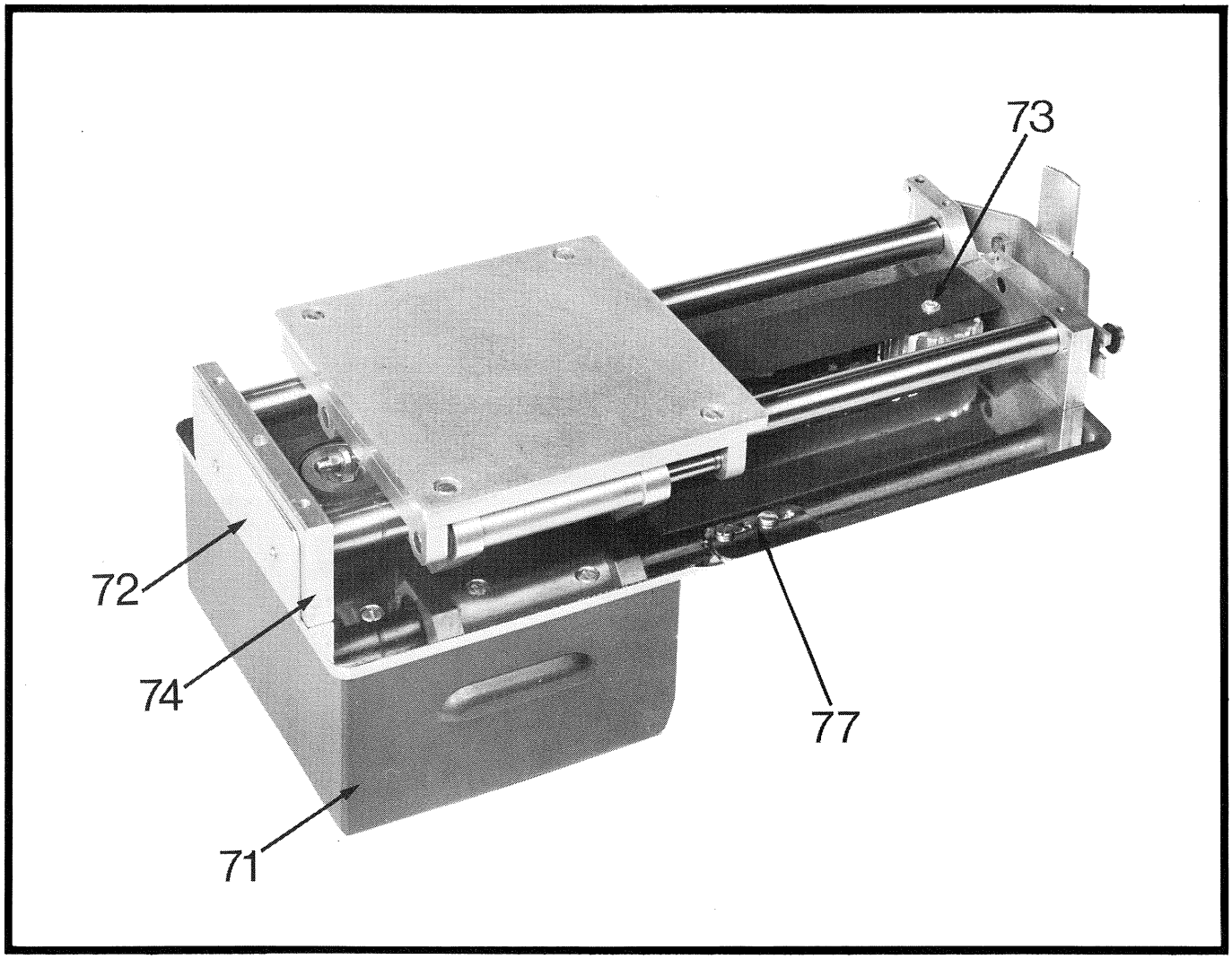



Fig 58

E 100 The belt guard is removed as follows: Remove end plate (72) secured by two screws.

E 101 Remove nut, screw and spacing washers.

E 102 Remove screw from centre of idler pulley (73).

E 103 Slide guard out through rails support bridge (74).

E 104 To obtain access to the spring (4) in the carriage remove the top plate of the table which is secured by four screws (2). Remove nine screws (3) to remove plate containing the spring.

R S print location stops (Fig 55, 59 and 60)

The stops on the R S unit have been designed to give a positive location without jarring the workholder. This is achieved by using a fibre stop and a pivot stop. As the worktable approaches the printing position the fibre stop is in position and stationary. The worktable makes contact with the pivot stop (75) and is held against it by the friction drive clutch. The main motor starts again and the fibre stop moves away, allowing the pivot stop to move gently forward with the carriage, which is still being driven by the friction drive clutch. The worktable is spring loaded on the carriage and makes positive contact with the fixed stop (76) on the R S unit.

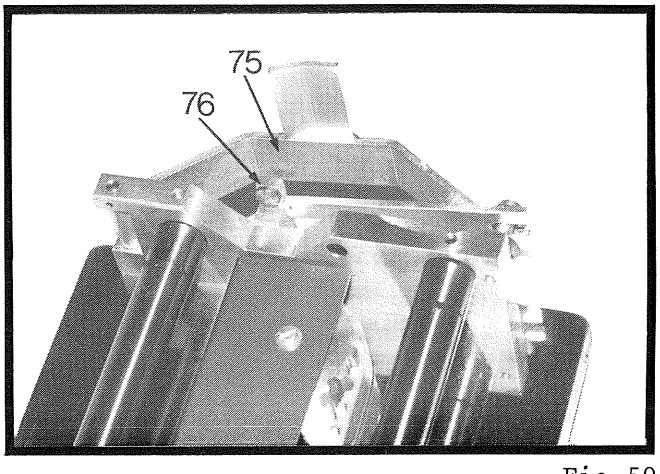


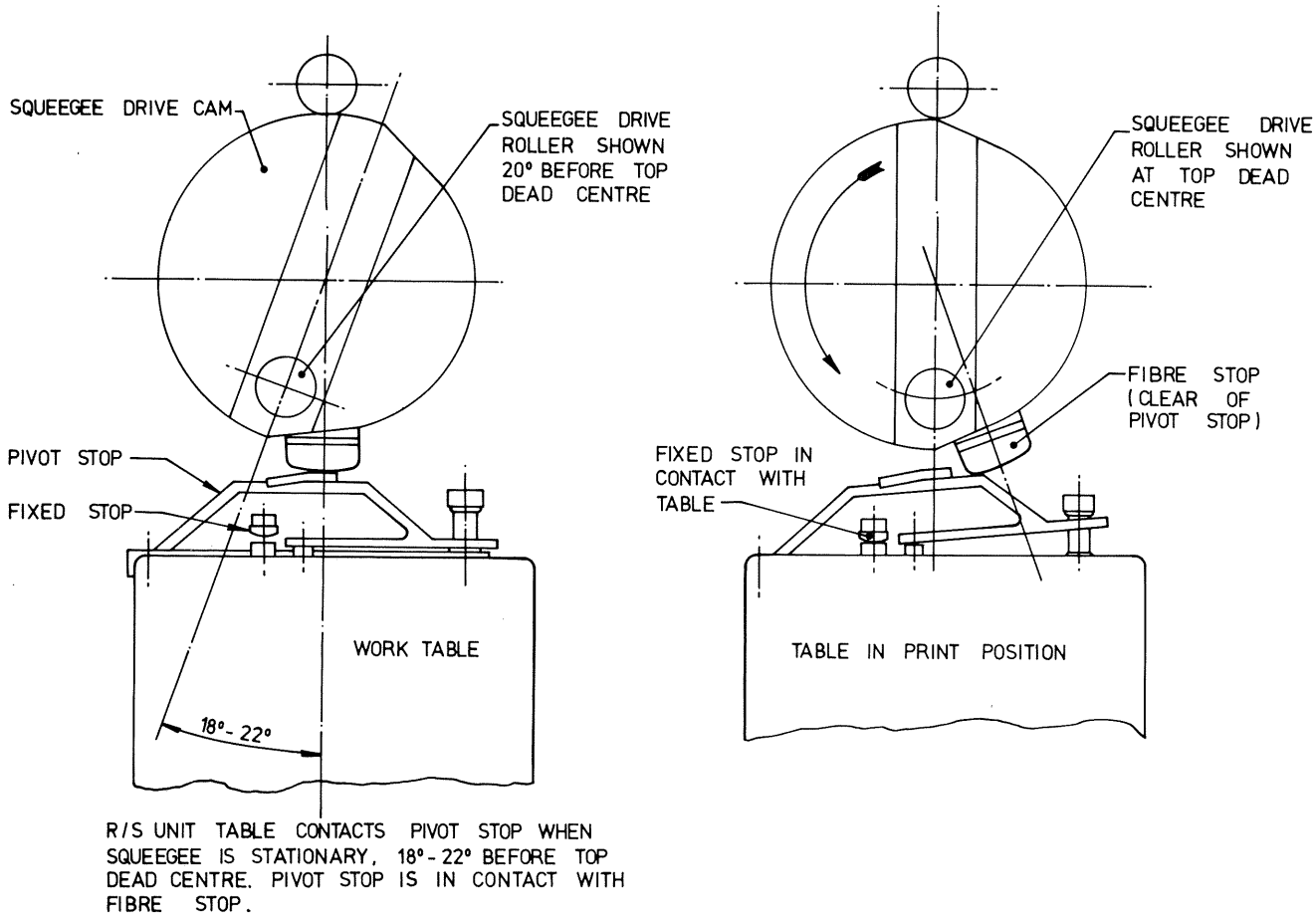
Fig 59

E 105 Ensure that the table is in contact with the fixed stop before the squeegee drops (Fig 60). If not the fibre stop must be advanced. Also the stopping position of the squeegee head must be adjusted so that the fibre stop becomes stationary towards the front of the machine. See section on cams (Operations E 16 to E 21) for other settings.

E 106 When the machine stops in the loading position, with the fibre stop to the front, the free movement of the pivot stop is just taken up by the fibre stop. The fibre stop can be adjusted radially by slackening a single nut behind the stop.

E 107 The angular setting of the fibre stop can be altered by slackening three Allen screws in the mounting plate.

E 108 The free movement on the pivot stop is taken up by adjusting the slotted stops (77) on each side of the R S unit.




PLAN VIEWS OF SQUEEGEE DRIVE CAM AND R/S UNIT TABLE STOPS

Fig 60

R S Unit speed setting (Fig 55)

The maximum operating speed should be set to suit the printing conditions, which is usually slower than the maximum machine speed if good quality is to be achieved.

E 109 The speed range for an R S system is set as follows: Remove the centre button (2) from the variable transformer control knob.

E 110 Turn the centre screw anticlockwise and remove the control knob (3).

E 111 Slacken the screw and move the stop (4) in a clockwise direction.

E 112 Replace the control knob in the zero position, then turn it anticlockwise to the position '5' so that the lug moves the stop.

E 113 Remove the knob and tighten the screw to fix the stop.

The maximum machine speed is set as follows:

E 114 Run the machine on R S CONTINUOUS. Turn the centre spindle of the Variac (1) anticlockwise until the R S table fails to complete its cycle.

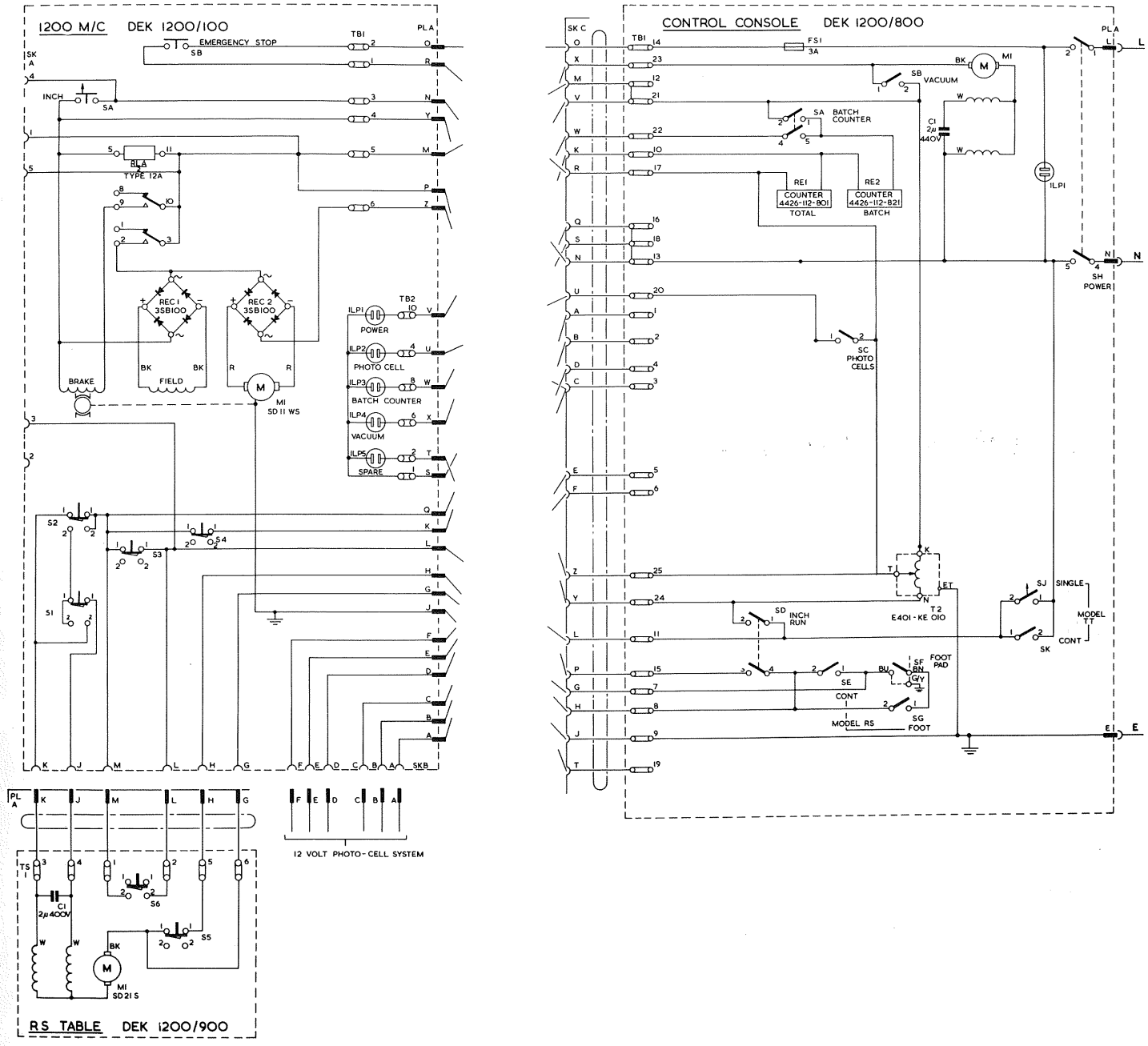
E 115 Turn the spindle clockwise until the R S table just completes its cycle.

E 116 Carefully replace the control knob in the position '5' without altering the speed. Lock up the centre screw. Replace the centre button.

E 117 As a check, when the knob is turned towards '0' the speed should reduce.

# Tool kit, wiring diagrams, spare parts

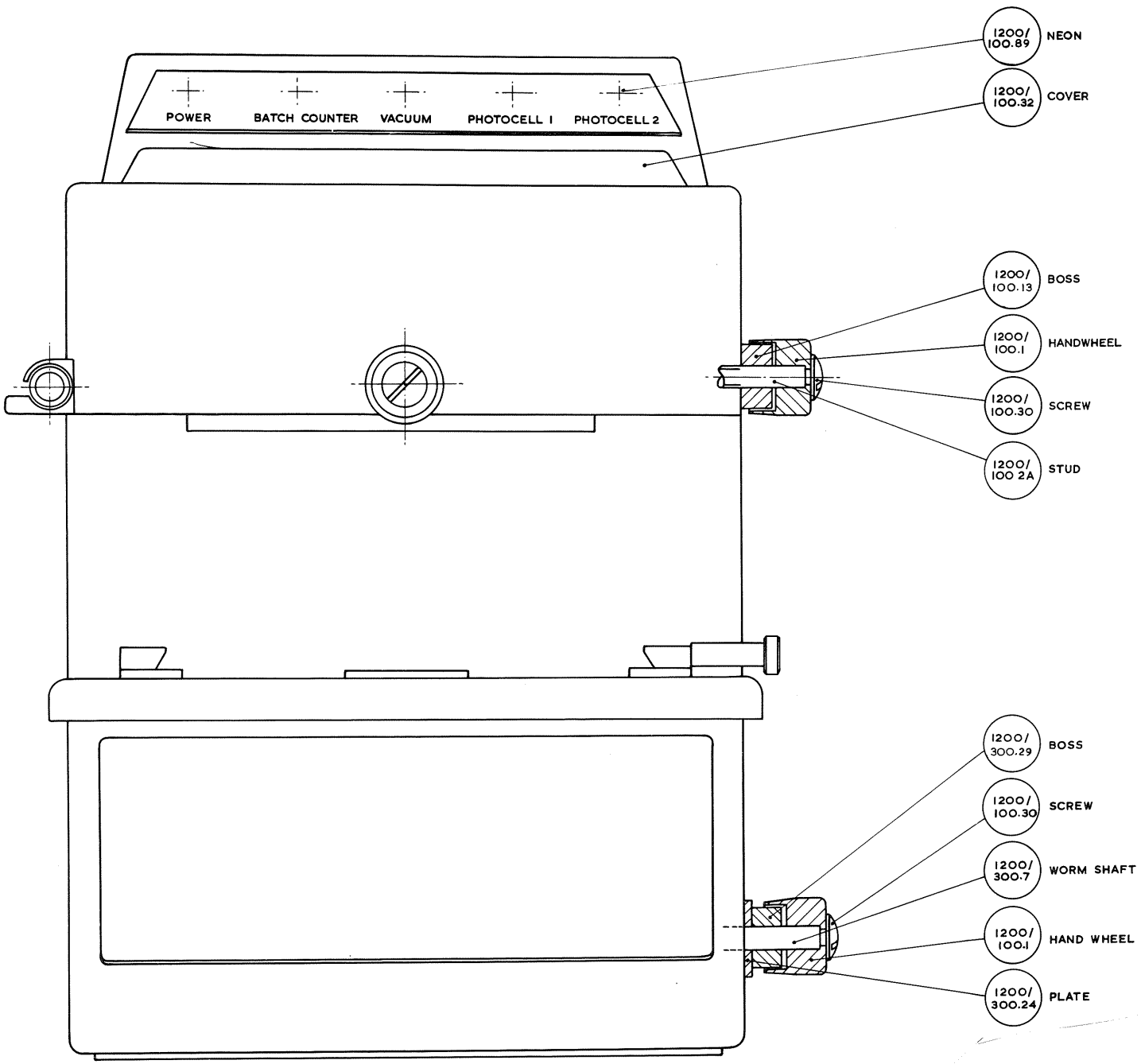
| 1200 Tool kit | | Reference | Quantity supplied U K | Overseas |
|---|---|---|---|---|
| Stroke adjusting tool | | 1200 27 S | 1 | 1 |
| Allen key | 3/16 in | G 25 | 1 | 1 |
| | 5/32 in | G 26 | 1 | 1 |
| | 3/32 in | G 28 | 1 | 1 |
| | 5/64 in | G 29 | 1 | 1 |
| | 1/16 in | G 30 | 1 | 1 |
| Spanner A F O E 5/16 x 3/8 in | | G 1 | 1 | 1 |
| Fuse 3 amp | | G 5 | 3 | 3 |
| Transformer | | | - | 1 |
| Plastic tube | Length 18 in | | 1 | 1 |
| Wide squeegee holder | | A4E 12A 1200-500<br>15A - 33 A | 1 | 1 |
| Wide squeegee | Red | | 1 | 1 |
| | Green | | 1 | 1 |
| Narrow squeegee | Green | | 1 | 1 |
| Squeegee tommy bar | | 1200 43 S | 1 | 1 |
| Ink distributor blade | Wide | 1200-500 19 B | 1 | 1 |
| Chase screws | | A 11 C 6 S | 9 | 9 |
| Plug | Control Console | 1200/800/34 'A' | 1 | 1 |
| Cover | Control Console | 1200-700-40 | 1 | 1 |
| Cover | Printer | 1200-700-39 | 1 | 1 |
| Tool bag | | | 1 | 1 |
| 1200 Operation Manual | | | 1 | 1 |

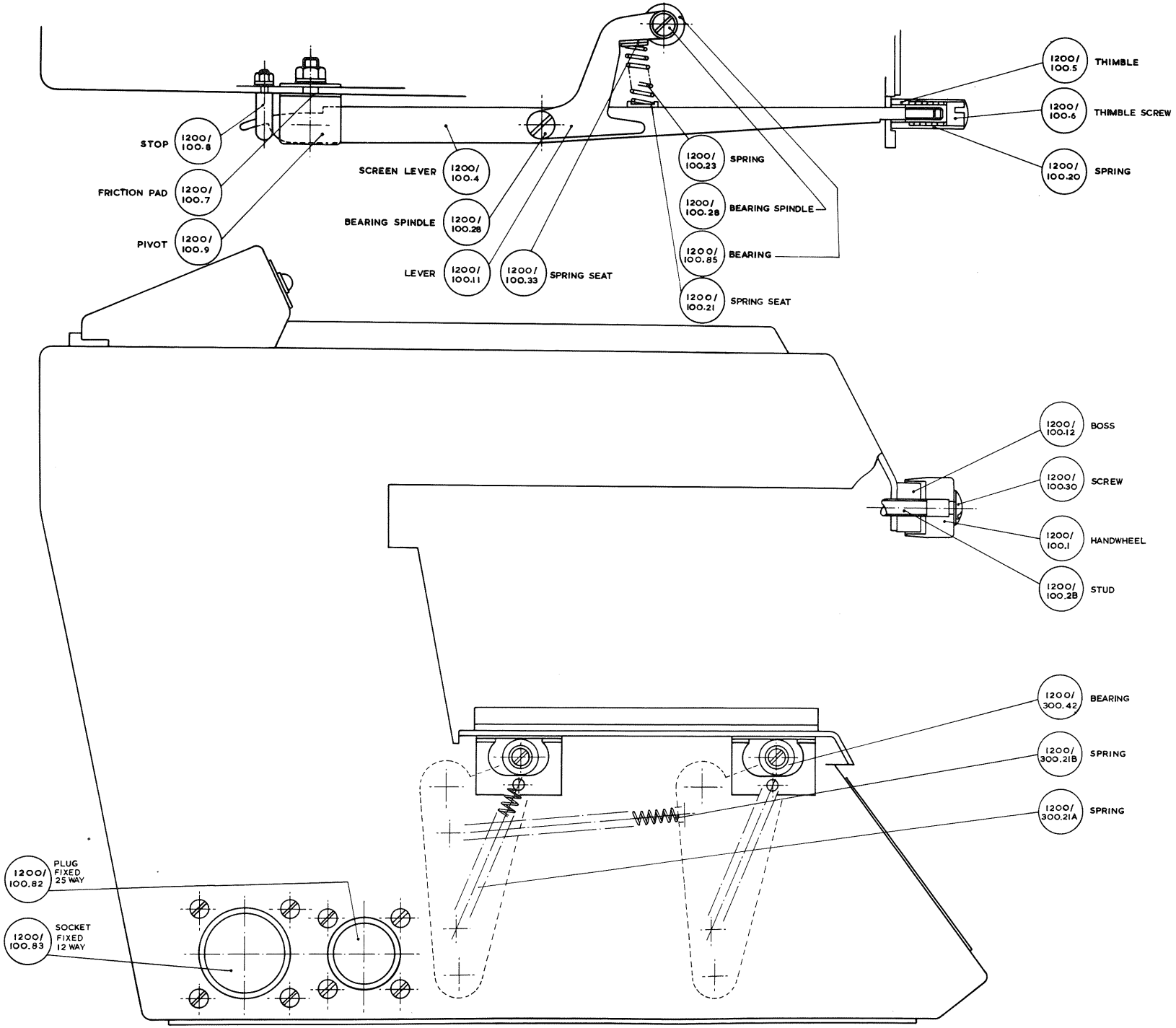


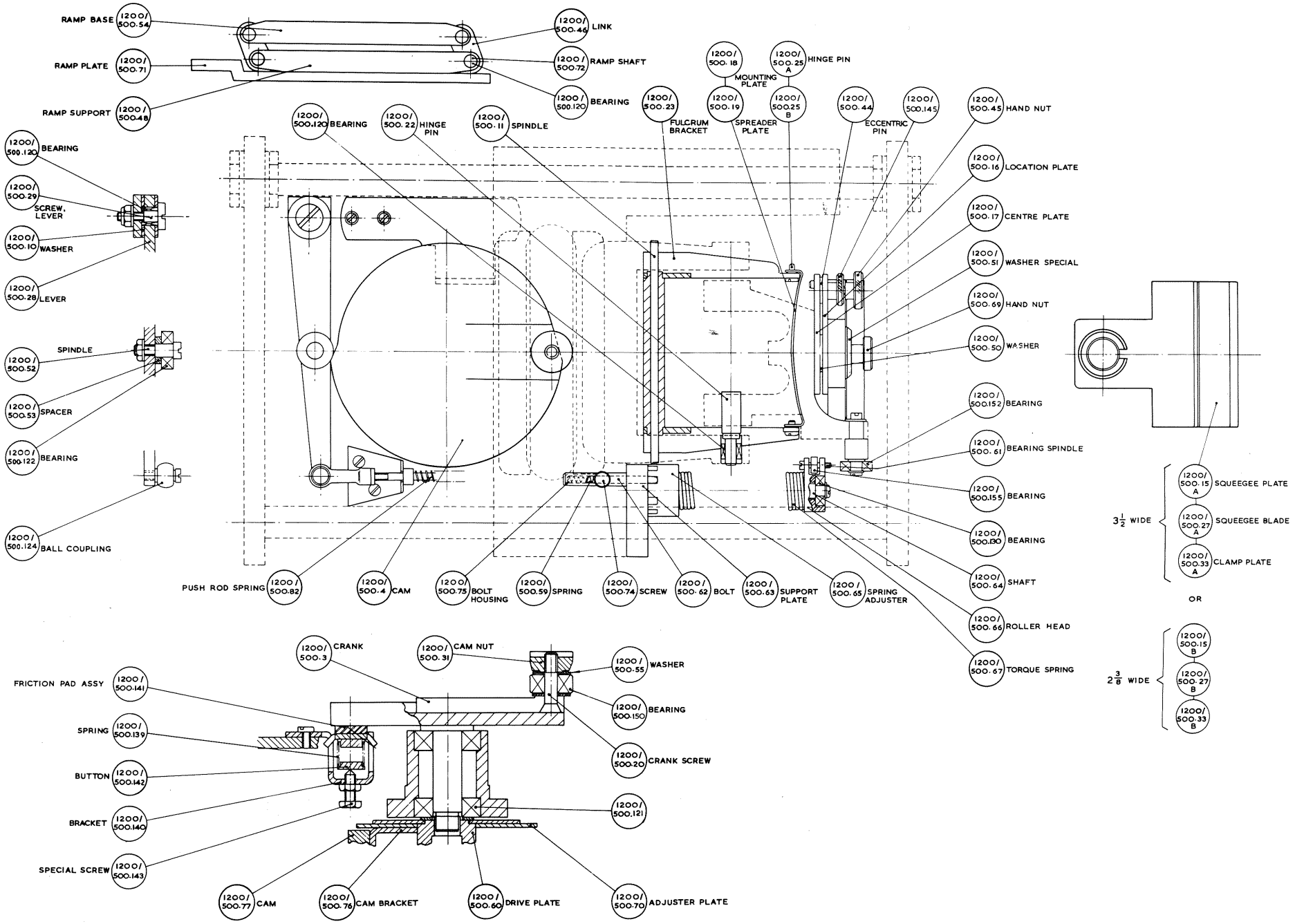

Wiring diagram (Fig 61)

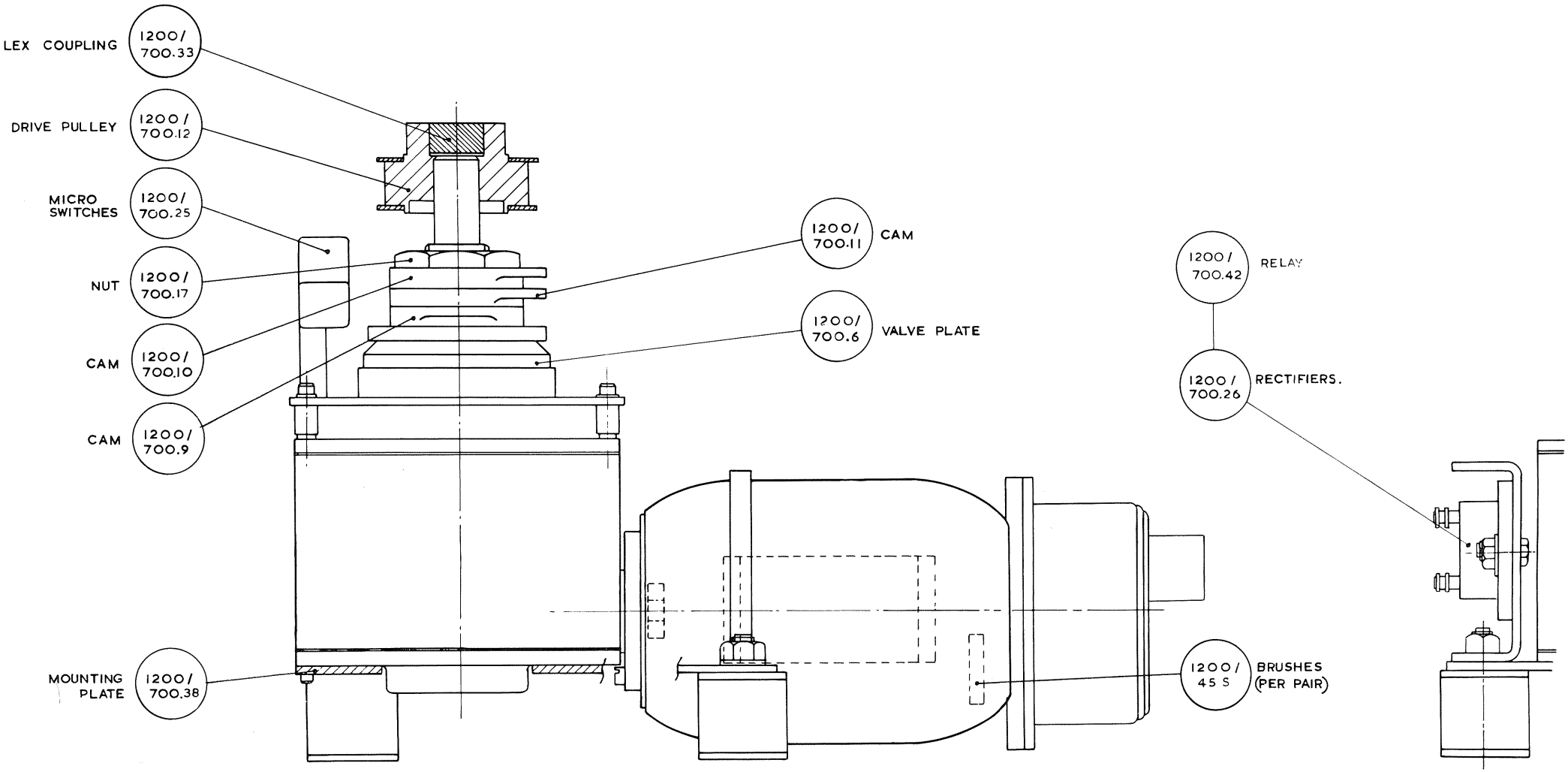
The components and interconnections of the 1200 System are shown in the wiring diagram, which covers the 1200 Printer, the 1200 Control Console, and the R S Unit.

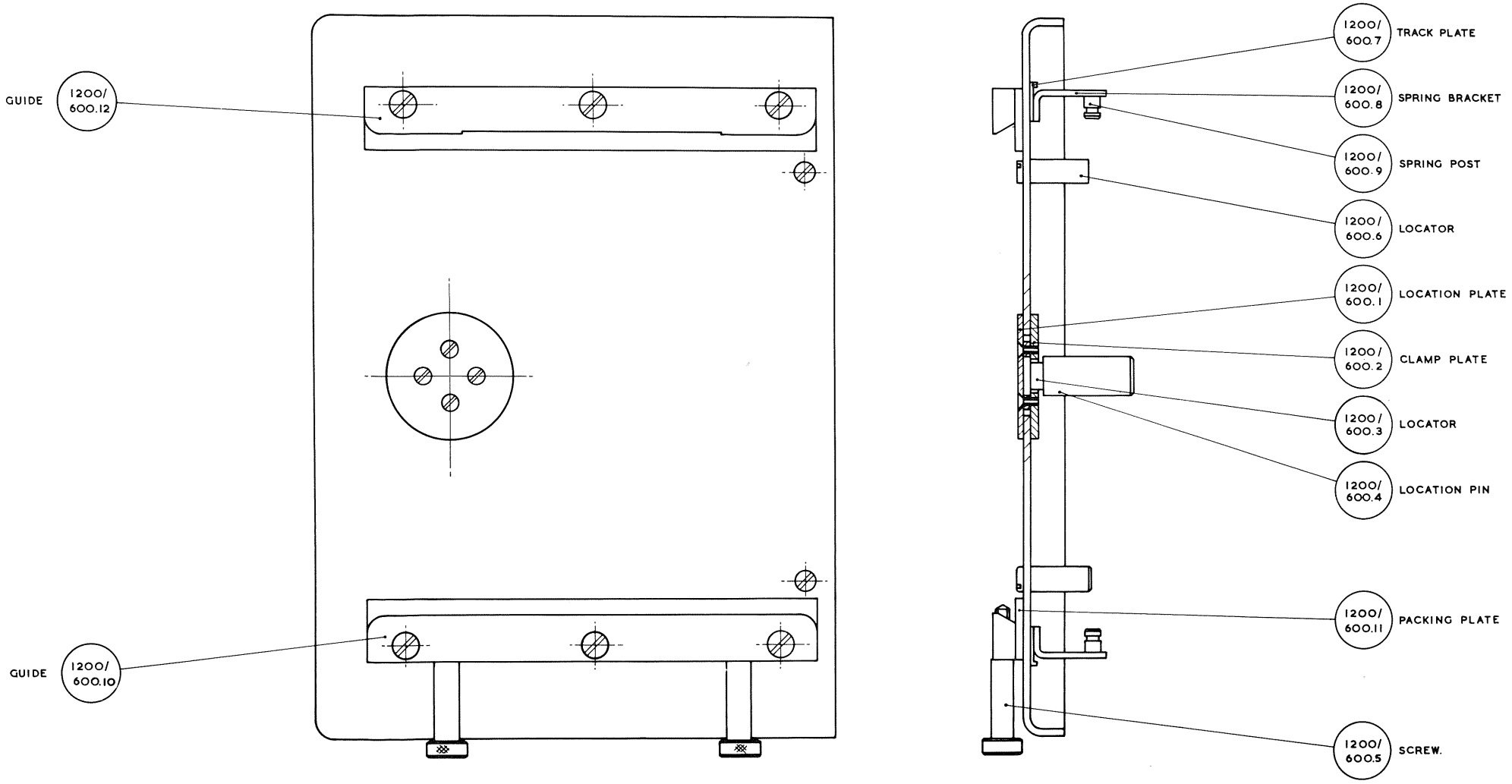
Systems with automatic machine feed or with units other than the R S Unit are covered by their own manuals. Some of the components and wiring provided are common to all systems and are inoperative or unused when R S Units are fitted.

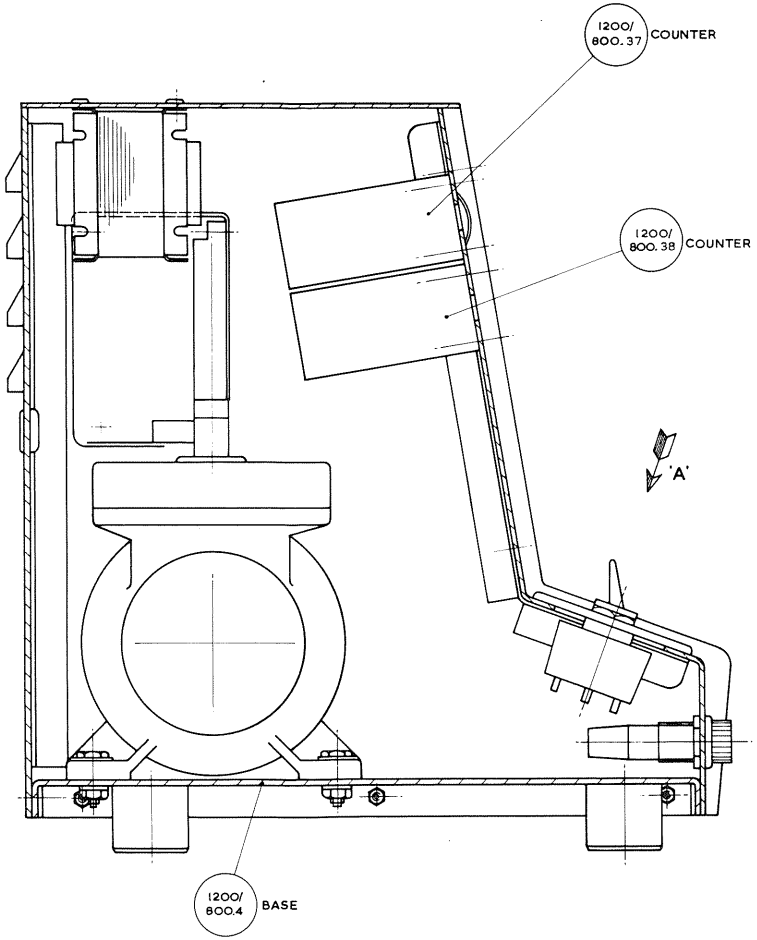

POWER
BATCH COUNTER
VACUUM
PHOTOCELL 1
PHOTOCELL 2
1200/100.89 NEON
1200/100.32 COVER
1200/100.13 BOSS
1200/100.1 HANDWHEEL
1200/100.30 SCREW
1200/100 2A STUD
1200/300.29 BOSS
1200/100.30 SCREW
1200/300.7 WORM SHAFT
1200/100.1 HAND WHEEL
1200/300.24 PLATE


1200/100.5 THIMBLE
1200/100.6 THIMBLE SCREW
1200/100.20 SPRING
STOP 1200/100.8
FRICTION PAD 1200/100.7
PIVOT 1200/100.9
SCREEN LEVER 1200/100.4
BEARING SPINDLE 1200/100.28
LEVER 1200/100.11
1200/100.33 SPRING SEAT
1200/100.23 SPRING
1200/100.28 BEARING SPINDLE
1200/100.85 BEARING
1200/100.21 SPRING SEAT
1200/100.12 BOSS
1200/100.30 SCREW
1200/100.1 HANDWHEEL
1200/100.28 STUD
1200/300.42 BEARING
1200/300.21B SPRING
1200/300.21A SPRING
1200/100.82 PLUG FIXED 25 WAY
1200/100.83 SOCKET FIXED 12 WAY

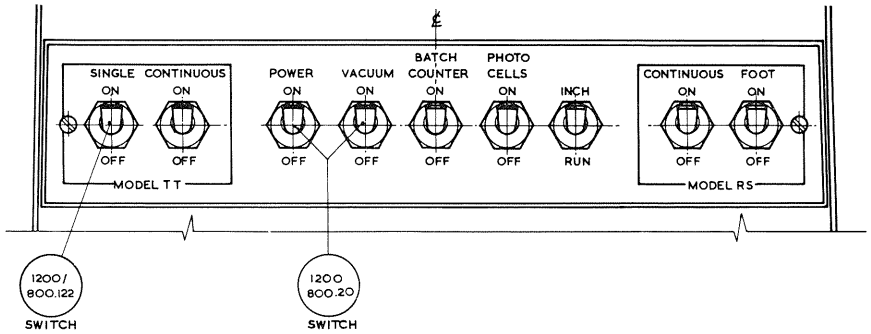

RAMP BASE 1200/500.54
RAMP PLATE 1200/500.71
RAMP SUPPORT 1200/500.48
1200/500.46 LINK
1200/500.72 RAMP SHAFT
1200/500.120 BEARING
1200/500.18 MOUNTING PLATE
1200/500.25A HINGE PIN
1200/500.23 FULCRUM BRACKET
1200/500.19 SPREADER PLATE
1200/500.25B
1200/500.44 ECCENTRIC PIN
1200/500.145
1200/500.120 BEARING
1200/500.22 HINGE PIN
1200/500.11 SPINDLE
1200/500.45 HAND NUT
1200/500.16 LOCATION PLATE
1200/500.17 CENTRE PLATE
1200/500.51 WASHER SPECIAL
1200/500.69 HAND NUT
1200/500.50 WASHER
1200/500.120 BEARING
1200/500.29 SCREW, LEVER
1200/500.10 WASHER
1200/500.28 LEVER
SPINDLE
1200/500.52
1200/500.53 SPACER
1200/500.122 BEARING
1200/500.124 BALL COUPLING
1200/500.152 BEARING
1200/500.61 BEARING SPINDLE
1200/500.155 BEARING
1200/500.130 BEARING
1200/500.64 SHAFT
1200/500.66 ROLLER HEAD
1200/500.67 TORQUE SPRING
PUSH ROD SPRING 1200/500.82
1200/500.4 CAM
1200/500.75 BOLT HOUSING
1200/500.59 SPRING
1200/500.74 SCREW
1200/500.62 BOLT
1200/500.63 SUPPORT PLATE
1200/500.65 SPRING ADJUSTER
3½ WIDE
1200/500.15A SQUEEGEE PLATE
1200/500.27A SQUEEGEE BLADE
1200/500.33A CLAMP PLATE
OR
2⅜ WIDE
1200/500.15B
1200/500.27B
1200/500.33B
1200/500.3 CRANK
1200/500.31 CAM NUT
1200/500.55 WASHER
1200/500.150 BEARING
1200/500.20 CRANK SCREW
1200/500.121
FRICTION PAD ASSY 1200/500.141
SPRING 1200/500.139
BUTTON 1200/500.142
BRACKET 1200/500.140
SPECIAL SCREW 1200/500.143
1200/500.77 CAM
1200/500.76 CAM BRACKET
1200/500.60 DRIVE PLATE
1200/500.70 ADJUSTER PLATE

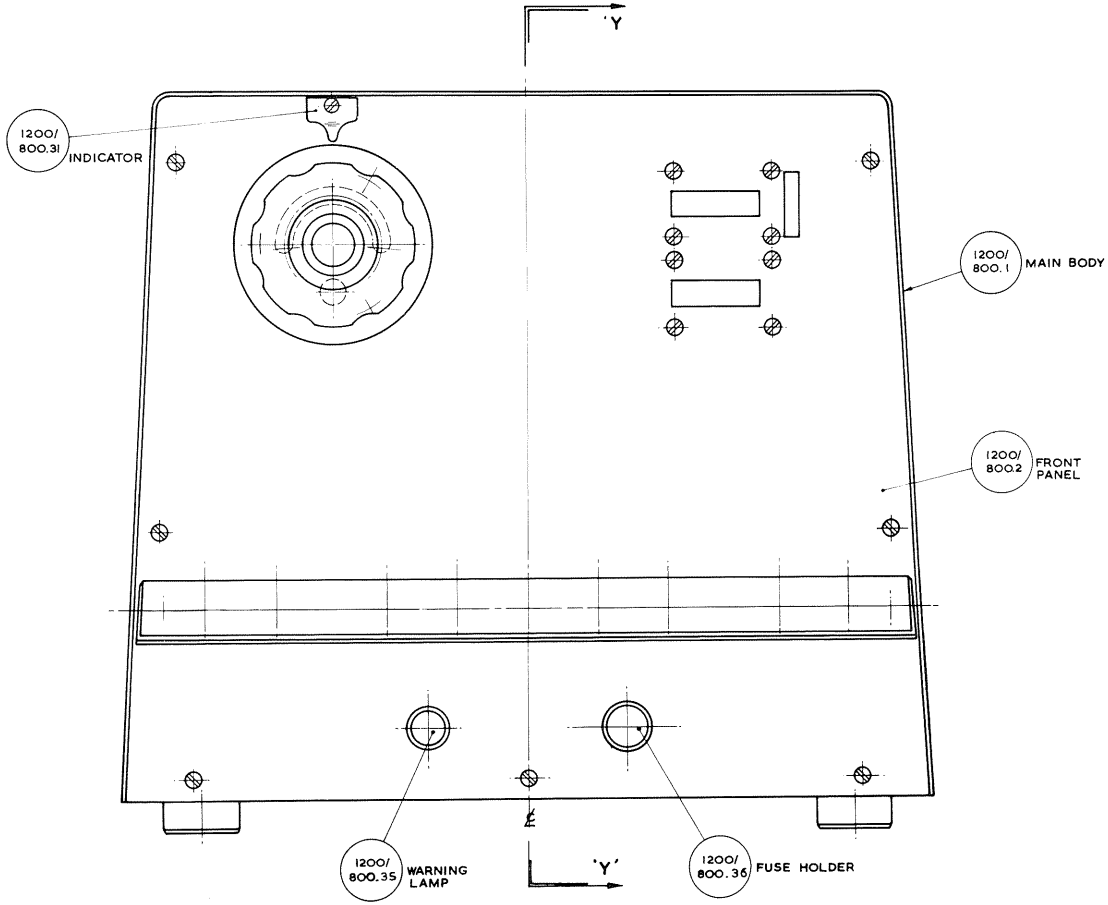

LEX COUPLING
1200/ 700.33
DRIVE PULLEY
1200/ 700.12
MICRO SWITCHES
1200/ 700.25
NUT
1200/ 700.17
CAM
1200/ 700.10
CAM
1200/ 700.9
MOUNTING PLATE
1200/ 700.38
1200/ 700.11
CAM
1200/ 700.6
VALVE PLATE
1200/ 700.42
RELAY
1200/ 700.26
RECTIFIERS.
1200/ 45 S
BRUSHES (PER PAIR)


GUIDE
1200/
600.12
GUIDE
1200/
600.10
1200/
600.7
TRACK PLATE
1200/
600.8
SPRING BRACKET
1200/
600.9
SPRING POST
1200/
600.6
LOCATOR
1200/
600.1
LOCATION PLATE
1200/
600.2
CLAMP PLATE
1200/
600.3
LOCATOR
1200/
600.4
LOCATION PIN
1200/
600.11
PACKING PLATE
1200/
600.5
SCREW.

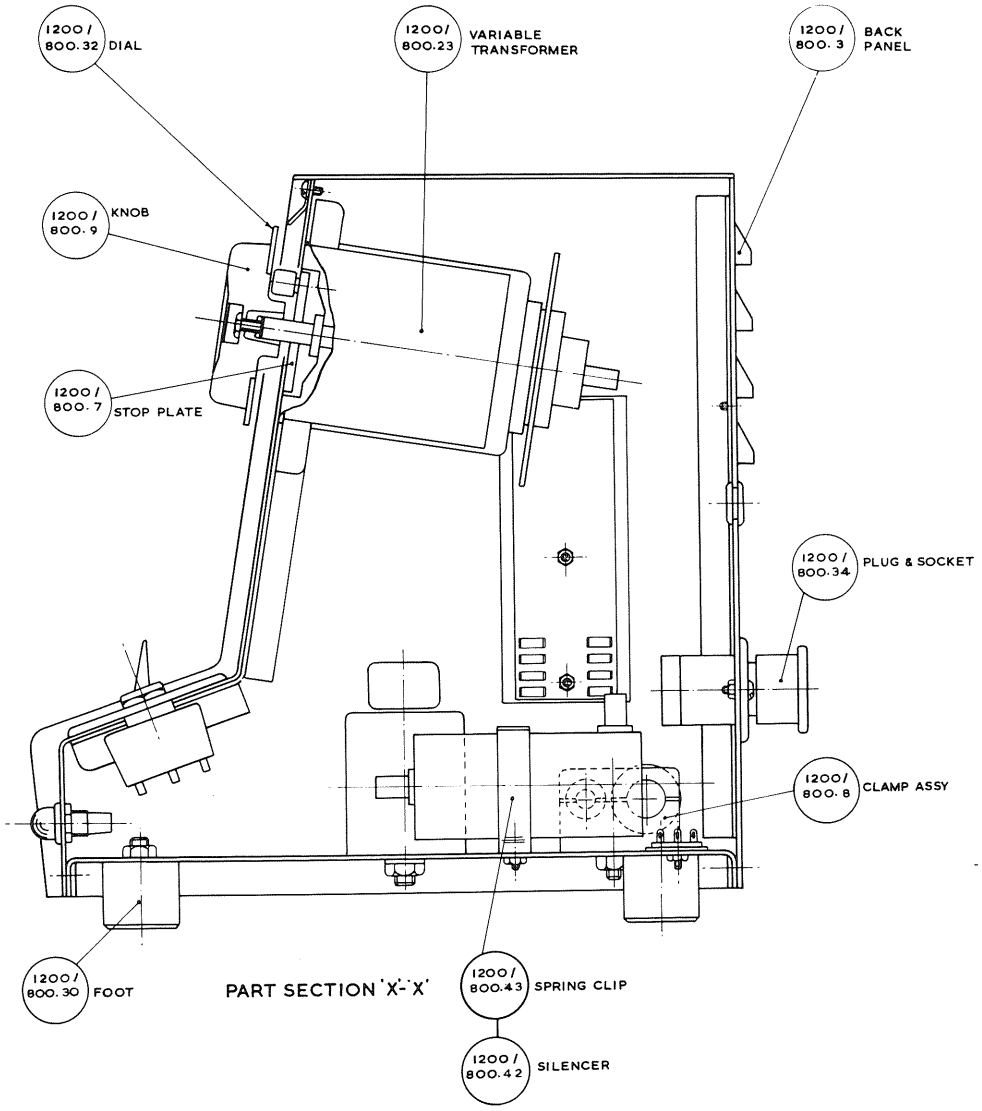



SECTION 'Y-Y'

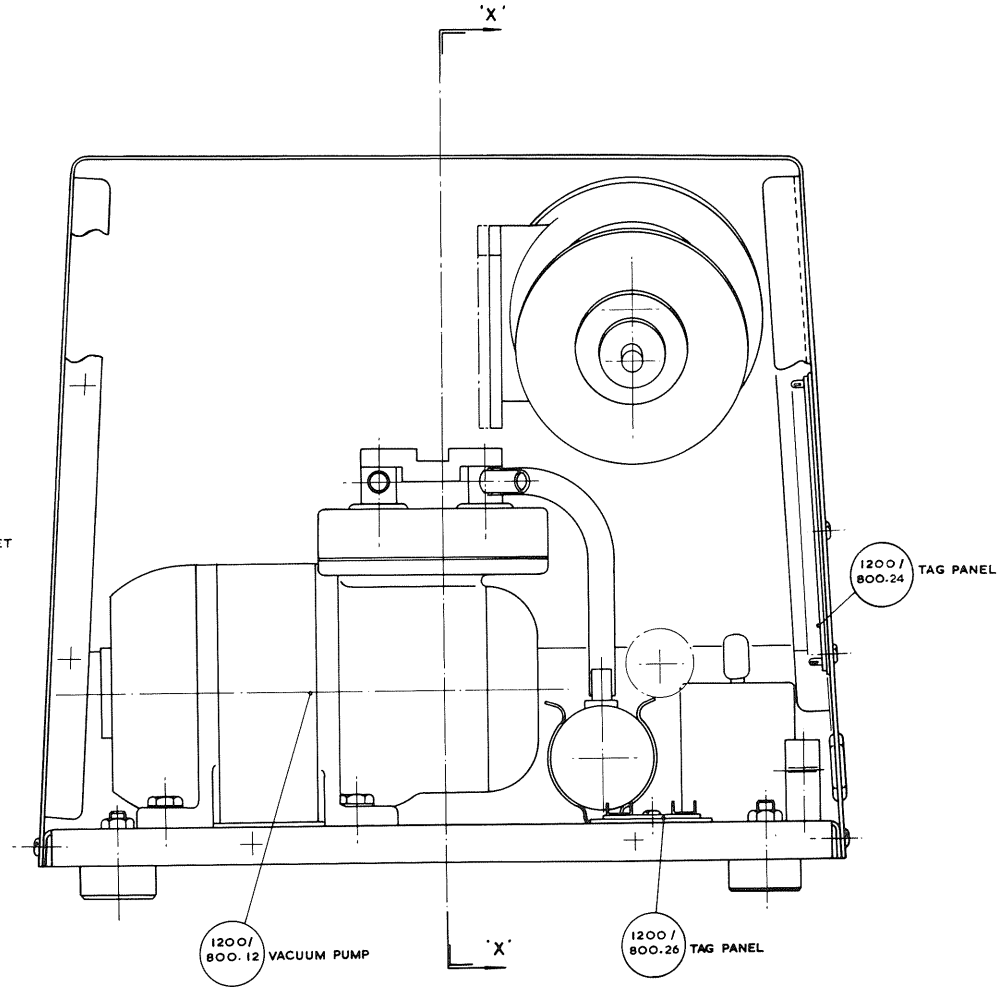


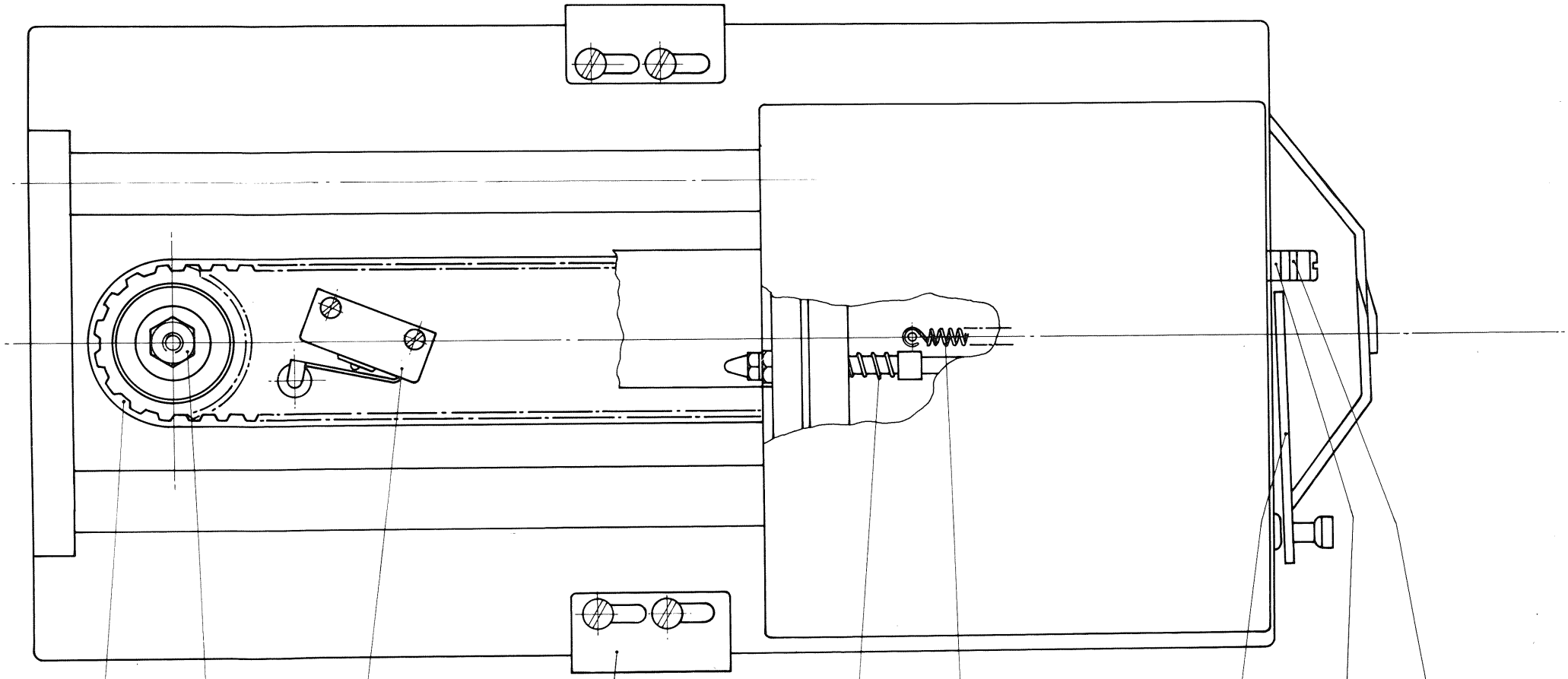

FRONT VIEW OF CONSOLE




PART SECTION 'X'-'X'




VIEW ON REAR WITH BACK PANEL REMOVED


1200/
900.102
BELT.
1200/
900-122
MOTOR ASSY.
INCLUDES SPECIAL
CLUTCH AND CAPACITOR
1200/
900.101
2 OFF/
SET
MICRO SWITCH.
1200/
900-2
STOP PLATE.
1200/
900.22
2 OFF/
SET
SPRING.
1200/
900.19
SPRING.
1200/
900. 6
CUSHION.
1200/
900.51
STOP PLATE.
1200/
900. 8
END STOP.