FI-CORD INTERNATIONAL

SERVICE MANUAL

Service Manual

for

FI-CORD 202

Contents

AMPLIFIER SECTION

Description of circuit and performance figures

The functions of record and playback are carried out by a common amplifier. Sections of the record/play switch make circuit changes to bring about the record or play condition. Before making any audio frequency measurements disconnect the supply to the oscillator section. This is conveniently done by opening the junction R29, R30, or R30, TR8, TR9 emitters.

Stage 1.

This is a preamplifier stage consisting of one transistor TR1. In the 'Record' condition, d.c. voltages are:-

TR1 emitter 5.5V TR1 base 5.4V TR1 collector 3.6V

These are average figures, they were measured with a very high resistance voltmeter, allowance should be made when using a normal voltmeter. The a.c. performance is:-

0.001V in at 1kc/s for 0.012V out, approximately. This is measured by connecting 0.001V from 22 ohms source of 1kc/s to the 'IN' socket, having the volume control fully clockwise, and measuring the output at the junction of C3, C7, with an a.c. millivoltmeter. The input may be fed to the 'IN/OUT' socket when it will be found that the stage gain is up by about 6dB.

The a.c. collector load for TR1 is either the volume control RV1 or, when the volume knob is turned fully anti-clockwise, the transistor TR2. The impedance of TR2 is made to vary inversely with the amplitude of the recorded material, and it effects an automatic control of volume. TR2 cannot be brought into circuit when the amplifier is switched to the 'Play' condition.

In the 'Play' condition, the d.c. voltages on TR1 and the a.c. performance are the same as in Record position. Check this by connecting the signal between the switch side of C1 and ground.

Stage 2.

This is a frequency compensating stage and consists of TR3 and TR4, directly coupled. In the 'Record' condition, the d.c. voltages are:-

TR3 emitter 6.2V TR3 base 6.1V TR3 collector 4.8V

TR4 emitter 4.9V TR4 base 4.8V TR4 collector 2.1V

The a.c. performance is:-

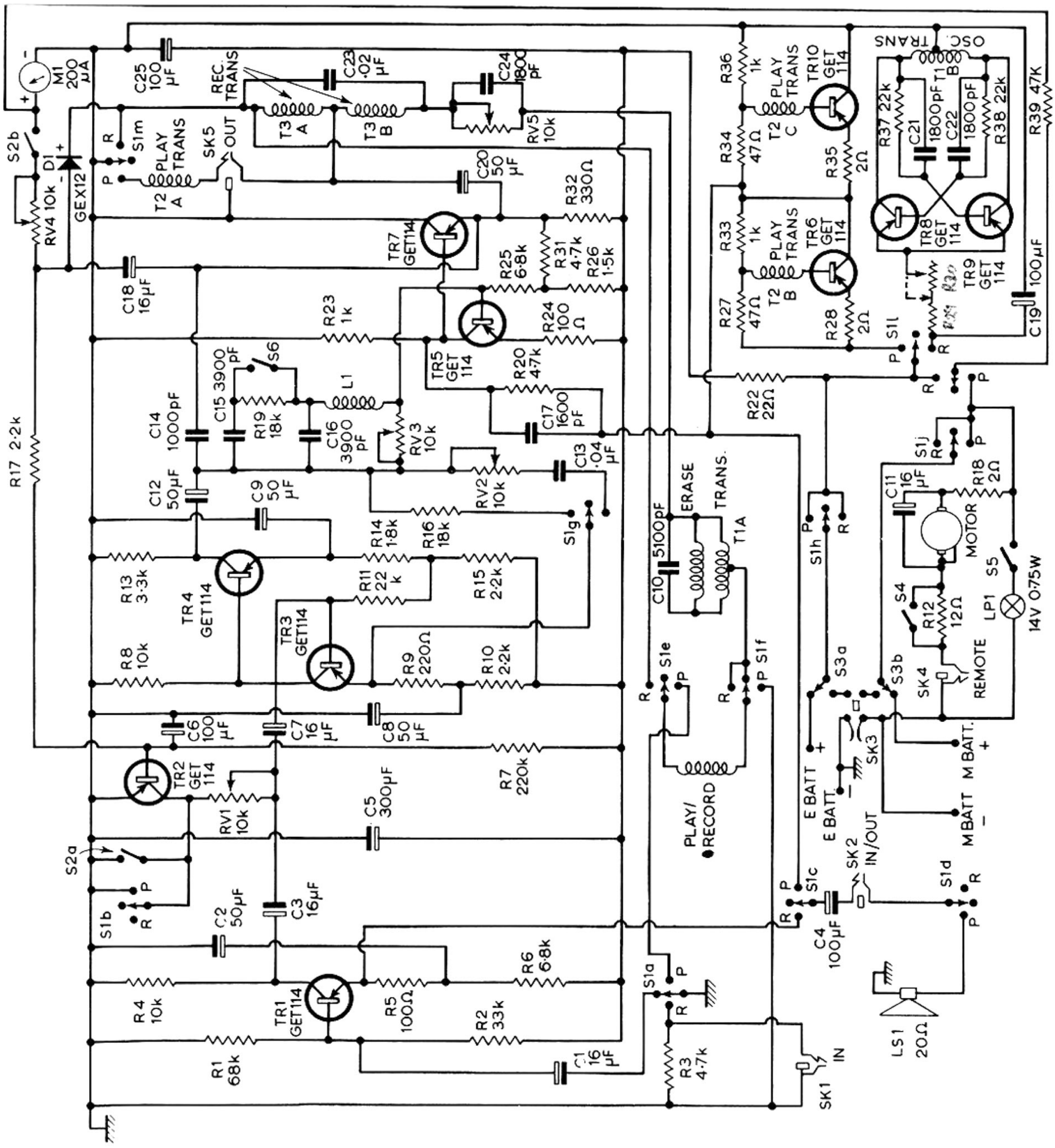
0.0002V at 'IN' socket 1kc/s for 0.25V at TR4 collector. To measure this, feed 0.0002V from 22 ohm source of 1kc/s to the 'IN' socket. Turn volume knob fully clockwise. Measure the voltage at TR4 collector, using a capacitor to block the d.c. The voltages measured at frequencies other than 1kc/s should be as follows:-

50c/s –1V 1kc/s 0V 8kc/s –1V 12kc/s –3V

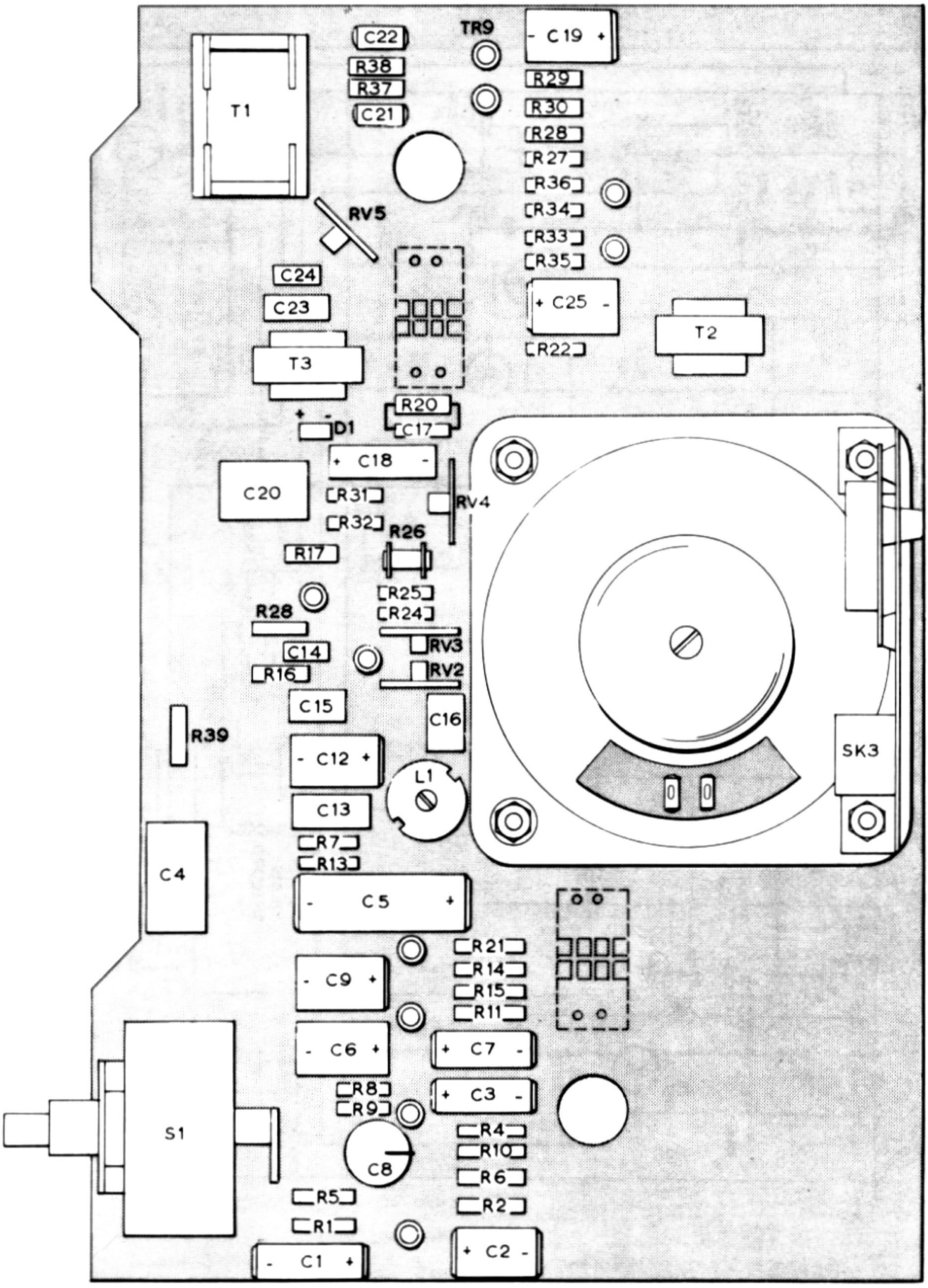
The feed back resistor R16 keeps the response reasonably flat over the frequency range. General lack of gain, particularly at low frequencies, could be due to faulty condensers C8 or C9.

In the 'Play' condition, the d.c. voltages are the same as in the 'Record' position. The a.c. performance is:- for 0.0005V in at 1kc/s 0.25V at TR4 collector.

To measure this, disconnect the head lead at Slf and insert a 47 ohm resistor in series with the lead. Feed in here via another resistor so that 0.0005V is developed across the 47 ohms. Measure the voltage at TR4 collector as before. To check the a.c. performance at other frequencies, vary the signal input frequency and amplitude, keeping the output voltage constant. This eliminates the pos-



Circuit diagram of the Fi-Cord 202



Component layout of the amplifier

sibility of getting false readings due to amplitude limited waveforms. The input at other frequencies relative to the input at 1kc/s should be similar to the following :-

50c/s	100	200	400	500	1kc/s	2	4	6	8	10	12	
–18	–15	–10	–6	–4	0	+2	+3	+4	+6	+9	+11	dB

The increase in gain at low frequencies is due to the combination RV2–C13. RV2 is adjustable; it should be about 2,500 ohms.

Coupling Stage.

Between stages 2 & 3 there is a series resistor RV3 which is adjustable in order to reduce the current drive to TR5 base. The series combination C16-L1 is arranged to resonate at 11 to 12kc/s, and at the resonant frequency it becomes an alternative and lower impedance path for TR5 base drive current. The net result is an increase in output at 11-12kc/s. By arranging to add C15 when the speed change lever is in the slow position, the resonant frequency is reduced to about 8kc/s.

Stage 3.

This is a driver stage consisting of TR5 TR7 directly coupled. In the 'Record' condition, the d.c. voltages are :-

TR5 emitter 7.7V	TR5 base 7.5V	TR5 collector 4.9V
TR7 emitter 5.0V	TR7 base 4.9V	TR7 collector 0V

The A.C. performance is:- for 0.0001V at 'IN' socket 1kc/s 0.5V at TR7 emitter. To measure this proceed as for measuring stage 2, 'Record', but use a plug in the 'OUT' socket to connect the A.C. meter to TR7 emitter.

The output at other frequencies, relative to that at 1kc/s should be similar to the following :-

	50c/s	100	200	400	500	1Kc/s	2	4	6	8	10	12	
7½"/sec	–2 dB	0	0	0	0	0	0	+1	+2	+3	+4	+4	dB
3¾"/sec	–2	0	0	0	0	0	+½	+2½	+5	+7			dB

In the 'Play position, the d.c. voltages are similar to those in the 'Record' position. The a.c. performance is :- 0.0005V in at 1kc/s for 0.7V at TR7 emitter. To check this proceed as for stage 2 Play.

Connect the a.c. voltmeter to a plug in the 'OUT' socket, and adjust the input level for a constant output level. The relative input levels should be similar to the following :-

	50c/s	100	200	400	500	1Kc/s	2	4	6	8	10	12	
7½"/sec	–19	–16	–11	–6	–4	0	+2	+2	+2	+1	0	–2	dB
3¾"/sec	–10	–16	–11	–6	–4	0	+2	+1	–1	–3	–3	–1	dB

TR7 emitter has both record & play transformers (T3 & T2 respectively) connected to it. Part of the Record/Play switch Slm completes the circuit of one or other of these transformers.

In the 'Record' position, the amplified audio signal is developed across T3A & B (auto transformer), and drives the head current via RV5, the oscillator transformer erase head combination, and Sle. The head current can be measured by inserting a 47 ohm between the head lead and Sle wiper, and measuring the voltage across it with an a.c. millivoltmeter.

The maximum current necessary is 240 micro-amps. With this current in the head, RV4 may be adjusted to make the meter pointer read at the left hand edge of the red scale.

In the Play condition, T2A (the Play transformer) is energised, but only in the absence of a plug in SK5 (the 'OUT' socket). The two other windings on T2 are part of the speaker amplifier circuit,

a single ended class B arrangement of transistors TR6 & TR10. The d.c. voltages on these transistors are :-

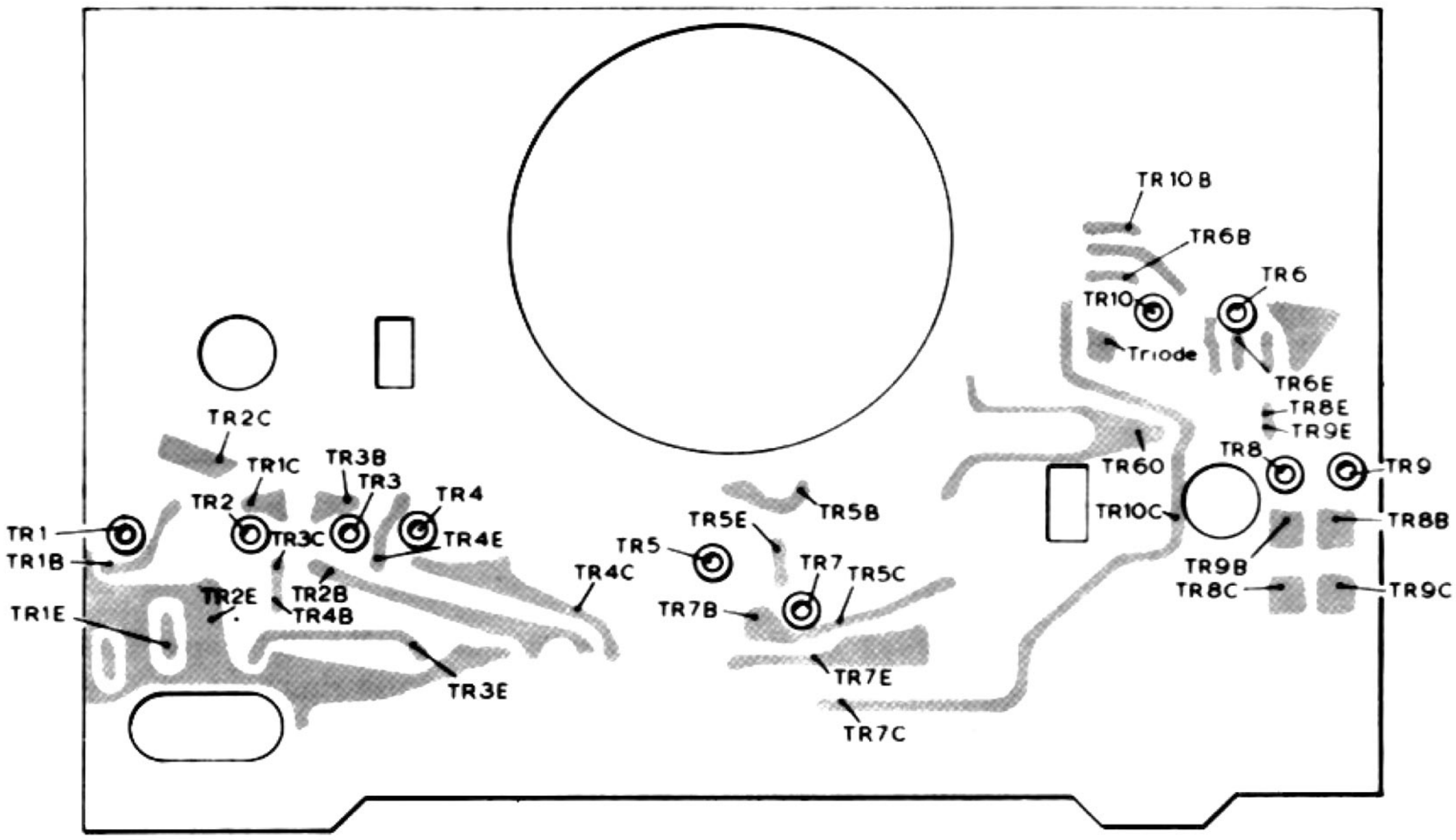
TR6 emitter 4.2V	TR6 base 4V	TR6 collector 0V
TR10 emitter 8.4V	TR10 base 8.3V	TR10 collector 4.3V

The a.c. performance should be less than 0.003V in for 1.9V no amplitude limited waveform across 20 ohms or the loudspeaker.

To check this, arrange the input as for Stage 3 play and transfer the a.c. meter from the 'OUT' socket to the 'IN/OUT' socket. Do not press the plug fully home since this will disconnect the speaker; it is possible to press the plug enough to obtain a reading on the a.c. voltmeter without disconnecting the speaker.

Oscillator Stage.

This is a push pull circuit made up with TR8, TR9 and transformer T1, generating high frequency erase voltage and bias voltage. The full voltage from the transformer secondary should be about 36V. rms with 8.4V supply to the recorder. This voltage appears also across the erase head & capacitor C10. A tapping on the transformer secondary drives bias current in the circuit C24, C23 and record head. The voltage across the record head is 28-32V rms at 55-63 kc/s. The bias current may be roughly adjusted by arranging R29, R30 individually, in series, or in parallel, in the oscillator supply.



Transistor connections to the foil, part of which is shown in shaded outline.

MECHANICAL SECTION

Some of the parts referred to in the following section recognised and located by referring to the instruction book provided with each instrument. The names of these parts are followed by a number in parentheses.

GENERAL MAINTENANCE

A periodic check should be made of the following points and these do not necessitate opening up the recorder.

1. Remove cassettes, remove batteries, clean the spring contacts in the cassette, and apply a thin covering of vaseline.
2. Use a stiff brush to clean the ends of the batteries, be sure to remove all signs of white powder dirt and damp.
3. Clean the record/play and the erase head as detailed on page 18 of the instruction book.

DISMANTLING

1. Remove cassettes, lid and reels.
2. Remove the four screws near the top of the outer case, one in each side and two in the back.
3. Turn the machine over so that the record head cover (23.) rests in the palm of the left hand, with the thumb across the front panel between the tape switch (3) and the volume control (5).
4. Ease off the case with the right hand, as in Fig. 1.

Enough of the machine is now exposed to enable the investigation to proceed. If the fault is electrical it is more convenient to make d.c. and audio frequency tests with the machine opened this far only.

To obtain access to the mechanism or to change components proceed as follows:-

1. Turn the record/play knob (2) 4/81 clockwise.
2. Remove the screw 6/13 in the knob and remove the knob.

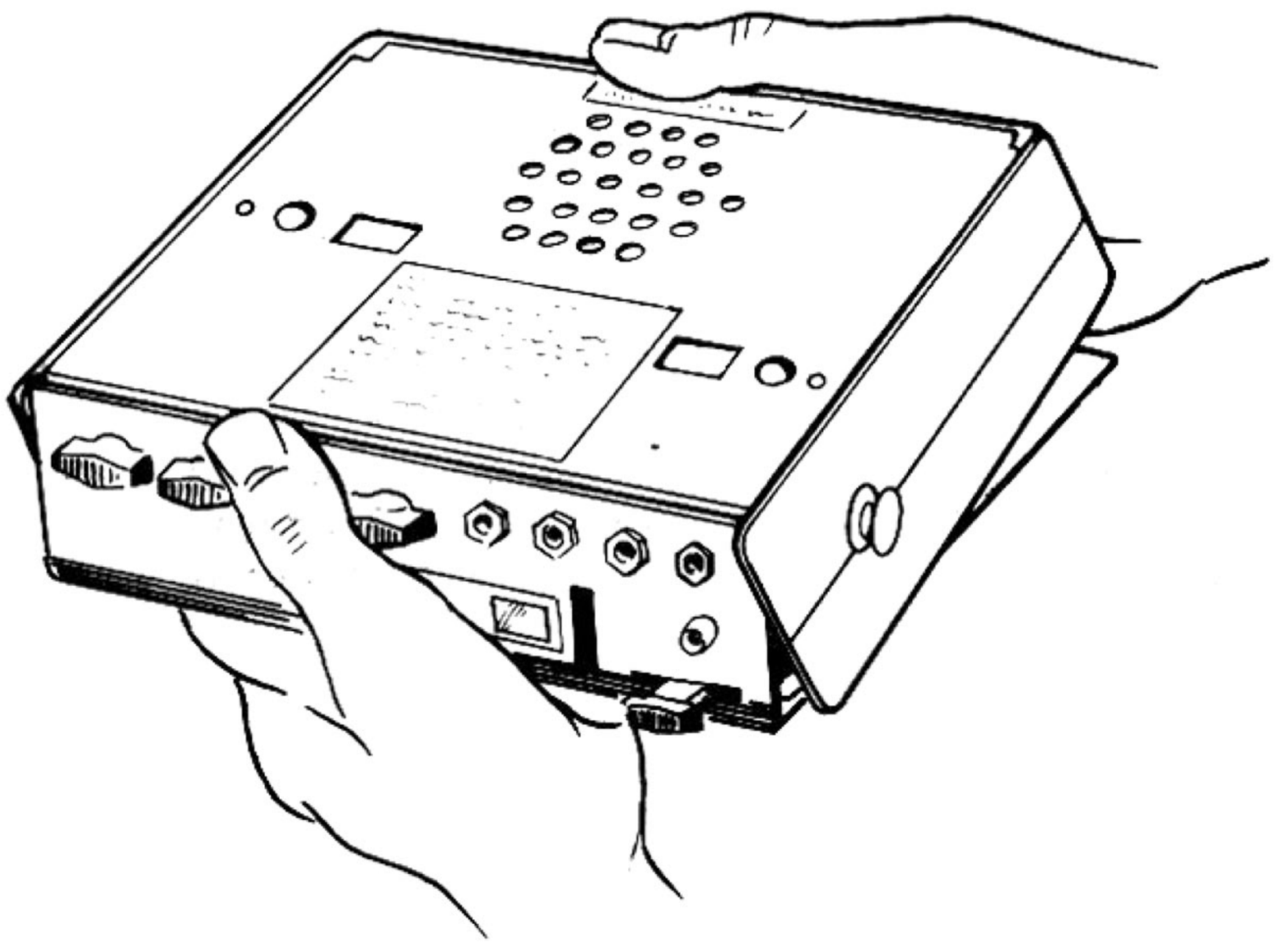


Fig 1.

3. Remove the nut which is now uncovered. Use a piece of card with a ⅛" dia. hole as a mask. This prevents the spanner scratching the panel, see Fig. 2.
4. Remove the two screws 6/11, which are at the top of the plug and switch plate on the back of the machine, see Fig. 3.
5. The printed circuit may now be opened, book fashion, taking care not to break connections or damage the circuit board by opening it too far.

The machine may now be placed in a service rack.

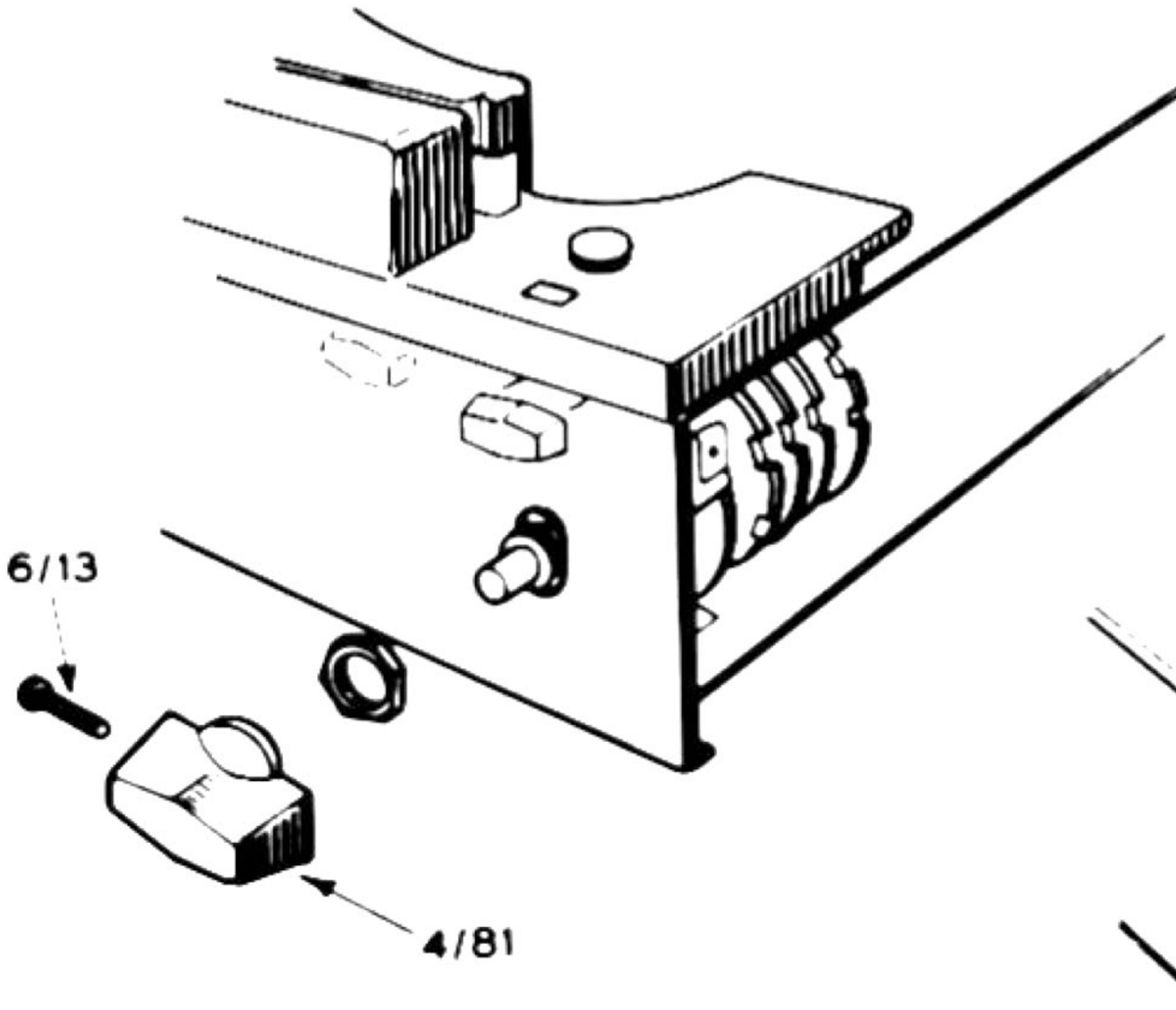


Fig 2.

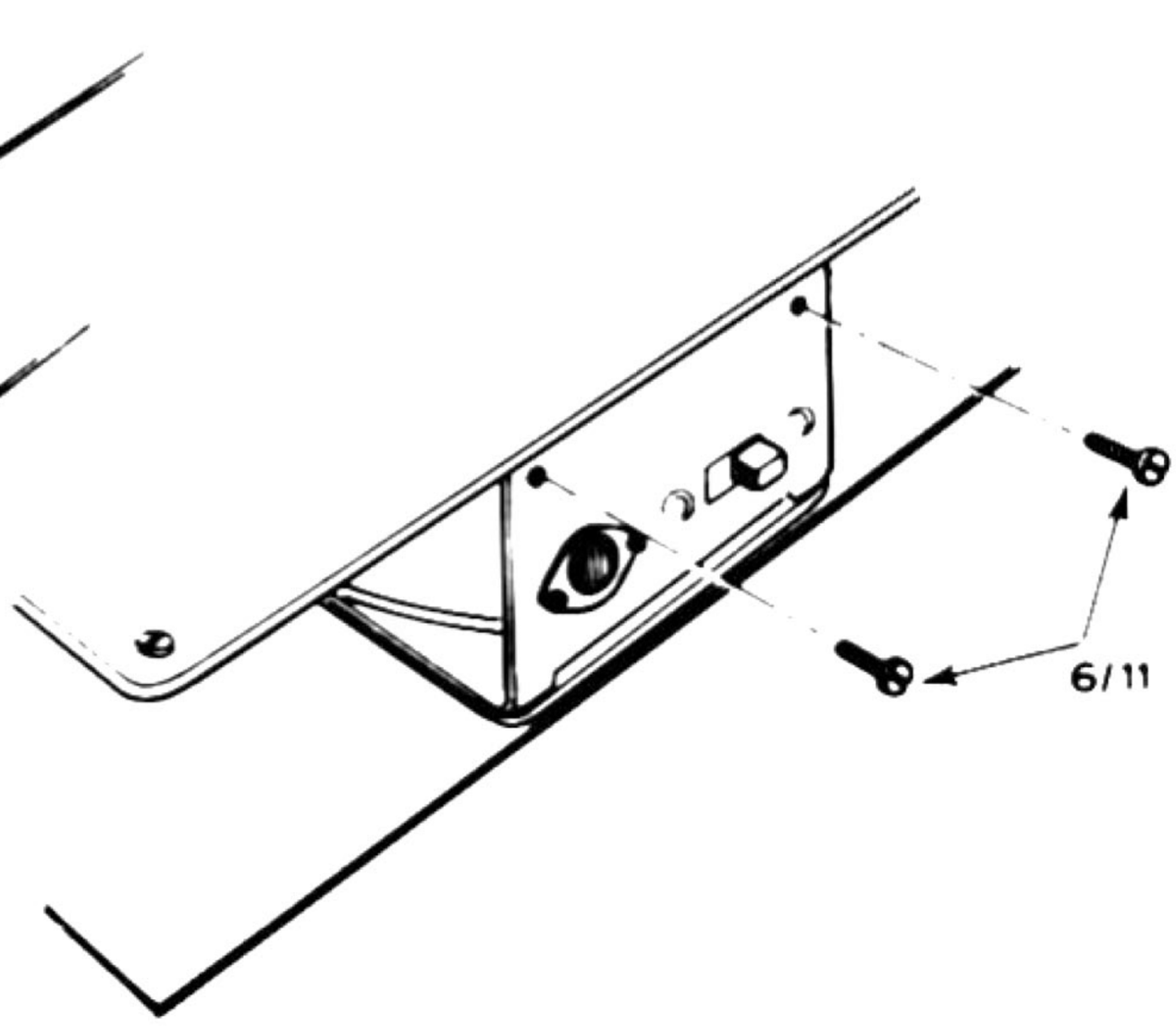


Fig 3.

THE MOTOR ASSEMBLY

View the machine so that the circuit components and the underside of the main deck are seen at one and the same time. The motor assembly is on the left.

To check the motor

1. Temporarily remove the belt and let it rest in the speed change fork.
2. Put the speed control button (10) to 3¾ ins/sec.
3. Supply the motor from 6 mercury batteries, (remove one battery from a cassette and join its springs with a piece of wire.)
4. Using as on record/playback lead, connect a 0-1 ammeter in the remote socket. The motor should run and take a current less than 50mA.
5. Remove the piece of wire from the cassette and replace the seventh battery. Reconnect this supply to the motor.
6. Slide speed control button (10) to 7½ ins/sec.
7. Load the motor with finger resting gently on the pulley, so that it takes 150mA. The speed should not vary more than 2% with a load change of from 80-150mA. When the motor is being governed, the ammeter shows random kicks, of 4 or 5 mA magnitude, about a mean reading. This is a convenient check that the motor is functioning properly. The speed should be between 2247 and 2293 r.p.m.

To change the motor assembly.

1. Remove the Head cover assy. (23) 5/156 & screws 5/46.
2. Remove the deck cover assy. by taking out the binder head screws 5/48 in the back corners on the top side of the machine.

3. Turn the machine over and remove the camera spring 4/41.
4. Remove the speed control button 4/82 & grub screw 6/17.
5. Remove the circlip 4/100 and spring plate 4/27 which holds the motor mounting plate assy. 5/134.
6. Unsolder the three leads at the terminals.
7. Remove the assembly.
8. Take off the motor pulley assy. (A), the fork plate sub-assy (B) and the circlip 4/99
9. & shim washer 4/63. Retain these and the shim washer for assembling with replacement motor (see Fig. 4).

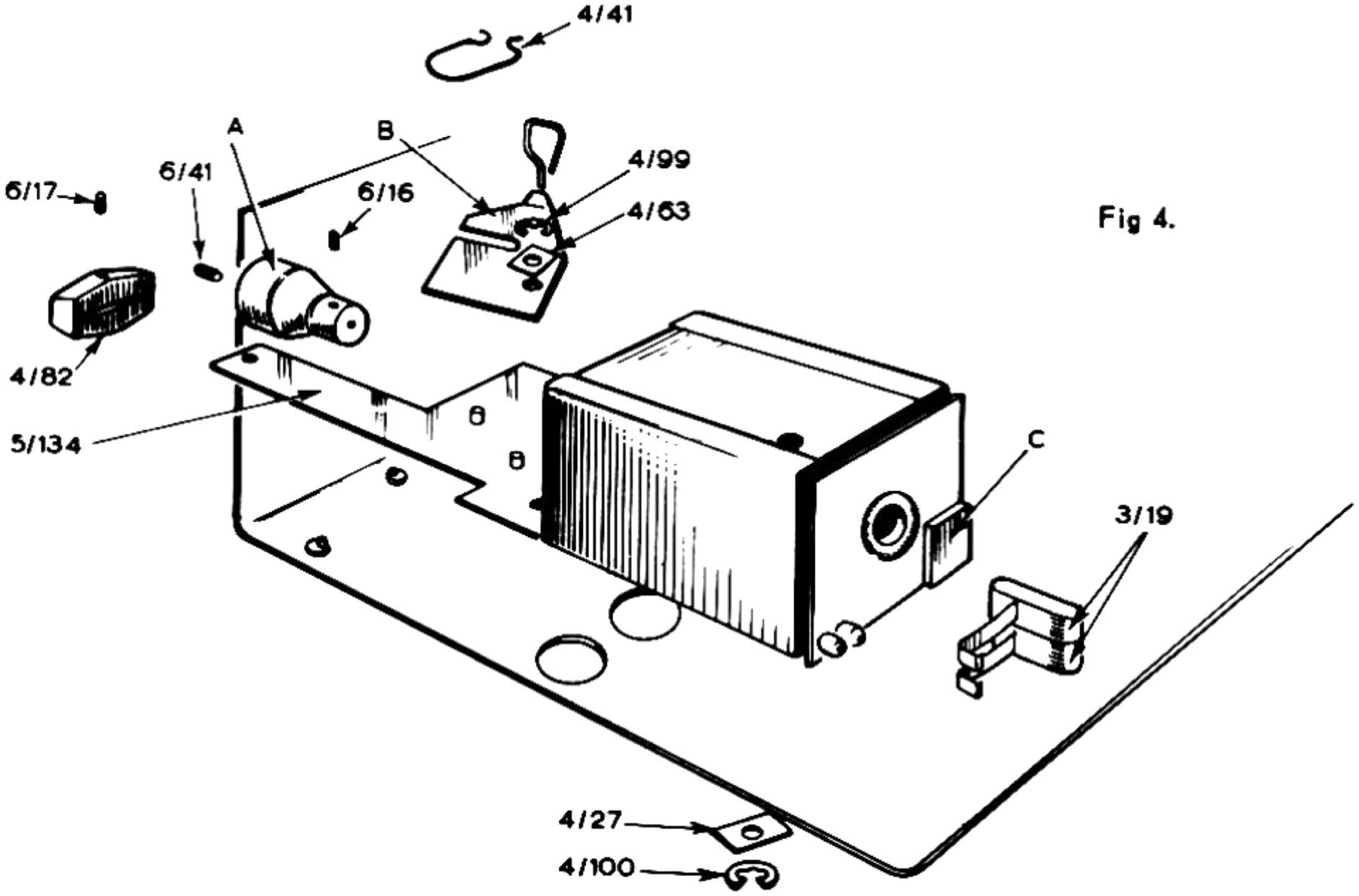


Fig 4.

To replace the motor assembly.

Reverse the dismantling procedure given above, but note the following: The pulley has a grub screw 6/41 in its centre hole, the screwdriver access being from the large diameter end of the pulley. Set this grub screw so that it touches the end of the motor shaft and prevents the pulley from touching the screen box, a gap of about (0.255mm) 0.10" is recommended. Retighten the other grub screw 6/16 which fastens the pulley to the motor shaft.

The red & green wires should be soldered together onto the outside terminal, and the blue wire onto the inside terminal (see Fig. 7). Take care to lift the micro switch 3/19 blades onto their plate (speed change & switch) (C); failure to do so may break the micro switches or sheer off the plate. Replace the main belt on the motor pulley.

The angle which the motor shaft presents to the belt run has a big effect on the position taken up by the driven belt on the pulley. In either 7½ins/sec, or the 3¾ins/sec, position of the motor assembly. The best position is that shown in Fig. 5.

To achieve this, gain access to the two screws which are indicated in Fig. 6 by first removing the spool carrier assy 5/138. Undo the grub screw 6/18 in the fast back drum assy. 5/130 and withdraw the spool carrier assy and its spindle from the top side. (see Fig. 8).

Slacken both these screws and move them very slightly to the left or right. It will be seen that the natural run of the belt on the motor pulley's large diameter depends on the position of these screws. Tighten the screws at a suitable position and finally set the belt position on the pulley by positioning the small travel limit cam adjacent to the counter reset wheel.

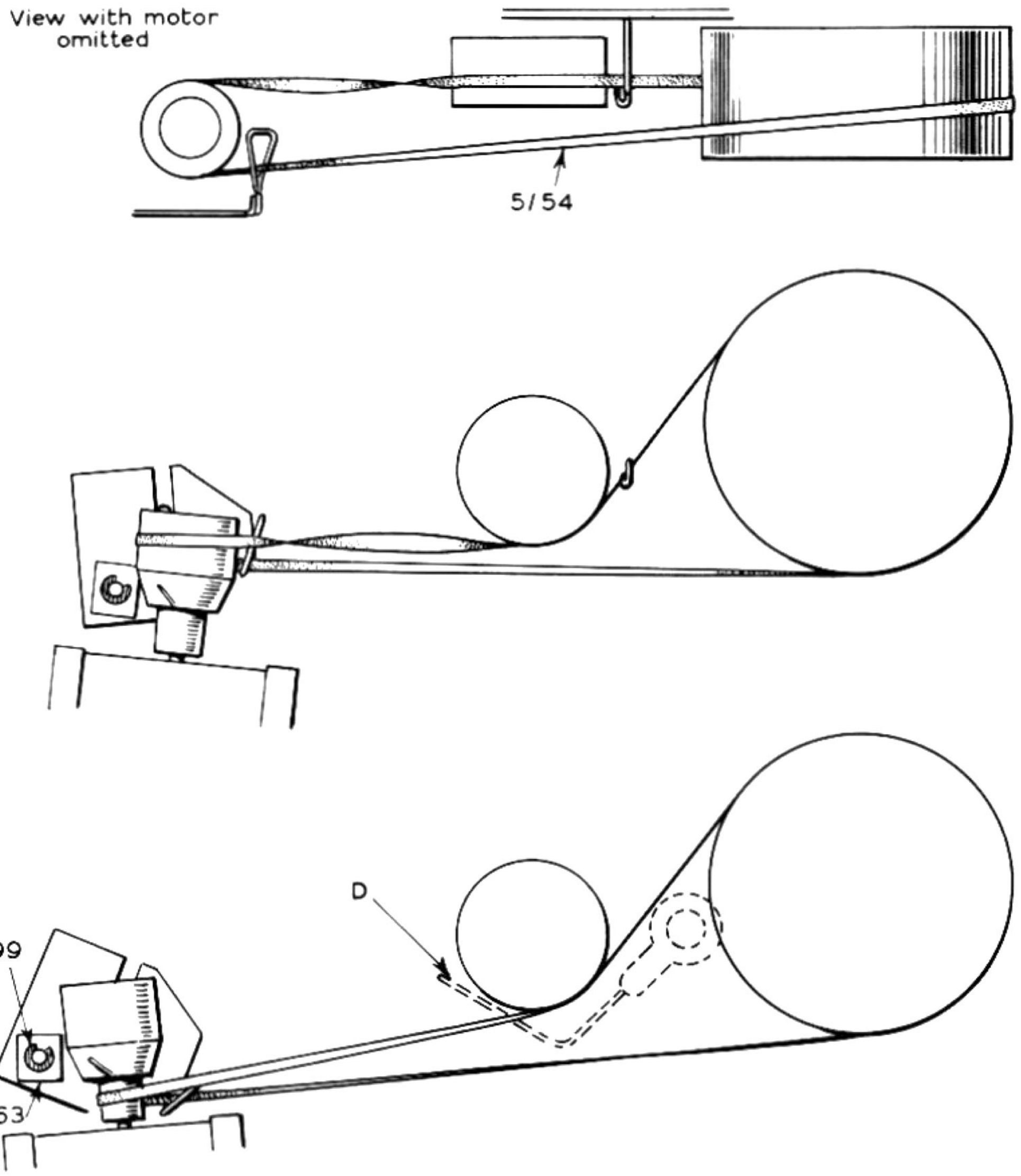


Fig 5.

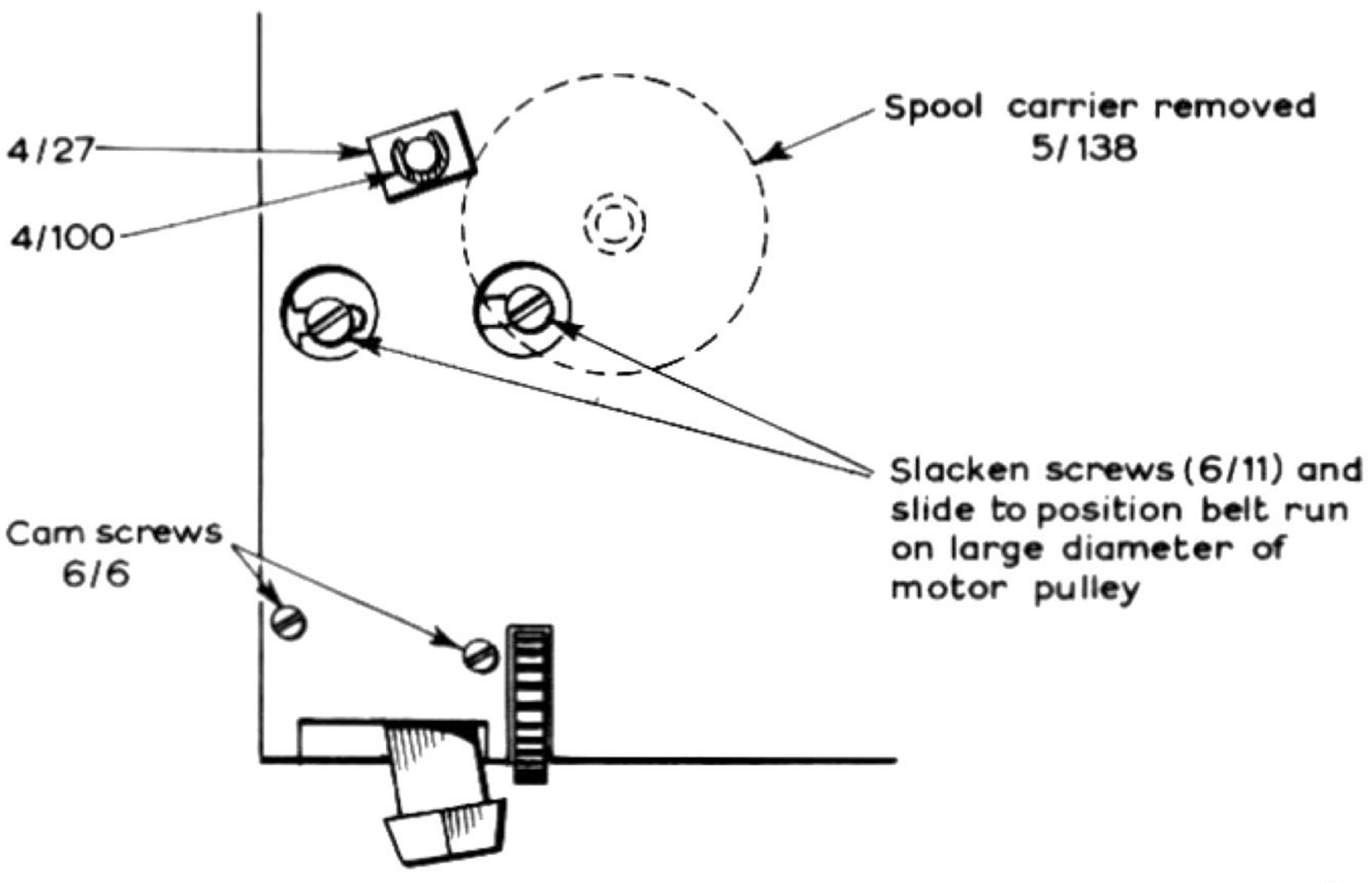


Fig 6.

Change the speed to 3¾ins/sec. and observe that the belt runs as in Fig. 5. Use the setting of the travel limit cam to obtain the desired results. At this speed the belt will rub against the speed change fork leg; this is in order.

Finally check that moving the speed control button from side to side, actuates the two micro switches at the rear of the motor.

When replacing the spool carrier, avoid trapping the brake pad under it.

The micro switch nearer the metal plate is arranged to add 12 ohms in series with the motor supply when in the 3¾ins/sec position. The resistor should be shorted out in the 7½ins/sec position. The micro switch remote from the plate is associated with the amplifier circuit (see Amplifier Section).

If the motor fails to run when a supply is connected to the machine, check for voltage at each connection in the circuit (see Fig. 7) starting at the supply. The diagram is laid out as nearly as possible in the same relation as the components on the equipment.

The main driving belt 5/54 should be clean and grease-free. To clean it use methylated spirits, cleaning off the spirit before it evaporates by holding a cloth to the belt while it is running.

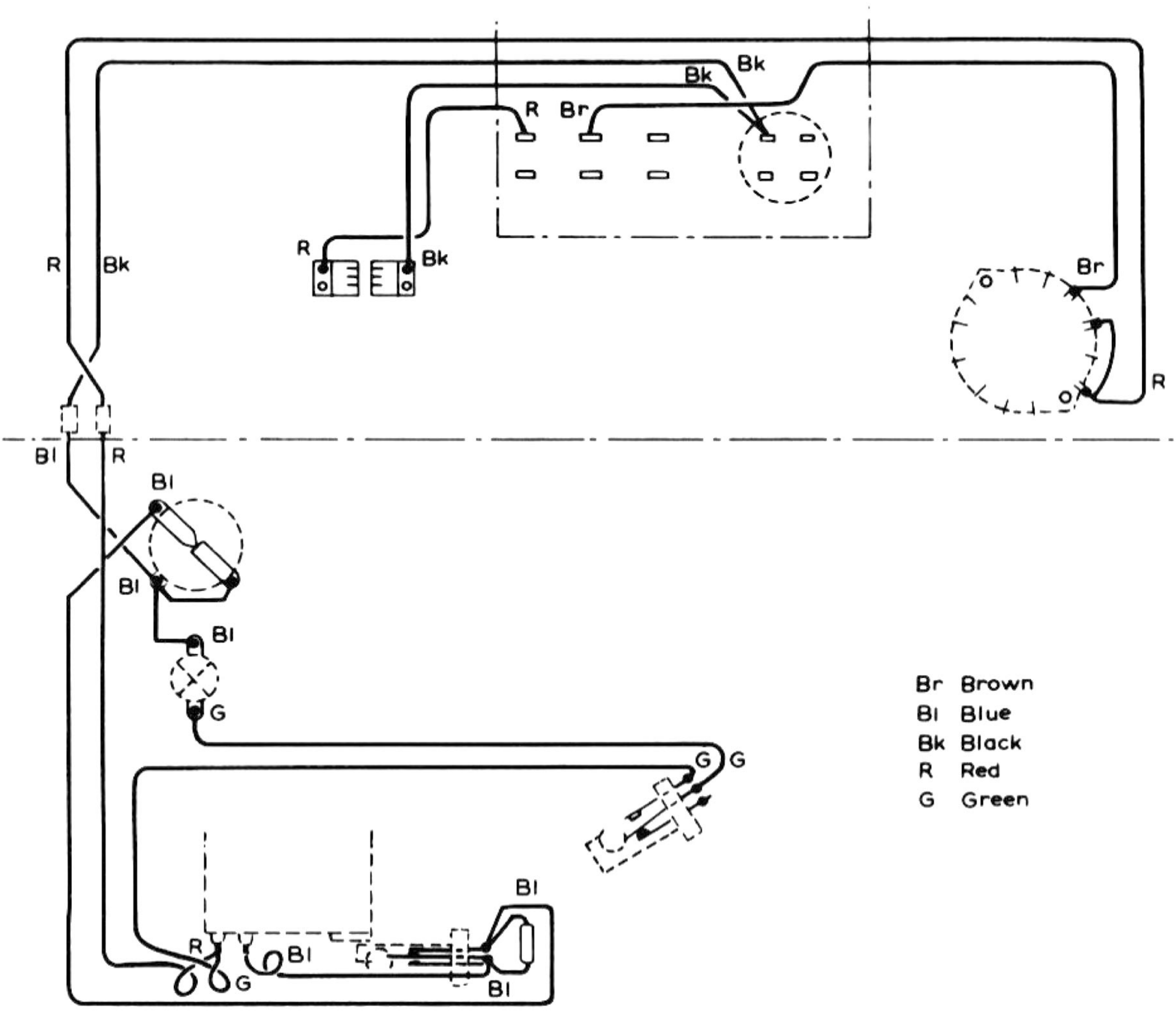


Fig 7. Motor wiring diagram

It will be noted that the belt between the flywheel and the motor pulley will always have a ¼ rev. clockwise or anti-clockwise twist. For either of these conditions the belt between the motor pulley and the jockey pulley will have a ¼ or ¾ rev. twist but always in one direction. After repeated speed changes the belt will find and settle to a fixed condition of twist. There should be no twist between the jockey pulley and the flywheel (see Fig. 5).

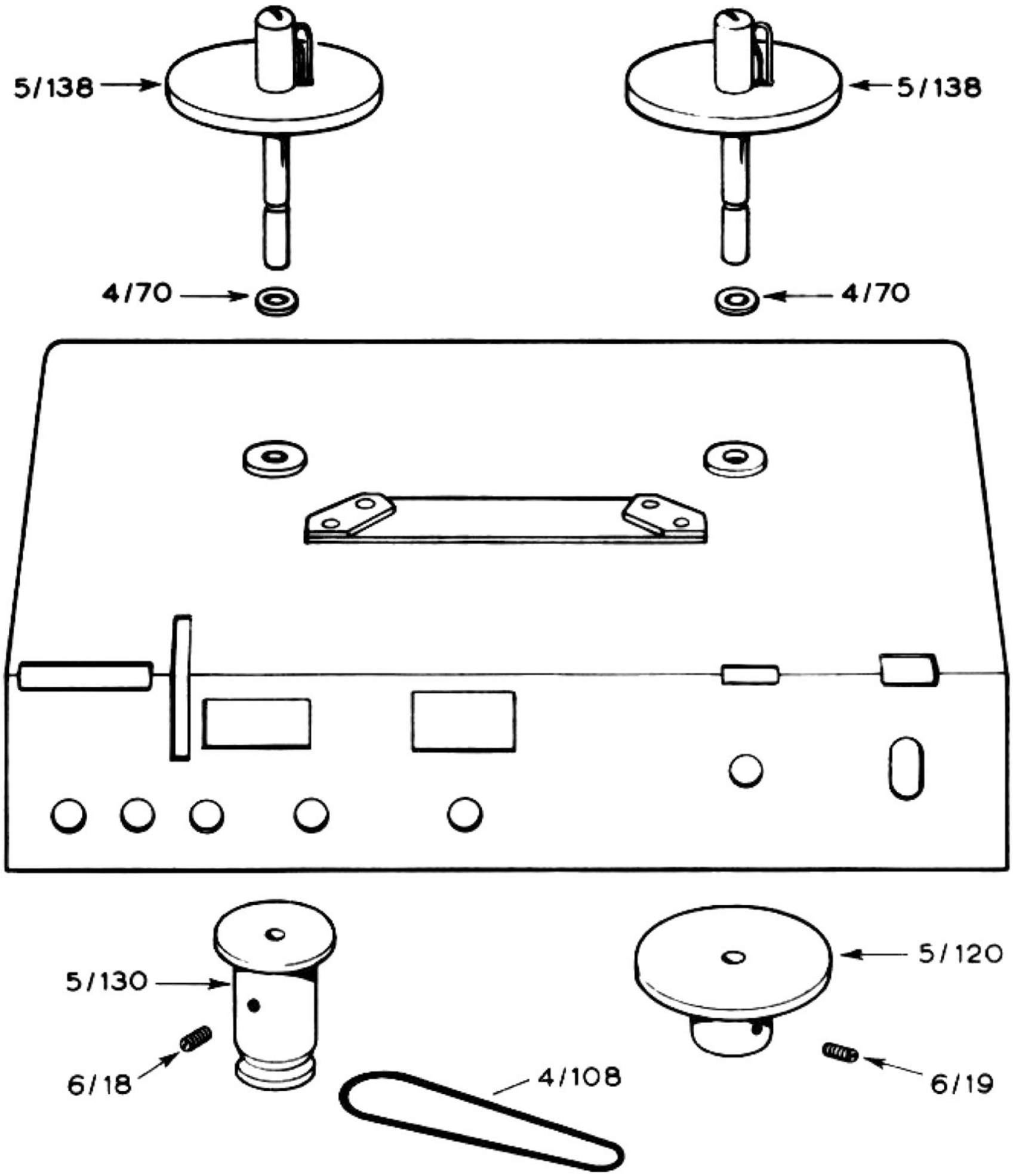


Fig 8.

THE MECHANISM

The Jockey Pulley

The jockey pulley is mounted in a bracket on the same plate as the bottom flywheel bearing (see Fig. 5). It is essential that this pulley runs very freely, and to this end it has cone bearings. There *must not* be any end thrust on the cones; the bearing screw at one end has been adjusted for just a perceptible end float. Any friction here is a waste of battery power and can be seen as an increase in motor current when the tape switch is horizontal and fast forward is not engaged.

Adjacent to the jockey pulley is a reverse guard. The main belt is threaded through this and it should ensure that when the motor is run in reverse, (which could happen if a battery cassette were wrongly loaded) the belt does not come off the jockey pulley.

Near the jockey pulley and mounted under a bottom bearing plate nut is a belt guard (D), the position of which is shown in Fig. 5. It acts as a physical barrier between the main belt and counter belt, and under some circumstances also prevents the main belt from leaving the periphery of the jockey pulley.

The bearing in the bottom bearing plate is a self aligning sealed-in unit. The end thrust of the capstan is taken on the flat end of a steel screw 6/21 which is retained with a lock nut in a tapped hole in the bearing housing. Should any fault develop in the jockey pulley or bearing, change the bottom bearing plate S assy 5/122.

These instructions should be followed when replacing any of the following items.

Bottom Bearing plate S assy 5/122.

Main belt 5/54.

Auxiliary belt 4/107.

Flywheel assembly.

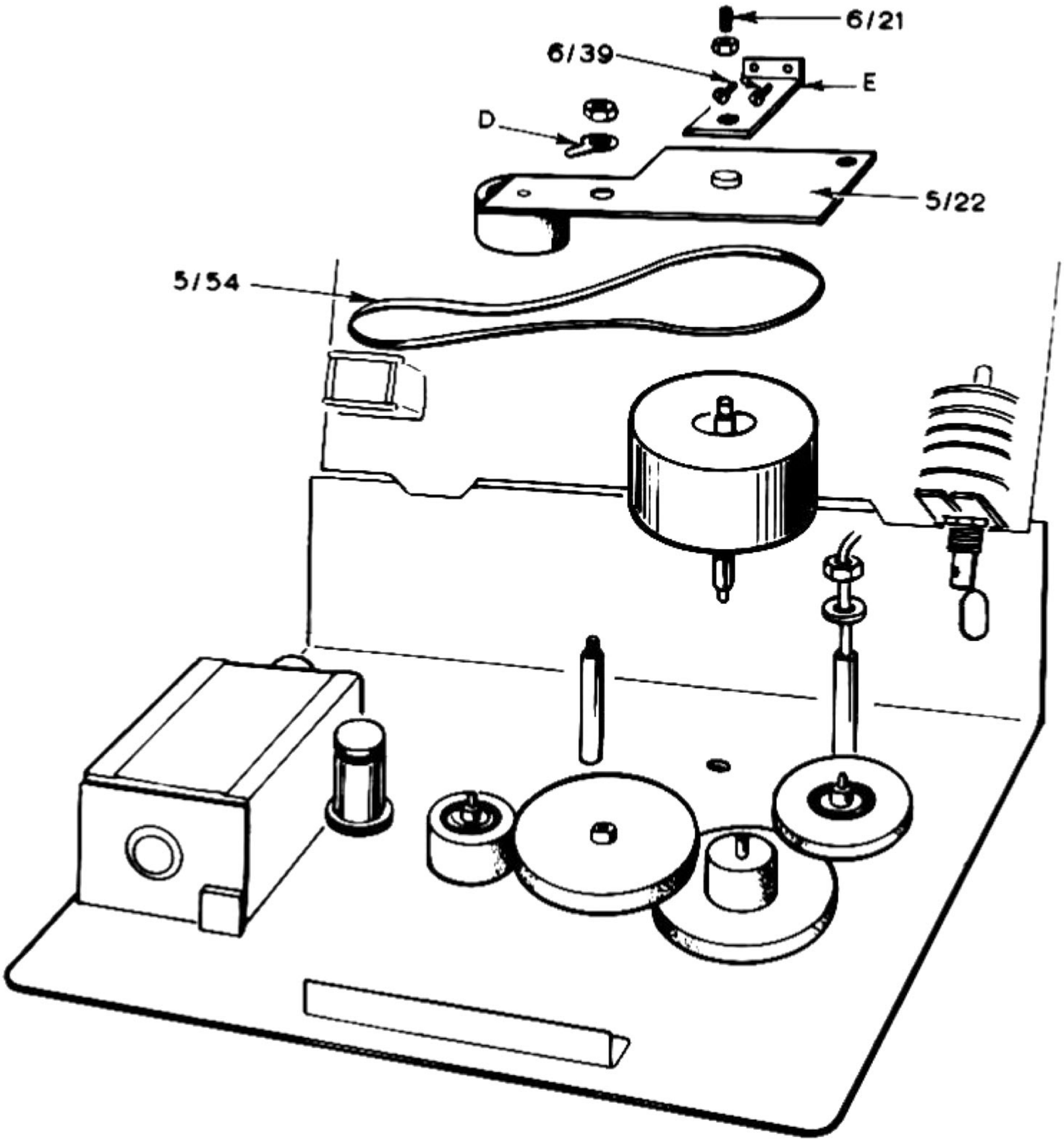


Fig 9.

View the machine as detailed in Fig. 9, then:

1. Remove the left hand nut.
2. Remove the belt guard assy (D).
3. Remove the right hand nut & washer. Slide these up the covered wires.
4. Take out the two screws 6/39 which hold the brace (E) against the back of the front panel.
5. Remove the locknut from the bottom bearing adjustment screw 6/21.
6. Remove the brace (E).
7. Remove the main belt 5/54 from the motor pulley and unthread it from the speed change fork.
8. Raise the bottom bearing plate S assy 5/122, until it is clear of the mounting pillars, and move it to the left to disengage it from the covered wires.
9. Unthread the main belt from the reverse guard.

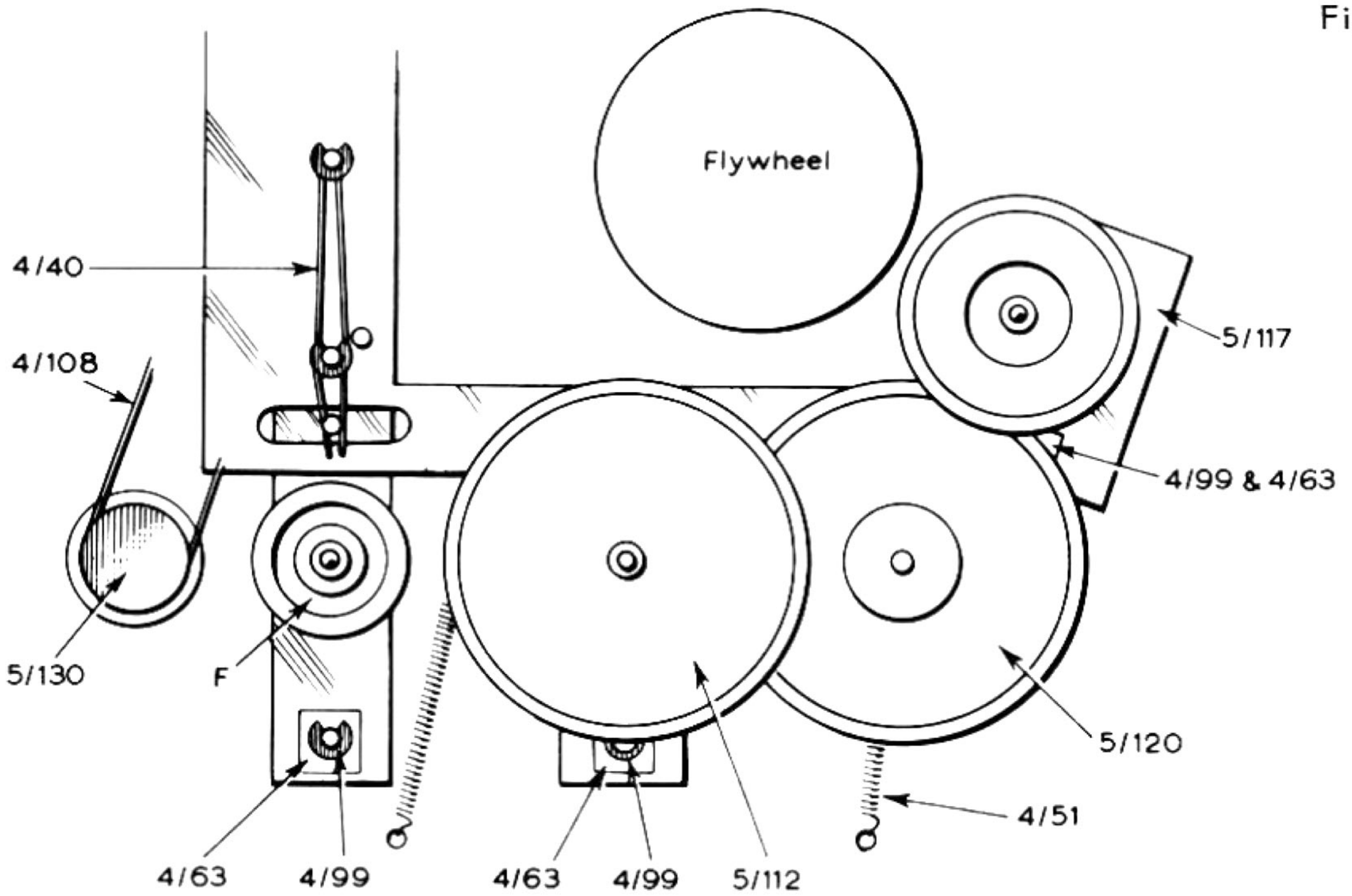
When reassembling carry out the instructions in reverse order. Leave all nuts & screws finger tight, and carry out a final tightening all round by degrees. Lastly, if necessary, readjust the screw 6/21 in the end of the self aligning bearing assembly. This should be set and locked with its nut, so that the capstan has 0.005" (0.125mm) to 0.010" (0.25mm) free end play. It is essential that the face of the screw referred to is properly lubricated with a correct lubricant, Fi-Cord "lubbo".

The flywheel drives an auxiliary pulley assembly (F) with a round section auxiliary belt 4/107. The auxiliary belt has a greater circumference and a smaller cross section, than the counter belt 4/108. Ensure that the belt is always in the groove in the flywheel.

The auxiliary pulley S plate (F) assembly (Fig. 10) is retained on the main deck with a circlip 4/99, and lightly held down with a shim washer 4/63. The assembly should be completely free to move under the action of the hairpin spring 4/40 which is attached to the cam plate.

The hairpin spring is part of the cam assembly. The "set" of the legs which operate the auxiliary pulley assembly is important. The bent leg should be clear of the auxiliary plate pin when the tape switch is in the clockwise position.

Fig 10.



The straight leg should exert enough pressure to ensure a smooth uninterrupted drive to the clutch assembly. The above to obtain when the main deck is vertical and the right hand side uppermost. With the tape switch in the anti-clockwise position, the bent leg should give enough thrust to ensure a satisfactory wind back of a full reel. Too much spring pressure in either direction results in wasting battery, and overloading of the motor.

The Clutch Assembly

The clutch & friction assembly 5/112 is retained on the main deck by a circlip 4/99 & held down very lightly by shim washer 4/63 at one end of the plate (see Fig. 10). The other end fits between the camplate & the main deck. It is essential that this blade has a complete freedom of movement in a plane with the deck. It should be able to move by its own weight for any change of attitude of the machine.

To check a clutch assembly already fitted, proceed as follows:

1. Place the machine on the bench deck uppermost.
2. Tape knob clockwise.
3. Speed 7½ inches per sec.
4. Motor Running.
5. No tape fitted.
6. An ammeter plugged into the In/Out socket to indicate motor current.

Note that the motor current increases when the right hand spool carrier is held. This increase should be between 18 and 25 milliamps.

The clutch assembly may be checked before fitting, as follows:- Arrange a weight of 14 gram (½ oz.) – a brass cylinder ½" dia. (12.7mm) ⅜" long (9.6mm) – to operate at a radius of 1.11/16" (4.3mm) from the centre pin (see Fig. 13).

Hold the assembly in the fingers and thumb of the right hand as in Fig. 13. Turn slowly in direction of the arrow A. It should be possible to raise the weight to the 8 o'clock position. It should not be possible to consistently carry the weight beyond the 9 o'clock position. In the event of trouble, fit a service replacement assembly 5/112.

The clutch and friction assembly 5/112 is the intermediary between auxiliary pulley and fed spool disc assembly 5/120 and it comes into action only when the tape switch (3) is in the clockwise position.

The fed spool disc assembly may also be driven direct from the flywheel by the fast forward idler plate sub-assembly 5/117. This again consists of a flat plate carrying a spindle and a two-diameter pulley. The plate is retained by a circlip 4/99 and held down lightly by a shim washer 4/63.

The plate should be completely free to move in the plane of the deck when it is not restrained by its spring 4/51 (see Fig. 10). The fast forward wind 4/51 spring, should pull the plate into a position which engages both flywheel and fed spool disc assembly, when the fast forward button is pressed. Fit a service replacement assembly when required.

Spool Carrier Assemblies

The spool carrier assemblies 5/138 carry the tape reels which are retained by spool carrier springs. The take up spool carrier assembly (right hand side) 5/138 should be very free in its bearing and should have adequate end play. This is ensured by having a groove in the shaft into which the fed spool disc grub screw 6/19 should be firmly seated. There should be a fibre washer small 4/70 between the underside of the carrier and the flange of the bearing.

The other spool carrier assembly is driven from the auxiliary pulley directly, when the tape knob is anti-clockwise. In this case the grub screw 6/18 of the fast back drum assembly below 5/130 the deck, is *not* intended to locate in the ditch in the shaft.

The bottom end of this fast backdrum, has a groove which carries the counter belt 4/108, and this drives a similar pulley on the counter (see Fig. 8).

Counter drive & counter.

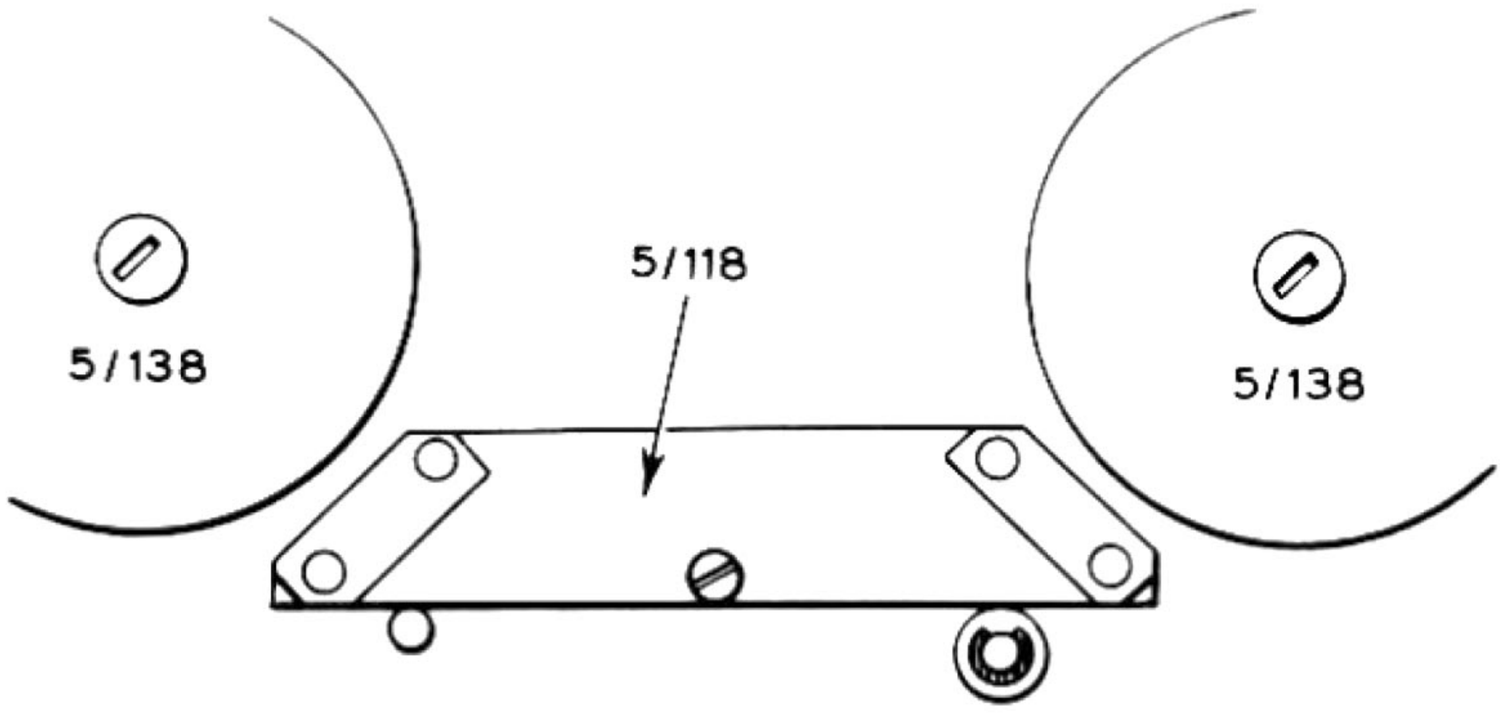
To check the counter drive and counter, back-wind with no tape fitted, and observe the counter belt 4/108. There should be smooth bow, in the slack side and this should not show any tendency to kick. Wind forward with a tape fitted and observe the same action of the belt.

The Brake Assembly.

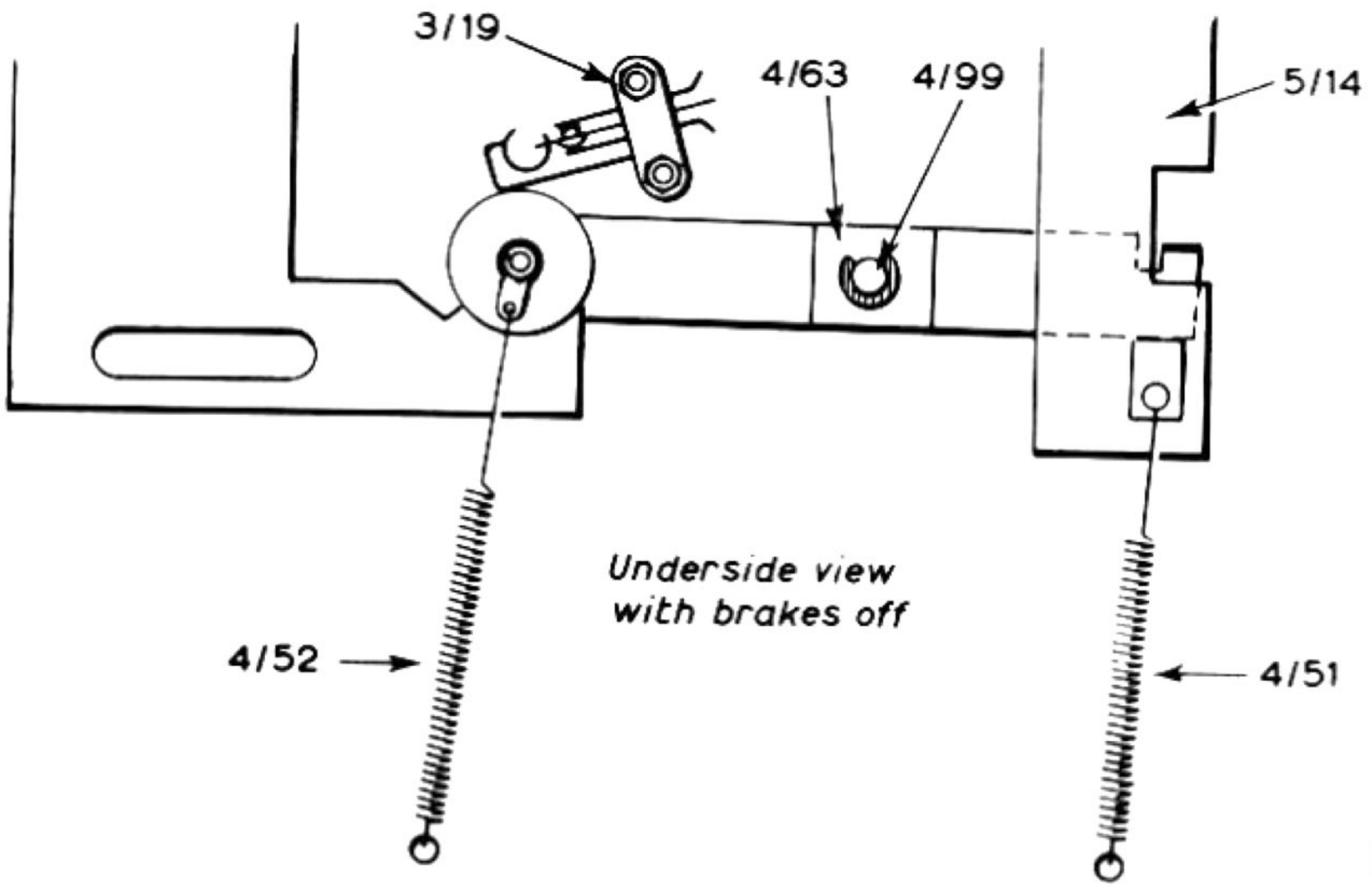
Brakes are applied to the edges of the spool carrier discs (see Fig. 11). To gain access to the brake assembly, remove the headcover and the deck cover. The brake arm assembly 5/118 consists

of an arm having a friction pad rivetted at each end. The centre of the arm is loosely pivoted on a pin which is actuated from beneath the deck. The action of the brakes should be such that, at the time of the pad application (the spools carrying tape) the emptying spool is always subject to brake grab. This ensures a taut non spill tape stop.

The brakes are held in the "On" position by the pull of a brake spring 4/52 attached to the pivot referred to, but on the underside of the chassis. The pin also carries a disc of insulating material, which when moved operates a micro switch 3/19. The micro switch switches off the warning light when any action, such as wind-on, wind-back, or playback, brings about a release of the brakes.



Top view with brakes off



Underside view with brakes off

Fig 11.

Pressure Roller Assembly.

Tape transport is effected by pressing the tape against the capstan by means of the pressure roller assembly (5/129). The mechanical linkage from the tape knob arranges that the pinch between roller and capstan is of three sequential events, the sequence being (a) brakes off, (b) pressure pad arm assembly on (5/126) take up to right hand spool effective, (c) pressure roller on. The pressure in a line capstan centre roller centre should be about 8 oz. (225 grams) to 10½ oz. (300 grams).

Adequate performance of the pressure roller assembly in action is best checked by stopping the left reel and noting the increase in motor current brought about by the friction between tape and capstan. A current increase of 40mA, when in 7½ins/sec position, should prove adequate but this will vary with different tapes and when the capstan surface has any form of lubricant. Whenever the heads are cleaned, degrease the capstan at the same time.

The pressure pad arm assembly may also be effectively checked by pulling it out of action and noting the current change (7½ins/sec position). A change of about 5mA is adequate. This may be difficult to determine because of small fluctuations in the motor current. The pressure at the felt pad should be 1 oz. to 1¼ oz. (27 to 35 grams).

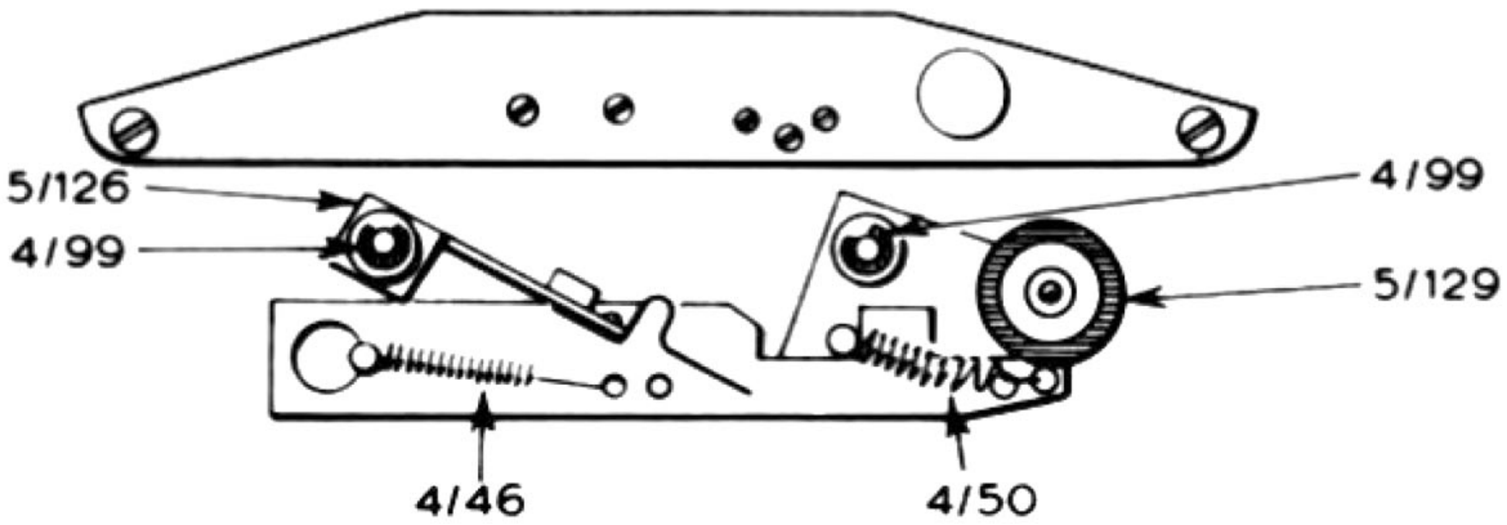


Fig 12.

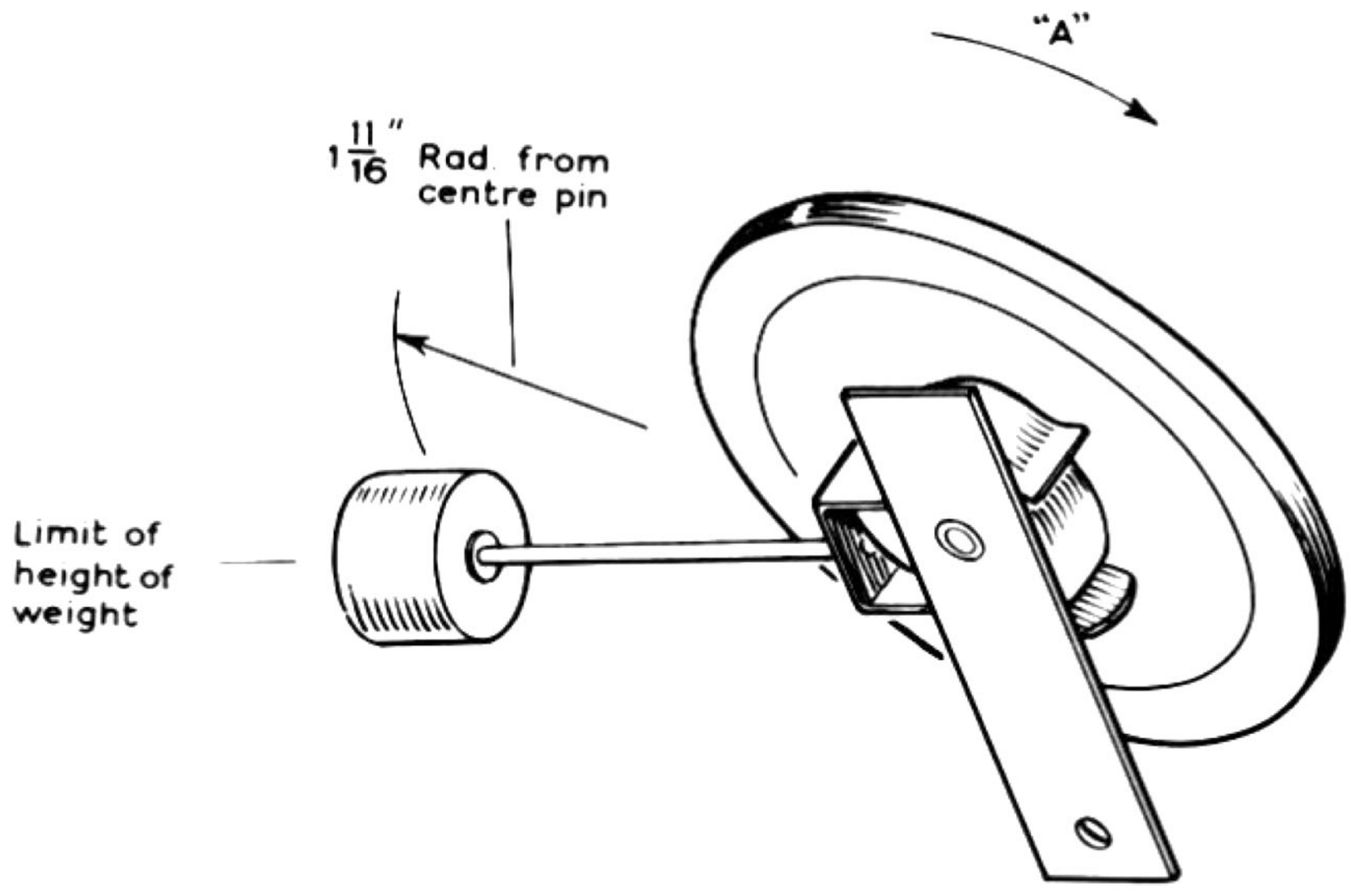


Fig 13.

SPARES LIST

When ordering spare parts, it is a great advantage to quote the serial No. of the machine in addition to the catalogue number of the part(s) required.

Description	*Cat No.*	*Quantity*	*Fix With*
Battery Case Assembly	5/155	1	
Lid Assembly	5/154	1	
Motor Mounting Plate Assembly	5/134	1	
Spool Carrier Assembly	5/138	1	
Fast Back Drum Assembly	5/130	1	6/18
Fed Spool Disc Assembly	5/120	1	6/19
Clutch and Friction Assembly	5/112	1	
Brake Arm Assembly	5/118	1	
Pressure Roller to Arm Assembly	5/129	1	
Pressure Pad Arm Assembly	5/126	1	
Fast Forward Idler Plate Assembly	5/117	1	
Bottom Bearing Plate Sub Assembly	5/122	1	6/32 Nuts. 2 off. 6/35 Washer 1 off.
Head Cover Assembly	5/156	1	
Fast Forward Wind Strip	5/14	1	
Binder Head Screws	5/48	2	
Retaining Screws	5/46	2	
Knobs Dotted	5/81	1	6/13
Main Belt	5/54	1	
Knobs Large	4/81	1	6/13
Knobs Small	4/82	1	6/17
Auxiliary Belt	4/107	1	
Counter Belt	4/108	1	
Circlips Small	4/99	4	
Shim Washer	4/63	4	
Circlip Large	4/100	1	
Spring Plate	4/27	1	
Counter	4/53	1	6/7
Oscillator transformer sub.Assembly	5/145	1	6/10
Inductor Sub.Assembly	5/150	1	6/4, 6/28
Head Record/Play	5/139	1	6/1
L.F. Transformer	3/18	1	
Loudspeaker	3/5	1	6/14 & 15 6/31, 6/34
Transistor	3/13	4	
Diode	3/14	1	
Potentiometer with Switch	3/10	1	
Head Erase	3/6	1	6/5, 6/28
Meter	3/3	1	6/3, 6/28
Hairpin Spring	4/40	1	
Camera Spring	4/41	1	
Pressure Pad Spring	4/46	1	
Arm Spring	4/47	1	

Description	*Cat No.*	*Quantity*
Safety Arm Spring	4/48	1
Fast Forward Strip Spring	4/49	1
Pressure Roller Spring	4/50	1
Fast Forward Wind Spring	4/51	1
Brake Spring	4/52	1
Fibre Washers Small	4/70	2
Round Head 10BA $\frac{5}{16}$" Brass Screw	6/3	2
Cheese Head 10BA x $\frac{1}{2}$" " "	6/4	2
Cheese Head 10BA x $\frac{3}{4}$" " "	6/5	2
Cheese Head 8BA x $\frac{3}{16}$" " "	6/6	2
Countersunk Head 8BA x $\frac{3}{16}$" Brass Screw	6/7	2
Cheese Head 8BA x $\frac{7}{16}$" Brass Screw	6/8	2
Cheese Head 8BA x $\frac{11}{16}$" " "	6/9	2
Cheese Head 6BA x $\frac{3}{16}$" " "	6/10	4
Cheese Head 6BA x $\frac{1}{4}$" " "	6/11	2
Cheese Head 6BA x $\frac{7}{16}$" " "	6/13	2
Cheese Head 4BA x $\frac{5}{16}$" " "	6/14	2
Cheese Head 4BA x $\frac{3}{8}$" " "	6/15	2
Grub Screw 8BA x $\frac{3}{32}$" Cone Point Steel	6/16	2
Grub Screw 8BA x $\frac{3}{16}$" Cone Point or Flat Point Brass	6/17	3
Grub Screw 6BA x $\frac{3}{16}$" Cone Point Steel	6/18	1
Grub Screw 6BA x $\frac{1}{4}$" Cone Point Steel	6/19	1
Socket Head Grub Screw 4BA x $\frac{3}{8}$" Flat Point Steel	6/21	1
Countersunk Head Screw 6BA x $\frac{1}{4}$" Brass	6/37	2
Cheese Head Screw 6BA x $\frac{1}{8}$" Brass	6/39	2
Grub Screw 6BA x $\frac{3}{16}$" Flat or Oval Point Steel	6/41	1
Nuts Full Hex. 10BA Brass	6/28	2
Nuts Full Hex. 8BA Brass	6/29	4
Nuts Full Hex. 6BA "	6/30	2
Nuts Full Hex. 4BA "	6/31	4
Nuts Lock OBA "	6/32	2
Washer 4BA Small "	6/34	2
Washer OBA "	6/35	1