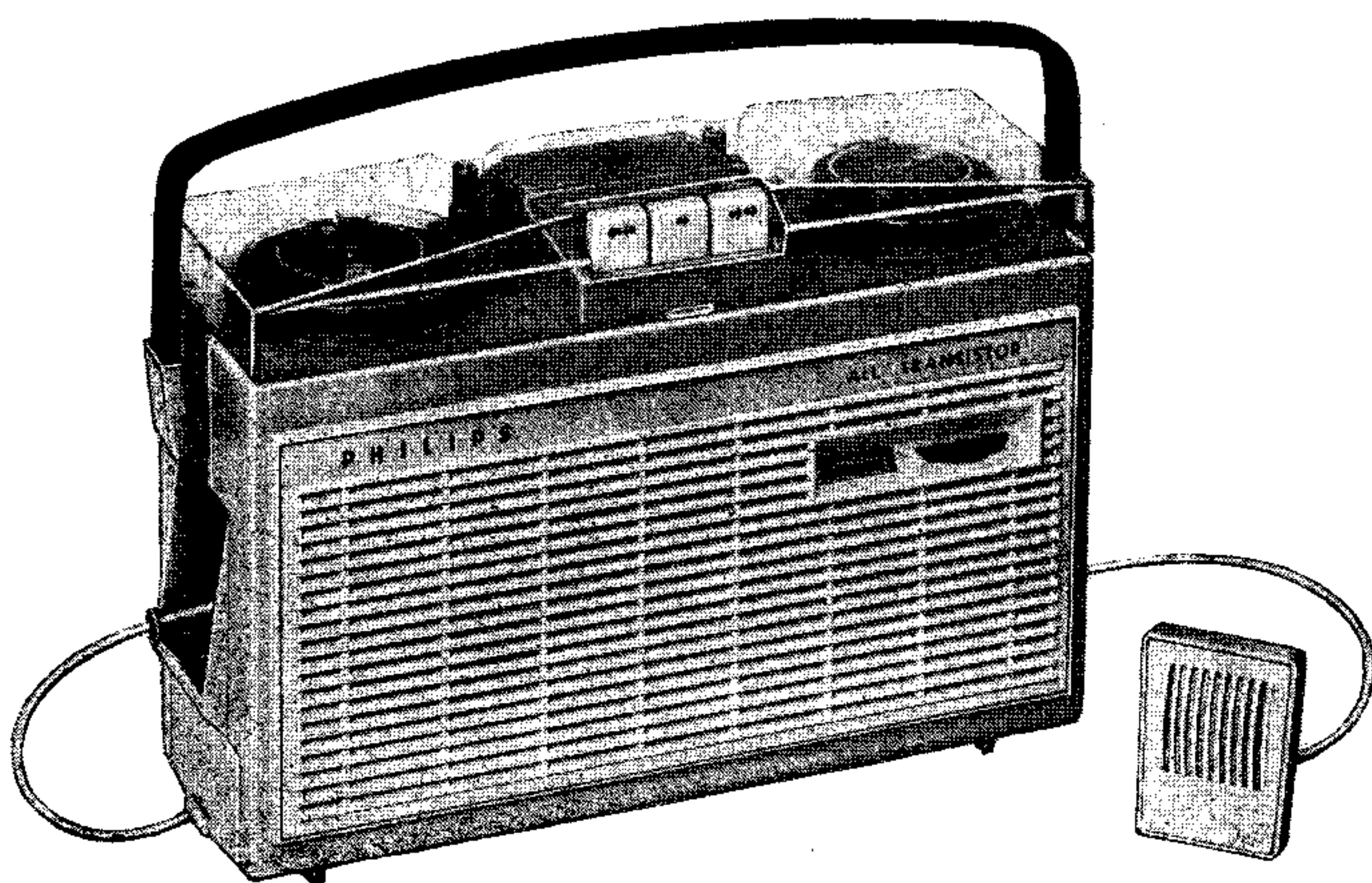


SERVICE INFORMATION

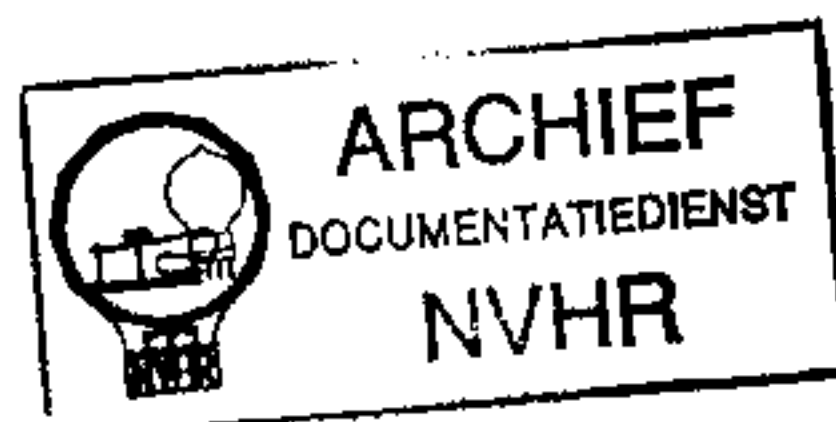
# PHILIPS

## TAPE RECORDER

### TYPE EL3585



Ned. Ver. v. Historie v/d Radio



CENTRAL SERVICE DEPARTMENT  
WADDON FACTORY ESTATE  
CROYDON · SURREY

Telephone . . . CROYDON 7722  
'Grams . . PHILISERVE CROYDON  
CIRCULATION RESTRICTED TO THE  
RADIO TRADE

JULY, 1961

PRICE 3s. 6d.

## A.—GENERAL DESCRIPTION

The EL.3585 is a twin-track, battery-operated tape recorder with a constant tape speed of  $1\frac{7}{8}$ " /sec. Record, play, forward wind and re-wind functions are selected by push-buttons which can be operated with the lid in position when using 3" reels. Reels of 4" diameter can be used with the lid removed.

The transistor amplifier is mounted on a printed circuit board and a dual purpose moving-coil meter is provided which indicates depth of modulation on record and battery voltage on playback.

## B.—SPECIFICATION

<b>Tape Speed</b>	1 $\frac{7}{8}$ " /sec.		
<b>Reel Diameters</b>	3" with lid in position. 4" with lid removed.		
<b>Playing Time (approximate)</b>	3" reel	4" reel	
Long Play Tape	2 × 22 mins.	2 × 45 mins.	
Double Play Tape	2 × 30 mins.	2 × 60 mins.	
<b>Forward Wind</b>	115 secs. (3" reel of DP tape).		
<b>Re-wind</b>	90 secs. (3" reel of DP tape).		
<b>Frequency Range</b>	120 c/s to 5,500 c/s ± 3db.		
<b>Transistors</b>	4 × OC 75* 2 × OC 72 1 × OA 91 (Diode)		
	* (Alternative type transistors may be fitted in which case replacements should be of the same type.)		
<b>Output</b>	Approximately 250 mW.		
<b>Loudspeaker</b>	Type AD.2400Z, 4" Diameter 3Ω Impedance.		
<b>Batteries</b>	9 volts (6 × 1.5v. Type U2 or similar).		
<b>Consumption</b>	Record 100–130 mA } with volume control Play-back 70–100 mA } at minimum. (Total playing time approximately 20 hours.)		
<b>Dimensions</b>	<i>Height</i>	<i>Width</i>	<i>Depth</i>
(excluding handle)	7 $\frac{3}{4}$ "	11 $\frac{1}{8}$ "	3 $\frac{7}{8}$ "
<b>Weight</b>	8 lbs. (including batteries).		
<b>Input and Output Socket (five-pin)</b>			
Microphone Input (Pins 1 and 4 in parallel)	.3mV across 2KΩ.		
Radio or Gram Input (Pins 1 and 4 in parallel) <i>via</i> EL3768/01 connecting lead	350mV across 2.2MΩ.		
Line Output (Pins 3 and 5 in parallel)	1V across 1KΩ approx. Pin 2 :—Common Earth.		

## C.—OPERATION

### 1. Record

Depress the "record" button (red spot) and (keeping it depressed) operate the "play" button (>). Adjust the modulation level with the volume control so that the meter pointer almost moves into the red segment during the loudest passages. When it is desired to stop recording, ease the "play" button slightly forward. This will release both buttons.

A twin screened lead (EL3768/01), incorporating a series resistor (record connection only) inside the plug, is supplied with the recorder. In order not to overload the input to the recorder, it is essential when recording from an input source other than the microphone, that the special lead and plug be used. The connections to the screened lead are :—Red—Recording input, White—Play-back, Black—Common earth (screening). (See page 9.)

### 2. Play-back

Depress the "play" button (>) and adjust the volume as required. During play-back, the condition of the batteries can be read from the meter. The pointer should deflect to the green segment. If it only reaches the red segment the batteries are unserviceable for recording. The screened connection lead

## CONTENTS

A. — GENERAL DESCRIPTION
B. — SPECIFICATION
C. — OPERATION
D. — REMOVING THE CABINET
E. — ELECTRICAL DESCRIPTION
F. — ELECTRICAL CHECKS AND ADJUSTMENTS
G. — MECHANICAL DESCRIPTION
H. — MECHANICAL CHECKS AND ADJUSTMENTS
I. — HEAD MAINTENANCE
J. — LUBRICATION
K. — SPARES LIST

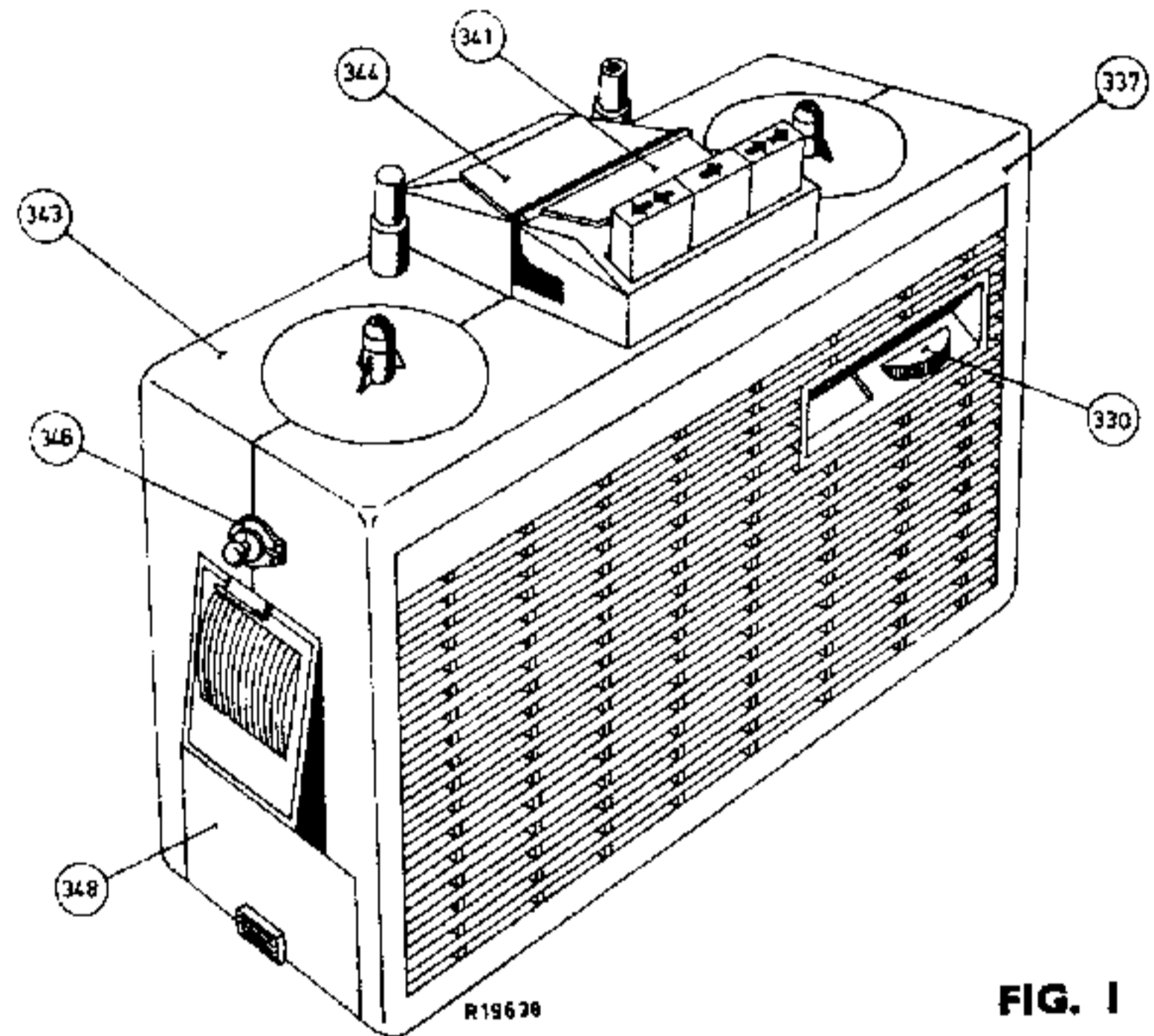


FIG. 1

supplied can be used to play back the signal through an external amplifier or radio. To stop play-back, ease the "play" button slightly forward.

### 3. Forward Wind and Re-wind

Depress the button marked << or >> according to which direction is required. The buttons are unlocked by easing forward slightly.

## D.—REMOVING THE CABINET

Having first removed the microphone, battery compartment cover and batteries, the two cabinet halves can be separated as follows :—Remove the base screws and side circlips and one screw from each clamp bracket at the top. The two mouldings can then be parted leaving the clamp brackets attached by the remaining two screws to one side of the cabinet.

## E.—ELECTRICAL DESCRIPTION

### 1. Play-back

The signal voltage from the record/play-back head K1 is applied *via* C1 to the base of T1. T1 bias is supplied by the network R1, R2 and R3. R3, which is by-passed by C3 to prevent negative feed-back, provides bias stabilisation for T1. The amplified signal, developed across T1 collector resistor R4,

is then applied *via* C4, the volume control R5, and C5 to the base of T2. R7, R8 and R9 provide bias and stabilisation. R9 is de-coupled by C6.

The signal across the collector resistor R10 is fed *via* C8 to the base of T3. C7 and R11 provide a degree of bass boost by attenuating the middle and high frequencies. Bias and stabilisation for T3 is provided by R12, R13 and R14. R14 is not fully by-passed due to the inclusion of R30 in series with C10. The negative feed-back obtained is less at the higher frequencies because of additional by-passing by C9 and R32.

The amplifier and frequency corrected signal from T3 is coupled *via* C12 to the base of T4. R17, R25, R18 and R19 provide bias and stabilisation. R19 is partially by-passed by C13 (low capacity) providing a degree of bass cut. At the collector of T4, the signal is developed across the primary winding (S1) of the driver transformer. A line output is taken *via* C18 to pin 3 of the input/output socket, for play-back by an external amplifier.

The secondary windings (S2, S3) of the driver transformer couple the signal in phase opposition to the bases of the push-pull output transistors T5 and T6. The collector current of the output stage is adjusted by varying the setting of R23 (see Section F4). R24, the common emitter resistor, provides bias stabilisation and controls the cross-over distortion point. Series connection of R26 and C22 across the primary of the output transformer ensures that the load does not vary appreciably with frequency. Negative feed-back from the secondary of the output transformer is applied to the base of T4 *via* R25.

Switch 6 is closed in the play-back position and the meter serves to indicate battery condition. The meter deflection is adjusted by the potentiometer R29 (see Section F3b).

## 2. Record

The input signal is applied *via* C1 to the base of T1. R31/C25 ensures correct matching to the microphone, and also forms a voltage divider with the resistor incorporated in the screened lead (EL.3768/01), in order to prevent the first transistor from becoming overloaded.

Bias and stabilisation for T1, T2 and T3 is the same as for play-back. However, the frequency correction networks R11/C7 and R30/C10 are not in circuit, thus giving a treble boost at 6,000 c/s. T4 operates as an emitter-follower, the signal being taken *via* C13, the correction filter R20/C15, and S10/C16 to the recording head K1.

The oscillator circuit is formed by T5 and T6 in push-pull with the transformer S4-S7 connected so as to apply positive feed-back to the bases. S8, which has the same D.C. resistance as R24 (used in the same position on play-back) ensures that a better sinusoidal A.C. voltage is obtained. The erasing head K2, and C21 in parallel, are connected between the collectors and tune the circuit to the correct frequency of approximately 33 Kc/s. Bias voltage is applied *via* C19 to the recording head K1. The tuned circuit S10/C16 forms a voltage divider with C19 and C24. As the impedance of this circuit varies with the tuning, it is possible to adjust the bias voltage applied to the recording head by varying the setting of S10.

The signal at T4 emitter is rectified by the diode X1 and applied to the meter which is used as a modulation indicator in the recording position. The diode is by-passed by C23 at high frequency so that the meter will not react to the bias voltage. The meter deflection is adjusted by the potentiometer R27 (see Section F3a).

## 3. Motor Circuit

On record and play-back the motor is supplied *via* the anti-interference filter R35, R36, C34 and C33. The speed of the motor is automatically regulated by a governor on the motor spindle.

During forward wind and re-wind, Sw.7 is closed thus by-passing the filter and governor and enabling the motor to run at greater speed. At the same time, Sw.8 opens and disconnects the battery supply to the amplifier circuit and provides muting.

## F.—ELECTRICAL CHECKS AND ADJUSTMENTS

### 1. Measurement of Overall Sensitivity and Frequency Characteristic

- Disconnect the loudspeaker and replace with a  $3\Omega$  load resistor.
- Connect a  $1K\Omega$  resistor across the microphone input (pins 1 and 2 of the input/output socket).
- Connect a signal generator *via* a  $470K\Omega$  resistor to pin 1 of the input/output socket.
- Adjust the generator output to 12mV.
- With the volume control at maximum, record on double-play tape at the following frequencies :  
166c/s, 1,000 c/s, 2,000 c/s, 4,000 c/s, 5,500 c/s.
- When played back, the output voltage across the  $3\Omega$  resistor should lie between 300 and 600mV at 1000 c/s and the full range should lie within a field of 8 db.

### 2. Adjustment of Bias Current

The bias current should be so adjusted that the requirements of the frequency characteristic, as described above, are met. The bias current is adjusted by means of the core in S10 and can be measured as a voltage across a  $10\Omega$  resistor inserted between the "earth" side of the record/play-back head and chassis. This voltage should lie between 10 and 20mV.

*Note :* An increase in bias current gives a reduction in treble response and a reduction in bias current gives an increase in treble response. However, too low a bias current will result in distortion at high modulation levels.

### 3. Adjustment of Meter Deflection

- On record the meter indicates modulation depth and is adjusted with R27 by the following procedure :
  - Disconnect the lead from the "earth" side of the record/play-back head and insert in series a  $10\Omega$  resistor.
  - Connect a  $1K\Omega$  resistor across the microphone input (pins 1 and 2 of the input/output socket).
  - Apply a 1K c/s signal *via* a  $470\Omega$  resistor to pin 1 of the input/output socket.
  - With the volume control at maximum, increase the input signal until 1.5 mV is measured across the  $10\Omega$  resistor.
  - Adjust R27 so that the pointer of the meter lies above the line separating the red and the black regions.
- On play-back, the meter indicates battery voltage and is adjusted with R29.

*Note :* The setting of R27 must be correct before R29 is adjusted.

  - Connect the recorder to a low resistance D.C. supply of 6.7 V.
  - With the "play" button depressed, adjust R29 so that the pointer of the meter lies above the line separating the green and the red regions.

### 4. Adjustment of Collector Current

If either or both output transistors are replaced, the collector current must be adjusted in the following manner :

- Connect a milliammeter between points A and B (see play-back circuit)—centre tap of S4/S5. A link, which can be disconnected for this purpose, is provided on the printed wiring panel, adjacent to S4/S5.
- Depress the "play" button and turn the volume control to minimum.
- Adjust R23 for a meter reading of 3mA.

## G.—MECHANICAL DESCRIPTION

### (a) Play-back

When the "play" button 82 is depressed, the bracket 79 pushes the brake slide 76 to the right, and this releases the brakes *via* the brake brackets 93 and 94. Bracket 94 in turn pushes the friction pad and spring assembly 113 to the right. At the same time, brake slide 76 operates the battery on/off switch Sw.4 thus supplying a voltage to the motor which directly drives the flywheel 17.

The operation of bracket 79 also allows the filter switch Sw.7 to open and at the same time bracket 19 is moved forward and in turn pushes forward the carriage bracket 55 to which is pivoted one end of the pressure arm 131. The pressure brackets and felt pads 137 and 138 and the pressure roller 147 are mounted on the pressure arm 131. The felt pressure pads are held against their respective heads by the tension of the springs 146; the pressure roller is held against the capstan by the tension of spring 150 which couples the "free" end of the pressure roller arm to the carriage bracket 55. Bracket 59 on the carriage bracket 55 locks the record button in the upper position during play-back thus avoiding accidental erasure of tapes. Spring 67 returns the complete carriage assembly to its rest position after the "play" button has been released.

The slipping clutch drive assembly mounted on the bracket 37 is held in tension against the carriage bracket 55 by the spring 53. As the carriage bracket 55 moves forward, bracket 37 follows to the position where the rubber clutch wheel touches and is driven by the flywheel. A friction coupling imparts the drive to the pulley 40b which in turn drives the turntable 194. The coupling between wheel 40a and pulley 40b is controlled by the tension of the spring 40c.

**(b) Record**

For recording, the "record" button 161 is depressed and held down whilst the "play" button 82 is depressed. Bracket 59 on the carriage bracket 55 now locks the record button in the lower (record) position. As the "record" button is operated, the attached paxolin sliding plate 164 allows Sw.6 to open and the metal sliding plate 162 operates Sw.1 and Sw.2 via the cable 333.

The rest of the mechanical operation in the record position is the same as described for the play-back position.

**(c) Forward Wind**

When the "forward wind" button 84 is depressed, bracket 80 moves the brake slide 76 to the right thus releasing the brakes and operating Sw.4 as described under "Play-back." As bracket 80 is pushed down, bracket 44, which bears against it, is drawn forward by the tension of spring 54. Bracket 44 in turn draws bracket 41 to the position where the forward wind pulley 47 (mounted on bracket 41) bears against and therefore transmits drive between the flywheel and the right-hand turntable.

**(d) Re-wind**

When the "re-wind" button 83 is depressed, bracket 81 moves the brake slide 76 to the right thus releasing the brakes and operating Sw.4 as described under "Play-back." As the distance travelled by brake slide 76 is less than in the "forward wind" and "play-back" positions, brake bracket 94 does not lift friction-pad 113 completely away from the right-hand turntable hub. The small amount of remaining friction ensures that tapes are re-wound with an even tension.

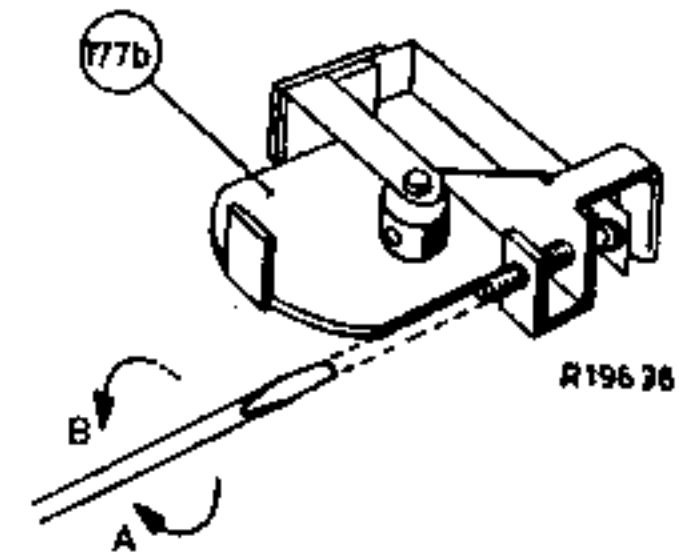
As bracket 81 is pushed downwards, pressure is applied via spring 109 to bracket 103 on which is mounted pulley 106. Bracket 103 moves inwards to the position where pulley 106 meets the flywheel 17, and transmits drive to the left-hand turntable 193 via the belt 196.

**H.—MECHANICAL CHECKS AND ADJUSTMENTS**

**1. Motor and Flywheel.**

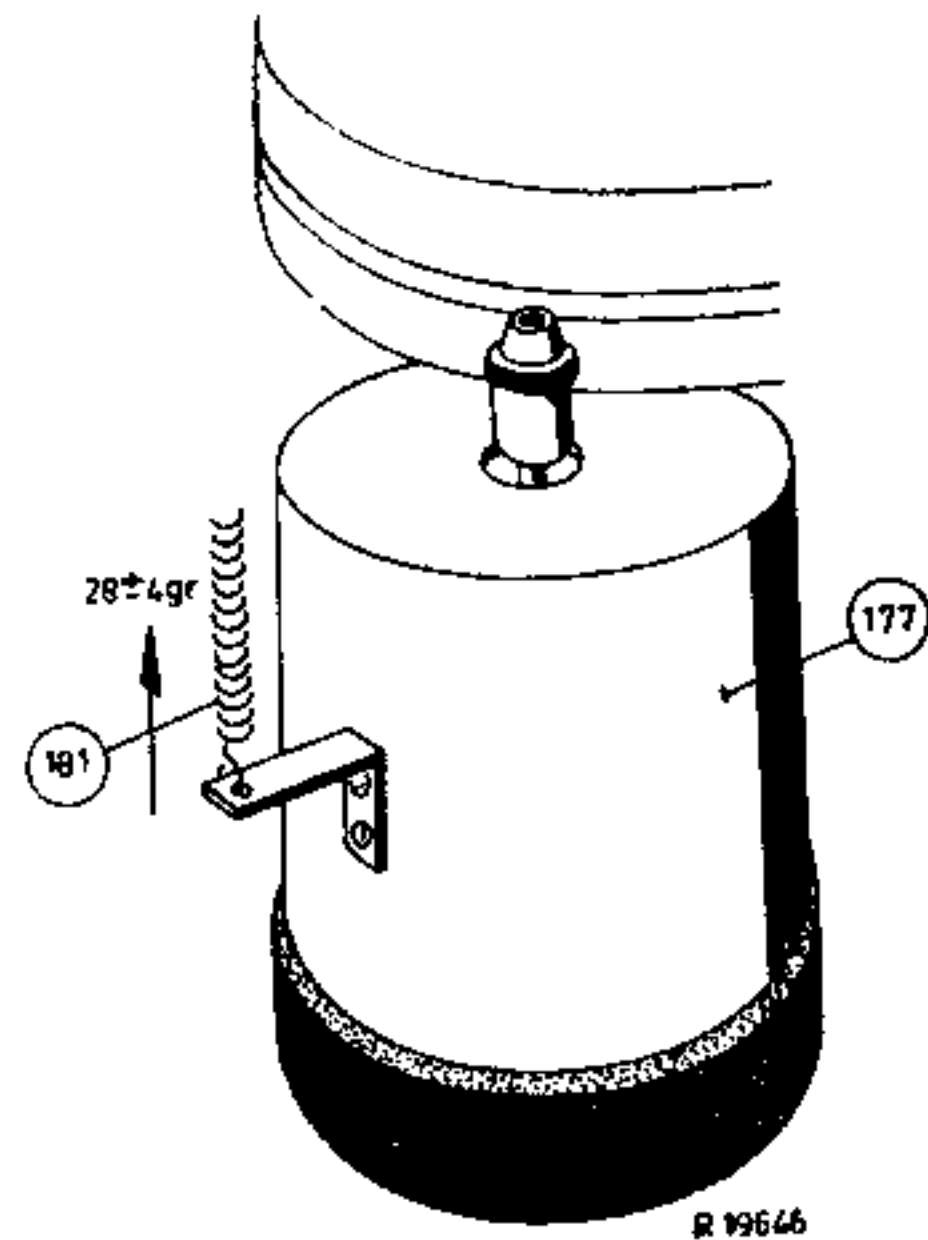
**(a) Speed Adjustment.** The tape speed should be  $1\frac{1}{2}$ " per second and can be checked and, if necessary, adjusted in the following manner:

Measure off a section of tape 15' in length and mark both start and finish. The time taken for the measured length of tape to pass a given point should lie between 93 and 101 seconds. If the time is incorrect, the speed of the motor can be adjusted with the regulator on the motor spindle (see Fig. 2). Rotate the screw in the direction "A" to increase speed or direction "B" to decrease speed.



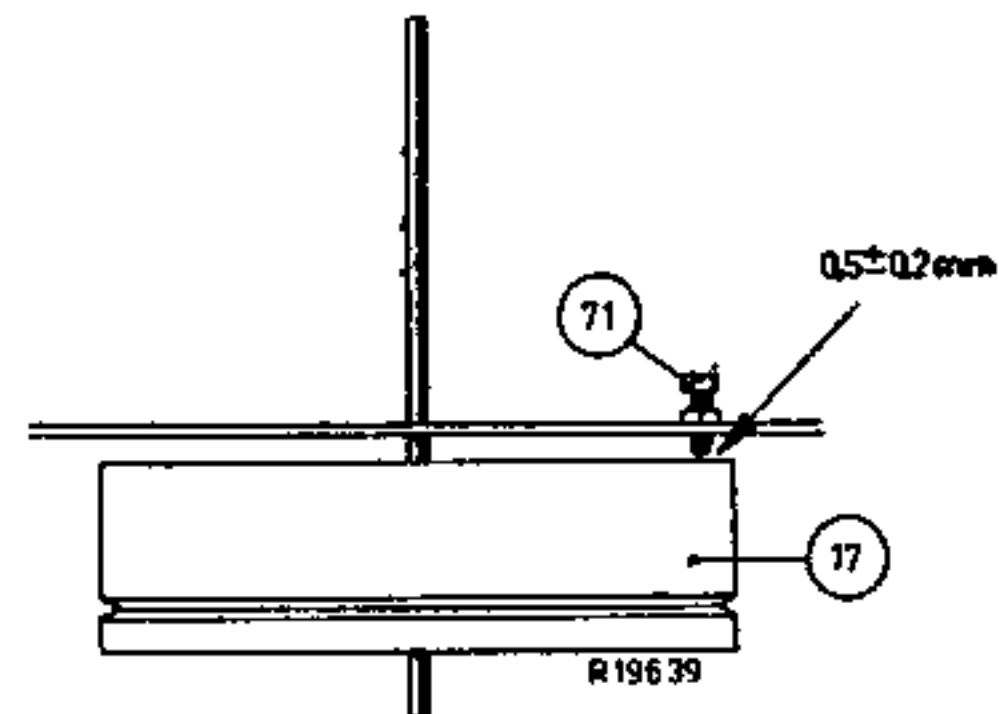
**FIG. 2**

**(b) Pressure of motor pulley against flywheel.** The tension of the spring 181 which maintains the motor pulley in contact with the flywheel is measured at the spring anchoring point on the motor and should be  $28 \pm 4$  grammes (see Fig. 3).



**FIG. 3**

**(c) Vertical movement of flywheel.** The screw 71 which limits the vertical movement of the flywheel should be adjusted to just touch the flywheel, after which it must be backed off one full turn and the lock nut tightened.



**FIG. 4**

**2. Clutch Assembly**

**(a) Stop bracket adjustment.** If the "play" button is depressed to the point where the rubber clutch wheel is just touching the flywheel, there should be a gap of 0.5 mm. between the stop bracket 23 and insert hub on coupling bracket 37. This can be adjusted, if necessary, by bending stop bracket 23 (see Fig. 5).



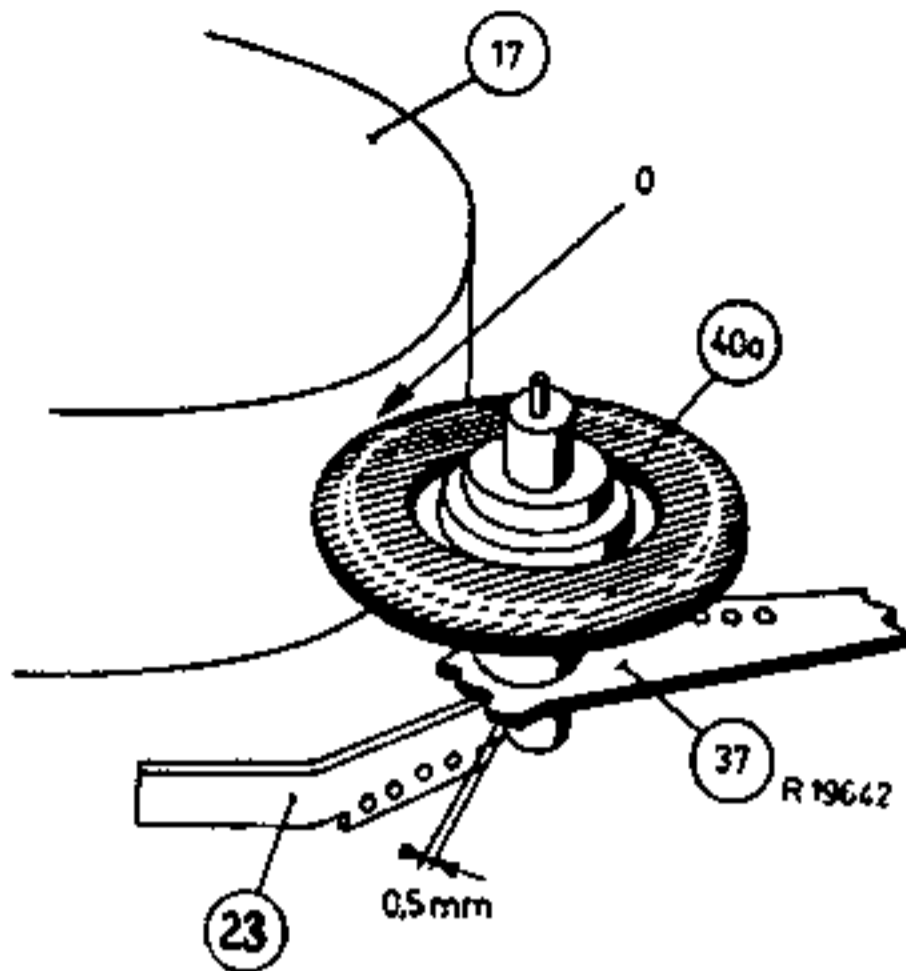


FIG. 5

(b) In the "play" position, the force necessary to overcome the friction in the clutch drive (40 and 40b), should lie between 8 and 15 grammes. This should be measured with a full 3" reel of tape on the R.H. turntable, and the tension gauge attached to a loop made at the end of the tape (see Fig. 6).

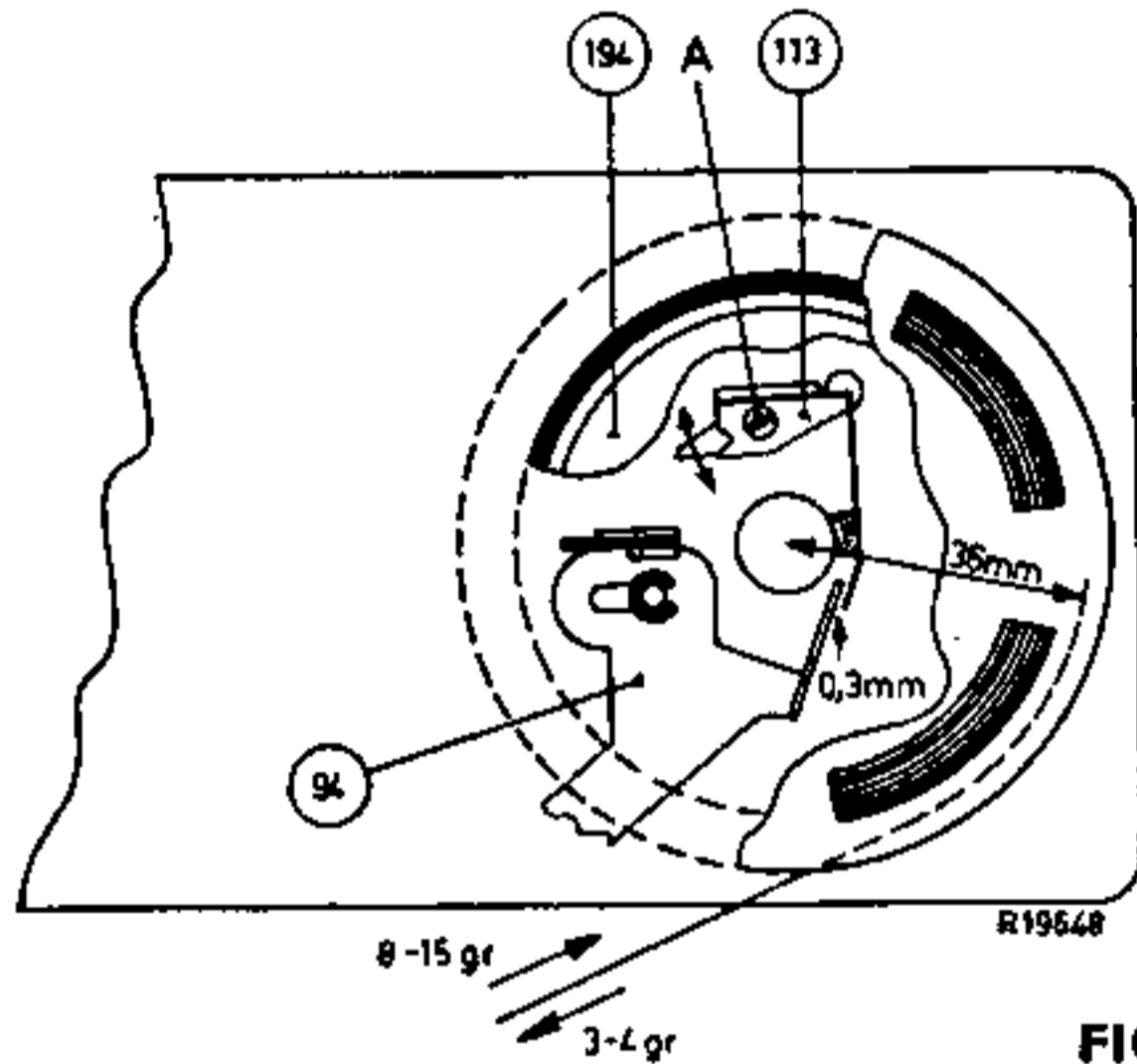


FIG. 6

(c) In the "play" position, there should be a tension of 25-30 grammes between the drive pulley 40b and the R.H. turntable 194 (see Fig. 7).

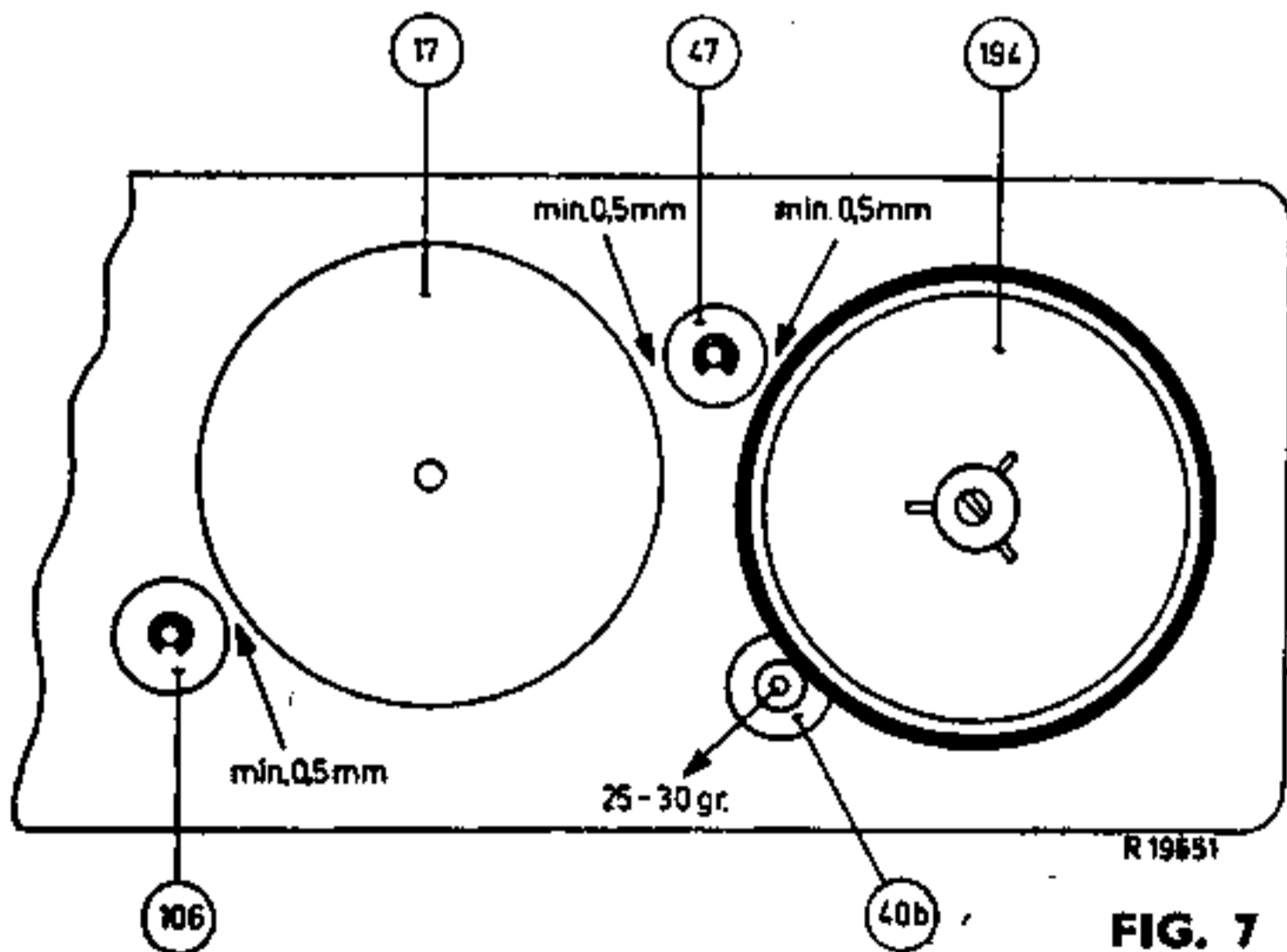


FIG. 7

### 3. Fast Wind Pulleys

(a) Forward Wind. In the "off" position, the forward wind pulley 47 should be spaced at least 0.5 mm. from the flywheel 17 and the R.H. turntable 194 (see Fig. 6). This can be adjusted by bending the operating bracket 44, but care should be taken to ensure that the end of the bracket 44 is spaced at least 0.4mm. from the bottom plate 18 when the forward wind button is

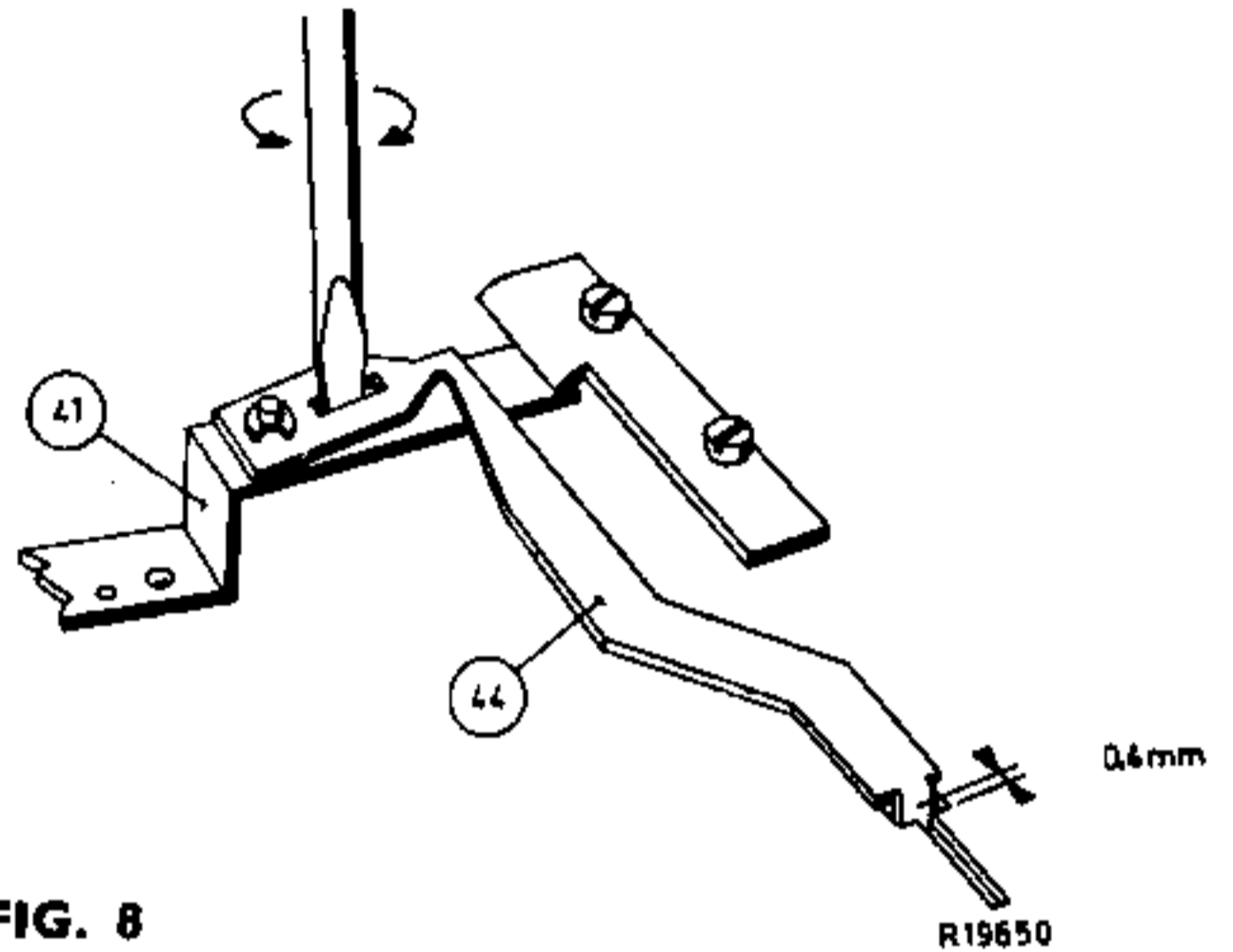


FIG. 8

depressed (see Fig. 8). In this position the forward wind pulley presses with a force of 75-100 grammes against the flywheel and the R.H. turntable (see Fig. 9).

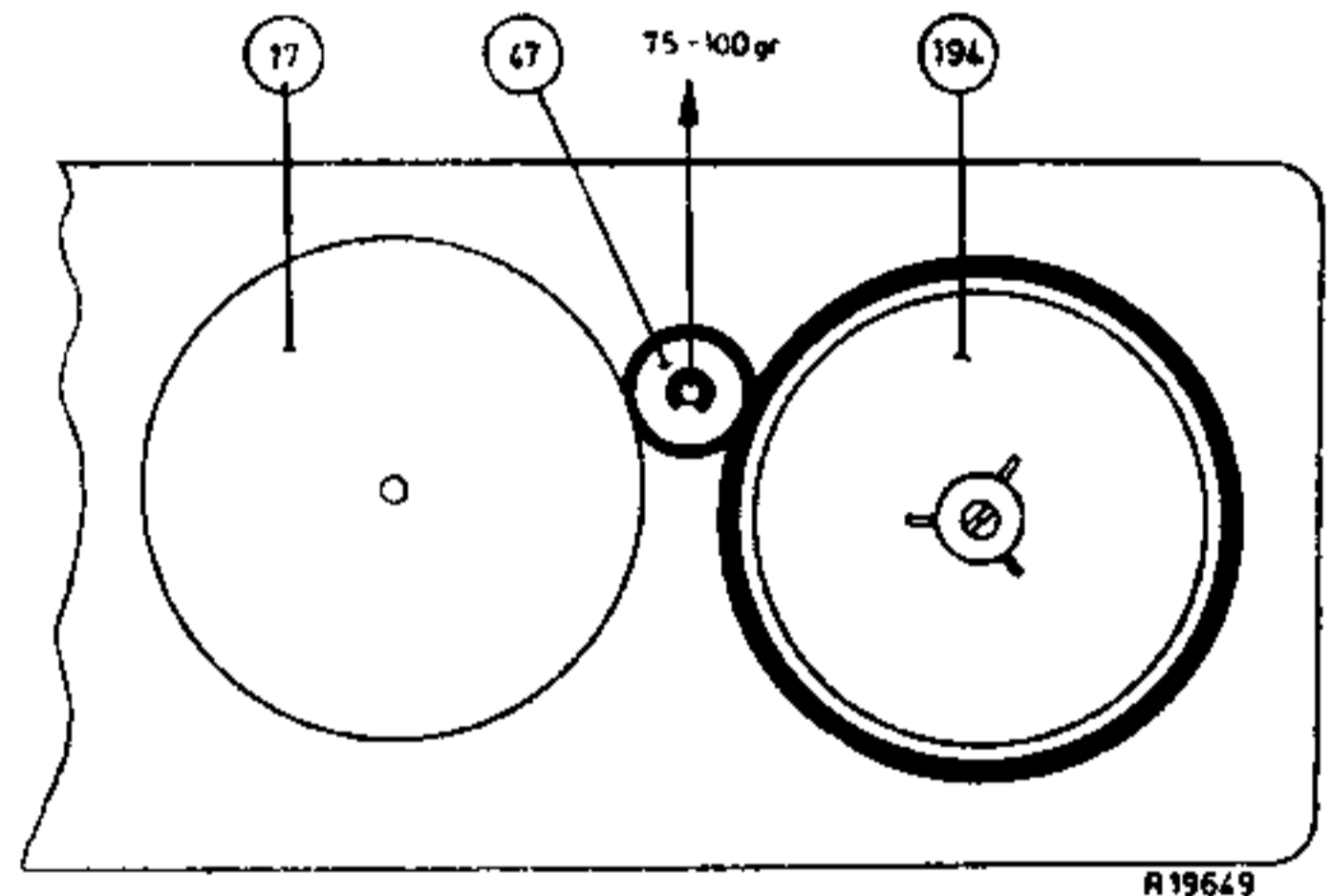


FIG. 9

(b) Re-wind. In the "off" position, the re-wind pulley 106 should be spaced at least 0.5 mm. from the flywheel 17 (see Fig. 11). This can be adjusted by bending lip "A" of the top mounting plate (see Fig 10). When

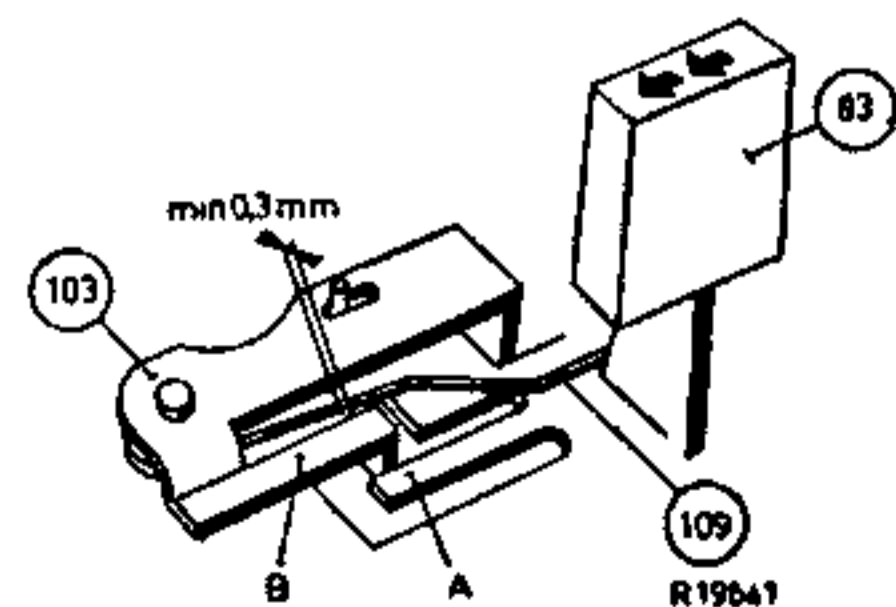


FIG. 10

the "re-wind" button is depressed, there should be a space of at least 0.3 mm. between the spring 109 and lip "B" of the sliding pulley bracket 103.

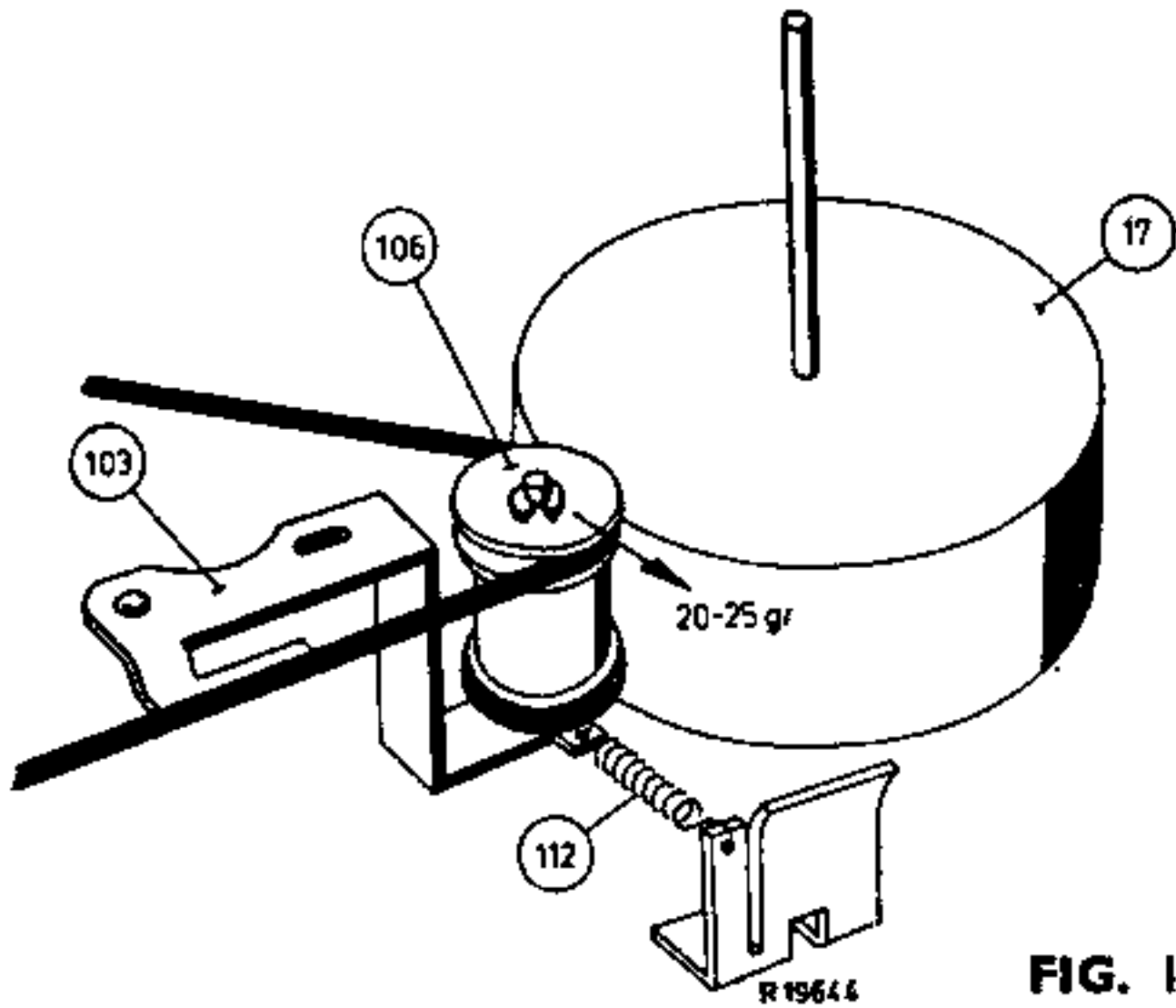


FIG. 11

The tension of spring 112 is measured in the "off" position, and should be 20-25 grammes (see Fig. 11).

#### 4. Brakes

(a) Left-hand. With the "re-wind" button depressed, the brake block on the left-hand brake bracket 93 should be 0.5 to 1 mm. from the turntable 193. This can be adjusted by slackening the locking screw "A" and moving the bracket (see Fig. 12).

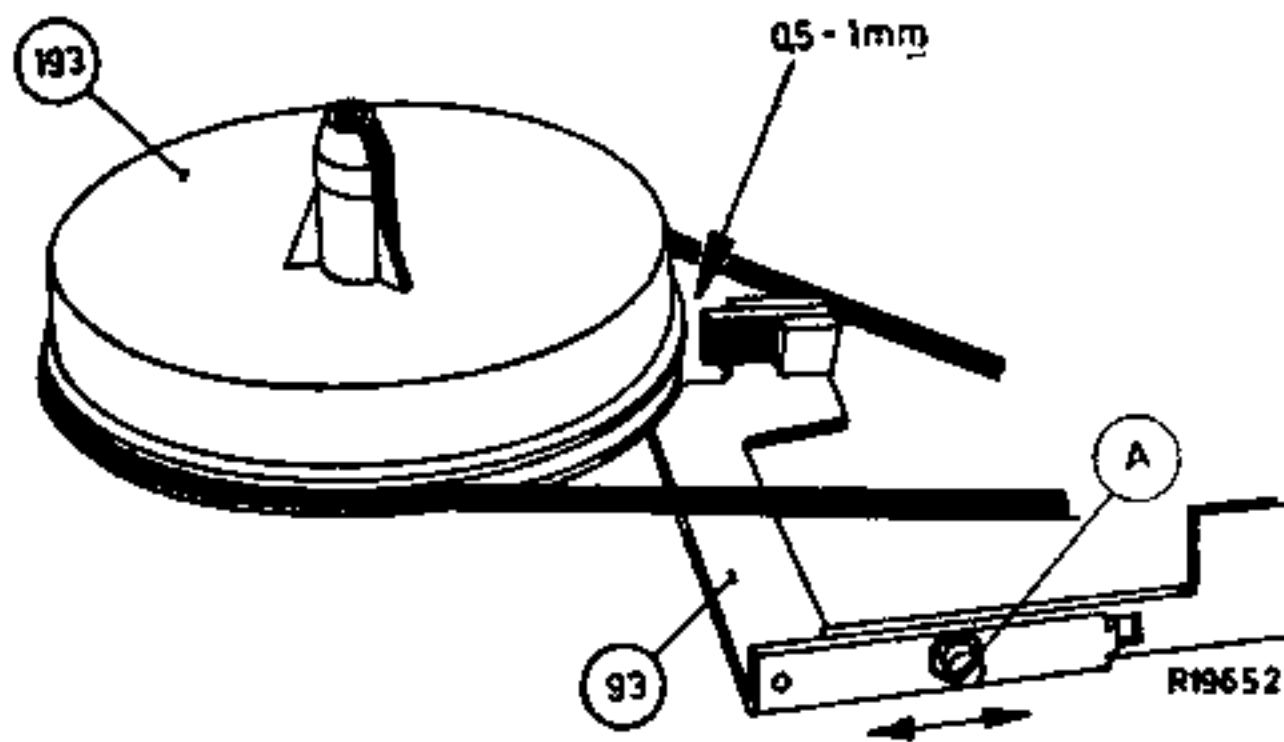


FIG. 12

(b) Right-hand. To adjust the right-hand brake, remove the R.H. turntable 194 and, after slackening the locking screw "B," set the brake bracket so that the edge of the brake block is 26 mm. from the right-hand edge of the turntable spindle (see Fig. 13).

(c) Friction-pad and spring assembly 113. The "free" end of this spring should be 0.3 mm. from the lip on brake bracket 94. If necessary this can be adjusted by bending the lip of brake bracket 94 (see fig. 6). When either the "record/play" or "forward wind" buttons are depressed, the felt friction-pad is pushed clear of the turntable hub (underside). During re-wind, this pad should maintain slight pressure on the turntable hub and may be checked as follows. Attach a tension gauge to a loop made at the end of a full 3" reel of tape and with the "re-wind" button depressed, a force of 3-4 grammes should be required to overcome the pad pressure. Adjustment of pressure is made by slackening screw "A" (see fig. 6).

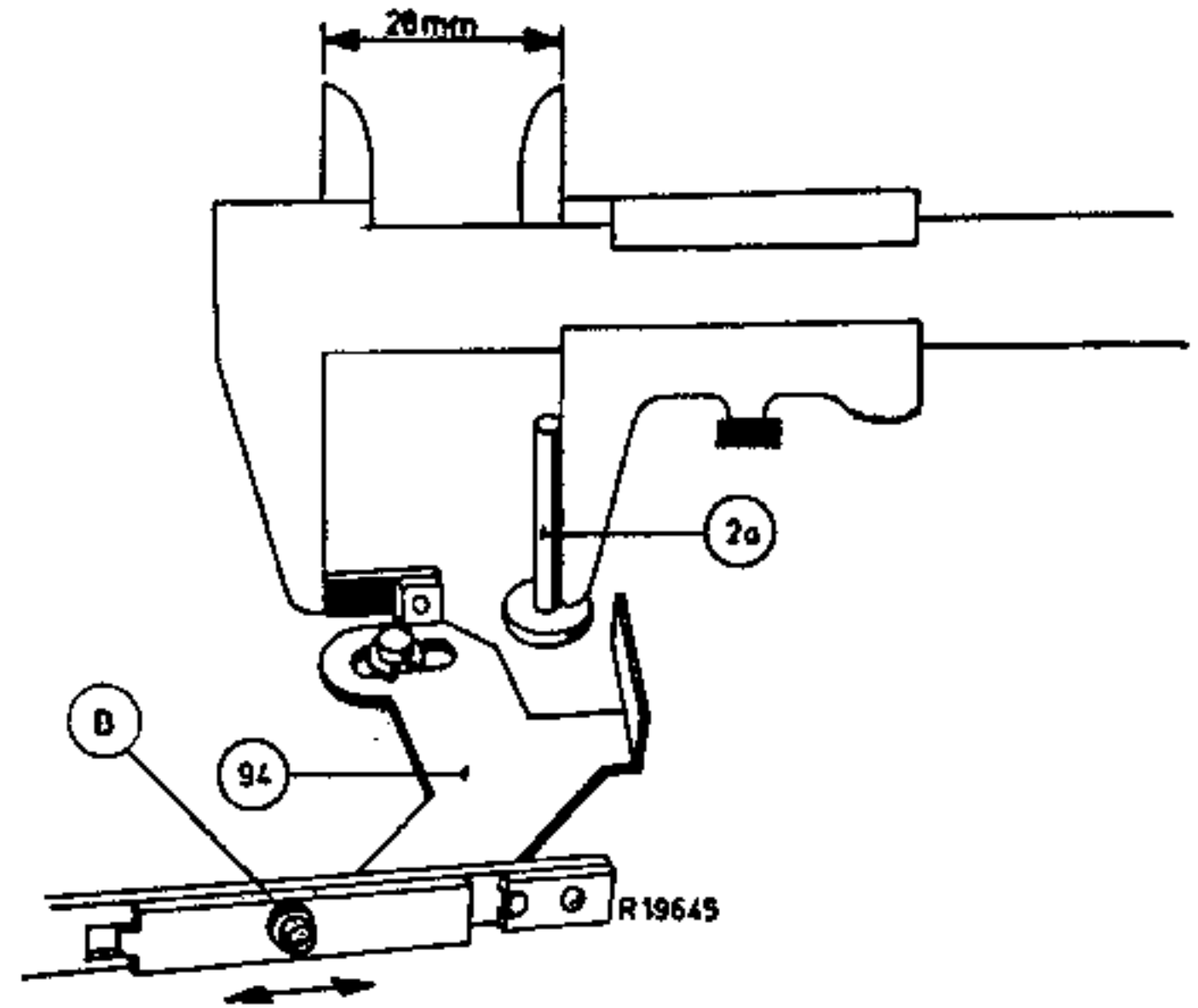


FIG. 13

#### 5. Heights of Turntables and Heads and Adjustment of Record/Play-back Head Gap

(a) The height of each turntable (193 and 194) can be adjusted by rotating its pivot screw 195. When set correctly, the top edge of the turntable should be  $14 \pm 0.2$  mm. above the mounting plate (see Fig. 14). The

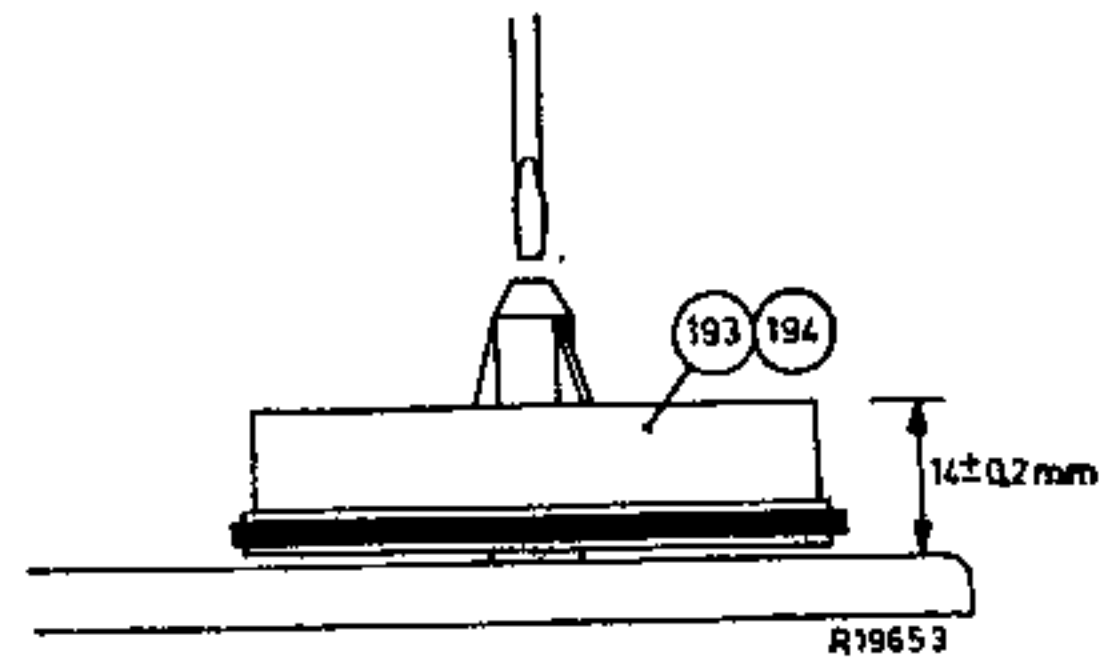


FIG. 14

tape should now run freely through the guide plate of the erase head K2 without twisting.

(b) After the turntable heights have been adjusted the record/play-back head K1 should be adjusted by means of the screws 63, 68 and 69, so that the face of the head is parallel to the tape and the height of the head is such that the tape will run freely through the head guide plate without twisting (see Fig. 15).

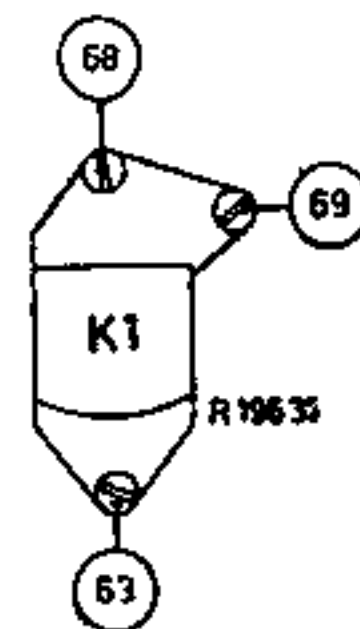


FIG. 15

(c) After the record/play-back head has been set to the correct height, the head gap must be adjusted perpendicular to the tape modulation, using an azimuth test tape as follows :

- (i) Place the test tape on the machine.
- (ii) Connect a Valve Voltmeter to contacts 2 and 3 of the input/output socket.
- (iii) Depress the "Play" button.
- (iv) Adjust screw 69 for maximum output voltage (see Fig. 15).
- (v) Check that the tape still runs freely through the head guide plate.

(A suitable test tape may be made on a machine known to be correctly adjusted, by recording a continuous tone of 6 Kc/s at  $3\frac{1}{2}$  i.p.s. or 3 Kc/s at  $1\frac{1}{2}$  i.p.s.)

## 6. Pressure Arm Assembly

(a) The carriage bracket and pressure arm assemblies are adjusted as follows: With the "play" button depressed, remove spring 150 and slacken off screws "B" and "C" as indicated in Fig. 16. With a tape on the

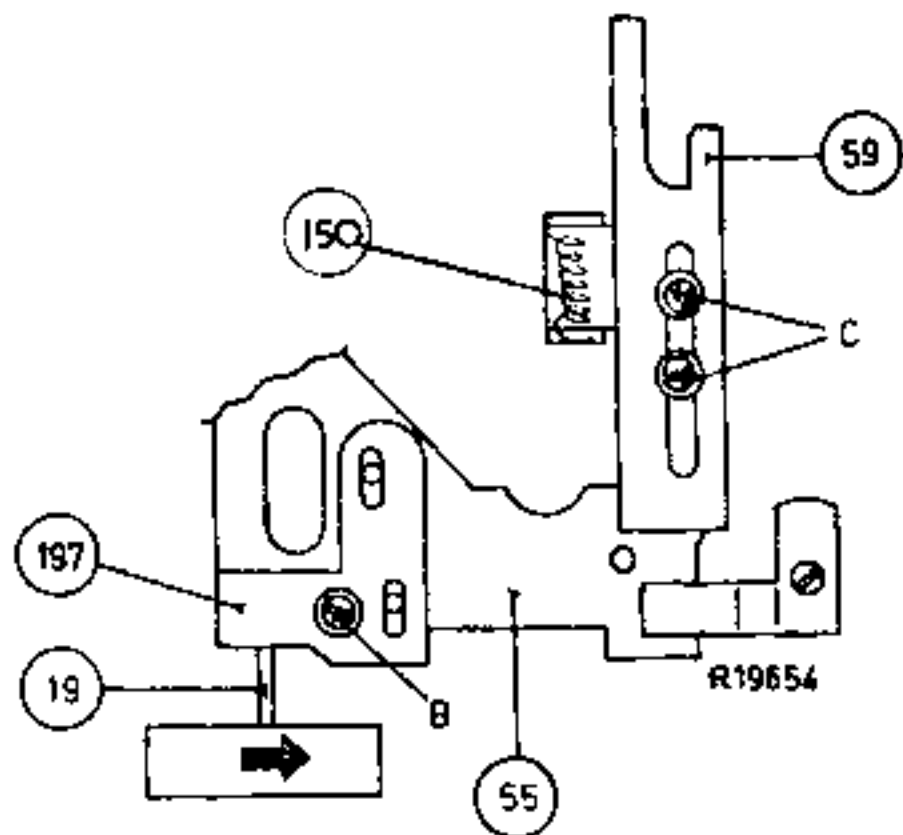


FIG. 16

machine, push the carriage bracket 55 forward by hand to the point where the angle the tape makes is equal on both sides of a line drawn through the centre of the erase head (see Fig. 17—Angles "A" and "B"). The

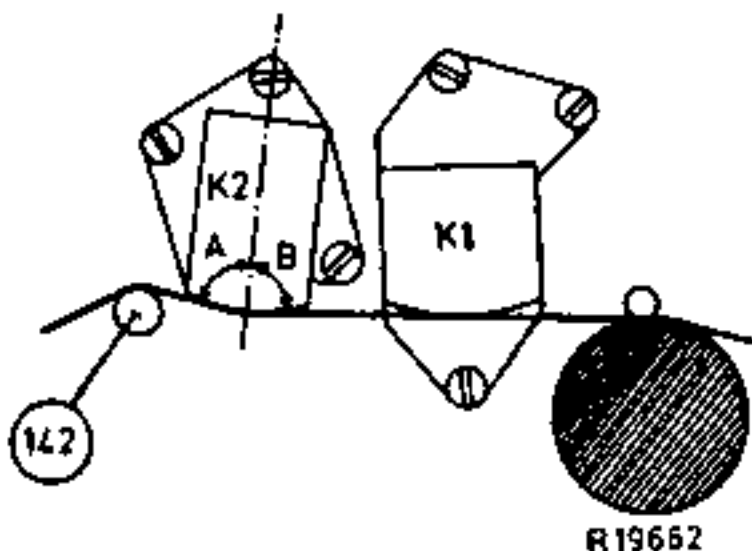


FIG. 17

pressure roller must be held against the capstan whilst making this check. Slide the plate 197 back against the bracket 19 and tighten screw "B." Slide the locking bracket 59 forward into the slot in the record button, and tighten the two screws "C" (Fig. 16). Re-fit spring 150. There should be a space of between 0.3 mm. and 1.5 mm. between the lug on the carriage bracket 55 and the lug on the pressure arm 131 when the "play" button is depressed (see Fig. 18). Adjust if necessary by bending the lug on the carriage bracket 55. The force required to just overcome the pressure of the roller 147 from the capstan should be 275-325 grammes. Adjust if necessary by bending the spring mounting lug on carriage bracket 55 (see Fig. 18).

(b) Pressure Brackets. When the "play" button is depressed, the two springs 146 should exert a tension of 8-12 grammes against the pressure brackets 137 and 138. This can be checked by measuring the force

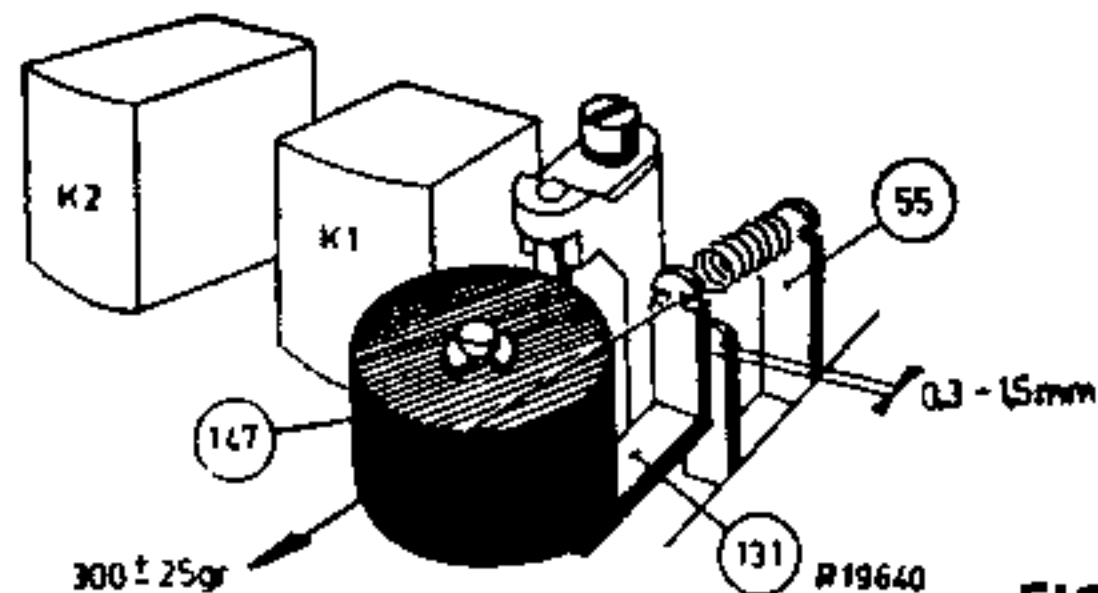


FIG. 18

necessary at the end of the pressure bracket to just pull the felt pads away from the heads. Adjust if necessary by bending lug "A" (see Fig. 19). There should be a

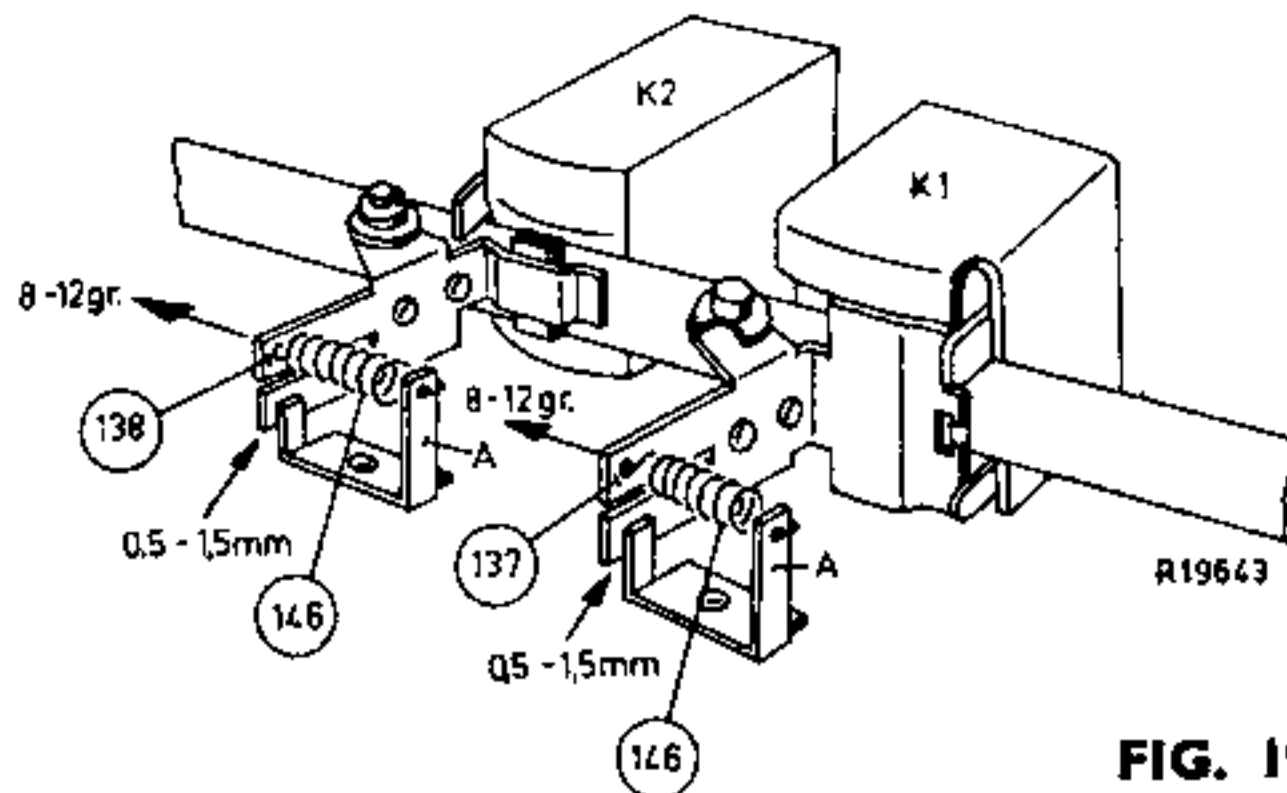


FIG. 19

space of between 0.5 and 1.5 mm. between the ends of the pressure brackets and the stop lugs on the pressure arm 131 in the "play" position (see Fig. 19).

## 7. Replacement of Bowden Cable

For replacement of Sw. 1/2 operating cable the following procedure should be adopted :

Push the switch sliders, by means of the operating bracket, into the recording position and insert a pin through the hole in the side of the switch, as indicated in the diagram. Fit the cable and, with the "record" button depressed, pull the inner cable above the chassis top plate until taut, then crimp the ferrule firmly to the cable flush with the chassis top plate. Finally, cut off the excess cable and remove the locking pin from the switch.

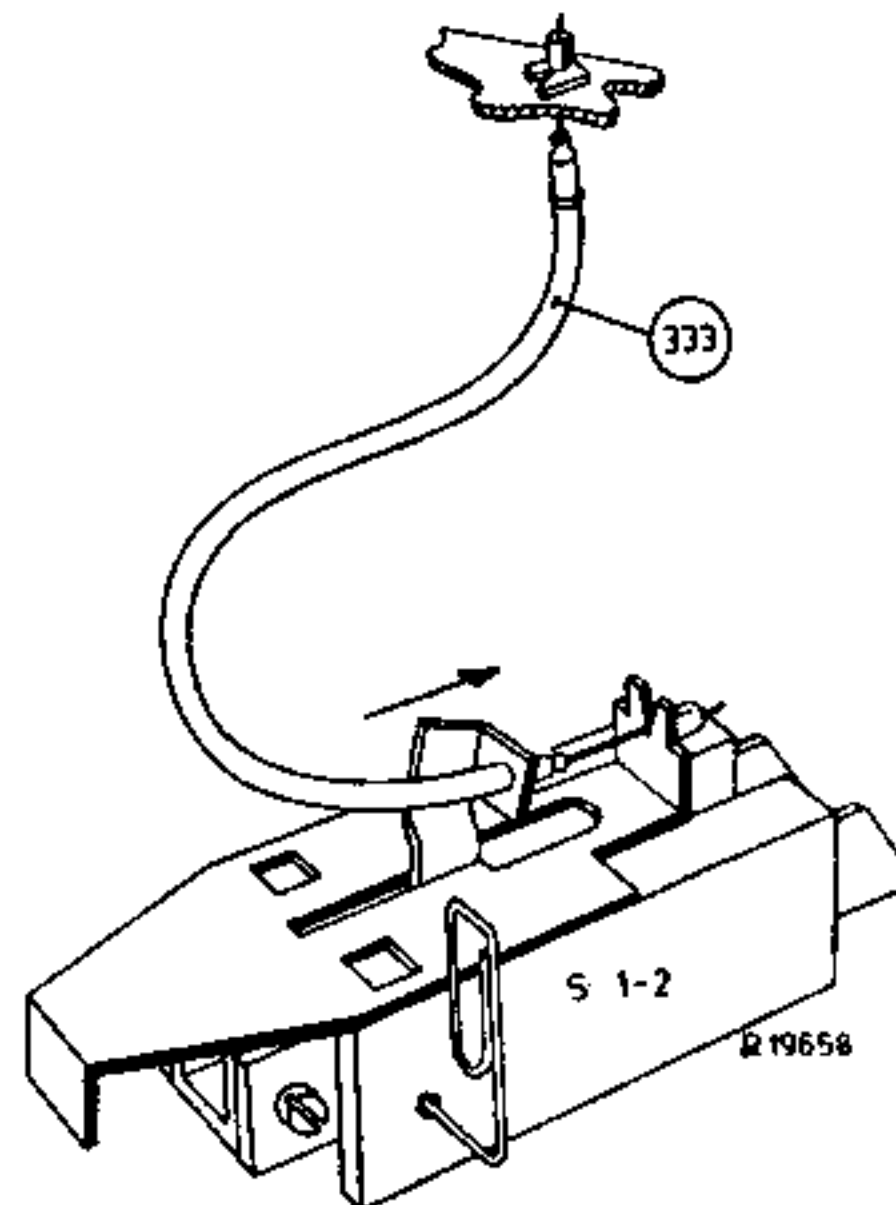


FIG. 20

## I.—HEAD MAINTENANCE

The magnetic heads and the capstan must be cleaned at regular intervals. For this purpose, the two plastic covers must be removed.

The heads can be cleaned with a soft cloth wrapped around a small stick and moistened with methylated spirits. Never touch the heads with a metal article or the metal band part of a brush.

## J.—LUBRICATION

All machines are fully lubricated during manufacture, and further attention should normally only be required after a long period of service. If this is the case, or upon replacement of any of the mechanical components, lubricant may be applied sparingly to the positions described below. It is emphasised that excessive lubrication will hinder rather than help the operation of the instrument, and particular care should be taken to ensure that no lubricant is allowed on to any of the pulley driving surfaces.

1. A light machine oil (indicated by ● page 8) may be applied to the following points :

Bearings of turntables 193 and 194. (Do not allow oil on to the brake felt under R.H. turntable 194.)

Bearing of R.H. turntable drive pulley 40b.  
Bearing of rubber clutch wheel 40a on pulley 40b.  
Bearing of forward wind pulley 47.  
Bearing of re-wind pulley 106.  
Bearing of pressure roller 147.  
Pivot spindle of pressure brackets 137 and 138.  
Pivot spindle of sliding pulley bracket 103.  
Upper and lower flywheel bearings.  
Motor suspension bearings 169 on bracket 168.

2. A light grease preferably containing graphite (indicated by ▲ page 8) may be applied to the following points :

Sliding surfaces of carriage bracket 55.  
Pivot of bracket 19 with bottom plate 18.  
Roller on bracket 19.  
Sliding surfaces of brake brackets 93 and 94 and guide pins 9.  
Sliding surface of coupling bracket 37 and top plate.  
Sliding surfaces of brackets 41 and 44.  
Sliding surfaces of brackets 79, 80 and 81.  
Sliding surface of brake slide 76.  
Sliding surfaces of plates 162 and 164 with spindle 11.

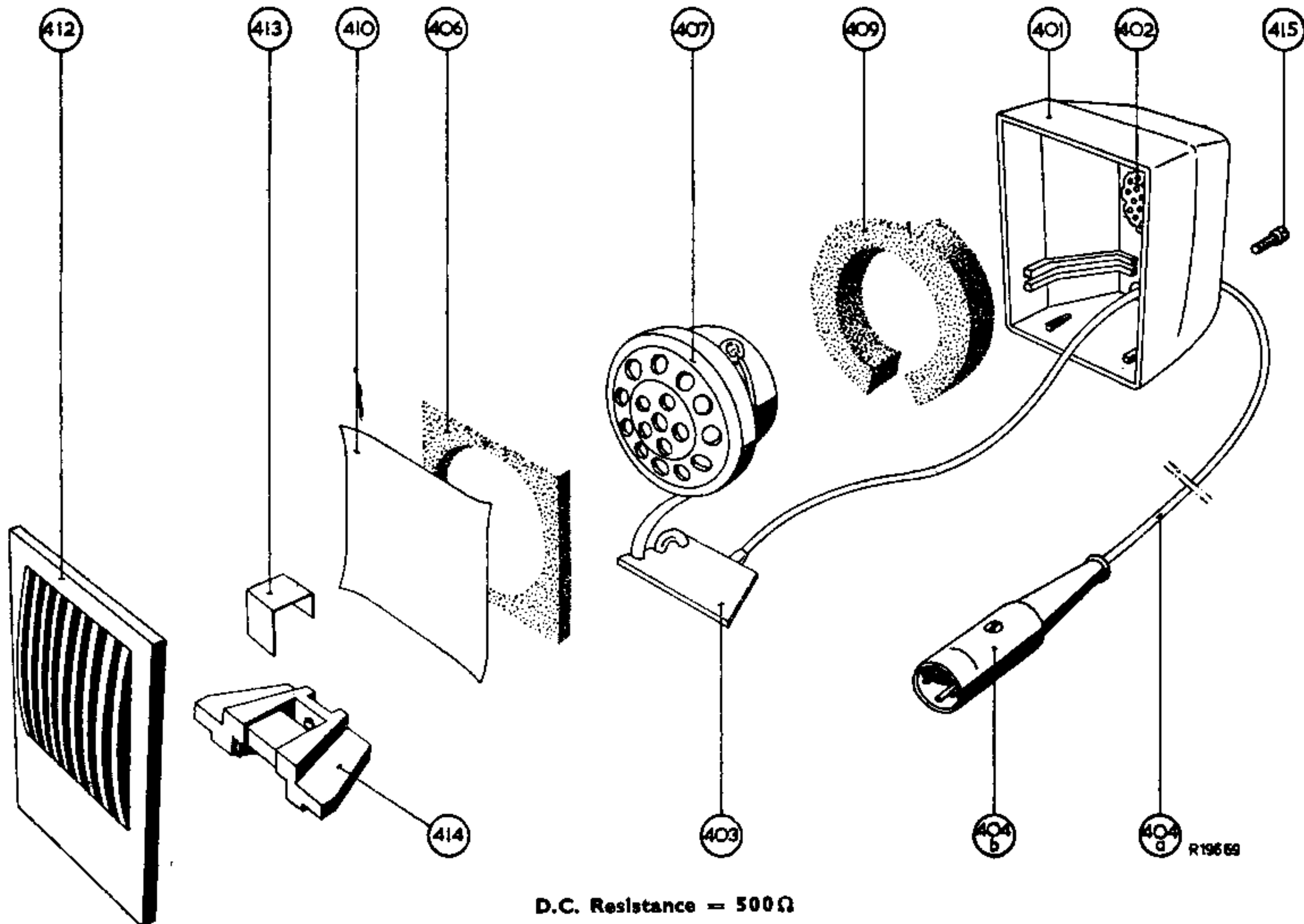
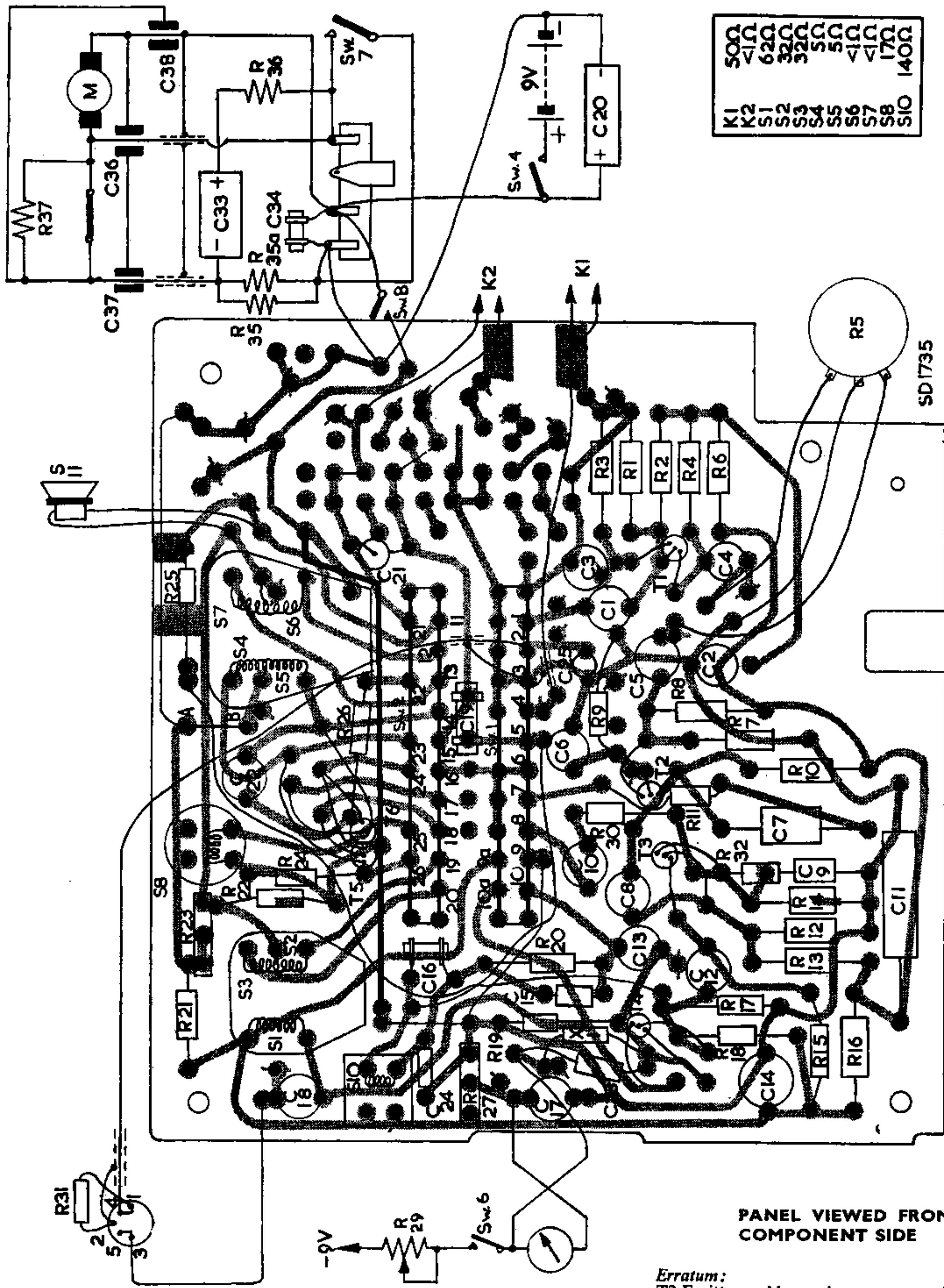


FIG. 26





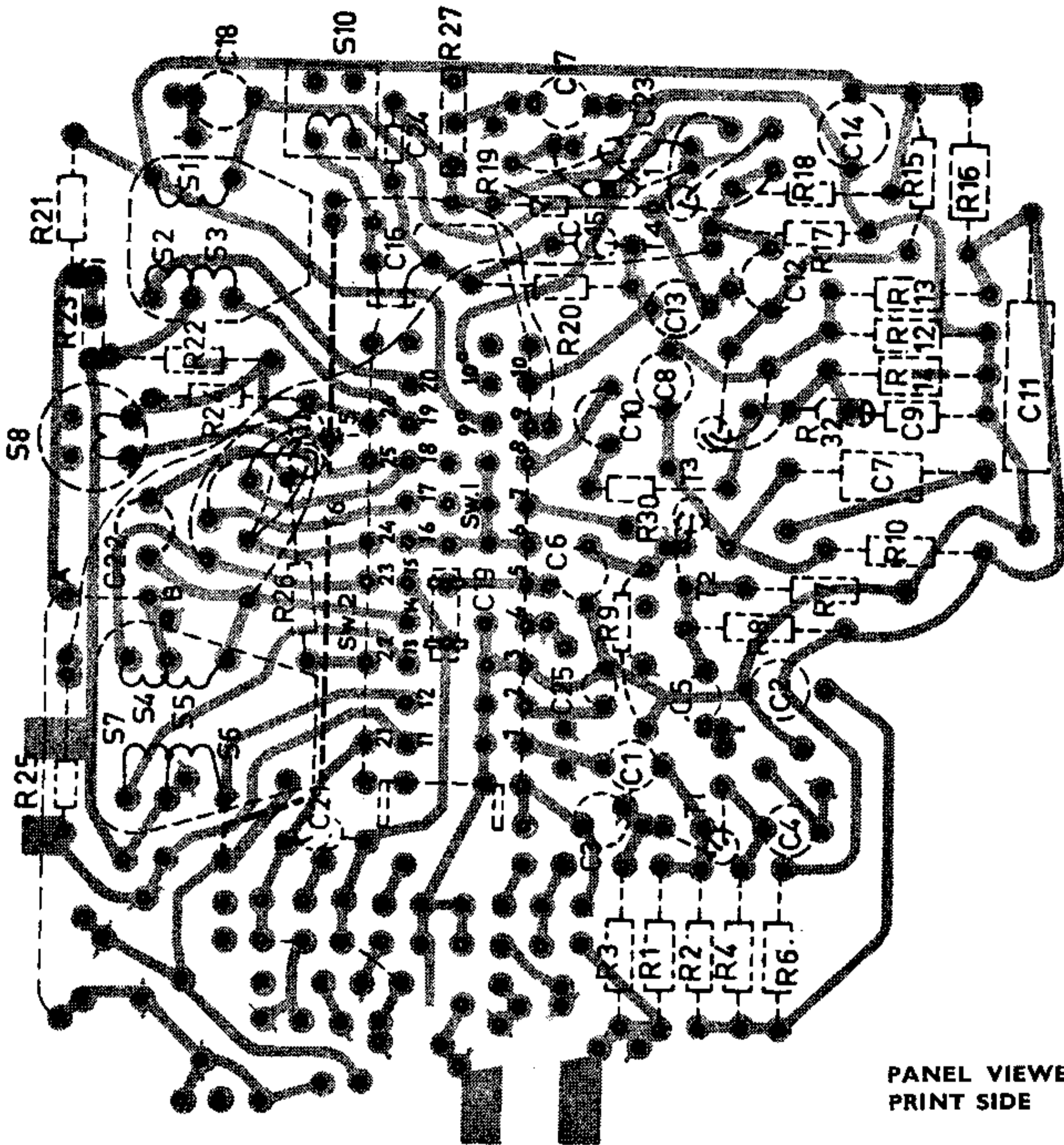
K1	500Ω
K2	<1Ω
S1	62Ω
S2	32Ω
S3	32Ω
S4	5Ω
S5	5Ω
S6	<1Ω
S7	<1Ω
S8	17Ω
S10	140Ω

Meter Resistance — 150 Ω (approx.)

FIG. 22

PANEL VIEWED FROM COMPONENT SIDE

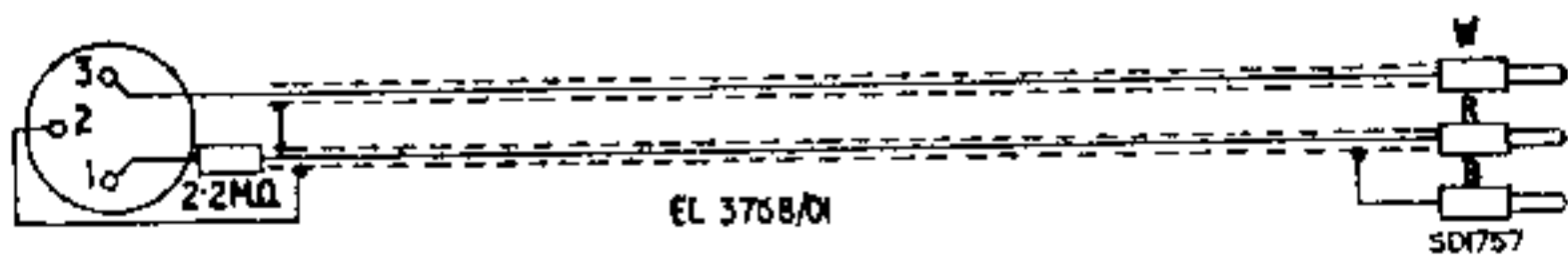
Erratum:  
T2 Emitter and base wires are reversed.



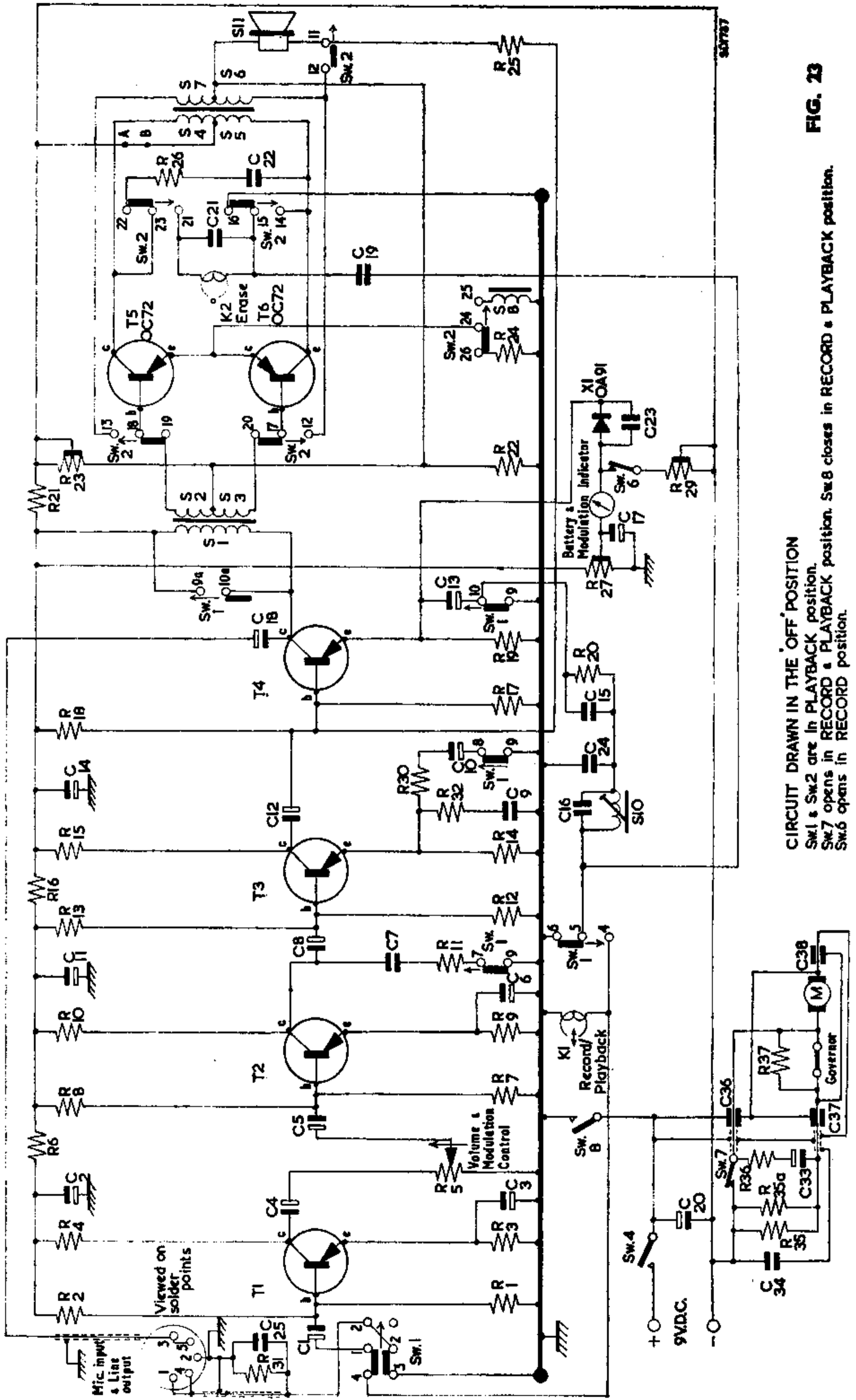
SD1756

PANEL VIEWED  
PRINT SIDE

*Erratum:*  
T2 Emitter and base wires are reversed.



S	25.1	2.1	34	20.4	32	33	5	36	37	6	11	7	38	8	10	12	9	13	14	10	15	18	13	17	2.3	8	19	21	22	4.5	7.6	11	
C	25.1	2.1	34	20.4	32	33	5	36	37	6	11	7	38	8	10	12	9	13	14	10	15	18	13	17	2.3	8	19	21	22	4.5	7.6	11	
R	31	2.1	4	3.35	35	5	36	6	8	7	37	10	9	11	13	12	16	15	14	32	30	18	17	20	19	21	29	23	22	26	25		



**FIG. 23**  
 CIRCUIT DRAWN IN THE 'OFF' POSITION  
 Sw.1 & Sw.2 are in PLAYBACK position.  
 Sw.7 opens in RECORD & PLAYBACK position. Sw.8 closes in RECORD & PLAYBACK position.  
 Sw.6 opens in RECORD position.

T1 to T4—Alternative type transistors may be fitted—see Spares List

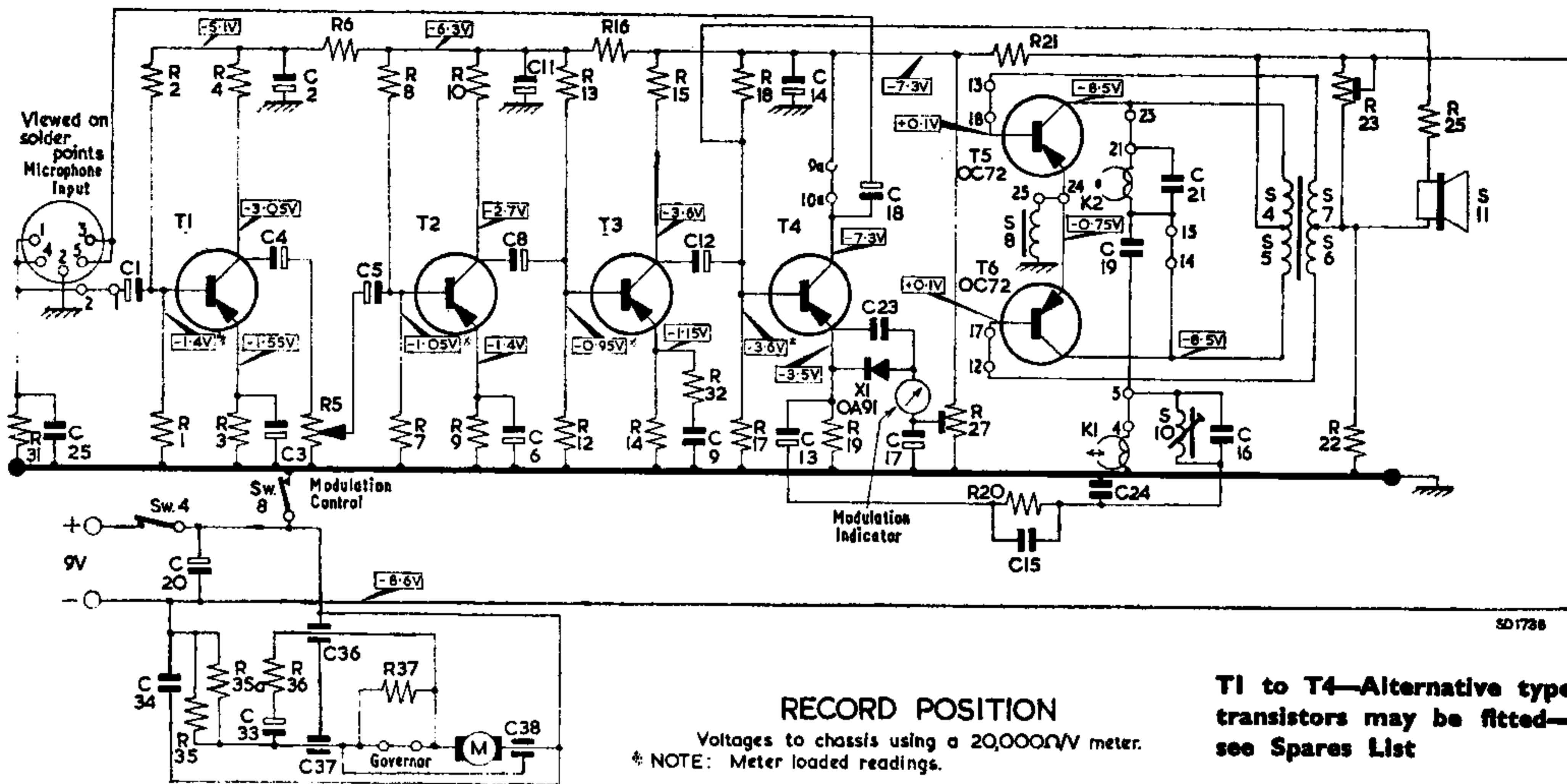


FIG. 24

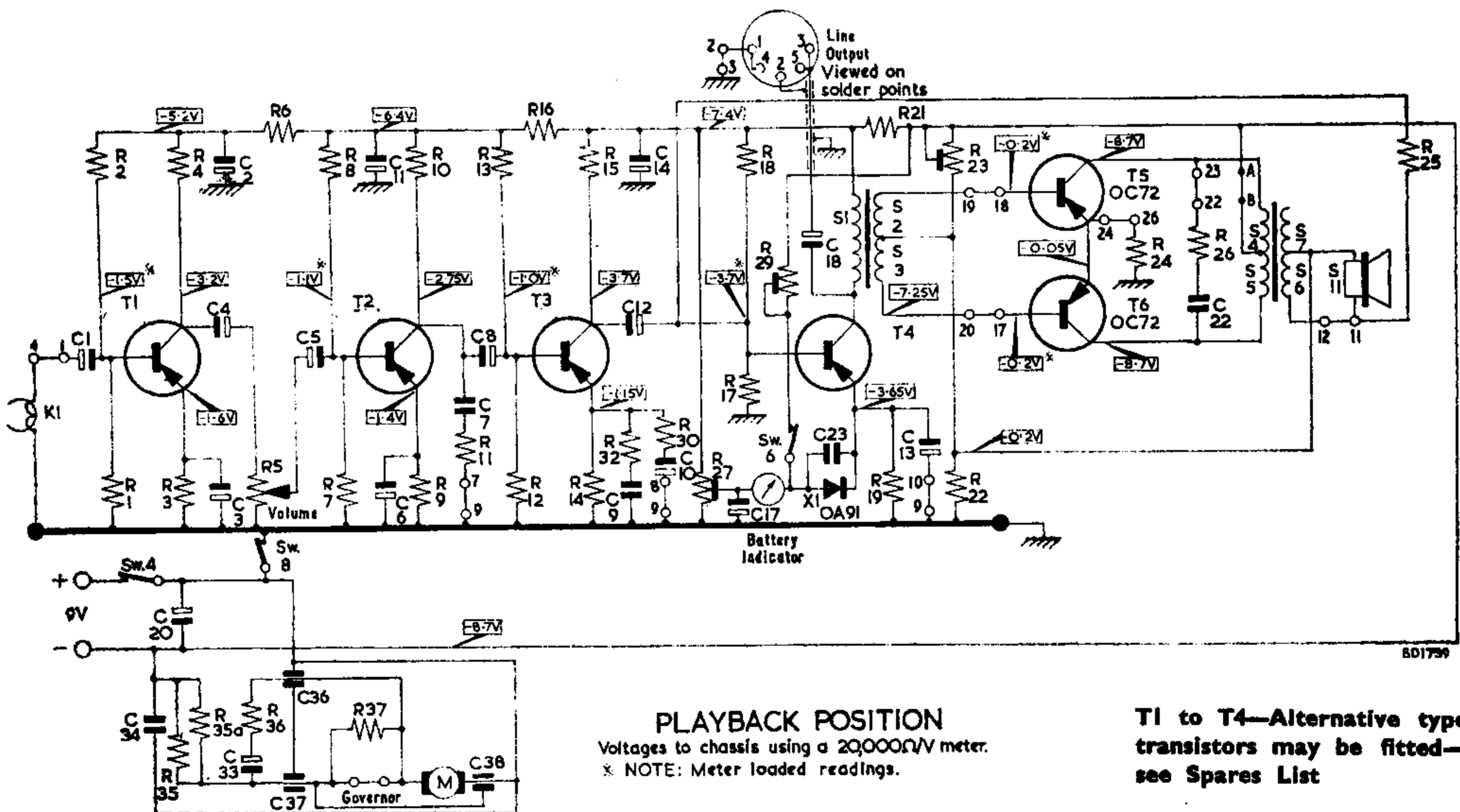


FIG. 25

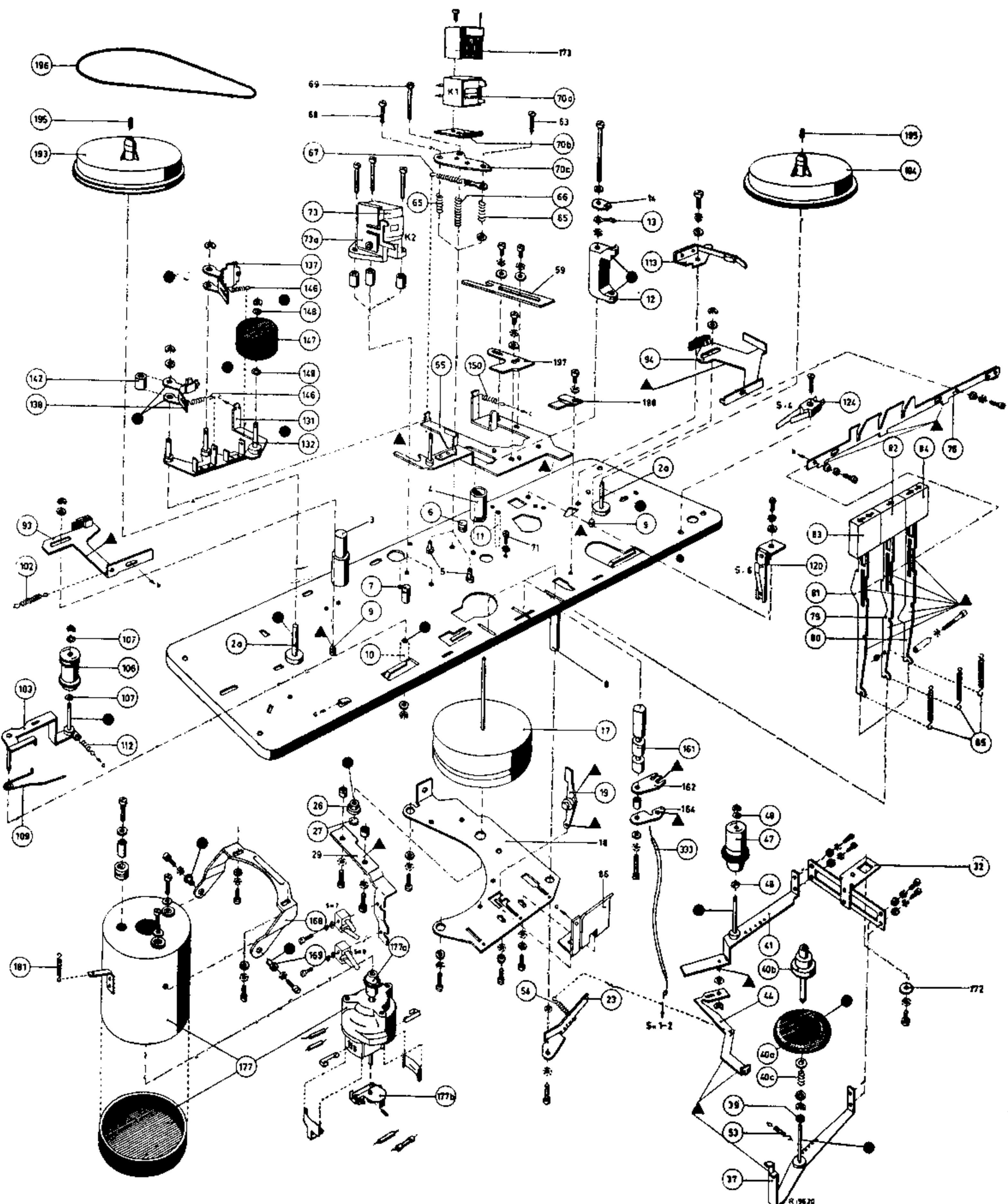


FIG. 21



# SPARE PARTS LIST — EL3585

K

## MOULDED CASE ASSEMBLY

337	Front ... ..	AE.606.19
343	Rear ... ..	P5.512.01/423GH
	Lid ... ..	P5.512.02/560AB
348	Battery cover ... ..	AE.606.16
	Handle ... ..	AE.571.42
346	Circlip for handle stud (2) ... ..	B.045.BF/13
341	Record/Playback cover—front ... ..	AE.606.18
344	Record/Playback cover—rear ... ..	AE.606.17
	Philips emblem ... ..	A3.825.33
	Fixing screws for base (2) ... ..	B.054.ED/4x40
	Countersunk screws for top (4) ... ..	B.055.ED/2.6x6
	Securing plate for cabinet sections (2) ... ..	AS.506.82
	Foam strip for speaker ... ..	MK.682.10
	Battery label (4x1.5V) ... ..	AE.506.95
	Battery label (2x1.5V) ... ..	AE.506.96

## CONTROL KNOBS AND PUSH BUTTONS

330	Modulation/Volume ... ..	AE.571.30
	Grubscrew ... ..	B.061.DD/3x6
83	Rewind push button ... ..	AE.571.04
81	Bracket for above ... ..	AE.504.77
82	Play push button ... ..	AE.571.03
79	Bracket for above ... ..	AE.504.75
84	Forward wind push button ... ..	AE.571.05
80	Bracket for above ... ..	AE.504.76
85	Springs (3) ... ..	AE.504.78
76	Slide bar ... ..	AE.606.12
161	Record button ... ..	AE.571.21
164	Paxolin sliding plate ... ..	AE.505.19
	Inner cable ... ..	N.449.KA/35
	Outer cable ... ..	R.255.RW/2.2x4x280mm.
	Nipples ... ..	964/3x8.2
	Eyelet ... ..	B.002.AF/2.6x6
	Insulated roller (Sw.7 and Sw.8) ... ..	HY.139.58
	Insulated washer for above ... ..	49.938.15

## MAGNETIC HEADS

	Erase head (K2) ... ..	AE.571.35
	Record head (K1) ... ..	AE.571.34
173	Screen for record head ... ..	AE.505.68
	Fixing screws for screen ... ..	B.054.ED/2x4
70b	Inner screen ... ..	AE.505.69
	Mounting screws (3) ... ..	B.054.ED/3x12
	Mounting springs—short (2) ... ..	AE.504.67
	Mounting springs—long ... ..	AE.504.68

## TAPE TRANSPORT ASSEMBLY

131	Pressure arm with spindle ... ..	RE.606.15
150	Spring for above ... ..	AE.505.13
142	Tape guide roller ... ..	AE.505.11
138	Pressure bracket and felt pad—erase head ... ..	AE.606.04
146	Spring for above ... ..	AE.505.12
	Circlip ... ..	B.108.AF/1.9
	Washer ... ..	B.050.CD/2
137	Pressure bracket and pad—record head ... ..	AE.606.03
146	Spring for above ... ..	AE.505.12
	Circlip ... ..	B.108.AF/3.2
147	Pressure roller ... ..	WT.881.66
148	Washer for above ... ..	P5.515.93/304
	Circlip ... ..	B.108.AF/3.2
55	Carriage bracket ... ..	AE.606.11
19	Operating bracket for above ... ..	AE.606.06
67	Spring for carriage bracket ... ..	AE.504.69
59	Locking bracket for record button ... ..	AE.504.66

## REWIND MECHANISM

193	Left hand turntable ... ..	P5.511.99/423
2a	Spindle ... ..	AE.504.28
195	Nylon bearing screw ... ..	P5.511.30/332
196	Drive belt ... ..	P7.520.45/000
93	Brake bracket ... ..	AE.606.13
102	Tension spring ... ..	AE.504.83
103	Sliding pulley bracket with spindle ... ..	AE.606.05
109	Hair spring for above ... ..	AE.504.89
112	Tension spring for above ... ..	AE.504.89
106	Pulley ... ..	AE.571.16
	Circlip ... ..	B.108.AF/1.9
107	Washer (2) ... ..	P5.515.93/304

## FORWARD WIND AND DRIVE MECHANISM

194	Right hand turntable ... ..	AE.505.26
2a	Spindle ... ..	AE.504.28
195	Nylon bearing screw ... ..	P5.511.30/332
94	Brake bracket ... ..	AE.606.14
113	Friction pad and spring assembly ... ..	AE.606.02
47	Forward wind pulley ... ..	AE.571.12
48	Washer (2) ... ..	P5.515.93/304
	Circlip ... ..	B.108.AF/3.2
41	Bracket with spindle ... ..	AE.606.10
44	Operating bracket for above ... ..	AE.504.59

54	Tension spring ... ..	AE.012.54
23	Adjusting bracket for spring ... ..	AE.505.76
40b	Turntable drive pulley ... ..	AE.606.09
40a	Rubber clutch wheel ... ..	AE.571.41
40c	Clutch spring ... ..	AE.505.81
39	Washer ... ..	P5.511.75/304
	Shim washers (2) ... ..	A4.452.27
37	Bracket with spindle ... ..	AE.606.08
53	Tension spring ... ..	AE.504.78
32	Leaf spring and bracket assembly ... ..	AE.606.07

## FLYWHEEL ASSEMBLY

17	Flywheel ... ..	AE.571.08
13	Leaf spring ... ..	AE.504.39
12	Top bearing ... ..	P5.511.98/334
26	Lower bearing ... ..	P5.511.95/334
27	Bearing plate ... ..	P5.511.93/334

## MOTOR ASSEMBLY

177	Motor with pulley ... ..	JW.525.08
177a	Replacement pulley ... ..	JW.523.29
177b	Governor ... ..	49.266.90
181	Tension spring ... ..	AE.505.24
	Rubber cap ... ..	P.145.342

## MISCELLANEOUS

	5-pole socket ... ..	WT.888.34
	Rivet for Socket (2) ... ..	B.002.AF/3x5
	Transistor label ... ..	AE.505.63
	Microphone securing clip ... ..	AE.505.33
	Spring for above ... ..	AE.505.34
	Nut for R5 ... ..	916/045
	Twin separate screened lead ... ..	R367.KN/02AA10
	Single screened lead ... ..	R367.KN/01AA10
	Twin screened lead ... ..	R.292.KN/01
	Washers for printed board ... ..	B.050.ZZ/153
	Transistor heat sink (2) ... ..	56200

## FIXING MATERIAL

<b>Cheesehead Screws</b>		
2.6x5 mm. ... ..	...	B.054.ED/2.6x5
2.6x8 mm. ... ..	...	B.054.ED/2.6x8
2.6x15 mm. ... ..	...	B.054.ED/2.6x15
3x5 mm. ... ..	...	B.054.ED/3x5
3x8 mm. ... ..	...	B.054.ED/3x8
3x12 mm. ... ..	...	B.054.ED/3x12
3x30 mm. ... ..	...	B.054.ED/3x30
3x40 mm. ... ..	...	B.054.ED/3x40
<b>Nuts</b>		
2.6 mm. ... ..	...	B.020.AD/2.6
<b>Washers</b>		
2.6 mm. ... ..	...	B.050.CK/2.6
3 mm. (small) ... ..	...	B.050.CD/3
3 mm. (large) ... ..	...	B.050.ED/3
4 mm. ... ..	...	B.050.CD/4
<b>Lock Washers</b>		
3 mm. ... ..	...	B.053.BD/3
4 mm. ... ..	...	B.053.BD/4
<b>Miscellaneous</b>		
Tag Strips ... ..	...	MK.964.52
Solder Tags 3 mm. ... ..	...	B.021.AF/3
Distance Pieces ... ..	...	990/3.5x35
Sleeving ... ..	...	K.558.LB/Size

## CONNECTING LEAD ASSEMBLY

*Connecting lead—complete ... ..	EL.3768/01
3-pin plug ... ..	WT.888.38
Single pin plug—black ... ..	978/1x4AA
Single pin plug—red ... ..	978/1x4AF
Single pin plug—white ... ..	AE.012.66
Resistor $\frac{1}{2}$ watt 2.2M $\Omega$ ... ..	88.305.80B/2M2
*REEL OF TAPE 3"—Double play (blue box) ... ..	EL.3953/80
*Empty spool ... ..	EL.3952/20

## MICROPHONE ASSEMBLY

*Microphone—complete ... ..	EL.3755/00
401 Housing ... ..	P5.649.14/350
402 Metal grille ... ..	V3.204.44
412 Ornamental front ... ..	P5.649.15/350
414 Weight ... ..	V3.458.28
413 Phosphor bronze clip ... ..	V3.006.02
407 Capsule ... ..	EL.6084/10
409 Foam ring ... ..	P7.630.62/319
406 Foam pad ... ..	P7.630.63/319
415 Fixing screw ... ..	B.054.ED/2x5
404a Cable ... ..	R.367.KN/01AA10
404b Plug ... ..	V3.607.68

\*THESE AND OTHER ACCESSORIES CAN BE ORDERED FROM OUR HEAD OFFICE

**TRANSISTORS**

T1 } *	N.B.—Alternative type transistors may be fitted in which case replacements should be of the same type.	OC75*	S1-3	Driver transformer	...	...	...	...	...	A3.162.32																											
T2 }											OC75*	S4-7	Output transformer	...	...	...	...	...	A3.154.38																		
T3 }																				OC75*	S8	Coupling coil	...	...	...	...	...	A3.987.02									
T4 }																													OC75*	S10	Booster coil	...	...	...	...	...	A3.910.37
T5 }																																					
T6 }	Matched pair—OC72	...	...	...	...	...	...	...	...	A9.868.25																											

**TRANSFORMERS AND COILS**

S1-3	Driver transformer	...	...	...	...	...	...	...	...	A3.162.32
S4-7	Output transformer	...	...	...	...	...	...	...	...	A3.154.38
S8	Coupling coil	...	...	...	...	...	...	...	...	A3.987.02
S10	Booster coil	...	...	...	...	...	...	...	...	A3.910.37
S11	Loudspeaker	...	...	...	...	...	...	...	...	940/AD2400Z
	Core for S.10	...	...	...	...	...	...	...	...	K5.120.00

**DIODE**

X1	...	...	...	...	...	...	...	...	...	OA91
METER 500 uA	...	...	...	...	...	...	...	...	...	AE.504.26

**SWITCHES**

Sw 1	} Complete	...	...	...	...	...	...	...	...	...
Sw 2		...	...	...	...	...	...	...	...	...
Sw 1	} Sliding contact only	...	...	...	...	...	...	...	...	A3.295.54
Sw 2		...	...	...	...	...	...	...	...	A3.295.52
Sw 4	...	...	...	...	...	...	...	...	...	AE.571.18
Sw 6	...	...	...	...	...	...	...	...	...	AE.571.17
Sw 7	...	...	...	...	...	...	...	...	...	...
Sw 8	...	...	...	...	...	...	...	...	...	...

**CAPACITORS**

		Value	Working Voltage	Permitted Tolerance%	
C1	Electrolytic	2.5uF	16	...	C.425.CF/E2.5
C2	Electrolytic	320uF	10	...	909/U320
C3	Electrolytic	100uF	4	...	909/W100
C4	Electrolytic	2.5uF	16	...	C.425.CF/E2.5
C5	Electrolytic	2.5uF	16	...	C.425.CF/E2.5
C6	Electrolytic	100uF	4	...	909/W100
C7	Polyester	150,000pF	125	10	C.296.AC/A150K
C8	Electrolytic	2.5uF	16	...	C.425.CF/E2.5
C9	Polyester	47,000pF	125	10	906/L47K
C10	Electrolytic	100uF	4	...	909/W100
C11	Electrolytic	320uF	10	...	909/U320
C12	Electrolytic	2.5uF	16	...	C.425.CF/E2.5
C13	Electrolytic	10uF	6.4	...	909/Z10
C14	Electrolytic	320uF	10	...	909/U320
C15	Polyester	18,000pF	125	10	906/L18K
C16	Ceramic	2,200pF	500	10	C.301.AA/H2K2
C17	Electrolytic	100uF	4	...	909/W100
C18	Electrolytic	2.5uF	16	...	C.425.CF/E2.5
C19	Ceramic	1,500pF	500	+50-20	904/1K5
C20	Electrolytic	250uF	10	...	910/B250
C21	Polyester	82,000pF	125	10	906/L82K
C22	Polyester	82,000pF	125	10	906/L82K
C23	Polyester	27,000pF	125	10	C.296.AC/A27K
C24	Ceramic	2,200pF	500	+50-20	C.301.AA/H2K2
C25	Ceramic	3,300pF	500	+50-20	904/3K3
C33	Electrolytic	2,000uF	10	...	C.430.BL/D2000
C34	Ceramic	3,300pF	500	+50-20	904/3K3
C36	Feed through	2,200pF	...	...	} In Motor
C37	Feed through	2,200pF	...	...	
C38	Feed through	2,200pF	...	...	

**RESISTORS**

(N.B.—Wattage is based upon an ambient temperature of 70°C.)

		Wattage	Permitted Tolerance%	
R1	...	15,000Ω	10	48.426.10/15K
R2	...	33,000Ω	10	48.426.10/33K
R3	...	6,800Ω	10	48.426.10/6K8
R4	...	8,200Ω	10	48.426.10/8K2
R5	Volume control	20,000Ω	Log Law	E.098.CG/00B30
R6	...	3,300Ω	10	48.426.10/3K3
R7	...	33,000Ω	10	48.426.10/33K
R8	...	100,000Ω	10	48.426.10/100K
R9	...	2,700Ω	10	48.426.10/2K7
R10	...	6,800Ω	10	48.426.10/6K8
R10†	...	5,600Ω	10	48.426.10/5K6
R11	...	820Ω	10	48.426.10/820E
R12	...	22,000Ω	10	48.426.10/22K
R13	...	82,000Ω	10	48.426.10/82K
R14	...	1,800Ω	10	48.426.10/1K8
R15	...	5,600Ω	10	48.426.10/5K6
R16	...	1,000Ω	10	48.426.10/1K
R17	...	22,000Ω	10	48.426.10/22K
R18	...	12,000Ω	10	48.426.10/12K
R19	...	1,500Ω	10	48.426.10/1K5
R19†	...	1,000Ω	10	48.426.10/K
R20	...	2,200Ω	10	48.426.10/2K2
R21	...	150Ω	10	48.426.10/150E
R22	...	100Ω	10	48.426.10/100E
R22†	...	47Ω	10	48.426.10/47E
R23	Pre-set	5,000Ω	...	E.097.AC/5K
R24	...	15Ω	10	48.426.10/15E
R25	...	33,000Ω	10	48.426.10/33K
R26	...	470Ω	10	48.426.10/470E
R27	Pre-set	2,000Ω	...	E.097.AC/2K
R29	Pre-set	20,000Ω	...	E.097.AC/20K
R30	...	820Ω	10	48.426.10/820E
R31	...	3,300Ω	10	48.426.10/3K3
R32	...	330Ω	10	48.426.10/330E
R35	...	10Ω	10	48.426.10/10E
R35a	...	10Ω	10	48.426.10/10E
R36	...	10Ω	10	48.426.10/10E
R37	...	330Ω	10	In Motor

† Are fitted when alternative type transistors are used.

# PHILIPS

## General Description.

The EL3766 is an A.C. mains supply unit designed for home use with the Philips type EL3585 battery operated tape recorder.

## Uncasing and Specification

To uncase the unit, remove the three fixing screws and slide off the cover.

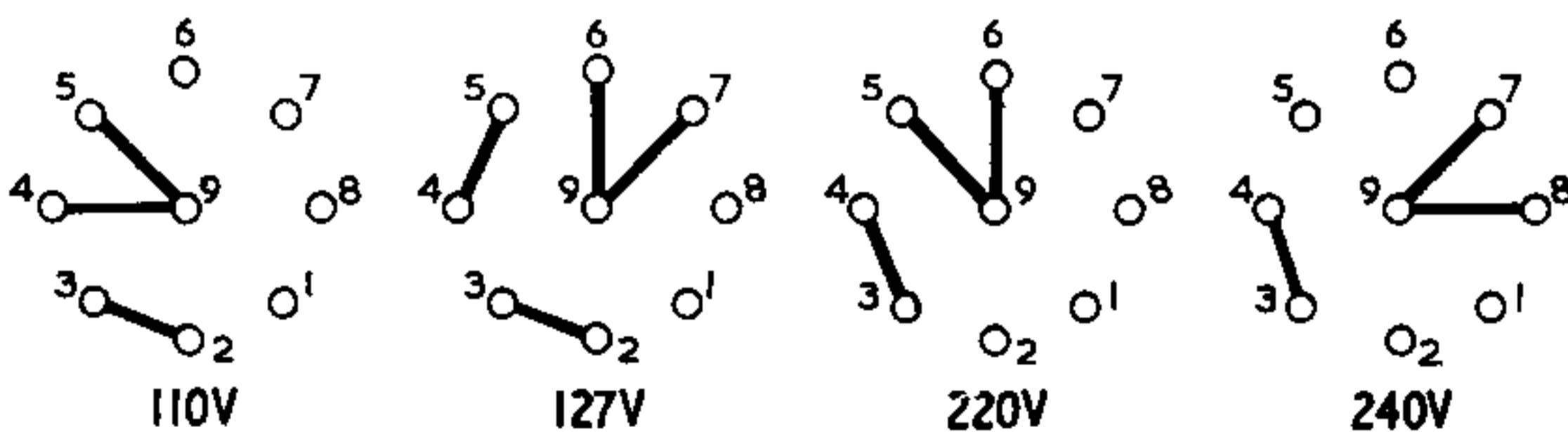
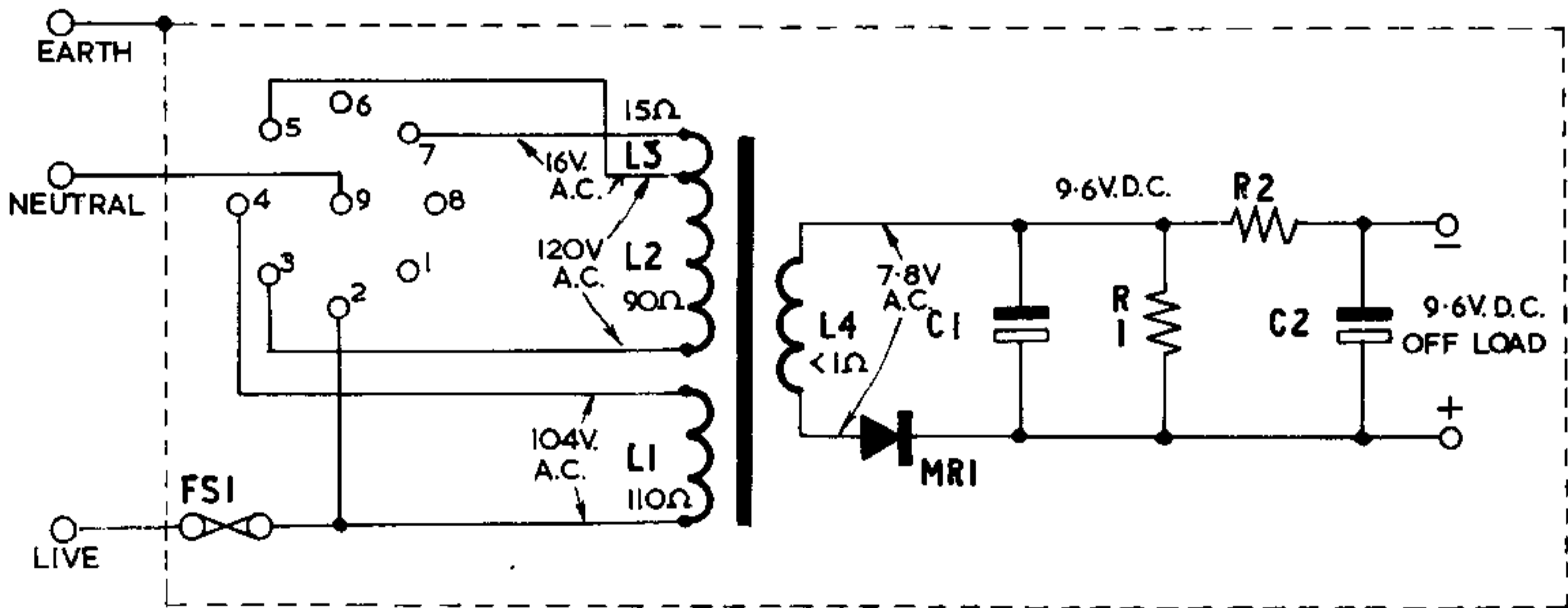
Conventional half-wave rectification is employed, using a silicon diode rectifier, type OA210. A thermal fuse mounted on a carrier, is situated in a "pocket" of the mains transformer. To release, unsolder the tag connection of the fuse-carrier from the tag-plate of transformer.

**Voltage ranges.** 110V, 127V, 220V and 240V A.C. 50 or 60 c/s.

**Dimensions:**

Length	Width	Height
6"	3½"	3"

**Weight:** (including battery adaptor) 2 lb. 10 ozs. (approx).



D.C. Voltages taken with respect to MRI +ve.  
240V in on 240V tap using a 20,000Ω/V meter.

SDI760

# SPARE PARTS LIST—TYPE EL3766

## Battery Contact Assembly

Moulded Tube	AE.505.86
Contact (2)	AE.505.87
Lead clamp	B.205.AD/1×6×10
Screws (3)	B.055.ED/3×6

## Chassis Assembly

Voltage disc & Plate assembly	WT.886.86
Voltage plate only	AE.570.08
Transformer (L1--L4)	A3.145.35
Fuse—carrier	A3.425.53
Rectifier—MR1	OA210
Battery lead—2 core	R.216.KN/07NE
Mains Lead—3 core	R.909.KA/804K

## Miscellaneous

Feet (3)	
Spacers for above	990/3.5×35
Fixing Materials	
Screws	
Cheesehead	
3×8 mm	B.054.ED/3×8
3×10 mm	B.054.ED/3×10
3×25 mm	B.054.ED/3×25
4×6 mm	B.054.ED/4×6
Washers—4 mm	B.050.CD/4
Lockwashers—4 mm	B.053.AD/4
Sleeving	K.558.LB/Size
Tag strip	HY.138.73
Rivets—for voltage plate	B.002.AF/3×6

## Capacitors

C1	2000uF	10V		C.430.BL/D2000
C2	2000uF	10V		C.430.BL/D2000

## Resistors

R1	100Ω	1W	10%		900/100E
R2	Wirewound	2.2Ω	2W		E.104.AA/A2E2



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