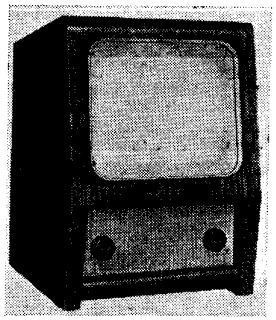
HMV 1807



Fourteen-valve AC/DC television receiver fitted with 10-inch aluminised Emiscope giving a 9 by 7-inch picture. Suitable for use on 220 to 250V DC or 200 to 250V AC 50 c/s. Housed in walnut veneered table cabinet. Marketed by the Gramophone Co., Ltd., Hayes, Middlesex.

THE receiver employs a straight TRF circuit using permeability-tuned inductances. The first RF amplifier is common to both sound and vision signals.

RF assembly, line and frame generators, and power supplies are all accommodated on a 10¾ by 11-inch chassis. Mains consumption is 130 watts.

Aerial. Input circuit is designed so that balanced twin feeder or concentric cable may be used. Earthy side of concentric cable and earth connection of receiver are isolated from chassis by C1. Live side of aerial is connected direct to coupling coil L1, but is isolated from chassis by C2.

L2, which is tuned to 41.5 mc/s by the "stray" circuit capacity and the grid-cathode capacity of V1, and damped by R2 to provide wide bandwidth to accept both sound and vision frequencies, couples aerial signal to first RF amplifier V1. Gain ("Contrast") is controlled by R8 in the cathode circuit. The effect of change of bias on the grid-cathode capacity of the valve and, therefore, on the frequency of the grid circuit, is reduced by the resistance network linking grid and cathode.

RFT2, which is in the anode of V1 and tuned to 44 mc/s, feeds signal to second RF amplifier V2.

Sound Channel. RFT3, which is in the cathode of V2 and tuned to 41.5 mc/s, feeds sound signal to V6 for further amplification, after which it is

Continued opposite

RESISTORS

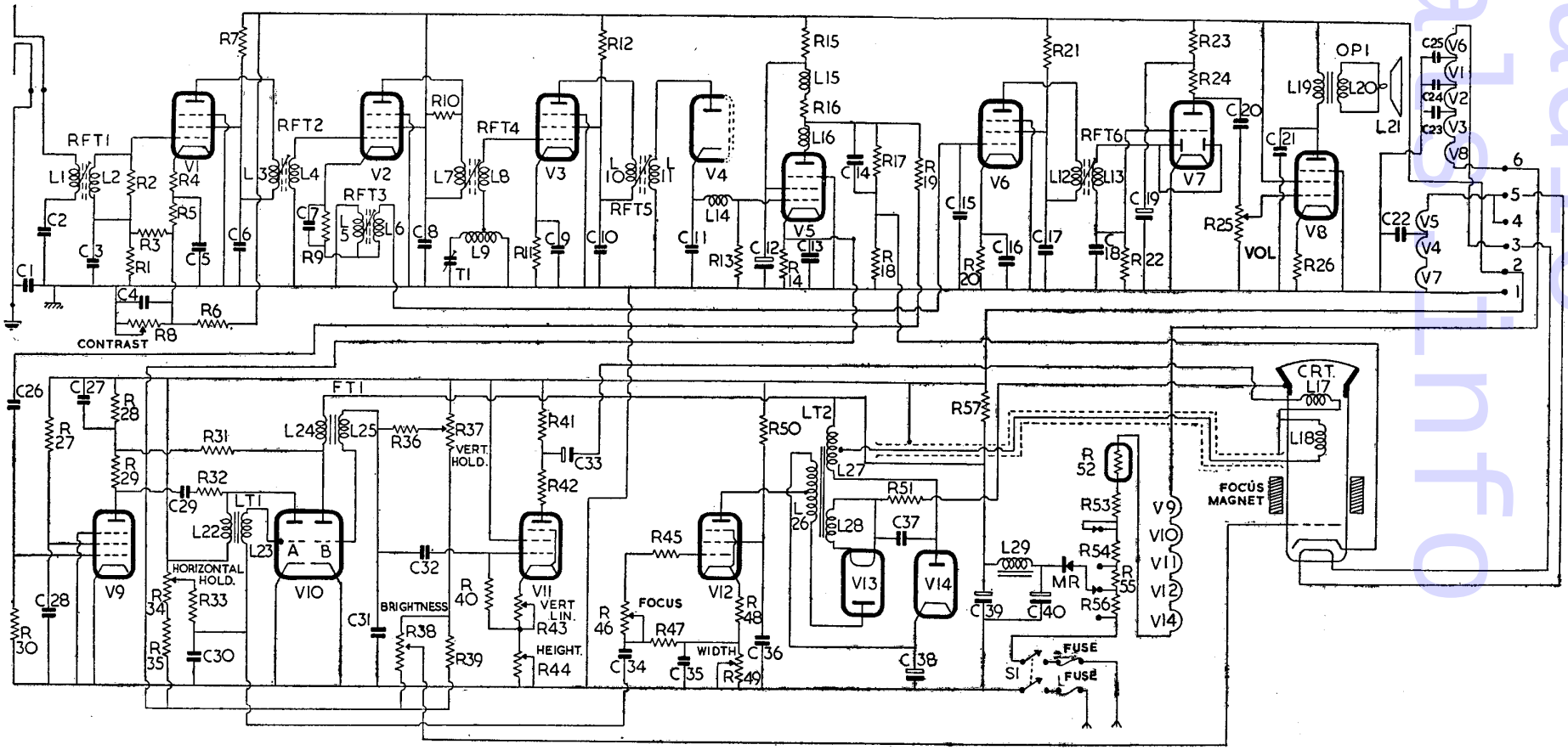
R	Ohms	Watts
1	47K	½
2	33K	½
3	2.2K	½
4	33	½
5	130	½
6	33K,1W(47K&150K)	
7	470	½
8	10K Potentiometer	
9	130	½
10	15K	½
11	130	½
12	470	½
13	4.7K	½
14	160	½
15	2.2K	1
16	6.8K	1
17	68K	½
18	68K	½
19	10K	½
20	130	½
21	470	½
22	47K	½
23	33K	½
24	220K	½
25	500K Potentiometer	
26	150	½
27	680K	½
28	68K	½
29	33K	½
30	1M	½
31	150K	½
32	22K	½
33	330K	½
34	25K Special potr.	
35	15K	1
36	1.5M	½
37	25K Special potr.	
38	50K Potentiometer	
39	22K	½
40	2.2M	½
41	6.8K	7.5
42	220	½
43	1.1K	7.5
44	1K Special potr.	
45	1K	½
46	100K Potentiometer	
47	470K	½
48	100	½
49	250 Special potr.	
50	4.7K	1
51	470K	½
52	Surge limiter	
53	69 Mains	
54	54 Dropper	
55	51 Resister	
56	16	
57	2.25 Resistive Lead	

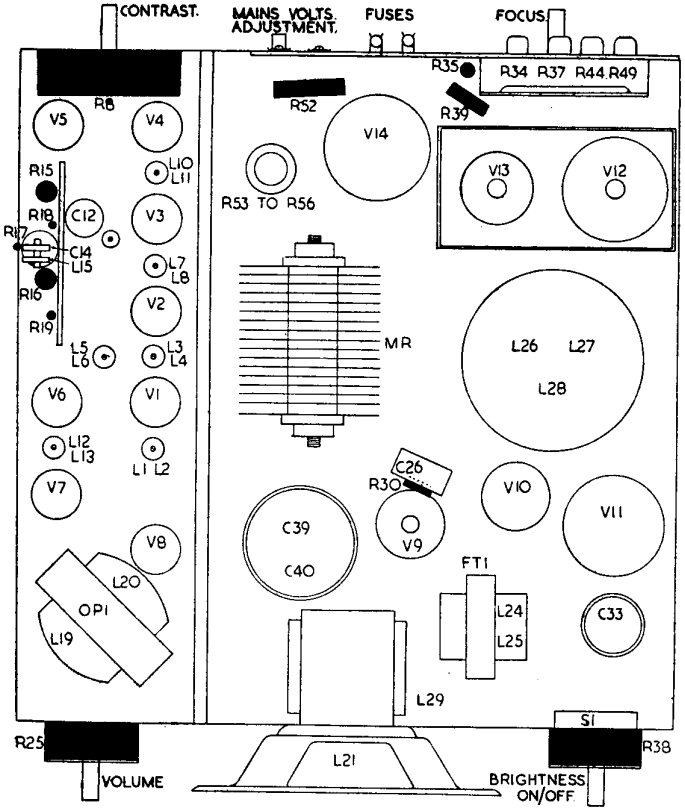
CAPACITORS

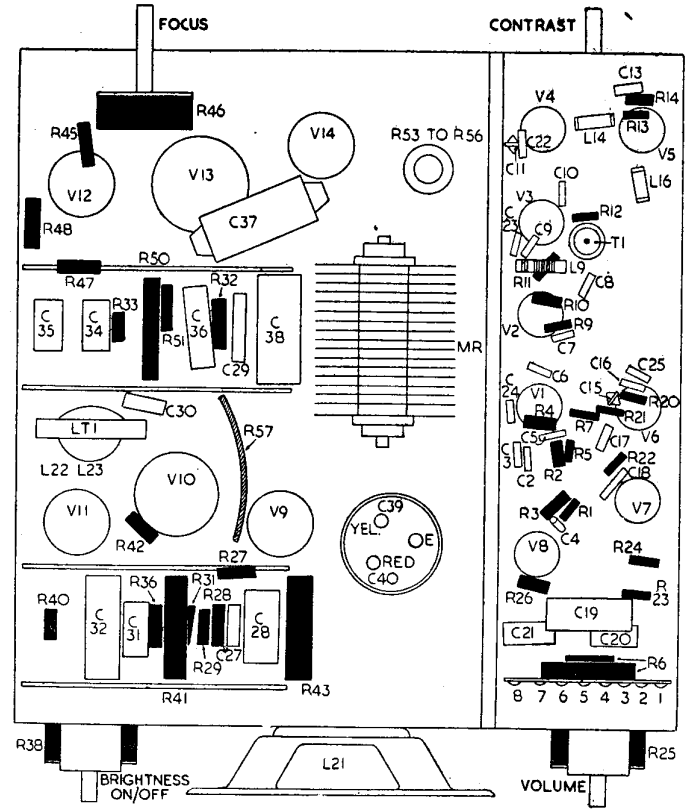
C	Capacity	Type
1	.01	Tubular 300V AC
2	1000pF	Tub. Ceramic
3	1000pF	Tub. Ceramic
4	100pF	Tub. Ceramic
5	100pF	Tub. Ceramic
6	1000pF	Tub. Ceramic
7	1000pF	Tub. Ceramic
8	1000pF	Tub. Ceramic
9	1000pF	Tub. Ceramic
10	1000pF	Tub. Ceramic
11	10pF	Ceramic
12	4	Electrolytic 350V
13	1000pF	Tub. Ceramic
14	.22	Tubular 350V
15	10pF	Ceramic
16	1000pF	Tub. Ceramic
17	1000pF	Tub. Ceramic
18	100pF	Tub. Ceramic
19	1	Electrolytic 350V
20	.01	Tubular 350V
21	.0022	Tubular 750V
22	1000pF	Tub. Ceramic
23	1000pF	Tub. Ceramic
24	1000pF	Tub. Ceramic
25	1000pF	Tub. Ceramic
26	.047	Tubular 350V
27	.001	Tubular 750V
28	.047	Tubular 350V
29	220pF	Silver Mica
30	.001	Tubular 750V
31	.047	Tubular 350V
32	.1	Tubular 350V
33	32	Electrolytic 200V
34	.01	Tubular 350V
35	.01	Tubular 350V
36	.1	Tubular 350V
37	1000pF	Tub. 7000V
38	2	Electrolytic 450V
39	128	Electrolytic 350V
40	64	Electrolytic 350V

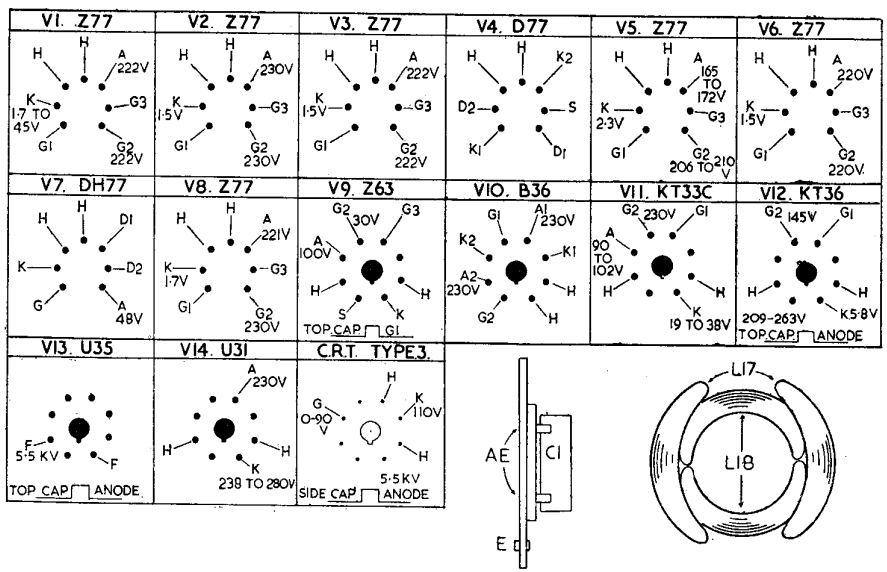
INDUCTORS

L	Ohms
1—13	very low
14	250
15	13
16	230
17	900
18	2.25
19	900
20	very low
21	4
22	2.25
23	4
24	260
25	145
26	300 total
27	13
28	very low
29	100









HMV 1807

coupled by RFT6, tuned to 41.5 mc/s, to strapped diodes of V7 for rectification. Rectified signal appears across diode load R22 and is directly coupled to grid of triode section of V7, amplified and fed through volume control R25 to output valve V8. OP1 in its anode circuit feeds signal to a 5-inch PM loudspeaker L21. C21 gives fixed tone control.

Vision channel operates on the lower sideband of the carrier. Alignment of the tuned circuits is staggered to give a flat response between 42.5 and 44 mc/s. RFT4, tuned to 42.5 mc/s, is in the anode of V2 and feeds V3. L9, T1 in the grid circuit are a 41.5 mc/s filter.

RFT5, tuned to 45 mc/s, couples V3 to signal rectifier diode V4. Rectified signal appearing across R13 is direct coupled to grid of video-frequency amplifier V5. Direct coupling is used to preserve the DC characteristic of the signal.

Note the low values of diode load components, C11, R13, to preserve wide response.

To secure maximum current swing in V5 the whole grid base must be utilised and extra current from Brightness and Hold controls is needed through R14 to obtain the necessary bias.

Signal is fed from V5 to CRT cathode by DC-AC coupling comprising R17-C14 and R18. The arrangement reduces heater-cathode surge voltage on CRT before video amplifier warms up, attenuates low-frequency components produced by aeroplane flutter and makes the DC-AC ratio of gain approximately compensate for excessive "Gamma" variations in the transmission.

Sync separator. Sync pulses are taken from anode of V5 through R19, C26 to grid of sync separator valve V9. The positive sync pulses drive the valve into grid current and produce a steady negative bias across R30, and the negative picture signals drive the valve beyond cut off. Thus only the synchronising pulses appear in the anode of V9.

Frame trigger pulses are developed across integrating circuit C27, R28, R31. Separation of frame and line pulses is accomplished because the longer frame pulses build up a charge on C27, whereas the short duration line pulses are smoothed out. The frame triggering pulse is fed *via* R31 to frame oscillator anode.

Line trigger pulses are developed by differentiating circuit R29, C29, R32, which sharpens the waveform because of its short time constant. Pulses are fed by R32 to line oscillator anode.

Scan oscillators. These are V10A for the line frequency and V10B for the frame, both being "blocking" triodes with transformer back-coupling from anode to grid. The time constant of C30 with R33, R34 decides the line frequency, and C31 with R36, R37 determines frame frequency.

Each oscillator attains maximum amplitude in the first quarter cycle of oscillation (the "flyback stroke"), the grid acquiring electrons which charge the grid condenser (C30, C31) to HT negative. While the oscillator is blocked, the electrons flow to HT positive at a rate determined by the time constant. This is the scanning stroke, the signals being passed from the grid circuits of V10 to amplifiers V11 and V12 by C34 and C32 respectively.

Frame amplifier is V11. Amplitude of scanning voltage is governed by R44, the Height control in the cathode of V11. Frame linearity is adjusted by R43.

Line amplifier is V12. Amplitude of scanning voltage is adjusted by R49, the Width control, in the cathode circuit. Output from V12 is fed by L27 of LT2 to the line scanning coils L18 on the CRT.

The overswing of flyback voltages in L27 are damped by V14, and the resultant rectified voltage, smoothed by C38, is fed back through L26 as additional HT for anode of V12. "Normal" HT for this valve is provided by DC through L27 and V14.

EHT supply for anode of CRT is obtained by rectifying the surge voltage developed across the primary L26 of LT2 when the line output valve V12 is cut off. The upper part of L26 is actually the primary section, the lower part being an additional section forming an auto-transformer to step-up the flyback voltage.

Filament current for rectifier V13 is provided by an auxiliary secondary winding L28 on transformer LT2. EHT is smoothed by C37 and fed through R51 to anode of CRT.

HT supply is provided by a half-wave metal rectifier MR, which is fed either direct from the mains or through part of mains dropper resistor R53—R56. Choke-capacity smoothing is given by loudspeaker field L29 with C39, C40.

Heaters of V1 to V12, V14 and CRT obtain current from the mains through dropper resistor R53—R56 and a thermally-operated surge limiting resistor R53 which reduces current when firs switching on.

Continued overleaf

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S1, ganged to the Brightness control, is the on/off switch. Fuses are fitted to the input mains lead.

Cathode-ray tube is a 10-in. triode, having an aluminised screen and providing a 9 by 7-inch picture. It is magnetically focused by ring magnet on the neck in conjunction with a variable control in the grid circuit of V12. This control, by varying the line flyback period, alters the EHT to the CRT anode and so alters the focus of the beam as well as having some effect on brightness.

Picture brightness is controlled by varying the bias applied to the grid of the CRT. This voltage is obtained from R38, the Brightness control, which forms part of a bleeder network.

Picture signals are fed to the cathode.

Note on Testing. Most stages can be checked by normal methods, but it is not advisable to break into the fine connections to RF coils if this can be avoided. Dynamic testing by signal injection is probably the best way to check RF, demodulator, video and AF stages.

Due to pulse operation in the time-base sections, DC voltage and current readings are of little value, and oscilloscope waveforms offer a more reliable check of performance.

None of the EHT points is lethal—peak current is approximately 1mA, but a RF burn may result from physical contact. Except for a check on the smoothed EHT point with an electrostatic meter or current indicator of less than 100 microamps loading, no other test is possible on the line output transformer primary circuit.

It is unlikely that failure of the scan during testing will damage the tube except due to disconnection of the scanning coils.

Alignment procedure. Connect micro-ammeter, decoupled by 20,000 ohms to grid of video amplifier. Connect output meter across 4 ohms to LS leads.

Allow 5 minutes for receiver to stabilise, then, from signal generator of 50 ohms output impedance, inject signals as below.

Signal mc/s.	Transformer or Trimming Condenser	Procedure
41.5 (Mod. 400 c/s 30%)	RFT3 RFT6	Tune to secure minimum input giving 250mW output.
41.5 (No. mod.)	T1	Minimum video output
43	RFT1	Minimum input for 2V at video diode.
44	RFT2	
42.5	RFT4	
45	RFT5	

Retune RFT1 for balance of sound to vision gain and curve shape.

Response should be as follows: Flat within +2dB between 42.5 and 44mc/s; —4 to —6dB at 45mc/s with respect to 43.5mc/s; more than 25dB down at 41.5mc/s.

REES MACE GNOME

Continued from page 35

Filament negative and g3 are connected down to chassis. Screen (g2) voltage is obtained from R3 and decoupled by C9.

Signal rectifier. L9, T8, the secondary of IFT2, feeds signal to diode anode of V3. R5, the volume control, is the load resistor and C10 filter capacitor.

AVC. The DC component of the rectified signal is used for this purpose and is fed by R4 to g3 of V1 and g1 of V2. C2 is decoupling capacitor.

AF amplifier. C11 feeds signal from volume control R5 to g1 of pentode section of V3. Bias for g1 is developed on C11 with R6 as leak resistor. Filament negative and g3 are connected down to chassis. Screen (g2) voltage is obtained from R7 and decoupled by C12. R8 is the anode load resistor and C13 anode RF by-pass capacitor.

Output stage. C14 feeds signal at anode V3 to g1 of pentode output valve V4. Bias for grid, which is developed across R11 in the HT negative return to chassis and decoupled by C18, is fed through R10 to g1. Centre tap of filament and g3 are connected down to chassis. (The two halves of filament are paralleled so as to operate from the 1.5V LT supply.)

Screen voltage is obtained from HT line. L10, the primary of output matching transformer OP1, is in the anode circuit. C15 is tone correction capacitor. L11, the secondary of OP1, feeds into a 5-in. PM loudspeaker L12.

HT is provided by two 45V batteries, such as Ever Ready Type B104, connected in series. The coupling together of the batteries is effected by the wo non-reversible plugs provided on the HT lead. HT battery is decoupled by C17. Further decoupling is provided by R9, C16.

S3 in its off position breaks the negative HT lead to receiver.

ALIGNMENT INSTRUCTIONS

Apply signal as stated below	Tune Receiver to	Trim in Order stated for Max. Output
(1) 430 kc/s direct to g3 of V1 (with g1 shorted to chassis)	—	T8, T7. Core L3
(2) 1.5 mc/s to L1 via a loop	200 metres	T4, T2
(3) 600 kc/s as above...	500 metres	T5. Repeat (2) and (3)
(4) 273 kc/s as above...	1,100 metres	T3, T1
(5) 150 kc/s as above...	2,000 metres	T6. Repeat (4) and (5)

LT of 1.5V is supplied by an Ever Ready All-Dry 4 type battery. S4, which is ganged to S3 and the wavechange switch breaks the LT negative lead to chassis.

Chassis Removal. Remove battery cover and unplug and remove the HT and LT batteries. Chassis is held in cabinet by two bolts—one at each end of valve platform. On unscrewing the nuts, chassis is free to be withdrawn to extent of leads into frame aerial and speaker compartment.

Top panel of chassis with dial escutcheon can be lifted off after removing the four self tapping screws. To expose wavechange switch, the dial plate must be removed.

Frame Aerial and Speaker Removal. Remove the two lower wood screws (nearest to edge) securing hinge to lid and also the two inner screws of snap fastener catches. Carefully ease out cover panel.

Undo the four wood screws at extreme sides of speaker baffle and carefully withdraw assembly so as to avoid damage to frame aerial.

HMV HAIR DRYER—*from page 31*

and remove paxolin gasket (Fig. 3). Unscrew brush caps located at each side of main body and remove carbon brushes.

Remove the two screws immediately below switch buttons (Fig. 4). Pull off oval-shaped plate marked "HMV" and remove slotted nut below it. Lift off switch escutcheon and carefully ease out switch assembly. Remove lead marked A (with yellow sleeve on it) from centre terminal of switch. Switch can then be temporarily placed back in position. Remove black lead (from one of motor field coils) which is held under the bolt at left-hand side of housing. Remove the four bolts (two at each side of motor) which secure bars under which motor frame lugs are clamped to body (Fig. 3). Motor can now be withdrawn from housing.

Dismantling motor. On removal of the two bolts at opposite sides of endplates (one is used to anchor earth lead of interference suppressor capacitors) the end plates, laminations, and armature can be separated (Fig. 6).

When reassembling see that the fibre washers are placed one at each end of armature spindle. These prevent any surplus oil from the end bearings being splashed on to commutator segments or armature windings. To relieve any tension on the armature bearings due to misalignment when re-assembly of motor is completed, it is advisable to tap the free side of laminations lightly but sharply with a small hide mallet.

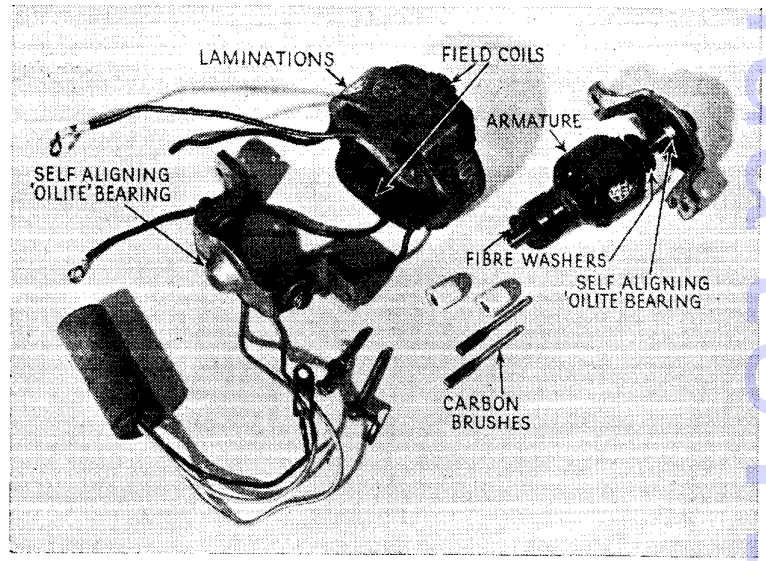

Fig. 6 — Motor armature, end-plates, laminations and field coils can all be taken down on removal of two bolts. Generally, the only attention needed is occasional renewal of the carbon brushes

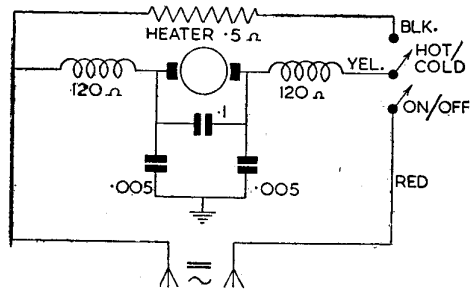

Fig. 7—Circuit diagram of the hair dryer showing motor, element and the two switches. Resistance of the heater when cold is 100 ohms

ATLAS FLUORESCENT FITTINGS

The original Quickstart control gear circuit for twin 40W fittings was given in Fig. 2 of last month's Service Chart on Atlas decorative fluorescent units.

A modified circuit is now in use and is reproduced below.

ATLAS "DOUBLE FORTY" Q.S. UNIT