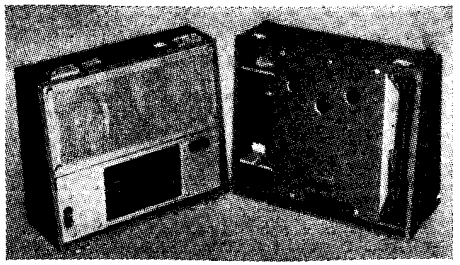
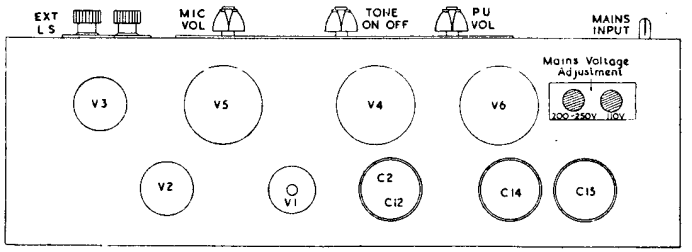
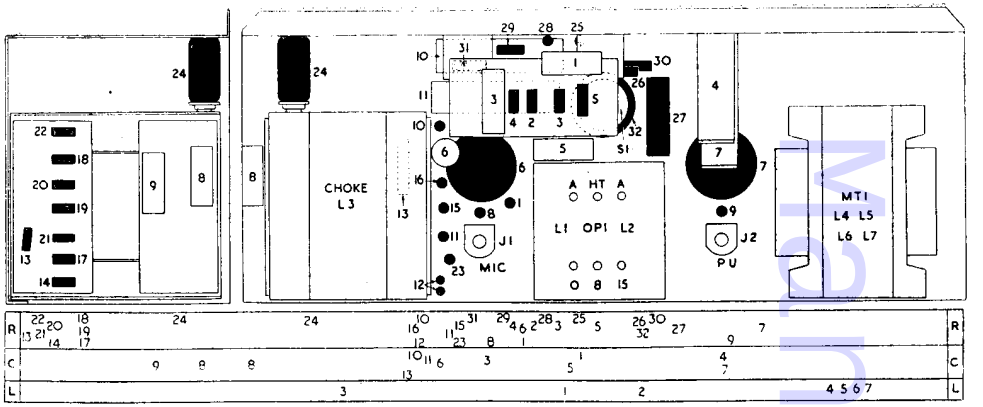
PREIL "TWENTY" AMPLIFIER







Portable six-valve 25-watt push-pull amplifier in dividing blue leather cloth covered suitcase with plastic carrying handle. Removable section of case contains a 10in. PM loudspeaker and provides stowage for crystal table microphone and mains and LS connecting leads. Amplifier has input jacks for high-impedance pickup and crystal microphone and output terminals for 8 and 15 ohm speakers. For 110 and 200-250V 50c/s operation. Manufactured by Portogram Radio Electrical Industries Ltd., Preil Works, St. Rule Street, London, SW8.

INDUCTORS

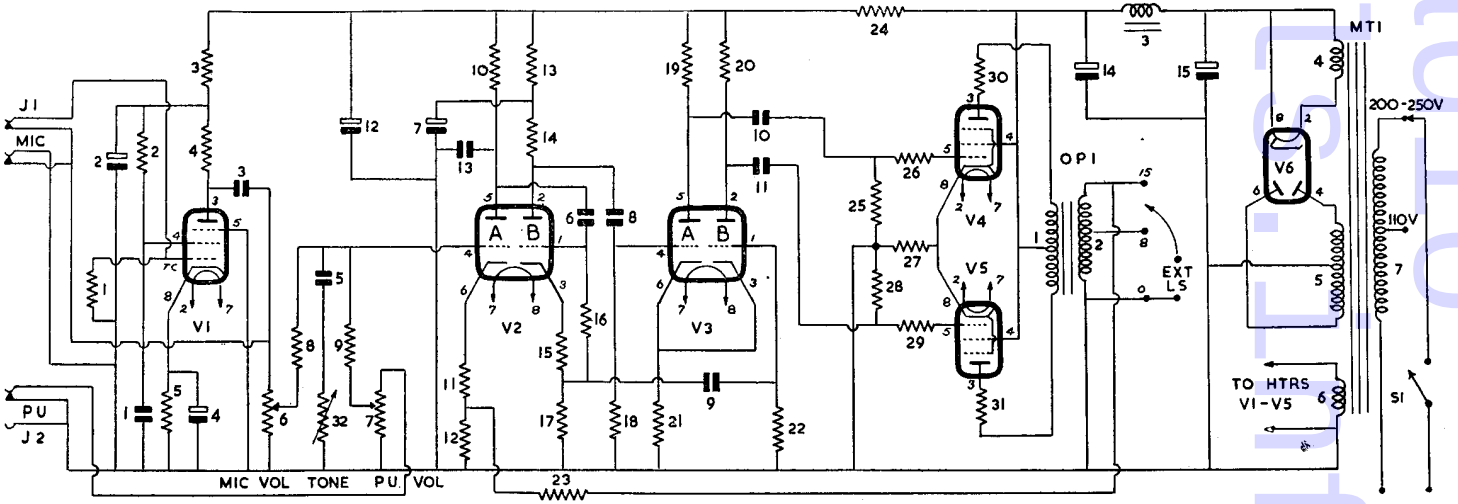
L	Ohms
1	300
2	.5
3	180
4, 6	Very Low
5	220
7	11

CAPACITORS

C	Capacity	Type
1	.05	Tubular 500V
2	32	Electrolytic 350V
3	.02	Tubular 500V
4	25	Electrolytic 25V
5	.02	Tubular 500V
6	.05	Tubular 500V
7	8	Electrolytic 200V
8	.05	Tubular 500V
9	.05	Tubular 500V
10	.25	Tubular 350V
11	.25	Tubular 350V
12	32	Electrolytic 350V
13	500pF	Mica
14	16	Electrolytic 450V
15	16	Electrolytic 450V

RESISTORS

R	Ohms	Watts
1	1M	½
2	1M	½
3	56K	½
4	250K	½
5	1.5K	½
6	500K	Potr.
7	500K	Potr.
8	100K	½
9	100K	½
10	56K	½
11	1K	½
12	20 (2 x 40)	½
13	56K	½
14	56K	½
15	1K	½
16	1M	½
17	56K	½
18	250K	½
19	100K	½
20	100K	½
21	470	½
22	250K	½
23	3.3K	½
24	4.5K	4W
25	250K	½
26	3.3K	½
27	150	4W
28	250K	½
29	3.3K	½
30	100	½
31	100	½
32	50K	Potr with SP switch



V1—EF37A	V2—6SN7	V3—6SN7	V4—EL37	V5—EL37	V6—GZ32
G2 25V G3 A 46V H H M K IV TC G1	G① A① 100V K① 2·8V K② 70V A② 100V H G② H	G① A① 70V K① 2V K② 2V A② 70V H G② H	G2 G1 345V A 335V H H K G3 23V	G2 G1 345V A 330V H H K G3 23V	A 335V RMS A 335V RMS H H/K 375V

Total HT Current = 160MA
V4 Anode Current = 69MA
V5 Anode Current = 66MA
Mains Current = 485MA

Voltage and current reading taken with 230V 50c/s mains input.

THE "Twenty" amplifier is a high-quality low-distortion 25W AC-powered amplifier designed for compactness, portability and simplicity. The amplifier is housed in one half of the case; the other half, containing a 10in. PM speaker, can be detached and placed in a suitable position.

Inputs are provided for crystal microphone, which can be stowed away in a compartment in the speaker section of case, and for any high-impedance pickup. Separate volume controls are provided and inputs can be mixed simply by turning up both controls. A tone control, which also operates the on/off switch, is provided.

The amplifier consists of a low-noise microphone amplifier, a twin-triode pickup amplifier, mixer and phase-splitter, a twin-triode push-pull driver and a pair of pentodes in a push-pull output stage with heavy negative feedback to cathode of mixer.

Microphone input is designed for use with a high-impedance crystal instrument which should be plugged into J1. Signal is fed to g1 of microphone amplifier V1 of which R1 is grid load. Cathode bias is provided by R5 decoupled by C4 and screen

PREIL "TWENTY"

Continued from opposite page

voltage is obtained from R2 decoupled by C1. Suppressor (g3) is earthed to chassis.

R4 is anode load and HT feed to anode and screen are voltage dropped and decoupled by R3 C2. Amplified signal at anode is fed by C3 to mic-volume control R6. When no plug is inserted into J1 then grid V1 and mic-volume control R6 are shorted to chassis, placing V1 inoperative.

Pickup input is designed for use with a high-resistance pickup which should be plugged into J2. Pickup signal is fed to pickup volume control R7.

Mixer is triode V2A. Signal from mic-volume control R6 or from PU volume control R7 or from both is applied through R8 R9 respectively to grid of V2A. Tone control giving top cut is provided by R32 with C5 connected between grid and chassis.

Cathode bias is provided by R11 and negative feedback from secondary L2 of output matching transformer OP1 is applied to cathode through R23 R12. Amplified signals are developed across anode load R10. C13 is an HF stabiliser. With no plug inserted in J2 then PU volume control R7 is short circuited to chassis.

Phase-splitter is triode V2B. Signal at anode V2A is fed by C6 to grid V2B of which R16 is grid load. Opposite-phased signals are developed across anode load R14 and cathode load R17. HT feed to anode V2B is decoupled by R13 C7.

Push-pull drivers are triodes V3A V3B, fed by C8 C9. R18 R22 are grid resistors and R21 common cathode bias resistor. Amplified, opposite-phase signals appear across R19 R20.

Push-pull output stage. C10, through stopper R26, feeds one push-pull output amplifier V4, and opposite-phase signal is coupled by C11, through R29, to second push-pull amplifier V5. R25 R28 are grid loads and R27 common cathode resistor.

Screens V4 V5 are strapped and obtain voltage direct from HT line, decoupling being by C14. Primary L1 of output matching transformer OP1 is in the anode circuits with HT applied to centre tap. R30 and R31 are anode stoppers.

Secondary L2 of OP1 is tapped for 8 and 15 ohm outputs. Voltages across L2 are applied through R23 R12 to cathode V2A as negative feedback to reduce distortion, increase speaker damping and allow less-critical matching for various numbers of speakers.

HT is provided by a full-wave indirectly heated rectifier V6 fed from HT secondary L5 of mains input transformer MT1. Heater current is obtained from L4. Choke-capacity smoothing is by L3 C14 with further voltage dropping and resistance-capacity smoothing by R24 C12. Reservoir smoothing capacitor C15 should be rated to handle 400 mA ripple current.

Heaters V1 to V5 are parallel connected and fed from secondary L6. Primary L7 is tapped for inputs of 110, 200-250V 50 c/s. S1, which is ganged to tone control spindle, is ON/OFF switch.

Removal of chassis. First remove ventilation grille above amplifier control panel by unscrewing the four milled nuts, one at each corner. Next unscrew nut and bolt securing rear top of chassis to back of case. Finally remove the two Philips screws located on underside of front edge of case. Chassis can now be withdrawn by sliding forward and tilting backward to clear grille support strips.

McCARTHY TSH312

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and chassis. Connect AC output meter across primary L26 of OP1.

IF stages. Inject 2.5mc/s to grid V3A through .01mF capacitor and adjust core L9 for minimum vision and core L10 for maximum sound output.

Inject 3.25mc/s and adjust core L5 for maximum vision.

Inject 5.5mc/s and adjust core L7-8 for maximum vision.

RF and oscillator stages. With London region models:—

1. Inject 41.5mc/s to aerial socket and adjust core L6 for maximum sound.

2. Inject 42mc/s to aerial socket and adjust L1/2 for maximum vision.

3. Inject 43.3mc/s to aerial socket and adjust L3 for maximum vision.

4. Inject 44.4mc/s to aerial socket and adjust L4 for maximum vision.

For other channels the procedure is identical using frequencies as listed below:—

Northern: (1) 48.25, (2) 48.8, (3) 50, (4) 51.2.
Scottish: (1) 53.25, (2) 53.8, (3) 55, (4) 56.2.
Midland: (1) 58.25, (2) 58.8, (3) 60, (4) 61.2.
Western: (1) 63.25, (2) 63.8, (3) 65, (4) 66.2.

The tuning should be checked on an actual transmission and if necessary slight adjustments made to improve picture quality. Cores of L9 L10 however, should not be disturbed.

Modification. R46 R47 are now fed from junction L14 R55.

FORFEX HAIRDRYER

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heater former and end plate. A press-on chromium plated metal nozzle fits over outlet to give a concentrated air jet when desired.

The 7ft. heavy rubber covered two-core mains cable is fed into base of handle through a groove retained flexible rubber protector and is attached to internal connecting leads by two nut and bolt terminals which are in cavities in handle sections (Fig. 3). End of mains cable is fitted with a two pin 2A connector plug.

DISMANTLING

Access to motor and heater. Undo and remove the three nuts and bolts, positioned one on each side of nozzle and one at rear, and carefully lift off top section of body (Fig. 2). When doing this it is advisable to place nozzle in palm of cupped left hand to prevent heater retaining spring flying out.

To remove motor. Loosen screws in Bakelite connector block which secure either motor or switch and heater leads and then lift out motor with fan and baffle plate (Fig. 4). Fan can be removed from motor spindle by loosening grub screw in hub.

To remove heater. Remove end plate and asbestos gasket and disconnect the three leads from terminals at rear end of heater former by undoing and removing the three screws under which leads are fastened.

Access to handle switches. Undo recessed screw on each side of handle near body and undo and remove clamping nut and bolt towards bottom of handle. The two halves of handle can now be separated and removed from anchoring bush on bottom of body.

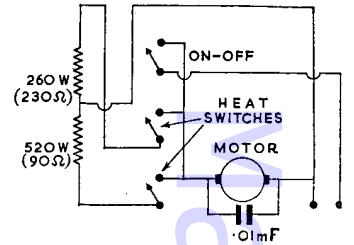

Fig. 5.—The two heat switches are not effective until the motor switch is closed

Switches are a press fit into support mouldings on inside of handle and can be removed by gripping switch cases and pulling. Paxolin insulation strips are inserted between the switches and when re-assembling see that these have been replaced in position.

MAINTENANCE

The motor is fitted with Sinterlite bearings with an oil-retaining washer. The bearings need no attention at any time by the user. The dryer is produced for hairdressers' use and continual running is catered for.

Motor brushes are a special type fitted with a retaining washer on spigot. This ensures no possibility of carbon springs fouling or damaging commutator when the life of the carbon has expired. Carbons can be obtained only from the manufacturers.

The element is a twin or double design and when damaged or burned out it is advisable to obtain a replacement part rather than to attempt repair.

Maintenance in the first year is covered by manufacturer's guarantee.

SERVICE CASEBOOK

FERGUSON 978T

SUFFERED from failure of frame hold control to take over except on extreme end of travel.

Time constants checked and fault found in R46 (680K, V13A grid leak) having gone high. Similar fault has been experienced in a number of these sets. —M.H.

SUPPRESS THIS ONE

OUR refrigeration engineer reports an unusual form of sparking which is believed to be responsible for radio interference.

The compressor of a refrigerator is driven by a rubber link belt with metal inserts. Friction causes this to work like a Whimshurst machine, emitting sparks nearly an inch long between the metal links and the driving pulley.

Both the motor drive pulley and the compressor flywheel are well earthed, yet the sparks occur only as the links approach the driving pulley and not as they approach the compressor pulley.—E. H. MEADOWS, Alton.

PYE AC

WE had an unusual and interesting fault the other day in a four-valve Pye AC superhet. Complaint was poor volume and at first we thought the EBL1 output pentode was defective. A new one brought no improvement; all other valves were up to standard and voltages everywhere were normal.

The fault appeared to be in the output stage so we concentrated there. After some little time we located the trouble.

One of the 120pF condensers in the diode detector circuit had developed a slight leak. As this condenser was connected from the earthy end of the second IFT secondary to chassis it biased the detector diode to the same extent as the pentode section of the EBL1.

Thus only strong signals could overcome the bias, and even they were attenuated by the amount of the bias. A new condenser completely cured the trouble.—G.R.W.

RADIOGRAM—WEAK OUTPUT

OUTPUT was almost inaudible. Checks of voltages, current and output transformer revealed no trouble.

Close examination of the speech coil circuit led to the cause of the bother. A panel—connected by flexible leads to the set—carried extension speaker sockets, aerial and earth sockets. One side of the speech coil ran direct to the secondary of the output transformer and to one speaker extension socket. The other side of the speech coil was wired to speaker frame and earthed chassis.

To complete the return circuit to the speech coil a lead from the extension speaker socket should have been connected to the earth socket. The lead was, in fact, there, but wired to the aerial socket! By changing over this connection results were brought to normal.

Although a simple fault—on paper—this took quite a time to find. The set was new and incorrect wiring was not anticipated.—J.R.

FERGUSON 288RG

A NEW receiver was suffering from strong modulation-hum on LW only when an external aerial was connected. With the built-in aerial there was no hum, though signals were naturally weaker.

As this receiver is of the AC/DC type, which is more prone to hum, an efficient earth was connected but without improvement. Various aerials were tried, the filter network tested, and a new set of valves substituted, but the hum persisted.

A study of the circuit diagram showed that on LW only, signals are fed to the grid of the FC by "bottom-end" coupling. This coupling is prone to mod-hum as there is no direct path to earth for any LF pick-up by the aerial.

A resistor was connected between coil and chassis but seemed to have little effect. A more conventional RF choke was fitted in place of this and a complete cure effected.—J. HALL, Peel, IoM.

INTERMITTENT HUM

A COMMON cause of intermittent hum, easily mistaken for faulty smoothing, is a temporary cathode-heater short in one of the valves. The usual culprit seems to be the double-diode triode in the 6-volt heater class.

Often the trouble occurs only at rare intervals and in many cases tapping the suspected valve will not produce the desired result. A change of valve is the only certain method of confirmation.—J. R.