

G.E.C. UNIVERSAL "A.C.-D.C. THREE"

Circuit.—Straight two-valve set plus rectifier, for A.C. or D.C. supplies.

The detector valve H30 (V1) operates as a leaky grid detector with reaction applied to the tuning coil by a differential condenser. Optional selectivity tappings are provided, and an aerial condenser is used for controlling volume either as a series condenser or as differential volume control. Coupling to the output valve is by straight transformer with anode decoupling.

The output valve N30K (V2) is an indirectly heated pentode. Bias is obtained by a resistance in the cathode lead, and the anode circuit is tone-compensated by a condenser between anode and cathode.

Mains equipment consists of a barretter lamp (301), a rectifying valve (W30) used as a half-wave rectifier, and a smoothing choke with electrolytic condensers. The L.S. field is connected across the unsmoothed H.T.

On D.C. the rectifying valve behaves as a pure resistance.

Special Notes.—In working with this receiver, remember that both on A.C. and D.C. the chassis is probably at full mains potential with relation to actual earth. The grid terminal of V1 is at the top of the bulb.

The aerial selectivity tappings at the back are brought into operation by a contact-making plug, which is a different size from the aerial and earth plugs.

The tuning compensator device consists of a lead from one side of the differential aerial condenser, which is either connected to chassis at *y* or is left free by being plugged into the *x* socket on the tuning condenser. In the *x* position the alteration of the aerial condenser affects the setting of the tuning condenser, and in the *y* position the lower half of the aerial condenser is in parallel with

the tuning condenser only when the selectivity plug is inserted into No. 1 socket. This raises the minimum wavelength to which the set can be tuned.

The valves used have 13-volt .3-amp filaments and are wired in order:—Rectifier 26 volts (i.e., two 13-volt in series), V2 13 volts, and H30 13 volts.

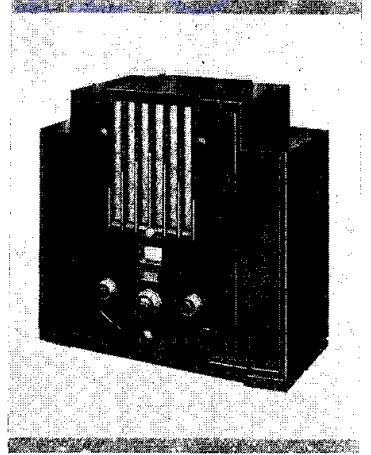
The pilot lamp is in series with the filament wiring and is connected between the rectifying valve and V2. Note that when the filament circuit is broken between the pilot lamp and chassis the full mains potential exists between the holder and chassis.

For 25-cycle A.C. mains, additional resistances and condensers are required, as shown in the circuit diagram and tables.

Quick Tests.—Between the following terminals on the L.S. transformer and chassis (looking from the back):—With 200 v. A.C. supply.—Bottom right-hand tag (H.T. unsmoothed) 200 v.; second from right on top (red) (H.T. smoothed) 185 v.; second from left (orange) 173 v. (V2 anode).

Removing Chassis.—Undo the insulated screws on the control knobs, remove four

(Continued on opposite page.)



Two valves, a rectifier and a barretter are employed in the A.C.-D.C. Three introduced by the General Electric Co., Ltd.

CONDENSERS

C.	Purpose.	Mfd.
1	V1 grid0002
2	Between chassis and earth1
3	V2 anode tone compensating0075
4	H.F. by-pass from mains04
5	V2 cathode	20 el.
6	V1 anode decoupling	1
7	V2 aux. grid	1
8	H.T. smoothing	6 el.
9	H.T. smoothing	6 el.

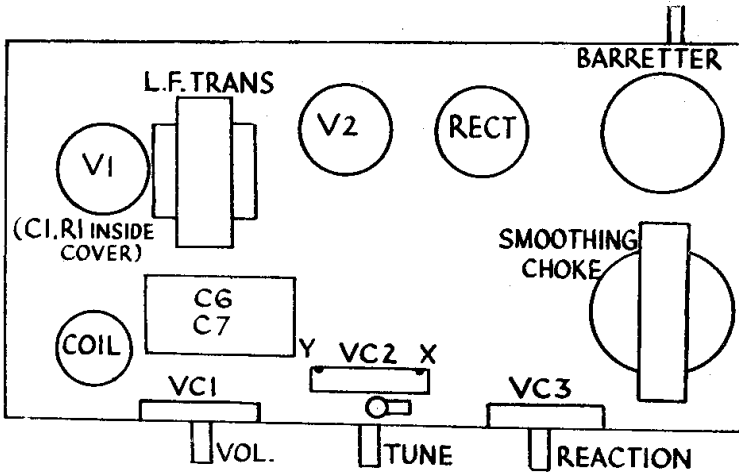
RESISTANCES

R.	Purpose.	Ohms.
1	V1 grid leak	2 meg.
2	V1 anode decoupling	77,000
3	Voltage dropping to V2 aux. grid.	5,500
4	V2 cathode bias	250
5	Reaction stabiliser	300
6*	Additional smoothing for 25 cycle mains.	33,000
7*	Additional smoothing for 25 cycle mains.	33,000
	L.S. field	6,750
	Output transformer primary ...	400
	L.F. transformer primary ...	1,150
	L.F. transformer secondary ...	7,500

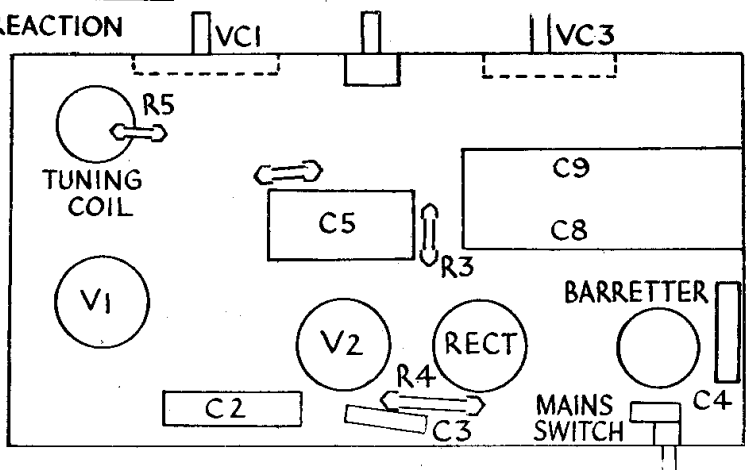
VALVE READINGS

(a) 200 v. and (b) 250 v.

Mains Supply	Valve.	Electrode.	Volts.		M.A.	
			a	b	a	b
D.C.	H30	anode ...	74	82	1.4	1.8
	N30K	anode ...	160	200	24	32
		aux. grid	140	180	5	6.5
A.C.	H30	anode ...	78	85	1.5	2
	N30K	anode ...	170	215	25	33
		aux. grid	150	190	5	7



Above, the top-deck layout of the A.C.-D.C. Three. When the filament circuit is broken between the pilot lamp and chassis full mains potential exists between the holder and chassis.



Right: the sub-chassis arrangement of components. The unusual connections of the rectifier are given under "Special Notes."

A.C.-D.C. THREE BY G.E.C. (Cont.)

screws underneath and lift chassis out. The L.S. leads are sufficiently long to allow examination.

Special Notes.—With the mains switched on, it is advisable to make sure that the engineer is not earthed.

The lay-out and connections are straightforward.

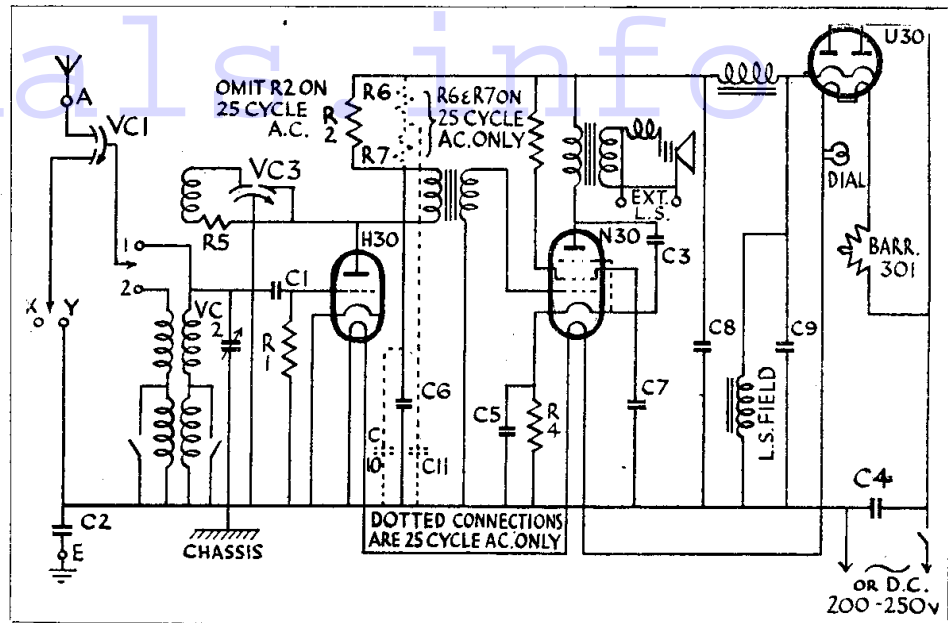
The wiring of the rectifier valve-holder is unusual, as the valve is actually a double half-wave rectifier with separate cathode pins and a centre tap to the filament. The connections are (counting heaters first and proceeding clockwise and looking from underneath): Heater, heater, anode 1, cathode 1, centre of heater, cathode 2, anode 2.

Owing to the fact that the voltages and currents of the valves vary with different voltages and types of supply, the tables contain the readings taken with the 200 and 250 volts for A.C. and for D.C.

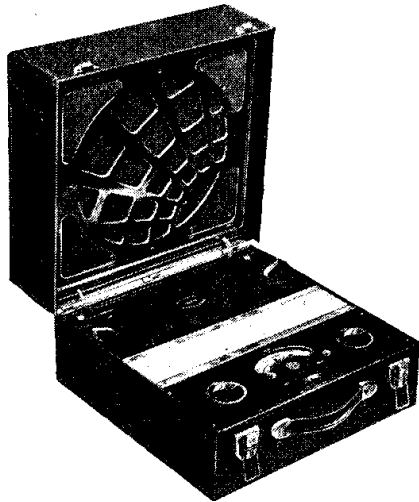
The pilot lamp is the 6.5 volt .3 amp type.

Replacing Chassis.—Lay chassis inside cabinet, replace holding screws, and cover with insulating compound. When replacing the knobs, see that the hexagonal-headed screws are tightened so that they cannot be undone without the use of a spanner.

Do not leave the set in the customer's house with the back off.



The circuit of the General Electric Company's A.C.-D.C. Three. Remember when working on the set that whether the supply is A.C. or D.C. the chassis is probably at mains potential.



McMICHAEL S.M.C. DUPLEX FOUR PORTABLE

of the primary returned to the H.T. + line at the decoupling resistance.

The L.F. valve, HL210 (V3), has an H.F. stopper in the grid circuit. Grid bias is obtained from the same tapping in the H.T. — potentiometer as V1. The L.F. coupling is another parallel fed transformer, but in this case a condenser C11 is connected across the coupling resistance (see special notes on previous models).

The output valve, Pen.220 (V4), is biased from the H.T. negative tapping and is tone

compensated by a condenser across the primary of the output transformer and by a condenser in series with a resistance (C14, R12).

Special Notes.—The screen potential for V1 is obtained from the low H.T. potential end of the detector anode decoupling resistance.

In previous M.C. models the second L.F. transformer was used with "straight" coup-

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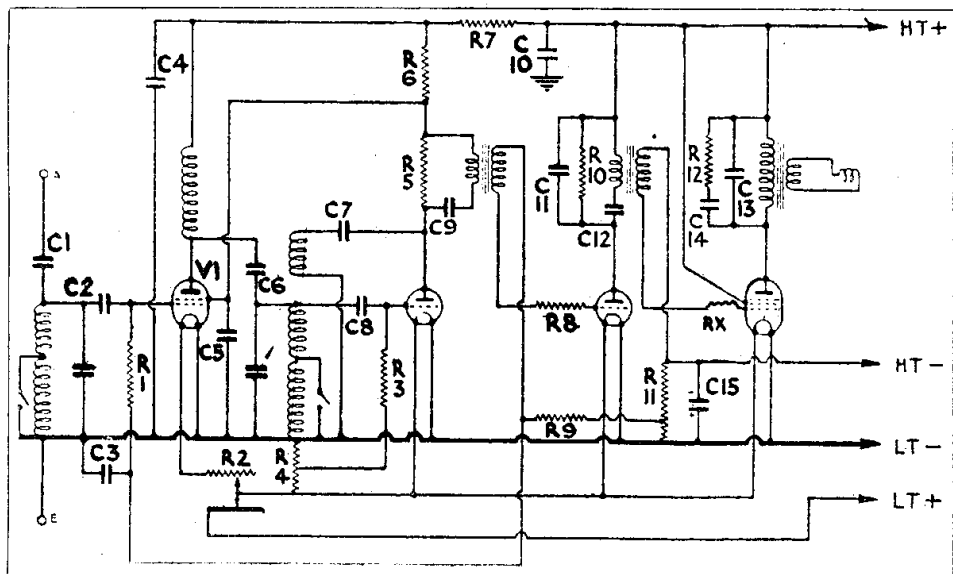
The S.M.C. Duplex portable introduced by McMichael Radio, Ltd., for the 1933-34 season is very similar to earlier models. Differences are mentioned under "Special Notes."

Circuit.—The H.F. valve, 215 S.G. (V1), is preceded by the frame aerial, of which the L.W. section is short circuited for use on M.W. Bias is obtained from a potentiometer in the negative H.T. lead (R11), and the grid circuit is decoupled. Coupling to the next valve is by H.F. choke and capacity feeding the tuned grid coil. Volume is controlled by a filament rheostat.

The detector valve, HL210 (V2), works as a leaky grid detector with reaction applied to the grid coil by a rotating coil inside the tuned grid coil former. This is fed through a condenser C7 from the detector anode.

Optimum operating conditions are obtained by taking the grid return lead to the centre tapping of a potentiometer across the filaments.

L.F. coupling consists of a parallel fed transformer with the low (AC) potential end



H.F., detector, L.F. and pentode valves, constitute the basis of the straightforward circuit of the McMichael Four portable. Rx the grid stabiliser of V4 is 100,000 ohms.