

C.B.4 BATTERY SET BY G.E.C. (Continued)

Orange to V3 anode; red to H.T. +; black to G.B. - 2 (anchored on the H.F. intervalve transformer); two green to V4 grids.

**Replacing Chassis.**—Lay chassis inside

cabinet, resolder earthing lead. Replace three holding screws underneath and press on the knobs, the marked one in the middle of the small ones. Replace battery shelf and screen.

**VALVE READINGS**

No signal, no reaction, and new H.T. battery.

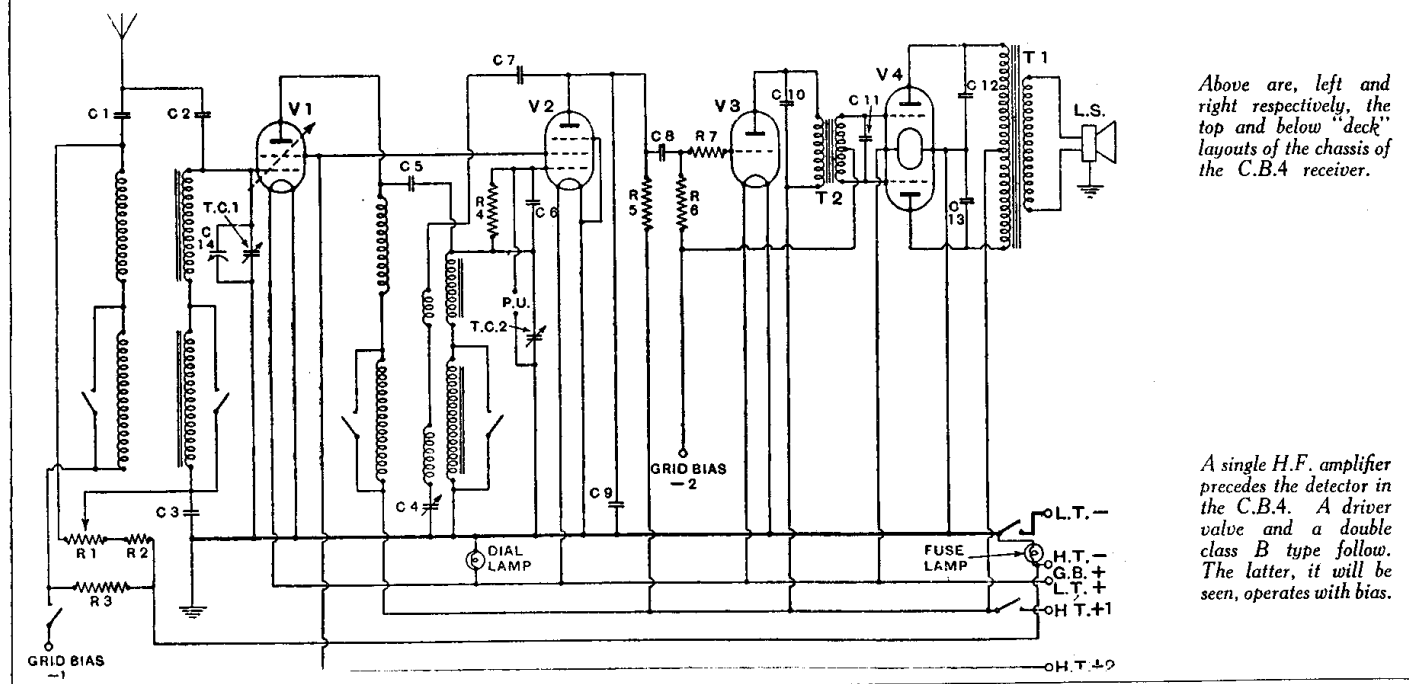
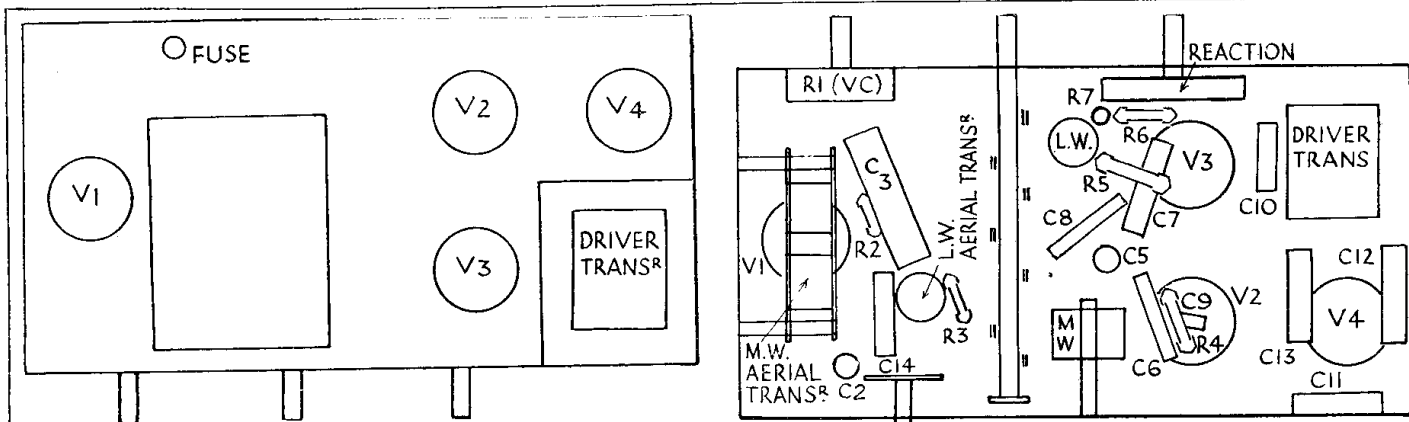
Valves	Type.	Electrode.	Volts.	M.A.
1	VS24 met. (4)	anode . . . . .	140	2.3
		screen . . . . .	58	
2	VP21 met. (7)	anode . . . . .	50	2.5
		aux. grid . . . . .	58	
3	L21 (4)	anode . . . . .	140	1.75
4	B21 (7)	each anode . . . . .	140	1

**RESISTANCES**

R.	Purpose.	Ohms.
1	Volume control . . . . .	50,000
2	Bias limiting resistance . . . . .	6,600
3	Exhausting G.B. battery . . . . .	990
4	V2 grid leak . . . . .	2 meg.
5	V2 anode coupling . . . . .	33,000
6	V3 grid leak . . . . .	220,000
7	H.F. stopper, V3 grid . . . . .	100,000

**CONDENSERS**

C.	Purpose.	Mfd.
1	Series aerial . . . . .	.003
2	Coupling to grid coil (semi-variable) . . . . .	.000006
3	Preventing short circuit of bias . . . . .	.25
4	Reaction . . . . .	.0005
5	Part of H.F. transformer coupling . . . . .	.000011
6	V2 grid reservoir . . . . .	.0001
7	Series with reaction tuning . . . . .	.002
8	L.F. coupling V2 to V3 . . . . .	.01
9	V2 anode by-pass . . . . .	.0005
10	Across primary of driver transformer . . . . .	.0005
11	Across secondary of driver transformer . . . . .	.002
12	Stabilising V4 anodes . . . . .	.003
13		.003
14	Trimmer of aerial tuner . . . . .	Variable



Above are, left and right respectively, the top and bottom "deck" layouts of the chassis of the C.B.4 receiver.

A single H.F. amplifier precedes the detector in the C.B.4. A driver valve and a double class B type follow. The latter, it will be seen, operates with bias.

**LISSEN 8093 A.C. MAINS THREE**

**Circuit.**—The H.F. valve AC/SGV. met. (V1) is preceded by a band-pass aerial tuner employing link coupling. Aerial series condensers are used for both aerial tappings. Volume is controlled by a variable resistance in series with a fixed resistance in the cathode lead. Coupling to the next valve is by H.F. choke filter.

The detector valve AC/HL met. (V2) operates as a semi-power-grid detector with reaction. Cathode bias is provided for gramophone reproduction and coupling to

the next valve is by parallel-fed transformer. The anode circuit contains an H.F. filter and is decoupled from the H.T.

The output pentode AC/PT (V3) is tone compensated by a condenser connected by a wander lead to the low potential side of the filter condenser for an external speaker.

Mains equipment consists of transformer full-wave UU41 rectifier and an L.F. choke in the positive lead for smoothing. The speaker field is connected across the unsmoothed H.T.

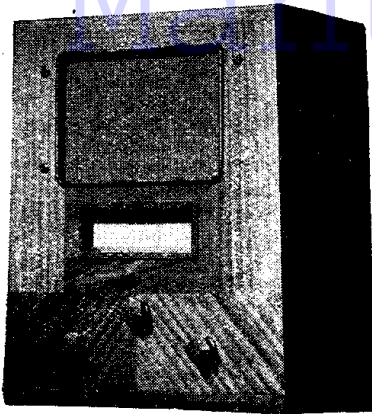
**Special Notes.**—The special mains plug with the set contains a fuse in each lead, and there is also a fuse in the H.T. negative lead. This latter is mounted on the mains adjustment panel behind the transformer.

**Quick Tests.**—Between the terminals on the L.S. transformer and chassis:—

- (1) white, 275 volts H.T. unsmoothed.
- (2) blue, 252 volts H.T. smoothed.
- (3) blue, 245 volts V3 anode.

Note that, as the choke is in the negative (Continued on opposite page.)

### LISSEN 8093 MAINS THREE (Cont.)



High-frequency amplifying, detector and pentode valves form the basis of the circuit of the Lissen 8093.

H.T. lead, the full unsmoothed voltage cannot be taken outside the chassis.

**Revealing Chassis.**—There is no need to remove the chassis. Simply remove the six wood screws from the plywood cover on the bottom of the cabinet.

**General Notes.**—The terminals on top

of the cylindrical condensers C8 and C12 are actually connected together and are not, as would at first appear, two separate condensers. The case is one side of each condenser, and is earthed to the chassis.

The layout is simple, and the wires are coloured to facilitate tracing.

Switch contacts can be cleaned with a piece of tape by turning the cams away from the spring contacts.

The leads from the mains transformer are bunched, and are coloured as follows (counting from rear):—

Right-hand side: (1) black (C.T. to chassis); (2) red, set heater; (3) and (5) green, rectifier heater; (4) white, C.T. to H.T. + unsmoothed.

Left-hand side: (1) red, set heater; (2) and (3) white, rectifier anodes.

#### CONDENSERS

C.	Purpose.	Mfd.
1	Series aerial .. .. .	.00005
2	Series aerial .. .. .	.0005
3	V1 screen by-pass .. .. .	1
4	V1 cathode by-pass .. .. .	1
5	H.F. coupling V1 to V2 .. .. .	.0001
6	V2 grid condenser .. .. .	.00004
7	V2 anode decoupling .. .. .	4 el.
8	V2 cathode by-pass .. .. .	.1
9	V2 anode by-pass .. .. .	.001
10	L.F. filter to transformer .. .. .	.1
11	V3 aux.-grid by-pass .. .. .	1
12	V3 cathode by-pass .. .. .	15 el.
13	Filter to ex. L.S. .. .. .	1
14	Tone compensating V3 anode .. .. .	.01
15	H.T. smoothing .. .. .	4 el.
16	H.T. smoothing .. .. .	4 el.
17	Mains aerial .. .. .	.005

The volume control and reaction are staggered on the same spindle, so that the reaction condenser does not operate till the V.C. is at maximum.

The convenient method of uncovering the internal components by removing a board allows the complete set to be tested with everything in position.

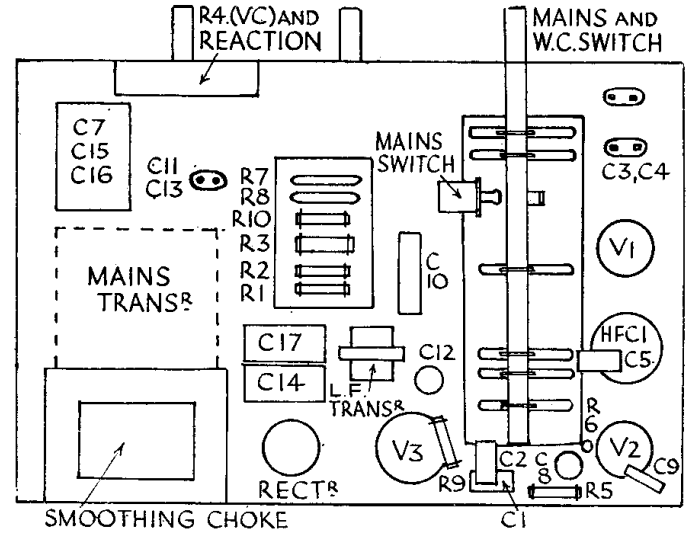
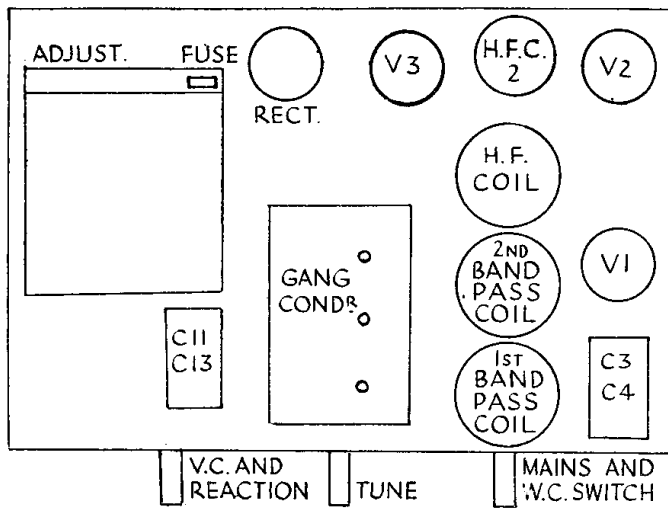
#### VALVE READINGS

No signal, V.C. max. and no reaction. The contact slider can be seen in front of the main transformer. This should just touch the "contact" plate for these readings.

Valve.	Type.	Electrode.	Volts.	M.A.
1	AC/SGV mct. (5)	anode ..	250	6
		screen ..	70	
2	AC/HL ..	anode ..	82	3.6
3	AC/PT ..	anode ..	245	30
		aux. grid ..	200	4.5

#### RESISTANCES

R.	Purpose.	Ohms.
1	V1 fixed cathode bias .. .. .	100
2	V1 screen ptr. (lower part) .. .. .	15,000
3	V1 screen ptr. (upper part) .. .. .	30,000
4	Var. cathode bias (V.C.) .. .. .	5,000
5	V2 grid leak .. .. .	.5
6	V2 cathode bias on "gram." .. .. .	600
7	V2 anode, L.F. coupling .. .. .	25,000
8	V2 anode, H.T. decoupling .. .. .	25,000
9	V3 cathode bias .. .. .	300
10	Voltage dropping to V3 aux. grid .. .. .	10,000



Besides a fuse included in the H.T. negative lead on the voltage adjustment strip, shown on the chassis layout above, the Lissen 8093 possesses a fuse fitted inside the mains plug.

An unusual feature of the circuit is that the speaker field is not used for smoothing but is connected across the output of the rectifier.

