Tell all your friends about it—

Mullard

The Master Three

Mullard

The Master Three

BUILT WITH 20 WIRES
NO SOLDER

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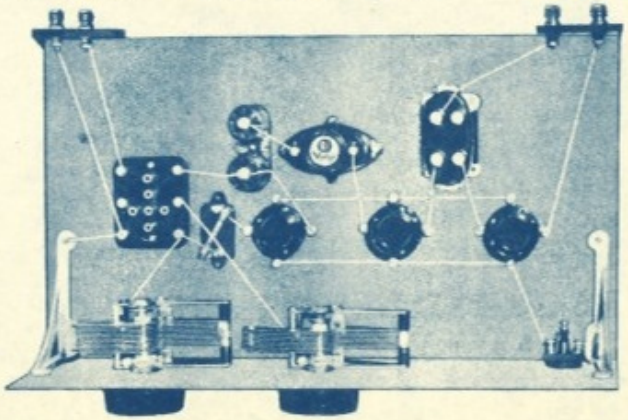
Bring the Magic Land of Radio to Your Home

Though you have never previously made a radio set, the new Simplified Plan of Assembly makes your immediate success certain with the Mullard Master Three

THIS Supplement to *Radio for the Million* describes a Mullard P.M. Radio Receiver which anyone is able to make in one hour with the assistance of the Simplified Plan of Assembly printed overleaf. You may have no technical knowledge whatsoever. That, however, is no disadvantage. If at this moment you do not know the name of one component, one hour after commencing this set you will be hearing music from a broadcast studio.

Everybody loves music. Imagine listening to delightful music—all kinds of music—every evening! Isn't there something really fascinating in the thought that you are separated from a new world of entertainment by only one hour? Music from your nearest broadcast station, music from the high-powered stations at Daventry and on the Continent are placed at your command for the outlay of an hour. Have you not often wished to own a radio set? Would you not have had one working long since but that you were always deterred by overwhelming technicalities? Why deprive yourself of an immeasurably pleasant future with Radio now that the description of the Mullard Master Three is before you.



The arrangement of the various components in the Mullard Master Three is failure-proof. If you follow the Simplified Plan of Assembly and proceed, connection by connection, you may have absolute faith that your one hour's work will be successful to a degree, which, at this moment, you have no conception. The Mullard Master Three is extremely easy to operate—stations are tuned-in on one dial and their volume increased by the other. Everyone in the family will be able to handle the set. Let the boys make the Mullard Master Three their first radio set. Though you—or they—have never previously made a radio set, you are able to make the Mullard Master Three with complete confidence in your success from the very first moment.

LEFT HAND DIAL READINGS.

LONG WAVE COIL.

1750	Radio Paris	124
1604.8	Daventry (5 X X)	95
1060	Hilversum	49

BROADCAST WAVE COIL.

535.7	Munich	167
517.2	Vienna	164.5
508.5	Brussels	161
500	Aberdeen	159.5
491.8	Daventry (5 G B)	157
483.9	Berlin	155
470	Langenberg	151.5
461.5	Oslo	149.5
458	Paris	148
450	Rome	146
441.2	Bruenn	144.5
428.6	Frankfurt-on-Main	140
411	Berne	133
405.4	Glasgow	131
400	Plymouth and Cork	129
396	Hamburg	128
391	Toulouse	125
384.6	Manchester	122.5
380.7	Stuttgart	120.5
373	Madrid	118
370	Paris	115.5
366.3	Leipzig	114
361.4	London	111
353	Cardiff	107
348.9	Prague	104.5
343.2	Barcelona	102
340.9	Paris	100
330.3	Koenigsburg	96
326.1	Bournemouth	94.5
322.6	Breslau	90
319.1	Dublin	89
312.5	Newcastle	87
306.1	Belfast	85
303	Nürnberg	84.5
297	Liverpool	82.5
294.1	Hull	82
288.5	Edinburgh	81.5
283	Dortmund	80
277.8	Leeds	77.5
275.2	Nottingham	77
272.7	Sheffield	76.5
260.9	Malmö	72
259	Toulouse	70.5
256	Kiel	69
252.1	Bradford	65.5
241.9	Muenster	58

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HOW THE MULLARD SIMPLIFIED PLAN OF ASSEMBLY HELPS YOU

IN the inside of this folder is printed a full-size bird's-eye view of the Mullard Master Three Receiver. For convenience, the panel is opened outwards so that a similar view of the back of the panel is obtained. The whole effect not only exposes every component and wire to the eye, but allows the builder to follow the exact placing of the parts as they are in the original receiver and to duplicate each wire from point to point without the slightest technical knowledge.

Having purchased all the essential components specified and provided yourself with a screw driver, a bradawl and a pair of pliers, building may be commenced.

Lay out the Simplified Plan of Assembly on the baseboard, fixing it at each corner with drawing pins, but first making certain that it is correctly placed with the outer lines of the plan coinciding with the four edges of the baseboard.

Reference to the plan will show that each component has one or more screw holes for fixing purposes which may be identified by a cross enclosed by a circle. Mark the centre of each cross—there are 22 in all—with a sharp-pointed instrument such as the bradawl, deep enough to pierce the surface of the baseboard. Remove then the four drawing pins.

The incisions you have made in this manner give the exact fixing holes for each component, which may then be screwed down into position.

MOUNTING THE PANEL COMPONENTS

If you have purchased the specified panel the two large holes for the two variable condensers and the large hole for the switch are already drilled.

Having fixed the panel brackets, the two variable condensers should be mounted into position—the larger to the right. The small ebonite insulating bush is fitted over the spindle of the switch after which it is also screwed into place. The two small terminal strips carrying the Aerial (A.) and the Earth (E.) and the Speaker (L.S. + L.S. —) terminals respectively, should now be screwed to the back edge of the baseboard at opposite ends, as directed by the Simplified Plan.

CONNECTING UP WITH THE A.B.C. CONNECTING LINKS

All will agree that up to this stage all has been simplicity itself, and now, by making use of the wonderful invention known as the A.B.C. Connecting Links, wiring-up is just as simple. These connecting links are actually the twenty wires duplicated from those appearing in the original set. This is a really important radio invention, and actually makes home-constructed receivers failure-proof, and at the same time brings assured success within the reach of everyone, even the non-mechanical.

Correctly select each wire in its proper order and connect up between the named components. Finally screw down all terminals.

TUNING IN STATIONS

Having fully completed the constructional side of the Mullard Master Three and connected up your batteries, you will be overwhelmed with the desire to hear music from your local station. For the majority, this will be a maiden voyage on the air.

Glance down list of dial readings until you find the name of the nearest broadcast station to your home. In the third column an approximate dial reading for this station is given. For example, a builder of THE MULLARD MASTER THREE living, say, at Durham would look upon Newcastle as his (or her) local station. Reference to the list will show the approximate dial setting for Newcastle to be 87.

The illustrations show both dials set to zero; that is with the moving plates of the condensers fully exposed. Newcastle would be tuned in by our friend in Durham by the rotation of the first dial until "87" comes into the position now occupied by zero. So far away as Durham, however, use of the second condenser might be found necessary in order to increase the sensitivity of the set. Should this be the case, rotate to the right the second dial until the station is heard. Do not be disappointed if instead of Newcastle you hear Belfast or Dublin. It happens that dial readings differ slightly with the particular aerial and earth system.

Having once tuned-in the nearest broadcast station and noted the difference of its dial reading from that which we specify, either higher or lower, it becomes comparatively simple to make a similar allowance when setting out to tune in any of the many distant stations which are within easy reach of THE MULLARD MASTER THREE.

After having set the first dial for Newcastle, but having tuned-in, say, Belfast, you will know that the dial must be rotated a little more to the right; in place of "87" you may find that 88, 89 or 90—perhaps higher—will be correct for Newcastle. If you tune-in Dublin instead of Newcastle it will be necessary to move the first dial to the left and read 86, 85 or 84—perhaps lower—in order to listen to Newcastle.

In practice this is simplicity itself—as simple as setting the hands of your watch to the correct hour.

HIGH-TENSION VALUES TO USE

BATTERY LEAD No. 3 or H.T. + 1 feeding detector valve V.1:
84 to 90 volts.
BATTERY LEAD No. 4 or H.T. + 2 connected to both L.F. valves:
108 volts.
With a Mullard Super Power Valve in the last stage, this lead will be taken to
120 to 150 volts.

GRID BIAS VALUES

BATTERY LEAD No. 6 or G.B.1: 1½—3 volts.
BATTERY LEAD No. 7 or G.B.2: 7½ volts. for P.M.2, P.M.4 or P.M.6 with 108 VOLTS high-tension; 12 to 18 volts for P.M.252, P.M.254 or P.M.256 with 120 to 150 VOLTS high-tension.

NOTE.—Many builders of the Mullard Master Three will prefer to use a Mullard A.C. H.T. Supply Unit for the high-tension supply. Such are referred to the current issue of *Radio for the Million* for details of installation.

The attention is also drawn of those readers who may consider operating the Mullard Master Three from D.C. Mains. In their case it is recommended that in place of aluminium, ebonite should be used for the panel. Full directions for this modification are also published in the current issue of *Radio for the Million*.

LIST OF SPECIFIED COMPONENTS

SEVERAL considerations have been observed in our choice of components for the Mullard Master Three. Primarily, all-round efficiency has been our first aim, upon which so many things depend. An efficient three-valve receiver naturally calls for greater care in the choice of components than would a more ambitious set. It is extremely easy to deprive oneself of the pleasure of many broadcast programmes by the unhappy use of unsuitable components. Do not make experiments in this direction.

It should also be remembered that the set of A.B.C. Connecting links is made for the specified components, and for this reason, at least, so far as newcomers to radio are concerned, any departure from the following list is not to be recommended.

2	Terminal Strips (2½ in. × 2 in. × ½ in.)	
1	Coil Base	Lewcos
1	S.L.F. Variable Condenser (·0005 mfd.)	J.B.
1	S.L.F. Variable Condenser (·00035 mfd.)	J.B.
1	H.F. Choke	Climax
3	Anti-Vibratory Valve Holders (with terminals)	Pye
1	R.C.C. Unit (Type A)	R.I.–Varley or Mullard
1	L.F. Transformer (G.P.)	R.I.–Varley
1	Combined Grid-Leak (2 megohms) and Condenser (·0003 mfd.)	Mullard
1	On and Off Switch	Bulgin
4	Terminals (A., E., L.S.–, L.S.+)	Belling–Lee
1	Set of A.B.C. Connecting Links	Junit
1	P.M. Speaker	Mullard
3	P.M. Valves (2 volt, 4 volt or 6 volt according to the voltage of the wet low-tension accumulator you purchase. The correct type for each voltage is included under the heading "Selected Valves for Best Results.")	Mullard
2	Spade Terminals (1 red, 1 black)	Belex
8	Wander Plugs (4 Red, 4 Black)	Belex
	Suitable length of Red and Black Flex.	
1	Ebonite Bush (¼ in. diam., ⅛ in. hole, ⅛ in. thick.	

LIST OF ACCESSORIES

1	Suitable Cabinet	W. H. Agar
1	Aluminium Panel (18 in. × 7 in.)	Collinson
1	Baseboard	W. H. Agar
1	Pair Panel Brackets	Magnum
1	Broadcast Wave, Master Three Coil	Colvern
1	Long Wave, Master Three Coil	Colvern
1	L.T. Accumulator, or Wet Battery	
1	H.T. Dry Battery (108 volts)	
1	Grid Bias Battery (9 volt). (Two will be necessary if you propose to use a P.M. 252, P.M. 254 or a P.M. 256.)	

SELECTED VALVES FOR BEST RESULTS

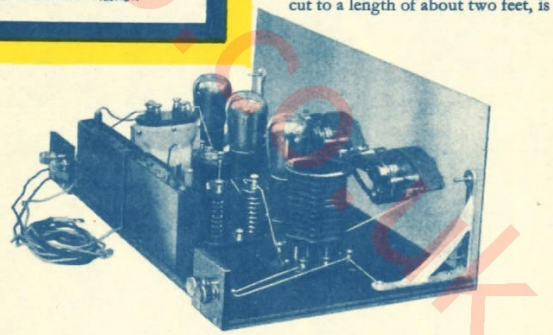
If you refer to the illustrations, the placing of each P.M. Valve into its correct valve-holder will not present any difficulties. With the panel to the front and counting towards the right, the valves are numbered V.1, V.2 and V.3, these being the Detector, the first L.F., and the second L.F. Valves respectively.

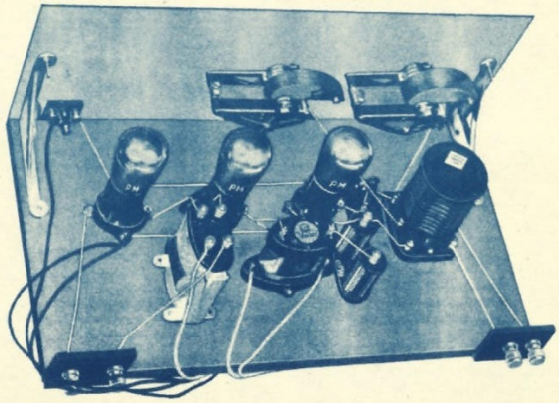
If you prefer a 2-volt accumulator:
V.1 Detector Mullard P.M.1 A. (R.C.C. Valve)
V.2 1st L.F. Mullard P.M.1 L.F. (L.F. Valve)
V.3 2nd L.F. Mullard P.M.2 (Power Valve)

With a 4-volt accumulator:
V.1 Detector Mullard P.M.3 A. (R.C.C. Valve)
V.2 1st L.F. Mullard P.M.3 (G.P. Valve)
V.3 2nd L.F. Mullard P.M.4 (Power Valve)

For a 6-volt accumulator:
V.1 Detector Mullard P.M.5 B. (R.C.C. Valve)
V.2 1st L.F. Mullard P.M.5 X. (G.P. Valve)
V.3 2nd L.F. Mullard P.M.6 (Power Valve)

Super Power Valves, for V.3, when reception very strong:
For a 2-volt accumulator:—P.M.252.
For a 4-volt accumulator:—P.M.254.
For a 6-volt accumulator:—P.M.256.





CONNECTING UP THE BATTERIES

BATTERY LEAD No. 1

Take a piece of black flex wire about a yard in length; bare each end attaching to one a black wander plug. About twelve inches from this same end remove the braid and rubber insulation at which point attach a red spade. Fix the other end of this wire under the left terminal of the on-off switch S. The red spade on this lead is placed under the + terminal of the L.T. (Wet) Accumulator. The black wander plug on this lead is inserted into the socket marked negative of the dry high-tension battery. This wire is labelled Battery Lead No. 1.

BATTERY LEAD No. 2

A second piece of black flex cut to a length of about two feet, is bared at each end; to one extremity attach a black spade which is placed under the negative terminal of the low-tension (wet) accumulator. The other end is attached to the terminal F– of the third valve-holder into which the L.F. valve called V.3 is placed.

BATTERY LEAD No. 3

A piece of red flex about two feet in length is bared at either end; one extremity is placed under the terminal marked B+ of the R.C.C Unit. To the other end attach a red wander plug and insert this into the socket marked 84 in the dry high-tension battery.

BATTERY LEAD No. 4

Another two foot length of red flex is similarly treated at each end; one end is taken to the terminal marked L.S.+ on the terminal strip T.S.2. To the other end attach a red wander plug which should be inserted into the socket marked 108 in the dry high-tension battery.

BATTERY LEAD No. 5

A nine inch length of red flex is bared at each end; take one end under the terminal F– of the valve holder marked V3 and attach a red wander plug to the other extremity. This plug is inserted into the positive socket of the grid-bias battery.

BATTERY LEAD No. 6

A nine inch length of black flex wire is then bared at each end, one end being taken to the terminal marked G.B.— of the R.C.C. Unit, and a black wander plug being attached to the other is inserted into the first or second negative socket (1½—3 volts) of the grid-bias battery.

BATTERY LEAD No. 7

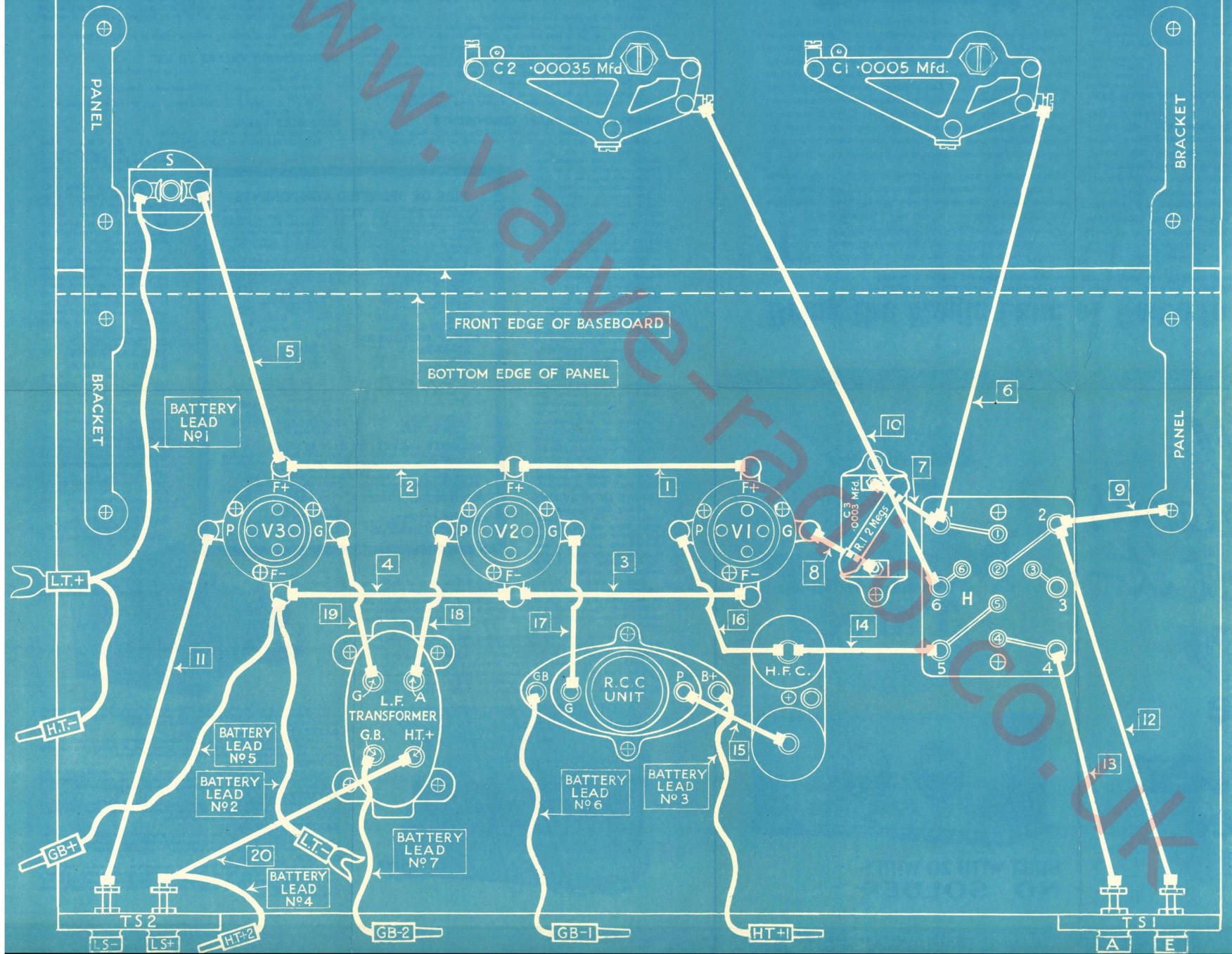
Another nine inch length of flex is treated in the same way. One end is taken to the terminal marked GRID BIAS on the L.F. Transformer and the other end to which is attached a black wander plug is inserted into the fifth negative socket (7½ volts) of the grid bias battery. When a Mullard Super Power Valve is employed this lead will be taken to the last negative socket in the second G.B. Battery.

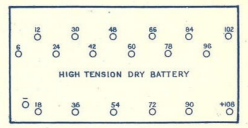
SIMPLIFIED PLAN OF ASSEMBLY Nº 302
For THE MULLARD MASTER THREE

Published as a Supplement to the December (1927) issue of
RADIO FOR THE MILLION
by the **MULLARD WIRELESS SERVICE Cº LTD** LONDON W.C.2

WIRES CROSSING BUT NOT CONNECTED
DO NOT BEND ANY WIRES TO THIS SHAPE

INDICATES SCREW HOLES FOR COMPONENTS



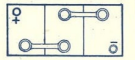


A plan view of the high-tension battery.

A plan view of a grid bias battery; used with a P.M.2, P.M.4, or P.M.6.

A plan view of two grid bias batteries connected in series; used with a P.M.252, P.M.254, or P.M.256.

A plan view of the low-tension accumulator (or wet battery).



KEY TO WIRES

Work from back of set when wiring

To suit individual taste the Mullard P.M. R.C.C. unit may be successfully used in this set. This involves suitably shortening wires No. 15 and No. 17 in the case of those wishing to make this change.

Wire No. 1. Connect together furthest terminals of valve holders V.1 and V.2.

Wire No. 2. Connect together furthest terminals of valve holders V.2 and V.3.

Wire No. 3. Connect together nearest terminals of valve holders V.1 and V.2.

Wire No. 4. Connect together nearest terminals of valve holders V.2 and V.3.

Wire No. 5. Connect furthest terminal of valve holder V.3 to right hand terminal of Switch S.

Wire No. 6. Connect terminal No. 1 of coil holder H to terminal on right side of variable condenser C.1.

Wire No. 7. Connect terminal No. 1 of coil holder H to furthest terminal of grid condenser C.3.

Wire No. 8. Connect nearest terminal of grid condenser C.3 to right hand terminal of valve holder V.1.

Wire No. 9. Connect terminal No. 2 of coil holder H to nearest screw securing right hand panel bracket to baseboard.

Wire No. 10. Connect terminal No. 6 of coil holder H to terminal on right hand side of variable condenser C.2.

Wire No. 11. Connect left hand terminal of valve holder V.3 to terminal L.S. — on terminal strip T.S.2.

Wire No. 12. Connect terminal No. 2 of coil holder H to terminal E. on terminal strip T.S.1.

Wire No. 13. Connect terminal No. 4 of coil holder H. to terminal A. on terminal strip T.S.1.

Wire No. 14. Connect terminal No. 5 of coil holder H. to furthest terminal of H.F. choke.

Wire No. 15. Connect nearest terminal of H.F. choke to terminal P. of R.C.C. Unit.

Wire No. 16. Connect furthest terminal of H.F. choke to left hand terminal of valve holder V.1.

Wire No. 17. Connect terminal G. of R.C.C. Unit to right hand terminal of valve holder V.2.

Wire No. 18. Connect left hand terminal of valve holder V.2 to terminal A. (Anode) of L.F. transformer.

Wire No. 19. Connect terminal G. (Grid) of L.F. transformer to right hand terminal of valve holder V.3.

Wire No. 20. Connect terminal H.T. + of L.F. transformer to terminal L.S. + on terminal strip T.S.2.

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