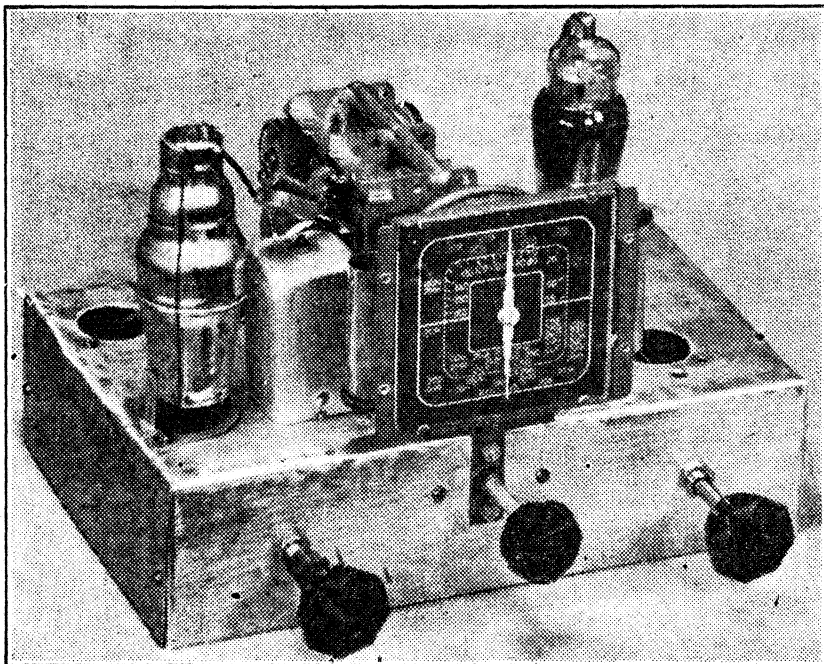


THE 1K5-G TWO VALVE BATTERY SET



The set is now beginning to take shape in its progress from a one valver to a four valver.

Let's assume that you followed out last month's article and successfully completed the "1K5-ONE" receiver. This month's project is to add an audio stage to the set, which will considerably increase the gain. Your "1K5-TWO" will have plenty of power for earphones on all stations and may even operate a loudspeaker successfully on the strongest of them.

FIRST of all, a few words about the function of an audio stage. Although a regenerative detector provides considerable amplification, the signal impulses in the plate circuit are relatively weak. Signals from the stronger stations may be heard at good strength in the earphones, but others are just too weak to follow clearly. An audio stage amplifies all signals, bringing the weaker ones up to comfortable listening level.

RESISTANCE COUPLING

Referring to the circuit diagram, the plate of the detector is now fed through a 0.1 meg. resistor, which, therefore, takes the place of the earphones in the one valve version. Variations of detector plate current at signal frequency produce voltage variations across the 0.1 meg. plate load resistor.

These voltage variations are impressed on the grid of the following amplifier valve through the .02 mfd. coupling condenser. This condenser passes on the signal voltage variations, but prevents the positive d-c plate voltage from affecting the grid of the following valve. A negative bias is applied to the grid through the 1.0 megohm resistor.

The majority of valves require some negative grid bias when used as audio amplifiers. The bias limits the plate current to a reasonable figure and also ensures better fidelity in amplification. The bias voltage necessary varies according to the type of valve in question and the operating potentials on plate and screen. More of this later.

The signal voltages applied to the grid are amplified by the valve and

appear as variations in the plate current of the amplifier valve. These variations, which are greater in magnitude than in the previous stage, are translated into sound by the earphones or loudspeaker.

When adding to your "1K5-One" receiver, it is assumed that the set will ultimately become the "1K5-Four." The extra valve, therefore, is installed in the position of the output stage, leaving room for the addition of still another audio voltage amplifier stage at a later date. The extra parts you will need to make the addition are shown in the accompanying list.

Let's assume, then, that you are ready to get on with the job. Begin by removing the lead which joins the RF choke to the loudspeaker or phone socket. This clears the way for the addition of the new components.

Mount the new valve socket in the hole adjacent to the speaker or phone plug. Connect the negative filament pin to an earth point and run a lead from the positive filament pin to the "off-on" switch, as shown in the diagram. Next job is to wire up the plate and grid circuits.

Instal a 0.1 meg. resistor on the resistor panel, one end connecting to the RF choke and the other to the free lug immediately opposite. This free lug is then bridged across to the lug "next door" but one, which is already connected through the B-plus.

SHIELDED LEAD

Before proceeding further, obtain a short length of shielded wire for the grid lead of the 1K5-G output valve. Snip off a length sufficient to reach with a little slack from the appropriate lug on the resistor panel, up through the chassis to the grid cap of the 1K5-G. Work the braiding along so that a little over an inch of the braid can be snipped off without cutting the inside conductor. Then work the braid back along the wire until

PARTS LIST

Here are the parts you have already in your one-valve set.

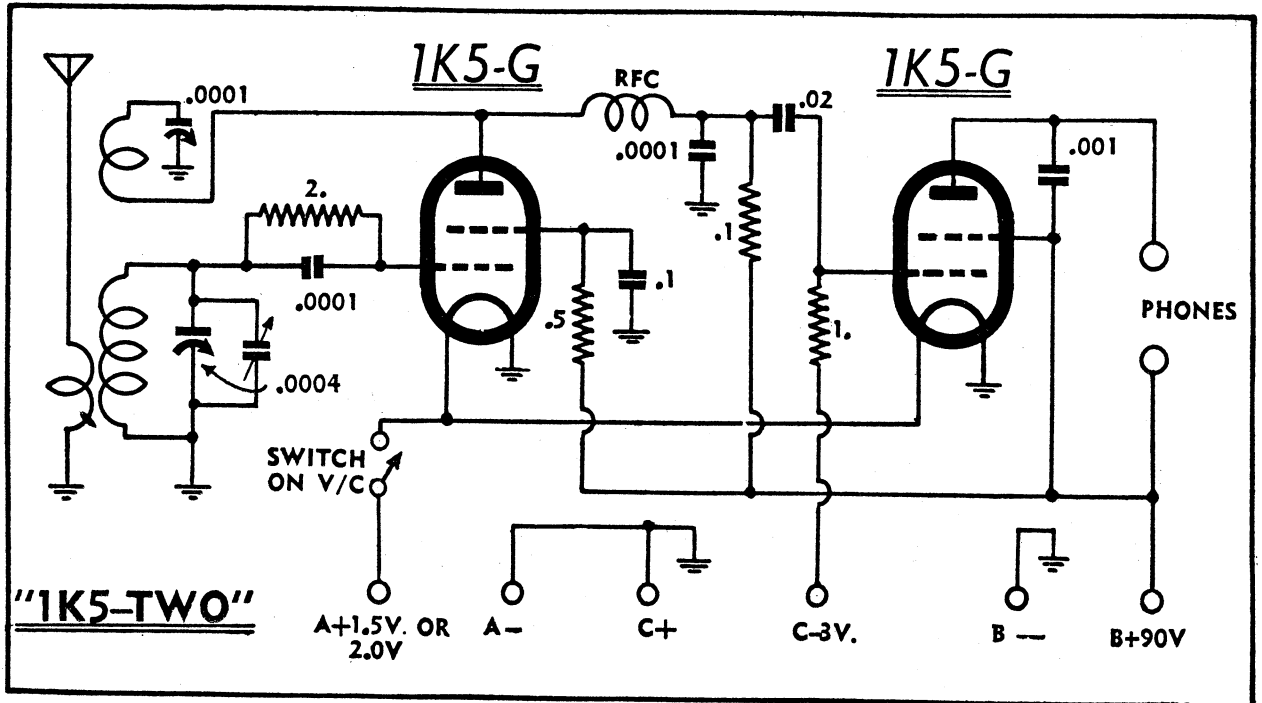
- 1 Chassis, 10" x 6½" x 2½"
- 1 "H" type two-gang condenser.
- 1 Tuning dial (Efcu type CD/17 or similar).
- 1 RF coil with reaction.
- 1 .0001 mfd. midget reaction condenser.
- 1 0.5 meg. potentiometer with "off-on" switch.
- 1 Octal socket, 1 6-pin, 1 4-pin.
- 1 RF choke.
- 1 0.1 mfd. tubular condenser.
- 2 .0001 mfd. mica condensers.
- 1 Trimmer condenser (if not fitted to gang).
- 1 2.0 meg. resistor.

- 1 .05 meg. resistor.
- 1 Type 1K5-G valve.
- 1 45-volt B-battery.
- 1 1.5 volt cell or 2.0 volt accumulator.
- Earphones, 2 terminals, 1 grid clip, 6-pin battery plug, 4-pin speaker plug, 7-position resistor panel.

And here are the extra parts you will need:

- 1 1K5-G valve.
- 1 Octal valve socket.
- 1 0.1 meg. resistor.
- 1 1.0 meg. resistor.
- 1 .02 mfd. tubular condenser.
- 1 .001mfd. mica condenser.
- Short length of shielded wire.
- 1 45-volt B battery.
- 2 1.5 volt torch cells.

CIRCUIT OF THE 1K5-G TWO VALVE RECEIVER



As will be seen from this circuit, the extra valve is an audio amplifier resistance, coupled to the detector.

you have just over a half inch of the insulated wire protruding from each end.

Rub the edges of the braid flat, smear very lightly with flux and tin round the edge of the braid to prevent fraying. Now, with a razor blade or sharp knife, cut through the insulation to leave about a quarter inch of the inner conductor bare. This can be tinned for connection into the circuit.

One end of your shielded lead can be soldered to the appropriate lug on the resistor panel and the outer braiding soldered to the earthed lug under the mounting bolt. A small grid clip can be attached to the other end of the lead for connection to the 1K5-G grid cap.

On this same end of the resistor panel instal a .02 mfd. coupling condenser and a 1.0 meg. resistor, linking them together at one end where they join the 1K5-G grid lead. The free end of the condenser links across to the RF choke while the 1.0 meg. grid resistor connects to the bias batteries.

These bias batteries are mounted by a clip behind the gang condenser. The clip can be fashioned from a scrap of aluminium and it should be bent and drilled to hold the cells snugly in place.

SERIES CONNECTION

Connect the cells in series by soldering a lead from the centre cap of one to the bottom of the other cell. Take a wire from the remaining centre positive terminal, which is C-plus, down through the chassis to an earth lug. A second wire goes from the base of

the other cell, which is C-minus, down through the chassis to the end of the 1 megohm grid resistor.

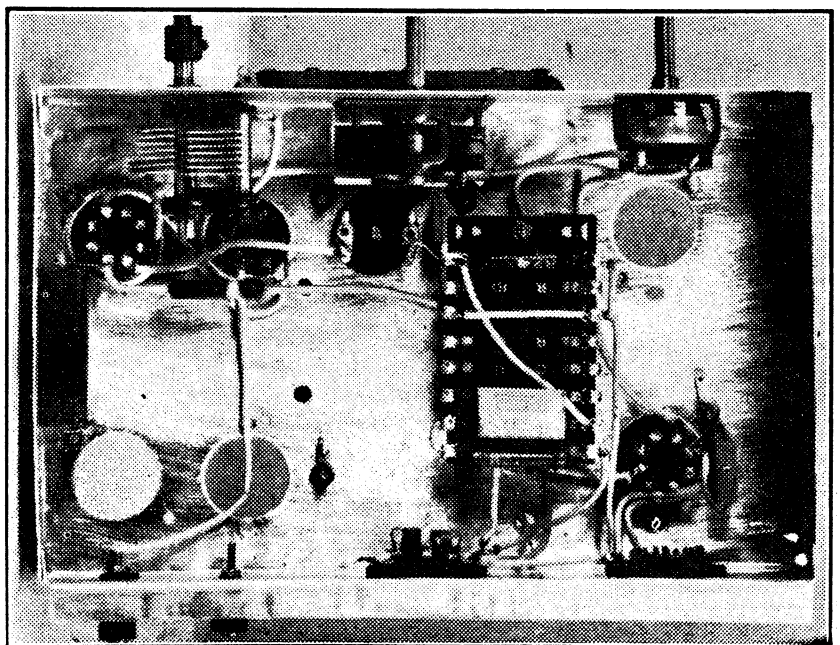
Connect the plate pin of the 1K5-G output valve to the phone or speaker socket, connect the screen to the B-plus wiring and finally instal a .001 mfd. condenser between the plate and screen pins at the socket. This completes the job of wiring.

Check over your work and before plugging the valves in, connect up to

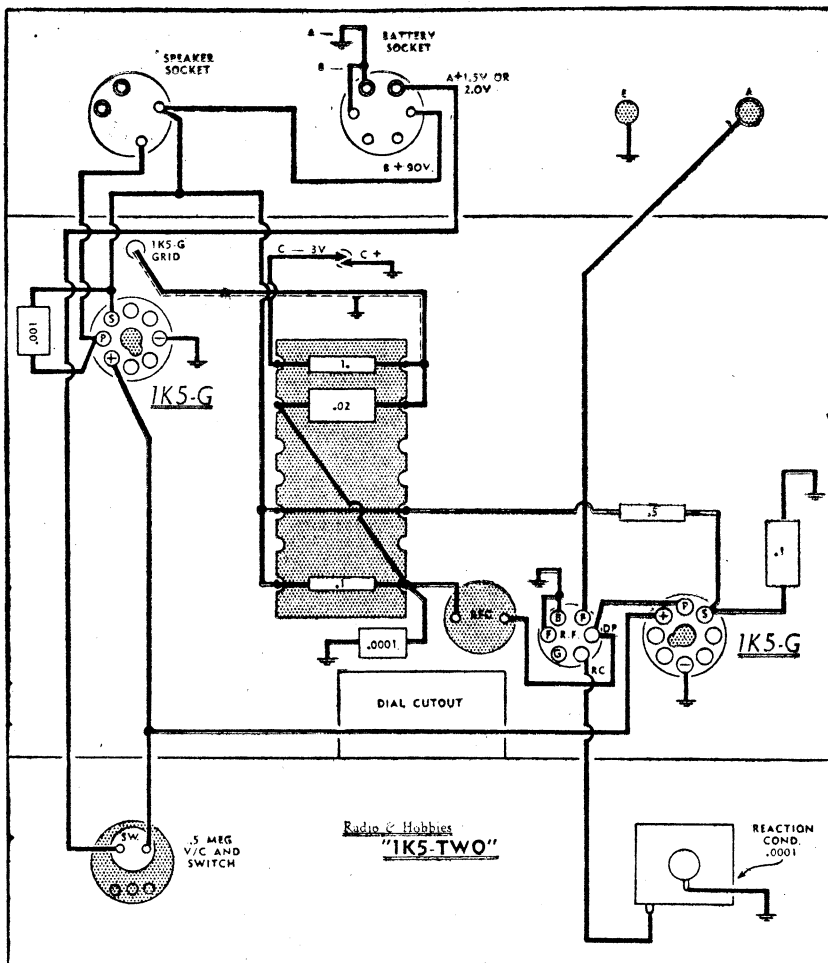
the batteries and to the aerial and earth. Plug in the earphones and test the voltage across the filament pins with a torch lamp. If all is in order, plug in the valves and the set should operate without further ado.

The one valve set operates quite well from a 1.5 volt A-battery and a 45 volt B-battery. This set, too, will operate satisfactorily from a 1.5 volt

(Continued on Page 37)



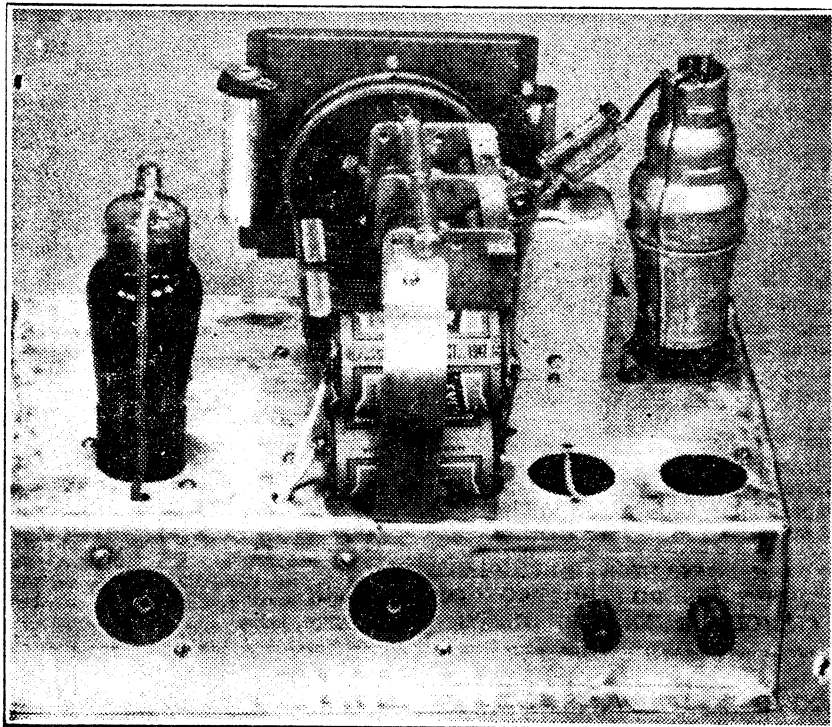
This picture shows the placement of parts beneath the base.



The underchassis wiring of the IK5-TWO two valver.

(Continued from Page 33)
 A-battery, provided the cell is large enough to handle economically the drain of the two valves at 1.5 volts.

namely about 0.18 amp. However, it is better to use a 2.0 volt accumulator for the set if you can manage it. It is assumed that the ultimate four



View from the rear. Note the bias batteries held in place by a clip.

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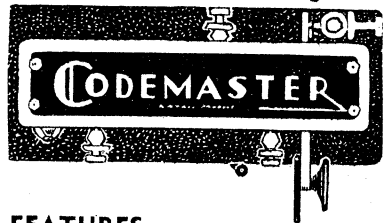
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valve set will operate from a 135 volt high tension supply, so that you may as well buy another 45 volt battery at this stage, bringing the high tension voltage up to 90. The suggested -3.0 volts bias on the 1K5-G grid is in order for this voltage. Alternatively you can use the set with the full 135 volt supply or from a single 67½ volt Minimax battery. The bias voltage will not need to be changed.

If, however, you plan to operate the set purely with earphones and from a single 45 volt battery, the grid bias voltage is better kept down to -1.5 volts. In other words, you will use just a single torch cell for the bias battery.

Such a wide variation in supply voltage will naturally have some bearing on the operation of the detector. In some cases the detector may now fail to oscillate over the whole band with a supply voltage of only 45. In this case, try reducing the value of the screen dropping resistor from its present value of 0.5 megohm. In an extreme case, the plate load resistor may also be reduced in value, but this will adversely affect the gain. Increasing the value of the screen resistor will restrict the oscillation on higher operating voltages.

EARPHONES

There is really little else to be said in the matter. Used with 2000 ohm earphones, the set should give really fine performance. With a high tension supply of 67 volts or more, it may operate a loudspeaker on the stronger stations. A sensitive 5-inch to 8-inch permagnetic unit is probably the best choice, but please yourself whether you buy the speaker now or next month when the third valve is added.

Much depends on the location and the aerial arrangement in a set of this type. You can expect some bother if you happen to be in the immediate vicinity of a powerful transmitter, but that is true of all small regenerative receivers.

Increasing the length of aerial will give you louder signals, but at the cost of selectivity, so you must experiment to obtain the best overall results.

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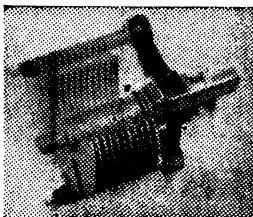
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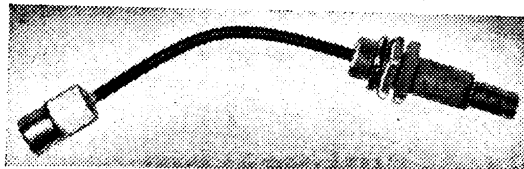
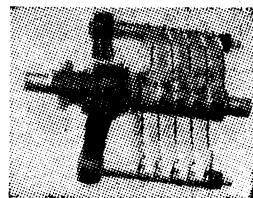


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