

THE intervention of the holidays has delayed the continuation of the description of this popular "Differential One" receiver. However, here are the specifications of the short-wave coils:—

BAND.	L1.	L2.	L3.
60-100 metres	6	30	8
30- 60 metres	3	14	6
15- 30 metres	2	5	3
8- 15 metres	1	3	3

THESE windings should be made with 26 or 28 D.S.C. wire. Except in the case of the 60-100-metres F B coil.

Parts List for "Differential Two."

.00035 Fixed Condenser.
Differential Condenser.
.00025 Fixed Condenser.
.0001 mfd. Fixed Condenser.
Switch.
H.F. Choke.
2 meg. Grid Leak.
2 Valve Holders.
Dozen Terminals.
Panel, 18in. x 7in.
Valve Base Coils.
Audio Transformer.
One 50,000 ohms. Decoupling Resistance.
One 2 mfd. Condenser.

room can be found on the valve base itself for all the windings if they are not separated from each other more than 1-8-inch or so. The 80-metre coil, however, will probably have to be wound on a former of the type described for the broadcast coil, unless the constructor cares to experiment with finer wire. The 8-15-metre coil is intended to have its tuning turns (L2) spaced to the extent of 1-8-inch or so between turns; all the others are close wound.

The description of the broadcast coil was made in such detail that it should be unnecessary to say more here than that the short-wave coils are wound in an exactly similar fashion. Reference should be made to Fig. 3 in the article appearing on December 26 last, where all the connections are shown diagrammatically.

Use as Short-wave Adapter.

INQUIRIES have already reached us as to the practicability of using the "Differential One" as a short-wave adapter. This can readily be arranged. It is probable that an adapter based on the design of this receiver will be published shortly, and this, of course, will be arranged in a properly compact manner. In the meantime, however, a few notes on the minor changes necessary to use the "Differential One" as an adapter will no doubt be appreciated.

In the first place, of course, the broadcast coil will not be required. Neither will the filament switch, so that a wire may be run direct between the A+ terminal and the moving plate of the differential condenser instead of taking the same path via the switch.

The next step is to prepare the plug for inserting into the detector valve-holder of the broadcast set. A burnt-out valve having the same type of base as the detector valve normally used must have the bulb removed, preferably by using methylated spirits as a solvent for the cement. Three flex leads should then be soldered to the pins, the three pins used being the plate pins and the two filament pins. It will usually be found that the pins are hollow, and thin leads may be run down them and soldered at the tips. After the flex has been properly soldered in position, melted paraffin wax may be run into the valve base to lend a certain degree of mechanical strength to the assembly.

The piece of flex which makes connection with the plate pin on the valve base should now be connected to the terminal marked "Phones" "Differential One." The other two

lengths of flex are to be connected with the terminals marked "A—" and "A+." It will be necessary to make sure, however, that the pin on the valve-base adapter which connects with the "A+" terminal makes contact with the actual A positive socket on the detector valve-holder of the broadcast set. It is not always safe to trust to the markings on the valve-holder in this connection. However, it is some consolation to reflect that no harm will be done if this connection is wrong except to the performance of the adapter so that it is even possible to achieve the correct connection by a process of trial and error if the broadcast set is too inaccessible for proper investigation.

In case this description is not absolutely clear, the necessary connections have been shown in theoretical form in Fig. 1. If, now, the valve-base adapter is plugged in in place of the detector valve of the broadcast set and the aerial and earth changed over from broadcast set to short-wave adapter, there should be no difficulty in tuning in both morse and short-wave broadcast. For the reception of morse, the adapter should be just oscillating, and for the reception of music it should be just on the verge of oscillation.

The "Differential Two."

IT has often occurred to the writer that the ideal method of constructing a multi-stage receiver is to make a start with the detector alone, subsequently adding the other stages one by one. By this means one is enabled, if perfection is not attained at once, to search for any fault in a strictly localised area. When it is known that a fault lies in one of three or four components or their connections, it is not usually a difficult matter to find it. Where, however, one is faced with the problem of finding a fault in a complete four or five-valve receiver, one's logic is apt to be falsified by a confusion of causes and effects.

This has been one of the considerations which prompted the description of the "Differential" receiver in the form which it has taken. Those numerous readers who have constructed the "Differential One" have had little or no difficulty in securing its perfect operation. If they had had a four-valve receiver to wrestle with from the commencement, it is possible that they would never have had their detector stage operating at the summit of efficiency which they have now attained. Now, with the detector operating smoothly both on broadcast and on short-wave bands, it is time to consid-

And now . . .

The "Differential" T

Short Wave Coils for "Differential One"

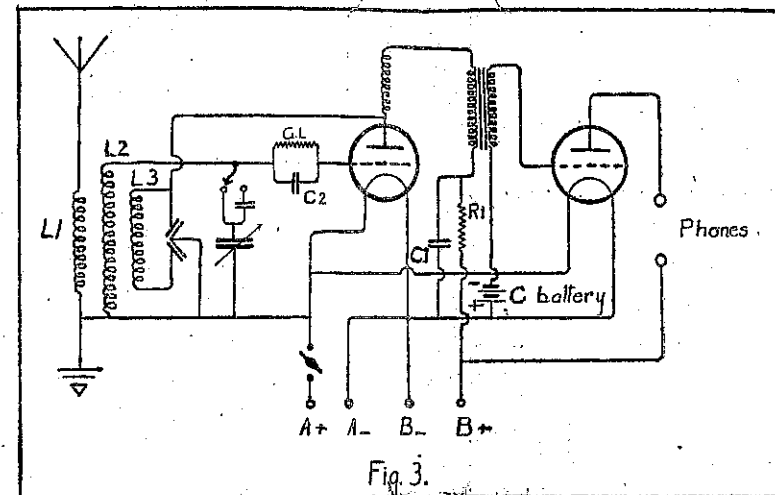


Fig. 3.

er the addition of the first audio amplifying stage.

For the conversion of the "Differential One" to the "Differential Two" four additional pieces of apparatus are required. These are as follow:—

1 Audio-frequency transformer (see text).

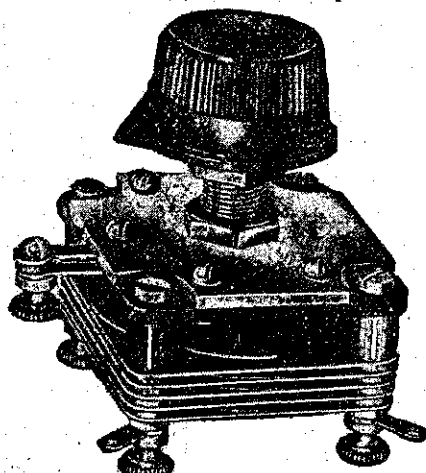
- 1 Valve-holder.
- 1 50,000 ohm. resistance.
- 1 2 mfd. condenser.

The receiver is worth putting a high-quality transformer in. It is recom-

ended that this should be of a ratio not greater than 3.5 to 1, although if it is not intended to add the second audio stage later on, it is permissible to use a transformer of higher ratio, say, 5 to 1. Incidentally, in case any one should be tempted to buy two transformers of the one type in readiness for the addition of a second stage, it is well to mention that it is inadvisable to use two identical transformers in a two-stage amplifier owing to the danger of peaks being apparent

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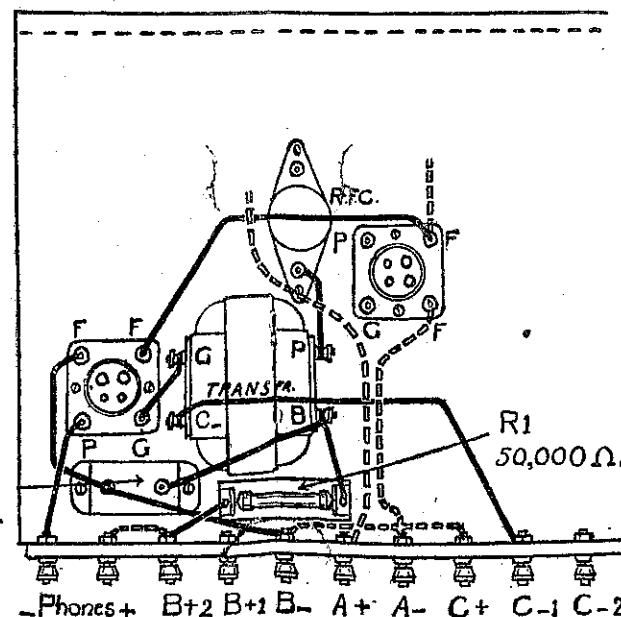


Fig 2