

# Mainly about Construction

## A Super-Regenerative Circuit

### FOR LOOP OPERATION ONLY

THIS type of circuit is particularly adapted for loop operation, being one that was awarded first prize in a "Radio News" constructional contest, for which it was entered as a two-valve portable set contained in a carrying-case 10 by 11 by 5 3/8 inches, loop, batteries and 'phones being also contained in the case.

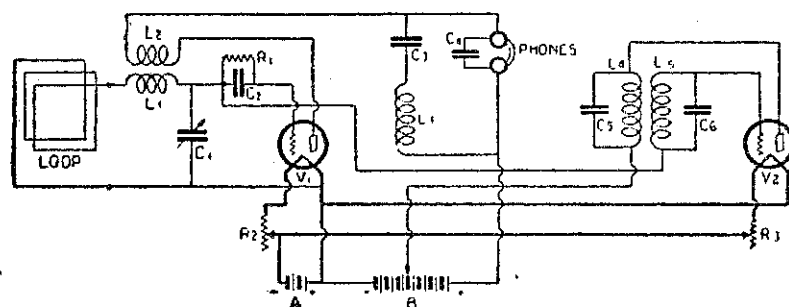
This is not given as a tested circuit, but as one from which experimenters can get good results with a certain amount of patience. A great point about the circuit is that there is absolutely no hand-capacity, an unusual point in super-regenerative receivers. Although the description embodies points for portability, the circuit may be used effectively on a larger indoor loop than would be employed in a portable set.

THE ends of the loop aerial connect to the single tuning condenser, C1, through the coil, L1; this

In the plate circuit of the detector tube is included the pair of headphones (each phone of 2,000 ohms resistance), shunted by a .002-mf. condenser. The 'phones themselves are shunted by a filtering system, composed of the coil L3, of 100,000 microhenries, and the condenser C3, of .007-mf.

From the grid-condenser connection of the detector tube a wire runs to the inductor, L5, in the grid circuit of the low-frequency oscillator, V2. This coil is in inductive relation to another of identical size (L4, 180,000 microhenries) which is in the plate circuit. Each is bridged by a fixed condenser of .002-mf. Coil L4 obviously is a straight tickler coil, reacting on L5 to produce oscillations, the frequency of which is determined by the electrical dimensions of the coils and condensers.

No filament switch is provided, nor is one necessary. The tubes are



tuning circuit being bridged across the grid of the detector tube, V1. The usual grid condenser and grid leak, C2 and R1, are used; the former has a capacity of .0001-mf. and the latter a resistance of 3 megohms. The tuning condenser is of the standard .0005-mf. size.

The coils, L1 and L2, provide the regenerative effect, being connected in a regular series-tickler manner. Coil L1 has an inductance value of 65 microhenries, and L2 of 180 microhenries.

Separate rheostats are used for the two tubes. The detector, V1, is a Philips valve, type B.406. Its filament is rated at 3.5 to 4 volts and 30 milliamperes, and requires a 15-ohm rheostat. The low-frequency oscillator, V2, is a Vicco tube, with filament rating of 2.5 to 4 volts, .06 amperes; filament rheostat 30 ohms. The "A" and "B" current is furnished by heavy-duty flashlight batteries contained in a compartment in the set case, as shown in the illustrations.

turned on and off by means of their individual rheostats, which must be adjusted carefully in order to make the tubes oscillate properly.

### THE LOOP AERIAL.

The loop aerial is of the flat variety, with one turn inside another on a simple X-shaped frame. The two ends of the cross bars that fit in the bottom edges of the cover are fastened by hinges to the latter, so that some adjustment of its position is possible. Of course, its directional effect is marked, and the set must be swung around so that the loop points in the direction of the station to be received. The whole loop fits snugly inside the shallow top of the carrying case.

### INTERCHANGEABLE COILS.

The tops of the case swings upward, the right side swings outward and the front folds down. The tuning condenser and the filament rheostat are mounted on a small panel, (Concluded at foot of next column).

## ELIMINATORS FOR SMALL SETS

### A FEW HINTS

AN eliminator for a two-valve set will not be called upon to give any very high plate voltage, and probably 100 to 135 will be the maximum required for the amplifier valve. It requires a considerable amount of resistance in the circuit to cut down the mains voltage, and in the case of the eliminator working with a bell-ringing transformer, it is necessary to either add resistance to the "high" output lead, or else take the plate current from the "low" terminal only. In order to reduce the maximum output, one of the fixed resistances of 100,000 ohms may be placed in the output lead by cutting the latter in front of its connection to the first resistance and connecting instead to the brass clip which connects the two resistances. A variable resistance may then be included in the high output circuit, and placed upon the panel.

THE above remark apply to 230-volt supplies, as where the voltage is only 110, no resistance will be necessary in the high output lead, as the voltage available will be reduced to 80 or 90 by the resistance of the valve used for rectifying.

Nothing is gained by placing too high a voltage upon the plates of any valve, and it will often be found that maximum results are obtained at a figure considerably below the maximum actually recommended by the makers.

UNDULY high B voltage shortens the life of a valve, so it pays to ascertain from the leaflets enclosed in the packing the maximum voltage recommended, and for economy, keep under rather than above that figure.

### INSULATING LAYERS.

NO attempt should be made to wind one layer of wire upon another without a layer of paper in between when putting the windings upon transformers. The care with which the ends of the layers are treated has much to do with the lasting qualities of the transformer. The best way of ensuring a fit for the paper used between layers is to have the strips cut by a printer, all an equal width, and then by using the width of these strips as a gauge, make the spool the exact width inside. By this means there will be practically no space through which the 36's wire can sink down to the layer below, but it is still necessary to use great vigilance so that not a single turn goes astray, and the safest way to ensure this is to leave a space of say one-sixteenth inch at each end of a layer.

NO doubt some readers interested in this subject would notice last week a paragraph stating that an article had been "held over until next week." That paragraph was written to appear on March 16, and along with several others had been held over by the printers, and these have recently appeared, though out of date. It is hoped at an early date to present another type of simple eliminator of easy

which forms the cover of a box containing the various fixed condensers and the coils L3, L4 and L5. Coils, L1 and L2, are not fixed permanently in place, but fit between clips on the right end of the instrument box. The earphones are not clamped in the usual U-shaped headband; instead, each is fitted with a half-moon clip which hangs over the ear and thus space is saved.

As a guide to the number of turns on coils, 65 microhenries would represent, approximately, a coil of 36 turns, 24's wire, and 180 microhenries, 56 similar turns. The equivalent of 180,000 microhenries would be a 1,500-turn coil.

construction and lower cost than those already given.

## Resistance for Battery Charging

### A HANDY UNIT FOR EXPERIMENTERS

HERE is a handy regulating resistance to use in conjunction with the A battery charger described on March 2. This resistance is kept connected up to the charger, and by means of the switch, all resistance may be cut out, or a suitable amount may be put into the circuit for

of two pieces of 3/8-in. wood, 4 1/2 by 2 1/2 and 4 1/2 by 1 1/2 respectively. The narrow strip is screwed to the back of baseboard and to the front edge of it the panel is secured by screws. Two terminals are placed in the front of the base. A couple of strips may be placed underneath at the sides, and two holes should be provided in the base so that the whole may be fastened to shelf or table by means of screws.

### THE RESISTANCES.

THE resistance is provided by 28's s.w.g. nichrome resistance wire. A size either way will serve if 28's is unobtainable. The wire is made into coils to be as compact as possible, by winding round a piece of 1/8-in. brass rod to make a close spiral. A convenient number of contacts is nine, the one on the left being an "all out" position. The spiral may be stretched out more or less to determine the amount of resistance between any adjacent two stops. It is a good plan to stretch out well for the first two, so that a small amount of resistance can be put in, and allow the spiral turns to be closer on the succeeding spans, and very close on the last one. This will give a good range to suit most cases.

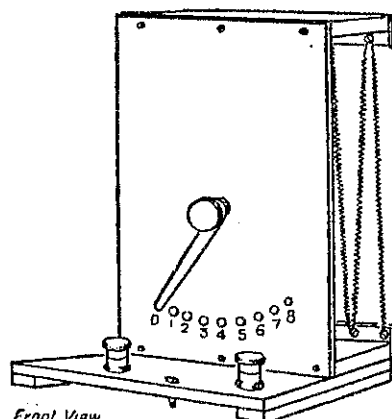
### GENERAL INSTRUCTIONS.

TO the top of the panel is screwed a strip of wood projecting back an amount equal to the portion on the base. A narrow strip of fibre is secured to the back edge of each of the strips, and through holes in the base are soldered to the resistance wire when in place, the resistance wire being well cleaned where the joint is to be made.

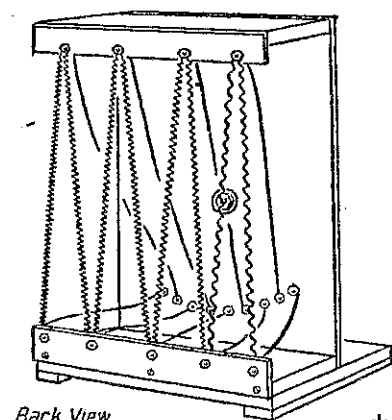
The switch contacts should be numbered, so that once the suitable position for any given purpose has been found, it can be used again without any uncertainty. Further explanation should be unnecessary, as details may be seen in the diagrams.

A light type of switch arm will serve to carry 1.3 ampere, but for larger currents the switch must be of suitable heavy pattern to prevent heating. A heavier gauge of resistance wire would also be necessary to carry several amperes without undue heating.

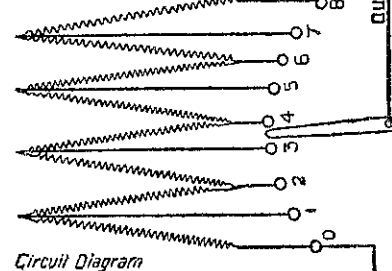
An ammeter could be conveniently mounted on the panel in the space above the switch. It must be remembered that the introduction of resistance into a charging circuit cuts down both voltage and amperes, so that only sufficient resistance can be introduced that will still leave the voltage higher than that of the cells to be charged.



Front View



Back View



Circuit Diagram

charging small cells or B battery cells in series-parallel, as described on April 13.

The panel measures 7 1/2 by 4 1/2 inches, and may be of fibre or ebonite. A switch arm and nine contacts will be required, and the panel is drilled to take these in the position shown. The base is constructed drilled in these brass bolts are placed



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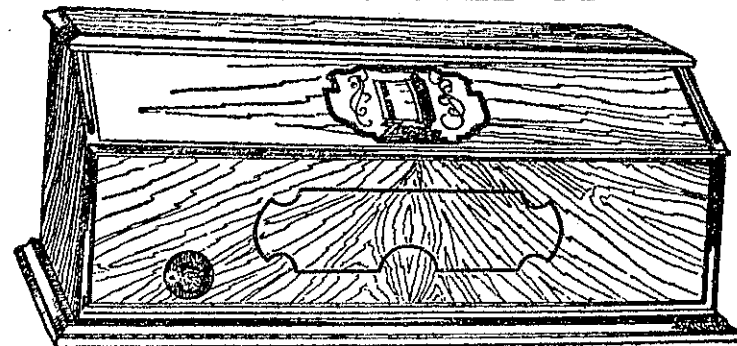
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