Our Crystal Corner

By "Galena"

The Full Wave Variometer Set

A REQUEST was made last week for a variometer crystal set that would give double the strength of an ordinary set, and so to meet this request the full wave set, in some respects similar to the full wave crystal set, is given this week. Before proceeding with the details the writer considers it worth while to take a little space to explain the action of the variometer.

A variometer consists chiefly of two coils of wire connected in series. When a current of electricity is passed through a coil it creates around itself a magnetic field, and if placed near to another coil will influence by its magnetic field. If two coils are placed in series and in such a position that they cannot influence one another the total inductance is half that of one coil. When one is placed within the other, the strength of the magnetic field is increased, and if the inner one is movable, the intensity of this field can be regulated at will. The regulating of the magnetic field determines the wave-length, and so the variometer came into being as a wavelength control.

In general, it gives smooth tuning, not quite so fine as a moving condenser but finer than the slider. Some few years back, this type of inductance was very popular, but of latter years it has been displaced by the fixed coil tuned with a condenser. However, many of our readers consider the variometer still maintains the pre-eminence.

A Simple Variometer.

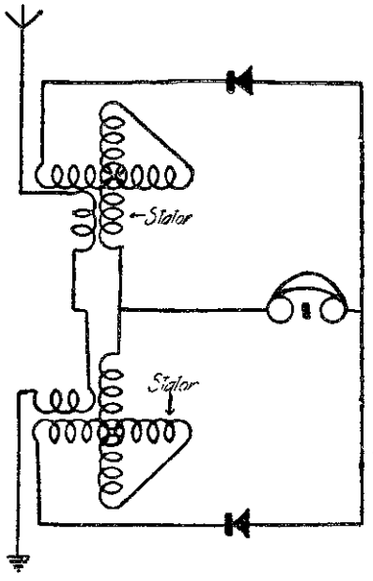
IN our issue Vol. 2, No. 26, a simple variometer crystal set was described, and it has proved so successful that interest was created in the full-wave variometer. The constructor who intends building up a full-wave set must bear certain points in mind. His crystals must be perfect, that is, they must pass current in one direction only. If one crystal passes current in the wrong direction, no matter how small it will be, this current will return through the circuit to the other crystal and will offset its strength by the amount that is eked back. This explains why many constructors have not had success with the full-wave crystal set.

A crystal can be quite easily tested by the 'phones and cell method. A distinct click should be heard in one direction, while on the terminals being reversed, nothing at all should be heard. If the faintest suggestion of a click is perceptible, the crystal is not perfect, and the total result will be less than that of an ordinary crystal set. Permanent crystals are generally more suitable for this type of circuit than the wat-whisker or even the perikon type. The reason for this is that if the contact is not being made with the most sensitive point on the crystal, efficiency is being lost, and some of the signals are working back and spoiling reception from the other.

Another point to be noticed is that the inductances (coils or variometer) must be balanced. If the readings are at different points on each dial, this indicates that the coils are not balanced, and turns must be added or taken off until both read at the same points. If the constructor bears these two points in mind, he will have little difficulty in making the set, and in getting very fine results. Some claim that a loudspeaker can be worked at comfortable strength from a set of this type.

The Circuit Diagram.

IT is not proposed in this article to give full constructional details of the variometers. These were fully described in the number already referred



to, and if the constructor would turn this up, he will find no difficulty.

The variometers need not necessarily be constructed exactly as shown. If a 3in. or 4in. cylindrical former is taken and 18 turns of 24-guage wire (silk or cotton-covered) be put on, then the wire taken over to the other half of the former and another 18 turns put on, the wire passed through and on to a 3in. or a 2in. former, and 14 turns put on, corresponding to the other half, and 14 more turns put on, and the wire carried out, an efficient variometer can be made. A space has been left between each half of the winding. This is to allow of a central rod being passed through to control the inner or rotor coil. Over the first half of the coil comprising the stator, wrap a couple of layers of shellaced brown paper or empire cloth. Over this wind 15 turns of wire. Connect one end to the aerial, and the other to the primary winding of the other variometer. The free end passes to earth.

The rest of the connections to be made can be quite easily ascertained from the diagram. Connect the beginning of the rotor stator to the crystal. The other free end, that is from the rotor, is connected to the 'phones and to the stator of the other variometer. The rotor of this latter passes to one crystal. The free ends of the two crystals are now joined, and this wire passes to the free end of the telephones.

The constructor will possibly have to experiment a little to get the right number of turns for his particular station, but the above are a guide, and although not the same as those given previously, should do equally well. This set gives plenty of scope for the enthusiast, and in presenting it, "Galena" would like to hear the results of some of the constructors.

Points Regarding Wave-Traps

P.R.S. (Auckland) writes asking the following questions:—

1. I wish to build a crystal set and wave-trap inside a Lucos coil screen, but find that a 3-inch former at 60 turns that signals are loudest when the coil is halfway in. What can I do to get the same signals full in? I want 1YA only.

ANSWER: It appears as though there are too many turns on the coil, although the correspondent has not made his point clear as to what he means by the coil halfway in. Generally, to reduce wave-length take off turns, and when the condenser reduces it to 0, it would indicate that there are too many turns. A wave-trap should not be shielded.

2. My B battery registers 18 volts, using a Philips 141 valve. Is it necessary to incorporate a choke and condenser?

ANSWER: No. A choke and condenser is necessary only when a large output, greater than that which the valve in question can handle, is to be dealt with.

3. An ingenious diagram embodying wave-trap, crystal set, and direct aerial, is sent, and the correspondent wants to know if it is correct.

ANSWER: It is O.K.

4. Is a fixed crystal a Foromodenser all right as both can be fitted into the tin?

ANSWER: This we cannot say. The best plan is to try.

5. You say, "To find the number of turns on a coil, divide the wave-length by 7." What size does this imply?

ANSWER: If tuned with a .0005 condenser, and the coil wound on a 3-inch former, this would give the requisite number of turns.

6. Is it possible to adjust the condenser so that by means of the D.P.T.D. switch it would be unnecessary to tune on each occasion?

ANSWER: It would be possible, but it is rather too complicated to be worth while.

A Hint for the Crystal Set Owner

ONE or two of the makers of commercial sets employ the sliding contact on a plain solenoid type of coil for tuning purposes. One slide of the coil has been scraped, and a sliding arm is usually adjusted from the outside. After several months of use the exposed copper becomes coated over with a thin film of oxide and tuning becomes difficult, signals dying out, and the next moment coming back.

Matters can generally be improved by rubbing this layer of bare wire over with fine sandpaper, and wiping over with a clean cloth. Also clean the underside of the sliding arm where contact is made.