Our Crystal Corner

By "Galena"

The Variometer Crystal Set

RECENTLY we have had inquiries regarding the variometer, and its application to the crystal set.

This is a variation from the ordinary method of tuning, good volume and compactness being its principal features. Variometer tuning is not particularly selective, but it offers a satisfactory method of getting good volume from the local station with a smooth control equal to that of a tuning condenser at much less cost, though it entails a little more work than the making of a plain solenoid. Those who care for the construction will find this an interesting piece of work that with a little care and patience will give good results. The panel, 4¾ inches wide by 6 inches high, may be of ebonite of 3-ply, and the base of 3-8in. rimu, is 4¾ by 4½ inches. A cover can be made in the same way.

The Variometer.

THE essential part of this set is the variometer, which consists of two parts, the stator or fixed portion, and the rotor or moving portion, which is provided with a spindle fixed in such a way that the rotor may be turned round within certain limits inside the stator. Turns of wire are wound upon both the rotor and stator, a space being left in the centre of the windings, on each, to clear the spindle. The first construction is a former for the rotor, and this is made of wood to the dimensions shown, the corners being neatly rounded off. Now a strip of thin celluloid (about 20 mils) is required not less than 11 by 1¾ inches. This is placed round the outside of the former, pulling tight, and overlapping in the centre of one of the long sides. The overlap is cemented with celluloid cement made by dissolving small chips of celluloid in liquid acetone, which may be obtained at the chemist's.

The celluloid dissolves in about two hours. A very small bottle may be used. This should be kept corked. When the joint is made, the whole should be tightly bound with many turns of twine and left a few hours to set.

Winding the Wire.

THE lap joint being set solid, the twine is removed and winding proceeded with. The wire recommended is 22's enamelled, but 24's may be used. A turn less is wound upon each of the four groups of winding. A small hole is made at the edge of the celluloid, which should be slid off the former 1-8in. at one side. With this edge to the left, the end of the wire is passed through this hole and turned sharply back to hold during the winding.

The turns are now put on in the direction shown in the diagram of rotor, commencing at A and winding in the direction of the arrow. It should here be mentioned that the spindle to be used must be a straight wooden penholder about 4½in. long and a little over ¼in. thick. Fourteen turns of 22's wire are wound on with the turns close together, then a space equal to the thickness of the spindle is left, the wire crossed over this diagonally, and the winding of 14 more turns proceeded with, the finishing end being cut off with 5in. to spare and temporarily secured with twine. The turns of wire are now to be secured with celluloid cement, especially the outer and inner turns of each group, as these will hold the others. When this work has set, a small amount of cardboard is required. Sixteen-ounce strawboard, about 18 to the inch, will suit. A number of squares of this are cut, 1 5-8in. by 1 7-8in., to make two lots each ¼in. thick. Two pieces are to be cut 3 5-8in. by 1⅜in. The ¼in. lots are placed one at each end of the rotor, resting on the windings, and a single piece is placed at each side over the wires. The whole is now bound together with a couple of turns of twine in the same direction as the windings, but outside the cardboard, the twine to be exactly over the centre of the space between the two windings.

Six pieces of celluloid are now to be cut about 1¾in. by 2in. One of these is slipped under the twine at each end of the former, and the winding of the stator proceeded with in exactly the same way as for the rotor, the beginning of the wire being temporarily secured to a small nail driven into the wooden former.

Fifteen turns are wound on each side, the space for spindle to be quite free, being left in the centre. Now two of the remaining pieces of celluloid are slipped under the twine and windings, one above the position of spindle and one below on each side. The turns of wire now cemented to each of the celluloid strips and left to set.

Now the formers have to be removed, and the easiest way to do this is to chip away one of the small ends of wooden former with a chisel. Then this will come away and the cardboard packing may be removed. The two parts of the variometer are now separate. The central position of the spindle must now be marked on each side of the rotor, and the holes made to be a tight fit for the spindle. One end of the spindle should now be thinned to fit the knob or dial to be used.

Fitting the Variometer.

THEN the rotor is inserted into the stator with the commencing end A near the end C on stator, and the spindle is pushed into place, through the spaces in the stator and through the celluloid of the rotor.

At the same time a washer of cardboard or other suitable material not less than 1-16in. thick is to be put over the spindle to separate rotor and stator at each side to keep them from touching. Two 1-8in. holes for small screws have to be made in the celluloid between the two windings at what is to be the bottom end of stator.

Now the whole is stood on a piece of wood ½in. thick on baseboard, and the best working position found and spindle height marked on back of panel for drilling. The back bearing for spindle is now made of wood as shown, the height 3 inches or so, 1in. wide, screwed to a small crosspiece to screw to baseboard.

The back end of spindle is drilled 1-16in. to take a small nail as a cotter on each side of the bearing.

When this has all been got into smooth working order, the last part is to get the stator into place so that it allows the rotor to move freely. The stator is screwed to the stand-piece by two ½in. brass screws through the celluloid. It may be necessary to pack the stator up with strips of card, to get the necessary position, and when all is O.K. the stator stand-piece can be screwed into position.

Final Details.

PANEL arrangements are the same as for previous crystal sets, 28's brass sheet being curled up for telephone clips if terminals are not used. The terminal on the left is the earth connection and that on the right for the aerial.

Ends A and C of variometer windings are connected together by 5in. of thing flexible wire, and end B is connected inside to a short piece of the same flexible, which is brought through the rotor and connected to the back of the aerial terminal, which also connects to back or one end of crystal. End D of stator connects to earth terminal and is continued to connect to 'phones at that side. Be careful to thoroughly scrape off all enamel from wires where a connection is to

Components Required.

- ¼lb. 22's enamelled wire
- Crystal
- Knob or dial
- 2 terminals
- Wood, celluloid, brass
- Approximate cost 7/6