larger gap means using a larger field coil and also a larger field current.

These were the two points referred to when it was suggested that the amateur should not attempt to copy, in size and field coil current economy, the speakers manufactured by well-known firms who spend thousands in installing machinery to do operations almost impossible by the human hand.

Now that these points have been cleared up let us get to work on a moving coil speaker, considered by the writer to be the simplest as far as construction goes.

Table of Wire for Field Coil.

| Volts | S.W.G. Guage | lbs. | Layers | Turns | resistance Ohms | Current |
|---|---|---|---|---|---|---|
| 6 | 18 d.c.c. | 4½ | 15 | 1,000 | 2.9 | 2.1 amps. |
| 12 | 20 d.c.c. | 4¼ | 20 | 1,700 | 8.4 | 1.4 amps. |
| 120 | 34 enam. | 3½ | 67 | 19,000 | 1500 | 67 m.a. |
| 230 | 38 enam. | 3 | 92 | 37,000 | 6500 | 30 m.a. |

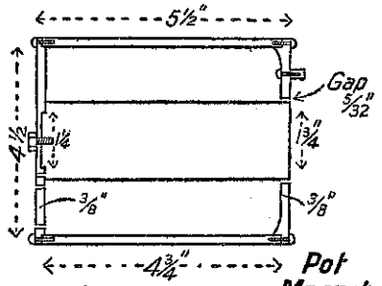



Fig. 1

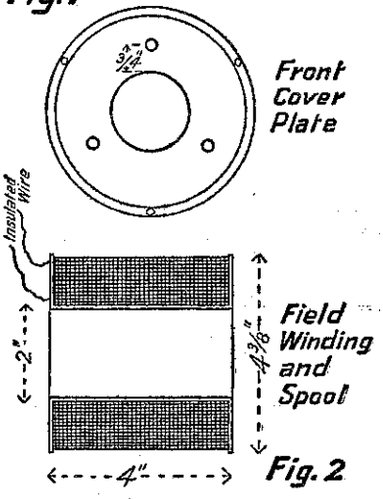
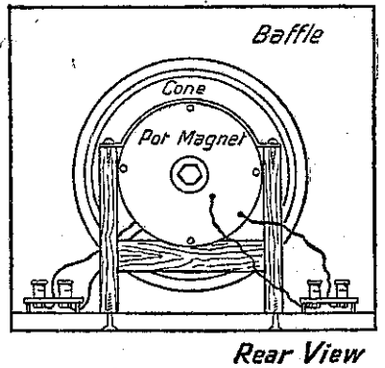



Fig. 2




Rear View

**Obtaining the Pot Magnet.**

THE first essential is to obtain the pot magnet. Starting with a length of iron water pipe with an internal diameter of at least 4¼ inches put into the lathe and clean off each end to a length of 4⅞ inches. To anyone who has the necessary lathe, etc., the diagrams are of sufficient value to work on. Two end plates will have to be cut from ½ inch steel or iron and have to be shaped as shown so that the length of pipe will fit into a 3-16 inch rabbit in the end pieces. Into the middle of one end a 2 1-16 inch hole. The centre of the other end is recessed 1¼ inch diameter, into which the specially shaped core piece must be bolted from the outside. This core is 1¾ inch diameter and must be machined accurately and cleaned on both faces of the gap so that a uniform space of 5-32 inch is left.

All machinery must be done accurately so that when the whole is bolted together it is quite rigid. It is essential that the joints are perfect otherwise a magnetic loss will occur and the efficiency of the speaker impaired. While in the hands of the engineer get him to drill three ⅛ inch holes equidistant in the front piece as shown and ¾ inch from the edge of the gap.

This section of the construction is passed over quickly as it will be assumed that the reader has entrusted this part to a professional turner who can obtain all information from the diagrams. The main point to impress is that the gap when finished will be an even 5-32 inch all round and ⅝ inch deep.

A suitable cast "pot" is obtainable from the Precision Engineering Co., Wellington, for about £3 10.

**The Field Magnet Wiring.**

NOW comes the field winding and "Pentode" has thought it advisable to give a table of the wire to be used and number of turns, etc., for different supplies of D.C. The field winding can be used as a choke in the smoothing system when working from the AC and this is an economical way of producing the magnetic field. Others will want to use their A battery to energise the magnet and reference to the table will show the number of turns and gauge of wire, etc. Choose the D.C. voltage supply available and work according to that specification.

Say it is desired to work off the 6 volt A battery. Then 1000 turns of 18 D.C.C. SWC wound in 15 layers will be suitable and will consume 2 ampres while in use.

This may seem a considerable drain but, as has been mentioned before this is due to the relatively large gap being used and also to make up for losses due to incorrect core material.

A word to those who contemplate using the pot magnet as a choke in a smoothing system. Calculate the total current in milliamps that will be passing through the coil. Say it is 30 m.a., then by using the 230 volt winding the voltage drop across the choke will be 230 volts and this will have to be made up on the rectifying valve end.

It is expected that most constructors will use the 6 or 12 volt table. If the reader considers 2 ampres too much of a drain on his 6 volt battery, he can use the 12 volt winding which takes only ¾ ampres but the sensitivity of the speaker will be cut down accordingly.

Before the field coil can be wound a bobbin has to be made so that it will slip over the centre core into the pot itself. A piece of wood slightly in excess of 1¾ inch diameter can be used round which a strip of 20 gauge brass or copper sheet has been wound. Two end pieces 4⅜ inch diameter in which a 2 inch diameter hole has been cut out of the centre are soldered on at each end forming a spool. These end pieces can be cut from No. 16 gauge metal. A section of the winding space of the finished spool must be 3⅞ inch x 1 3-16 inch.

The wooden former round which the spool has been made can be kept in place until winding has been completed making use of it to mount the whole on a winder. Drill two holes in one end of the spool to pass the beginning and end of the wires out. Now glue three or four layers of brown paper over the inside of the spool; ends as well so that everywhere the wire touches will be thoroughly insulated. Give the whole a liberal coating of shellac varnish.

It must be realised that whenever the field current is shut off quickly a great voltage potential is built up at either end and special care must be given to insulation. Six volts is thought to be nothing, but it is this built-up voltage when the circuit is broken that is liable to do damage.

Some form of winder will be needed and this will have to be left to the