enough to permit of amplification with an untuned coupling. The design of this can at best be but a compromise, as in the case of the chokes commercially available.

Dealing with the construction of these four types of chokes in turn:—

(1) Firstly, in regard to the choke for parallel feed, we are not faced with

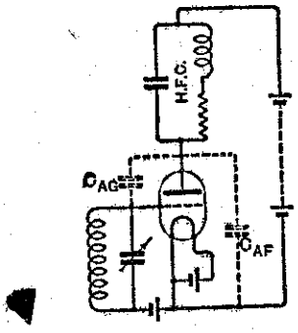


**FIG. 3.**
**Circuit showing valve capacities which influence the performance of an H.F. choke.**

the necessity of reducing self-capacity to the lowest possible figure. Therefore it is suggested that the constructor should adopt a simple slot winding with its attendant ease of construction. For making the winding former, three discs of hard rubber will be required, two of two-inch diameter and one-eighth inch thickness, the other of half-inch diameter and three-sixteenths-inch thickness; one of the larger discs may well have three "wings" left on it when cutting it out with the fretsaw or cop-

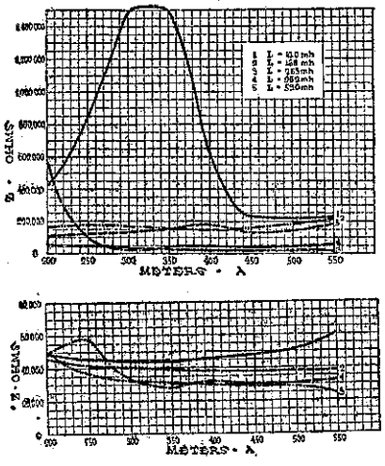


**FIG. 4 (upper).**
**Impedance of Chokes without Shunt Capacity.**

**FIG. 5 (lower).**
**Impedance of Chokes with 15 mmfd. Shunt.**

ing saw, two of the "wings" being fitted with terminals or soldering lugs to which the ends of the winding are connected, the remaining wing being utilised for mounting by means of an angle bracket. The three discs are then bolted together by means of a small brass bolt through their centres; the small disc is of course placed in the middle, and the slot thus formed accommodates the winding; the illustration of such a former in Fig. 6 will make matters clear. In this instance a winding of about 200 millihenries should be quite large enough, and this will require some 2500 turns of either 40 S.W.G. double silk covered or 38 S.W.G. enamelled wire (the enamelled wire is the cheaper). If the dimensions given are adhered to, and one of the recommended wires used, it will be unnecessary to count the turns; just wind the slot full. About one ounce of wire will be sufficient. If the constructor so desires, he may adopt a subdivided type of winding as described in paragraph (4) below, but there is no particular advantage in so doing if the choke is to be used in a parallel feed circuit.

(2) Secondly, for a coupling choke for a portable receiver or other receiver with a stage of untuned high-frequency amplification the same type of construction is entirely suitable. The diameter of the large discs, however, is reduced to one and one-half inches—while the thickness of the smaller is reduced to one-eighth of an inch. On this smaller former, then, 900 turns of either 38 S.W.G. double silk covered or 36 S.W.G. enamelled wire should be wound. Here again, if the dimensions given are followed, winding the slot full of one of the recommended wires will dispense with the necessity of counting the turns. One ounce of wire will be sufficient to wind two of these chokes.

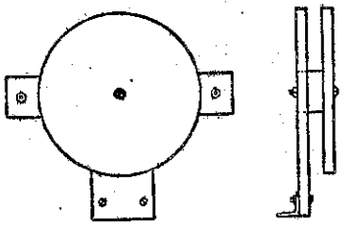

**Fig. 6. Former for choke for parallel-feed, reaction and R.F. coupling. The size will alter with the type.**

(3) Thirdly, for a reaction choke in the plate circuit of a detector valve, such a choke as is described in paragraph (2) above will be very suitable and efficient. Where compactness is a consideration, however, the diameter of the larger discs may be reduced to one inch, the winding then being made with finer wire, says, No. 40 S.W.G. enamelled, of which the required number of turns will just fill the slot.

(4) Fourthly, for a general-purpose choke, some subdivision of windings is necessary, in order to gain the necessary high inductance for a parallel feed circuit, without having so high a self capacity to render the choke useless for coupling an untuned high-frequency stage. Such a choke may well be wound on a piece of half-inch ebonite tubing, such as is commonly used for leads-in, this having a number of one and one half-inch discs of one-eighth inch thickness (drilled with a half-inch hole in the centre) forced over it in the manner illustrated in Fig. 7, and well secured with shellac

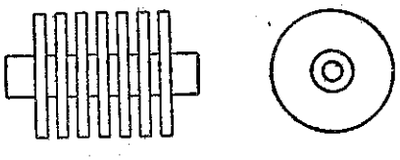

**Fig 7. Former for general purpose choke in which self-capacity is at a minimum.**

varnish. Each slot is then filled with 38 S.W.G. double silk or 36 S.W.G. enamelled wire, all the slots being, of course, wound in the same direction. Some slight advantage may be gained by placing two discs between each wound slot and leaving an air space between them, but this will make the choke rather long unless the discs are made of one-sixteenth inch formica, which by the way can be obtained from Johns, Ltd., Auckland. For that matter, there would be no particular objection to reducing the number of wound slots to four instead of the six shown in the diagram, as the induct-

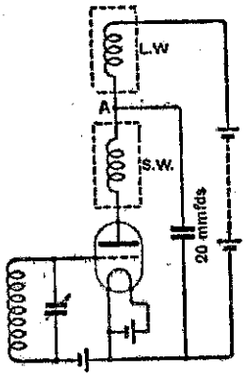


**FIG 8.**
**Long-wave and short-wave chokes connected in series to improve choking effect on short waves.**

ance would still be sufficiently high for all practical purposes. Where compactness is a consideration, the diameter of the discs may be reduced to one inch, and the slots wound full with 40 S.W.G. enamelled wire. As an alternative method of construction of a former for this type of choke, a number of discs of one-eighth inch hard rubber, alternatively half-inch and one or one and one-half inches in diameter, may be bolted together by means of a length of thing threaded brass rod through thier centres. The wire is then wound in the resulting slots in the same manner as has just been described.

For short-wave work any of the foregoing chokes will be found reasonably efficient. Where a receiver is to be used exclusively for short-wave work, however, better results will be obtained by the use of a straightforward single layer winding of 200 or 300 turns of fine enamelled wire (38 or 40 S.W.G.) on a length of half-inch or three-quarter-inch ebonite tubing.

The effect of using a short-wave choke in series with an ordinary choke has been tried for use in an all-wave receiver, but not with very promising results. In order to make the short-wave choke operate separately on short waves it was found necessary to connect a tiny condenser from the junction of the two chokes to earth in the manner illustrated in Fig. 8, and this condenser, being in parallel with the long-wave choke, naturally changed the resonant frequency of the latter component and impaired its performance to some extent. However, some experimenters may think the idea worth playing with, notwithstanding the complication introduced by its use.

## *Gang Condenser Tuning*

WHEN a number of circuits are being simultaneously tuned by means of ganged condensers, a difficulty sometimes arises owing to the natural capacity in the aerial circuit due to the aerial and earth. In these circumstances the transformer in the radio frequency stages or the aerial tuning coil is apt to become tuned to a lower frequency than the other circuits, and it is necessary to find some method for overcoming this effect. There are various ways in which this can be achieved, and perhaps the simplest of all is to leave the aerial circuit untuned and to introduce instead a choke coil (or resistance), connecting this between the grid and filament of the first valve. The radio frequency inter-valve coils are tuned by the condenser, and consequently it is a very much simpler matter to arrange the settings. This scheme will not be applicable in all cases, but in a large number of cases it provides a very easy way out of the difficulty and gives perfectly good reception.