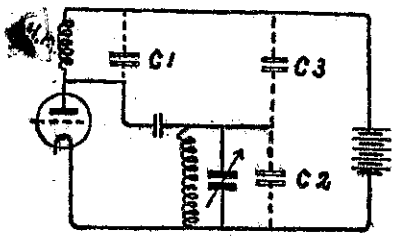
secure enhanced selectivity at the cost of a drop in amplification.

A comparison of parallel feed with high-frequency transformer coupling does not show any substantial advantage in favour of parallel feed, assuming that the high-frequency transformer used is one of real efficiency. There is this to be considered, however: that the construction of a highly-efficient transformer is a matter of some delicacy, the completed component being anything but robust, while the construction of a simple tapped or untapped coil is a matter of the utmost simplicity, and will result in a product capable of sustaining any amount of knocking round.



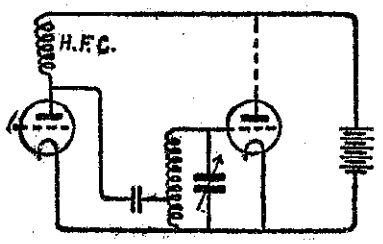


Figure 5 upper.
Figure 6 lower.

There is one other point which might be dealt with, namely, the ascertaining of a suitable tapping point on the grid coil to match a valve of any particular impedance. It is felt, however, that this can be better dealt with when the writer has gone a little further with the papers on coil and high-frequency transformer design which are at present appearing in the form of a short series, and readers will doubtless condone the slight delay in dealing with this particular matter.

As a final word, it is desirable to stress the necessity of using a choke of the highest possible quality in parallel-feed circuits. The effect of any substantial loss in a choke thus employed is to seriously reduce the effective impedance in the plate circuit of the valve, and with it the amplification. For the enthusiastic constructor it is proposed to prepare in the near future complete data on the design and construction of high-frequency chokes having some pretensions to efficiency, and this will be published in due course. We have learnt from our simple analysis that to be of the utmost service in a parallel-feed circuit, the high-frequency choke employed must possess a very high inductance (that is, it must have a great many turns), while a certain amount of self-capacity will not be so serious as might be the case in a different circuit. These things will be borne in mind when the process of design is embarked upon. "Different chokes for different purposes" will be the watchword of the future.

The A.C. Browning Drake

Coil Considerations

WITH the multitude of possibilities of coil condenser combination for this set the full details for any one combination was not given in the original description. It was intended that the set would be made by constructors who have had a little experience in coil construction and who were in consequence able to work out the specifications of this for themselves.

Some constructors who do not have any apparatus on hand and who in consequence have to purchase this will be advised to follow the following details:

Obtain a piece of two-inch diameter cardboard former about eight inches in length, a quarter pound of 24 d.s.c. wire and a few yards of 30 d.s.c. Wind the aerial coil first. Drill two very small holes in the end of the former (marked G) and thread the end of the wire through this so as to make a substantial hold. From the lowest of these holes measure two inches and drill another two holes (marked E). Measure ½ inch from here back toward the first hole and perforate the former to allow a loop of wire to be passed through (marked A). Commence winding. When the perforation is reached, bare the wire and pass it through as a loop, catching another piece of heavier wire in the loop inside the former. Tighten the wire and proceed until the last two holes are reached. Cut the wire and pass it through the holes. Later solder the joint to the loop. Leave sufficient to make a connection. Leave a space of an inch, and again drill two holes (marked G), measure 2½ inches and then another two holes (marked B—). from these two measure back half an inch and make another slot (marked N). Commence winding, and proceed as before. The coils on completion should be aerial coil 73 turns tapped at the eighteenth, grid coil 87 turns tapped at the fifteenth. A small variation from these specifications will be immaterial. Provision has now been made for tuning the aerial coil with a .0005 mfd. condenser and the regenaformer with a .00035 mfd. The connections are evident from the rest of the description.

The more experienced may depart from these specifications, and where the coils are already in use in a Browning Drake merely transpose them to the new set, do not rewind them unless economy in the size of former is required.

The tickler comprises about from 15 to 20 turns wound on a smaller former and pivoted under the grid end of the grid coil by bolts, washers and cellars. The ends should be fastened to flexible wire and brought across to the main former. The terminals should be marked T and P1, but the connections to them may have to be reversed on try-out, so it is not advisable to solder them at this stage.

The description of the primary was sufficiently detailed, so that further description this week is unnecessary. One end goes to B— and the other (P) to the condenser C.5. The connections **may have to be reversed later.**

When commercial coils are used a few alterations are advisable. The promary should be removed and the turns reduced to 15 or 16 in the case of a two-inch former. Like other specifications, these alter for different conditions. Those who wish to make excursions into the realm of simple mathematics can use the following simple formula for determining number of primary turns:—

$$P = \frac{T}{\sqrt{\frac{200{,}000}{Ri}}}$$

where P = Number of primary turns.
T = Number of turns on the grid coil.
Ri = Valve impedance.

Another alteration to commercial coils where neutralizing is carried out from the end of the secondary is to disconnect terminal marked N, connecting it instead to the fifteenth turn from the bottom. This loose end could with advantage be removed.

Watch those Valves

READERS who use push-pull circuits should make a point of checking the emission of their valves from time to time to see that one or the other has not seriously fallen off, thus upsetting the balance. A paper label should be stuck on each of the push-pull valves, and the emission at zero grid volts for a given plate voltage marked when the valve is new. No elaborate apparatus is necessary to make this check.

It is advisable not to keep the valve alight for more than a minute or so at zero grid volts. Some of the modern super-valve sets have a nasty habit of losing a considerable portion of their emission without warning, and a check of the kind mentioned should certainly be made from time to time.

Testing Condenser Insulation

FIXED condensers are worse than useless in a receiver unless their internal insulation is sound. This is specially important in B battery shunting condensers, and those who have electric supply mains available can test any doubtful condensers in the following way.

Cut one of the leads to a lamp, leaving the other lead intact, and connect the ends of the cut lead to the terminals of the condenser. The lamp and condenser are then in series, and when the switch is put on, the lamp should not light, if the condenser dielectric is sound. Any fixed condenser should be able to withstand safely the 220 volts of the mains, so that no damage will result from the test. In the event of a fault in the dielectric, and a consequent contact between two adjacent plates of the condenser, the lamp will light, acting as a safety resistance and preventing a short-circuit in the mains

To Prevent Noise

AS a rule it is usual to employ a variable condenser on the short waves for controlling reaction. It is impossible to keep such a condenser completely free from dust, and any small particles which become lodged between the two sets of plates will cause a crackle and scraping noise as the condenser spindle is turned.

This trouble may be removed by inserting a fixed condenser in series with the variable one. The value of this fixed condenser may be in the neighbourhood of .001, although a much smaller one can be employed if the variable reaction condenser is found to be too large. Incidentally, such a condenser acts as a safeguard for the valves in the event of the variable condenser becoming shorted, in which case it is possible for valves to be burnt out.