Final Instalment of

The Direct Current Eliminator

"By MEGOHM"

THE essential alteration that must be carried out in an existing receiver is to series the filament wiring. The other important point is to isolate the aerial-earth circiut from the rest of the receiver circuit. In the Hammarlund-Roberts type of set all that is necessary is to cut the connection between the aerial primary coil and filament wiring. The earth terminal will now be connected to earth, and from it a wire will also run to the earth terminal of the eliminator, or the terminal may be connected to the filament wiring, end nearest the earthed main, through a 1 or 2mfd. condenser.

The Browning-Drake aerial circuit will require a little more attention. It will be necessary to make an aerial primary coil. preferably on a celluloid collar of such depth that it may rest inside the secondary coil with the lowest turn level with the lowest secondary turn. The diameter of the coil should allow it easily to drop inside the secondary when the necessary 18 turns of 24's d.c.c. wire are in place. If it is likely to touch the turns of the secondary coil, give to the primary two or three coats of shellac. The top of this coil connects direct to the aerial without series condenser—it will be very selective—and the lower end is connected to the earth terminal, which connects to no other parts. The earth wire then connects to this terminal, and also runs to the eliminator earth terminal, or through a condenser to filament.

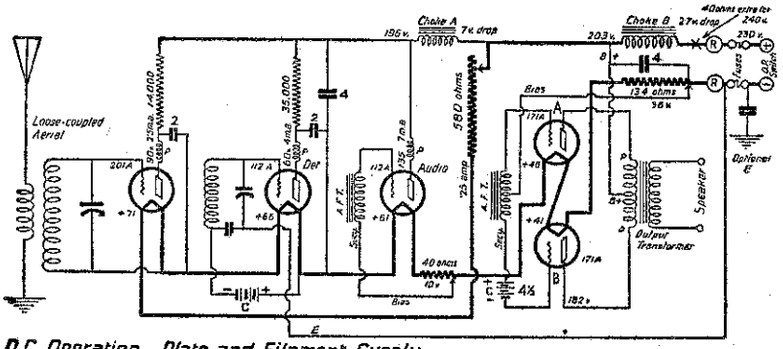
Constructing a Container.

WHETHER the plate resistors are placed in the receiver or not, most constructors will favour the idea of a separate housing for the smoothing chokes and condensers. This should be constructed of thin sheet-iron, which is cheap, strong, and easily worked, a neat job being obtained with a final coat of duco or black sapolin.

The idea to be aimed at in construction is to arrange that all "life" parts, terminals, etc., are safely enclosed so that the chance of an unpleasant shock may be avoided. This is important, and unless carried out, the receiver will not comply with the Electrical Regulations.

A minimum size for the baseboard to contain the smoothing condensers and chokes would be 9½in. wide and 7½in. deep. This should be strengthened with narrow battens underneath, 1in. high, to allow plenty of room for the 180-ohm. filament resistance. It is presumed that a lamp will be obtained for the 400 ohms., and for this a batten type holder is provided in series with the 180 ohms. The insulated leads may all be well protected and emerge from the case through a notch in the tray and corresponding notch in the cover, which has four sides and no openings, unless a few holes are found to be necessary in the top for ventilation. The diagram shows sufficient of the arrangement to enable constructors to proceed without any uncertainty. The plate resistors are shown in the eliminator, but may be put in the receiver if desired, in which case the 2mfd. condensers must go with them.

The baseboard fits into an iron tray with 1in. sides turned up, ¼in. clear of base all round. Into this the cover drops, the front and back of which are ½in. short at the bottom to allow ventilation for the resistance under the board, which is sure to warm up a certain amount. It would be wise to line the under side of base with iron near the resistor. Corners of the sheet-iron are secured with rivets.



D.C. Operation—Plate and Filament Supply

Choke Construction.

CHOKE A is for plate smoothing and will have an inductance of fully 30 henrys when passing 10 m.a. The core is to be built of 1in. stalloy to 1 x 1 on the same plan as choke B, the lengths of the four pieces of stalloy being 2 5-8, 2⅜, 1⅜, 1 5-8in. respectively, a 1in. pile of each, requiring just under 2 dozen 3ft. strips of stalloy. Run a strip of thin cardboard across not exceeding 1-64th thick for a gap. Spool 1½ long inside, ends 2 x 2. Note that 1 x 3-8in. wooden clamps overlap at XX. Carries up to 50 m.a. The d.c. resistance is 484 ohms. Voltage drop, 50 m.a. 24 volts, 25 m.a. 13 volts, 10 m.a. 5 volts.

Those who wish to purchase a ready-made choke should obtain one similar to the Ferranti B1 type, 500 ohms, carries up to 100 m.a. Carrying 20 m.a. the inductance is 33 henrys and volts dropped 10, 50 m.a. 18 henrys and 25 volts drop.

The Ferranti B2 has a lower inductance and carries up to 150 m.a., with a d.c. resistance of 145 ohms. Carrying 40 m.a. the inductance is 8 henrys and drop 6 volts; carrying 90 m.a. the inductance is 6 henrys and drop 14 volts.

Choke B is for filament current smoothing. This type of choke cannot be purchased ready-made, so must be made by the constructor himself or by a radiotrician. A diagram shows shape and dimensions of the core. The winding consists of 5000 turns of 26 s.w.g. enamelled wire, which should be wound in layers with paper between. The spool is 3¼in. long inside, and ends 3½ square. Cardboard 1-16in. thick across ends for gaps. Note that clamps overlap to hold both portions together. Carries up to ¼ ampere.

Radio-frequency chokes for insertion in the main leads consist of 1000 turns of 26 swg enamelled wire, and have a d.c. resistance of 10 ohms, giving a drop of 2.5 volts each with .25 amp. passing. Formers for these are easily made from 1lb. wooden wire spools by sawing one end off, then shortening the core to 3-8in., then attaching the free end with a couple of thin screws.

The object of these is chiefly to reduce interference from sparking of commutators, etc.

As a general rule, the less smoothing there is in the filament circuit the more must the audio amplification be kept down in order to minimise noise. "Spare the chokes and spoil the job."

The position of radio chokes is shown in the diagram by circles with the letter "R," but their resistance is not taken into account.

Earthed Positive Main.

ALL the foregoing circuits have been described on the assumption that the negative main is earthed, and smoothing chokes have accordingly been placed in the positive lead. When the positive is earthed, the choke should either be transferred to the negative lead, corresponding position, or a choke placed in the negative lead also—this is often done on "rough" mains. Where there are separate chokes for filament and plate supplies, only the filament choke need be transferred to the negative side. This transfer does not affect the total resistance of the circuit, and if placed close to the negative terminal the amount of resistance represented by the choke can be deducted from the 171 bias resistory. With a 27-volt drop in the choke, 8ft. 9in. of resistance wire is all that would be required in addition. The bias connection would be to the negative end of the choke.

When the positive is earthed, no attempt must be made to earth the negative through a condenser, but the positive side may be thus treated. It is inseparable from d.c. operation that earthing through different values of condensers should be tried if hum is experienced. Conditions vary more on d.c. lines than on a.c., because d.c. motors all run with commutators, the brushes of which "spark" more or less, causing r.f. interference, which may also be produced at the powerhouse.

When using a "B" eliminator only, remember to connect "B" to "A" and once again, don't forget the loose-coupled aerial.

A double-pole switch and fuse in each line must be provided where the supply current enters the receiver or eliminator. When a d.c. eliminator is used on a receiver with a metal chassis or cabinet, all direct connections between filament and chassis or screens must be dispensed with, and the connections made through a condenser. In some cases it will be necessary to add insulating bushes for condenser spindles, etc.

If there is any difficulty in finding the polarity of the mains, construct as if for