D.C. Eliminators, Small and Large



NFORTUNATELY suitable direct-current supply is not available in Wellington for experiment of any kind, but for some time the writer has been gathering literature on the subject, from

various sources, until he has been enabled to design the "full plate and filament supply eliminator, scribed at the end of the article. This is designed to work on the standard 230 volts (or 240) as available in New Zealand. This will be found not too costly in running expense, and will perform much more satisfactorily than circuits designed to use .1 amp. valves, hampers the output which unduly

Although in the use of direct current for radio work, there is not the necessity for rectification which accompanies the use of alternating current, yet the use of d.c. from the mains is not always the straightforward problem that it should be when considered on a theoretical basis. Whereas alternating current may be stepped up or down in voltage, rectified and smoothed, the direct-current supply has its limitation from the fact that the voltage available is no greater than that actually provided by the mains. This is less of a disadvantage when the mains voltage is 230, than when it is only 110.

Most towns using d.c. are wired up-on the "three-wire system," which must be briefly explained in order to acquaint readers with the reason why the supply in some houses has the positive main earthed, whilst in others the negative main is earthed.

When the latter is the case, the problem of radio supply is a simpler one.

The Three-wire System.

IN Fig. 1, A and B are two generators at the power-station, connected in series just as two accumulator cells would be. Each generator gives 230 volts, and the connecting-wire between the two is earthed, a wire from this point being also led along every street. Along main streets there will also be a cable from the outer end of each generator, and a supply taken across these two gives 460 volts for factories. Up residential streets the earthed wire and only one of the outer wires is led, the aim being to get half the 230-volt load halved on each generator. Looking at the diagram we can see why a per living in "King Street" finds that the negative main is earthed, while his friend living in "Queen

wire would be that necessary to carry the current of one lamp as they are to be used in series. Full details on transformer construction can be found in the 1929 "Guide."

2. Can a 230 volt a.c. dynamic speaker be used with a battery set using an elimi-

nator? A.: If you mean one that uses a rectifier, yes. It is necessary only to connect the a.c. mains to a suitable lighting

J. (Dunedin): Can a wave trap cut out 4YA and bring in 2YA when the two are separated by one point on the

A.: It is very doubtful, especially as you are right in Dunedin, but you could try the wave trap in the 1930 "Guide."

How to Run Plate and Filament too restrictive an effect upon the type from D.C. Mains

By "MEGOHM"

FROM time to time inquiries are sent in for particulars of battery eliminators for direct current mains. are quite a number of areas where the supply is direct current, this article has been compiled to show different methods of dealing with these conditions, so that constructors and experimenters, large and small, are catered for. article, beside giving specific circuits, is intended to illustrate principles so that constructors may make up a circuit to suit their own needs. Constructors are recommended to read the whole article through, because in some cases hints are given regarding one circuit that may also be useful in another.

of an earthed positive main .

The earthed main is found by connecting one side of a lamp to earth, and with a wire from the other side, insulated except at the end. touching each main connection in turn, but only momentarily. The unearthed main gives a bright light, and the earthed main none, or a dull glow that indi-

"KING ST." Three-Wire Sustem "QUEEN ST. 00000 **^^^**^^

cates a few volts above ground poten-Polarity is then formed by one of the tests that have been published from time to time. The regulations stipulate that any operation such as this where the mains are interfered with, a certificated wireman must perform the operation.

General Considerations.

THE desire of the radio enthusiast will be to run his receiver entirely without batteries, and whilst it is quite possible to do this, it usually pays to bias the anode bend detector with a lry battery if there is any difficulty in getting rid of a small residual hum.

Street," has to deal with the problem ply filament current as well, and in either case grid bias for at least the last audio stage. For either style of eliminator the best procedure is to construct a separate unit so that it may be placed a short distance away from the receiver, thus minimising any chance of the grid circuits, especially the detector, picking up hum from the smoothing equipment.

A potential divider should be dispensed with, and plate current voltages reduced by a separate resistance for each voltage. These resistances are best placed in the receiver itself, with the accompanying by-pass condenser, in which case the eliminator gives only one plate voltage, which is connected to a suitable terminal on the receiver.

Filament Current.

THE usual method of filament heating with completely "d.c. mains" operated sets is by connecting all the This is better filaments in series. than parallel for several reasons. This arrangement, however, brings to light one of the limitations of complete d.c. On account of the filaments working. all being placed in series, it is necessary that the amount of current taken by each should be equal and preferably not too great. The average a.c. mainsoperated receiver requires at least 100 watts from the mains, and in this respect the d.c. operator should not expect to obtain good results unless a reasonable amount of current is consumed.

Current at 230 volts costs just twice as much per ampere as it does at 110 volts, so that the 110 volts circuit will supply a half-ampere at the same cost as a quarter-ampere on a 230 volt circuit, though the watts consumed will be (practically) the same in each With a half-ampere available, case. filaments taking .25 amp. may be wired in parallel in pairs, each pair being placed in series, so that push-pull will then have no complications regarding For the sake of economy grid-bias. it is well to restrict the consumption on 230 volt mains to a quarter-ampere, which is equal to the ordinary household 60 watt lamp, as there is little to be gained in practice by doubling the consumption.

Circuits have been published to work The eliminator may be intended only with a consumption of only 0.1 amp., to supply plate current, or it may sup- but this is unnecessarily low, and has

audio stage.

Anode Bend Detector.

THE detector, as in A.C. sets, is liable to pick up a certain amount of hum if of the grid-leak type, and for this reason an anode-bend detector is recommended. Experimenters need have no apprehensions about converting to anode-bend detection on a multi-This is now known in valve set. America as a "power detector," and is being widely used. The writer has had it in use on the two r.f. Browning-Drake over a long period with marked If a grid detector is used, success. the grid condenser must be placed on edge, that is in a vertical position, and not horizontally, screwed down to the baseboard, as is sometimes Whether the grid-leak is the case. retained or not, the lead to the grid terminal of the valve-socket should be kept as short as possible, and away from other leads.

Plate Voltages.

ANOTHER point to be borne in mind is that when filaments are in series, the plate current for all valves returns through the filaments, and if the plate current of the last valve is heavy, must be taken into account. For this reason some circuits are arranged so that the plate current of the last stage is returned without traversing all the preceding filaments.

When all plate voltages are taken from a common resistance such as a voltage divider there is a chance of "motor-boating" developing, and in order to avoid this it is good practice to have a separate resistor for each plate, so that there is less chance of un-

wanted coupling.

