

Mainly about Construction

BY "MEGOHM"

SEEKING GOOD RECEPTION

THE VALUE OF AERIAL INSULATORS

Starting at the aerial, good insulators are perhaps the first consideration. The porcelain pulley pattern answers well in fine weather with, say, three in series at each end, and in wet weather they may be effective if the rain is not very heavy. But there will be occasions on which heavy rain will cause frequent leakage, giving an effect similar to fading. Such leakage is caused by rain reaching the insulators more quickly than it can run off, and a good method of reducing this leakage is to give the insulators an occasional wipe over with oil or vaseline. A better method is to purchase a pair of pyrex insulators, costing 5/- the pair, and include one of these at each end of the aerial. The special glass of which these are constructed has a repellent effect upon water, and minimises any loss of signal strength caused by leakage.

LEAD-IN AND HALYARDS.

The best insulators to use for lead-in wires requiring support are the post-office or "petticoat" pattern, as these give practically perfect insulation in all weathers. Attention should be given to the aerial halyards when necessary in order to keep the wire at a reasonable tautness. To prevent halyards making an irritating noise by flapping against the pole during a wind, a crosspiece of wood can be nailed to the pole a few feet above the ground, and the halyards passed through a notch in the end before fastening them to the pole. This should keep the halyards clear of the pole for their whole length.

Then there is the old slogan about having a good earth—many listeners are still handicapping their reception by not testing other earth connections than the water-pipe, which is sometimes quite good, but not always. A true constructor is always testing, altering, improving, but the set-owner who is not a constructor should not let things rest until he is getting the best reception possible with the apparatus in his possession, and improvements of aerial and earth circuits are within the capabilities of most people.

The Browning-Drake four-valve set, made exactly as described in this column, with a Ferranti A.F. 3 transformer in the second audio stage is capable of giving reproduction of a thoroughly high-class order, with full mellow tone, big volume, and not a trace of harshness or distortion. But the loud-speaker, also, must be equal to the task of handling the tone passed on from the transformers. And this quality and volume is maintained, apart from interference, on reception of all main New Zealand and Australian stations. With a high-

grade of cone speaker the soprano notes are there, the low humming double-bass of the orchestra, the double-diapason of the organ, are there too.

"Megohm" would like to be able to hear the tone obtained from each set that has been constructed from his description. Probably few would come near to the tone of the original, and yet by patient adjustment any constructor should be able eventually to bring his set to give reproduction as nearly perfect as is possible.

Ready-made sets are built to sell at a competitive price in most cases, and as a natural consequence purchasers cannot expect to get more than they are paying for. The inexperienced person is generally the buyer of a set, and consequently is unable to judge properly the merits of one set against another. A person not used to listening-in has no standard against which to judge quality of reception, and is liable to be carried away by the novelty of the situation and buy almost the first set demonstrated. If this is a set of good design, all may be well, and tone may be good and pleasing. If the set is a low-grade affair, with trashy components, tone will be raspy, all the emphasised notes will blur and blast, unless volume is kept down almost to inaudibility, and general dissatisfaction with reception will soon creep over the unwary purchaser and his family. These remarks apply from a crystal with one amplifier upwards.

READY-MADE SETS.

A large proportion of bought sets are fitted with audio transformers, and if the set is not giving satisfactory tone, and these transformers are small in size and of poor design, then it would be worth while to have at least the second one replaced by one of modern type. The writer is getting to feel tired of emphasising this point, but from the large amount of information lately received on the question it is evident that there are far too many sets and loud speakers that are unable to handle a little extra volume without distortion.

Then there is the last audio valve. In a ready-made set it is a simple matter to put this in where an ordinary valve is in use. If the provision of grid bias is any difficulty, then a power valve should be chosen that does not require too great a C battery voltage. The PM 254 and 256 at 100 volts (12) and 125 volts (17) high tension require grid bias as shown in parenthesis. Radiotron UX 112 at high tension voltage of 90 (6) and at H.T. 135 (9), whilst Radiotron UX 171 requires grid bias as shown after the high-tension vol-

tage in parenthesis—90 (16½) and 135 (27).

The C battery is chiefly utilised to improve tone, whilst also increasing volume, and no amplifier should be run without it. Listeners who live in the country and are dependant upon dry cells for current are more limited in choice of valves, and for them the Radiotron UX 120 or PM 2 are suitable, requiring at 100 volts H.T., 16 and 10 volts grid bias respectively.

THE CHOKE FILTER

Every set with four or more valves should be provided with an efficient choke filter at the output. This arrangement has already been described, and is included in the four-valve Browning-Drake circuit already published in this column. The choke filter improves tone, prevents distortion by overloading of the speaker, and protects 'phone and speaker magnets from demagnetisation. These filters can be bought ready-made as one component and connected to the set. These should be tried out, if possible, because some makes may not improve the tone of the set as much as they should.

THE LOUD SPEAKER.

The choke filter, already mentioned, will make matters much easier for the loud speaker, but the ideal way of getting good volume without overloading the speaker is to have both a cone and a horn speaker connected in parallel. This is the best method of reproduction possible at the present time, and has already been dealt with in this column. Probably there will soon be a speaker combining horn and cone in one unit, both operated by the same armature, but until this is available, two speakers are best. They should be placed two or three feet apart.

These notes are really a resume of previous articles in order to give readers in concise form a few outstanding improvements that may be made in many receiving outfits with great gain in quality of reception.

ANSWERS TO CORRESPONDENTS

BROWNING-DRAKE.

B.D. (Stratford) has built the 4-valve Browning-Drake, but gets weak volume on distance. Departures from specifications are as follows:—Two 6 to 1 transformers, No. 1 mfd. fixed condenser (presumably across speaker and filter choke), no series condenser in aerial circuit, and no condenser across primary of first transformer. Your bought coils are a good make, but an A.F. 3 Ferranti is recommended for second audio. Put in the missing parts and see what happens.

Power-house Interference.

J.W. (Reefton) is situated near an electric power-house, interference from which prevents reception during daytime. A method of reducing the interference is asked for. This matter was recently dealt with in this column. The most effective way is to approach the power-house management, and for the good of listeners in the locality get them to suitably place large capacity fixed condensers in order to reduce sparking at the brushes of their machines.

Unsatisfactory Set.

"Worried" (Glen Eden): Your letter does not state what circuit is in use. The original dealer should put the set into working order, and it has complicated matters by approaching another on the question. The order of battery terminals would not matter if each one was marked correctly. Distortion on increasing volume is probably caused by small audio transformers.

Crystal Amplifier.

"New Chum" (Wellington) has made up carborundum crystal and one amplifier using grid bias. A disc cone speaker is employed, but deep notes blast badly, though results in other respects are good. The cone speaker would reproduce bass notes, so the inference is that the audio transformer is not of sufficiently good quality to pass them along. If you have no fixed condenser across speaker, try one of .001 mfd. and another the same across primary of transformer.

Converting Transformer to Choke.

C.D. (Manunui): As you do not give size of transformer, order 8 ounces of 36's enamelled wire, of which some should be left over. The laminations should be reassembled so that the joints all come together, and at the two points where the outside arms meet a piece of paper is inserted and the ends

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TO ELIMINATOR CONSTRUCTORS

SOME FURTHER HINTS

When constructing a B eliminator it is necessary to remember that all apparatus connected to electric supply mains is expected to conform to certain regulations concerning electrical wiring. In a general way, the larger the amount of current being handled, the more stringent are the regulations, which are framed to protect life and property, and to ensure uninterrupted service.

An eliminator only consumes a small fraction of the current used by an ordinary lighting bulb, and a possible shock from it would be quite harmless.

The eliminator just described is housed in a metal case, and in the original a moveable sheet of tin is also fitted inside, a short distance behind the panel to afford complete metallic screening. Constructors should not neglect to provide a tin or iron case of some kind, and should also go to the small amount of trouble involved in fitting the four small fuses above the transformer. Two of these fuses are in the A.C. connections, and as the current passed is very small, they may be of fine tinfoil strips as used on the H.T. side. If any short circuit occurs one of the fuses will "blow" and automatically cut off the current supply. In the original also the condenser holder and metal lining of the partition are joined to the case by soldered wires, the former being shown at E on the under-base wiring. Where there are A.C. mains very close to the eliminator, it is sometimes a good plan to attach an earth wire to the metal case.

TRANSFORMER TESTING.

An efficient transformer passes practically no current through the primary at "no load," that is, when the secondary windings are not doing any work. The primary winding and core must form a complete "choke" to alternating current at "no load," and this effect can be tested by temporarily including an ordinary electric lamp in the primary circuit. This will show no glow whatever at "no load," and even when the eliminator is supplying a large set,

still no glow will be visible in the lamp. If the lamp lights up, something is wrong, and must be rectified, as without the lamp in series, a transformer containing insufficient primary winding might give quite a good secondary output, but would be passing through the primary an amount of current that would cause the household electric light bill to assume alarming proportions.

The foregoing is a hint to constructors to adhere rigidly to the gauges of wire and number of turns specified for the transformer, which will ensure a consumption of current so low that it will pass unnoticed in the lighting account. The number of hours that an eliminator is run makes the current consumption an important matter. Once this is assured there need be no stinting of H.T. in the set itself, as the cost of high tension current for an extra valve or two will be practically nil.

CHECKING CONSUMPTION.

The consumption of an eliminator can easily be checked upon the household electric supply meter during daytime reception when no other current is being taken. If current consumed in one hour does not exceed one division on the "hundredths" dial, then the consumption is satisfactorily low. At this rate the rotating disc of the meter will only be perceptibly moving.

A SIMPLE ELIMINATOR.

"Megohm" does not recommend eliminator circuits in which no transformer is included, as in such case the set is too intimately connected to the mains. Some readers who are running two and three-valve sets may wish to enjoy the advantages afforded by an eliminator, and yet would not care to expend the amount necessary to build the full-size article recently described. With this idea in view "Megohm" will shortly describe the simplest reliable single-wave eliminator. Construction will be cut to the minimum, and the cost kept as low as possible consistent with service.

pressed against while the whole is bolted together.

Battery Charging.

E.K.W. (Patea): The opinion you have arrived at regarding chemical rectifiers—that they are at the best only an expedient—is quite correct. They are used for economy of first cost, but often turn out dearest in the end, and give their owner a good deal of anxiety whilst they are running. Valve rectification is always safe and reliable. The transformer described in the B eliminator can be differently wound to suit several purposes—experimental low voltage, or charging A or B batteries. P.M.T.'s would not pass enough current to charge a B battery quickly unless of small capacity. Good double-wave rectifier valves for the purpose can now be obtained for 17s. 6d. each.

Neutralising Set.

M.M. (Napier).—You have misread the instructions on neutralisation, as it is the neutralising condenser that is to be turned until signals are at a minimum whilst the R.F. filament is turned off. Neutralisation must be carried out on a station that comes in with plenty of volume.

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