

# Mainly about Construction

BY "MEGOHM"

## Special Interference

### HOW TO SUPPRESS THE TROUBLE

The radius of interference from picture theatres is usually up to 200 yards, the direct-current generator employed being the cause of the trouble. It would be supposed by most people that the arc lights in use would produce interference, but such is not the case. More interference will usually be experienced from the generator before the arc is "struck," than when it is in use. To remedy such generator interference, a suitable fixed condenser of 2 mfd capacity is connected by a 5-amp fuse to each brush, the other side of each condenser being connected to earth or to the bed of the machine. If the commutator is worn, it should be turned down in a lathe. The quality of the carbon brushes used has an effect upon interference.

#### STREET LIGHTING.

Arc lamps themselves do not produce interference, but leakages on the circuit can cause a great deal, owing to the comparatively large amount of current handled. Interference can be produced by rectifying tubes at the central station.

Incandescent street lamps produce a great more interference than do the arc lamps. This is not due to any

difference in the actual system, but to less careful installation, and the condition is general. The most frequent causes of interfering noise are leakages caused by rain or moisture, loose connections of wires at lamps, lamps loose in their sockets, defective insulators, etc. Such interference is difficult to locate, and of course remedy rests with the authority concerned.

#### FACTORY BELTS.

Friction between pulleys and belting will set up sufficient static sparking to be heard in a nearby receiver. It has been demonstrated that the film of oil in the bearings is sufficient to prevent this electric charge from immediately sparking to earth through the frame of the machine.

#### ELECTRIC WARMING PADS.

These are fitted with small thermostats that automatically switch the current on and off to keep the heat uniform, causing annoying clicks in a receiver either in the same house or the one on either side. Corroded or burned contacts often accentuate the trouble, but if cleaning them does not sufficiently reduce interference, a condenser may be put across the leads—with a fuse.

## LONG DISTANCE ON CRYSTAL

### NOT DUE TO RADIATION

Crystal users will be interested in the following from London radio journal:—The coming of the new Daventry experimental station, 5GB, has had one very unexpected effect—it has revived interest in the possibilities of long-distance reception with a crystal set. Many a listener, who has tuned his set to try and hear the alternative programmes provided by Daventry experimental, has astonished himself by picking up a foreign programme, instead! Langenburg, whose wavelength happens to be near that of 5GB was picked up at such strength by one Essex listener that it was assumed to be Daventry experimental until the announcer said a few kind words in unmistakable German!

#### RERADIATION RULED OUT.

If anyone tells you that such results can always be explained by reradiation from a valve set, don't believe him. It is Tommy-ot to say that crystal sets cannot pick up a foreign station unless a near-by valve set, tuned to that station, is helping. Why, some lucky crystal-set owners, situated in exceptionally favourable conditions, can actually tune in more than one foreign station, almost any night they choose!

Why this is so is a bit of a mystery, for people living near and using similar sets may be quite unable to duplicate the performance. Yet so many instances of non re-radiated reception are authenticated that the "Can't-be-done" bogey, has been killed, and buried far beyond the resurrection point.

(Langenburg is 325 miles from Essex, and rated at 25 kilowatts.)

## THE "DUCON"

For those who live in apartment houses or situations where an aerial cannot be erected there is a handy device called a "Ducon." This is a small accessory that is plugged into any electric light socket, and utilises the electric mains as an aerial and earth. The essential portion of the device is a pair of fixed condensers of suitable capacity. Each of these is connected to a main contact with a tiny fuse. The other end of each condenser leads to a terminal. One of these terminals is connected to the aerial terminal of the set, and if no proper earth connection is available, the other side may be connected to the earth terminal. After tuning in, the "Ducon" should be removed from the light socket and plugged in the other way round, as sometimes there will be a difference. For use at night it is best to provide an extra socket to allow of the light being used at the same time. In the day time the wall-switch must be "on," so the lamp can be removed. There is absolutely no danger from this attachment, as no through connection is established for the current supply, but the condensers allow a free passage of the high-frequency aerial currents. The "Ducon" is not recommended for crystal sets where the mains are underground, but in New Zealand they are mostly overhead, and it works well in most localities. The "Ducon" is chiefly used for local reception, but the writer has experimentally taken both F.T. and aerial currents from the mains and received Australian stations quite well. Five years ago, upon their appearance, "Megohm" imported a "Ducon," and by means of it and two Marconi D.E.R. valves could sometimes receive KGO (California) at weak speaker strength, which five valves can seldom accomplish at the present time.

## UPKEEP EXPENSE

Every Radio owner wants to cut it to the bone. That is why you should insist upon having the opportunity to exercise your own preference by choosing Vesta Batteries.

### BATTERIES

Vesta "A" and "B" Batteries are selected to replace original equipment in very much the same way a "Cord" tyre is bought to replace a "fabric." The Vesta "Costs less per month of service." When buying a "Set" you are entitled to ask for the best equipment—Therefore have your dealer supply both "A" and "B" Vesta Batteries.

Sole New Zealand Distributors:

## E. SIME & CO. LTD.

148 WAKEFIELD STREET, WELLINGTON.

## TO BUILDERS OF RADIO SETS

When you have built your own set, call upon us and we will make you a cabinet at a reasonable cost.

## FLANN AND COPP,

5 STURDEE ST., Off Dixon St. WELLINGTON.

## SILVERTOWN RADIO ACCESSORIES

### BUY BRITISH GOODS

Intervalve transformers,—	Ebonite Panels, 24 x 7 x 3-16,
22/6 each	11/-; 21 x 7 x 3-16, 9/6;
Straight line Condensers—	19 x 7 x 3-16, 9/-.
.0005, 13/- each	Filament Rheostats, 30 ohm and
.00025, 11/6 each	6 ohm, 6/- each.
Variable Condenser, Ebonite	Antimicrophonic holders—
ends— 9/6 each	3/- each
	Silvertown Speakers, 70/- each

165 MANCHESTER STREET, CHRISTCHURCH.  
SILVERTOWN CO.,

## HINTS AND WRINKLES

### A AND B ELIMINATION

There is a method of running an ordinary set of four or five valves by obtaining both A and B current from an ordinary B eliminator. But certain provisos have to be observed. The valve filaments must all be wired in series, and that is the only alteration to be made. The output of an ordinary eliminator is limited, and for this purpose not less than an 85 milliamp tube can be used, and unless a 350 milliamp tube is used in the eliminator it is necessary to discard six-volt valves and refit the set with 100's, which only require 60 m.a. on the filament and 20 m.a. plate current, whereas "A" tubes draw 230 m.a. on the filament and 50 or 60 on the plate.

Few would care to actually discard "A" valves to give place to 100's, and this idea is not put forward as a serious proposition, but just to show what is possible with very little alteration. The mere placing of a 350 m.a. tube in an ordinary eliminator would not ensure success, as other components would be asked to carry much more current than they were designed for. This remark applies very much to the variable resistance delivering the filament current.

### DISTANT RECEPTION.

Detector valves will not work effectively on weak distant signals when the grid charge is excessive, as too much energy is being fed back from the plate and the grid becomes too highly charged. The feed-back should be decreased and filaments lowered or plate voltage reduced.

### CHEMICAL CHARGERS.

When constructing a chemical battery charger, it is just as well to be particular about the metal plates employed, as they are the essential part of the rectifying process. Both the lead and aluminium should be the purest obtainable, especially the aluminium, but these should be kept small in size. No. B battery should be charged at a greater rate than 1-amp., and this rate is regulated by the amount of plate surface exposed or immersed in the liquid, and the distance separating the two electrodes, which should not be too small, not less than half an inch on 230-volt circuits. A saturated solution of ammonium phosphate is the usual liquid, but borax is sometimes used.

It is important to "form" the plates before attempting to charge a battery. This is done by connecting up a resistance in place of the battery and passing current through the rectifier for two or three hours. If the lead has formed it will show a dark chocolate colour like the positive plates of an accumulator. This "forming" does not last long when the charger is not used for a few days, and it is this fact that causes a good deal of trouble with such rectifiers. It is a good plan to pass a forming current through for a few minutes if the charger has been standing for some time.

Another point is to use fair-sized jars, as the larger amount of liquid contained will keep at a low temperature longer than a smaller quantity.

Resistances in the circuit, usually lamps, cut down both volts and amperes.

### AERIALS AND REGENERATION.

Any and all regenerative receivers work most efficiently on long aerials. When the aerial is too short it causes the set to oscillate too easily. The remedy is to reduce the number of turns on the tickler coil, or reduce the bypass condenser capacity in the plate circuit of the detector, or do both.

### USE OF BY-PASS AND CHOKES.

Both by-pass condensers and R.F. chokes greatly increase the efficiency of any receiver when properly used. The condenser is used to pass the R.F. currents around some circuit or component, and keep the battery currents out. The choke coil has an opposite effect. It permits the battery currents to flow through, but chokes back or prevents the R.F. currents from going through.

### IMPROVING RESISTANCE COUPLING.

Readers who are using resistance-coupled audio amplification will be able to effect an improvement in reception by doing a little experimenting in the way of utilising newer valves than those now employed. The high amplification valves recently introduced, such as the UX 210, have so increased the amplification per stage for resistance coupling as to compare favourably with the usual stage of transformer coupling. Thus a two-stage resistance-coupled amplifier, using one of these latest valves for the first stage and a power valve for the second, will be found to deliver ample loudspeaker volume, while the B-battery drain will be found surprisingly low, as compared with the use of the standard "A" tube on the same circuit. The power valve would be of the 171 or 112 type, with a coupler made up of a 250,000-ohm plate resistor and a 100,000-ohm grid leak, with a .05 mfd. coupling condenser. The first stage would be coupled in the same way, but with a different grid leak valve, 2 megohms.

### WATCH YOUR FILAMENTS.

There is a critical temperature for every vacuum tube, especially dull emitters with a thoriated tungsten filament. In these tubes a delicate balance must be struck between the heat necessary to drive out the required

## SHORT-WAVE NOTES

To avoid radiation as much as possible, the aerial and secondary coils should be loose-coupled, and the aerial circuit should not be more in resonance with the secondary than necessary.

"Dead-spots" may originate from nearby electric light wiring, choke-coils, wave-meters, etc. Any circuit in resonance with a receiver may be detected at a distance of several feet.

"Dead-spots" are seldom encountered if a long aerial is used, which should be the case if greater volume and DX are desired. Loose-coupling reduces the "dead-spot" effect, and a method of getting rid of them is to change the length of the aerial or use a small series condenser.

Close-coupling of aerial and secondary prevents the detector from oscillating easily. This is a frequent difficulty with novices.

The detector tube is of great importance if sensitivity, proper regeneration, and a minimum of noise are required. Some valves regenerate with a hum, others with a click, and still others with a gentle "hiss." The grid-leak may influence this to some extent, but generally speaking, only the third type of tube should be employed where quiet, sensitive reception is desired. A good valve with a socket that will not allow microphonic "ringing" (especially noticeable at the higher frequencies) is certainly a big step towards proper receiver operation.

The value of the grid-leak is usually very much higher than an ordinary broadcast wavelength.

Country listeners will be interested to hear of the appearance of a Mullard two-volt super-power valve. In the last audio stage the valve handles powerful signals with ease, thus allowing greater volume without distortion. This valve, the P.M. 253, will probably shortly be on sale in New Zealand.

quantity of thorium to coat the surface, and the excessive heat which results in burning off the thorium coating, so that veritable bald spots are formed with the paralyzing of the tube to short-life follow. In most cases filaments are operated at from 10 to 30 per cent. excessive voltage, reducing the tube life by hundreds of hours, not to mention the lowered efficiency of the receiver through serious deactivation. In other cases operators, afraid of burning their tubes, will operate at as much as 40 per cent. below the proper temperature, which is insufficient to preserve the correct crystalline construction of the filament, and, at the same time, introduce distortion, due to the insufficient power of emission. "Megohm" recommends every constructor and experimenter to purchase a reliable voltmeter, which is the most reliable way of checking filament current. It is placed across valve socket filament terminals to test voltage, and not across battery terminals, each time the receiver is used, adjustment being made with the rheostats. This will ensure correct operation, long life to valves, and good tone reproduction, whilst the first cost of the meter will soon be saved by less frequent valve renewals.

## NEW RECTIFIERS

### FOR "A" BATTERY CHARGING

Recent invention has produced two new rectifiers which appear to have many advantages over those hitherto in use. A new principle is involved, quite apart from valve or mechanical rectification, and not chemical in the usual sense. One of these rectifiers is the "Raytheon A" tube, and the other the "Kuprox" rectifier.

#### THE RAYTHEON A TUBE.

This tube, about the size of one's thumb, is a "dry" rectifier in the sense that paste takes the place of liquid, the container being a steel tube. The advantage of this rectifier is its very low internal resistance and consequent low loss of power, and thus the small tube is able to pass 2½ amps., and by using two tubes in the usual way for double-wave rectification, the maximum current is increased to 5 amps. A step-down transformer giving 8 or 9 volts suffices for half-wave charging, and with this low voltage a good tapering charge is obtained. A safety fuse is included in the circuit. Larger currents than 5 amps. may be handled by paralleling the suitable number of tubes.

#### THE "KUPROX" RECTIFIER.

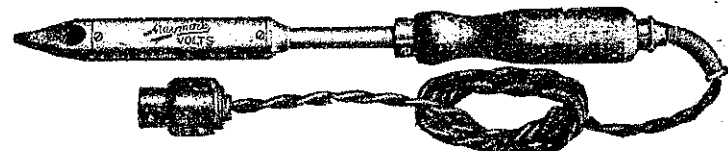
This rectifier relies upon the discovery that one-way conductivity exists between a disc of lead and a disc of copper pressed together with a layer of copper oxide between the two. The action is probably akin to that between a crystal and cat's-whisker. A number of pairs of such discs are bolted together to form a rectifier, which, like the one previously mentioned, passes a

## THE POCKET CRYSTAL SET

Listeners out for the day will find many ways of using the "R.R." crystal set. Seventy or eighty feet of 22's or 24's enamelled wire wound on a flat piece of cardboard will serve as a portable aerial. This can be unwound, where the picnic quarters are established and hitched up in the easiest way. A few feet above the ground will suffice at short range, but of course the higher the better. The experiment can be made of connecting with a short wire to the top wire of a fence, using it as an aerial, which in many cases will give excellent results, affording a primitive example of a "Beveridge" aerial. A good earth will be necessary, but a length of wire run into a creek will provide that.

#### ON SHORT AERIALS.

With the full winding, unspaced, short aerials can be used, and as an experiment the set was tried out on a beach situated three miles distant from 2YA. For an earth connection, a short length of wire was twisted round a small strip of brass, which was stuck into the sand where not too dry. With thirty feet of wire supported three feet above the ground, reception was splendid.



## ELECTRIC SOLDERING IRONS.

	(Post Free)		
Radio Pattern	No. 10026	14/6	15/2
Light Duty	No. 10020	17/6	18/2
Medium Duty	No. 10022	21/-	22/-
Heavy Duty	No. 10027	25/-	26/-

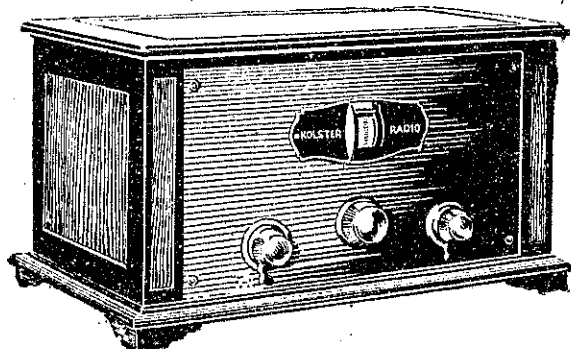
Obtainable at all stores, or write:

**McLEAN & ARCHIBALD**

New Zealand Agents.

29 WILLIS STREET, Box 940. WELLINGTON.

## KOLSTER RADIO



Hearing a Kolster 6 Valve Set will make you dissatisfied with anything less.

Let us demonstrate, without obligation, this latest product of Federal-Brandes.

PRICE (Set only): £30

**INTERNATIONAL RADIO CO. LTD.**

FORD BUILDINGS AUSTRALASIAN AGENTS. WELLINGTON.