

# Noises and Their Elimination

(Continued from Front Page)

IF this test reveals that any of this apparatus is giving trouble, the supply must be filtered. Filtering methods should be considered under the following headings: (a) Filtering directly at the device by the use of a 1 mfd. condenser shunted across the terminals can eliminate 90 to 100 per cent. disturbance. (b) By filtering at the meter from 80 to 100 per cent. may be eliminated. (c) Filtering at both points, A and B, may be necessary in bad cases. Filtering directly at the receiving set can eliminate 25 to 90 per cent. of the disturbance. Further types of filtering devices for stopping electrical disturbances are as follow: (1) Single condensers from  $\frac{1}{2}$  mfd. to 1 mfd. or more capacity having a D.C. test of 400 volts or over. Simply connect a condenser across the spark or are direct or connect a non-inductive resistance of 1000 to 30,000 ohms in series with a condenser and place this combination across the arc. If this interferes with the functioning of the spark, see method 2. Another cure is to connect one leg of a small condenser, say,  $\frac{1}{2}$  mfd. capacity, to ground, and the other leg to each side of the power lines in turn. When connected to the positive side, much noise will be prevented. If the plug to the electric device is reversed the noise will again be bad. In this case reverse the plug or connect the device in figure A to the line. (b) Double condenser filters. These are very effective for small motors such as sewing machines, vacuum cleaners and electric gramophones. Where one condenser bridged across a spark gap in series with a resistance interferes with the spark use two condensers in series with a centre resistor of 1000-2000 ohms between the centre taps of the condensers and the ground connection.

## Combined Choke and Condenser Filters.

2. Switch off the light current at the point where it enters the house. If, after the opening of the master switch, the noise continues it is safe to assume that the trouble is outside the home, and the authorities, whoever they might be, should be communicated with.

3. Aerial and earth. Note the condition and position of these. Where an electric appliance is grounded through the earth connection of the wireless set it is possible for a high-frequency interference to feed back through this source. Likewise, any other metal in the building may carry disturbances into the set. The remedy is to have a separate and independent earth contact with the set. Keep the ground lead-in wires as short as possible. If the aerial runs close or parallel to power lines it should be turned round at right angles to it and made as short as possible. A counterpoise earth will quite frequently help to reduce interference.

THIS concludes the search for the city dweller who has at his hand power companies and sympathetic post and telegraph officials. In the case of Wellington listeners a very wise plan has been adopted by the Post and Telegraph Department,

and listeners who have failed to locate interference by the above tests, should communicate with them. Upon receipt of this communication, the Post and Telegraph Department forward a form, a copy of which appears on this page. They are asked to make their observa-

## The Listener Outback.

THERE exist a proportion of the listening public who are so remote from city and town that they have to rely on the power derived from motor or water generators for their

when both are clean function without sparking or interruption. Dirt and corrosion alter the whole performance, sparking occurs and the surface becomes pitted with the result that more sparking occurs.

The first and obvious treatment of such a case is to clean it. Cleanliness saves the upkeep and service and is an economical procedure. Even a sparking commutator will not cause a great deal of trouble if the iron shell of the motor were grounded, but surveys have shown that old motor installations were frequently made on wooden supports insulated from the ground. Grounding must therefore be listed as a second step. If the interference still persists connect a 2 mfd. condenser tested to stand 1000 volts D.C. across the brushes.

The design of the filter varies somewhat if the line is less than 600 volts and ungrounded. In that event, two condensers ground at their common lead may be used as shown in upper diagram.

When a source has been found and the foregoing treatment is not applicable, the interference is most effectively suppressed by connecting a filter in the line which supplies the current to the electric device which is causing the trouble. If it is not possible, such a filter may be connected in the line at the main switch, or even between the plug socket and the radio set, though in this case, less noise will be eliminated than if the filter is installed at the source.

Suitable filters are in general of low cast type, i.e., they will readily pass the 60-cycle current and block the higher audio frequencies which constitute the noise. In some cases, it is sufficient to connect two fixed condensers between the two sides of the line and the ground. Then simply by-passing the audio frequencies. In more persistent cases, it is necessary to insert choke coils so as to block the high frequencies, and allow them to be by-passed to the ground, as in lower diagram. This circuit is applicable to four-fifths of interference trouble.

A suitable filter can be made by anyone who is at all handy with tools. The chokes may consist of 100 turns of wire each banded round on a double wooden hobbin or fibre cylinder. They may even be wound as an ordinary radio coil on a fairly large former. No. 14 D.C.C. wire should be used for 2 amp. load. No. 12 for 6 amps., and No. 10 for 9 amps. Each layer should be separated by a covering of empire cloth. The condenser should be tested or have a working voltage higher than that to be handled. They should be installed in metal boxes, their capacities being 1 or 2 m.f.d.'s. It should be borne in mind when installing any of these devices that large capacity condensers contain wax, and therefore should be placed where heat generated by the motor will not affect them.

Bad contacts in power lines as well as in the radio set itself are a very common source of interference.

Loose fuses, loose connections, insecure light sockets, cause a great deal of trouble, besides which they constitute a fire risk. Most of these have fallen under the heading of defective household apparatus.

## POST AND TELEGRAPH DEPARTMENT.

### PARTICULARS IN RESPECT OF INTERFERENCE TO RADIO BROADCAST RECEPTION EXPERIENCED BY

To	Name
The Radio Inspector,	Address
P. & T. Laboratory,	Telephone No. (if any)
Hope Gibbons' Bldgs.,	
Wellington.	

- When did you first notice the disturbance referred to? .....
- Does the interference occur during the day-time? .....
- Is it continuous or intermittent? .....
- At what hours is it most severe? .....
- Is the disturbance a hum, buzz, squeal, hiss, tapping, crackling, frying, or roaring noise? .....
- How many other listeners in your vicinity are having the same trouble? (Give addresses below, together with particulars of set used in each case, i.e., crystal set or valve set.) Address ..... Set .....
- Type and make of your radio receiver. ....
- Has the following test been made? If so, with what result? With antenna and ground leads disconnected, and these terminals shorted by a piece of wire, is the disturbance experienced when the receiver is operated in the usual manner? .....
- Can the interference be tuned to a maximum on your receiver? If so, near what broadcasting station's wave? .....
- Is your aerial in close proximity to, or does it run parallel to, (a) telephone leads, (b) power lines? .....
- How far is your receiving station from the nearest tram route? .....
- Do you use (a) "B" eliminator? (b) Battery charger? (Please state type and make.) .....
- When will there be someone available at your address to operate set— (a) During day-time. (b) During evening. And further remarks. ....

tions carefully and by doing this they will materially aid the Department's officials.

THERE are a very large number who are outside the cities, and who cannot call upon the assistance of a trouble-seeking van. A large proportion of these have recourse to power boards, and providing the trouble is located in their power lines, the individual listener need worry no further.

power. These are more often than not the cause of interference. Motors in all their special forms cause a great deal of noise to the adjacent receiving set.

A motor consists of an armature revolving in a strong magnetic field. The driving current passes first through the armature whence it is used to excite the field magnets. It then passes to the windings of a revolving spool, and this can be done only by sliding contacts called brushes. The brushes press down on a drum of copper, and