

tion condenser must be turned to 100 degrees as should the tuning condenser. Now slowly rotate the tuning condenser until signals are heard. Then slowly turn the reaction condenser until the signals become clear. Then experiment with the screen grid and the plate voltages, as well as the rheostat settings until the reaction con-

Tips and Jottings

To Cure Distortion.

A MILLIAMMETER is invaluable to all those whose aim it is to secure distortionless reproduction. The meter is inserted in circuit between the "B+" lead to the last valve, and the loudspeaker or choke terminal to which this lead goes. The object is to attain an adjustment of signal strength which does not produce needle "kicks." It is usual to permit not more than a variation of 10 per cent. of the anode current in the form of "kicks," and if the needle fluctuates more than this amount the B battery and grid bias supply should be increased. Another remedy is to insert a more suitable power valve in the last stage. A suitable milliammeter for most purposes is one having a reading of 0-25 milliamps.

High-frequency Chokes.

WITH the application of more modern forms of tuning, many constructors probably have in their workshops a collection of discarded plug-in coils and sockets. These are quite suitable for use as high-frequency chokes, and can be used for short-wave purposes, as well as for the broadcast band. For the medium broadcast band, a 250 or 300-turn coil is adequate, while for use on the higher frequencies, a 60 or 70-turn coil is quite large enough.

Aerial Coupling.

DEAD spots (i.e., frequencies at which the receiver does not oscillate) in short wave reception are generally due to over-tight aerial coupling. A very small-series condenser or a detuning coil in series with the aerial (50 turns on a 3-in. former is ample) will usually cure the trouble. In some cases, however, the trouble may be caused by a circuit which happens to be tuned to a frequency within the range of the receiver, though situated two or three feet away.

Metal-Working.

WHEN drilling holes in thin sheet-metal constructors will no doubt have noticed that it is not an easy matter to ensure the drilling of a good clean hole. This is primarily due to the fact that the drill bites the metal when just on the point of emerging. The difficulty is best overcome by backing the thin sheet of metal against a piece of hard wood, or, better still, a thicker sheet of metal. The sheet must be tightly clamped to the backing material, otherwise no real benefit will result.

To Clean Terminals.

ANYONE who has dismantled an old receiver in order to use the parts for a more modern set will have met with the difficulty of removing nuts from terminal shanks to which connections have been soldered. A certain amount of solder usually remains in the end threads of a terminal shank when the connecting wire has been pulled off, so that the nut becomes fixed so tightly when an attempt is made to unscrew it that it has eventually to be cut off. A die of the correct size for the terminal shank is invaluable on such occasions. With its aid the thread of the shank may be cleaned up in a few moments, making the removal of the nut a simple matter, and leaving the terminal as good as new.

LIST OF PARTS.

- 1 All-wave kit, L1, L2, L3.
- 1 Variable condenser, 0.0001mfd., C1.
- 1 Variable condenser, 0.00025 mfd., C2.
- 1 Fixed condenser, 0.0002 mfd., C3.
- 1 Audio frequency transformer, AFT.
- 1 Single-circuit filament control jack, J.
- 1 Two-megohm grid leak, GL.
- 1 Fixed condenser, 0.0002 mfd.
- 2 Radio frequency choke coils.
- 2 Valve sockets.
- 2 Rheostats.
- 2 Vernier Dials.
- 8 Terminals
- 1 Pair panel brackets.
- 1 Panel, 1 sub-panel.

The following accessories will be required:—

- 1 Screen grid valve.
- 1 Screen grid audio valve.
- 1 A battery.
- 1 120-volt B battery.
- 1 15-volt C battery.
- Aerial, phones, speaker, and connecting wire.

control is smooth and the set goes into and out of oscillation without a plop. Should the set not oscillate the reaction coil connections should be reversed.

The results obtained with this receiver are remarkable. It has been in operation, and in all cases the local stations are received at deafening strength, while distant reception is good. On the short waves amateur stations all over the world can be received and held without difficulty, so smooth is the operation of the set.

It gives far better results than an ordinary three-valve short-wave receiver, and is excellent on short-wave telephony, no difficulty being experienced in receiving the international short-wave broadcasters.

On very weak signals it is often better to use an ordinary valve in the audio stage, because the screen grid audio valve required a large amount of energy to operate it.

Capacity Variation

IT is often necessary for testing purposes to utilise a variable condenser with a maximum capacity higher than that immediately available. In this connection it should be borne in mind that a fixed condenser joined in parallel with the variable condenser will often meet the needs of the moment. For example, a .0005 fixed condenser in parallel with a .0005 variable condenser will give a maximum capacity of .001. This fact is often lost sight of by experimenters, and it has many practical applications when trying out new or special circuits.

RADIO DIRECTORY

What to Buy and Where

CITIES

- AERIAL MASTS** Domestic Radio Co., Ltd.,
300 Queen Street, Auckland.
- ALTONA & HAMMARLUND-ROBERTS SETS.** Johns, Ltd.
Chancery Street, Auckland.
- AMPLION LOUDSPEAKERS** . All Radio Dealers.
- BURGESS RADIO BATTERIES,** All Radio Dealers.
- CROSLEY RADIO** Abel, Smeeton, Ltd.,
27-29 Customs St. E., Auckland.
- CROSLEY RADIO RECEIVERS** G. G. Macquarrie, Ltd.,
120 Willis Street, Wellington.
- CROSLEY RADIO** Abel, Smeeton, Ltd. Rep.: G. MOSES,
James Street, Mangarei.
- DAYTON All-Electric Radio** ... Superadio, Ltd.,
147 Queen Street, Auckland.
- EMMCO RADIO PRODUCTS** Johns, Ltd.,
Chancery St., Auckland.
- EMMCO RADIO PRODUCTS** Thos. Ballinger & Co., Ltd.,
Victoria St., Wellington.
- EMMCO RADIO PRODUCTS** L. B. Scott Ltd.,
Worcester St., Christchurch.
- KING RADIO RECEIVERS** ... F. J. W. Fear & Co.,
63 Willis Street, Wellington.
- LISSEN RADIO PARTS AND KITS** All Radio Dealers.
- LOUDSPEAKER AND TRANSFORMER REPAIRS** A. E. Strange,
404 Worcester Street, Christchurch.
- MAJESTIC RADIO RECEIVERS** Kirkcaldie & Stains,
Chief Wellington Agents, Lambton Quay
- MULLARD VALVES** All Radio Dealers.
- PILOT 1930 PARTS AND KITS, ETC.** Abel, Smeeton, Ltd.,
27-29 Customs Street East, Auckland.
- PILOT 1930 PARTS—PILOT SUPER WASP KITS, GILFILLAN, KELLOGG and ATWATER KENT SETS** Harrington's, N.Z., Ltd.,
138-140 Queen St., Auckland.
40-42 Willis St., Wellington.
- RADIOLA RECEIVERS and Expert Radiola Service.** Farmers' Trading Co., Ltd.,
Hobson Street, Auckland.
- RADIO REPAIRS AND SERVICE** E. G. Shipley,
185 Manchester Street, Christchurch.

COUNTRY TOWNS

- CROSLEY RADIO** J. C. Davidson,
Main Street, Pahiatua.
- CROSLEY SETS** Abel, Smeeton, Ltd. Rep.: C. RUSSELL,
400 Devon Street, New Plymouth.
- CROSLEY RADIO** D. A. Morrison & Co.,
Victoria Avenue, Wanganui.
- MAJESTIC ELECTRIC RADIO** Berryman's, The Home of Music,
Palmerston North.
- MAJESTIC, ATWATER-KENT AND RADIOLA ELECTRIC SETS** Radio House, Hamilton.
G. S. Anchor, Manager.
- PHILIPS VALVES AND APPARATUS** All Good Radio Dealers.