

# KOLSTER BRANDES

## THREE VALVE AC. MAINS RECEIVER

### A Compact Cabinet Set with Built-in Moving-coil Loud Speaker.

**I**N a surprisingly short space of time the self-contained three-valve receiver, mains-operated and almost invariably fitted with a moving-coil loud speaker, has firmly established itself, and it is hardly an exaggeration to say that for this season it is almost the mainstay of the British radio industry.

The attractiveness of this type of set lies mainly in its compactness, and in the fact that, except for an aerial and earth connection—the former is often optional, so far as short-wave work is concerned—no external accessories whatsoever are needed.

In many ways the Kolster-Brandes Model K.B.279 is a typical example of the better type of set in this category. It is a well-finished job throughout, and, moreover, this finish is not confined merely to externals; the circuit design embodies practically every refinement that has been proved to be really worth while; and, indeed, it is difficult to suggest any elaboration that might with advantage be added, even if cost were no object. Admittedly, a single-tuned input circuit is employed in place of the popular band-pass filter, but details have been so well arranged that there is no apparent lack of selectivity, and in this respect the set is quite capable of putting up as good a performance as might reasonably be required, even under the more exacting kind of conditions.

The circuit arrangement is mainly conventional, and does not include any untried features that might possibly give rise to trouble. In essentials, it embodies an H.F. stage, followed by a grid detector, which in turn is coupled by a transformer to a pentode in the output position. The first two valves are indirectly heated, while the pentode, of the directly heated type, is supplied with current from a separate winding on the power transformer.

A simple auto-transformer is embodied in the aerial input circuit, but interference from a near-by medium-wave station, when receiving at the lower end of the long-wave band, is prevented by inserting a special form of choke coil in the long-wave aerial circuit. Incidentally, this choke coil is wound on a flat strip former in such a way that its inductance must be low in proportion to its resistance: the device seems to work almost perfectly.

For the H.F. coupling a tuned anode circuit is used, and it has been so arranged that the coil acts as an auto-transformer, suitable provision being made for changing over the anode connection for either wave-band. In order to avoid all risk of damage in the unlikely event of a short-circuit developing between the variable condenser vanes, a fixed condenser is inserted at the high-potential end of the tuned anode circuit, which is "earthed" through a second condenser.

Mechanically linked tuning is provided for the two circuits, but an external trimmer is fitted; this control is operated by a knob mounted concentrically with the main tuning adjustment—a satisfactory and very convenient plan. Whatever may be the advantages of a fully ganged tuning system—without external trimming adjustment—it is extremely reassuring to know that both circuits may be maintained in perfect resonance over the whole of the two wave ranges.

The grid detector is planned on modern lines, and operates with an ample anode voltage; reaction between the plate and grid circuits is controlled

by a differential condenser operating with an earthed rotor. H.F. energy is kept out of the L.F. amplifier by a filter in the detector anode circuit.

There is nothing calling for special comment in the output stage. Automatic bias for the directly heated pentode is developed across a resistance joined between an artificially located centre point of the cathode of this valve and the H.T. negative terminal. A double-wound transformer is used as a coupling for the moving-coil loud speaker, and a corrector consisting of the usual condenser-resistance combination is shunted across the primary winding. It should be noted that the field winding of the instrument serves as a smoothing choke, and is connected in series with the feed circuits. The H.T. supply is rectified by a full-wave valve with a high-capacity electrolytic condenser across the output circuit. All possible precautions are taken

#### SPECIFICATION.

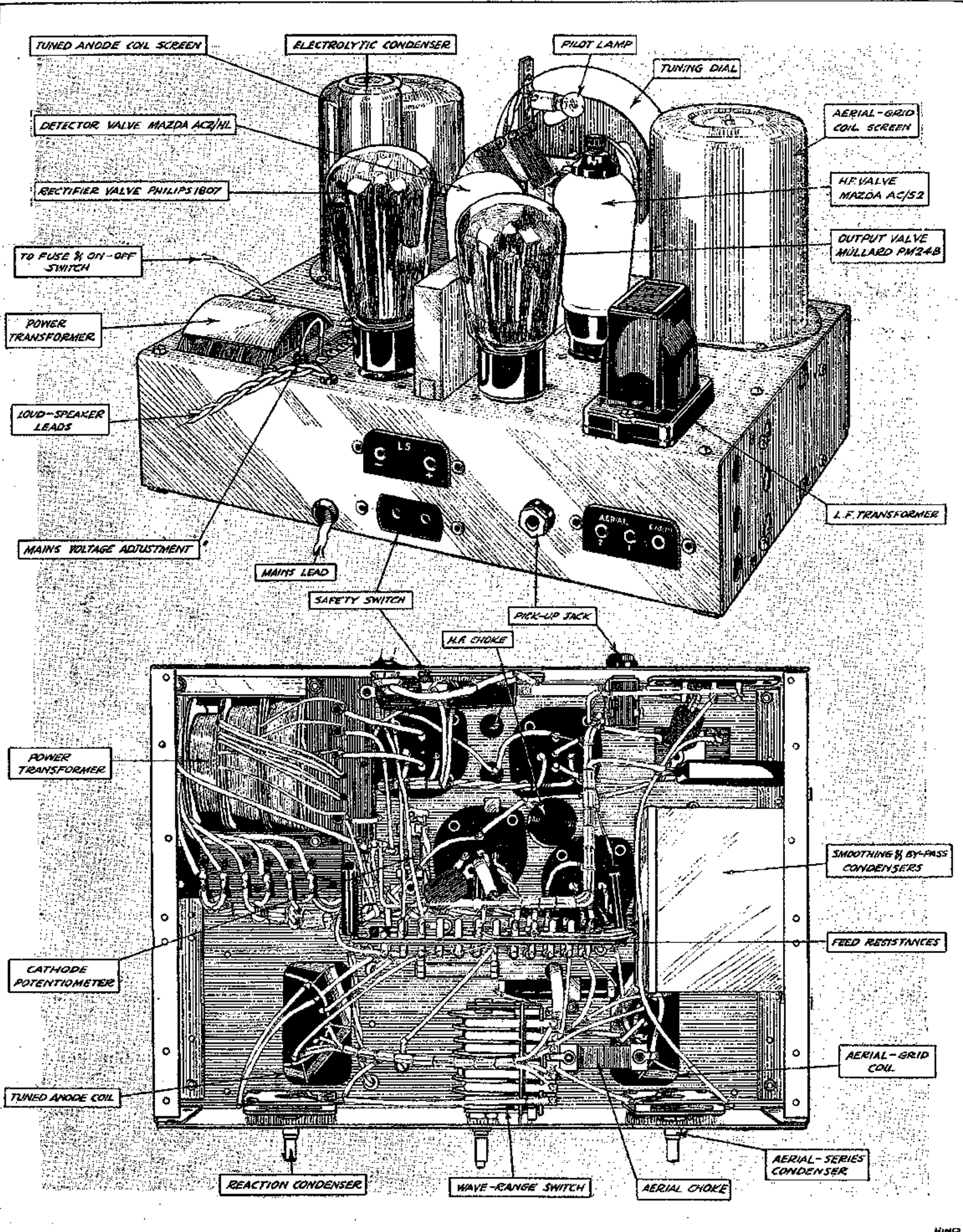
**GENERAL:** Self-contained A.C. mains receiver for operation with external or "mains" aerial and ear'n. Gramophone pick-up jack; moving-coil loud speaker.

**CIRCUIT:** One H.F. stage, coupled by tuned anode system to grid detector. Transformer-coupled pentode output valve. Full-wave power rectifying valve.

**CONTROLS:** (1) Single-knob tuning with external trimmer. (2) Differential reaction. (3) Input volume control. (4) Wave-range switch. (5) On-off switch.

**PRICE:** £18 18 0 complete with valves (for 25-cycle mains, 12/- extra).

**MAKERS:** Kolster-Brandes, Ltd., Cray Works, Sidcup, Kent.



Chassis of the Kolster-Brandes Model K.-B.279 receiver, and (below) arrangement of wiring and components in the base compartment.

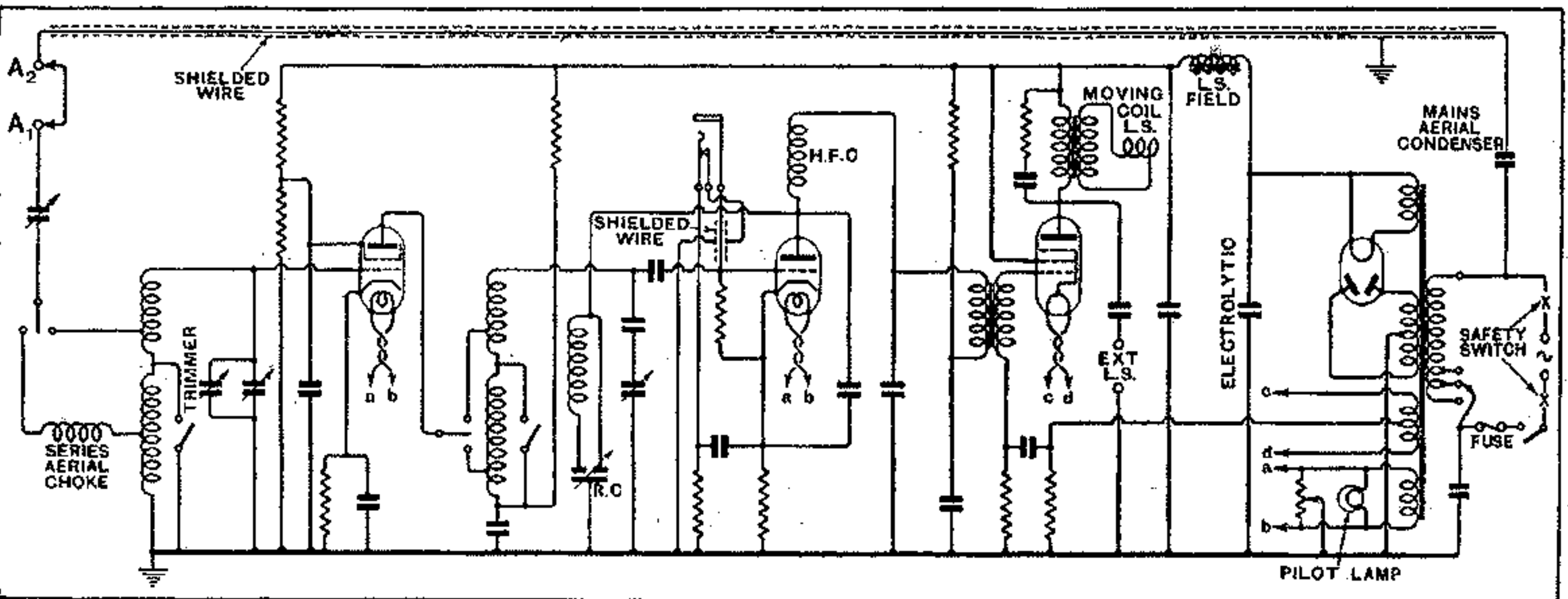
**Kolster-Brandes Three-valve A.C. Mains Receiver.—**

to avoid hum, including the connection of a condenser between the mains input and earth and a semi-fixed cathode potentiometer.

It is hardly necessary to say that complete decoupling is included both in anode and grid circuits. Among what may be called the refinements of the receiver are a pick-up jack, mounted at the back of the cabinet, and provision for an external loud speaker, for which the primary of the output transformer acts as a feed choke. There is also a safety device, which takes the form of "breaks" in each of the mains leads, which are automatically closed when the back cover of the cabinet is placed in position; the set is entirely "dead" when this cover is removed, and so there is

selectivity; where the fullest possible immunity from interference is needed it is a good plan to reduce aerial input by decreasing the series capacity, and then to restore sensitivity by reaction. That reaction control is not quite so good on the long-wave side is compensated for by the fact that the circuits, without adventitious aid, give exceptionally good results on this band.

Reproduction is marked by a good, but not overpowering, bass, free of the lower-register resonance that is usually found in sets of this type. Output is well maintained up to about 4,500 cycles, with the result that reproduction is bright, but without hiss or scratch. Frequencies in the neighbourhood of 2,500 cycles are rather over-emphasised, and on some heavily modulated musical passages there is an effect akin to



Complete circuit diagram. The tuning condensers are ganged, and all wave-range switches are mechanically linked.

no risk of shock. A glass cartridge fuse is mounted in an accessible position.

Cadmium-plated steel is the material used for the chassis, which may be removed for test after disconnecting the leads to the fuse and loud speaker and taking out a few screws. It is reassuring to see that proper precautions are taken against accidental short circuits; for instance, the leads passing through the metal work are protected by soft rubber bushes.

In order to ensure sufficient selectivity in a set of this type, it is necessary to effect a compromise by working with fairly loose coupling in the aerial-grid and H.F. intervalve circuits. As a result of making a careful comparative test, it can be stated definitely that this compromise has been effected in an extremely satisfactory manner; there has been no undue sacrifice of sensitivity, as witness the fact that a good selection of foreign programmes can be received under fair conditions, even in daylight. Selectivity with the aerial series condenser set at maximum is quite good, and can be increased by suitable operation of this control to almost any desired extent. Well-proportioned screened tuning coils, with an H.F. resistance apparently well below the usual value, undoubtedly contribute something towards these results.

Reaction works smoothly and well; apart from increasing sensitivity, it also has a slight effect on

that produced by overloading, although the output valve is actually working within its capacity; this effect is not so marked as to be really objectionable.