

KIT CONSTRUCTORS' NOTES



The New Cossor Melody Maker.

How Best Results may be Obtained.

A WIRELESS Rip van Winkle, oblivious to developments in the amateur field since, say, 1922, would, on resuming his hobby to-day, probably be even more intrigued by the way in which the set builder's difficulties have been removed than by the technical progress made during the intervening years.

Kit construction is not new, but what changes it has undergone! Looking through an old copy of *The Wireless World*, dated a few months before the inception of broadcasting in this country, one sees a "bargain offer" of a set of parts for making a tuner—coil-holder, variable condenser, and box—for £5. Nowadays we expect to get all necessary components for a simple receiver for something less than that, and, thanks to increased demand and production, we are not disappointed.

The new Cossor Melody Maker is an outstanding example of what may be done, by careful attention to details, in producing a kit of parts that can be assembled

and wired by the veriest novice. Everything, excepting batteries and loud speaker, is included, and there is no need for such work as drilling or sawing; the set can be built in a living room without any messy operations, as terminals are used throughout in place of soldered connections. Even the boring of holes for wood screws is avoided by supplying a plywood baseboard ready drilled to take the small bolts, by means of which the various components are secured in position.

Features of the Design.

Needless to say, the receiver can be wired without any knowledge of theoretical diagrams, but it will be interesting to consider the circuit, which is given in Fig. 1. The aerial is coupled to the grid circuit of the shielded H.F. amplifying valve by an auto-transformer arrangement, and is tapped to a point on the winding near its earthed end. Normally the valve is operated with a zero grid, but a small negative bias is applied when resistance is included by rotation of the volume-reducing rheostat.

The anode coil, which couples the H.F. amplifier to the detector, is almost equally simple, consisting as it does of a single-layer winding with two tappings; the first, at the centre point of the tuned section, is connected to plate of the H.F. valve. A second is joined to H.T. positive, and a few extra turns wound from this point as a continuation of the low-potential end of the coil, serve as a reaction winding. It will be observed that the grid condenser and leak have values respectively somewhat lower and higher than usual.

There is but one L.F. stage, transformer-coupled, which probably accounts for the fact that there is no appreciable tendency towards low-frequency instability. It should be possible to operate the set on dry-cell H.T. batteries of high internal

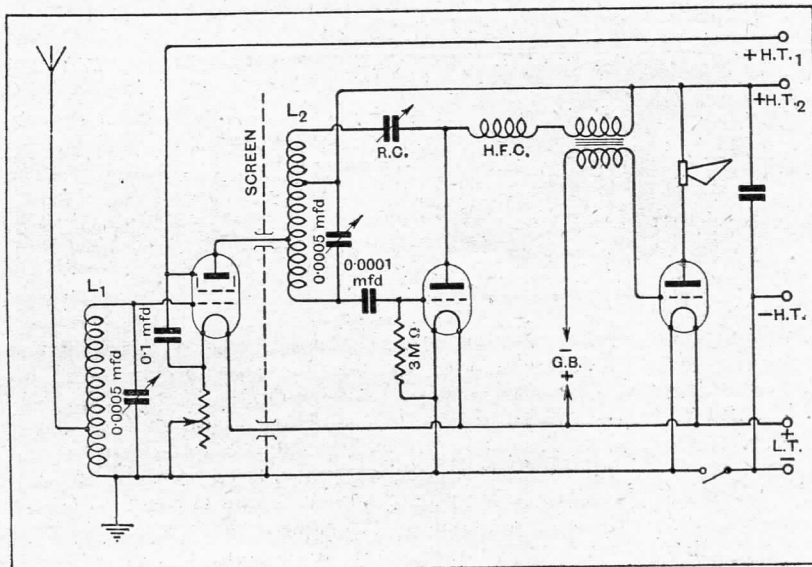


Fig. 1.—Theoretical circuit diagram, showing values of the various components.

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resistance without introducing howling; indeed, the effect of inserting artificial resistance in the common H.T. lead had no effect beyond reducing volume.

Although matters are so arranged that pitfalls for the novice are almost non-existent, one rather serious "snag" was encountered in testing the particular receiver under review: it was found that self-oscillation was produced as the two variable condensers were brought into tune, in spite of the fact that the reaction capacity was set at minimum. This effect was evident on both medium and long wavebands, and it could be checked only by dimming the H.F. valve filament to an extent which reduced amplification excessively.

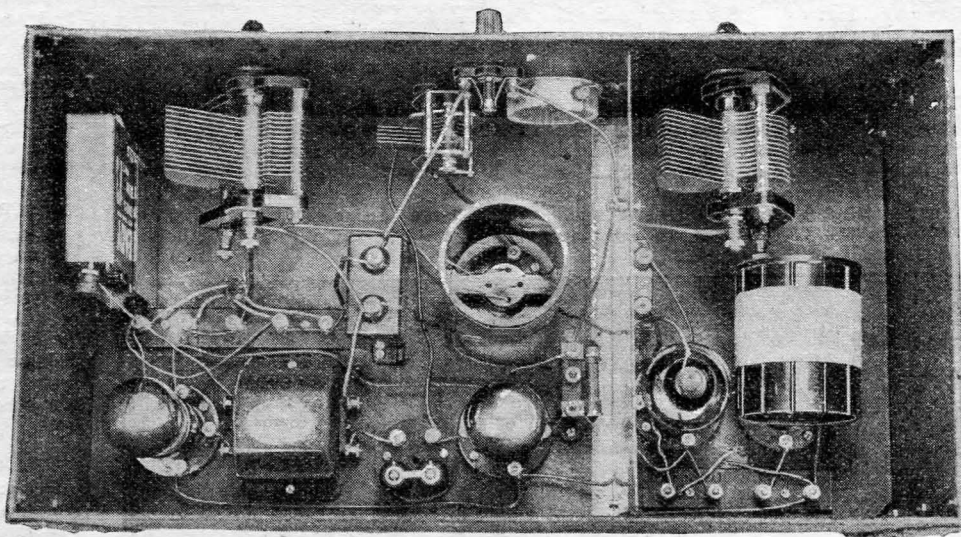
Ensuring Complete H.F. Stability.

A careful check of connections and measurement of the applied voltages failed to show anything abnormal, but brought to light the fact that the metal container was not earthed, although there was a connection between the vertical screen and the earth terminal. The addition of a wire connected between a screw securing one of the angle-pieces of the box and the common negative lead was found to effect a complete cure; precautions were taken to ensure a good electrical joint by scraping away the enamel from the metal walls under both head and nut of the bolt. Although this expedient can be recommended to any users of the set who may encounter the same trouble, it should be pointed out that, when the original design has been thus modified, care must be taken to avoid short-circuits between the terminals of phones or loud speaker and any exposed metal work.

The selectivity of any set with simple tuning controls and a single-stage H.F. amplifier is bound to be inadequate when it is used in the wipe-out area around a high-power broadcasting station, and, as was only to be expected, interference from 2LO was a difficult problem when the receiver was tested with an aerial of medium length at a distance of $1\frac{3}{4}$ miles from that station. With the medium waveband coils in position, signals spread over a large part of the tuning scale, but it was possible to receive 5GB without any background, and on the wavelength of this station there was no need to improve selectivity by reaction. Even when the long-wave coils were substituted, there was still interference, but it could be satisfactorily reduced either by using a shorter aerial or connecting the full-sized aerial to its terminal through a small fixed condenser of 0.0001 mfd. Under conditions less exacting than these, selectivity was found to be all that could be desired.

An excellent feature of the particular form of capacity reaction control is its small effect on tuning, and the operator can take advantage of this in searching for distant stations. At the time of writing, the state of ether congestion is most marked on the lower part of the broadcast band, and many stations receivable below about 300 metres are heterodyned. Attention was accordingly concentrated on reception of transmissions corresponding to dial readings of over 40 divisions. A convenient method of searching is as follows: Tune in a station at about this setting and adjust reaction for maximum response; then slowly work each dial together towards a higher reading, keeping them "in step" (as indicated, in the absence of actual signals, by a breathing sound in phones or loud speaker). Do not trouble unduly about critical adjustment of reaction until a transmission to which it is desired to listen is heard; by concentrating on the tuning dials proper, the advantages of two-handed control are retained, and a signal once tuned in can be brought up to maximum possible intensity by a slight right-handed rotation of the reaction control without fear of losing it.

Mention has already been made of the absence of any tendency towards L.F. instability; this largely accounts for the fact that the quality of reproduction is distinctly pleasing, inclining perhaps towards a slight emphasis to the higher musical frequencies. In view of the simplicity of the L.F. amplifying side of the



Plan view of the receiver, with cover removed.

receiver, it seems most unlikely that it will be responsible for trouble, and so comment is unnecessary.

The fact that actual or incipient L.F. oscillation is not produced when the set is used with an H.T. battery with an (artificial) high resistance would suggest that little trouble should be encountered in using a simple eliminator for the supply of anode current. Provision for reasonably close adjustment of screen grid voltage must be included, and, to be on the safe side, it is as well to include a simple decoupling feed scheme to prevent feed-back to the detector grid.