Two-valve S.W. Receiver

A Long Range Simple Receiver for the Beginner

By A. W. MANN

THE receiver to be described, is of simple design, but is nevertheless one of proved efficiency. It should be of interest to those who like to build experimental receivers in which they can incorporate suitable spare components which are to hand. The use of doubtful and junk components should however be avoided.

The Circuit

Fig. 1 shows the theoretical circuit, in which will be seen a regenerative triode detector, six-pin plug-in type coils, and a simple yet efficient form of band spreading. The extra expense of a band-spread condenser and slow-motion dial will prove in terms of results to be fully justified.

Components Values

The grid leak and grid condenser values specified are, in the writer's opinion, the most suitable for use with triode detectors, and enable the operator to obtain smooth regeneration throughout the full tuning range, providing of course that too high a voltage is not applied to the plate of the detector valve. That, however, is a matter for experiment.

The H.F. Choke and Coils

If you have a set of plug-in coils which cover all ranges between ten and one hundred metres, the H.F. choke should be of the type which will function efficiently throughout the full range with entire freedom from resonance peaks. The Eddystone type No. 1010 or one of the old Graham Farrish screened all-wave type meet these requirements.

Should you have suitable tuning condensers and slow-motion dials to hand, by all means use them. There are various makes of coils available and the theoretical diagram shows how the aperiodic or primary winding may be cut out of circuit.

Thus you can use only the grid and reaction winding of the six-pin coil, or four-pin coils if these are to hand. The .00005 μF pre-set, aerial series condenser should be used on all bands apart from the trawler and 160 metres amateur band, and in these circumstances true aperiodic coupling should be used.

If however you are using four-pin plug-in coils, the above trawler and amateur bands are best received using a .0001 μF pre-set condenser in series with the aerial

L.F. Coupling

Transformer coupling is used between the detector and output stage, and decoupling is also included. A suitable pentode L.F. transformer can be used if loud-speaker reception of the more powerful Europeans is desired, and is to hand.

As the original model was required for headphone reception only, a Lissen Hypermu Nickel-iron core type was used. The Ferranti AF4 is also suitable. A pentode output choke, however, should be used.

Depending on the form of H.T. supply used, some modification of the decoupling resistance might be found necessary. If an H.T. battery eliminator is used and the detector plate voltage on the lowest tapping is found to be excessive, the value of this resistance should be increased to 50,000 ohms or higher.

If when tuning on the higher range coils, the regeneration starts with what may be aptly termed a bump, the detector voltage is definitely too high. Some experiment is necessary on each aerial coupling. Note the following. A cuts out aperiodic winding, B is for use on 160 metre bands, C for use on all other bands.

Layout

Fig. 2 shows the component layout. The valve holders and coil holder as shown, are of the base-board type, as used in the original model. If however you have none of these on hand, I would strongly advise the purchase and use of the more modern chassis mounting type.

The layout diagram conveys the relative positions of the components at a glance. The coil holder and the detector valve holder should be as

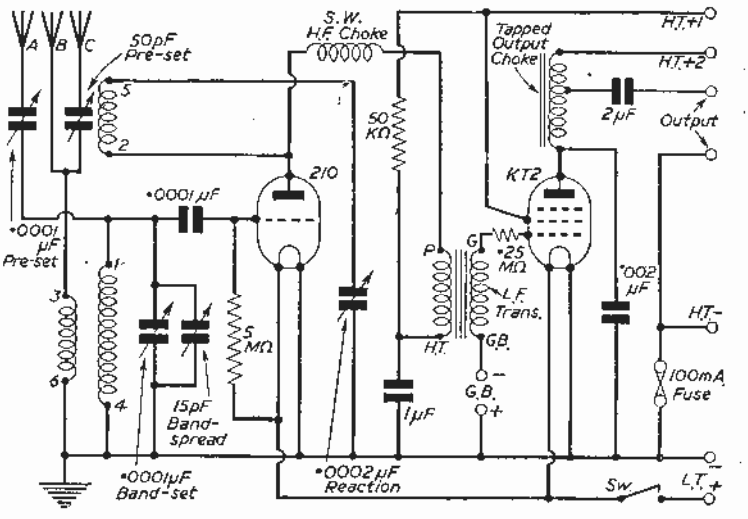

Fig. 1.—Circuit of the Regenerative Detector and Pentode Output receiver.

close together as the grid condenser coupled between them will allow. The leads from the band-setting condenser should go to the coil holder connections. The band-spread condenser being wired in parallel with the band-setting condenser.

The Wiring

All leads should be short and as direct as possible, but the tuning condensers should not come within the magnetic field of the coil winding. Do not use old wire. Push-back insulated wire is now available and is very handy to use. My own method when using this is to remove the insulation from one end, and push back the other end. This avoids the piling up of the insulation, and certainly looks neater.

Chassis and Panel

Chassis and panel dimensions will depend upon the relative size of the larger components. An aluminium chassis and panel should be used. Alternatively a plywood chassis with two side runners, and a plywood top face with aluminium sheet could be made at low cost.

It should be understood, therefore, that the chassis and panel dimensions are given only as a guide, and some slight modification may be found necessary.

When building this receiver, do not make the chassis and panel first and then lay out the components. Take a sheet of drawing paper, mark out a plan of the 12in. by 10in. chassis to full size. Follow this by arranging the components in their relative positions as shown at Fig. 2.

This method will enable you to avoid cramped layout, and on the other hand excessive spacing between components, which would result in long leads.

Apply this method to the panel layout but in this instance use cardboard. The relative position of the tuning condenser and dials can be determined at a glance and mistakes avoided.

One point which should be understood is that unless the chassis and panel assembly of this, or for that matter, any short-wave receiver built as a rigid assembly, tuning operations will be accompanied by a series of crackles.

The panel should therefore be of stout gauge material, and the brackets used should have at least a 2½in. base. (See Fig. 3.)

It is also a sound idea to bend over about half an inch at the top of the panel at right angles. This, together with the support provided by the chassis, will guard against panel whip when tuning.

Another point is that the panel should not be depended upon to provide effective earthing of the tuning and reaction condenser moving vanes, or rotors. Wire up to both sides of these condensers: it may save trouble later.

Tuning Dials

The writer is strongly in favour of panel-mounted slow-motion dials (where direct calibration is not desired): the Utility and Muirhead are good examples.

These could be used in conjunction with Raymart tuning condensers. A reaction condenser with integral s.m. drive was used in the original model.

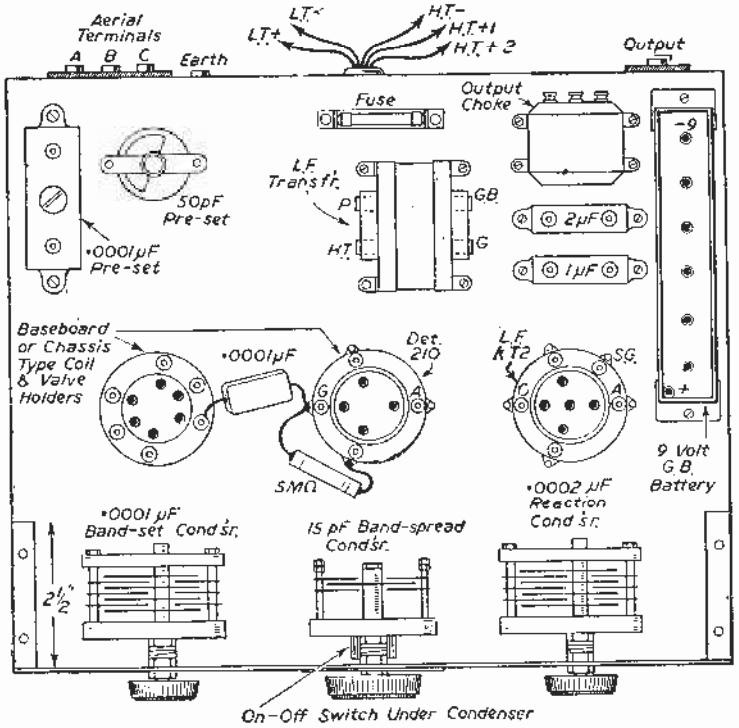

Fig. 2.—Chassis and Component layout.

Safety First

Beginners and others are sometimes worried when about to try out a new home-constructed receiver in case a wiring mistake has passed undetected, with the possibility of burnt-out filaments. Two components should be common to all battery receivers—a fuse and fuseholder. Fuses are cheaper than valves.

Two versions of this receiver were built, the second one now being under test. So far as performance is concerned, there is little to choose between them. This version, however, is far simpler to build and wire.

Experimental Designs

This is an experimental design, as distinct from a sponsored, complete kit receiver. It is intended solely for the experimenter who wishes to use spare components and build his receivers with the minimum of extra outlay.