

# Electricity Applied to Meccano

## XIV.—Crystal Receiving Set

*This is the last of a series of articles intended to draw every Meccano boy's attention to the numerous fascinating uses to which the Meccano Electrical parts may be put. The first two articles of the series dealt with the elementary principles of electricity, and subsequent articles described Meccano switches, a coil winding machine, a telegraph system, electro magnets, a galvanometer, motors, an electric locomotive, bells, lamps, an ammeter, an electric sign, an electrically-controlled railway, electric engines, a drop hammer, a remote control for radio sets, and electric clocks. This month we describe an efficient wireless receiving set made principally from Meccano parts.*

It is little more than twenty years since Senator Marconi attained success in transmitting telegraphic messages without the aid of wires. The value of the new invention was soon proved, although by tragic means. In 1912, when the R.M.S. "Titanic" struck an iceberg in the Atlantic and rapidly commenced to sink, wireless was used to summon other vessels to its aid, and but for the fact that the "S.O.S." messages were heard and quickly answered, the loss of life—although terrible—would have been much greater.

The development of broadcasting is one of the wonders of the present day. Ten years ago wireless enthusiasts listened-in to telephony with instruments of the crudest description. First came crystal sets tuned with inductance coils, and then valve detector sets with a similar means of tuning, which hardly could be described as "low loss."

Since these early days broadcasting has grown apace. The improvements at the transmitting end have been great and the receiving set, which is now an almost indispensable feature in most homes, also has been improved beyond recognition, both as regards appearance, reception and reproduction. Radio sets may now be obtained for every purpose and to suit every pocket. There is the superheterodyne, for those whose ambition is to "get" Mars (and who also have plenty of money!); the ordinary three or four-valve receiver in its many forms; entirely self-contained "portables" (ideal for the river, picnics, etc.); and lastly, the humble pioneer crystal set.

The crystal set has not much to be ashamed of even in these days, for although its range is strictly limited, it is well known that for clarity of reproduction—as pure as its name implies—the crystal as a means of rectification has never been excelled. Moreover, it costs nothing to maintain—a consideration which, we believe, is of no little importance to most, if not all, Meccano boys!

### Building the Meccano Model

The Meccano crystal set is of very simple construction, as will be seen from Fig. 1, but this fact does not detract from its efficiency. It will receive telephony within a radius of approximately 15 miles. With a high power station, such as Daventry (5XX), the range is much greater, but as such stations transmit on a wave length much higher than the normal range of the set, a loading coil is necessary. The latter is connected in series with the variometer. That is to say, one end of the loading coil is connected to the aerial terminal of the set and the other directly to the aerial lead-in. Approximately 150 turns of 26 S.C.C. Wire will be required, wound on a suitable former. The former will of necessity be rather larger than those used for the variometer.

The plates forming the "panel" may be made from stout cardboard or fibre strip. The best way to make the holes is to place the material between two  $5\frac{1}{2} \times 2\frac{1}{2}$ " Flat Plates; a Meccano Rod may then be punched through the fibre, the holes in the Meccano Plates acting as a guide for the Rod. After the holes have been punched,

the edges of the fibre plate may be trimmed. It may be asked why the panel should be made of two  $5\frac{1}{2} \times 2\frac{1}{2}$ " Plates and why they have so many apparently unnecessary holes. The reason for this is that the plates so made may be used in numerous other models and for a variety of purposes.

The coil formers may be made out of the same material as the panel, or if preferred, they may be bought already shaped in various sizes. If cardboard is used it should be soaked in melted paraffin wax. Sufficient fibre for the panel and formers should be obtainable for about sixpence.

On each of the coil formers 25 turns of 26 S.C.C. Copper Wire are wound. In order to secure its end, the wire is first passed through two small holes that are made near the centre of the former. The winding is then commenced, the wire being laid on alternate sides of each of the segments of the former until the 25 turns have been completed, and the coil is finished off by passing the end of the wire through two other small holes near the circumference.

The coil 1 is attached by a nut and bolt to a 57-teeth Gear Wheel that is secured to a 3" Rod journalled in a  $2\frac{1}{2} \times 1\frac{1}{2}$ " Double Angle Strip 3. The latter is bolted to the fibre plates forming the base

of the model. The 57-teeth Gear meshes with a Worm on a  $3\frac{1}{2}$ " Threaded Rod that is journalled in a  $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip, and this Strip is secured to the base at right angles to the Double Angle Strip 3. By rotating the insulating knob that is locked by a nut on the end of the Threaded Rod, the coil 1 may be moved slowly round, thus altering the position in relation to the fixed coil 2. This alteration of the coils tunes the set to the desired wave length.

The fixed coil is attached to a  $1 \times 1$ " Angle Bracket secured to the base. The 57-teeth Gear with the coil 1 attached should be now adjusted on its Rod so that the two coils are as close to each other as possible without actually touching. The  $1 \times 1$ " Angle Bracket is provided with a terminal to which the aerial lead-in is attached and the commencement of the winding of the fixed coil 2 should be secured to the bolt that holds the coil to the Angle Bracket.

The crystal is mounted in two Double Brackets that are bolted to  $1 \times 1$ " Angle Brackets 4. Suitable crystals with catwhisker may easily be obtained, but we recommend readers to use only the best. Several well-known and reliable makes of crystal are on the market.

A Cranked Bent Strip 5, pivotally mounted by a lock-nutted bolt (see Standard Mechanism 263) on the panel, carries at its upper end a Threaded Boss that is attached to the Cranked Bent Strip by bolts.

The bolts are inserted in the tapped transverse holes of the Threaded Boss and are locked in position by nuts so that they do not grip the 2" Threaded Rod passing through the longitudinal bore of the Boss. This Rod carries the catwhisker at one end and an insulating knob at the other. (A suitable knob may be purchased from any wireless stores or, if appearance is of secondary importance, a 1" fast Pulley fitted with a small Rubber Ring (part

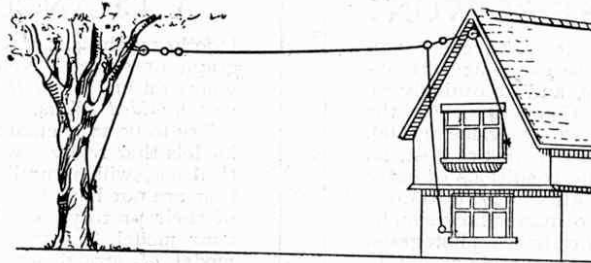


Fig. 1. A typical single-wire Aerial

### Parts required to build the Crystal Receiving Set

2 of No. 5	28 of No. 37	1 of No. 80A
6 " " 11	5 " " 37A	1 " " 81
2 " " 12A	1 " " 44	4 " " 304
1 " " 16B	1 " " 47	4 " " 305
1 " " 27A	1 " " 48A	4 " " 306
1 " " 32	4 " " 59	1 " " 313

The following items will be required, but are not included in the Meccano system.

Strip of fibre or stout cardboard, approximately  $15 \times 5$ ".

2 Ebonite Knobs (not essential).

1 Crystal.

1 Catwhisker.

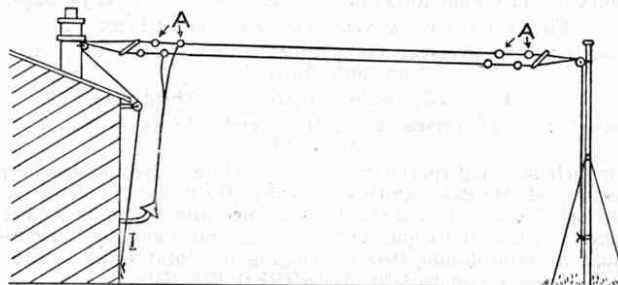


Fig. 2. A two-wire Aerial, for use where space is restricted