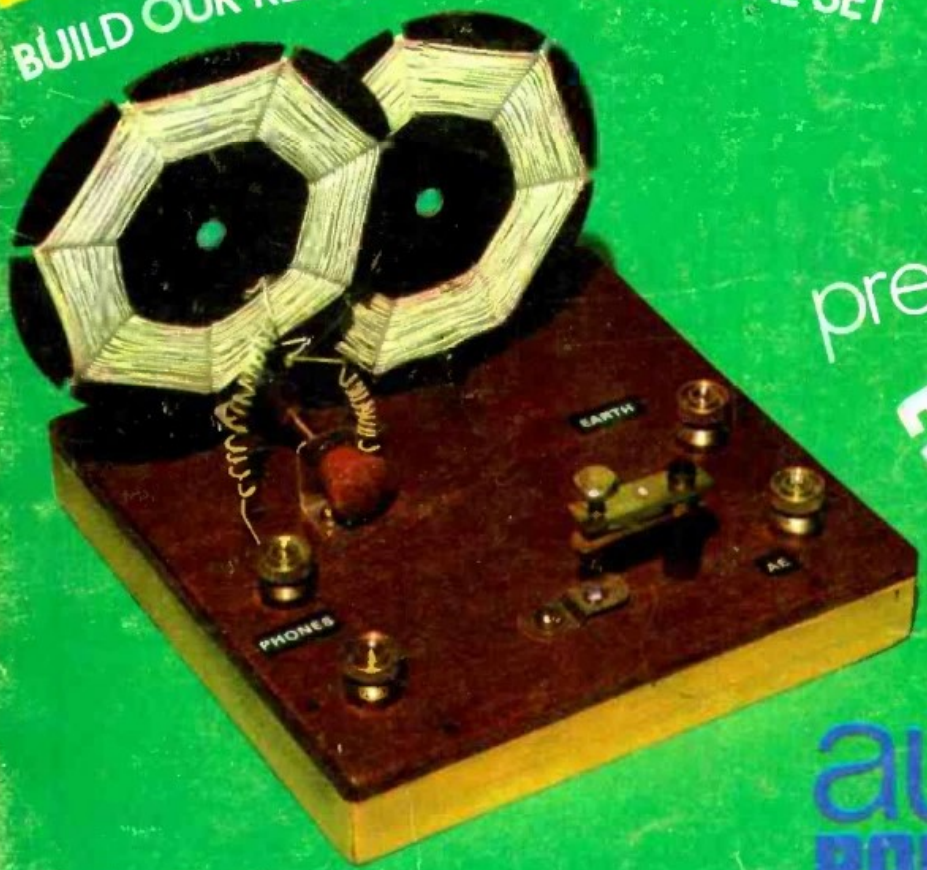
PRACTICAL WIRELESS

SEPTEMBER 1972

20p

it's crystal clear!

BUILD OUR REPRODUCTION CRYSTAL SET



precision

ENLARGER TIMER

auto

PARKING LIGHT

SELECTIVE

4-BAND RECEIVER

Next November the British Broadcasting Corporation will be commemorating the first broadcasts, made in 1922, by the original British Broadcasting Company. We thought that readers might be interested in listening to these 50th anniversary programmes on a reproduction crystal set, typical of receivers in use in those early days.

Reproduction crystal set

R. F. GRAHAM

IN the early days of radio crystal sets were used in many homes, and this project is a reproduction of such a receiver. Variable capacitors *were* available for tuning, but their cost often resulted in some other means of tuning such as tapped coils, coils with sliding contacts bearing on the turns and swinging coils where mutual coupling (and hence the inductance and resonant frequency) could be adjusted.

In addition to the headphones, such receivers required only a few components such as terminals, a detector crystal and "catswhisker", wire to wind the coils, an insulated board or panel and a few small parts such as bolts and brackets to make a detector assembly.

The receiver shown here is something of a novelty, and sure to arouse interest when it is seen.

COILS

These are a flat type quite popular in the early days, and wound with 26 s.w.g. cotton-covered wire. Actually, any silk covered or enamelled wire, from 30 s.w.g. to 24 s.w.g., is suitable. If heavier wire is used then larger discs will be required.

Each disc is about 4in. in diameter, and can be *stout* cardboard or thin paxolin sheet. Seven slots, each about $\frac{1}{8}$in. wide, are cut about 1in. deep.

Pass the wire through two small holes, and wind in and out of each slot in turn, as winding progresses. This results in half the turns lying on one face of the disc, and half on the other face, crossing over in the slots. Each coil has about 40 turns, the wire being finally anchored through two small holes, leaving the ends long enough to reach to the terminals.

With such a circuit, the parallel capacitance is mainly due to that of the aerial and earth. As a matter of interest, "tuning" coverage was tested with a signal generator, and was 1300-1700kHz with a 25pF aerial/earth system, 850-1100kHz with 100pF, and 550-750kHz with the aerial/earth placing about 250pF across the receiver.

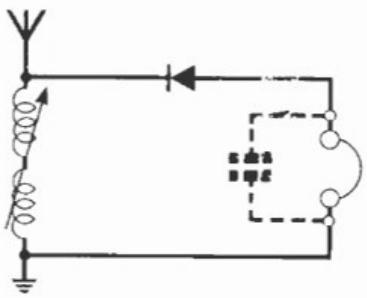
With such a receiver it was quite usual to adjust the number of turns to suit the aerial, or wavelength of local stations.

One coil is fixed on a small bracket. The other is bolted to a strip of material about 1in. long, secured to a threaded rod by lock-nuts. The rod runs in two brackets, and is rotated by a large terminal head or small knob. "Tuning" is accomplished by swinging one coil over the other thus varying the effective inductance.

The base is varnished plywood or ebonite or paxolin about 6×6in. Strips raise it about $\frac{3}{4}$in. to clear the terminals projecting underneath.

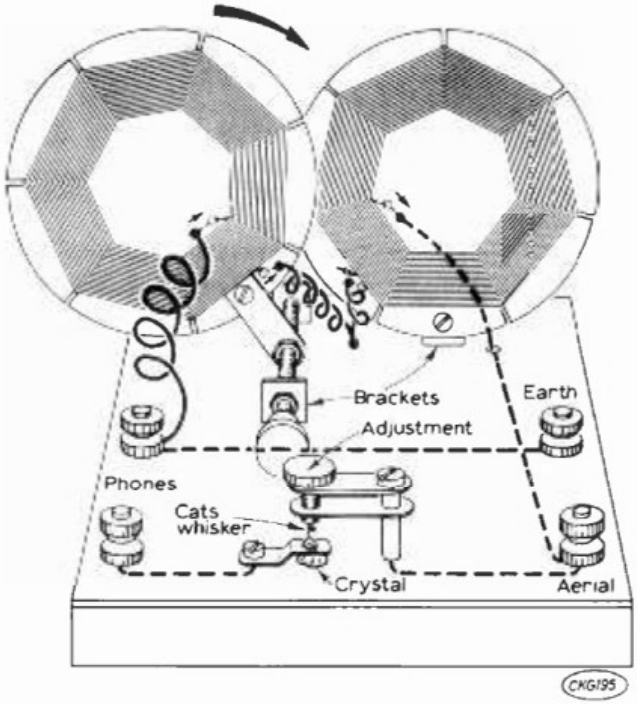
DETECTOR

A strip of brass about 1×$\frac{3}{8}$in. (from an old lamp battery) is bolted to hold the crystal firmly, a corner or point on the latter projecting up through a hole in the strip.



It could hardly be more simple! The suggested additional 'condenser' shown dotted can be about 1000pF. It will be cheaper to buy it rather than to follow the method described in the text for making a 'condenser'!

A 1½in. bolt with spacers holds a similar strip about 1¼in. long to which the catswhisker is soldered. Above this strip is a stouter strip of metal, and a screw or terminal head runs through a threaded hole in this, or through a nut soldered to it. Turning this screw or terminal adjusts pressure of the catswhisker on the crystal.



This drawing, showing the constructional details of the crystal set, should not be difficult to follow.

The catswhisker is made by winding about 1½in. of copper, tinned-copper or brass wire, about 34 s.w.g., on a small drill about ⅛in. diameter, and then stretching the winding slightly. These bygone detectors used wonderful combinations of crystals and even gold-tipped whiskers, all of which appeared to give about the same result. There is great room for experiment here, using various kinds of wire, or soldering the crystal (use Woods metal) or packing it with metal foil. All these trials will probably give a detector of about equal efficiency to that shown, which is about the same as a modern crystal-diode, when a sensitive spot on the crystal has been found.

AERIAL AND EARTH

The aerial ought to be at least 25ft long, and preferably over 50ft. Maximum range is usually considered to be about 25 to 150 miles from a major transmitter, anything over about 50 miles generally needing some 50-100ft or so of outside aerial, 20ft or more high.

The earth lead runs to a metal spike or other earth rod in damp soil. With a 180ft aerial ample volume was obtained by the author some 25 miles from a transmitter. No earth was used but the earth is usually desirable.

The headphones ought to be good-quality, sensitive headsets of about 500Ω to 2,000Ω resistance, so as to give best volume with the rather limited output of the crystal set. Strictly speaking, a capacitor of about 1,000pF should be connected across the headphones but it was not always fitted in the early days. A description of how to make such a "telephone condenser" appeared in "Amateur Wireless" in 1922.

"The telephone condenser is made up of twenty-five small sheets of tinfoil measuring 1½in. by ¾in. with a small strip left at one corner to make a lug. It is built up by placing the strips of tinfoil, with strips of waxed paper in between, with the lugs alternately at one end and then at the other. When the condenser has been built up the ends of the tinfoil should be carefully soldered together by means of a blob of solder, two pieces of cardboard being placed either side of the condenser and a length of linen tape wound round to keep the whole together. The condenser should then be immersed in molten paraffin and allowed to set in a solid block."

The "components list" is short and sweet! One galena crystal (ref. X6), four 4BA brass terminals, 2oz. reel of 26 s.w.g. enamelled wire and a length of 4BA brass studding, all of which are obtainable from Home Radio (Mitcham) as a "kit" for 96p which includes post and packing. ■