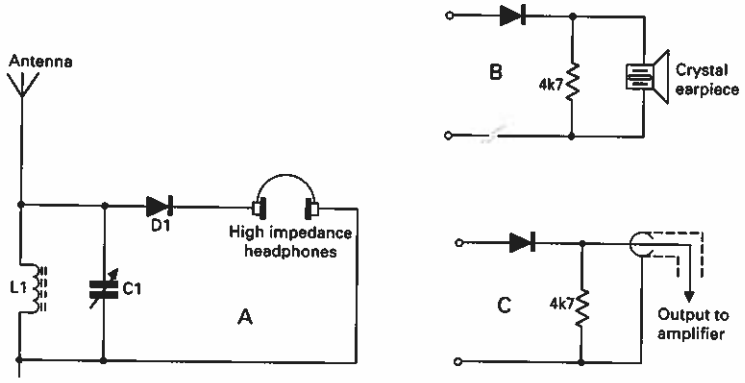


Fig. 1: A typical crystal radio circuit, with an alternative output arrangement using a crystal earpiece shown inset.

was also frequently used. These days a diode is used for D1. Germanium diodes such as the OA47, OA90 and OA91 work well ifor this purpose, as do Schottky diodes such as the BAT81, BAT85 and 1N5711 types. Avoid using silicon diodes as they have a higher forward voltage drop with associated signal loss. In all the versions of the crystal set described here, I use the OA47 germanium diode simply because I already had several of them. All the diodes listed above would achieve similar results.

The Spider's Web Coil

The type of coil used by NM0S in his permeability-tuned crystal set is known as the spider's web coil. There are several types of coil that have been used in classic crystal set construction. The simplest is the tubular wound coil. I well remember from my shed-based experiments in the 1950s that 60 to 80 turns of enamel covered copper wire wound around a toilet roll former would tune the medium wave a.m. band using a typical 0.0005µF (500pF) tuning condenser (capacitor).

Trying this recently revealed a present day failing; that because of increasing costs, we live in an age of insubstantial toilet roll formers. Tubular formers are very viable for crystal sets, but only if a decent former can be found!

Perhaps the most complex coils formerly used in crystal sets are 'basket-wound' coils. I have a vintage crystal set that has a lovely set of plug-in coils wound like a basket.

The type of coil used by NM0S in his permeability-tuned crystal set is known as a spider's web coil, which is a much simpler but nevertheless quite impressive type of coil. The coil, which looks like a spider's web, is formed by winding the wire through a series of radial slots. The turns should be carefully laid side by side. The slots may be cut into almost any non-metallic sheet; cardboard and plastic both work well. As can be seen in the photographs, I used an old CDROM (CD) as the coil former because it cuts neatly with a sharp junior hacksaw blade. For the winding to fit well it requires an odd number of slots. This ensures that each time the wire does one circuit of the former it changes sides on the former. If each slot is at an angle of 40 degrees to its adjacent slot, 9 slots will fit around the CD. This may sound complex but even a quick glance at a photograph of the coil shows how it works.

A simple way to make the coil former is to begin with a sheet of paper, lay the CD on the paper and draw around the outer circle and the circle of the centre hole. If the drawing was a cake, we would need to divide it into 9 slices. Each slice would form an angle of 40 degrees. Draw the lines with a pen and a protractor, taking them slightly over the edges of the outer circle.

Lay the CD over the drawn outer circle and with a spirit-based felt pen (a CD marker pen is ideal) draw the 9 'slices' on the surface of the CD. Then

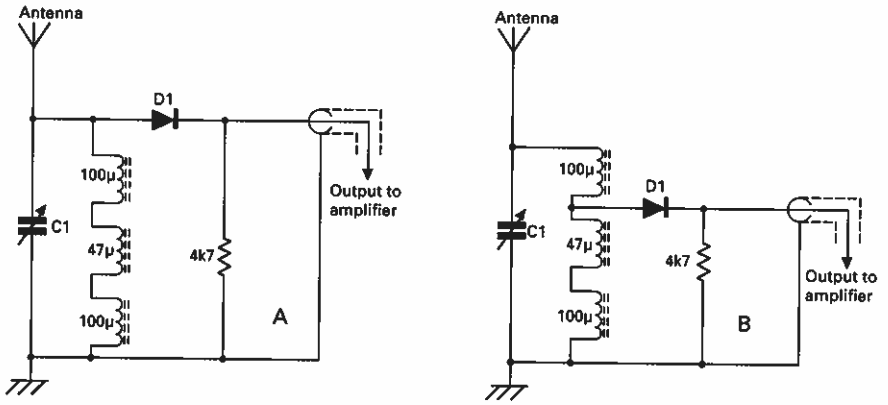


Fig. 2: Two instances of using axial choke inductors for tuning.

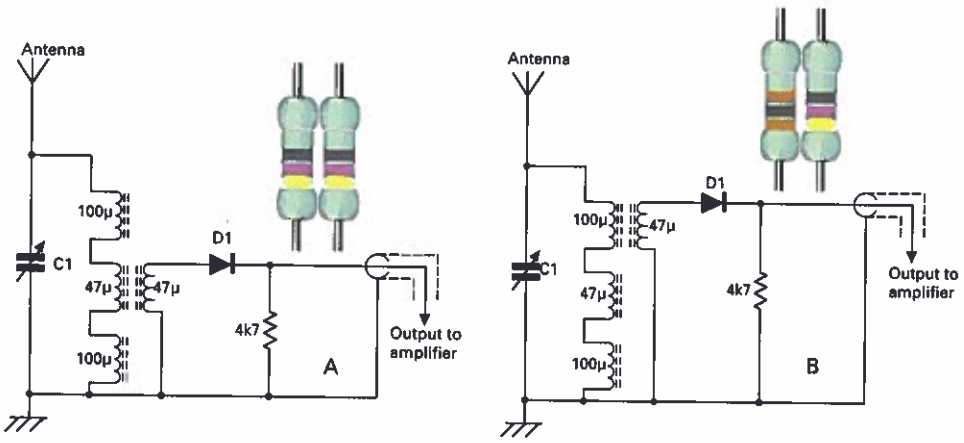
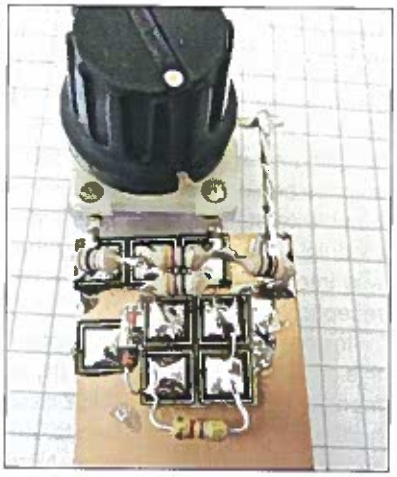


Fig. 3: George's various attempts at inductive coupling.



The crystal set built using the 'Manhattan' copper island technique.