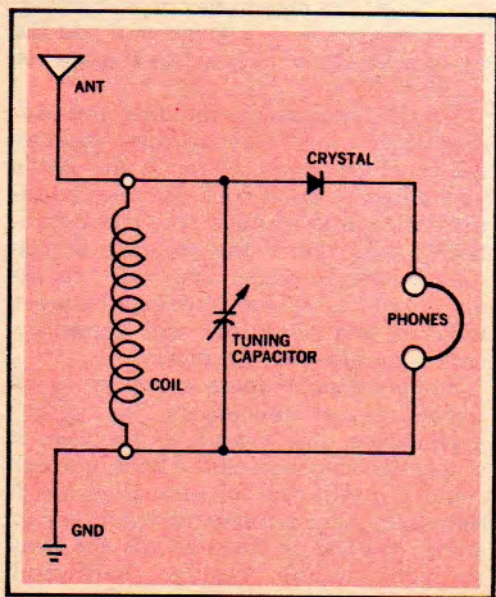


By Len Buckwalter

## Build the Original Radio

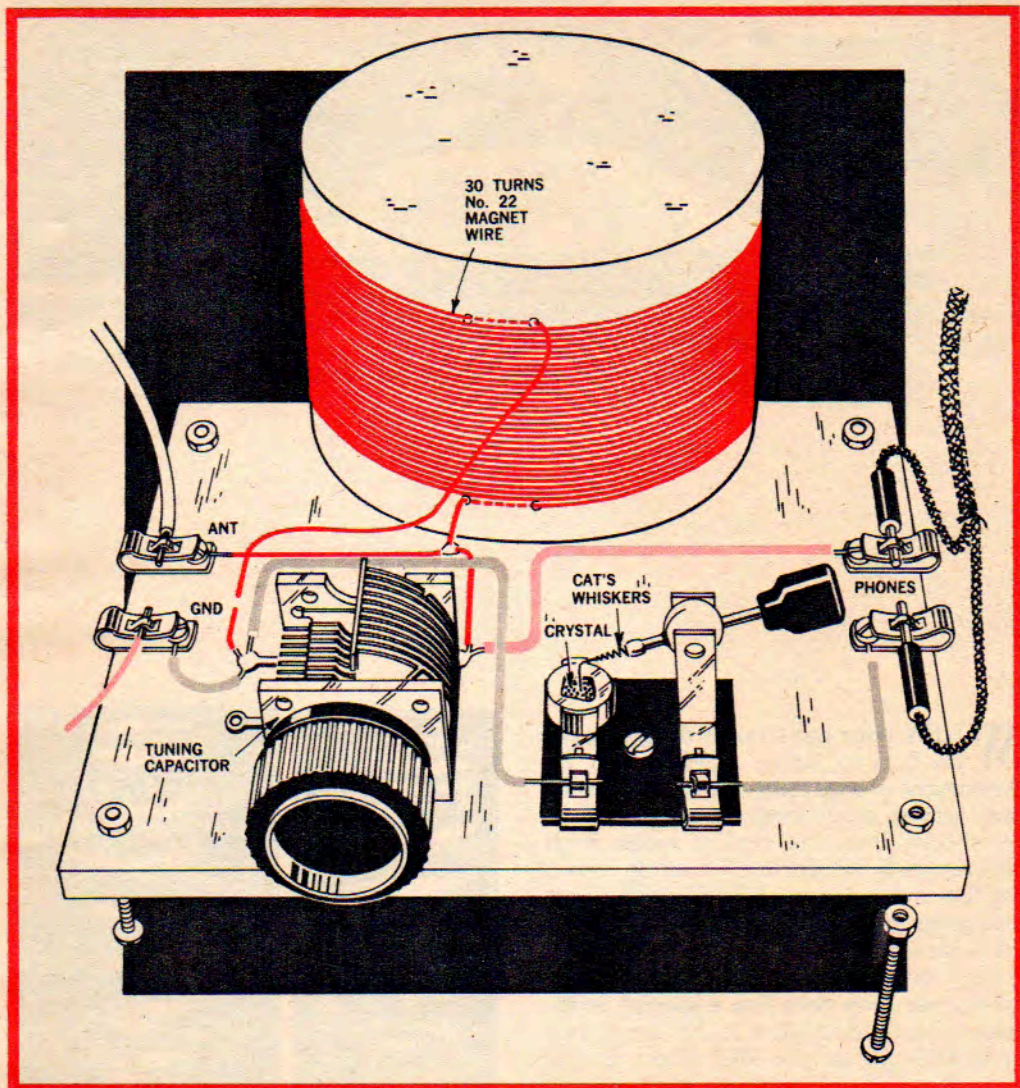


**CIRCUIT DIAGRAM** shows simplicity of crystal radio. For easier initial tuning, substitute sealed crystal diode (1N34) for crystal until you find a station, then use crystal.

**C**AN a radio capable of picking up stations 7,000 mi. away without a power source of its own be anything but the latest electronic wonder? Ask Grandpa. He built such sets about the time of the First World War. Without batteries or house current—not all houses even had electricity in those days—his home-built radio stole signals out of the air. Fifty years later you can still enjoy this form of legal larceny with the radio stations paying the electric bills.

In 1970 the practical features of this living electronic fossil keep it in such demand that there is a mail-order house specializing in crystal radios—Modern Radio Labs, 2612 Butano Dr., Sacramento, Calif. 95821. Modern? There is still great need for an inexpensive radio that requires no power source. All the parts for MI's crystal set cost less than \$7.

A crystal set is a complete radio. It may appear simple and require no power-consuming amplifiers or speakers but it does have every essential



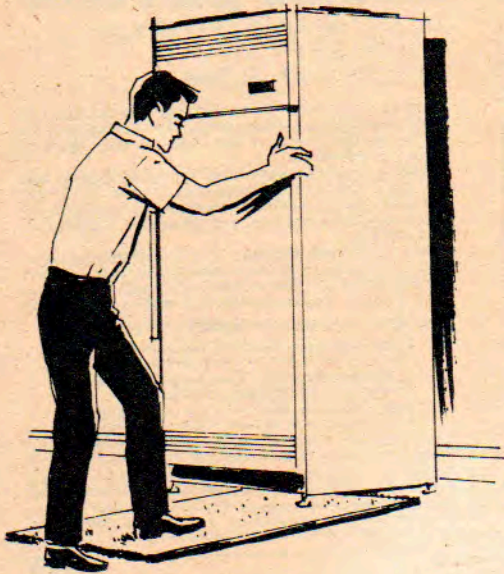
radio system: An antenna to intercept standard broadcast station signals, a coil and tuning capacitor to filter out the one you wish to hear, a detector—the crystal—to convert radio-wave energy to an audio signal and ear phones to hear it. To pick up the signal from the crystal, you probe it with a fine wire called, obviously, a cat's whisker. This galena crystal, a small chunk of lead ore, is embedded in a metal disk for easy mounting.

Note: No battery, transformer or other power source is included—the crystal set operates on radio wave en-

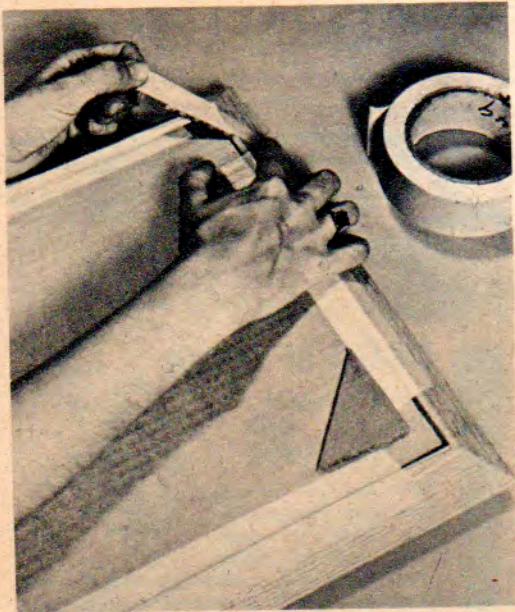
ergy transmitted by the sending station.

Start building your set in the traditional manner by winding the coil on a mush box. Mush box? Fortunately the Quaker Oats box has survived unchanged for the past half-century and is still available in your local grocery if at what Grandpa would consider an outrageously inflated price. Wind 30 turns of enamelled magnet wire onto the box pushing the strands together and securing with tape. Scrape the ends to bare the wire before soldering into the circuit. Cut down the oat box to about 3½ in. high [Continued on page 120]

## Home Hints



WHEN laying tile and the like, you can make moving appliances easier and avoid damaging new floor by sliding appliance on piece of rug.



HARDWOOD PICTURE frames may split if cardboard backing is secured with brads or staples. Use masking tape to solve problem.

## Original Home Radio

[Continued from page 75]

and glue it to the 5x7 plywood base. Add four 1-in. feet for support.

Tuning capacitor glues to the board with one wire to the side solder-lug and the other to its frame. Use plenty of heat for good solder joints.

The crystal and cat's whisker take special handling. Do not touch the crystal with your fingers when you press it into its holder and mount it on the board. The ball joint holding the cat's whisker is too stiff for easy operation. Free it by springing the holder so the ball will just stay where you put it. Change the stock whisker which is too coarse for the superior phosphor bronze type (10 cents extra) and solder it in place.

The antenna should be at least 50 ft. long and as high as you can mount it to pick up stations up to 20 mi. away. Since there are no amplifiers in the set, good ground and antenna connections count. You can clip the antenna to the finger stop on a telephone and sometimes get a strong signal. For more than 20-mi. range, use at least 100 ft. of aerial kept away from metal surfaces and insulated from the end support with a piece of plastic. Connect the ground to a cold water pipe or a rod driven several ft. into the ground, preferably damp earth.

Tuning in a crystal set is a real juggling act. Start with the tuning capacitor fully closed (meshed) and tickle the crystal with the cat's whisker. Probe the rough surface with the tip of the wire until you hear something in the earphones. Nothing? Open the capacitor plates slightly and try again.

This tuning method works but it takes time. You can make it easier by cheating. Substitute a sealed crystal diode (1N34, 60 cents) for the crystal and cat's whisker. Then tune with the variable condenser until you hear a station. Leave the condenser tuned and replace the crystal in the circuit to make final tuning by the more finicky tickling-with-the-whisker technique.

If you can't get stations at the extreme low or high ends of the dial, you can bring them in by changing the number of turns on the coil. To tune lower, add five turns at a time until you find the missing station.

Removing turns shifts the band up to the higher end.

Whether you cheat or play it straight, Grandpa's crystal radio set has a lot going for it as a power-free radio or just for fun. •

#### PARTS LIST

Variable Tuning Capacitor, 350 mmfd (Cat. 8-7, \$1.50)

Crystal Holder Stand (Cat. 9/17, 45 cents)

Cat's Whisker, fine (Cat. 9-35, 10 cents)

Coil Wire, No. 22 enamelled magnet wire, 40 ft.

4 Fahnestock Clips, 3/4 in. (Cat. 7-53, 20 cents)

Crystal Diode (fixed), Type 1N34 (Cat. 1N34, 60 cents)

Misc.: 5-in. diameter mush box, 5x7x1/4-in. plywood for base.

Source: Modern Radio Labs, 2612 Butano Dr., Sacramento, Calif. 95821

## Low Cost Tools

[Continued from page 97]

end of a bar for convenient chucking, drill a 60° tapered hole for the headstock center in one faced end. Reverse the work and turn it down to the exact bore diameter of the piece to be mounted, face the end and polish the surface. Drill this end 1 1/2 in. deep and tap for tapered inside pipe threads (TPI). Chamfer the end to 60°. Now you can cut the slots.

Make the expansion bolt from a steel machine bolt. Cut matching tapered pipe threads on the end, a 60° taper on the shoulder to expand the mandrel and drill a 60° center hole in the head so the lathe's tailstock center can support it.

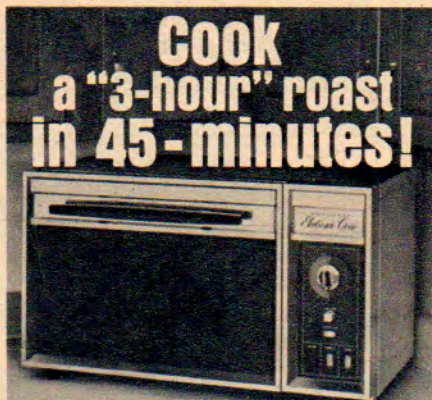
To use, insert the mandrel in the work-piece, tighten the expanding bolt to lock it and chuck it in your lathe. •

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