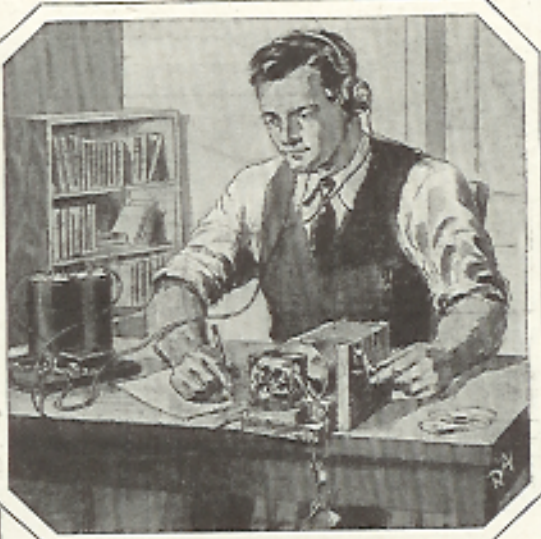
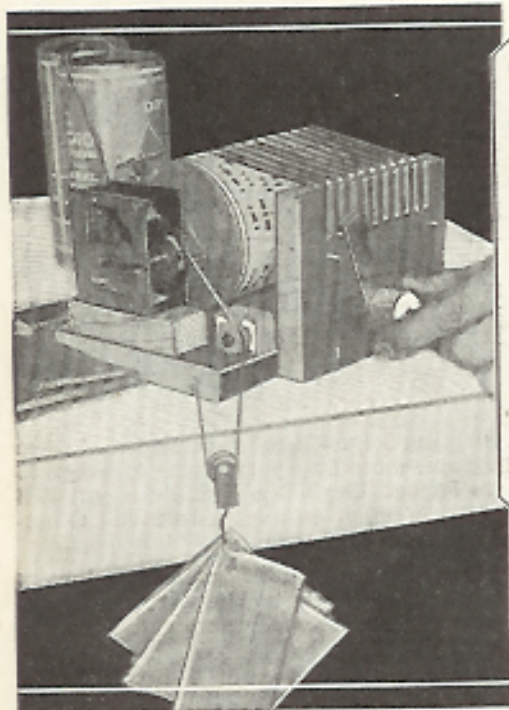


# Alarm Clock Omnigraph



In practice lay parts out on table as illustrated above.

The completed omnigraph, ready for code lessons. Weights suspended on hook turn the drum around which the code sheet is wrapped. The switch arm permits shifting from one set of characters to another in rapid order, preventing anticipation of letters.

A SIMPLE device to use for learning the radio code can be easily made with a tin can, an old alarm clock works and a few pieces of tin and wood. The omnigraph has been so designed that it is reliable in its operation, but requires no special tools or parts for its construction.

The principal features of the instrument can be seen in the accompanying drawings. The clock works rotate a tin can which is connected to the minute hand shaft. A simple universal joint is used to couple the clock and can.

In preparing the clock works for use on the omnigraph the escapement mechanism must be removed and also the main spring. A small wooden spool is then mounted on the main spring shaft. The clock works is operated by a cord wound around this spool and force applied by means of a weight.

The tin can drum is covered with a paper field in place by rubber bands, as illustrated in Fig. 1.

Radio amateurs having difficulty in learning the radio code in preparation to going on the air with a transmitter will find this home-made omnigraph a helpful and patient instructor. It reels off the dots and dashes at any desired speed to develop your proficiency at reception.

The dots and dashes are cut in this paper and a contact spring makes contact through the holes in the paper as the can is rotated, thus completing an electrical circuit and making the radio signals.

#### Operating on the Clock Works

The hair spring and adjacent parts should be removed from the clock works, but the escapement wheel left in place. The wheels will then spin rapidly, depending on the force applied to the main spring shaft. If desired, the alarm spring and wheels and hour hand wheels may be also removed.

The main spring is removed because there is no simple way to regulate the speed if it is used. By substituting a small pulley spool in place of the main spring and driving it with a cord and weight, the speed can be regulated by the weight applied.

This method also gives a longer run per winding than

## How to Become a Radio Amateur

When you've learned the radio code from this omnigraph you're ready to take your government license and get on the air with your transmitter. How to achieve the status of full-fledged amateur and how to build your own long distance transmitter and receiver are told in our long booklet, "How to Become a Radio Amateur," available for 25c from Modern Mechanix Radio Editor, 529 South Seventh Street, Minneapolis, Minnesota.



# Teaches Code to Radio Fans

with the spring. The time is doubled by adding the movable pulley, as shown in the drawing, and doubling the weight. The cord is wound up by turning the winding key in the usual manner. The can should rotate about once in 4 to 8 seconds.

A universal joint between the clock works and the tin can drum is desirable because with the simple mounting used it is difficult to align the shaft and bearing properly. Contact with the tin can drum is made through the end bearing. This is not a perfect way to complete the electrical circuit, but it is entirely satisfactory.

## Rotating Drum From Tin Can

The contact springs make very good contact with the tin can because of the bright tin plated surface. When selecting a can, choose one without dents and with a bright surface. Soak the paper label off. Cut a circular piece of tin and solder into the open end. The tension of the contact

springs should be such that they will move downward about  $\frac{1}{8}$  in. if the drum is removed.

To make a paper with code lessons, first cut an oblong strip of paper the width of the can and about  $\frac{1}{8}$  in. longer than the circumference. (See Fig. 2.) Cross-line or graph paper is best if available. Place the paper on the drum and mark where the contact springs touch it. Cut the holes in the paper with a small chisel or sharp knife.

## How to Mark Dots and Dashes

The holes should be about  $\frac{1}{8}$  in. wide. Make a dot  $\frac{1}{20}$  to  $\frac{1}{16}$  in. long. (Some cross section paper is made with lines  $\frac{1}{20}$  in. apart.) Make a dash 3 times as long as a dot, the space between signals (dots and dashes) equal to 1 dot, the space between letters 4 dots, the space between words 8 dots.

Since most letters indicate some other letter when reversed, the paper can be

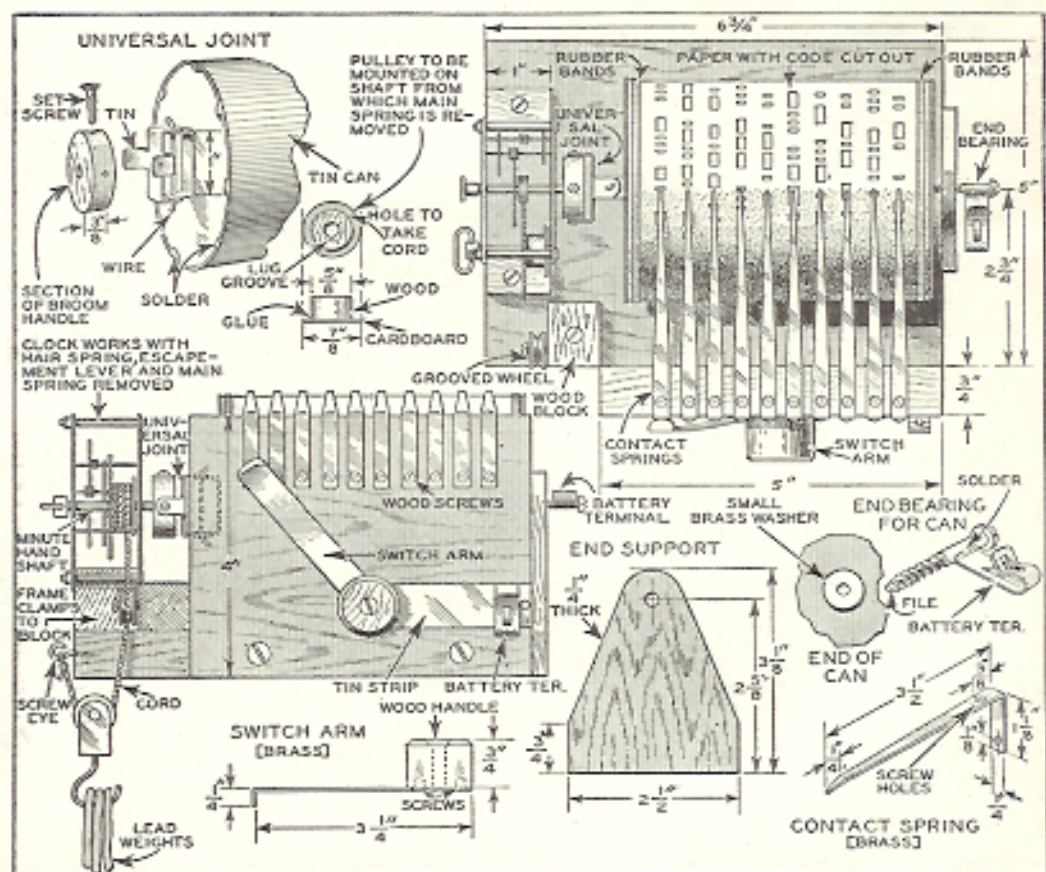


Fig. 1. Details of construction are given here. Universal joint coupling permits best alignment of drum and quick removal. Note how frame of clock clamps to block. Connections to battery are taken off from end bearing and switch arm terminal.



## Dots and Dashes Cut in Graph Paper to Form Characters for Practice

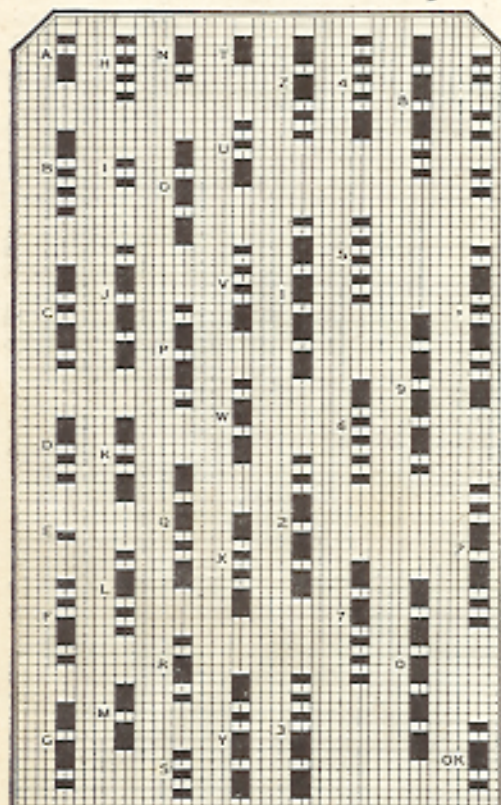
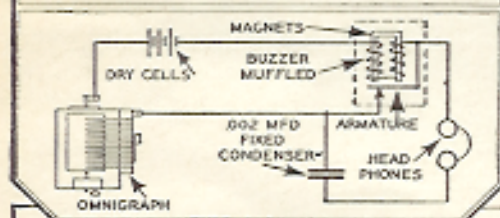


Fig. 2. Here is how dots and dashes of characters are cut out of squared paper.



placed on backwards and a new group of signals obtained.

The circuit, shown in Fig. 3, is as simple as could be desired. Taps are taken off the end bearing and switch arm of the omnigraph, the former leading to the battery and the latter going to the armature contact of the buzzer and the fixed condenser.

### Wiring of Omnigraph Is Easy

Either a loud speaker or a pair of head phones may be used, whichever you have available. In wiring them into the circuit, hook one terminal to the wire which connects the armature to the magnet, and the other terminal to the remaining terminal of the fixed condenser.

Sparking on the springs which make contact with the rotating drum can be prevented by hooking small fixed condensers (about .1 mfd.) across the bearing contact and switch arm lead.

As mentioned before, the speed of the sending depends upon the weight of the lead pieces suspended on the hook. For beginners, about four pounds is required on the hook for transmission at a fairly slow speed.

When practicing, allow the dial to turn around and around till you have learned the letters in that row thoroughly, then switch to the next row. If after long practice you get to know the letters well, shift the switch arm without looking where it is placed and try to take the signals down without a break.

### Practice for Advanced Students

When you have learned to identify the characters with a moderate degree of speed, try making a few new code sheets, with the letters well mixed, rather than in alphabetical order. With such a scheme you cannot anticipate the letters, and so practice will be much more beneficial.

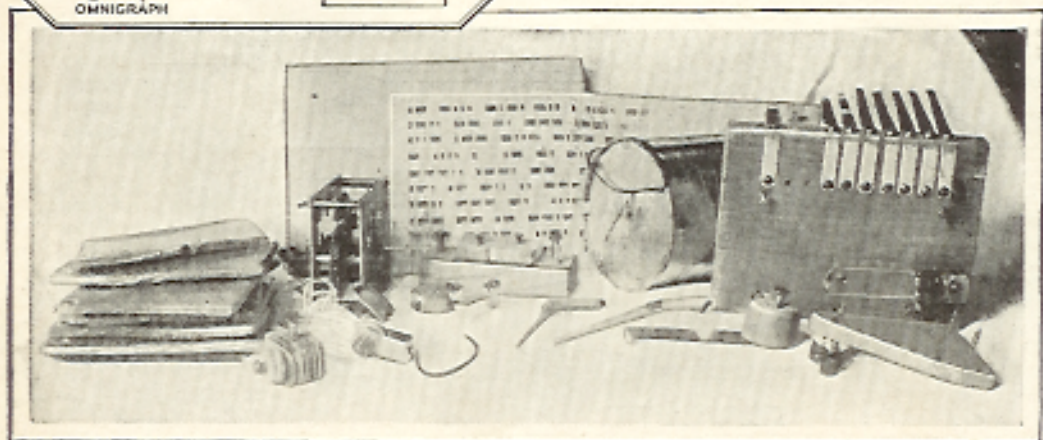


Fig. 3. Wire up omnigraph and accessory parts according to the circuit at top left. Note that one side of phones taps onto wire of buzzer that connects armature with the magnets. All necessary parts required are seen in bottom photo.