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## Making Electric Telephone at Home

**W**HAT would we do without the telephone? Think of all the time and trouble this wonderful invention saves us every day. In the office and the home, for business and pleasure, the telephone is surely a useful and necessary instrument.

But in spite of all its wonders a simple telephone is an easy thing for a boy to construct. I'll tell you how you can make one for less than 50 cents and with very few tools.

Get a small cigar box, such as are used to hold 12 cigars. A box about four

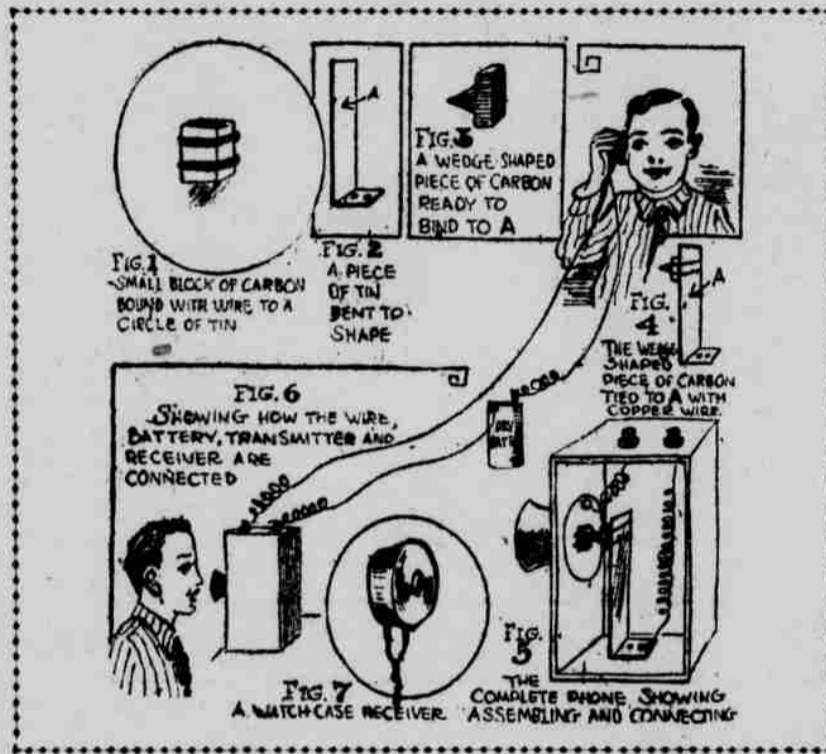
set that will give you much fun and instruction. Any boy can make the outfit in an hour. Try it!

### A Cigar Box Camera.

Pictures can readily be taken by anyone with a cigar box and without a lens of any kind.

Select a deep, well-made box, as nearly cubical in shape as possible. In one end drill a tiny hole, one-thirty-second of an inch in diameter.

Inside the box, on the end opposite the hole, carefully pin, by each corner, a sheet of "gas light" photo paper, which can be secured at any photo supply store



inches square and one inch deep is just right. Cut a round hole in the center of the bottom about two inches in diameter. Now get a piece of very thin tin and cut it into a circle two and one-half inches around. A small piece of carbon about one-eighth inch thick and one-half inch square should be fastened firmly to the center of this circle of tin, as shown in figure 1. The best way to do this is to cut notches in the sides of the carbon. With a nail drive four holes in the center of the tin circle and tie the carbon piece to the tin by drawing bare copper wire through these holes. The carbon must be very firmly fastened so that it cannot move.

Next nail the tin circle just over the round hole in the cigar box with the carbon on the inside. Use very small brads for this purpose. Now bend a strip of tin one-half inch wide and three inches long, as shown in figure 2.

With a knife cut a tiny wedge-shaped piece of carbon with a sharp point, as shown in figure 3. Bind this piece with copper wire to the end of tin strip. Figure 4 will show you how this is done. Nail the bottom of the tin strip to one of the sides of the cigar box so that the point of carbon presses very lightly against the carbon plate on the tin circle. See figure 5.

Two holes should now be drilled in the top side of the cigar box. In each of these holes should be fastened a brass binding post to connect our telephone wires. (A binding post is simply a nut or bolt of some kind to conveniently fasten the wires.) Solder a copper wire to the circle of tin and fasten the other end to one binding post. Solder another wire to the strip of tin and connect this to the other post. Our "transmitter" is now complete.

It is cheaper to buy a telephone "receiver" than it is to make one. Most electrical stores or experimenter's shops have inexpensive ones for 45 cents. Figure 6 shows one. Purchase one of these and your telephone is complete. Figure 7 shows how it is connected with a battery and line wire for talking. This telephone should work several hundred feet on one dry cell or door-bell battery. The pointed carbon must bear very lightly against the tiny carbon plate. When some one talks into the plate anyone at the other end can hear what he is saying very plainly.

The receiver will cost 45 cents and the transmitter will cost little or nothing. The carbon may be cut from an old arc light carbon or from the carbon stick removed from an old dry cell. The tin used must be extremely thin.

A tin telephone "diaphragm," already cut in a circle, may be purchased for 5 or 10 cents. This is the best tin to use for the circle. Very thin brass, if you have some, not over .01 of an inch thick, will do instead of tin. Be careful not to bend the circle in any way when working with it. If all these directions are carefully followed you will have a dandy

for 12c a dozen. Read the directions for handling, which accompanies each package, before attempting to use the paper.

When the paper is in place, close the box tightly so that no light can enter, excepting through the "lens" hole.

Place the "camera" facing a house or tree or other object and allow it to stand for two or three hours, thus "exposing" the paper.

Now "develop" and "fix" the paper. The picture will appear inverted, that is the light parts will be dark and the dark parts light.

When the "negative" has dried pin it over another sheet of photo paper and expose to daylight for five minutes. Develop and fix as before and you will have a fair picture of your object.

Directions given with each package of paper will explain how to develop. A tube of developer costing 5 cents and a pound of "hypo" costing 3 cents, is all that is needed in the way of chemicals. Use old dishes in which to do the developing.

### Odd Inventions of the War.

In one of the trenches, close to the French lines, the Germans have fitted two trap doors which can be opened or closed by means of a mechanical device from a place of safety when an attack at night is feared. The outer door consists of barbed wire netting, which they call a Spanish rider, and the inner door a few yards further back, is composed of three layers of armored steel plates with loop holes. If the attacking soldiers get between these two trap doors they are cornered; escape is impossible.

In one of the Vosges valleys the Germans have constructed a cable railway 500 yards long, capable of conveying supplies for several thousand men. The railway leads from the bottom of a mountain to the top, about 400 yards above the valley. A car takes 10 to 15 minutes from the bottom to the top and vice versa. Even the wounded men are transported on this ingenious line.

### Free Poland-China History.

The Standard Poland-China Record Association has just issued a 32-page booklet entitled "A Pedigree Manual" and a "Short Story of the Early History of Poland-Chinas." Numerous requests have been received from breeders, students and instructors in agricultural colleges, farm demonstrators and instructors in public schools, for a condensed history of the Poland-China breed. This booklet has been prepared to meet these requests.

The Poland-Chinas are strictly an American breed and this booklet deals with not only their origin and early history, but what Poland-Chinas are doing today. Instruction for the writing of pedigrees giving in detail how to write a pedigree, is one of the main features of this booklet.

Copies of this booklet will be sent free upon application to the Standard Poland-China Record Association, Ray Davis, Secretary, Maryville, Missouri.

## ORAL HYGIENE

Modern dentistry is ever progressing. Methods of other days, the best then known, are being replaced with better and more effective practice, and foremost in value is oral hygiene. Many dentists of today are specializing their efforts to this practice only.

It has been demonstrated that children with defective teeth have increased their capacity for learning fully 50 per cent after having their teeth and mouth put in the proper condition and what is true of children is also true of adults. We readily admit the annoyance, distress and inefficiency caused by a simple toothache, but hardly less injurious to our nervous system and general vitality is the detrimental influence of decay of the teeth and infection of the gums. Recent discovery shows the mouth to be an incubator of disease germs and one is fortunate indeed who can continuously resist the germ activity which finds extraordinary opportunity for development in the unclean mouths. Bad breath, diseased mucous membrane and improper mastication necessarily result and, while prevention is better than cure, the up-to-date dentist is conferring a blessing on humanity by the application of the principles laid down in recent discoveries. Not only should the dentist thoroughly prepare himself to do this, but further, he should give his advanced knowledge to the patient. No disease or decay of tooth structure can develop on a clean tooth and yet so simple and important a process as cleansing the teeth and mouth is not properly practiced except by a very few people. Here is a great field of service to humanity, to put the teeth in such condition that they may easily be kept clean and prevent disease (prophylaxis), the treatment of inflamed gums and the curing of pus formation (pyorrhea), all of which will tax the skill of the most progressive dentist and still leave a great demand for inlays, porcelain fillings, bridge work and crowns.

Your dental needs should have first attention, since health, appearance and efficiency are involved, and I shall be glad to have you consult me either by mail or at my office and will give you any information possible.

**J. E. Stevenson, D.D.S.**  
Portland, Or.

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