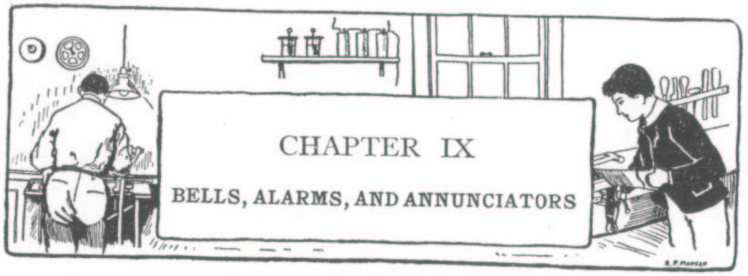

CHAPTER IX

BELLS, ALARMS, AND ANNUNCIATORS

An electric bell may be bought almost anywhere for twenty-five cents, and from the standpoint of *economy* it does not pay to build one.

A bell is not a hard thing to construct, and the time and money spent will be amply repaid by the more intimate knowledge of this useful piece of apparatus which will be gained by constructing it.

The base is four inches wide and five and one-half inches long.

The magnets consist of two machine bolts, wound with No. 22 cotton-covered magnet wire. Fiber ends are fitted on the bolts to hold the wire in place.

The wire is wound on each of the magnets separately. Cover the cores with two or three layers of paper before winding on the wire. The ends of the wire are led through holes in the core ends. The ends of the bolts are passed through the yoke, and the nuts applied to hold them in place.

The magnets are clamped down to the bell-base by means of a hard-wood strip having a screw passed through it between the magnets into the base.

The armature of the bell is shown in Figure 120. It is made of a piece of iron having a steel spring riveted to

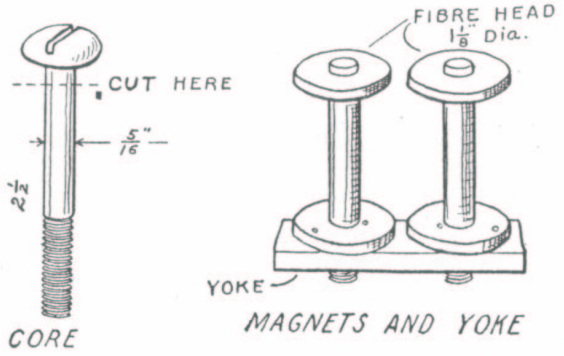

FIG. 119. — Details of the Magnet Spools, and Yoke for an Electric Bell.

it, as illustrated. The armature is fastened to a small block mounted on the lower left-hand corner of the base.

A second block with a contact-point made from an ordinary brass screw by filing the end into the shape shown

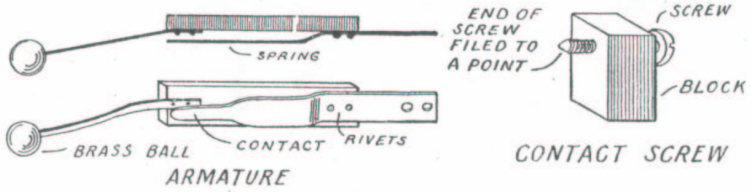

FIG. 120. — Details of the Armature, and Contact Screw.

in the illustration, is mounted on the base so that it is opposite the end of the contact-spring fastened to the armature.

The gong may be secured from an old bell or alarm

clock. It is mounted on the upper part of the base in such a position that the hammer will strike it on its lower edge.

The instrument is connected as shown in Figure 121. One terminal of the magnets is connected to the contact-

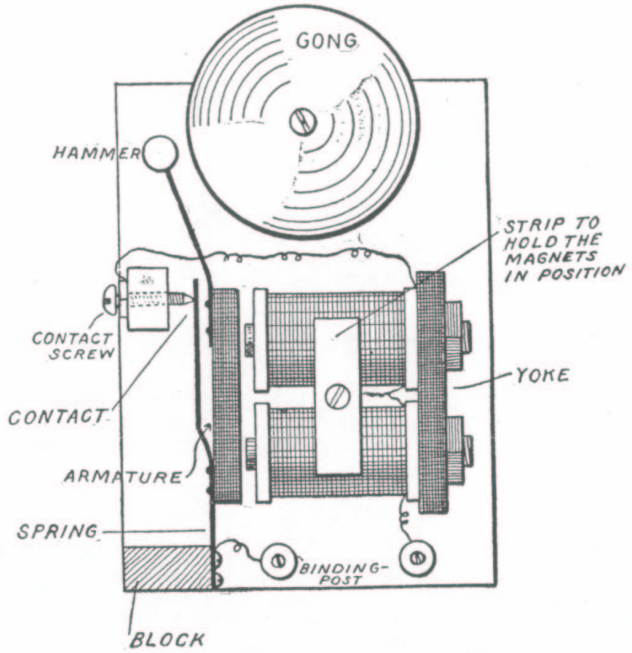

FIG. 121. — The Completed Bell.

screw. The other end is connected to the binding-post. A second binding-post is connected to the armature.

The armature spring should be bent so that the armature is pushed over against the contact.

If a battery is connected to the bell, the electromagnets

will pull the armature and cause the hammer to strike the gong. As soon as the armature has moved a short distance, the spring will move away from the contact and break the circuit. The magnets cease pulling as soon as the current is cut off and the armature spring then causes the armature to move back and touch the contact. As soon as the con-

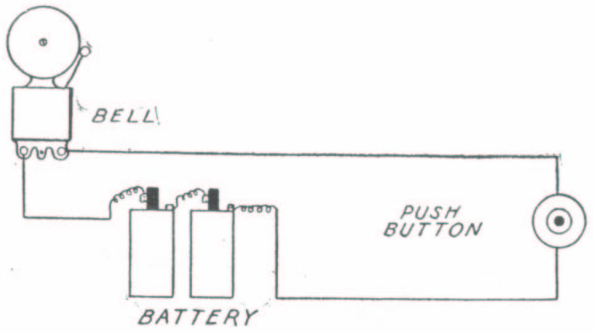

FIG. 122. — Diagram showing how to connect a Bell, Battery, and Push-Button.

tact is made, the armature is drawn in again and the process is repeated.

A little experimenting with the bell will soon enable one to find its best adjustment. Figure 122 shows how to connect a bell to a battery and a push-button. A push-button is simply a small switch which closes the circuit when pressed. Do not make the armature spring too weak, or the hammer will move very slowly and with very little life. Each time that the armature moves toward the magnets, it should barely touch the iron cores before the ball strikes the bell.

After you get the bell in good working order, it is well to make a small box to serve as a cover for the working parts of the instrument, leaving only the gong exposed.

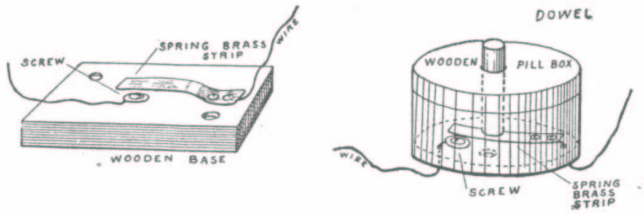

FIG. 123. — Two Simple Push-Buttons.

Figure 123 shows two simple methods of making push-buttons.

It is sometimes desirable to arrange two bells and two push-buttons, so that a return signal can be sent. In that

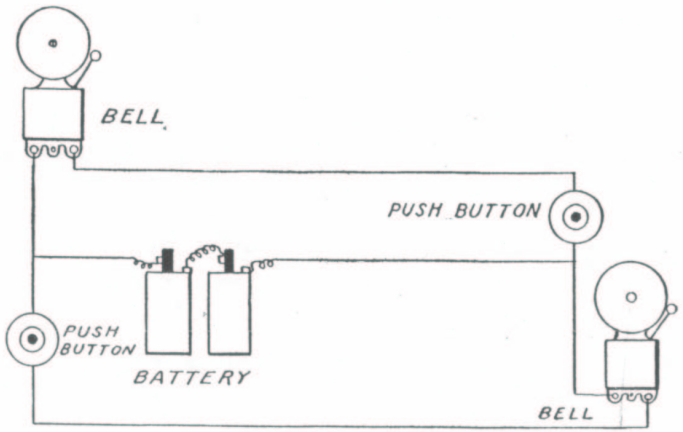

FIG. 124. — Diagram showing how to arrange a Bell System of Return Signals.

case the circuit shown in Figure 124 may be employed. It is then possible for the person answering the bell to indicate that he has heard the call by pushing the second button. For instance, one push-button and bell might be located on the top floor of a house and the other bell and button in the basement. A person in the basement wishing to call another on the top floor would push the button. The person answering could return the signal by pushing the button on the top floor and cause the bell in the basement to ring.

A Burglar Alarm

A simple method of making an efficient burglar alarm is shown in Figure 125. The base is a piece of wood about

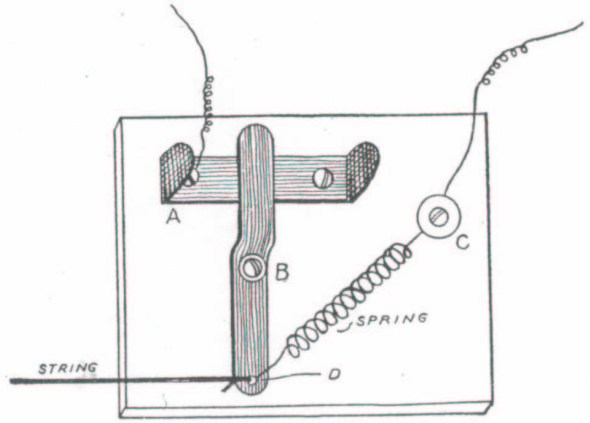

FIG. 125. — Burglar-Alarm Trap.

five by six inches, and half an inch thick. A small brass strip, *A*, is fastened to the base by means of two round-

headed wood screws and the ends turned up at right angles. The lever, *B*, is also a strip of brass. One end is bent out, so as to clear the strip and the screws that are under it. The lever is pivoted in the middle with a screw and a washer. A small hole, *D*, is bored in the lower end through which a spring and a string are passed. The other end of the spring is fastened under a screw and washer, *C*.

In order to set the alarm, first fasten the base in any convenient place. Carry the string across the room and fasten it. Adjust the string so that the lever is half-way between the two ends of the strip, *A*.

If the string is disturbed, it will pull the lever over against the strip, *A*. If the string is cut, the spring will pull the lever over to the opposite side. In either case, if the alarm is properly connected to a bell and battery, the circuit will be closed if the string is disturbed, and the bell will ring.

One wire leading from the bell and the battery should be connected to *A*, and the other to the screw and washer, *C*.

The alarm may be arranged across a window or doorway and a black thread substituted for the string. Any one entering in the dark and unaware of the existence of the alarm is liable to break the thread and ring the bell.

An Electric Alarm

It is often desirable to arrange an electrical alarm clock so that a bell will ring continuously until shut off.

Figure 126 shows an electrical alarm attachment. It consists of a wooden box, large enough to receive an ordinary dry cell. A bell is fastened on the outside of the box. Connect one terminal of the battery to one terminal of the bell. Connect the other bell and battery terminals, each to a short piece of brass chain, about four inches long. The ends of the chain are then fastened to a small piece of sheet fiber or hard rubber, so that they are insulated from each other. The opposite end of the fiber is fastened to a piece of wire spring having a garter or suspender clip soldered to the end.

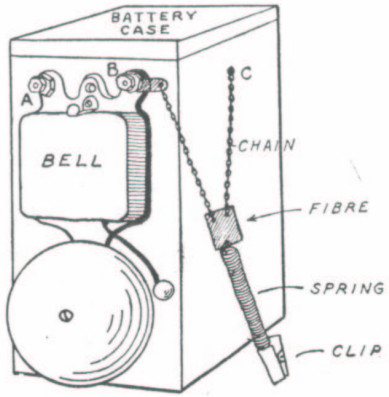

FIG. 126. — An Early-Riser's Electric Alarm Attachment for a Clock.

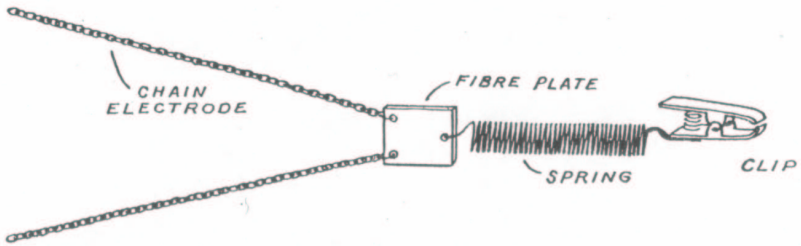

FIG. 127. — Details of the Chain Electrodes, etc.

The operation of this electrical attachment is very simple. Wind up the alarm key of an ordinary alarm clock and

place the clip on the key. Place the clock in such a position that the two chains do not touch each other. Set the clock. When the mechanical alarm goes off, the key will revolve and twist the two chains, thus closing the electric circuit and causing the bell to ring. The bell will ring until the clamp is removed. The outfit can be attached to any ordinary alarm clock.

An Annunciator

Annunciators are often placed in bell and burglar alarm-circuits to indicate where the button ringing the bell was pushed, in case there are several.

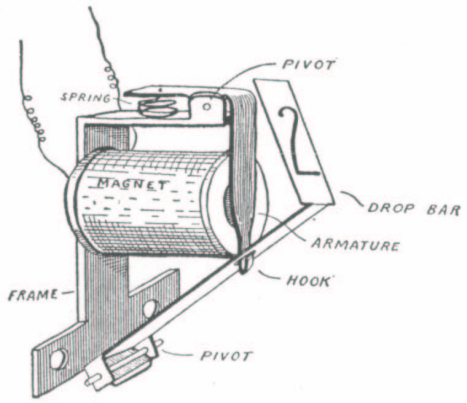

FIG. 128. — An Annunciator Drop.

The separate indicators used on an annunciator are called *drops*.

A drop may be made from an electromagnet and some brass strips, etc.

The frame is cut from heavy sheet-brass and shaped as shown in Figures 128 and 129.

The drop bar is a strip of metal which is pivoted on the frame at its lower end and has the upper end turned up to receive a numeral or letter.

The armature is made from a strip of sheet-iron. It is pivoted on the frame at its upper end. The strip is bent at right angles so as to fall in front of the magnet. The lower part of the armature is bent into a hook. The hook fits into a slot cut in the drop bar. A fine wire spring is placed between the frame and the upper end of the armature so as to pull the armature away from the core when the current is not passing through the magnet.

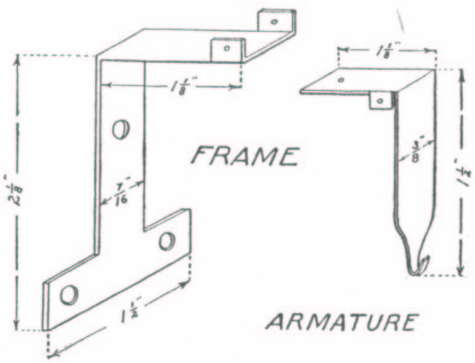

FIG 129. — Details of the Drop-Frame and Armature.

The electromagnet should be wound with No. 25 B. & S. cotton-covered magnet wire.

When a current is sent through the magnet, it will draw the armature in. This action releases the hook from the edge of the slot in the drop bar and permits the bar to drop and bring the number or letter down into view.

A number of " drops " may be arranged on a board and placed in different circuits so as to indicate which circuit is closed at any time. It is a good plan to arrange a bar to act as a stop, so that the numeral will not drop down too far. Each time that any one of the drops falls, it must be reset by pushing the bar back into position.