Nov. 12, 1940. F. A. SWANSON 2,220,979

SIGNAL DEVICE

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Fig. 1

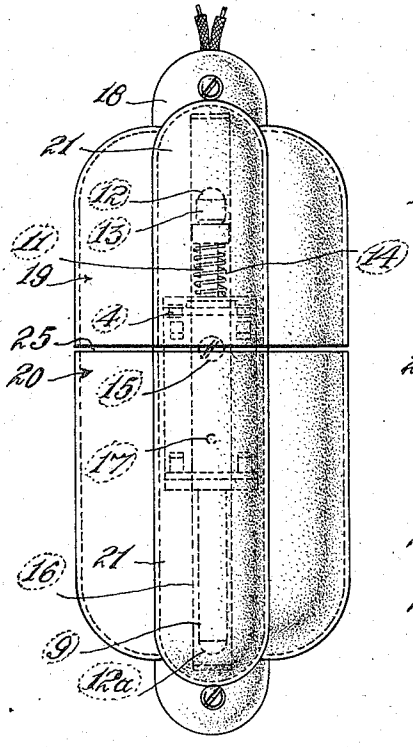


Fig. 2

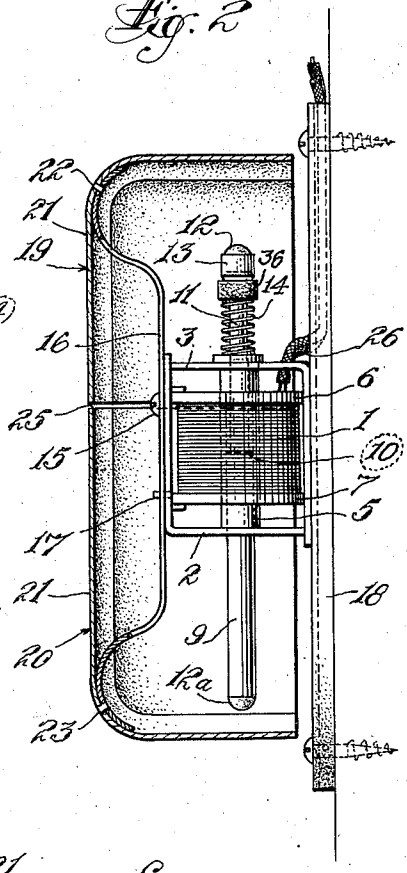


Fig. 3

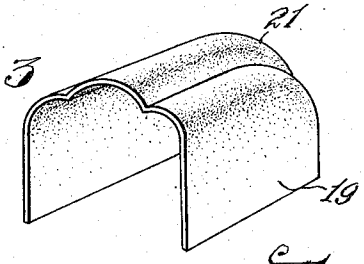


Fig. 5

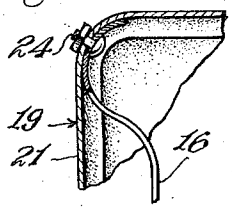
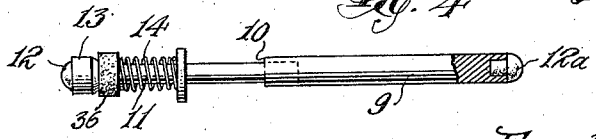


Fig. 4



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Fig. 6

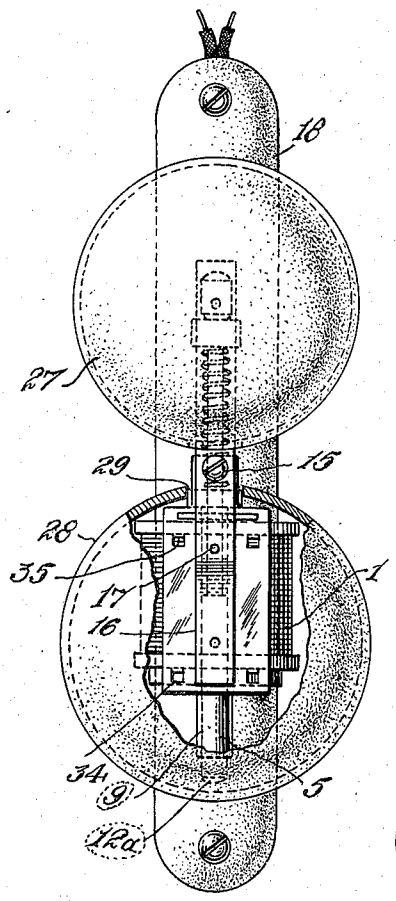
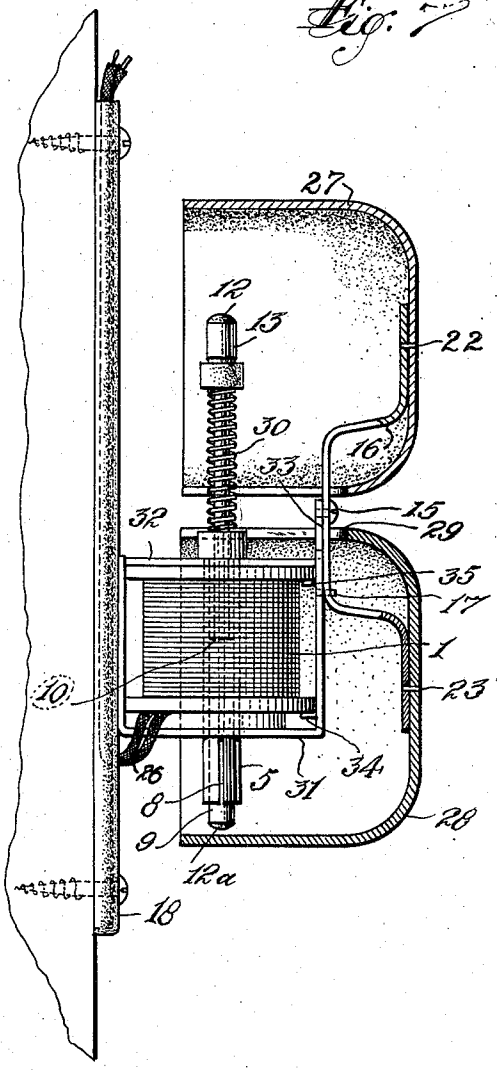


Fig. 7



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SIGNAL DEVICE

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9 Claims. (Cl. 177—7)

This invention relates to a new design of a signal device which may be used in various places where a device of the character to be hereinafter described has a field of usefulness.

One of the objects of my invention is to provide a signal device of a unique and attractive design which will have a pleasing tone or sound.

Another object of my invention is to provide a signal device which is not only pleasing in quality of sound but is attractive in general appearance.

Another object of my invention is to provide a signal device of a different character from that ordinarily used for doorbells and yet one which will be relatively cheap to manufacture.

These and other objects will be discernible from a reading of the specification taken in connection with the annexed drawings wherein:

Figure 1 is an elevational view of one form of my invention.

Figure 2 is a part side elevational and part sectional view of the device shown in Figure 1.

Figure 3 is a perspective view of one of the resonators shown in Figures 1 and 2.

Figure 4 is a view of the plunger unit shown in Figures 1 and 2.

Figure 5 is a fragmentary sectional view showing a modified form of mounting the resonators on their support.

Figure 6 is an elevational view of a modified form of construction, one of the resonators being broken away to show the parts housed within the same.

Figure 7 is a side elevation of Figure 6, the resonators being shown in section.

In the different views in which like numbers refer to corresponding parts, 1 is an electromagnet having a frame of magnetic material made up of two members 2 and 3 which are preferably made identical, the parts being held together by projections 4 which pass through openings in the cooperative ends of either of the pieces 2 and 3 after which the projections 4 are upset or swaged, interlocking the two members 2 and 3 together. The electromagnet 1 has a tubular member 5 carrying the heads 6 and 7 of the electromagnet. Where the member 5 is of non-magnetic material such as brass, it is preferably slitted throughout its length as indicated at 8 in Figure 7.

Within the cylindrical member 5 is positioned a plunger unit composed of a core 9 of magnetic material the upper end of which normally terminates at the point 10 and from there on the end 11 of the plunger is of non-magnetic material, preferably brass. The end 11 carries a striker 12 supported in a cup-shaped portion 13 forming an integral part or attached to the portion 11. The lower end of the plunger has a striker 12a carried thereon in any satisfactory manner. The striker, while it may be of metal, is preferably of a different material, such as wood or leather, which produces a softer sound when it hits the resonator as will be hereinafter described.

The plunger unit portion 11 carries a spring 14 which is of a length and character such as will normally position the magnetic portion of the plunger 9 so that its end 10 terminates at some point within the electromagnet as illustrated by the heavy line 10. A buffer 36 of some material such as felt, is preferably used between the ends of the spring 14 and the cup 13. Attached to the frame as by a screw 15 is a support member 16, the same being provided with an orifice to receive a dowel lug 17 thrown up from the frame member 2, which lug if thrown up on the member 3, engages a hole in a mounting member 18.

As shown in Figure 2 the support member extends generally longitudinally of the axis of the electromagnet and the ends thereof are formed to receive resonators 19 and 20 which are formed as by punching and drawing suitable material to the desired shape. As indicated in Figures 1 and 3, the resonator has an arcuately formed rib-like portion 21. This formation is made to match the form of the support member 18 so that when the resonators 19 and 20 are mounted in position, it will give a smooth streamlined effect.

As indicated in Figure 2 the ends of the support member 16 are made to conform to the curvature of the ends of the resonators. The method of attaching to the support may be made by spot-welding at 22 and 23. However, a screw and nut may be used as indicated at 24 in Figure 5.

As shown in Figures 1 and 2, the screw 15 for holding the support 16 to the frame of the electromagnet is positioned at the junction space 25 between the two resonators so that if it is desired to remove the resonators with their support from the frame, this can be done by bending the resonators 19 and 20 away from each other so as to open and widen the space 25 so that access may be had to the screw 25, but as shown in Figure 1 the two resonators 19 and 20 form substantially a closed housing for the electromagnet and other associated parts. Connection

is made to the electromagnet through conductors which are indicated by the number 26, which conductors are carried out through the mounting member 18.

In operation of the structure so far described, when the push button is operated, a circuit is closed in the usual manner through the electromagnet 1 and this quickly draws the plunger 9 upwardly, causing the striker end 12 to hit the resonator 19, causing it to give a tone. If the operator's finger is quickly removed from the button, the rebound from the resonator 19, together with the weight of the plunger unit, causes the plunger unit to move downwardly so that the striker end 12a will hit the resonator 20. However, if the operator's finger is held on the button, the plunger unit will be held in its upper position until the button is released, when the weight of the plunger unit will cause the striker end 12a to hit the resonator 20.

As shown in Figures 1 and 2 the resonators 19 and 20 are of different lengths, and consequently they will produce a different tonal effect. This difference in effect might be produced if the resonators 19 and 20 were identical in form, but one thicker than the other, or of different material. As indicated, they have a shape generally like the quarter of a closed cylindrical shell.

In Figures 6 and 7 the resonators 27 and 28 are shaped like the end of a cylinder, they being slotted as indicated at 29 to pass over the support member 16.

As indicated in Figures 6 and 7, the resonator 28 is slightly larger in diameter than the resonator 27 and it may also be thicker as indicated in Figure 7, thereby giving a different tone from the resonator 27. In this form of the device, the plunger unit is shown as equipped with a spring 30 which is somewhat longer than the spring 14 shown in Figure 4, and the tubular member 5 extends beyond the frame of the electromagnet. In this form the frame is made somewhat differently than the form shown in Figure 2, in that it has one long member 31 and a short frame member 32, the member 31 having an extension at 33 to which the support member 16 is attached.

It will also be noted that one side of the frame member 31 has positioning lugs 34 and 35 thrown out into cooperative relation with the spool heads of the electromagnet 1 to locate the same.

The support member 16 has considerable resilience so that when the resonators are struck by the plunger unit as described, the entire resonator will have a vibratory motion as a whole, as well as the vibrations set up by the blow as in a rigidly anchored bell or resonator. This secondary action or bodily movement of the resonators has been found to add effectiveness to the operation of the signal which is louder and of a more pleasing tone.

While I have shown the support member 16 as being attached to the frame of the magnet, the resonators may be supported directly from the mounting member 18, but I prefer the arrangement as shown. The structure herein shown and described has no electrical make and break contacts and no adjustments are required after the device has once been properly assembled, which acts to prolong the life of the device.

From what has been said it will be clear that certain changes may be made in the details of construction of the signal without departing from the spirit of my invention and the scope of the appended claims, for example, one resonator may be used instead of two with the one end so constructed as to give a different tonal effect from the other end when these ends are hit by the plunger unit.

Also, while mention has been made of differences in diameter and thickness when two resonators are used, the material of one, or its shape, may be different from the other to give a different tonal effect.

What I claim is:

1. A signal device of the class described including a mounting member, an electromagnet having a frame fastened to said mounting member, a resilient support attached to the magnet frame and extending at both ends generally longitudinally of the axis of the magnet, shell type resonating members attached, one to each end of said support, a plunger unit at least a portion of which is of magnetic material forming the core of said electromagnet, a spring serving to normally hold the said unit in a position to be moved by the electromagnet to cause one end of the unit to strike one of said resonating members, the weight of the unit and its rebound from striking the first resonating member causing the opposite end of the unit to strike the second resonating member, the spring then acting to return the unit to normal position.

2. A signal device of the class described including a mounting member, an electromagnet having a frame fastened to said mounting member, a support attached to the magnet frame and extending at both ends generally longitudinally of the frame, at least the ends of the support being resilient for the purposes described, shell type resonating member attached, one to each end of said support, a plunger unit forming the core of said electromagnet, a spring carried by the plunger unit and serving to normally hold the said unit in a position to be moved by the electromagnet to cause one end of the unit to strike one of said resonating members, the weight of the unit and its rebound from striking the first resonating member causing the opposite end of the unit to strike the second resonating member, the spring then acting to return the unit to normal position.

3. A signal device as set forth in claim 1 further defined in that the resonating members are generally shaped similar to the quarter of a closed cylindrical shell with one end open and one end closed, the closed end having a curvature to meet the side of the cylinder, said members being supported on a central line at the end curvature, and further defined in that one resonating member is longer than the other, the two having the same shape and forming in effect a continuous cover over the electromagnet, plunger unit and support.

4. A signal device as set forth in claim 2 further defined in that the resonating members are positioned over and form in effect a continuous surface over the electromagnet, plunger unit and support.

5. A signal device of the class described including a mounting member, an electromagnet having a frame fastened to said mounting member, a resilient resonator support, shell type resonating members attached, to said support at their neutral vibrating points, so said resonating members will oscillate about said points of support as well as having vibrations per se when struck, a plunger unit forming the core of said electromagnet, a spring carried by the plunger unit and serving to normally hold the said unit

in a position to be moved by the electromagnet to cause one end of the unit to strike one of said resonating members, the weight of the unit and its rebound from striking the first resonating member causing the opposite end of the unit to strike the second resonating member, the spring then acting to return the unit to normal position.

6. A signal device as set forth in claim 8 further defined in that means are provided for fastening said support to the magnet frame and the two resonating members are positioned over the support so that at least one of them forms a substantial housing for the magnet and plunger unit, the support carrying the resonating members having sufficient resilience to allow the said members to be bent away from each other sufficiently to get at said support fastening means.

7. A signal structure of the class described including a mounting member, an electromagnet having a field frame with means for fastening the magnet and frame to said mounting member, a resilient support carried by the structure, shell type resonating means resiliently attached to said support, a plunger unit only the lower portion of which is of magnetic material and positioned in the axis of said electromagnet the magnetic material stopping at a point approximately midway of the length of the magnet, so when the magnet is energized one end of the plunger unit will move to strike the resonator means at one end, the weight of the plunger acting to cause the opposite end of the plunger unit to strike the resonator means at its opposite end, and a spring acting to return the plunger unit to normal position after the second end of the resonator is struck.

8. A signal structure of the class described including a mounting member, an electromagnet having a field frame with means for fastening the magnet and frame to said mounting member, shell type resonating means forming part of said structure and covering the magnet with means for resiliently mounting the resonating means at opposite ends of said frame, a plunger unit, at least a portion of which is of magnetic material, positioned in the axis of said electromagnet and normally extending only part of the length of the magnet, so when the magnet is energized the plunger unit will move to strike the resonator means, and means acting to normally hold the plunger unit in a position to be acted on by the electromagnet to initiate said blow.

9. A signal structure including an elongated mounting member, an electro-magnet supported longitudinally of the mounting member, shell-type resonators resiliently supported, one each on the structure at its opposite ends with their openings adjacent the base, and substantially covering the electro-magnet, and a plunger unit comprising a core at least a part of which is of magnetic material initially actuated by the electro-magnet for striking the resonators.

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