

Jan. 5, 1943.

G. L. BOSSARD

2,307,104

SIGNALING DEVICE

Original Filed June 27, 1935

2 Sheets-Sheet 1

Fig. 2.

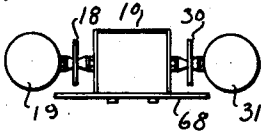


Fig. 1.

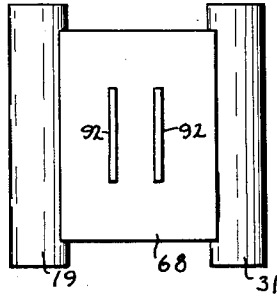


Fig. 3

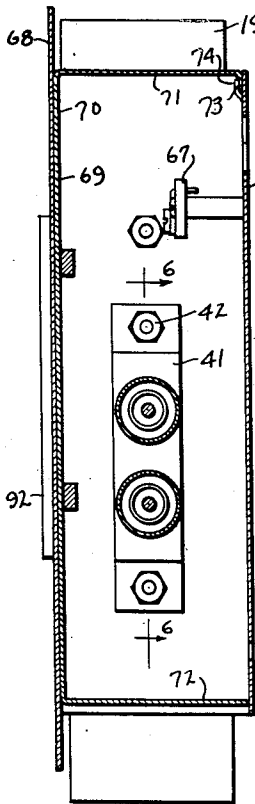
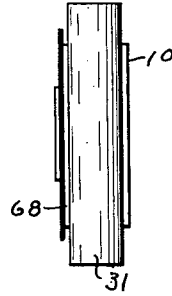


Fig. 5

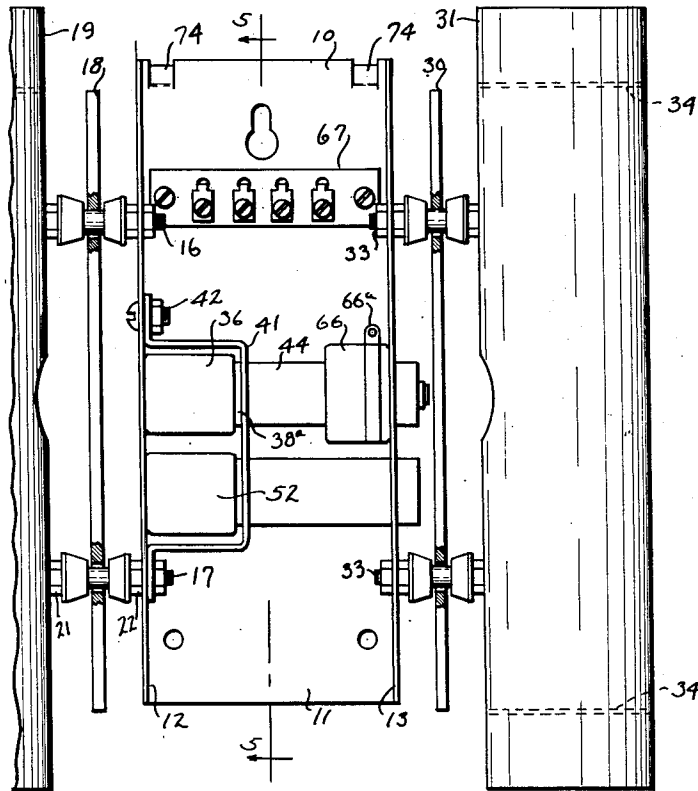


Fig. 4

Inventor
Gisbert L. Bossard

By

Marichel & Noe
Attorneys

Jan. 5, 1943.

G. L. BOSSARD

2,307,104

SIGNALING DEVICE

Original Filed June 27, 1935

2 Sheets-Sheet 2

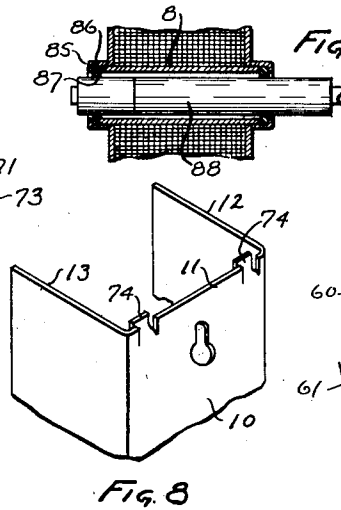
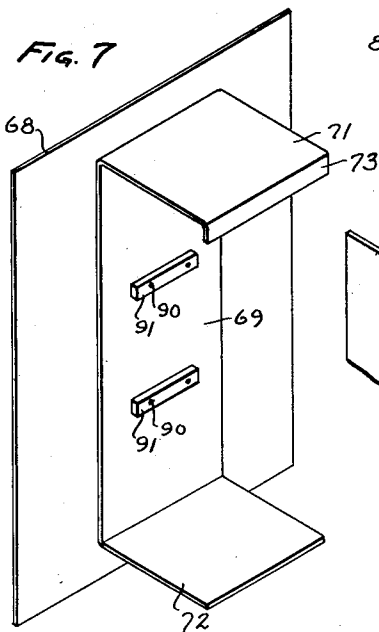
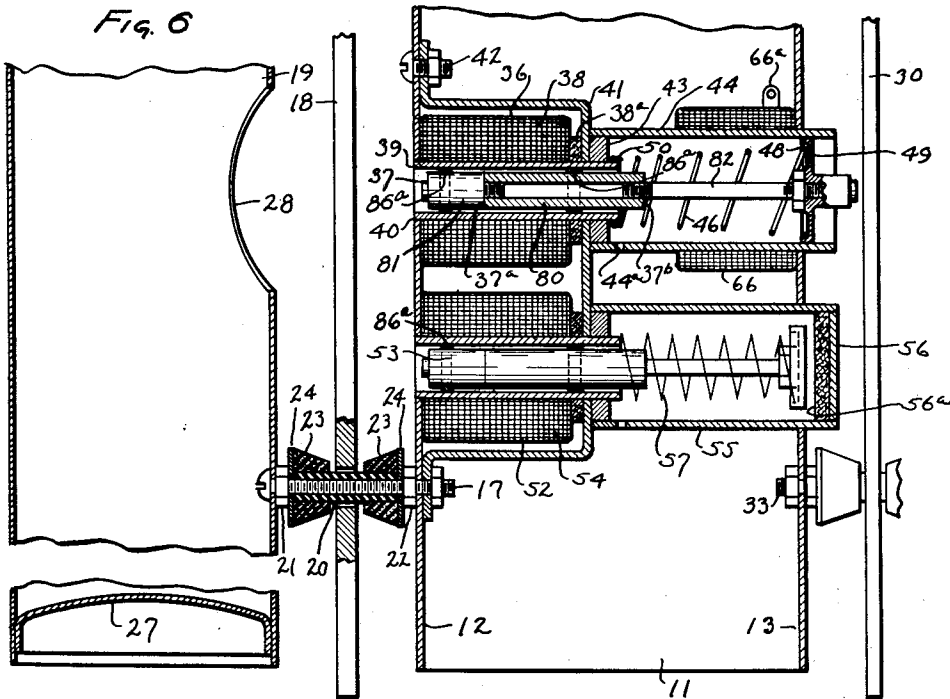
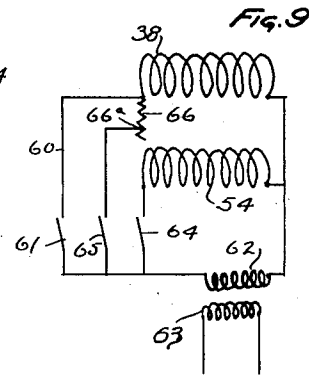


Fig. 10



Inventor
Gibert & Bossard

By

Murphy & Noe

Attorney

UNITED STATES PATENT OFFICE

2,307,104

SIGNALING DEVICE

Gilbert L. Bossard, Los Angeles, Calif., assignor
to Mary W. Agnew, Hopkinsville, Ky.

Substituted for abandoned application Serial No.
28,696, June 27, 1935. This application March
5, 1942, Serial No. 433,504

2 Claims. (Cl. 177-7)

This invention relates to signal devices such as chimes or the like adapted to produce a predetermined sound or a sequence of sounds.

This application is a substitute for the one filed June 27, 1935; Serial No. 28,696; allowed May 23, 1940; forfeited November 23, 1940.

One object of the invention is the provision of a signal device adapted to give a predetermined sound or sequence of sounds, as desired, and of simple construction and adapted for operation over long periods of time without requiring attention or care.

Another object of the invention is the provision of a signal device of the character mentioned, embodying chime bars of different pitch, and a resonating tube for each chime bar and in tune therewith, the resonating tubes having generally the same external dimensions so as to present a symmetrical appearance.

Another object of the invention is the provision of a signal device having a plurality of sounding members operated by solenoid means which are provided between the sounding members, the construction providing a device which can be mounted on a wall and extend away from the wall only a comparatively small distance.

Another object of the invention is the provision of a signal device having sounding members operated by a plurality of solenoids, one of the solenoids having a plunger which strikes one sounding member and which subsequently strikes the other sounding member under the action of a spring, an auxiliary means being provided for striking only one of the sounding members so that the signal produced by closing different switches will be audibly different.

Another object of the invention is the provision of a solenoid having plunger guiding means of such character as to give unusual quietness of the solenoid when the solenoid coil is energized, and which is such as to reduce the friction of the plunger in its striking movement.

Other objects and advantages of the invention will be apparent from the following description, the attendant claims and the accompanying drawings, in which:

Fig. 1 is a front elevation of a signal device embodying the present invention;

Fig. 2 is a top plan view of the signal device;

Fig. 3 is a side elevation of the signal device;

Fig. 4 is a front elevation of the device on an enlarged scale, showing the cover removed and a part of one of the resonating tubes omitted;

Fig. 5 is a section on the line 5-5 of Fig. 4, showing the cover in place;

Fig. 6 is a sectional view taken on the line 6-6 of Fig. 5;

Fig. 7 is a perspective view of the cover;

Fig. 8 is a detailed perspective view showing the top of the supporting frame;

Fig. 9 is a diagrammatic showing of the electrical connections; and

Fig. 10 is a sectional view of a modified form of solenoid construction.

Referring more particularly to the drawings by reference numerals, 10 generally designates the supporting frame of the signal unit. This frame preferably comprises a sheet metal plate of substantially U-shape in cross section and including the back plate portion 11 and opposed side plate portions 12 and 13, these portions extending vertically, with the back plate portion 11 adapted to lie flat against a building wall or other supporting surface.

Supported on the two side plate portions 12 and 13 are a plurality of sounding or vibrating members. As shown, the plate portion 12 is provided with a pair of supporting studs or bolts 16 and 17, projecting laterally and serving as supports for the vibrating chime bar 18 and the resonating tube 19. The bar 18 is a flat solid metal member capable of producing a pleasing note when struck. It is provided with two holes, receiving the two studs 16 and 17, and considerably larger in size than the diameter of the studs. Each stud is provided with a rubber sleeve 20, Fig. 6, extending between the nuts 21 and 22 which are threaded on each of the supporting studs. On each side of the chime bar and mounted on each stud around the sleeve 20 is a rubber pad 23 of soft or sponge rubber, preferably of substantially conical form so as to reduce its area of contact with the chime bar. On the outer side of each pad 23 is a metal washer 24 abutting against the nuts 21 and 22. The ends of the studs extend into the resonating tube 19 and thus rigidly secure the resonating tube in place. The sounding bar 18, however, is adapted for free vibration as it is afforded some movement in all directions.

The resonating tube 19 is a closed metal tube, herein shown as cylindrical in cross section and having end closure walls 27. Adjacent the center of the sounding bar 18, the resonating tube 19 is provided with a single opening 28 of limited size but sufficiently large so that the air vibrations created by the vibrating bar 18 can pass directly through the opening 28 into the interior of the resonating tube and there be amplified

due to the resonance existing between the resonating tube and the bar 18 to which it is tuned.

At the other side of the supporting frame and supported in a similar manner is a sounding or chime bar 30 and a second resonating tube 31, both being supported on studs 33 which are mounted securely on the side plate portion 13. The bar 30 is preferably of the same height and width as the bar 18 so as to present a generally symmetrical appearance to a casual observer. However, the thickness of the bar 30 is different from that of the bar 18, so that the two sounding bars are of different tone or pitch. The bar 30 being thinner, is of higher pitch. It therefore requires a resonating tube of shorter length, but to avoid an unsymmetrical appearance the resonating tube 31 is of the same external dimension as the resonating tube 19. The internal dimensions, however, are different, since the tube 31 is provided with walls 34 which are spaced the proper distance apart within the tube so as to provide a resonating chamber of the proper size for resonance with the sounding bar 30.

In accordance with the present invention the sounding bars 18 and 30 are struck by solenoid plungers which operate in the direction of their longitudinal axes through the wall portions 12 and 13 of the supporting structure, and between the bars 18 and 30. 36 generally represents a solenoid, having a solenoid plunger 37 and also including an energizing coil 38. The coil 38 is provided on a cylindrical tube 39 of brass or insulating material, which fits tightly in a hole 40 in the side plate portion 12. A substantially U-shaped iron strap 41 is secured by means of a bolt 42 and by the stud 17 to the wall portion 12 and encloses the other end of the tube 39, and also holds the coil 38 in position, a thick felt pad 38a being provided between the end of the coil and the strap as shown in Fig. 6. Fitting tightly on the right-hand end of the tube 39 is a ring 43 on which a housing cylinder 44 is fixed, as by means of a forced fit thereon. The cylinder 44 projects through a clearance opening in the plate portion 13 and serves to enclose the right-hand end of the solenoid plunger 37. The iron part of the plunger 37 extends from the line 37a to the line 37b which are so spaced that when the coil 38 is held energized the striking tip of the solenoid plunger is maintained a very small distance to the right of the sounding bar 18. However, when the coil 38 is initially energized the inertia of the solenoid plunger causes its left-hand end to strike the sounding member 18 forcibly, and then after striking the sounding member the tip of the plunger is retracted a very little distance and so held as long as the solenoid coil is energized. This permits the sounding member 18 to vibrate freely without touching the solenoid plunger 37 after the sounding member has been struck.

When the circuit including the coil 38 is deenergized, the plunger 37 is moved rapidly to the right, by means of the spiral spring 46 which is secured at 48 to a flanged plate 49 fixed on the brass extension 82 of the solenoid plunger, the plate 49 having a running fit in the housing cylinder 44. An air hole 44a permits escape of air so the solenoid can move freely. The other end of the spring is wrapped tightly around the extended portion of the tube 39, as indicated at 50. In the normal position of the spring 46 the solenoid is held in the position as shown in Fig. 6 with the right-hand tip of the solenoid plunger some little distance to the left of the bar 30.

When the coil 38 is energized the plunger, of course, moves to the left, compressing the spring, and when deenergized the compressed spring 46 moves the plunger rapidly to the right past the position in which it is shown, and causes the striking of the sounding bar 30. Thus when the push button switch included in the circuit with the coil 38 is closed, the sounding bar 18 is struck and then when the finger is released from the push button the sounding bar 30 is struck, giving two notes of different pitch in succession.

The solenoid plunger 37 is preferably constructed with a hollow iron part 80, having a brass end 81 provided with the striking tip. The extension 82 is fixed to the iron portion. The outside diameter of the plunger is somewhat less than the inside diameter of the major portion of the tube 39, and either the plunger or the tube are provided with a plurality of spaced guiding rings of small axial length, providing a smooth running fit for the plunger. As shown in Fig. 6 these guide rings 86a are rings of copper and graphite or other oilless bearing composition, fixed in the tube 39 and preventing movement of the plunger in a direction transverse of the plunger axis and thus preventing noisy vibrations of plunger and also minimizing the friction created during the movement of the plunger.

As shown in Fig. 10 the guiding rings are of a modified form. As shown in that figure the tube 8 has at one end a metal cap 85 which is fixed tightly thereon and which carries a rubber ring 86 which may be provided with a wear surface 87 of suitable metal in which the plunger 88 has a running fit.

The axis of the plunger 37 is preferably in line with about the center of the two sounding bars 18 and 30, so that both sounding bars will be capable of producing their loudest sounds when struck by this plunger.

Arranged below the solenoid 36 is a second solenoid 52 and including the plunger 53, coil 54 and enclosing tube 55, the latter being provided with an end cap or cover 56 having a soft pad 56a of felt on its inner side, since the plunger 53 of this solenoid is adapted to strike only the sounding bar 18. When the winding or coil 54 is energized, the solenoid plunger 53 is moved forcibly to the left and strikes the sounding bar 18, spring 57 serving to return the plunger when the coil is deenergized. This plunger has a normal position which is out of engagement with the sounding bar 18, when the coil 54 is maintained energized so as not to interfere with the free vibration of the bar 18 after the latter has been struck. The construction of the solenoid 52, except as above mentioned is the same as that of the solenoid 36.

The U-shaped metal strap 41 which holds the coil 38 of the solenoid 36 in place, also extends past and around coil 54 so that the two solenoid coils have a common flux path through the strap 41 and back to the plate portion 12. The two solenoids form a readily replaceable unit, and can be readily removed from the frame 10 and replaced by another solenoid unit which may have windings adapted for operation under a different voltage. Thus the same frame and sounding members can be used with 6 to 8 volt coils, or used with coils adapted to operate on 18 volts or other suitable voltage as replacements for the 6 to 8 volt coils, the disassembly of one unit being readily accomplished by unfastening the nuts 42 and disconnecting the electrical connections.

Fig. 9 shows diagrammatically a scheme of

electrical connections that may be employed in accordance with this invention. As therein shown, the winding 38 is connected by wire 60 to a switch 61, which, when closed, connects the winding 38 in series with the secondary 62 of a transformer 63 which may, for example, step the voltage down from 110 volts A. C. to about 6 volts. The winding 38 when thus energized and deenergized gives the two tones in succession. In series with winding 54 of the lower solenoid is a switch 64 which, when energized and deenergized, produces only a single tone, namely the lower tone produced by the sounding member 18 and its resonating chamber. In addition to these switches 61 and 64 there may be a third switch 65 which is connected in series with a resistance 66 connected to the end of the winding 38. The resistance 66, which is readily adjustable by means of a slider 66a, may be positioned on the outside of the sleeve 44 or in some other suitable place. When the switch 65 is closed, the winding 38 is included in a circuit in series with the resistance 66, so that the full power of the solenoid is not produced, and the plunger 37 is moved to the left but not far enough to strike the sounding bar 18. When the switch 65 is opened, however, the spring 46 is fully effective in causing the plunger to strike sounding bar 30. This arrangement therefore produces a single note, but of different pitch of course than the one produced by the closing of the switch 64. The switch 61 may be used at the front door of a building, and the two switches 64 and 65 may be used at the side door and at another suitable point to serve as a call or signal and at the same time give an indication as to where this signal is controlled from.

The various connections from the control switches and transformer secondary may be readily made, as a connection block 67 is provided on the frame 10 and connecting wires, not shown, extend to the solenoid coils and resistance from the several terminals.

The front of the signal unit is preferably enclosed by a cover plate 68, which is preferably of such width as to extend beyond the sounding bars 18 and 30 but to leave at least a portion of the resonating tubes 19 and 31 exposed to view. The cover plate 68 is preferably a finished metal

sheet secured to a plate 69 as by attaching screws 90 which pass through a bar 91 and are threaded in strips 92 provided at the front of the cover. The plate 69 provides a front wall portion 70 and top and bottom wall portions 71 and 72 respectively, all of such size as to enclose the top, bottom and front of the frame 10, thus providing a substantially enclosed chamber in which the solenoids are housed.

The rear portion of the wall 71 is bent downwardly as indicated at 73, this portion being of such width as to be received between the side wall portions 12 and 13 of the frame 10. The upper corners of the frame 10 are indented to provide tongues 74 which receive the ends of the down-turned portion 73 of the cover. The lower wall 72 of the cover is receivable between the side walls 12 and 13 of the frame, so that the cover can be readily applied by moving it against the frame 10 and then lowering it vertically into place.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A signal device of the character described comprising a pair of spaced sounding bars of different tune, a common support for said bars, a resonating tube positioned on such support adjacent to each bar, said resonating tubes being each tuned to its respective bar and said bars being of the same length and of different thickness, and common means carried by said support for striking said bars.

2. A signal device of the character described comprising a pair of parallel sounding bars of the same length but of different tune, common means supporting said bars for vibration, common means carried thereby between said bars for striking said bars, a resonating tube positioned on said support adjacent each bar, said tubes being all of the same length but of different internal dimensions whereby each tube is tuned to its respective bar.

GISBERT L. BOSSARD.