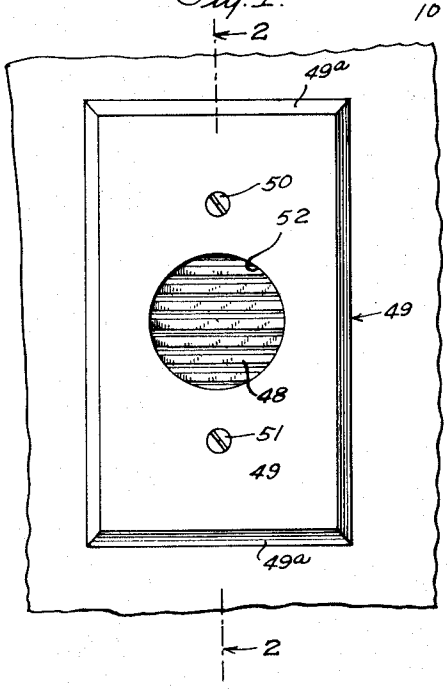
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SIGNALING DEVICE

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Fig. 1.



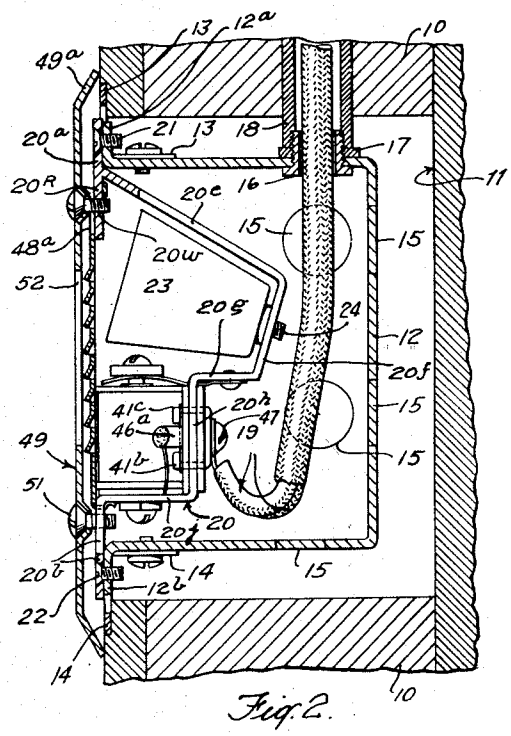


Fig. 2.

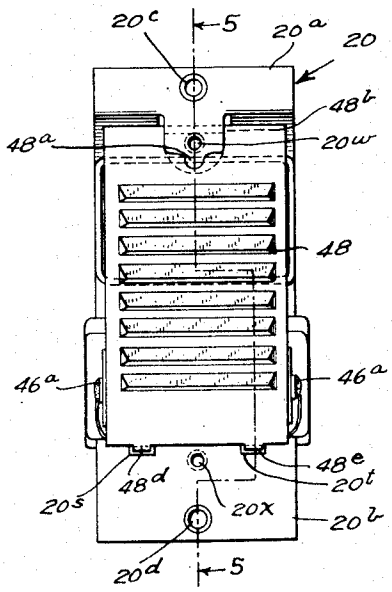


Fig. 3.

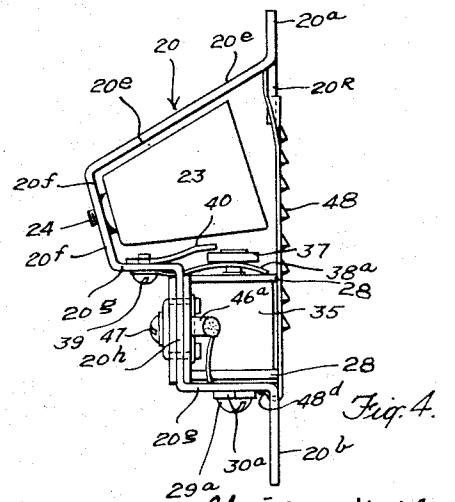


Fig. 4.

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Fig. 5.

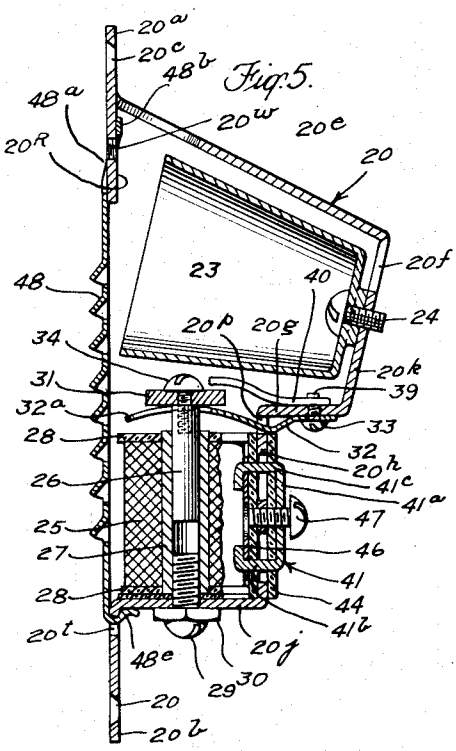
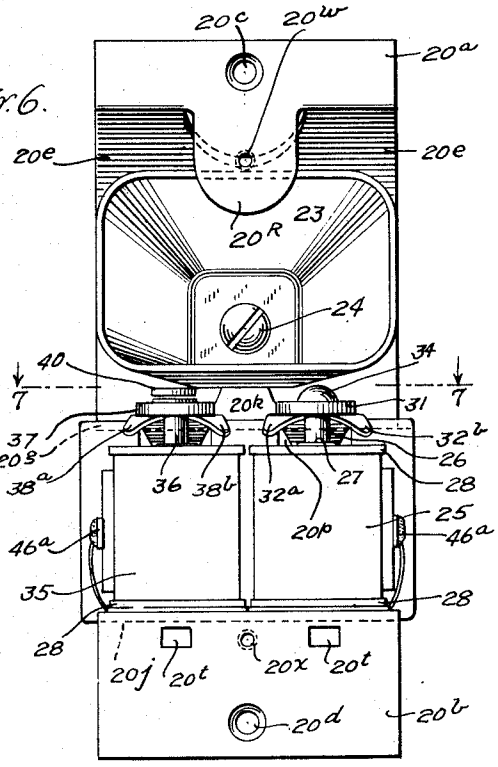


Fig. 6.



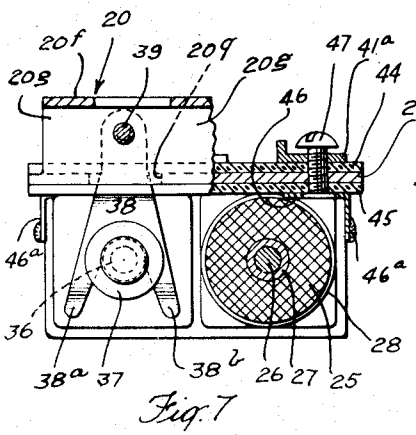


Fig. 7.

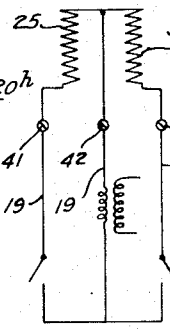


Fig. 9.

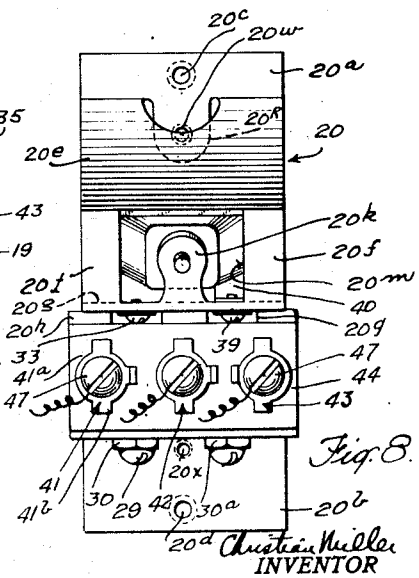


Fig. 8.

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Patented June 14, 1932

1,863,532

UNITED STATES PATENT OFFICE

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SIGNALING DEVICE

Application filed December 16, 1930. Serial No. 502,651.

This invention relates to signaling devices and more particularly to the construction of audible signaling devices such as electric buzzers, bells, and the like.

One of the objects of this invention is to provide a simple, practical and compact audible signaling construction that will be of inexpensive manufacture, reliable in action and convenient and inexpensive to install. Another object is to provide a construction of the above-mentioned character in which so-called standardized parts may be readily incorporated. Another object is to provide an electric buzzer or bell construction or unit that will be capable of rapid and inexpensive installation for practical use. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings in which is shown one of various possible embodiments of my invention,

Figure 1 is a front elevation of the signaling device as it appears when installed;

Figure 2 is a central vertical sectional view, as seen along the line 2—2 of Figure 1, certain parts, however, being shown in elevation;

Figure 3 is a front elevation of the buzzer and bell unit of Figure 2;

Figure 4 is a side elevation, as seen from the left of Figure 3;

Figure 5 is a vertical sectional view, on an enlarged scale, as is seen along the line 5—5 of Figure 3;

Figure 6 is a front elevation, on an enlarged scale, of the buzzer and bell unit, this view being substantially similar to that of Figure 5, excepting that certain parts have been omitted in order to show certain features of construction more clearly;

Figure 7 is a horizontal sectional view, as seen along the line 7—7 of Figure 6;

Figure 8 is an elevation, as seen from the rear of Figure 3 or from the left of Figure 4, and

Figure 9 is a diagram of the circuit arrangements of the installed device.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to Figures 1 and 2 of the drawings, I have shown at 10 a wall or like part of a building with respect to which the audible signaling device of my invention is to be mounted; the wall 10 may be of any construction usual in building construction work and is suitably recessed as at 11 (Figure 2) to receive therein a standard sheet metal outlet box generally indicated at 12. This box 12 is preferably of the standard type of conduit or outlet box such as is used in practice and is readily available on the market for mounting switches, outlets, or the like, and is provided with suitable brackets 13 and 14 by which the box may be attached to the wall 10 with its open end facing outwardly of the recess 11 in the wall 10. The outlet box 12 is provided with suitable knock-outs 15 to permit the connection thereto of any suitable type of metal conduit or the like. These knock-outs 15 are positioned, in practice, substantially as indicated in Figure 2, the right-hand end wall as well as all four of the side walls being provided with such knock-outs.

In Figure 2 the knock-out in the upper end wall of the box 12 is shown removed and a terminal nipple 16 is extended through the opening thus provided, a clamping nut 17 holding the nipple in place and the latter being threaded, as indicated in Figure 2, to permit the connection thereto of the metal conduit 18. Through the metal conduit 18 extend the conductors generally indicated at 19 for connection to the signaling apparatus.

The audible signaling unit which illustratively comprises an electric bell or an electric buzzer or preferably both includes a frame member generally indicated at 20, preferably made of sheet metal and having, with the parts carried thereby, a peculiar shape for coaction not only with such parts but also with certain features of the conduit

or outlet box construction above-described. The frame 20 has a width somewhat less than the inside dimension of width of the box 12 and a length greater than the inside dimension of length (in a vertical direction as viewed in Figure 2) so that portions of the frame 20 can overlap the upper and lower end walls of the box 12.

These overlapping portions are better shown in Figures 2, 3, 4, 5 and 6 and are indicated at 20^a and 20^b, respectively; they overlap respectively the lips or flanges 12^a and 12^b (see Figure 2) of the upper and lower end walls of the box 12. As is usual with the standard outlet box, these lips 12^a and 12^b have a substantially centrally positioned threaded opening and I provide portions 20^a and 20^b of the frame 20 with openings 20^c and 20^d (see Figures 3 and 5) adapted, when the frame 20 is inserted into the box 12, as is shown in Figure 2, to register substantially with the threaded openings in the lips 12^a and 12^b of the box. Screws 21 and 22 (Figure 2) passed through the openings in the lips 12^a and 12^b secure the frame 20 and associated parts in position within the box 12.

As is better shown in Figures 2, 3 and 5, frame 20 is provided with a portion 20^e extending downwardly from the portion 20^a at an appropriate angle sufficient to leave a substantial space between the upper end wall of the box 12 and sufficient to give ample clearance for the conduit construction 16—17—18 that is connected to the box 12; the portion 20^e is then bent at a substantial angle to provide a portion 20^f, the bend being made at such a point that the portion 20^f is sufficiently spaced from the right-hand wall of the box 12 to leave adequate clearance therebetween not only for the passage of the conductors 19 but also for a conduit construction such as 16, 17, 18 that may have to be associated with any one of the openings provided by the knock-outs 15 in the right-hand wall of the box 12.

The frame 20 is again bent to provide a portion 20^g that extends to the left, as viewed in Figures 2 and 5, whence it is bent at substantially right angles to provide a portion 20^h that extends downwardly into relatively close proximity to the lower end wall of the box 12 whence it is bent at right angles and toward the left, as viewed in Figures 2 and 5, to provide a portion 20^j, a subsequent right-angle bend providing the lower end portion 20^b, already above-described, of the frame 20.

As will be clear from Figure 2, the portions 20^g and 20^h carry the frame in such directions that the remaining knock-outs in the lower portions of the side and end walls of the box 12 are adequately cleared and hence to provide sufficient space for bringing into the box the conductor-carrying conduit, like the conduit 18, through any one of these knockouts.

Housed within the acute-angled space between the portions 20^e and 20^g is a gong 23 shaped substantially as shown in Figures 2, 4, 5 and 6; this gong 23 is generally rectangularly shaped in cross-sections transverse of its axis. It tapers in its substantially vertical dimension, as viewed in the drawings, so as to fit relatively snugly in the space between a plane passing through the portions 20^a and 20^b, and the portions 20^e, 20^f and 20^h and it preferably also tapers in its horizontal dimension substantially in the manner shown in Figure 6.

A screw 24 secures the gong 23 to the frame 20 but in order to give the gong 23 a mounting that is not too rigid and that will be sufficiently yieldable to avoid interfering with the acoustic vibration of the gong, I provide in the frame 20 and preferably in the portion 20^f thereof a tongue 20^k (see Figure 8) which I form preferably by stamping or cutting an opening 20^m (see Figure 8) of such shape as to leave the relatively yieldable tongue 20^k into which the screw 24, securing the gong 23, is threaded. This construction mounts the gong 23 sufficiently yieldingly to avoid undesired interference with the tone and acoustic action of the gong 23.

By shaping the gong substantially as above described, I am enabled not only to house the latter within the peculiarly shaped frame 20 and also within the box 12 (Figure 2) but also to achieve an effective sound-producing gong of substantially maximum effective area for a minimum of space, at the same time insuring, by the peculiar inter-relation of the frame and gong to the box 12 freedom from interference with the connections to the box of the conduits and with the conductors brought into the box through the conduits.

Seated within the right angle between the portions 20^h and 20^j of the frame 20, as is better shown in Figure 5, is the gong-vibrating mechanism which I have illustratively shown as adapted for operation on alternating current though it is to be understood that I do not limit my invention to an alternating current apparatus and that any other suitable energizing current may, insofar as these broader aspects of my invention are concerned, be employed. This bell or gong-ringing mechanism preferably takes the form of a solenoid having a winding 25 and a core or plunger 26 of a suitable magnetic material.

The winding 25 is wound about and suitably insulated from a brass sleeve 27 (see Figure 5), suitable insulating end members 28 suitably secured to the ends of the sleeve 27 holding the turns of the winding 25 in place. The lower end of sleeve 27 is threaded to receive a screw 29 that is passed through an opening in the portion 20^j of the frame 20, a suitable lock nut 30 locking the screw 29 against becoming loose.

Into the upper end of the sleeve 27 extends

and is slidably received the core or plunger 26, the latter having secured at its upper end a washer or disk 31 which straddles the two spaced arms 32^a and 32^b (see Figure 6) of a leaf spring 32 that extends through a suitable opening 20^p in the portion 20^g (see Figure 5) to which it is secured by a screw 33; the washer 31 is secured to the plunger 26 by means of a screw 34 which is preferably of non-magnetic metal such as brass, the head of screw 34, during the vibration of the plunger 26, striking the gong 23.

The leaf spring 32 shaped substantially as shown in Figures 5 and 6, holds the plunger 26, by means of the arms 32^a and 32^b that are straddled by the washer 31, in an upper position and, in fact, in a position intermediate of the effective stroke of the plunger 26 when the winding 25 is energized.

When the winding 25 is energized by an alternating current, the energization of winding 25 and hence the pull thereof on the plunger 26 varies with the instantaneous value of the energizing current and causes the plunger 26 to be pulled down, as viewed in Figure 5, at each half cycle. This action takes place against the retractive effort of spring 32 so that, when the instantaneous value of the current passes through zero, the energy stored in the spring 32 is released and the plunger 26 is driven upwardly into contact with the gong 23. The next succeeding half cycle of energizing current causes the above-described actions to be repeated.

The screw 34 is, as above noted, preferably of brass, particularly where the metal of the gong 23 is metallic or has a metallic metal as a component thereof; the brass screw 34 thus prevents the direct physical closing of any possible magnetic circuit through the gong, frame 20, or related parts.

As is better shown in Figure 6, the solenoid 25 and coacting parts are mounted preferably to the right of the vertical center line of the frame 20 and to the left of this center line I provide a buzzer, the construction of which includes a solenoid winding 35 and a coacting plunger 36, the detailed construction of which is substantially similar to that described in connection with the actuating mechanism associated with the gong 23, a screw 29^a and lock nut 30^a (Figures 4 and 8), like the parts 29 and 30 of Figure 5, mounting the solenoid 35 to the portion 20^j of the frame 20.

The plunger 36 (Figures 6 and 7) has secured at its end a washer 37, like the washer 31 of Figure 5, this washer straddling the arms 38^a and 38^b (Figure 7) of a leaf spring 38 secured as by screw 39 to the portion 20^g of the frame 20, the spring 38 passing through a suitable opening 20^q in the portion 20^h of the frame.

Secured in any suitable manner to the portion 20^g of the frame but upon the inside face thereof is a rigid metal arm 40 (see Figures 4, 5 and 6), the arm 40 extending into overlapping relation with respect to the washer 37 on the solenoid plunger 36, as is clearly shown in Figure 4.

The arm 40 acts as a stop against which the plunger washer 37 is caused to impact as the plunger is vibrated by the conjoint action of the spring 38 and the pulsating or varying current energizing the solenoid winding 35, causing the production of a non-musical buzzing sound. Preferably member 40 is of non-metallic metal like brass so that no physical closing of a magnetic circuit takes place.

The right-hand face of the portion 20^h (Figure 5) of the frame 20 I utilize to mount binding posts, preferably three in number and indicated at 41, 42 and 43 in Figure 8. I utilize three binding posts where two windings are employed with a common return wire for the respective circuits thereof but it is to be understood that I may use four or more binding posts where circuits of the various devices are intended to be kept electrically separate or one or two such binding posts where I wish to employ only one signaling device instead of two or more.

Since these various binding posts are of identical construction, it will suffice to describe in detail only one of them, and in Figure 5 the binding post 41 is shown in cross-section. The binding post includes a sheet metal U-shaped member 41^a, the two arms 41^b and 41^c of which are passed through suitably alined apertures in a sheet of insulating material 44, in the portion 20^h of the frame, and in a sheet of insulating material 45 resting against the inside face of the portion 20^h; resting against the inside face of the insulating sheet 45 is a sheet metal member 46 (see also Figure 7) over which the ends of the arms 41^c and 41^d are bent to clamp the members 44, 20^b, 45 and 46 tightly together.

The member 46, made of copper, or the like, is provided with an ear or tab 46^a (see Figure 7) to which the end of a solenoid winding is soldered. Threaded into the portion 41^a of the member 41 (see Figures 5 and 7) is a binding screw 47 to which one of the conductors 19 (see Figure 2) that are brought into the conduit box 12 may be connected and secured by clamping against the part 41^a, the latter being in electrical connection with the part 46.

The parts of the various binding posts 41, 42, 43 corresponding to the U-shaped member 41, 41^b, 41^c pass through slots in the portion 20^h of the frame that are of sufficient width to prevent these parts from contacting with the frame 20, and preferably suitable insulating means, such as fiber or hard rubber washers or shims, extend about the binding screws and into these slots.

The parts 46—46^a of the binding posts 41, 42 and 43 are connected to the terminals of the

windings 25 and 35, as is diagrammatically indicated in Figure 9, as by soldering, while the conductors 19 are connected to the binding posts by the screws 47, as is also diagrammatically indicated in Figure 9.

The inclined portion 20^e of the frame 20 (see Figures 5, 6 and 8) has a portion or tab 20^r cut out of it and bent into the plane of the portion 20^a, as appears clearly in Figures 5, 4 and 2. This tab 20^r serves a number of purposes. It coacts to hold in place a grid 48 (Figures 1, 2, 3 and 5), grid 48 being made up preferably of a suitable sheet metal provided with appropriate closely spaced openings to form substantially a screen or grid. As appears clearly from the drawings and particularly in Figures 2, 3 and 5, the sheet metal member 48 will be seen to be transversely severed or slotted and the portions immediately above the line of severance bent outwardly at a downwardly inclined slope, thus to permit easier emission of the sound from the audible signaling mechanism and also to better prevent foreign matter or particles or dust or the like from entering into the operating parts of the signaling mechanism; the member 48 may thus be termed a louver. Grid 48 is of substantially the same width as that of the frame 20 (see Figure 3) and at its upper end is apertured as at 48^a, the aperture being of sufficient width to receive the tab 20^r and the upper marginal boundary 48^b (Figure 5) of the aperture 48^a being bent out of the plane of the grid 48 so that it may take in back of the tab 20^r while allowing the grid 48 to aline itself with the plane of the portions 20^a and 20^b of the frame.

The lower end of the grid 48 is provided with two horizontally spaced inwardly bent ears 48^d and 48^e (Figure 3) each of which is shaped substantially as is shown in Figure 5 and adapted to pass through openings 20^s and 20^t in the portion 20^b of the frame. These openings are spaced downwardly from the portion 20^j of the frame (Figure 5) so that, as the grid 48 is swung into position in clockwise direction, as viewed in Figure 5, after having the tab 20^r passed through the aperture 48^a, the curved ears 48^d and 48^e will snap in back of part of the portion 20^b of the frame and hold the grid in place.

The thus-assembled construction may then be assembled with respect to the conduit box 12 (Figure 2) in the manner already described above, the grid 48 substantially closing the open end of the box 12. The grid or inside cover 48 thus acts also as a protective closure for the installation during continued construction work such as, for example, the carrying on of the plastering of the walls. The circuits may be tested and any time thereafter, for example after the walls have been plastered, finished, or the like, a cover plate 49 (Figures 1 and 2) is placed over the front end of the box 12 and secured in position by screws 50 and 51 threaded respectively into an opening 20^w in the tab 20^r (Figures 5 and 6) and an opening 20^x in the portion 20^b of frame 20. This cover plate 49 is of standard construction, having an area sufficient to materially overlap the conduit box 12, being provided with a peripheral flange 49^a and a round centrally positioned opening 52 such as is provided to permit an electrical outlet or plug receptacle to project therethrough. The opening 52, however, overlies the screen or grid 48 and permits the sound from either the bell or buzzer or both therein to pass into the open. The openings in the cover plate 49 through which the screws 50 and 51 pass are spaced vertically by a standard distance and in constructing the signaling unit above-described, I space the threaded holes 20^w and 20^x (Figure 6) by the same standard spacing, just as I space the slots or holes 20^c and 20^d (Figures 5 and 6) by the same standard spacing that exists between the standardly spaced screws 21 and 22 (Figure 2) that extend into the upper and lower flanges or ears in the upper and lower walls of the box 12.

It will thus be seen that there has been provided in this invention a construction in which the various objects hereinabove noted, together with many thoroughly practical advantages, are successfully achieved. It will be seen that the construction meets effectively and reliably the varied conditions met with in practice; for example, the signaling unit, as appears clearly from Figure 1, is so arranged and constructed that any one of the knock-outs may be used to bring the conduit and conductors into the conduit box, all without clamping the work or wiring or without interfering with the signaling device or devices. Moreover, it will be seen that standardized structural parts and standardized wiring practice may be utilized efficiently and conveniently.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In construction of the character described, in combination, a conduit box having a knock-out in a wall thereof, a gong, gong-striking mechanism, a frame secured across the front of said box and shaped to provide a space for said gong and a space for said mechanism, said frame carrying said gong and mechanism and being shaped with respect to the interior of said box to leave a space between itself and the bottom wall of said box sufficient for conduits and conductors, a grid extending across said frame, a finishing face plate having an opening

therein, and means detachably securing said face plate to said frame, said opening overlapping said grid.

2. In construction of the character described, in combination, a conduit box having a knock-out in a wall thereof, a gong, gong-striking mechanism, a frame secured across the front of said box and shaped to provide a space for said gong and a space for said mechanism, said frame being shaped with respect to the interior of said box to leave a space therebetween sufficient for conduits and conductors, a standard face plate having screw holes spaced at a standard distance, said frame being provided with threaded holes having the same spacings as the holes in said face plate, screws coacting with said holes for holding said face plate in position, and an inside cover member underneath said face plate detachably connected with said frame, said face plate, when secured in place, making said inside cover member inaccessible for detachment.

3. A signaling unit comprising, in combination, a frame bent and set into and secured to an outlet box, audible signaling means carried by said frame, a grid member secured to and closing over the front of said frame, and means for securing to said frame a finishing plate.

4. A signaling unit comprising, in combination, a sheet metal frame member bent to provide end flanges adapted to overlap the end flanges of a standard conduit box, a tapered gong, said frame being bent to provide a recess for said gong, and electromagnetic means for striking said gong, said frame being bent to provide a recess for receiving said electromagnetic means, the recess-providing bends in said member being within the space between the plane of the open end of said box and the plane of the bottom thereof.

5. A signaling unit comprising, in combination, a sheet metal frame member bent to provide end flanges adapted to overlap the end flanges of a standard conduit box, a tapered gong, said frame being bent to provide a recess for said gong, electromagnetic means for striking said gong, said frame being bent to provide a recess for receiving said electromagnetic means, cover means permitting the passage of sound therethrough for closing over said gong, the recess-providing bends in said member being within the space between the plane of the open end of said box and the plane of the bottom thereof, and means for securing a standard cover plate to said frame.

6. A signaling unit comprising, in combination, a sheet metal frame member bent to provide end flanges adapted to overlap the end flanges of a standard conduit box, a tapered gong, said frame being bent to provide a recess for said gong, electromagnetic means for striking said gong, said frame being bent to provide a recess for receiving said electromagnetic means, the recess-providing bends in said member being within the space between the plane of the open end of said box and the plane of the bottom thereof, a metallic grid detachably secured to said frame and having an extent less than that of the open end of said box but great enough to extend over said gong, and a finishing plate secured to said frame and having an extent greater than that of the open end of said box.

7. A signaling unit comprising, in combination, a sheet metal frame bent to provide end flanges adapted to overlap the end flanges of a standard conduit box, a tapered gong, said frame being bent to provide a recess for said gong, and electromagnetic means for striking said gong, said frame being bent to provide a recess for receiving said electromagnetic means, the recess-providing bends in said member being within the space between the plane of the open end of said box and the plane of the bottom thereof, said frame having stamped out of a portion thereof a tab-like member to which said gong is secured, said member having a cross-section so small that said gong is free from the damping effect thereon of the frame.

8. In construction of the character described, in combination, a sheet metal box having conductors led thereinto, a sheet metal frame secured across the open end of said box and bent to extend inwardly into the latter but spaced from the walls thereof, thereby to provide space for said conductors, electromagnetic signaling means carried by said frame on that side thereof toward the open end, connecting means carried by said frame on that side thereof toward the bottom wall of said box and in electrical connection with said signaling means and adapted to have conductors secured thereto, and a detachable cover plate extending over and beyond the peripheral portions of said box.

9. In construction of the character described, in combination, a sheet metal box having conductors led thereinto, a sheet metal frame secured across the open end of said box and bent to extend inwardly into the latter but spaced from the walls thereof, electromagnetic signaling means carried by said frame on that side thereof toward the open end, a gridlike member extending over said signaling means, and a cover plate closing the open end of said box and extending beyond the edges thereof and having a large opening therein, a substantial portion of said grid being underneath said opening.

10. A signaling unit comprising, in combination, a sheet metal frame member bent to provide end flanges adapted to overlap the end flanges of a standard conduit box, electromagnetic signaling means supported by said frame, cover means permitting the passage

of sound therethrough, said cover means being carried by said frame and lying substanitally in the plane of said bent flanges, said frame being provided with threaded openings spaced apart by the same distance that the screw holes of a standard cover plate are spaced and adapted to receive the screws for receiving a standard cover plate in position, a standard cover plate overlapping said cover means, and screws in engagement with said threaded openings for securing said cover plate to said frame, said cover means having an opening therein through which one of said screws passes.

11. A signaling unit comprising, in combination, an audible signaling device, means supporting said signaling device, said means being provided with spaced openings corresponding to the spacing of the threaded openings in the ends of a standard conduit box to permit the screws in the latter to secure said means in place and said means being provided with threaded openings spaced apart by the same distance that the screw holes of a standard cover plate are spaced, cover means carried by said supporting means, said cover means and said supporting means being shaped to detachably interfit, a standard cover plate overlapping said cover means and holding the latter against detachment from said supporting means, and screws engaging said second-mentioned threaded openings for holding said cover plate in place.

12. A signaling unit comprising, in combination, an audible signaling device, means supporting said signaling device, said means being provided with spaced openings corresponding to the spacing of the threaded openings in the ends of a standard conduit box to permit the screws in the latter to secure said means in place and said means being provided with threaded openings spaced apart by the same distance that the screw holes of a standard cover plate are spaced, cover means carried by said supporting means, said cover means and said supporting means being shaped to detachably interfit, a standard cover plate overlapping said cover means, screws passing through said cover plate and into said second-mentioned threaded openings, said cover means being shaped to interengage with one of said screws whereby the latter locks said cover means against detachment.

13. A signaling unit comprising in combination, a sheet metal frame member bent to provide end flanges adapted to overlap the ends of a standard conduit box, a gong carried by said frame, said frame being bent to provide a space for said gong, electromagnetic means carried by said frame and adapted to strike said gong, said frame being bent to provide a space for receiving said electromagnetic means, a sheet-like cover member permitting the passage of sound therethrough for closing over said gong, said frame and cover member having detachable tongue and recess connection with each other, and a cover plate secured to said frame and holding said cover member and frame against detachment from one another.

14. A signaling unit comprising, in combination, a frame adapted to be fitted into a standard conduit box and having flanges at its ends to overlap the edges of a said box, said frame having a tongue projecting therefrom adjacent one of said end flanges and having a recess adjacent the other end flange, signaling means carried by said frame intermediate of said end flanges, said frame being bent to accommodate said signaling means, and cover means for said signaling means, said cover means having a recess into which said tongue is received and having a tongue adapted to enter said first-mentioned recess.

15. A signaling unit comprising, in combination, a frame adapted to be fitted into a standard conduit box and having flanges at its ends to overlap the edges of said box, said frame having a tongue projecting therefrom adjacent one of said end flanges and having a recess adjacent the other end flange, signaling means carried by said frame intermediate of said end flanges, said frame being bent to accommodate said signaling means, cover means for said signaling means, said cover means having a recess into which said tongue is received and having a tongue adapted to enter said first-mentioned recess, and a cover plate secured to said frame and overlapping said cover means for holding the latter against displacement, said cover plate having a dimension sufficient to cause it to overlap said conduit box.

16. A signaling unit comprising, in combination, a frame adapted to be fitted into a standard conduit box and having flanges at its ends to overlap the edges of said box, said frame having a tongue projecting therefrom adjacent one of said end flanges and having a recess adjacent the other end flange, signaling means carried by said frame intermediate of said end flanges, said frame being bent to accommodate said signaling means, a perforated sheet metal member covering over said signaling means, said member having a recess into which said tongue is received and having a tongue for passage into said first-mentioned recess, and an apertured cover plate secured to said frame and overlapping said perforated member for holding the latter against displacement, said cover plate having a dimension sufficiently great to cause it to overlap the conduit box.

17. In construction of the character described, in combination, a conduit box having a knock-out in a wall thereof, a frame secured across the front of said box, a gong, gong-striking mechanism, said frame being bent inwardly toward the bottom of the box in a

series of steps, one of which provides an angular space facing toward the open end of said box for said gong and another of which provides a space for said gong-striking mechanism, said frame being shaped to leave a space between a wall of said box and itself to accommodate conductors brought through said knock-out, a connecting device mounted on said frame and in electrical connection with said mechanism and adapted to have a conductor secured thereto, and insulating means for insulating said device from said frame.

18. In construction of the character described, in combination, a conduit box having a knock-out in a wall thereof, a frame secured across the front of said box, a gong, gong-striking mechanism, said frame being bent inwardly toward the bottom of the box in a series of steps, one of which provides an angular space facing toward the open end of said box for said gong and another of which provides a space for said gong-striking mechanism, said frame being shaped to leave a space between a wall of said box and itself to accommodate conductors brought through said knock-out, a connecting terminal carried on a wall of that step of said frame in the angular space in which said gong-striking mechanism is accommodated, said connecting terminal being in electrical connection with said mechanism and adapted to have a conductor secured thereto, and means for insulating said connecting terminal from said frame.

19. In construction of the character described, in combination, a conduit box having a knock-out in a wall thereof, a gong, gong-striking mechanism, a sheet metal frame secured against the front of said box and bent in a direction inwardly of the latter to provide, on the outer face of the frame, a space for said gong and a space for said mechanism and to leave a space between the frame and a wall of said box for the entry of conductors through said knock-out, said frame being of sufficient lateral expanse to protect said gong from contact with said conductors, and cover means bridged across and secured to the front ends of said frame, said cover means having a lateral dimension substantially equivalent to that of said frame and having a longitudinal dimension less than that of said box.

20. In construction of the character described, in combination, a conduit box having a knock-out in a wall thereof, a gong, gong-striking mechanism, a sheet metal frame secured across the front of said box and bent in a direction inwardly of the latter to provide, on the outer face of the frame, a space for said gong and a space for said mechanism and to leave a space between the frame and a wall of said box for the entry of conductors through said knock-out, said frame being of sufficient lateral expanse to protect said gong from contact with said conductors, cover means bridged across and secured to the front ends of said frame, said cover means having a lateral dimension substantially equivalent to that of said frame and having a longitudinal dimension less than that of said box, said cover means being constructed to permit the passage therethrough of sounds, and a cover plate of greater length than that of the box and overlapping said cover means.

21. A signaling unit comprising, in combination, a sheet metal frame bent to provide end flanges adapted to overlap the supporting portions of a conduit box, said frame having intermediate end portions bent away from the plane of said end flanges so that, when said frame is inserted into a conduit box, said end portions carry the frame into the box, one of said end portions being of greater length than the other, said frame having a stepped portion joining the inner ends of said end portions, thereby to provide two spaces facing outwardly toward the plane of said end flanges, one of said spaces being of greater depth than the other, a gong accommodated in the space of greater depth and secured to said frame, and electromagnetic gong-striking mechanism carried by said frame and accommodated in the space of lesser depth.

22. A signaling unit comprising in combination, a sheet metal frame bent to provide end flanges adapted to overlap the supporting portions of a conduit box, said frame having intermediate end portions bent away from the plane of said end flanges so that, when said frame is inserted into a conduit box, said end portions carry the frame into the box, one of said end portions being inclined toward the other at an acute angle, said frame having a portion bridged across the inner ends of said end portions, a tapered gong carried by said frame in the angular space formed by said inclined end portion and said bridging portion, and gong-striking mechanism carried by said frame and positioned in the angular space between the other end portion and said bridging portion.

23. A signaling unit comprising, in combination, a sheet metal frame bent to provide end flanges adapted to overlap the supporting portions of a conduit box, said frame having intermediate end portions bent away from the plane of said end flanges so that, when said frame is inserted into a conduit box, said end portions carry the frame into the box, said frame having means extending substantially along the plane of said end flanges and substantially bridging the outer ends of said end portions and having means bridging the inner ends of said end portions, one of said means being integrally formed with said frame, a gong and gong-striking mechanism carried by said frame within the

space between said two means and said two end portions, means for attaching said other means to said frame, a finishing plate, and means for securing said finishing plate in position to overlap said first-mentioned means, said finishing plate having a dimension in the direction of the length of said frame greater than the length of said frame.

24. A signaling unit comprising, in combination, a sheet metal frame bent to provide end flanges adapted to overlap the supporting portions of a conduit box, said frame having intermediate end portions bent away from the plane of said end flanges so that, when said frame is inserted into a conduit box, said end portions carry the frame into the box, said frame having means extending substantially along the plane of said end flanges and substantially bridging the outer ends of said end portions and having means bridging the inner ends of said end portions, a gong and gong-striking mechanism carried by said frame within the space between said two means and said two end portions, a finishing plate, and means for securing said finishing plate in position to overlap said first-mentioned means, said finishing plate having a dimension in the direction of the length of said frame greater than the length of said frame.

25. In constuction of the character described, in combination, a conduit box having a knock-out in a wall thereof, a frame secured across the front of said box and having portions extending inwardly thereof but spaced away from the rear wall of the box sufficiently to provide a space for conductors brought through a knock-out, a gong carried by said frame, said frame having two portions bent at right angles to each other, a solenoid and movable plunger, said solenoid being mounted within the angle formed by said two portions and having its axis and hence said plunger extending toward said gong, a connecting terminal in electrical connection with the winding of said solenoid, and means insulatingly mounting said terminal on said frame, said terminal adapted to have a conductor that is brought through a knock-out connected thereto.

26. In construction of the character described, in combination, a standard outlet box having flanged end walls each provided with a threaded opening for receiving a screw, and having a wall thereof provided with a knock-out, an electric signaling device, a frame carrying said signaling device, said frame being of greater length than width and having portions extending in the direction of its length adapted to overlap said flanged ends of said box, said portions being provided with openings to receive the screws coacting with said threaded openings, said frame being bent relative to its length and said signaling device being shaped to occupy such a fraction of the space within said box as will leave exposed and accessible said knock-out.

27. In construction of the character described, in combination, a standard outlet box having flanged end walls each provided with a threaded opening for receiving a screw, and having a wall thereof provided with a knock-out, electric signaling means, a frame carrying said signaling means and having portions adapted to overlap said flanged ends of said box, said portions being provided with openings to receive the screws coacting with said threaded openings, said frame and signaling means being shaped to occupy such a fraction of the space within said box as will leave the remainder of the space of said box available to accommodate conductors brought into the box through a knock-out, a terminal board of insulating material having a plurality of terminal members in permanent electrical connection with said signaling means and adapted to have said conductors connected thereto, said terminal board being carried by said frame and positioned to expose the terminals thereof to the said remainder of the space of said box, said frame being provided with threaded holes spaced apart by a distance similar to the spacing of the holes in a standard cover plate, and a standard cover plate secured to said frame and overlapping said outlet box, and screws threaded into said threaded openings on said frame for securing said cover plate in position.

28. A signaling unit comprising, in combination, a frame bent and set into and secured to an outlet box and having apertured sheet-like means closing over the front of said frame, audible signaling means carried by said frame on the rear side of said sheet-like means, a finishing cover plate dimensioned to overlap said apertured sheet-like means, and means for securing said finishing cover plate in overlapping position.

29. A signaling installation comprising, in combination, a conduit box adapted to be set into a wall and having an opening through which a conductor may be led, end walls of said box being provided with supporting portions having threaded openings therein, a sheet metal frame having end flanges overlapping the supporting portions of said box and having intermediate end portions extending inwardly into said box, said frame having means extending substantially along the plane of said end flanges and having means bridging the inner ends of said end portions, electromagnetic audible signaling mechanism carried by said frame within the space between said two means and said two end portions, terminal means associated with said frame and in electrical connection with said signaling means and adapted to have said conductor attached thereto, screws threaded into said threaded openings for

securing said end flanges to said supporting portions of said box, said first-mentioned means forming a protective covering for said signaling means when said frame is inserted into the box and secured thereto, and a finishing cover plate secured to said frame and dimensioned to overlap the wall into which said box is inserted.

30. A signaling installation comprising, in combination, a conduit box adapted to be set into a wall and having an opening through which a conductor may be led, end walls of said box being provided with supporting portions having threaded openings therein, a sheet metal frame having end flanges overlapping the supporting portions of said box and having intermediate end portions extending inwardly into said box, said frame having means extending substantially along the plane of said end flanges and provided with a louver and having means bridging the inner ends of said end portions, electromagnetic audible signaling mechanism carried by said frame within the space between said two means and said two end portions, terminal means associated with said frame and in electrical connection with said signaling means and adapted to have said conductor attached thereto, screws threaded into said threaded openings for securing said end flanges to said supporting portions of said box, said first-mentioned means forming a protective covering for said signaling means when said frame is inserted into the box and secured thereto, and a cover plate dimensioned to overlap the wall into which said box is set and having an opening through which said louver is exposed.

31. A signaling unit comprising, in combination, a frame having end members by which it is secured to a conduit box, audible signaling means carried by said frame and accommodated to the rear of the plane of said end members, said frame having a louver extending substantially in the plane of said end members, a finishing cover plate secured to said frame and over the front thereof and having an opening through which said louver is exposed.

32. A signaling unit comprising, in combination, a frame having end members adapted to be secured to the supporting portions of an outlet box, electro-responsive audible signaling means carried by said frame and positioned to the rear of the plane of said end members, said frame having a sheet metal louver portion extending substantially in the plane of said end members, a terminal board of insulating material supported by said frame in a plane substantially parallel to said first-mentioned plane but to the rear thereof, said terminal board having terminal connecting members in electrical connection with said electro-responsive signaling means and adapted to have conductors secured thereto, a cover plate extending over the front of said louver portion and having an opening through which said louver is exposed, and means securing said cover plate to said frame.

In testimony whereof, I have signed my name to this specification this 4th day of December, 1930.

CHRISTIAN MILLER.