

Feb. 17, 1942.

A. L. BOLZ ET AL
AUDIBLE SIGNAL DEVICE
Filed Oct. 7, 1939

2,273,688

2 Sheets-Sheet 1

FIG. 1

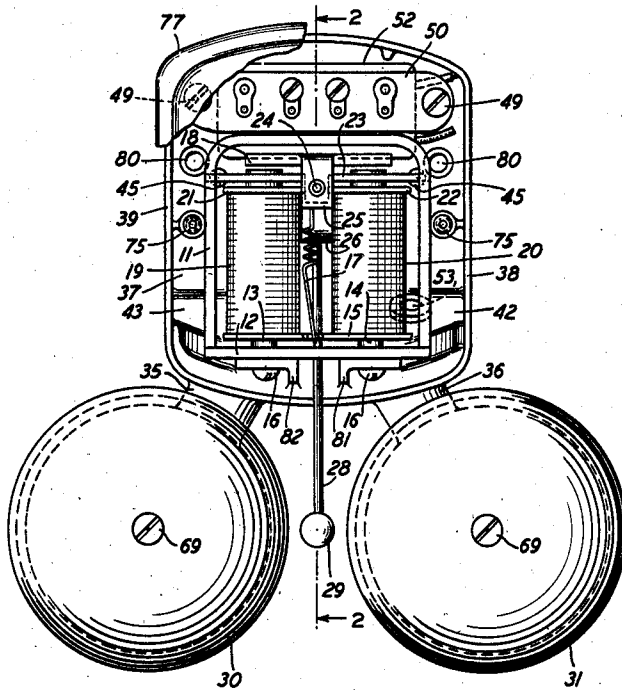


FIG. 2

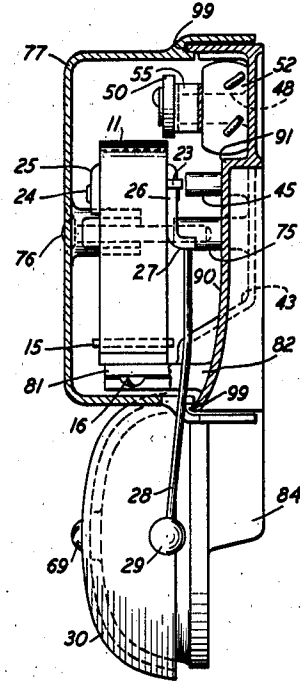
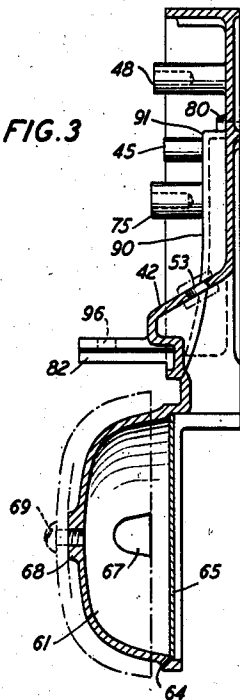


FIG. 3



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FIG. 4

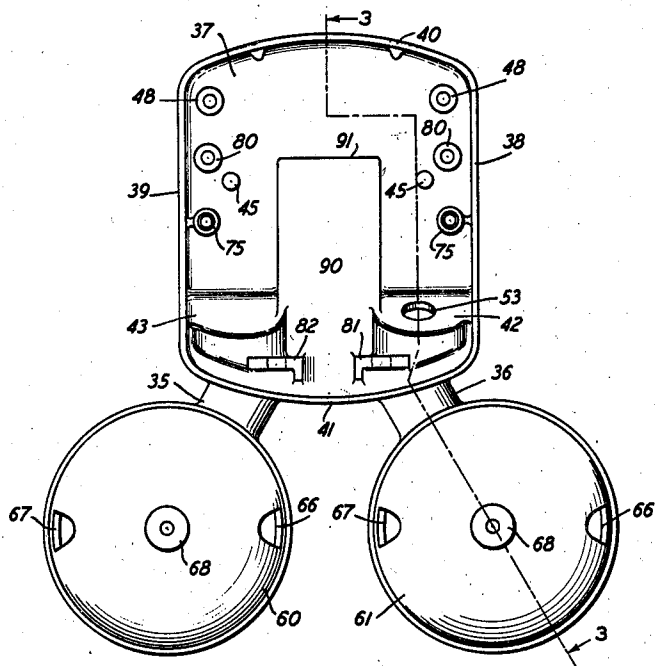


FIG. 5

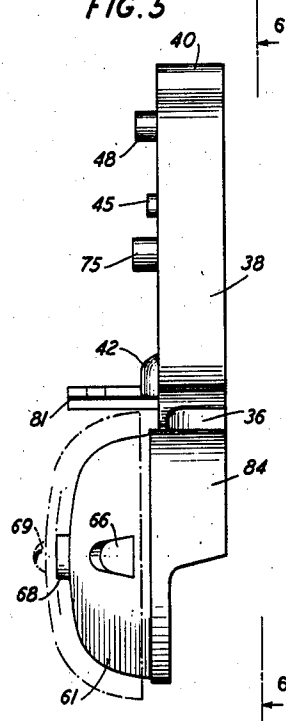
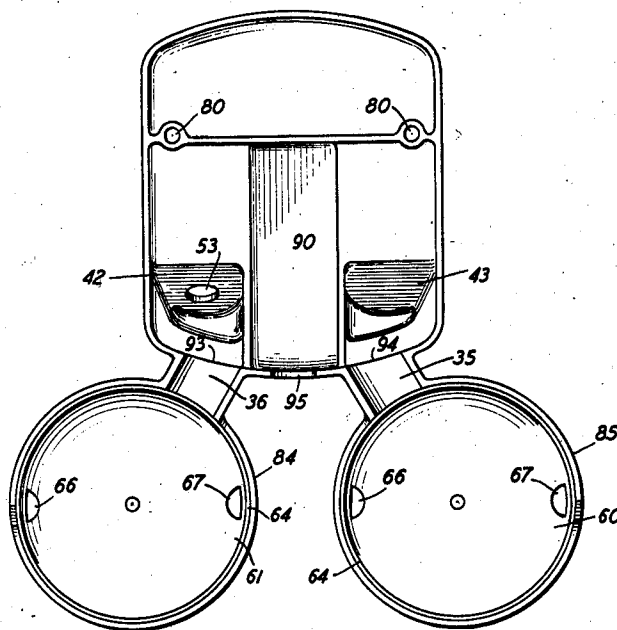


FIG. 6



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2,273,688

AUDIBLE SIGNAL DEVICE

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Application October 7, 1939, Serial No. 298,408

6 Claims. (Cl. 177—7)

This invention relates to audible signaling devices of the type generally known as telephone ringers and particularly to heavy duty ringers intended for use under severe operating conditions and in localities requiring a sound signal of relatively great intensity.

The object of this invention is to simplify and otherwise improve the construction of telephone ringers whose sound emitting elements are equipped with mechanical sound amplifiers in the form of resonators.

This object is attained in accordance with one feature of the invention by housing the electromagnetic portion of the ringer in an enclosed compartment comprising a die-cast, or molded base and a similarly constructed cover, the latter being secured to the base by means of screws which are threaded into tapped bosses projecting from the front face of the base.

A more pertinent feature of the invention resides in casting the sound resonators integral with the base which supports the electromagnetic structure of the ringer.

These and other features of the invention will be readily understood from the following detailed description made with reference to the accompanying drawings, in which:

Fig. 1 is a front elevation of a ringer designed in accordance with the present invention and with a portion of the cover broken away to reveal the interior design of the mounting base and the method of mounting the electromagnetic structure on the base;

Fig. 2 is a section of the mounting base and cover taken along the line 2—2 of Fig. 1 looking in the direction of the arrows. In this figure the equipment mounted on the base is shown in full;

Fig. 3 is a section of the mounting base taken along the line 3—3 of Fig. 4 looking in the direction of the arrows;

Fig. 4 is a front elevation of the mounting base stripped of the ringer equipment;

Fig. 5 is a side elevation of the base illustrated in Fig. 4; and

Fig. 6 is a rear elevation of the mounting base.

The subject-matter disclosed in the drawings may be considered to consist of two main parts, namely, the ringer per se, and the housing therefor which consists of the mounting base and cover. The first description will be directed primarily to the construction of the ringer per se and will be followed by a detailed description of the mounting base.

The ringer per se is built along well-known lines and consists essentially of a pair of magnet

coils, a permanent magnet, an armature, a clapper rod secured to the armature and a pair of gongs between which the clapper rod functions when the magnet coils are energized to cause the gongs to be alternately struck.

Referring now to the drawings and particularly to Figs. 1 and 2, the ringer consists of a U-shaped permanent magnet 11 whose extremities are bridged by a cross-bar 12 of magnetic material. The cross-bar 12 may be secured to the permanent magnet ends in any suitable manner, preferably by welding. The cross-bar 12 serves as a support for the spaced cores 13 and 14 of the ringer electromagnets. Each core is provided with a winding such as 19 and 20, and passes through an aperture in the insulating plate 15 which serves as a spoolhead and is common to the two windings 19 and 20 of the ringer. The lower ends of the cores 13 and 14 are drilled and tapped to receive machine screws 16 which serve to secure the electromagnetic structure to the mounting base, as will appear more fully in a later description.

The plate 15 is a comparatively stiff strip of insulating material, such as phenol fibre and has its front edge provided with a series of spaced notches into which the free end of an armature biasing spring 17 fits. By moving the free end of the biasing spring 17 from one notch to another the biasing torque on the armature 18 may be adjusted, the other end of the spring 17 being staked or otherwise fixed to a depending integral arm 25 of the armature.

The coils 19 and 20 are wound on the cores 13 and 14 respectively, between the strip 15 and the circular spoolheads 21 and 22, respectively, the latter being apertured to permit them to be slipped over the shank and against the head of their respective cores. The upper ends of the cores 13 and 14 project beyond the upper face of the spoolheads 21 and 22, respectively, and extend through circular apertures in the non-magnetic yoke 23. The dimensions of the upper core ends and of the yoke apertures are such that the yoke is held firmly on the core ends.

The yoke 23, though substantially totally confined between the two side legs of the permanent magnet 11, is provided with a small integral projection extending from each of the rear corners thereof which abut against the rear edges of the permanent magnet 11. At each side of its mid-section the yoke 23 is provided with a depending lug, one of which is shown in broken lines behind the armature lug 25, which lugs are provided with aligned circular holes through and beyond

which the armature mounting pin 24 extends. The armature 13 consists of an elongated flat magnetic body portion of sufficient length and width to extend over the upper face of the cores 13 and 14 when mounted on the extremities of pin 24 as will now be described. Each side of the armature is provided at its mid-point with a depending arm or lug, such as 25 and 26, which is provided with a small circular aperture through each of which a protruding end of the pin 24 extends and is then staked. In this manner the armature 13 is supported by the yoke 23 through the agency of the pin 24 which is free to rotate in the small apertures in the yoke lugs.

The rear integral extension or lug 26 of armature 13 is of greater length than the corresponding front lug 25 and terminates in an outwardly projecting portion 27 (Fig. 2) to which the clapper rod 28 is staked. At its lower extremity, the rod 28 carries a striker ball 29.

When the windings 19 and 20 of the ringer are energized the armature 13 is caused to operate in the well-known manner. The clapper rod 28 is correspondingly actuated and the striker ball 29 caused to strike the gongs 30 and 31 alternately. The manner in which the gongs are mounted will appear from the following description directed to the construction of the mounting base and the integrally formed resonators.

The mounting base which serves as a support for the electromagnetic structure and bells of the ringer is die-cast, or molded of aluminum or some other suitable alloy, and consists essentially of a substantially rectangular wall 37 and a pair of diverging neck-like extensions 35 and 36, each of which terminates in a substantially hemispherical dome-like portion 60 or 61. The wall 37 is provided with two straight side walls 33 and 39, a slightly arcuate upper wall 40 and a similarly shaped lower wall 41, the latter being open at 93, 94 and 95. The outlet 95 communicates with a compartment 90 formed by an inclined forwardly projecting depression whose upper edge or boundary constitutes a shoulder which, in effect, defines the lower edge of a compartment whose upper boundary is the arcuate wall 40. This upper compartment serves to house a condenser 52 which is utilized in the ringer circuit. The compartment effected by boss 42 constitutes a receptacle or enclosure for the wires of the ringer circuit which pass by way of the neck portion 36, through the aperture 53 in boss 42, to be eventually terminated at the terminal strip 50, to be more fully referred to hereinafter.

On either side of the compartment 90 and located near the lower end of the wall 37, is formed a forwardly extending inclined boss 42 or 43, each of which has integrally formed therewith a pedestal or shelf-like extension 81 or 82. The extent to which the pedestal portions extend beyond the front edge of the side walls, as well as the depth of the side walls are clearly disclosed in Fig. 5. Each of the pedestal portions is provided with a circular hole 96 (Fig. 3) through which mounting screws 16 pass to engage and securely fix the electromagnetic structure of the ringer, as will be explained more fully later.

On each side of the rear wall 37 and extending forwardly therefrom, is a series of substantially cylindrical bosses 45, 48 and 75 whose purposes will be described presently. The bosses 48 serve to support the terminal strip 50 which is secured to the bosses by means of screws 49, the said bosses being tapped to receive the screws. 75

Interposed between the upper faces of the bosses 48 and the terminal strip 50 are located the ends of a bow spring 55 which is arched in such a manner as to press against the condenser 52 and hold it firmly against the face of the wall 37, the said condenser being further confined between the shoulder 91 and the upper wall 40 of the base.

The bosses 75 are tapped for the reception of the cover screws 76 which serve to secure the cover 77 rigidly to the base. The purpose of the bosses 45 will appear from the description having to do with the mounting of the electromagnetic structure on the pedestal portions 81 and 82.

The bosses 30 are relatively short and merely strengthen the apertures through which screws, used in mounting the base on a support, pass.

In mounting the electromagnetic structure on the base, the cross-bar 12 is seated on the pedestal projections 81 and 82 with the apertures thereof in alignment. The screws 16 are then passed through these apertures and screwed into the tapped ends of the cores 13 and 14. The electromagnetic structure is thus held in an upright position, and the height of the bosses 45 is such that the rear edge projections of yoke 23 abut against the faces of the bosses 45. Thus the electromagnetic structure is fixedly held in spaced relation to the inner face of the rear wall 37 of the mounting base.

As clearly disclosed in Figs. 5 and 6, the outside walls of the neck portions 35 and 36, in effect, constitute continuations of the side walls 39 and 38, respectively, and at their lower ends, these outside walls are continued or extended in an arc of a circle for substantially 120 degrees, though this length of arc is not critical. These curved flanges constitute apron-like extensions 84 and 85 from the dome-like portions 61 and 60, respectively, and serve as guards against the ingress of moisture or other foreign material which might cause deterioration of the ringer wiring. It will also be noted that the side wall edges and the edges of the guards 84 and 85 are in the same plane, so that any pressure which may be applied to the dome-like portions 60 and 61 during the mounting of the gongs thereon, or at any other time, will not cause any undue stress on the neck-like portions 35 and 36 which might cause them to break.

The dome-like portions 60 and 61 are substantially hemispherical in shape, having the same general contour as the gongs they support. The portions 60 and 61 constitute sound resonators for the bells 31 and 30, respectively and are each provided with a boss 68 located at the apex of the dome and tapped to receive the gong mounting screws 69. The depth of the boss 68 is such as to space the gong from its respective resonator a predetermined distance. The edge or rim of each of the resonators is flanged to effect a circular ledge 64 upon which is force-fitted a circular metal disc 65 which constitutes a cover for the resonator. Each resonator is provided with a pair of diametrically disposed substantially triangular-shaped openings 66 and 67 of predetermined dimensions. These openings, or apertures are so located on the resonator wall that the rear edge thereof is in substantial alignment with the rim of the gong with which the resonator functions. The apertures 66 and 67 are also so located that when the electromagnetic structure is secured to the base, the inner openings are positioned opposite the points on their respective

gongs at which the striker ball 29 engages the gong when the ringer coils are energized. This is to insure maximum tone amplification.

After mounting the ringer structure on the pedestal portions 81 and 82 of the base, the cover 77 may be fitted over the side and end walls of the base and the screws 76 screwed into the tapped bosses 75. The cover rim is so constructed that a groove 99 is formed into which the edges of the side and end walls of the base fit. If desirable a gasket may be used at this point as a seal. The lower face of the cover at its rear mid-point is provided with an opening through which the clapper rod 28 extends.

Should it be desirable, the rear wall of channel 90 may be apertured and provided with a bushing through which the clapper rod 28 may pass and thence be passed downwardly through the opening 95 in the rear of the lower arcuate edge of the base. This would serve to prevent moisture from entering the housing by way of the aperture through which the clapper rod passes.

What is claimed is:

1. In combination, a telephone ringer having a bell, and a mounting for said ringer comprising a casting to which said ringer is secured and having a hemispherically shaped portion supporting said bell and constituting a resonator therefor.

2. In combination, a telephone ringer having a bell, a resonator formed with a resonating air chamber, said resonator having a wall of substantially the same contour as the bell, means for mounting said bell on said resonator in spaced telescopic relation, a base formed integral with said resonator providing means for mounting said ringer thereon and a cover for the mouth of the resonating chamber removably associated with said resonator.

3. A ringer mounting comprising a base having an integral pedestal to which said ringer is secured, a pair of resonators cast integral with said base and means for mounting the ringer gongs on said resonators in telescopic relation.

4. A support for a ringer having an electromagnetic operating mechanism and a pair of cup-

shaped gongs, comprising a base having a pair of pedestal portions cast integrally therewith for supporting said electromagnetic operating mechanism, a pair of arms cast integral with said base and diverging therefrom below said pedestal portions and terminating in substantially hemispherical portions arranged to support said cup-shaped gongs in telescopic relation thereto.

5. A support for a ringer having an electromagnetic operating mechanism and a pair of cup-shaped gongs, comprising a base having integral pedestal portions upon which said operating mechanism is supported and a pair of resonators cast integral with said base and having the same general contour as said gongs and provided with two small openings in the walls thereof, substantially 180 degrees apart, said resonators constituting a support for said gongs and adapted to mount said gongs so as to locate the resonator openings near the mouths of said gongs.

6. A mounting for a gong type telephone ringer comprising a base having a pair of shelf-like projections cast integral therewith and extending outwardly therefrom, to which one end of the ringer may be secured in spaced relation to said base, a pair of bosses cast integral with said base and projecting therefrom in the same direction as said shelf-like projections against which the upper end of said ringer abuts, a pair of diverging neck-like portions cast integral with and projecting from said base and having dome-like portions cast integrally therewith upon which the gongs of said ringer are mounted, and an apron-like portion cast integrally with and extending from the rim of said dome-like portions and having its outer edge in alignment with the rear surface of said base whereby said neck-like portions are protected against breakage upon the application of pressure on said dome-like portions during the mounting of the gongs thereon.

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