

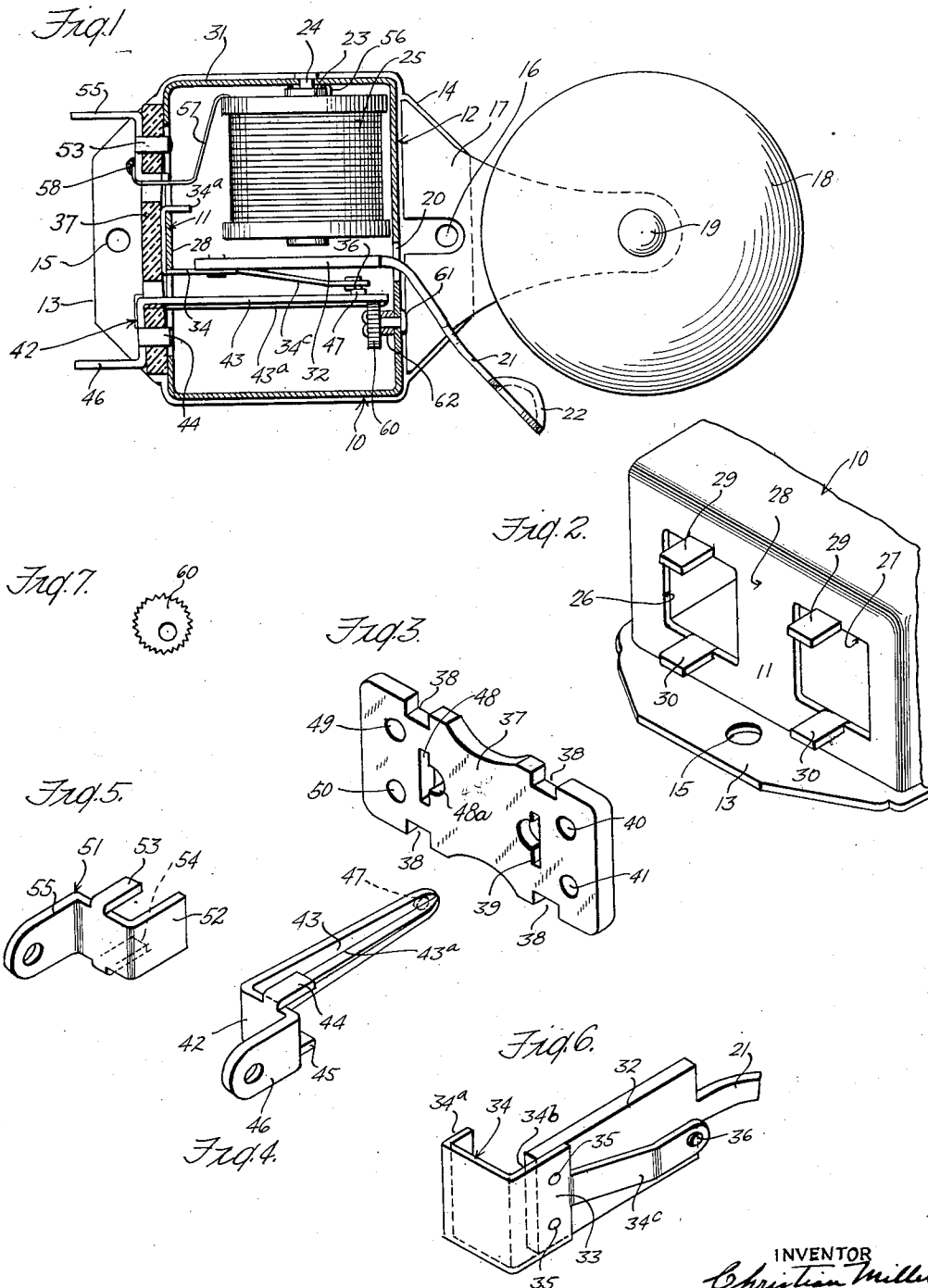
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C. MILLER

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SIGNALING APPARATUS

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INVENTOR
Christian Miller
BY *James, Blair & Co.*
ATTORNEYS

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SIGNALING APPARATUS

Christian Miller, New York, N. Y., assignor to
Edwards and Company, Inc., a corporation of
New York

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This invention relates to signaling apparatus, particularly of the audible type, such as electrically actuated bells or buzzers. One of the objects of this invention is to provide a simple and thoroughly practical electric buzzer or bell construction that will be capable of rapid and inexpensive manufacture and thoroughly dependable and reliable action in practical use. Another object is to provide a construction of the above-mentioned character that will be capable of rapid and inexpensive assembly. Another object is to provide a construction of the above-mentioned character that will be compact and capable of embodiment in very small form. Another object is to provide a construction for buzzers or bells in which there is embodied the relatively small number of parts. Another object is to provide a construction of the above-mentioned character that will be capable of quantity production. Another object is to provide a buzzer and bell construction well adapted to meet the varying conditions of hard 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 drawing in which is shown one of various possible embodiments of my invention,

Figure 1 is a plan view, partly in section, showing the assembled device on an enlarged scale,

Figures 2, 3, 4 and 5 may be considered as an exploded perspective view of several of the parts prior to assembly thereof, and more particularly, Figure 2 is a perspective view of a portion of the casing, as viewed generally from the left in Figure 1, Figure 3 is a perspective view of an insulating block or member, Figure 4 is a perspective view of a combined terminal and contact member, and Figure 5 is a like perspective view of a terminal member; and

Figure 6 is a perspective view, with certain parts broken away, of the movable part or parts of the device.

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

Referring now more particularly to Figure 1, there is shown a sheet metal casing 10 preferably of a generally rectangular shape and preferably open at its bottom. Adjacent to preferably two of its end walls 11 and 12 the casing has inte-

grally formed therewith securing flanges 13 and 14, each provided with a suitable aperture or apertures 15 and 16 (see also Fig. 2), which are adapted to rest against the surface or wall to which the device is to be applied, suitable securing devices, such as screws or the like, being passed through the openings 15 and 16.

Overlapping and secured to the flange 14, as by spot welding thereto, is a bracket 17, conveniently in the form of a sheet metal stamping, and suitably bent upwardly (toward the observer viewing Fig. 1) to extend within and support a gong 18, the latter being secured thereto as by a rivet 19. The end wall 12 which is adjacent the gong 18 is cut away as at 20 to permit an arm 21 carrying a gong clapper 22 to extend there-through, the arm 21 being suitably shaped or bent to position the clapper 22 within proximity of the gong 18.

The casing 10, which is preferably drawn out of a single piece of sheet metal, has mounted in its upper right-hand corner, as viewed in Figure 1, a core 23, the latter having a reduced portion 24 extending through a suitable opening in the side wall 31 of the casing 10 and headed over to hold the core 23 rigidly in place. The core 23 has extending thereabout a winding or coil 25 adapted to be energized from any suitable source of current and adapted, in coaction with the core 23, to actuate the clapper 22, all as will be more clearly described hereinafter. The end wall 11 and the side wall 31, as appears better from Figure 1, together form two arms, at right angles to each other, and insofar as certain aspects of my invention are concerned, I term these two arms as an L-shaped frame.

The left-hand end wall of the casing 10, referring now to Figure 2, is cut away or punched to provide two preferably rectangularly shaped and laterally spaced openings or windows 26 and 27, the spacing of the two openings leaving therebetween a portion 28 of the side wall 11 for a purpose to be more clearly described hereinafter. The windows 26 and 27 are cut out in such a way as to leave upper and lower ears 29 and 30 bent outwardly, as is clearly shown in Figure 2, adjacent the openings themselves.

The arm 21 (Figs. 1 and 6) is moved by an armature 32 of generally rectangular shape, the armature 32 being mounted for vibratory movement toward or away from the core 23. Preferably I provide a sheet metal member 33 (Fig. 6) made of a suitable spring material, such as phosphor bronze, for example, and shape the member substantially as shown in Figure 6, thus pro-

viding it with a substantially U-shaped portion 34, the arms 34^a and 34^b of which are so spaced as to snugly receive therebetween the portion 28 of the side wall 11 (see Fig. 1). To the arm 34^b, which is longer than the arm 34^a, I secure the armature 32 as by the rivets 35. Also, the arm 34^b is provided with an extension 34^c extending toward the right along the armature 32 and terminating adjacent the right-hand end thereof but spaced therefrom. At its extreme right-hand end I provide the extension 34^c with a suitable corrosion-resisting contact 36 made of a material, for example, like German silver.

With the U-shaped portion 34 assembled with respect to the side wall 11, substantially as shown in Figure 1, the armature 32 is suitably positioned for coaction with the core 23 of the magnet 25, it being understood that the armature 32 and the core 23 are made of a suitable magnetic material. Preferably, the armature 32 is made of a suitable thickness of sheet iron, the armature 32, arm 21, and clapper 22, being preferably made of the same piece of metal and conveniently and preferably stamped in one piece. The clapper 22, as is clearly shown in Figure 1, is substantially hemi-spherical and hollow, being thus shaped by suitable dies.

With the U-shaped portion 34 interengaged with the portion 28 of the side wall 11, I then place against the outer face of the wall 11 an insulating block 37 shaped preferably substantially as indicated in Figure 3. The block 37 is of sufficient length and breadth to close the openings or windows 26 and 27 and is provided with suitable recesses 38 in its upper and lower edges to receive the ears 29 and 30 (see Fig. 2) extending outwardly from the side wall 11 of the casing 10. These ears are thereupon bent over upon the outer surface of the insulating block 37, thus securely clamping the latter against the end wall 11 of the casing and positively securing the spring member 33 (Figs. 6 and 1) to the side wall 11.

The insulating block 37 is, however, provided with suitable openings which overlap the windows or apertures 26 and 27 in the side wall 11 of the casing 10. For example, referring to Figure 3, the right-hand portion of the insulating block 37 is provided with a slot 39 generally of a rectangular shape and extending transversely and to the right of this slot 39 there are provided two holes 40 and 41. A combined terminal and contact member generally indicated in Figure 4 at 42 has a shank 43 that passes through the slot 39 and is provided with ears 44 and 45 that pass through the holes 40 and 41 in the insulating block, being bent over upon the rear face of the block 37 to securely clamp the member 42 to the block 37. The member 42 is provided with a shank 46 which projects away from the insulating block 37 (see Fig. 1) and the shank 46 is provided with any suitable means, such as a binding screw or the like (not shown), for making an extraneous electrical connection thereto. The shank 43 of the member 42 (see Fig. 1) extends substantially parallel to the armature 32 and at its right-hand end has suitably secured thereto a corrosion-resisting contact 47 adapted to coact with the contact 36 on the spring arm 34^c (Figs. 1 and 6).

The shank 43 and the bent over ears 44 and 45 of the member 42 will be seen, by reference to Figure 1, to pass through or into the window or opening 27 in the end wall 11 and are thus held out of electrical contact with the casing 10.

At its left-hand portion the insulating block 37 is provided with a rectangular slot 48 adjacent to which are provided holes 49 and 50. A terminal member generally indicated in Figure 5 at 51 is provided with a short shank 52 and spaced ears 53 and 54 adapted to pass through the openings 49 and 50, respectively, in the insulating block 37, the ears 53 and 54 being thereupon bent over securely to hold the terminal member 51 in assembled relation to the block 37. Such parts 10 of the terminal member 51 as are exposed on the rear face of the insulating block 37 will be seen to fall well within the compass of the window 26 and are thus held out of electrical contact with the casing 10. The member 51 (Fig. 5) is provided with a shank 55 extending away from the block 37, the shank 55 being in turn provided with any suitable means, such as a binding screw or the like (not shown), adapted to permit an electrical connection to be readily made there- 20 with.

Preferably, the terminal members 51 and 42 (Figs. 5 and 4) are assembled in the manner substantially as above described with respect to the insulating block 37 prior to securing the latter 25 to the end wall 11 of the casing.

Considering now the circuit of the coil or winding 25, it is first pointed out that one terminal or end 56 (Fig. 1) is grounded to the casing 10, being conveniently clamped between the core 23 30 and the side wall 31. The other end of the winding 25 is connected by conductor 57 to the terminal 51, being passed through a suitable lateral extension 48^a (see Fig. 3) of the slot 48 in the insulating block 37, whence the conductor 57 is 35 soldered to the terminal 51, as is indicated at 58.

Assuming a suitable source of current to be connected to the terminals 55 and 46, the operative circuit will thus extend from the terminal 55, thence by way of conductor 57 through the winding 25 and by way of the end or terminal 56 of the latter to the casing 10; from the latter the circuit continues by way of the spring member 33, the U-shaped portion 34 of which is in electrical contact with the portion 28 of the side 45 wall 11 and is held in electrical contact therewith by the clamping action of the insulating block 37. Thence the circuit continues by way of the spring extension 34^c through contact 36, thence contact 47, and by way of the shank 43 to the other 50 terminal 46. The armature 32 is thus attracted and swung in counter-clockwise direction, as viewed in Figures 1 and 6, the clapper 22 striking the gong 18. This movement is effected against the yieldable action of the spring arm 55 34^b of the member 33. At the same time, however, this movement effects a separation of the contacts 36 and 47 (Fig. 1) due to the movement of the spring arm 34^c with the armature 32 in a direction away from the fixed contact 47. Thus the 60 circuit is interrupted, the magnet 25—32 is deenergized, and the spring arm 34^b swings the armature 32 and the clapper 22 in clockwise direction, bringing the contact 36 again into electrical engagement with the fixed contact 47, thus again 65 closing the circuit, and thus repeating the cycle as long as the energizing circuit is maintained closed outside of the device itself.

The action of the device may be predetermined by suitable adjustment of various of the parts. 70 For example, the position of the armature 32 with respect to the core 23 may be easily determined by forcibly bending the spring arm 34^b into the desired angularity necessary to fix the position of the armature 32. Likewise, the relation be- 75

tween the interrupter contacts 36 and 47 may be easily predetermined either by giving the spring arm 34^c suitable bends but preferably by forcibly bending the shank 43 to bring the otherwise fixed contact 47 nearer to or farther away from the armature 32. Preferably the shank 43 is stamped to have formed therein a rib 43^a in order to give the shank 43 greater rigidity and greater permanence of adjustment when once bent into desired position.

The device, as already above pointed out, embodies a number of features that make it possible, readily and inexpensively to build the apparatus in such diminutive forms that it is particularly adapted for use as a toy or in connection with toy apparatus. When thus embodied, the device is apt to be subjected to considerable rough usage, and may and oftentimes is dropped or banged around. To preclude disarrangement of certain of the operating parts when the device is roughly handled, I provide a stop 60, preferably in the form of a washer made of a suitable insulating material, like fibre, and preferably shaped substantially as shown in Figure 7, and rigidly support this washer 60 adjacent the shank 43, as is better shown in Figure 1. Preferably this washer is supported by means of an eyelet 61, which rivets the washer 60 and an interposed spacer 62 to the end wall 12 of the casing 10, the washer 60 being thus positioned to abut against the right hand and free end of the shank 43. Thus if the device is dropped or receives a blow from any cause so as to tend to spring the shank 43 in clock-wise direction, as viewed in Figure 1, the movement of the shank 43 in a direction away from the spring extension 34^c, which carries the contact 36, is definitely prevented and thus there is no danger of such a separation of the contact 47, carried by the shank 43, from the contact 36, carried by the spring extension 34^c, when the latter is in its normal position, as will prevent the intended electrical and mechanical operation of the device from taking place.

Preferably also the washer 60 is eccentric, and is toothed throughout its periphery, as is clearly shown in Figure 7, and preferably also is so held by the eyelet 61 as to permit rotation, at will, of the eccentric washer 60 about the rivet 61. The recesses provided between adjacent teeth in the periphery of the washer 60 are of such sizes as to snugly receive the rib 43^a in the shank 43. The rotation of the eccentric washer 60 may thus be utilized to adjust the shank 43, and hence its contact 47 toward or away from the spring-carried contact 36, the interlocking of the rib 43^a with the toothed periphery of the eccentric 60 holding the latter not only in position to prevent undesired distortion of the shank 43 when the device is roughly handled, but also against rotation out of adjusted position.

It will thus be seen that there has been provided in this invention an apparatus in which the various objects hereinabove noted, as well as many thoroughly practical advantages, are successfully achieved. It will be seen that the apparatus is of a thoroughly practical construction and that practically all of the metal parts thereof may be readily stamped out of sheet metal by operations that are simple, speedy and inexpensive. Moreover, it will be noted that the various parts may be rapidly and dependably assembled by operations that are simple and inexpensive to carry on. Also, it will be seen that a great compactness of construction is achieved and it may here be pointed out that I have been able

to construct my invention in quite diminutive form to meet certain practical conditions of use. I might also note that where I desire to dispense with the gong and have the device operate solely as a buzzer, I simply provide an armature 32 that is devoid of the arm 21 and clapper 22 and I simply eliminate the step of spot welding the extension 17 to the flange 14. The device, moreover, will be seen to be well adapted to meet the varying conditions of hard practical use.

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 drawing is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In audible signaling apparatus, in combination, a sheet metal housing having a coil supported therein and having a pair of apertures in a side wall thereof, an armature with which said coil coacts, a leaf spring to which said armature is attached and having a U-shaped portion extending about that portion of the side wall intervening said apertures, a sheet of insulating material substantially closing said apertures and extending over said U-shaped portion, means securing said sheet to said side wall to cause it to hold said leaf spring in position, a terminal secured by ears to said insulating material over one of said apertures and having one terminal of said coil connected thereto, and a terminal secured by ears to said insulating material substantially over said other aperture, said terminal having an extension extending inwardly of said housing and adjacent said armature and said extension having a part adapted to form one of the make and break contacts.

2. In audible signaling apparatus, in combination, a sheet metal casing having mounted therein a coil, a wall of said casing being apertured, an armature for coaction with said coil, a yielding part for said armature to permit it to vibrate, means including a block of insulating material secured to said casing for securing said yielding part to said casing, said block of insulating material extending over said aperture, a terminal carried by said insulating block, and a conductive member in electrical connection with said terminal passing through said insulating block and into said casing and adjacent said armature to limit extent of vibrating movement of said armature.

3. In audible signaling apparatus, in combination, a sheet metal casing having a coil mounted therein, an armature for coaction with said coil, yielding means secured to said armature, an insulating block resting against a wall of said casing and having said yielding means interposed between itself and said wall, a plurality of ears on said casing for holding said insulating block in place, and a terminal carried by said insulating block and having one end of said coil connected thereto.

4. In audible signaling apparatus, in combination, a casing having a coil mounted therein and having a pair of apertures in a side wall thereof, an armature for coaction with said coil, a yielding part for said armature, said part being substantially U-shaped and substantially fitted over the part of said side wall intervening said apertures, said yielding part supporting said armature for yielding movement relative to said coil and said side wall being provided with a plu-

ality of securing ears, and a block of insulating material secured to said side wall by said ears and clamping apart of said U-shaped portion between itself and said side wall.

5 5. In audible signaling apparatus, in combination, a substantially L-shaped frame having a core secured to one arm thereof and extending substantially parallel to the other arm thereof, a coil about said core, an armature for coaction
10 with the other end of said core and extending substantially parallel to said one arm, a leaf spring secured to said armature and having a portion bent at right angles and extending lengthwise of said other arm, and means including
15 an elongated block of insulating material extending along and secured to said other arm and engaging said bent portion of said leaf spring for holding said leaf spring, both said block and said bent portion extending toward said one arm.

20 6. In audible signaling apparatus, in combination, a substantially L-shaped frame having a core secured to one arm thereof and extending substantially parallel to the other arm thereof, a coil about said core, an armature for coaction
25 with the other end of said core and extending substantially parallel to said one arm, a leaf spring secured to said armature, a block of insulating material between which and said other arm said leaf spring is interposed, means securing
30 said block to said other arm, thereby to hold said leaf spring in place, said leaf spring having a contact movable therewith, a contact arm having a contact with which said leaf-spring contact coacts, and means securing said contact arm to
35 said block.

7. In audible signaling apparatus, in combination, a substantially L-shaped frame having a core secured to one arm thereof and extending substantially parallel to the other arm thereof,
40 said other arm being recessed, a coil about said core, an armature for coaction with the other end of said core and extending substantially parallel to said one arm, a leaf spring secured to said armature, said leaf spring being shaped
45 to substantially interengage with said recessed arm through a recess of the latter, and means preventing disengagement between said leaf spring and said other arm.

8. In audible signaling apparatus, in combination, a substantially L-shaped frame having a core secured to one arm thereof and extending substantially parallel to the other arm thereof,
50 a coil about said core, an armature for coaction with the other end of said core and extending substantially parallel to said one arm, a block of insulating material, a leaf spring secured to
55 said armature, said leaf spring and said other arm being shaped to substantially interengage a terminal to which one end of said coil is connected, means mounting said terminal on said
60 block and means securing said insulating block to said frame in a position relative to said leaf spring to hold the latter against disengagement from said other arm.

9. In audible signaling apparatus, in combination, a substantially L-shaped frame having a core secured to one arm thereof and extending substantially parallel to the other arm thereof,
70 a coil about said core, an armature for coaction with the other end of said core and extending substantially parallel to said one arm, a leaf spring secured to said armature, said leaf spring and said other arm being shaped to substantially interengage, said leaf spring having a contact
75 movable therewith, an insulating block carrying

a fixed contact for coaction with said leaf spring contact, means securing said block to said frame in a position to hold said spring against disengagement from said other arm, and means independent of said securing means for mounting said
5 fixed contact on said block.

10. In audible signaling apparatus, in combination, a substantially L-shaped frame having a core secured to one arm thereof and extending substantially parallel to the other arm thereof,
10 one of said arms being recessed, a coil about said core, an armature for coaction with the other end of said core and extending substantially parallel to said one arm, a leaf spring secured to said armature, said leaf spring being bent around and
15 through a recessed portion of said recessed arm, and insulating means carrying a terminal for said coil and secured to said frame for holding said leaf spring in position on said frame.

11. In audible signaling apparatus, in combination, a substantially L-shaped frame having a core secured to one arm thereof and extending substantially parallel to the other arm thereof, a coil about said core, an armature for coaction with
20 the other end of said core and extending substantially parallel to said one arm, a leaf spring secured to said armature, said leaf spring having a contact movable therewith, a member carrying a fixed contact for coaction with said leaf-spring-
25 contact, an insulating block, means mounting said member on said block and means securing said block to said frame in a position to hold said leaf spring in assembled relation with respect to said frame.

12. In audible signaling apparatus, in combination, a frame, a coil supported by said frame, a leaf spring member carrying an armature for coaction with said coil and having a contact thereon, a relatively rigid member having a contact for coaction with said first-mentioned contact,
40 an elongated insulating block, said two members being spaced from each other in a direction lengthwise of said insulating block, one of said members having a portion thereof extending between said insulating block and said frame at one
45 point along the length of said block, whereby said portion may be clamped between the block and the frame when the block is secured to the frame, means whereby said other member is related to and supported with respect to said insulating
50 block at a point spaced along said block from said first-mentioned point, and means securing said block to said frame.

13. In audible signaling apparatus, in combination, a frame, a coil supported by said frame, a
55 leaf spring member carried by said frame and carrying an armature for coaction with said coil and having a contact thereon, a relatively rigid member carried by said frame and having a contact for coaction with said first-mentioned contact,
60 said frame having ears, and means whereby said members are carried by said frame, said means including an insulating block secured to said frame by said ears, one of said members having means for interlocking engagement thereof
65 with said insulating block.

14. In audible signaling apparatus, in combination, a frame, a coil supported by said frame, a leaf spring member carrying an armature for coaction with said coil and having a contact
70 thereon, a relatively rigid member having a contact for coaction with said first-mentioned contact, said frame having ears, an insulating block secured to said frame by said ears, said relatively rigid member being insulated from said frame by
75

said insulating block, and means whereby said block holds said leaf spring member anchored relative to said frame.

15. In audible signaling apparatus, in combination, a frame, a coil supported by said frame, an insulating block secured to said frame, a leaf spring member carrying an armature for coaction with said coil and having a contact thereon adjacent its free end, a relatively rigid member having a contact adjacent its free end for coaction with said first-mentioned contact, said two members extending substantially parallel to each other with their free ends directed in the same direction and said two members being substantially at right angles to the plane of said insulating block, one of said members having ears at its end remote from its free end by which it is secured to said insulating block.

16. In audible signaling apparatus, in combination, a frame, a coil supported by said frame, an armature, means mounting said armature for coaction with said coil, said armature having a contact movable therewith, an elongated member having a reinforcing rib and also having a con-

tact for coaction with said first mentioned contact, means securing one end of said elongated member to said frame, and a notched eccentric member positioned adjacent to the free end of said elongated member with the rib of the latter engageable in a notch of said eccentric member, and means rotatably mounting said eccentric member on said frame.

17. In audible signaling apparatus, in combination, a frame, a coil supported by said frame, a leaf spring member carrying an armature for coaction with said coil and having a contact thereon, a relatively rigid member having a contact for coaction with said first-mentioned contact, an insulating block, means securing said block to said frame, said two members extending substantially parallel to each other and at substantially 90° to the plane of said block, said frame and block being shaped so that said block extends in a direction generally lengthwise of the axis of said coil, means securing one of said members to said block, and means securing the other of said members to said frame.

CHRISTIAN MILLER.