

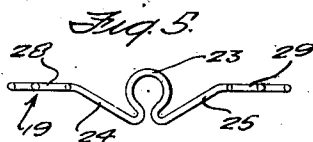
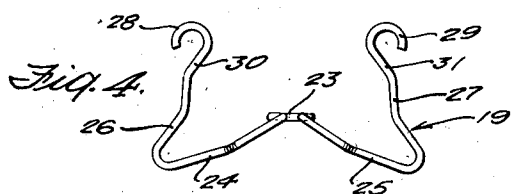
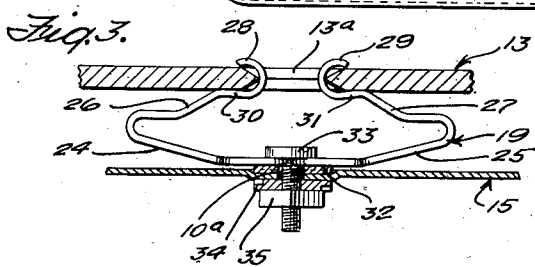
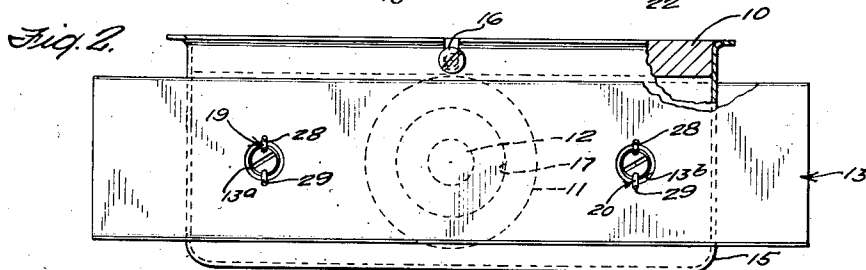
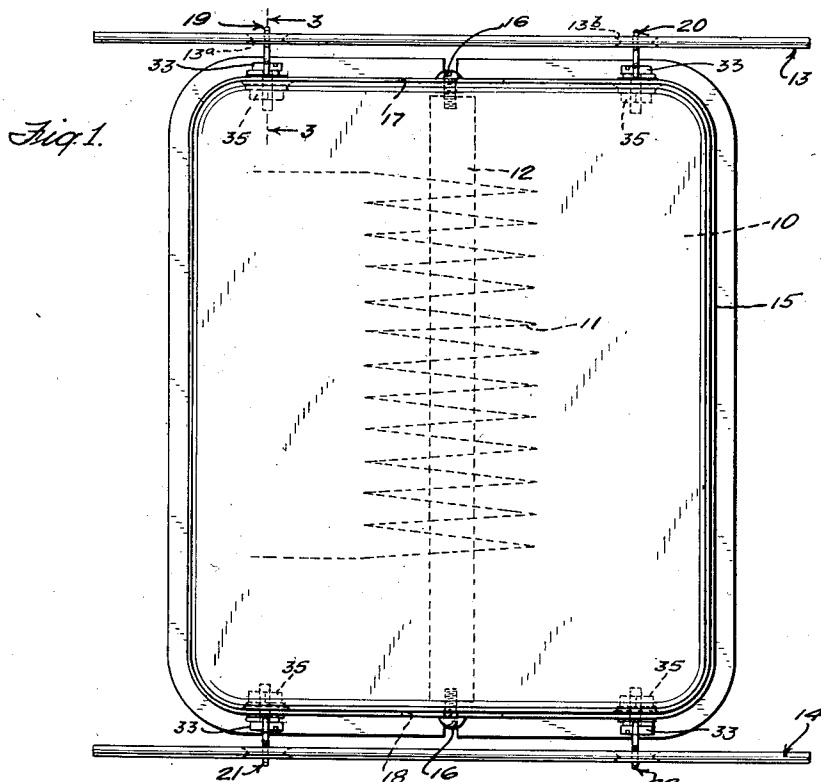
Jan. 19, 1937.

C. MILLER

2,068,629

MUSICAL SIGNALING APPARATUS

Filed Oct. 24, 1935



INVENTOR
CHRISTIAN MILLER
BY
Blair, Curtis & Dunne
ATTORNEYS

UNITED STATES PATENT OFFICE

2,068,629

MUSICAL SIGNALING APPARATUS

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

Application October 24, 1935, Serial No. 46,491

8 Claims. (Cl. 116—149)

This invention relates to audible signaling apparatus of the type in which there is a vibratable sounding element intended to give a musical note when struck, and to a mounting therefor.

One of the objects of this invention is to provide a simple, thoroughly practical and rugged signaling device or apparatus of the above-mentioned character and more particularly to provide such an apparatus that will be capable of inexpensive but sound manufacture, that will be light yet strong, and that will be capable of speedy and convenient assembly or disassembly. Another object is to provide an apparatus of the above-mentioned character in which the number of parts is reduced, thereby diminishing the cost of construction, and to simplify and make less expensive the manufacture of individual parts as well as the assembly thereof to form the complete ultimate apparatus. Another object is to provide a strong, simple, inexpensive and dependable mounting for a vibratable sounding element, particularly for an element intended to vibrate at an audio frequency that is musical, and also to provide a mounting for an element of this last-mentioned character that will have minimum interference with the acoustic or sounding properties of the sounding element itself and that will achieve dependable interaction or coaction between the sounding element and a resonating or amplifying board, structure, chamber, or the like. Another object is to provide a construction of the above-mentioned character that will be neat and attractive in appearance, as well as achieving such utilitarian objects as have just been set forth. 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 the various possible embodiments of my invention,

Figure 1 is a front elevation of a signaling apparatus;

Figure 2 is a top plan view thereof, as seen from the top in Figure 1;

Figure 3 is a vertical sectional view on an enlarged scale, as seen along the line 3—3 of Figure 1, showing the details of the mechanical interrelation and construction of the sounding element, the main support, and the mounting means for the former;

Figure 4 is a front elevation of the mounting device per se in the form in which it is constructed and which it assumes prior to interrelation with the support or casing and the sounding element, and

Figure 5 is a plan view as seen from the top in Figure 4.

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

Referring first to Figures 1 and 2, I have there shown a back plate 10 arranged in any suitable manner to be secured to any suitable supporting surface such as a wall or the like (not shown); if desired and by way of example, the back plate 10 may be provided with suitable openings through which screws may be passed to secure it to the support or wall. The back plate 10 supports, in any suitable manner or by any suitable means (not shown) a suitable striking mechanism which illustratively may take the form of a solenoid diagrammatically indicated in Figures 1 and 2 at 11, its circuit (not shown) being extended to include a suitable source of current, preferably of low voltage, and a circuit controlling device or switch. The solenoid 11 is provided with a core 12.

In so far as certain features of my invention are concerned, the solenoid winding 11 and the core 12 are intended to illustrate or typify any suitable or appropriate mechanism usually electromagnetically actuated, for effecting the striking of a vibratable or sounding element and by way of illustration of certain other features of my invention I have shown in Figure 1 two such sounding elements 13 and 14 preferably in the form of bars of suitable metal or alloy and appropriately dimensioned (see Figures 1 and 2) and shaped to produce, when set into vibration, as by a blow, musical notes, one for each of the sounding elements 13, 14, and preferably the latter are so proportioned that the two notes sounded thereby are of different pitch. They are mounted, as is later described in detail, for coaction with the striking mechanism, such as the solenoid 11 and plunger 12 and conveniently and illustratively they are positioned at the opposite ends of the stroke of the striker or solenoid core 12. Accordingly, either one or both of the sounding elements 13, 14 may be struck, depending upon the energizing circuit for the winding 11 and its control (not shown). Illustratively, also, but likewise not by way of limitation, the bar sounding elements 13, 14 are arranged horizontally because of the illustrative vertical arrange-

ment of the solenoid core 12 but it is to be understood that, due to certain other features of my invention as are later described, the sounding elements 13, 14 or one of them, where only one is desired to be employed, may be mounted in any other suitable position or angle.

I therefore provide some suitable main or rigid support and, where certain of the mechanism is to be enclosed or encased, as in the preferred and illustrative embodiment, I may provide and utilize for such support the casing structure which is to coact with the back plate 10 to form a complete enclosure for the mechanism. Such casing structure is shown in Figures 1 and 2 at 15. The casing 15 may be and preferably is of sheet metal generally rectangular in shape and is adapted to be fitted against or over the back plate 10, to form a complete enclosure therewith, and thereby secured thereto in any suitable manner, preferably detachably, as by screws 16.

The upper and lower end walls of the casing structure 15 are provided with openings 17 and 18 larger in cross-section than and alined with the solenoid core or plunger 12 so that reciprocating movement of the latter projects its ends alternately through the openings 17 and 18. Now the sounding bar or element 13 is mounted so that the part or portion thereof that is to be struck in order to set it into vibration is over the hole 17 and thus in the path of upward movement of the solenoid core 12, so that the latter, upon upward movement, may strike the member 13 a suitable blow and set it into vibration.

The other sounding element or bar 14 is similarly mounted with respect to the lower hole 18, thus to be in the path of downward movement of the solenoid core 12 and to have a suitable point or portion thereof exposed to be struck by the solenoid core 12, thereby to be set into vibration.

Since the casing structure 15 is dependably secured to the back plate 10, I prefer to utilize the casing structure 15 as the main or principal support for the sounding element or elements, and accordingly the latter is or are attached thereto in a manner to be maintained in the position or positions above described and to insure proper vibration thereof when struck. The mounting, moreover, as is later pointed out, achieves other advantages as well, for example, it may be made effective to cause the casing structure 15 to act, in part at least, as a resonator or as a sounding box, though that feature is optional.

To mount each sounding element in place I preferably provide two mounting devices, all of the same construction and arrangement. Thus, referring to Figure 1, two such devices 19-20 provide the mounting for the member 13 to the support 15 and two identical devices 21 and 22 provide for mounting the other sounding element 14 to the support 15. These devices and their connection to the support as well as their connection to the sounding element or elements, are preferably identical, thus simplifying manufacture or production as well as assembly, and accordingly it will suffice to describe one of them in detail and hence reference may now be made to Figures 3, 4 and 5 in which certain features thereof are better shown on enlarged scale.

In Figure 3, which is specifically a vertical sectional view along the line 3-3 of Figure 1 and hence through the mounting device 19, the upper end wall of the casing or support 15 is shown as

having the sounding element 13, appearing in Figure 3 in transverse section, spaced upwardly therefrom and held in that relation by the mounting device 19. The latter comprises a member made of a single piece of wire preferably of any suitable spring metal or alloy, illustratively a suitable phosphor bronze, and it is, prior to assembly to the support and sounding element, given a shape such as is better shown in Figures 4 and 5. Reference to those figures shows that the device 19 is bent to form a center loop or eye 23 whence the ends of the wire are extended oppositely from each other to provide arms 24 and 25, the bending operation so stressing the spring wire as to cause it to tend to assume the shape or bowed relation (as between the arms 24 and 25) better shown in Figure 4.

The arms 24, 25 are provided with upwardly directed extensions 26, 27, respectively, subtending therebetween an acute angle, as better appears in Figure 4. But the arms 26, 27 terminate in what might be termed hooks 28 and 29, respectively, and have intermediate portions bent substantially as shown in Figure 4, thereby providing portions 30 and 31 immediately adjacent the hooks 28 and 29, respectively, that are displaced outwardly away from but extend generally parallel to the remaining or lower portions of the arms 26, 27, respectively, all for a purpose later described.

The inherent springiness or resiliency of the wire of which the device 19 is made tends always, as above indicated, to return, when tensioned or bowed, to the shape and relationship shown in Figure 4.

The wall of the casing 15 to which the device 19 is to be secured is provided with a hole 10^a (Figure 3) of a size commensurate with that provided by the eye or loop 23 (Figure 5) of the device 19, and in assembling the latter to the support 15, these two openings are registered (see now Figure 3) with a washer 32, preferably of metal, therebetween; thereupon a bolt 33 is passed through the registered holes or openings, a lock washer 34 slipped over the free end of the bolt 33, and a nut 35 then threaded onto the bolt and driven home or tightened up, so as to clamp the device 19 securely and rigidly to the support 15. In a similar manner, the devices 20, 21 and 22 (Figure 1) are secured in place.

The devices are now all ready for the reception of the sounding element or bar or bars. The sounding element 13 (Figures 1 and 2) is provided with holes 13^a and 13^b of relatively substantial size and spaced lengthwise of the bar 13 by the distance of the spacing between the mounting elements 19 and 20 that are to carry and mount the member 13.

The device 19, thus far having assumed and retained a shape generally like that shown in Figure 4, though now secured to the support 15, is now forcibly distorted or compressed to give the arms 24-29 an opposite curvature or bow from that shown in Figure 4 and thus to bring the end hooks 28, 29 substantially together. This may be accomplished manually or by any suitable tool or device, analogous to a pair of pliers, for example, as may be desired or found most convenient. As a result the hook ends 28, 29 are brought closely enough together to be passed as a unit through the hole 13^a in the sounding bar 13, the holes in the latter element or elements being preferably countersunk from both sides so as to give the wall of the hole or holes the V-

shaped or knife-edge cross-section better shown in Figure 3. Release of the compressing or tensioning force applied to the device 19 now permits the energy that had thus been stored in the spring wire device 19 to be at least in part released and thereby to cause the hook members 28, 29 to move away from each other until they engage the substantially diametrically opposed portions of the hole 13^a, substantially as is better shown in Figure 3.

Thereby, due to the tension or energy remaining in the spring device 19, its shape now being that of Figure 3 as compared with its initial shape shown in Figure 4, the hook members 28, 29 securely and dependably become interengaged with the sounding member 13 and hold it in place.

At the same time, however, the parts being appropriately proportioned and shaped for this purpose, the parts 30 and 31 of the device 19, as shown in Figure 4, assume the respective and relative positions better shown in Figure 3 from which it will be seen that these portions 30, 31 become aligned with each other and together lie in a single plane or along a straight line, while the curvature of the hooks 28, 29 is preferably so proportioned with respect to the portions 30 and 31, respectively, and with respect to the thickness of the sounding element 13 that the under face, preferably plane, of the latter, rests snugly against these aligned portions 30, 31. The latter, therefore, hold the sounding element against tilting out of parallelism with the supporting wall 15 and insure maintenance of nicety of appearance and consistency of relation of the several parts.

In a similar manner the other end of the sounding element 13 is engaged and supported by the similar mounting device 20, engaging in the hole 13^b of the element 13. Thus, the sounding element 13 is dependably but still yieldingly mounted in position by engagement thereof at two appropriately spaced points. These points may, as desired, be coincident with nodes of the sounding element itself.

Where more than one sounding device is employed, such as the member 14 of Figure 1, its mounting is carried out in the same way by way of the similar mounting members 21 and 22, all as already above described.

Assembly or mounting will be seen to be quickly and simply achieved and even though a relatively stiff spring wire may be employed, as is sometimes preferred, in making up the mounting members, the desired and intended acoustic or vibrating action of the sounding element or elements is not interfered with and accordingly, and particularly where the sounding elements are constructed to sound a musical note, the musical or tonal quality of the sounding element or elements is dependably prevented from being detrimentally interfered with.

Furthermore, the mounting members themselves are of simple and inexpensive manufacture, can be easily and inexpensively produced by automatic machinery, and their attachment, illustratively by bolts though, of course, rivets or eyelets, or any other suitable fastening may be employed, may be proceeded with in a simple and inexpensive manner.

Thus, it will be seen that there has been provided in this invention a signaling apparatus and a mounting for sounding elements that are compact, simple and inexpensive and of thoroughly dependable action and, furthermore, 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 an apparatus for audible signaling and having a striker, the combination therewith of a vibratable sounding element, a support therefor, said element having aperture means therein, two cantilever spring arms having one end of each hook-shaped, and means for anchoring the other ends of said arms to said support to insure cantilever action of said arms, said hook-shaped ends engaging said element through said aperture means and the springiness of said cantilever arms about the said anchoring means tending to force and hold said hook-shaped ends in engagement with said aperture means.

2. In an apparatus for audible signaling and having a striker, the combination therewith of a vibratable sounding element, a support therefor, said element having an aperture therein, a device, of spring wire made generally U-shaped and having the ends of its arms engaged in said aperture, said device having a loop formed in the portion thereof intermediate of said arms, and means passing through said loop for securing said device to said support.

3. A construction as claimed in claim 2 in which the sounding element is substantially flat adjacent said aperture and in which the arms of said device are bent into alignment with each other and into parallelism with a face of said element, adjacent their outer ends, to provide portions to hold said element against tilting.

4. In an apparatus for audible signaling and having a striker, the combination therewith of a vibratable sounding element, a support therefor, a device made of elongated spring material having its two ends substantially hook-shaped to engage said element at two spaced points in the latter, and means intermediate of said ends for securing said device to said support.

5. A construction as claimed in claim 4 in which the sounding element is provided with a relatively large aperture, said hook-shaped ends of said device passing therethrough, whereby said spaced points of engagement are two points on opposite sides of said aperture.

6. In an apparatus for audible signaling and having a striker, the combination therewith of a vibratable sounding element, a support therefor, said vibratable element being elongated, and a plurality of mounting devices rigidly secured to and spaced along said support, each of said devices being in general U-shaped and having its two arms also generally U-shaped, said arms terminating in two finger-like members for engaging opposed portions of said sounding element, the part of said device intermediate of said finger-like members yieldably urging and holding them in engagement with the sounding element.

7. A construction as claimed in claim 6 in which the devices are made of spring wire whereby its own U-shape and the U-shape of its two arms urge the finger-like members thereof in a direction away from each other, said sounding element being apertured for the reception of the ends of said finger-like members.

8. In apparatus for audible signaling and having a striker, the combination therewith of a vibratable sounding element, a supporting element

therefor, a device made of spring wire having two substantially U-shaped portions one arm of each of which terminates in a hook-like end portion and the other arms of said two U-shaped portions being joined together by an intermediate loop-like portion, one of said elements being provided

with means for engaging said hook-like end portions for connection thereto, and means passing through said loop-like portion for securing said device and the other of said elements together.

CHRISTIAN MILLER.