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R. B. BREWER ET AL

1,994,560

MUSICAL INSTRUMENT

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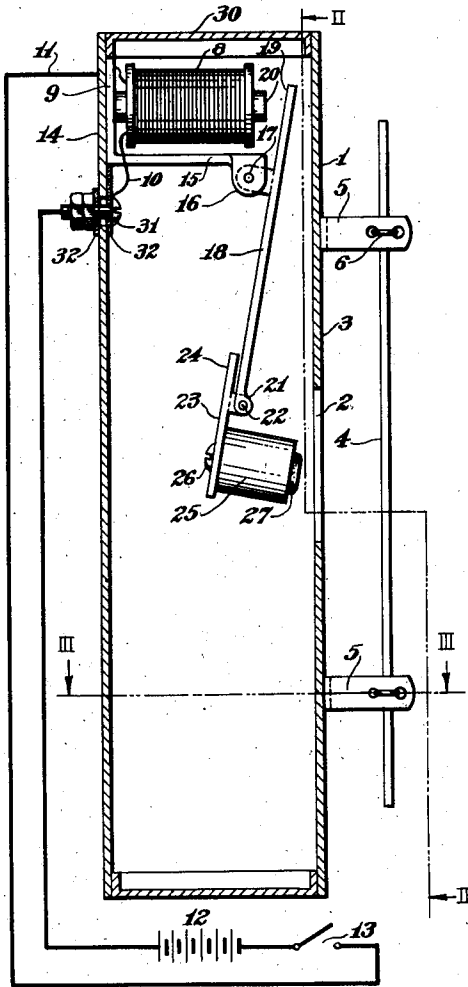


Fig. 1

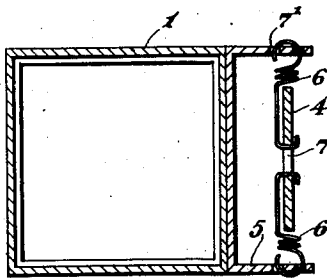


Fig. 3

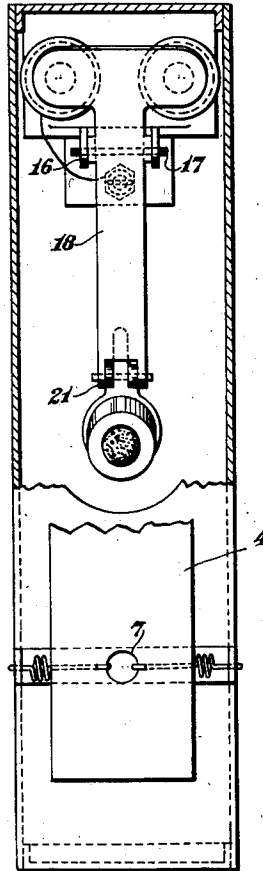


Fig. 2

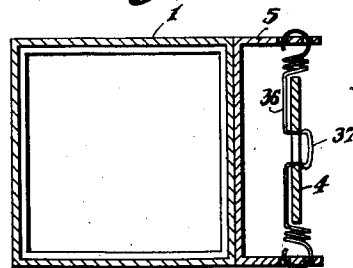


Fig. 4

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MUSICAL INSTRUMENT

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5 Claims. (Cl. 177-7)

Our invention is an improvement in signalling devices or musical instruments of the percussion type and relates more particularly to a striker mechanism preferably housed within a resonance chamber forming part of the device.

It is one of the objects of our invention to produce an electro mechanical type of signal or musical instrument which may be operated on alternating or direct current and which is equipped with a striker designed to eliminate forced vibrations in the same yet which has a rebound speed equivalent to the response frequency of the vibrating member.

It is a further object of the invention to construct such a device in which the striker mechanism is completely enclosed within the resonance chamber of the device.

A further object is to provide a striker which is efficient to a high degree, and which has a wide range of stroke to eliminate close adjustments in spacing, while at the same time providing a simple, rugged, compact structure which is easily adapted to the simplest manufacturing requirements.

Another object of the invention is to enclose a striker mechanism of the class described in a resonance chamber associated with the vibrating element, so that the same may be readily removed as a unit, thereby further simplifying the device as a whole, and rendering the device more attractive and durable in use.

Other objects and advantages of our invention will become more apparent as the following description of one embodiment thereof progresses, reference being made to the accompanying drawing in which like reference characters are employed to designate like parts throughout the same.

In the drawing:—

Figure 1 is a vertical section partly in elevation, through one of the devices embodying our invention;

Figure 2 is a view, partly in section, taken on line II—II of Figure 1;

Figure 3 is a section taken on line III—III of Figure 1, and,

Figure 4 is a view similar to that shown in Figure 3, and illustrates a modification of the chime holding means.

In carrying out our invention in accordance with the form illustrated in the drawing, a resonance chamber or box 1 is provided which consists primarily of an elongated tube of sheet metal or other material, closed at its ends and having

an opening 2 in one face 3 thereof to permit a striker, housed within the resonance chamber, to be projected through the opening and into quick but momentary engagement with the vibratable element 4. The vibratable element 4 may be a reed or similar member carried by the resonance chamber by means of brackets 5 and a securing means 6. In the present form of our invention the securing means may consist of spring members 6 the adjacent ends of which are passed through openings 7 in the reed in a manner similar to that shown in Figure 3, the other ends of the springs being inserted in the openings 7' in the brackets 5. In this way the reed is properly suspended on the resonance chamber and in close proximity to the opening 2 to give a very pleasing and mellow tone when the reed is struck. It is to be understood that the means which we have described above for suspending the reed on the brackets is illustrative of one manner of suspending the element 4 and we do not wish to be limited to this form of suspension since other simple means for suspending the reed may be used as, for example, a flexible cord may be strung through the bracket openings and the opening in the reed to suitably suspend the reed from the brackets.

We have provided electro mechanical means for causing the vibratable element to produce a pleasing mellow signal or tone, and in the embodiment shown this means consists of an electromagnet 8 mounted on a bracket 9 and having suitable electric connections through the wires 10 and 11 to a source of electrical energy and a circuit maker and breaker 13. The bracket 9 may be removably secured to the rear wall 14 of the resonance chamber or box in any suitable manner, and is provided with a forwardly projecting portion 15 which terminates at its forward end in a pair of bearings 16 which receive a pin 17 for pivotally supporting the armature 18. The armature 18 has an upwardly extending portion 19 which is normally spaced from the pole piece 20 of the electromagnet 8, but which when the pole is energized as by passing the current through the coil 8 the end 19 of the armature will be drawn quickly toward the pole piece 20. The lower portion of the armature 18 terminates in a pair of spaced bearings 21 which are apertured to receive a pin 22 for supporting the clapper 23. This clapper is, of course, loosely and pivotally suspended by means of the pin 22 from the armature 18 and is provided with an upwardly extending portion 24 which may engage the

under surface of the armature 18. The lower portion of the clapper is provided with a weight 25 which may be removably secured to the clapper by means of a screw 26. The weight 25 may carry a tip 27 of soft material such as rubber or cork, which may be removable or interchangeable so that various tone quality may be obtained. In the same manner the weight 25 is interchangeable with other weights in order to vary the volume of the tone.

It is one of the purposes of this invention to provide a striker mechanism having a natural period of vibration opposed to the impressed power frequency which is usually 60 cycles and which will eliminate forced vibrations and which has a rebound speed equivalent to the response frequency of the vibratable member 4. This is very readily accomplished by means of the striker above described and shown in the accompanying drawing. By loosely and freely mounting the clapper 23 at the end of the armature 18 it will be seen that upon energizing the coil 8 to thrust the clapper toward the reed 4 that the striking tip 27 of the clapper will make but brief contact with the reed and will rebound from the same at a speed equal to the response frequency of the reed. In this manner a clear, mellow tone will be delivered by the reed to the resonance chamber where it is amplified by the column of air therein.

We have also found in employing a striker of the type described, that precision in adjustment or in assembly is not necessary, and, in fact, its absence is desirable not only for quick assembly but because of the tendency to reduce and to eliminate forced vibration.

In the illustration shown in the drawing, the striker mechanism including the armature and the electro magnet may be constructed as a unit and may be inserted in the resonance chamber by removing the end piece 30 which is secured to the bracket 9. In the present form we have shown the unit as being secured to the rear wall 14 of the resonance chamber by means of the screw 31 which serves not only as a binding post but also as a supporting fastener. The screw when used as a binding post may be insulated from the wall 14 by means of the members 32.

If desired, the striker unit may be removably attached within the chamber by providing elongated openings or slots in the wall 14 of the chamber and by providing suitable supporting pins or screws in the bracket 9 which are adapted to pass through the slots as the unit is lowered into place toward the lower end of the slots, suitable fastening means such as nuts and lock washers may be provided for the screws on the outside of the rear wall 14.

In Figure 4, we have illustrated a modified form of suspension means for the vibratable element. This form is similar to that shown in Figure 3, but with the exception that the spring 36 is formed in one piece having a centrally located partial loop 37 compressible to permit its being passed through the opening 7 in the vibratable element. When so positioned the loop acts as a retainer for the element on the spring support. Such construction contributes to quick assembly and disassembly.

It will be seen that our invention is extremely simple in construction, is compact and is rugged and durable in use. At the same time the general appearance of the device may be of a very pleasing character since the movable parts are housed within the resonance chamber 1. Fur-

thermore the construction illustrated in the drawing and forming one embodiment of our invention is such that the device may be readily manufactured and assembled by the simplest methods and consequently may be manufactured very inexpensively.

Various changes in the details of construction and arrangement of parts may be made without departing from the spirit of our invention or the scope of the appended claims.

We claim:

1. A signal device including in combination, a resonance chamber comprising an elongated tube open at one end thereof and having a restricted opening intermediate its ends, a striker normally housed within said chamber and operating through said restricted opening, a vibratable element, means for supporting the vibratable element on said chamber, said vibratable element arranged adjacent said restricted opening and in the path of movement of the striker there-through, and electrically responsive means for quickly thrusting the striker through the restricted opening to deliver an impact blow to the vibratable element, said striker and electrically responsive means being formed as a unit and shaped to close said opening in the end of the tube when the device is assembled.

2. A signal device including in combination, a resonance chamber comprising an elongated tube open at one end thereof and having a restricted opening intermediate its ends, a striker normally housed within said chamber and operating through said restricted opening, a vibratable element, means for supporting the vibratable element on said chamber and arranged adjacent said restricted opening and in the path of movement of the striker therethrough, and electrically responsive means for quickly thrusting the striker through the restricted opening to deliver an impact blow to the vibratable element, said striker and electrically responsive means being shaped to close the open end of the tube and removably secured therein.

3. A signal device including a resonance chamber comprising an elongated tube having an opening in one wall thereof and having a restricted opening in another wall thereof, a striker normally housed within said chamber and operating through said restricted opening to momentarily engage a vibratable member, a vibratable member mounted exteriorly of said chamber and in the path of movement of said striker through said restricted opening, electrically responsive means for quickly thrusting said striker through the restricted opening to deliver a sharp impact blow to the vibratable member, means for removably securing and supporting said striker and electrically responsive means as a unit within said resonance chamber said last named means being insertable through said first chamber opening and formed to provide a closure for said chamber opening when the device is assembled.

4. A signal device including in combination, a resonance chamber having an open end and an opening in one of its walls, a vibratable member, means for supporting the vibratable member exteriorly of said chamber and overlying said opening, a striker, means for actuating said striker, means for removably securing and supporting said striker and actuating means as a unit within the said chamber, said unit being insertable in the open end of the chamber and formed to provide an end closure for the chamber.

5. A signal device including in combination, a resonance chamber having an open end and an opening in one wall thereof, a vibratable member, means for supporting the vibratable member exteriorly of the chamber and in position to be struck by a striker, a striker, means for projecting said striker through said wall opening, and means for removably securing said striker and projecting means as a unit within said resonance chamber and insertable through the open end of the chamber, said unit being formed to provide a closure for the open end of the chamber when the device is assembled.

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