March 20, 1956 M. F. MILLER 2,738,697

SOUND PRODUCING DEVICE

Filed March 23, 1953

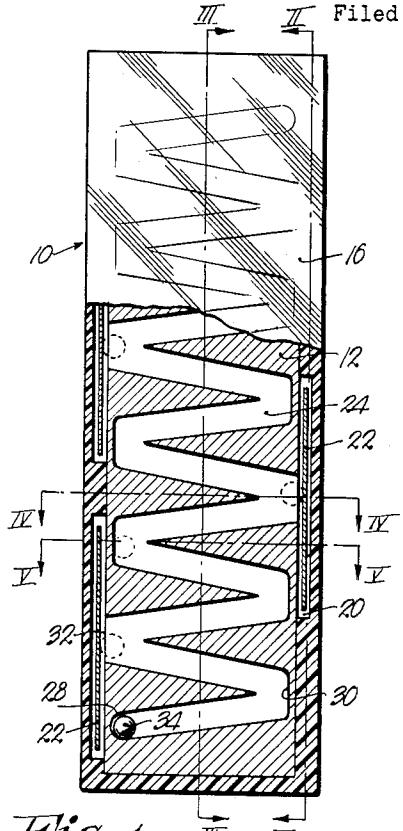


Fig. 1.

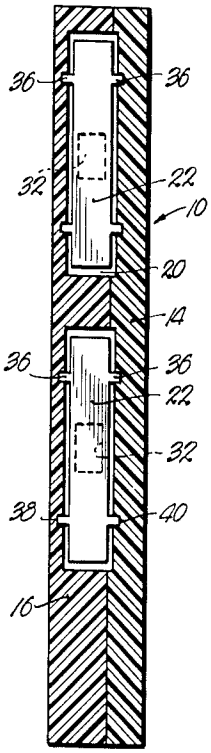


Fig. 2.

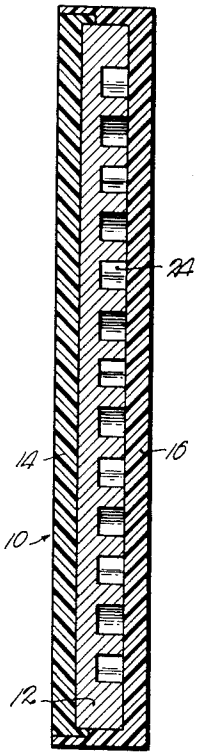


Fig. 3.

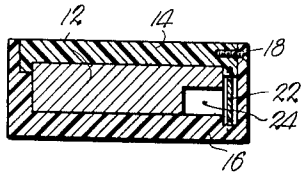


Fig. 4.

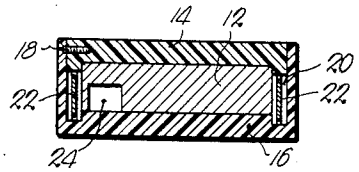


Fig. 5.

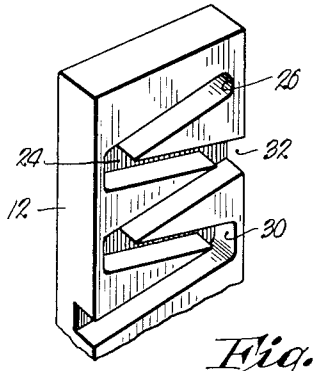


Fig. 6.

INVENTOR.
Milo F. Miller
BY
ATTORNEY.

United States Patent Office

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SOUND PRODUCING DEVICE

Milo F. Miller, Kansas City, Mo.

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1 Claim. (Cl. 84—404)

This invention relates to instruments of percussion, particularly those adapted to produce sounds of predetermined characteristics as a freely moving percussion element is caused to successively strike a plurality of sonorous members disposed within the path of travel of the moving element.

It is the primary object of the present invention to provide sound producing structure, as above set forth, which improves upon the principles set forth in my U. S. Letters Patent No. 2,254,488, of September 2, 1941.

It is the most important object of the present invention to provide a sound producing device of the percussion type wherein is provided a body having a serpentine path of travel for the percussion element, all to the end that the instrument may be tipped to various positions whereby the element will travel by gravitational movement alternately in opposite directions along the passage and strike the vibratory sonorous members successively to produce a series of tones of predetermined character.

Another very important object of the present invention is to provide an improved vibratory element by virtue of its having mounting means at the nodes thereof, forming an integral part of the element itself.

Other objects include the novel way in which the serpentine passage is provided with a number of openings that clear the gravitating element so that it will strike the vibratory members as it moves along the passage; the way in which the body of the instrument is provided with cavities for receiving the vibratory elements, which cavities are in turn in communication with the serpentine passage by way of access openings; the manner of mounting the vibratory members within the cavities through use of integral protuberances or ears at the nodes of the vibratory elements; the manner of closing the ends of the serpentine passage so that the instrument may be tilted and the percussion element caused to gravitate in either of two directions along its path of travel; and many other important objects, all of which will be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawing wherein:

Figure 1 is a top plan view of a sound producing device made pursuant to the present invention, parts being broken away and in section to reveal detail of construction.

Fig. 2 is a longitudinal cross sectional view taken on line II—II of Fig. 1.

Fig. 3 is a longitudinal cross sectional view taken on line III—III of Fig. 1.

Fig. 4 is a transverse cross sectional view taken on line IV—IV of Fig. 1.

Fig. 5 is a transverse cross sectional view taken on line V—V of Fig. 1; and,

Fig. 6 is a fragmentary perspective view of the central section of the body of the instrument.

A suitable body such as shown on Figs. 1 to 5 of the drawing is broadly designated by the numeral **10** and consists of a central section **12** that is incased within a

pair of outer sections **14** and **16**. Body **10** may be made from any suitable material but it is to be preferred that the section **16** thereof be transparent so that the user of the instrument may observe its operation.

The two outer sections **14** and **16** are U-shaped in cross section, not only transversely, but longitudinally, as shown in Figs. 3 and 4, the section **14** accordingly being fitted within the section **16** and releasably attached thereto through the medium of a plurality of screws or the like **18**. When the sections **14** and **16** are thus interconnected the center section **12** is held tightly therewithin.

The two longitudinal sides or legs of the section **16** are each provided with a plurality of elongated cavities **20** that face inwardly toward the longitudinal edges of the central section **12** and each receive an elongated vibratory sonorous member **22**.

The central member **12**, in the nature of an elongated, rectangular block, has a serpentine passage **24** provided with closed ends **26** and **28**. The passage **24** in one face of the section **12** has a plurality of bights throughout its length some of which are closed as at **30** and others of which are provided with openings **32**, each of which registers with a corresponding cavity **20**, when the central section **12** is disposed between the body sections **14** and **16**. The openings **32** clear a small percussion element **34** disposed in the passage **24** for gravitational movement therealong so that the element **34** successively strikes the members **22** and produces a series of tones of predetermined characteristics.

Each of the vibratory members **22** is mounted at the nodes thereof in the manner shown by Figs. 2, 4, and 5 of the drawing. To this end each member **22** has at least one integral protuberance or ear **36** integral therewith and adjacent one of its nodes. The elements **22** chosen for illustration are in the nature of elongated, relatively thin, rectangular plates, and there is provided a pair of opposed, oppositely-extending protuberances **36** at each of its two nodes respectively. These ears **36**, integral with the plates **22**, are disposed at the longitudinal edges of the members **22** and are engaged by the sections **14** and **16** of body **10** to hold the members **22** in place within their respective cavities **20**. The only portions of the vibratory members **22** which actually contact any part of the body **10** are the ears **36** and the sections **14** and **16** are accordingly provided with small notches **38** and **40** respectively, so disposed as to receive the ears **36** without the sides or edges of the plates **22** contacting either the section **14**, the section **16**, or the central section **12**. Manifestly the vibratory elements **22** are each provided with antinodes and the central antinode or ventral segment between the pairs of ears **36** is disposed in alignment with the openings **32** of the central body portion **12**.

The importance of the provision of integral mounting means in the nature of ears or protuberances **36** at the nodes of the vibratory elements **22** cannot be overemphasized. Many suggestions have heretofore been proposed for providing a satisfactory means of mounting vibratory elements at the nodes thereof, all without complete success in meeting the problem and it is to be pointed out that by forming the mounting means integral with the vibratory element the same can conveniently and easily be mounted where desired without any part of the antinodes thereof contacting a surface which would adversely effect the tone to be produced thereby through use of a percussion element. Manifestly the same principle of integral mounting means may be used in other types of vibratory elements differing from the flat, rectangular shape of the elements **22** chosen for illustration.

The percussion element **34** is preferably in the nature of a spherical cut ball which will readily roll or gravitate along the serpentine passage **24** when the body **10** is

properly tipped. Accordingly, when the ball **34** is disposed as illustrated in Fig. 1 of the drawing, adjacent the closed end **28** of passage **24**, it is but necessary for the operator to properly tilt the body **10** so as to cause the ball **34** to travel along the passage **24** until it reaches the closed end **26** thereof. As the percussion element **34** moves along the passage **24** it will successively engage the vibratory elements **22** and produce a series of tones such as may be desired and having chosen characteristics, depending upon the nature of the elements **22** themselves.

Manifestly instruments of this type have many and varied uses including those set forth in my patent above identified, and such uses as may be found for the instrument or for vibratory elements having the novel mounting means hereof, by those who desire to employ the present invention, are contemplated hereby, and it is therefore desired to be limited only by the spirit of the invention as defined by the scope of the appended claim.

Having thus described my invention, what is claimed as new and desired to be secured by Letters Patent is:

A percussion instrument for produding various resonant sounds by tilting of the instrument to predetermined angles comprising a hollow rectangular body having a pair of opposed longitudinal sides, each having a plurality of cavities in the innermost faces thereof; a rectangular block housed within the body and having a serpentine passage in one face thereof and extending longitudinally thereof, said passage having a plurality of bights adjacent each longitudinal edge thereof respectively, certain of the bights being closed and the remaining bights being open at corresponding longitudinal edges of the block; a percussion ball freely movable in said passage; and an elongated, flat, percussion plate in each cavity respectively, each plate having a pair of spaced nodal zones and an antinodal zone midway between the nodal zones, each plate having a pair of relatively narrow opposed, integral protuberances adjacent each nodal zone respectively and extending outwardly from the longitudinal edges thereof, the plates spanning the distance across corresponding adjacent bights and said open bights being in alignment with the antinodal zones, said body being provided with notches receiving a portion of the protuberances serving as the sole means of support for the plates whereby to prevent damping of the resonatory frequencies of the plates when the ball strikes the same at the antinodal zones thereof.

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