Dec. 29, 1931. H. J. SCHLUTER 1,838,502

VIBRANT BAR FOR MUSICAL INSTRUMENTS

Filed Oct. 30, 1930

Fig. 1.

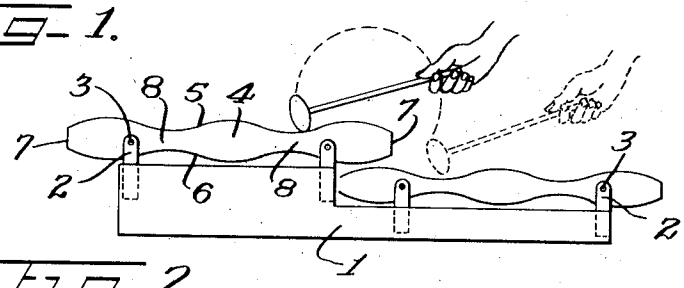


Fig. 2.

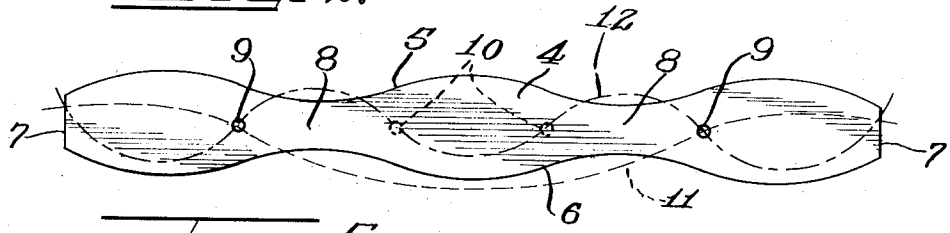


Fig. 5.

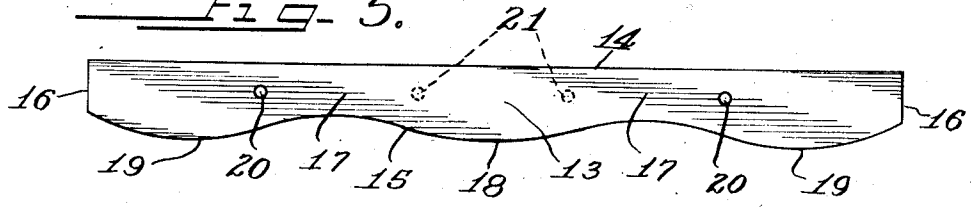


Fig. 4.

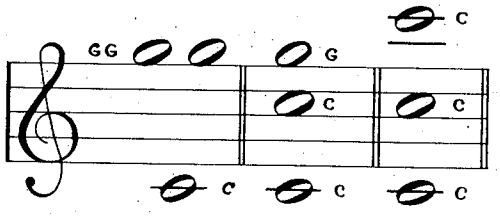
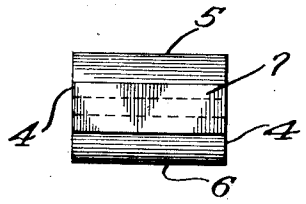


Fig. 3.



Inventor

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By: Charles Miller Attys.

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1,838,502

UNITED STATES PATENT OFFICE

HENRY J. SCHLUTER, OF CHICAGO, ILLINOIS, ASSIGNOR TO J. C. DEAGAN, INC., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

VIBRANT BAR FOR MUSICAL INSTRUMENTS

Application filed October 30, 1930. Serial No. 492,129.

In the manufacture of musical instruments of the percussion type, such as xylophones, metal orchestra bells, harp celeste, marimbaphones, and the like, where the vibrant bars are struck with a mallet or hammer, the musical bars are usually laid or supported on frames balanced at their nodal points, or they are sometimes suspended perpendicularly from a single node to render them very sensitive as a percussion instrument. In musical bars such as used on xylophones and similar percussion instruments, the pitch of the tone of said bars depends generally upon the length and the thickness of the bar. It has been the practice heretofore to reduce the bars in cross-section at their centers usually by hollowing out the underside or bottom of the bars when it has been desired to lower the fundamental tone of the bars, and in cases where it has been desired to raise the fundamental tone of the bars said bars have been thinned off at their ends.

This invention relates to percussion musical instrument bars which are constructed with reduced portions between the center and the fundamental nodal points thereby producing a musical or vibrant bar which will produce two or more harmonic intervals, that is, distinct and different musical tones which are in harmony with each other, giving the effect of a plurality of sounds or a triad.

It is an object of this invention to provide a percussion musical instrument bar reduced in thickness between the middle of the bar and the fundamental nodal points by constructing the vibrant bar with one or more waving or undulating longitudinal surfaces leaving the middle section of the bar at substantially its original thickness to provide a vibrant bar having an additional pair of nodal points intermediate the fundamental nodal points.

It is also an object of this invention to provide an improved percussion type of musical bar with one or more wavy or undulating surfaces to provide a plurality of sections of reduced thickness to form a bar having additional nodal points whereby additional tones may be produced in harmonic relation to the fundamental tone of the bar.

It is a further object of this invention to provide an improved type of percussion musical instrument bar having sections of reduced thickness creating intermediate nodal points making it possible to produce the quint and other selected intervals.

It is furthermore an object of this invention to provide a percussion type musical instrument bar having a wavy or undulating surface to produce a bar of varying thickness of either tubular or solid construction to create overtone nodal points intermediate the fundamental nodal points to provide a bar adapted when played to produce not only the fundamental octave but twelfth or quint frequencies, producing the effect of a triad.

It is still further an object of this invention to provide a percussion type of musical instrument bar which is so constructed that it is provided with sections of reduced thickness outside of and between the fundamental nodal points whereby second and third partials are produced in addition to the fundamental or first partial.

It is an important object of this invention to provide a percussion type of musical instrument provided with improved vibrant bars shaped to provide a plurality of sections of reduced thickness between the nodal points of the bar and the middle section whereby not only a shorter range of hammer movement is made possible but greatly facilitating the ease of operation, particularly in the playing of rapid movements, whereby extra tones in the forms of twelfths or quints are produced in addition to the fundamental tones.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is an end elevation of a musical percussion instrument equipped with im-

proved vibrant bars embodying the principles of this invention and illustrating the shorter range of hammer movement made possible by the novel shaping and positioning of the bars.

Figure 2 is a side view of an improved vibrant bar illustrating the position of the fundamental nodal points and the intermediate or overtone nodal points, and furthermore illustrating in broken lines the fundamental tone wave and the overtone or partial wave curve.

Figure 3 is an end view of the vibrant bar illustrated in Figure 2.

Figure 4 illustrates a musical staff, showing in the first measure a fundamental note and twelfths or quints; a second measure illustrating a triad comprising a fundamental note, an octave note and a quint or twelfth; and a third measure illustrating a triad comprising a fundamental or first partial, an octave note or second partial, and a second octave note or third partial adapted to be produced by the improved bar when played.

Figure 5 is a side elevation of a modified form of vibrant bar having a single waved surface to provide intermediate or overtone nodal points between the fundamental nodal points of the bar.

As shown on the drawings:

The reference numeral 1 indicates a percussion musical instrument resonator box or base provided with upwardly projecting posts or supports 2 for supporting the chords 3 or the like which pass through the fundamental nodal points of a plurality of groups of improved vibrant bars embodying the principles of this invention. The vibrant bars in the instrument illustrated in Figure 1 are arranged in upper and lower groups with the inner ends of the bars positioned in overlapping relation. This arrangement of the groups of vibrant bars provides an instrument whereby the playing of the same is greatly facilitated in view of the shorter range of hammer movement required as illustrated by the full line and dotted line positions of the hammer in Figure 1 of the drawings.

The important feature of the percussion type of musical instrument as illustrated in Figure 1 is the novel formation of the vibrant bars, the formation of which will now be described in detail.

Each of the improved vibrant bars of the type illustrated in Figures 2 and 3 is adapted to be constructed out of metal, wood, or other specially prepared suitable material, and is of elongated shape having flat parallel side surfaces 4, a waved, sinuous or undulating top surface 5, a waved or undulating bottom surface 6, and reduced end surfaces 7. The top surface 5 and the bottom surface 6 are waved in symmetrical relation with respect to the longitudinal axis of the bar as clearly illustrated in Figure 2, to provide a plurality of reduced or concave intermediate sections 8 on opposite sides of the middle and adjacent the fundamental nodal points 9 of the bar. The waved surfaces 5 and 6 continue to the outer ends of the bar to provide convex or bulged end sections which taper gradually to the reduced end surfaces 7 of the bar. This provision of the reduced or concave sections between the fundamental nodal points and the middle of the bar provides an additional pair of intermediate or overtone nodal points 10, thus providing the improved bar with four nodes. The novel construction of the improved vibrant bar produces a convex intermediate or middle section in the bar between the reduced concave sections with said middle section adapted to be varied in thickness and length for producing desired fundamental tones, while the thickness and length of the concave sections may be varied to determine the desired twelfths or quints. While the end sections are illustrated as being of convex shape it will of course be understood that the end sections may be straight with alternating concave and convex sections therebetween.

The novel or particular shape of the vibrant bar having the reduced intermediate sections between the end sections and the middle section produces a bar which when played by means of a mallet or hammer will produce the theoretical wave curve 11 of the fundamental tone and in addition thereto will produce an overtone or partial theoretical wave 12. As illustrated in Figure 2, the fundamental tone wave 11 produces a curve which passes through the fundamental nodal points 9 while the overtone or partial wave curve 12 passes not only through the fundamental nodes 9 but also through the intermediate nodal points 10 of the bar. Corresponding with a single loop or wave of the fundamental sound curve 11 which extends between a pair of the fundamental nodal points 9, the overtone or partial wave curve 12 comprises three waves or loops extending from the two fundamental nodal points 9 and passing through the two intermediate nodal points 10. This novel combination of the fundamental and partial tones produced by playing the improved vibrant bar produces extra tones in harmonic relation to the fundamental tone whereby a fundamental octave, a twelfth or quint frequency or other selected intervals may be secured, producing the effect of a plurality of sounds or a triad; examples of which are illustrated in Figure 4 of the drawings in which the first group of notes represents a fundamental and a pair of twelfths or quints; the second group indicating a fundamental, an octave and a quint or twelfth; while the third group illustrates a triad comprising a fundamental note and double octave notes.

Referring now to Figure 5 of the drawings,

a modified form of percussion musical instrument vibrant bar is illustrated which is of elongated form and may be constructed of metal, wood or other suitable specially prepared material of either solid or hollow construction. In the form shown in Figure 5, the modified vibrant bar comprises a pair of parallel straight sides 13, a flat upper surface 14 and a waved or undulating bottom surface 15, the ends of which terminate at reduced end surfaces 16. Providing a waved or undulating bottom surface 15 produces a vibrant bar having a plurality of reduced intermediate sections 17 between an enlarged middle section 18 and a pair of end sections 19. The sections of reduced thickness 17 are positioned adjacent the fundamental nodal points 20 of the bar affording a pair of intermediate or overtone nodal points 21. The improved bar thus shaped, when struck with a hammer or mallet produces not only a fundamental tone but in addition distinct and different musical tones, all of which are in harmony with each other to produce a triad.

The thickness of the middle section is varied to produce a required fundamental tone, while the thickness of the concave sections determines the twelfths and quints.

The improved vibrant bars of this invention are peculiarly shaped to provide not only a plurality of sections of reduced thickness between the middle and the fundamental nodal points of the bar but are also provided with reduced or tapered end sections whereby each bar is provided with additional nodes to the fundamental nodes of the bar. The additional nodes produce extra tones in harmonic relation to the fundamental tone whereby octaves, twelfths, quints and other selected intervals can be produced.

The improved vibrant bars of this invention may be constructed of solid or hollow material in the shape of waved bars or tubes, said bars having a plurality of sections of reduced thickness provided between end sections and intermediate sections whereby a plurality of additional nodal points are provided between the fundamental nodal points of the bar. The improved bars when played produce partials or overtones in addition to the fundamental tone thereby producing a plurality of distinct and different musical tones, all of which are in harmony with one another to produce a triad. The improved bars are constructed to produce better harmony and tone qualities in an instrument, and when mounted in an arrangement similar to that illustrated in Figure 1 of the drawings provide a percussion instrument which is easier to play and in which the range of the hammer movement is greatly reduced. The arrangement of the two groups of vibrant bars in the relation illustrated in Figure 1 permits the bars to be struck by means of a hammer or mallet near their inner ends to produce triads consisting of the fundamental tones in addition to partials or overtones in the forms of octaves, twelfths or quints.

It will of course be understood that various details of construction may be varied through a wide range without departing from the principles of this invention, and it is therefore not intended to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. A percussion musical instrument vibrant bar having undulating top and bottom surfaces and providing a plurality of sections of reduced thickness between the fundamental nodal points of the bar.

2. A musical instrument bar having one of the longitudinal surfaces thereof waved to produce additional nodal points between the fundamental nodal points of the bar.

3. A musical bar of uniform width having a surface of sinuous form providing a plurality of convex portions separated by concave portions to provide additional nodes between the fundamental nodes of the bar.

4. A musical instrument bar of uniform width and sinuous form from end to end provided with a convex middle section and a pair of convex end sections, with said convex middle section and said convex end sections connected by means of concave intermediate sections.

5. A percussion musical instrument bar shaped to provide alternating convex and concave sections and having the surfaces defining such sections of undulating symmetrical shape.

6. A musical bar shaped to provide three convex sections connected by two concave sections to provide the bar with a pair of overtone nodes positioned between a pair of fundamental nodes of the bar.

7. A musical instrument percussion member shaped to provide ends and a plurality of spaced sections connected by reduced sections to provide additional nodal points between the fundamental nodal points of the member.

8. A vibrant bar for musical instruments having top and bottom surfaces of undulating form from end to end, said bar being of maximum thickness at its middle with portions on each side of its middle successively of reduced and increased thickness, the portions of reduced thickness being between the fundamental nodal points of the bar.

9. A vibrant bar for musical instruments so varied in thickness in each direction from its middle as to produce an overtone above the octave of the fundamental tone of the bar.

10. A vibrant bar for musical instruments so varied in thickness in each direction from its middle that the first overtone will be octavely spaced from its fundamental tone and the next overtone will be a fifth above the octave of its fundamental tone.

11. A vibrant bar for musical instruments having one of its active surfaces of undulating shape from end to end thus providing portions of varying thicknesses, said surface being so fashioned that a portion of reduced thickness lies between the fundamental nodal points of the bar.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

HENRY J. SCHLUTER.