April 18, 1950 N. P. BLAIR 2,504,632

MUSIC PRODUCING UNIT

Filed Oct. 14, 1949 2 Sheets-Sheet 1

Fig. 1.

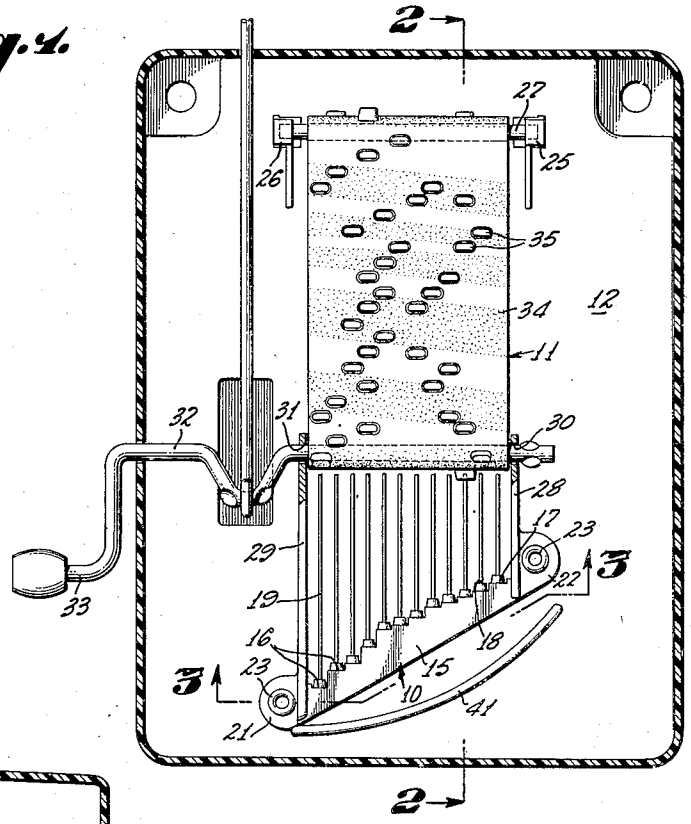


Fig. 2.

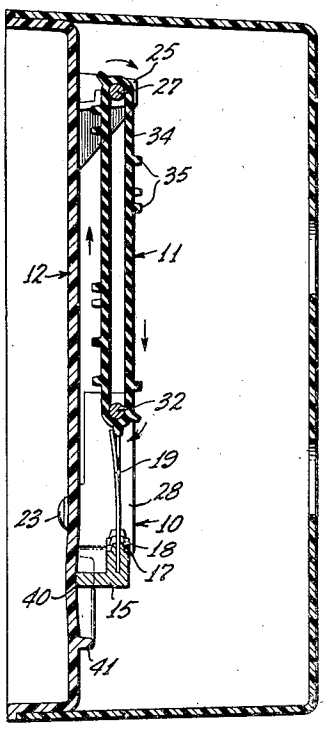
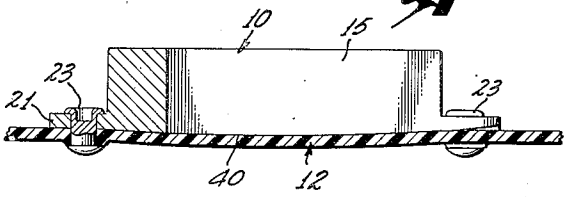


Fig. 3.



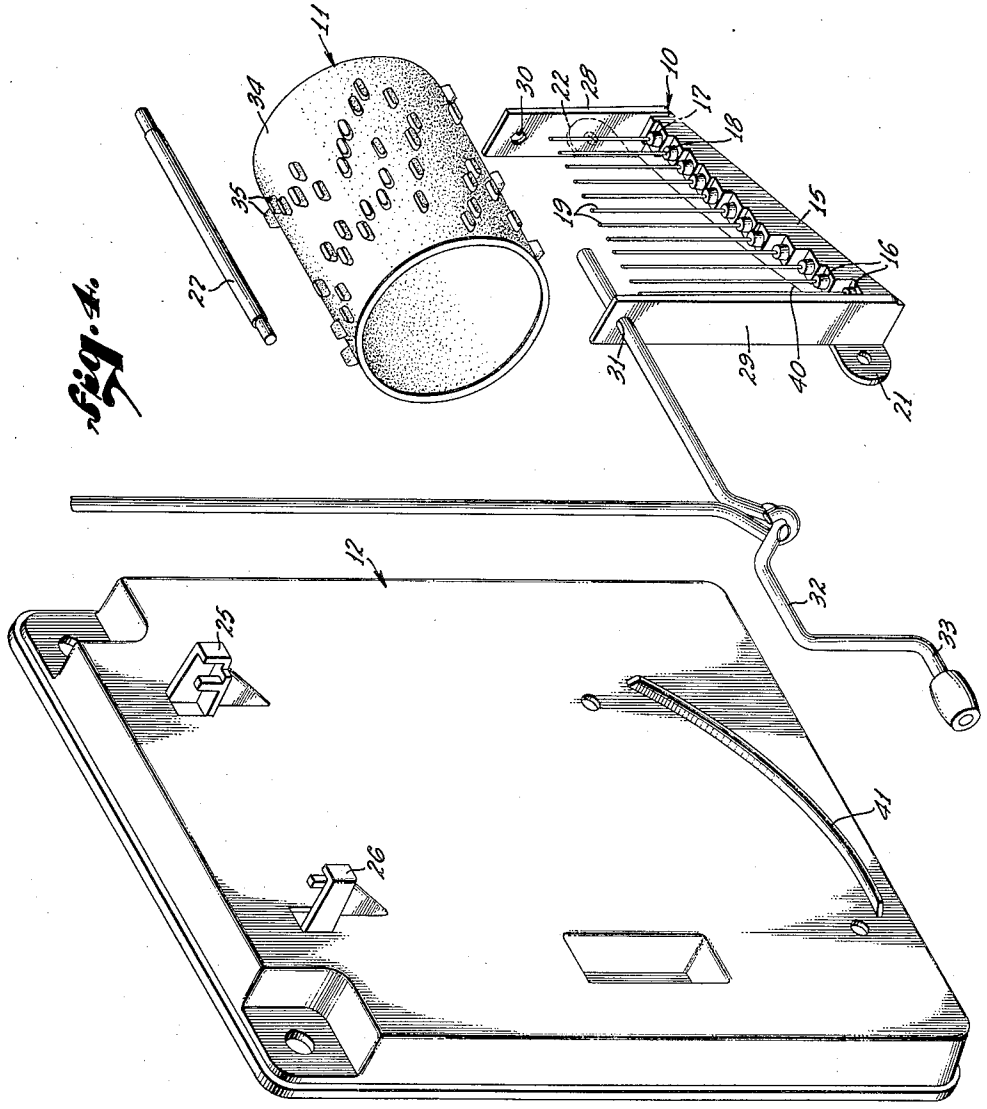
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ATTORNEYS.
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Fig. 4.



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2,504,632

UNITED STATES PATENT OFFICE

2,504,632

MUSIC PRODUCING UNIT

Nathan Paul Blair, Los Angeles, Calif., assignor to Mattel Creations, Inc., Culver City, Calif., a corporation of California

Application October 14, 1949, Serial No. 121,400

11 Claims. (Cl. 84—95)

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My invention relates to a musical unit and has particular reference to the construction of a musical playing device for incorporation in musical toys.

This application has particular reference to a musical producing unit using a pluckable music comb, the details of which are more fully disclosed in the copending application of Theodore Duncan, filed May 24, 1948, being Serial No. 28,767, and an endless plucking belt the details of which are described in the copending application of Nathan Paul Blair, filed October 14, 1949, being Serial No. 121,399.

One of the more serious problems in producing an inexpensive music producing unit for incorporation into children's toys is to produce a unit which will give sufficient volume to make it attractive to children.

One of the objects of my invention is to provide a musical producing unit having sufficient volume without distorting any of the tonal quality obtained by the use of a die-cast musical comb described in the above identified copending application.

It is highly advantageous in the manufacture of such a unit to be able to quickly and easily adapt the unit to any desired tune or composition. If such unit be so adaptable, it can be incorporated in a great variety of toys, thereby materially reducing the cost of production to make such units more universally available for children.

I have discovered that unless the musical comb is secured very tightly against any member upon which it is mounted undesired and undesirable vibrations are generated.

The proper mounting of such musical combs as heretofore known have been cumbersome and expensive insofar as the manufacturing is concerned. It is one of the objects of my invention to provide a musical instrument wherein the musical comb can be mounted by relatively simple and inexpensive means and yet which results in a clear transmission and amplification of the sound produced by the vibrating piece.

This is accomplished by employing the principles illustrated in the copending application to Theodore Duncan above mentioned, wherein a die-cast musical comb is produced having mounting ears adapted to be riveted against a sounding board, wherein the surface of a supporting member of the musical comb in contact with the sounding board is slightly convex to thereby place the sounding board in close contact with the musical comb and also in tension.

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I have observed that if a sounding board, regardless of its material, is placed in tension in the substantially conical configuration it assumes the quality of grained wood insofar as acting as a sounding board is concerned.

It is the further object of my invention to provide means on the sounding board to direct and control the distortion caused by the contact pressure between the convex edge of the supporting member of the musical comb and the adjacent area of the sounding board to thereby further enhance the quality and volume of the sounds produced.

It is also one of the objects of my invention to produce a music producing unit which is adaptable to play substantially any tune desired and which can be adapted for use in connection with a great variety of musical toys.

Other and further objects and advantages will become apparent from the drawings and specifications relative thereto.

In the drawing:

Figure 1 is a top plan view of a music producing unit embodying the principles of my invention.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a fragmentary sectional view taken on line 3—3 of Figure 1.

Figure 4 is an exploded perspective view of the music producing unit illustrated in Figure 1.

In describing an embodiment of my invention, reference is first made to Figure 4 wherein I have illustrated an exploded perspective view of one embodiment of my invention, which comprises essentially a musical comb designated generally 10, a plucking belt designated generally 11, and mounting and sounding board designated generally 12.

The musical comb 10 is formed of a bar 15 having a plurality of steps 16, each of which is formed with a truncated conical boss such as 17, these bosses being formed with flat faces 18.

A vibratable wire 19 is secured in the bar and extends outwardly from the front face of each of said bosses 17. As will be seen in Figure 1, the vibratable wires 19 become progressively shorter from left to right in such a manner that the tone emitted from each of said wires follows a musical scale. For further details on the method of embedding the wires 19 in the bar 15, reference is hereby made to the said copending application Serial No. 28,767.

The bar 15 is formed with laterally extending ears 21 and 22 at each end thereof, respectively,

each of the ears being formed with an aperture adapted to receive a rivet 23 or other suitable fastening means, adapted to secure the bar 15 to the sounding board 12.

The sounding board 12 is formed with a pair of upwardly extending bosses 25 and 26 having a slot therein adapted to receive an axle shaft 27 in rotatable engagement. The bar 15 is formed with a pair of forwardly extending arms 28 and 29, each of which is formed with apertures 30 and 31, respectively, in axial alignment. An axle shaft 32 is rotatably disposed through said apertures 30 and 31 and is formed with a crank handle 33 extending outwardly from the musical toy.

A resilient, flexible, endless, seamless belt 34 having integral outwardly extending fingers 35 is wound about the axles 27 and 32 so that upon rotation of the crank 33, the axle 32 causes the belt 34 to travel as indicated by the arrows in Figure 2, so that the fingers 35 move in the proper sequence past the wires 19 to thereby pluck the same, causing them to vibrate and to emit musical tones, the frequency of which is dependent upon the length and diameter of the respective wires.

For further details of the belt 34 and the method of producing the same, reference is hereby made to the said copending application Serial No. 121,399.

I prefer to form the melody comb with the bar 15 being of substantial thickness with respect to the teeth 19 so that the teeth 19 will be raised thereby above the surface of the sounding board 12 and so that it will be relatively rigid with respect to said sounding board.

Any reference hereafter in the specification or claims to a "relatively rigid bar" or a "relatively flexible sounding board" shall be deemed relative to each other; by that is meant that the sounding board is more flexible than the bar 15 so that upon being secured together in intimate contact the sounding board will conform to the shape and configuration of the rigid bar.

Referring to Figure 3, it will be noted that the lower edge 40 of the bar 15 is convexed slightly, so that when the rivets 23 are set, the sounding board conforms to the contour thereof and is thereby placed in tension, having internal stresses which tend to produce a satisfactory sounding board having the tonal qualities of a fine-grain wood, even though made from such materials as thermal-setting plastics or metal.

The sounding board 12 is formed with a curved rib 41 adjacent the back of the bar 15. The upwardly extending rib 41 causes the stress lines set up in the plastic or other material forming the sounding board 12 to radiate in a substantial circle so that a substantially conical-shaped section is formed in the plastic material. The rib is for the purpose of directing and concentrating the stress lines to further amplify the sound in the sounding board and to effect a better tonal quality.

Thus, it will be seen that I have produced a musical toy unit capable of being produced at a relatively inexpensive cost in large volumes, which gives a satisfactory tonal quality and having satisfactory and sufficient volume to readily be enjoyed by children and which is highly advantageous over any of the prior art. The objectives above enumerated have therefore been accomplished.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is

recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A musical unit comprising a relatively flexible sounding board, a melody comb having pluckable teeth secured thereto, said comb comprising a relatively rigid bar having a bottom, front and back edges, a plurality of pluckable teeth in parallel spaced relation extending from the front edge of said bar, each of which has a free end terminating in a common line, and means for plucking said teeth in predetermined order to play a given melody, the bottom of said bar being convex downwardly, spaced fastening means holding said bar in intimate surface contact with a surface of said sounding board, the normal contour of said sounding board surface being such that said fastening means cause said sounding board to warp upon being secured to said bar to thereby set up stress lines in said sounding board.

2. A musical unit comprising a relatively flexible sounding board, a melody comb having pluckable teeth secured thereto, said comb comprising a relatively rigid bar having a bottom, front and back edges, a plurality of pluckable teeth in parallel spaced relation extending from the front edge of said bar, each of which has a free end terminating in a common line, and means for plucking said teeth in predetermined order to play a given melody, the bottom of said bar being convex downwardly, spaced fastening means holding said bar in intimate surface contact with a surface of said sounding board, the normal contour of said sounding board surface being such that said fastening means cause said sounding board to warp upon being secured to said bar to thereby set up stress lines in said sounding board, said sounding board being formed with an arcuate rib in spaced relation to the back of said bar and arranged to direct said stress lines into substantially converging relation.

3. A musical unit comprising a relatively flexible sounding board, a melody comb having pluckable teeth secured thereto, said comb comprising a relatively rigid bar having a bottom, front and back edges, a plurality of pluckable teeth in parallel spaced relation extending from the front edge of said bar, each of which has a free end terminating in a common line, a pair of parallel axles in spaced relation, one of which is disposed in spaced relation with the common line of said teeth, an endless belt disposed over said axle having means on the outer surface thereof adapted to pluck said teeth upon the rotation of said axle, the bottom of said bar being convex downwardly, spaced fastening means holding said bar in intimate surface contact with a surface of said sounding board, the normal contour of said sounding board surface being such that said fastening means cause said sounding board to warp upon being secured to said bar to thereby set up stress lines in said sounding board.

4. A musical unit comprising a relatively flexible sounding board, a melody comb having pluckable teeth secured thereto, said comb comprising a relatively rigid bar having a bottom, front and back edges, a plurality of pluckable teeth in parallel spaced relation extending from the front edge of said bar, each of which has a free end terminating in a common line, a pair of parallel

axles, one of which is disposed in spaced relation with the common line of said pluckable teeth, an endless belt disposed over said axles having means on the outer surface thereof adapted to pluck said teeth upon the rotation of said axles, the bottom of said bar being convex downwardly, spaced fastening means holding said bar in intimate surface contact with a surface of said sounding board, the normal contour of said sounding board surface being such that said fastening means cause said sounding board to warp upon being secured to said bar to thereby set up stress lines in said sounding board, said sounding board being formed with an arcuate rib in spaced relation to the back of said bar and arranged to direct said stress lines into substantially converging relation.

5. A musical unit comprising a relatively flexible sounding board, a melody comb having pluckable teeth secured thereto, said comb comprising a relatively rigid bar having a bottom, front and back edges, a plurality of pluckable teeth in parallel spaced relation extending from the front edge of said bar, each of which has a free end terminating in a common line, a forwardly extending arm at each end of said bar having axially aligned apertures at the outer ends thereof, an axle rotatably disposed through said apertures in spaced relation from and parallel to said common line of said pluckable teeth, an endless belt disposed over said axle having plucking fingers on the outer surface thereof, said fingers being adapted to pluck said teeth upon the rotation of said axle, the bottom of said bar being convex downwardly, spaced fastening means holding said bar in intimate surface contact with a surface of said sounding board, the normal contour of said sounding board surface being such that said fastening means cause said sounding board to warp upon being secured to said bar to thereby set up stress lines in said sounding board.

6. A musical unit comprising a relatively flexible sounding board, a melody comb having pluckable teeth secured thereto, said comb comprising a relatively rigid bar having a bottom, front and back edges, a plurality of pluckable teeth in parallel spaced relation extending from the front edge of said bar, each of which has a free end terminating in a common line, a forwardly extending arm at each end of said bar having axially aligned apertures at the outer ends thereof, an axle rotatably disposed through said apertures in spaced relation from and parallel to said common line of said pluckable teeth, a second axle disposed in spaced relation to said first axle and parallel thereto, an endless belt disposed over said axles having plucking fingers on the outer surface thereof, said belt being adapted to travel past said pluckable teeth so that said fingers will pluck said teeth upon the rotation of said axle, the bottom of said bar being convex downwardly, spaced fastening means holding said bar in intimate surface contact with a surface of said sounding board, the normal contour of said sounding board surface being such that said fastening means cause said sounding board to warp upon being secured to said bar to thereby set up stress lines in said sounding board, said sounding board being formed with an arcuate rib in spaced relation to the back of said bar and arranged to direct said stress lines into substantially converging relation.

7. A musical unit comprising a relatively flexible sounding board, sound producing means having a relatively rigid mounting bar and pluckable teeth secured to said sounding board in intimate surface contact therewith at at least three spaced points, the means defining said spaced points on said mounting bar and said sounding board lying in surfaces normally of different contours, spaced fastening means holding said surfaces in intimate contact and effective to cause said sounding board to warp upon being secured to said relatively rigid bar to thereby set up stress lines in said sounding board.

8. A musical unit comprising a relatively flexible sounding board, sound producing means having a relatively rigid mounting bar and pluckable teeth secured to said sounding board in intimate surface contact therewith, the contacting surface of said mounting bar being convex toward said sounding board and of a different contour from the normal contour of said sounding board, spaced fastening means holding said surfaces in intimate contact and effective to cause said sounding board to warp upon being secured to said relatively rigid bar to thereby set up stress lines in said sounding board.

9. A musical unit comprising a relatively flexible sounding board, sound producing means having a relatively rigid mounting bar and pluckable teeth secured to said sounding board in intimate surface contact therewith at at least three spaced points, the means defining said spaced points on said mounting bar and said sounding board lying in surfaces normally of different contours, spaced fastening means holding said surfaces in intimate contact and effective to cause said sounding board to warp upon being secured to said relatively rigid bar to thereby set up stress lines in said sounding board, said sounding board being formed with an arcuate rib adjacent said sound producing means and arranged to direct said stress lines into converging relation.

10. A musical unit comprising a relatively flexible sounding board, a melody comb having pluckable teeth secured thereto, said comb comprising a bar having a plurality of pluckable teeth in parallel spaced relation extending from one edge of said bar, each of which has a free end terminating in a common line, said bar having a forwardly extending arm at each end thereof having axially aligned apertures at the outer ends thereof, an axle rotatably disposed through said apertures in spaced relation from and parallel to said common line of said pluckable teeth, an endless belt disposed over said axle having plucking fingers on the outer surface thereof, said fingers being adapted to pluck said teeth upon the rotation of said axle, and spaced fastening means holding said bar in intimate surface contact with a surface of said sounding board.

11. A musical unit comprising a relatively flexible sounding board, a melody comb having pluckable teeth secured thereto, said comb comprising a bar having a bottom, front and back edges, a plurality of pluckable teeth in parallel spaced relation extending from the front edge of said bar, each of which has a free end terminating in a common line, said bar having a forwardly extending arm at each end thereof having axially aligned apertures at the outer ends thereof, an axle rotatably disposed through said apertures in spaced relation from and parallel to said common line of said pluckable teeth, a second axle disposed in spaced relation to said first axle and parallel thereto, an endless belt disposed over said axles having plucking fingers on the outer surface thereof, said belt being adapted to travel past said pluckable teeth so that said fingers will

pluck said teeth upon the rotation of said axle, and spaced fastening means holding said bar in intimate surface contact with a surface of said sounding board.

N. PAUL BLAIR.

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