April 11, 1944. L. G. MACHLIN ET AL 2,346,444

MUSICAL DEVICE

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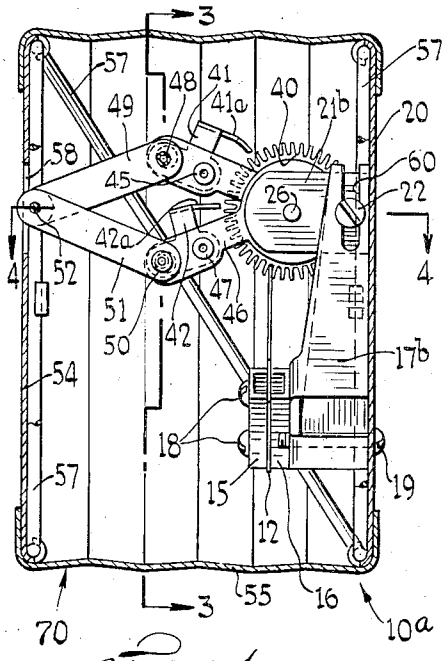



Fig. 1.

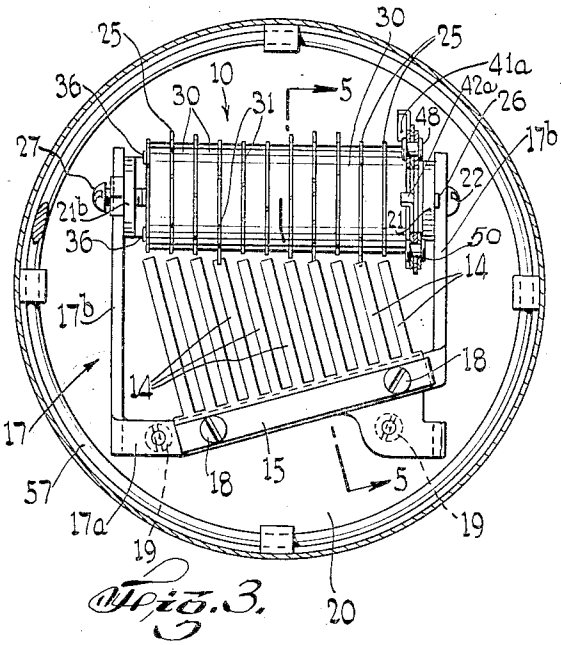



Fig. 3.

Fig. 4.

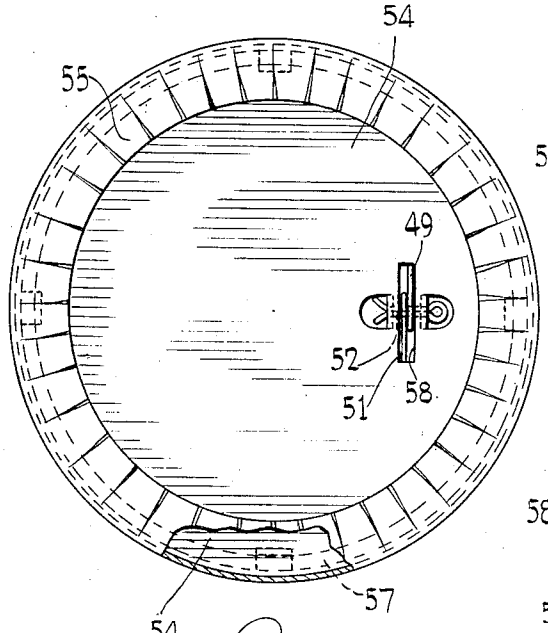
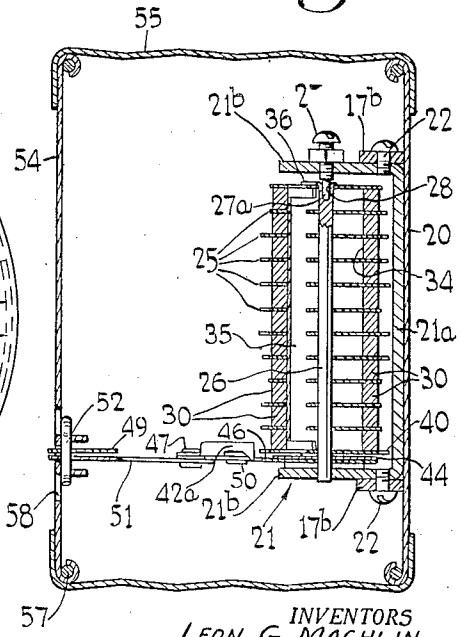



Fig. 2.




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Fig. 5.

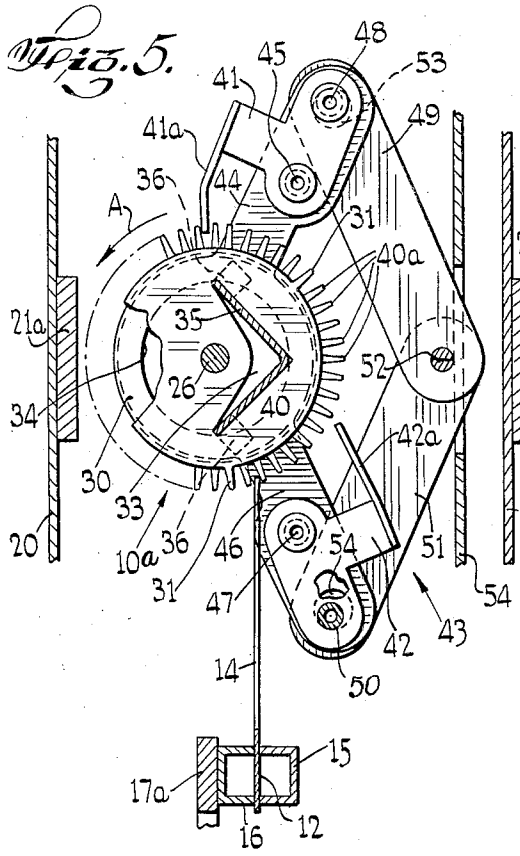



Fig. 6.

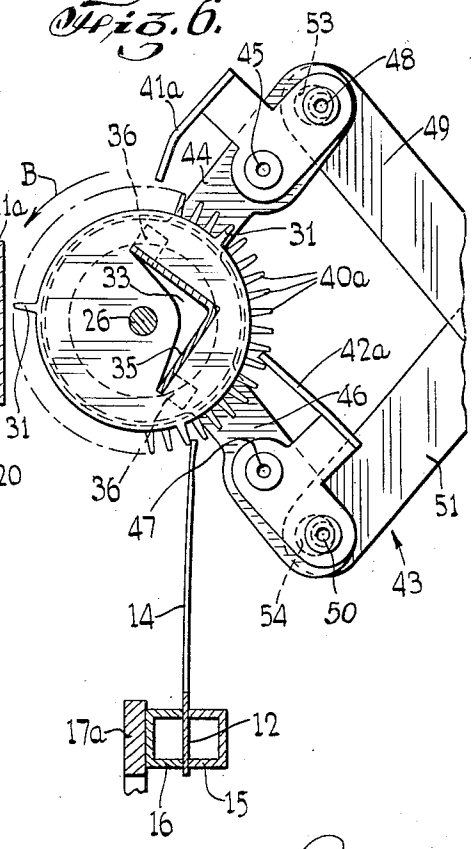



Fig. 9.

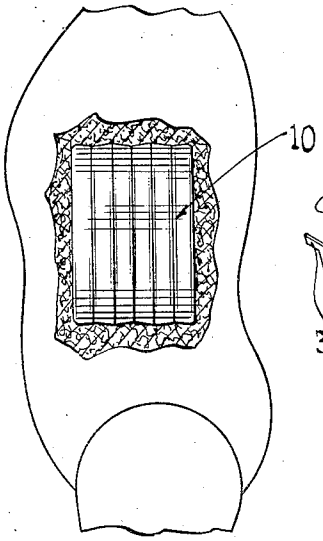



Fig. 7.

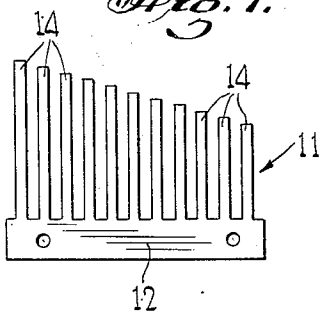
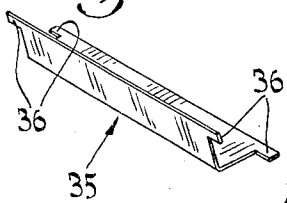



Fig. 8.




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# UNITED STATES PATENT OFFICE

2,346,444

## MUSICAL DEVICE

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Application January 29, 1942, Serial No. 428,690

8 Claims. (Cl. 84—95)

This invention relates generally to musical devices. More particularly our invention relates to a novel and improved construction for the type of musical devices employing reeds and operated by a bellows.

One of the objects of our invention is to provide an improved musical device of the character described which shall be characterized by the simplicity of the construction and assembly of the parts thereof as compared to musical devices of a similar nature heretofore manufactured, and which shall, at the same time, be practical and operate with a high degree of efficiency.

Another object of our invention is to provide, in a musical device of the class described a novel and highly improved construction for a drum unit, as well as a highly improved design and arrangement for reed unit cooperating with said drum unit in combination with improved means for causing said drum to rotate in a given direction only.

There are further objects of our invention which will become apparent in the following detailed description thereof.

In the accompanying drawings,

Fig. 1 is an end elevational view, partly in section, of a musical device constructed and arranged in accordance with our invention;

Fig. 2 is a front elevational view thereof with a portion of the outer wall thereof broken away to disclose the interior construction thereof;

Fig. 3 is a cross-sectional view taken substantially on the line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view taken substantially on the line 4—4 of Fig. 1;

Figs. 5 and 6 are enlarged sectional views of a portion of the mechanisms of the device shown in Fig. 1, and illustrating the operation thereof;

Fig. 7 is a plan view showing the detail of the reed unit disassembled from our musical device;

Fig. 8 is a perspective view illustrating in detail another part, disassembled from our musical device; and

Fig. 9 is a fragmentary view of a doll's body with the musical device of our invention mounted therein for effective use.

Referring now in detail to the drawings we have shown a musical device 10 constructed and arranged in accordance with our invention and which may be suitably mounted within a doll's body or similar toy to be effectively operated by alternately compressing and releasing the said doll's body. It is understood however that my musical device may be adapted for use in any other desired manner.

The said device 10 comprises generally a reed unit 11 and a cooperating drum unit 10a (see Figs. 1 and 3 to 8). In accordance with our invention the reed 11 is preferably of one piece construction stamped out of suitable metallic material designed to provide the proper degree of rigidity to produce a tone when vibrated and at the same time sufficiently flexible to bend without breaking. The said reed unit, as shown in detail in Fig. 7 comprises a longitudinal body portion 12 and a plurality of reeds 14 extending transversely therefrom, the said reeds being spaced from each other a predetermined distance and of varying lengths to provide the desired variation in tone.

The reed unit 11 is rigidly clamped between a pair of rigid channel members 15 and 16 with the side walls of the said channel members in symmetrically opposed relationship, as clearly shown in Figs. 5 and 6 of the drawings. The said channels 15 and 16 with the reed unit clamped therebetween are fixedly mounted on a cross member 17a of a support 17 by any suitable attaching means, such as for example, the screws 18 passing through the bottom walls of each of the channel members 15 and 16 as well as through the body portion 12 of the unit 11 and threadedly received in the said cross member 17a.

The said support 17 may comprise, in addition to the cross arm 17a, a pair of side arm members 17b, forming a substantially C-shaped support. The said support 17 may be rigidly attached to a flat wall member 20 by any suitable attaching means, such as, for example, the screws 19 threadedly passing through the cross arm 17a.

Mounted on the support 17 between the side arms 17b is a U-shaped cradle member 21 adapted to rotatably support the drum 10a and comprising the base portion 21a and the legs 21b upstanding therefrom, the said legs 21b being fixed to the arms 17b by suitable screw members 22.

In accordance with our invention the drum unit 10a comprises the following novel construction designed to selectively and at predetermined subsequent intervals vibrate selected reeds 14 to produce a desired melody.

A plurality of flat disc members 25 with aligned central apertures are received on a shaft 26 supported at one end thereof in one of the legs 21b and supported at the opposite end thereof by a stub shaft 27a forming a part of a screw member 27 threadedly passing through the other leg 21b.

An opening 28 in the shaft 26 is provided for the stub shaft 27a. The said discs 25 are maintained in predetermined laterally spaced relationship by annular spacer members 30 interposed between adjacently disposed discs 25. The said spacer members 30 may be of any desired material such as wood, cardboard, metal or plastic, and may be substantially of the same diameter as that of the discs 25. Each disc 25 is provided with one or more teeth or projections 31 extending outwardly from the periphery of the said discs 25. These projections 31 are designed to be disposed in the path of correspondingly disposed reeds 14 so that upon rotation of the drum 10a certain designated projections 31 will strike certain designated reeds in proper sequence to vibrate the latter and to cause a melody to be produced.

It is noted that the projection or projections 31 of each disc 25 must be positioned at a predetermined part of the periphery of the disc so that they will strike the cooperating reed 14 in proper sequence with respect to the melody desired. It is also noted that once the said proper arrangement of projections 31 is obtained it is important that they be so maintained, otherwise the melody will be wrong. To this end we have provided the following construction designed to prevent relative axial rotation between the discs 25, and to cause them to rotate as a unit and in a given direction only.

Each disc 25 is provided with an angular or V-shaped opening 33 therein, the said openings spaced from the central openings receiving the shaft 26, as clearly shown in Figs. 5 and 6 of the drawings.

Passing through the said openings 33 and through the center openings 34 of the spacer members 30 is a substantially correspondingly angular or V-shaped member 35, shown in detail in Fig. 8 of the drawings.

To maintain the said rigid member 35 in position and at the same time to prevent the lateral separation of the discs 25 and spacer members 30, we provide integral tabs 36 extending from the ends of the said member which are bent over to overlie the outer surface of the outermost discs or spacer members at opposite ends of the drum 10a as shown in Figs. 3 and 4 and in dotted lines in Figs. 5 and 6.

It is thus seen from the above described construction that when a suitable force is applied to any part of the drum it will move or rotate about the axis of the shaft 26, as a unit, and that during such rotation projections 31 on the discs 25 will progressively vibrate reeds 14 in accordance with a prearranged sequence.

In accordance with our invention the following means are employed for causing rotational movement of the drum.

Mounted on the shaft 26 to form a part of the unit 10a, is a gear member 40 preferably stamped from a flat relatively thin sheet of suitable material. The said member 40 is provided with a V-shaped opening 33 the same as, and in alignment with the openings 33 in the discs 25. The tabs 36 passing through the opening 33 in the gear 40 and bent over and fastened in the manner hereinbefore described serve to cause the gear 40 to rotate as an integral unit with the drum 10. While in the drawings I have shown the gear 40 as being disposed at the outermost end of the laminated drum structure it is understood that it may be positioned at any other suitable position. Cooperating with the gear 40 is a pair of pawl members 41 and 42 adapted to be received between adjacent pairs of teeth 40a to cause rotation of said gear 40. The said pawl members 41 and 42 are carried by a lazy tongs device 43. The pawl 41 is pivotally mounted on a link member 44 by means of the pivot 45, and the pawl 42 is pivotally mounted on a link member 46 by means of the pivot 47, the said links 44 and 46 being in turn pivotally interconnected by the shaft 26. Pivotally connected to the link 44 by means of a pivot 48 is a link 49, and pivotally connected to the link 46 by means of a pivot 50 is a link 51, the said links 49 and 51 being pivotally interconnected by the pivot 52.

It is noted that the pivot 48 also pivotally connects the pawl member 41 to the link 49 and that the pivot 50 also connects the pawl member 42 to the link 51. To permit limited movements of the pawl members so that they may effectively do their work and at the same time movement between the links 44, 49 and 46, 51, the link 44 is provided with an enlarged opening 53 freely surrounding the pivot 48 and the link 46 is provided with an enlarged opening 54 freely surrounding the pivot 50.

The finger portions 41a and 42a of the pawls 41 and 42 respectively are so positioned that upon compression of the lazy tongs 43, to a position shown in Fig. 5, the finger 41a will engage between adjacent teeth 40a and cause the rotation of the gear 40 as well as the entire drum unit in the direction of the arrow A, and when the lazy tongs is extended to the position shown in Fig. 6, the finger 42a will engage between a pair of teeth 40a to cause the gear 40 and drum 10a to rotate in the same direction as indicated by the arrow B.

It is thus seen that by alternately compressing and extending the lazy tongs 43 the drum 10a will be caused to rotate in one given direction, thus making it possible to play a relatively long tune and also making the musical device of our invention adapted for use in the body of a doll, as in Fig. 9.

For convenience in operating the lazy tongs, and to further facilitate the use of our invention in dolls or similar toys, we provide a bellows member 70 comprising the wall 20 to which the support 17 is attached and a second wall 51, parallel to and of similar contour, in this case, circular. The walls 20 and 51 are interconnected by suitable annular wall 55 made of the usual flexible material suitable for a bellows.

As hereinbefore described one end of the lazy tongs is fixed to the shaft 26 which in turn is supported by the cradle member 21 fixed to the wall 20 for movement therewith. The opposite end of the lazy tongs is fixed to the shaft 52 which in turn is fixedly attached to the wall 51 for movement therewith. Inside the bellows, adjacent the periphery of the walls 20 and 51 and interposed therebetween is a coil spring 57 normally tending to urge the lazy tongs to extended position.

It is thus evident from the above detailed description that when the bellows 70 is compressed against the action of the spring 57 the reeds 14 will be vibrated due to the rotation of the drum 10a and that upon release of the bellows from its compressed position the spring 57 will automatically move the lazy tongs to extend position to cause the drum to continue to rotate in the same direction and thus continue the melody, and so on, by compressing and releasing the bellows until the song has been completed.

A slot 58 may be provided in the wall 51 to

permit freedom of movement of the links 49 and 51 of the lazy tongs 43. Suitable openings may also be provided in the wall 20 to provide an air egress and intake for the bellows when compressed and released.

As noted in Fig. 1 of the drawings the arms 17b supporting the cradle 21 therebetween may be provided with elongated open end slots 69 to facilitate the assembly thereof and at the same time to permit adjustment of the position of the projections 31 of the drum 10a with respect to the reeds 14.

In accordance with our invention we have provided the following novel and relatively inexpensive method for making the discs 25. All the discs 25 are each originally stamped out of a flat sheet of metallic material by the same die for stamping the gear 40. Thereafter, all but certain selected teeth are blanked off from the gears 40 to form the individual discs 25, each remaining tooth of the gear becoming a projection 31 adapted to cooperate with a reed 14.

It is further noted that each of the finger portions 41a and 42a of the pawl members 41 and 42 respectively are arranged in a plane at right angles to the plane of the gear 40 so that a very thin gear may be employed, which saves material and space.

In accordance with the provisions of the patent statutes, we have herein described the principle and operation of our invention, together with the constructions which we now consider to represent the best embodiments thereof, but we desire to have it understood that the constructions shown are only illustrative and that the invention can be carried out by other means. Also, while it is designed to use the various features and elements in the combination and relations described, some of these may be altered and others omitted without interfering with the more general results outlined, and the invention extends to such use.

Having described our invention, what we claim and desire to secure by Letters Patent is:

1. In a musical device of the class described the combination of a shaft, a laminated drum member having projections thereon, and rotatably mounted on said shaft, a reed unit comprising a plurality of reeds, means for fixedly supporting said reed unit so that said reeds will lie in the path of rotation of said projections, means for causing said drum to rotate, said last named means comprising a bellows, a spring normally tending to urge said bellows to expanded position, and a lazy tongs device, one end of said lazy tongs being fixed to a wall of said bellows and the other end of said lazy tongs being attached to said drum shaft and being relatively rotatable with respect to said drum.

2. In a musical device of the class described the combination according to claim 1 in which the means for causing said drum to rotate additionally comprises a gear member mounted for integral rotation with said drum and a pawl member fixed to said lazy tongs, for movement therewith, said pawl member having a finger portion adapted to be received between adjacent teeth of said gear member to rotate said drum.

3. In a musical device of the class described the combination according to claim 1 in which the means for causing said drum to rotate additionally comprises a gear member mounted for integral rotation with said drum and a pawl member fixed to said lazy tongs, said pawl member having a finger portion adapted to be received between adjacent teeth of said gear member to rotate said drum, said gear member and said pawl member being of relatively thin material and the plane of said finger portion of said pawl being at right angles to the plane of said gear member.

4. In a musical device wherein a plurality of fixedly mounted reeds are positioned in the path of projections on a rotatably mounted drum, that improvement which comprises constructing said drum of a plurality of discs having peripheral projections at predetermined portions thereof and means for preventing relative rotation between said discs and to cause said discs to rotate as a unit, said last named means comprising axially aligned apertures in said discs, said apertures being non-circular in contour and a rigid key member of substantially similar cross sectional contour as said apertures permanently received therein.

5. In a musical device wherein a plurality of fixedly mounted reeds are positioned in the path of projections on a rotatably mounted drum, that improvement which comprises constructing said drum of a plurality of discs having peripheral projections at predetermined portions thereof and means for preventing relative rotation between said discs and to cause said discs to rotate as a unit, said last named means comprising axially aligned apertures in said discs, said apertures being non-circular in contour and a rigid key member of substantially similar non-circular cross sectional contour received in said apertures, said key member having extending bendable tabs at opposite ends thereof, said tabs being bent to overlie the outer surfaces of the two end discs of said drum unit.

6. A musical device according to claim 5 in which said discs are additionally mounted on a shaft and in which means are provided for supporting said shaft.

7. A musical device according to claim 5 in which a gear member is fixed to said drum for integral rotation therewith and in which manually manipulative means are provided, cooperating with said gear member, to cause continuous rotation of said drum in one direction only.

8. In a musical device of the class described the combination of a plurality of reed members, a rotatable drum, said drum comprising a plurality of laminae, said laminae being provided with projections adapted to vibrate said reed members and means for maintaining said laminae in assembled condition, said last named means comprising axially aligned V-shaped apertures in said discs, and a rigid correspondingly shaped key member received in said apertures.

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