June 10, 1924. 1,497,651

G. P. BENES

SOUND CONTROLLING DEVICE

Filed Sept. 29, 1922

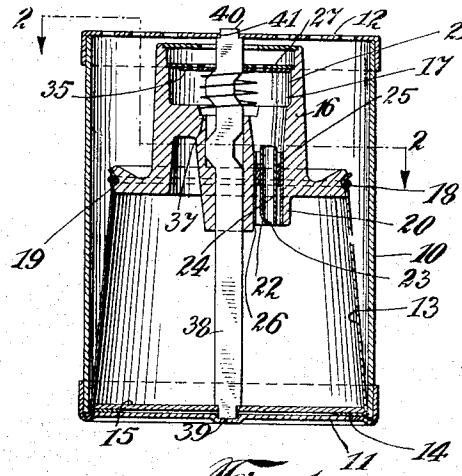


Fig. 1.

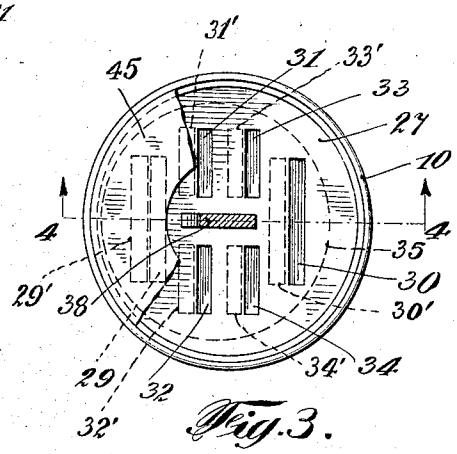


Fig. 3.

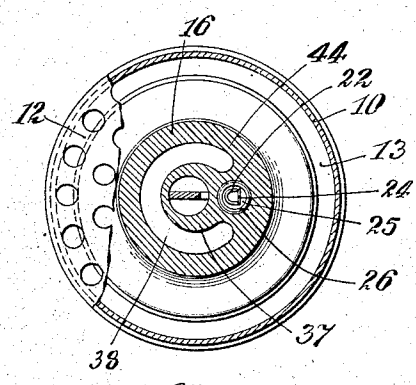


Fig. 2.

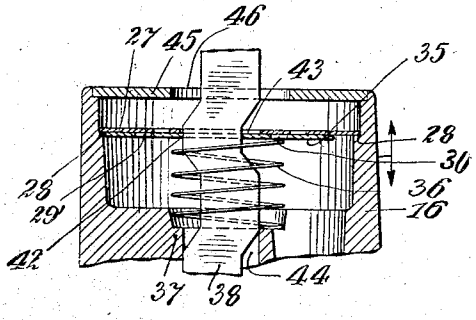


Fig. 4.

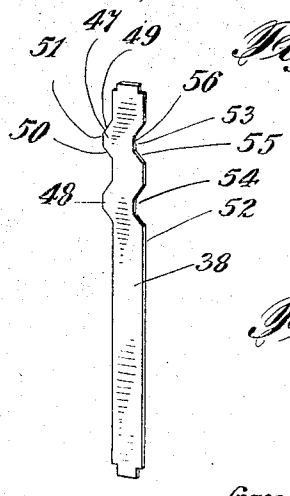


Fig. 6.

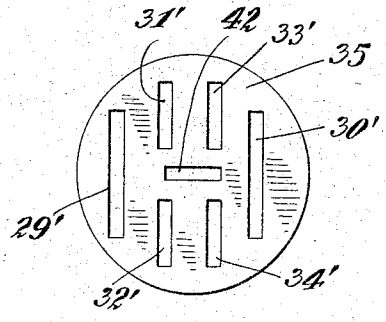


Fig. 5.

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UNITED STATES PATENT OFFICE.

GASPAR P. BENES, OF NEW YORK, N. Y.

SOUND-CONTROLLING DEVICE.

Application filed September 29, 1922. Serial No. 591,220.

To all whom it may concern:

Be it known that I, GASPAR P. BENES, a citizen of the United States, and resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Sound-Controlling Devices, of which the following is a specification.

My present invention relates to sound controlling devices and in its more specific application to speaking mechanisms for dolls.

Among the objects of the invention are to provide a mechanism of the type referred to, of construction simple and light, as well as inexpensive, both in material and labor, and which shall operate reliably, without likelihood of binding or jamming to substantially reproduce the "ma ma" call of an infant.

It is well understood by those skilled in the art, that to effectively produce the "ma" syllable, a closed vibrating body of air should be opened relatively suddenly. Where this result is accomplished by the use of a disk valve which is opened and closed by passing through a corresponding aperture in the sound chamber, it is apparent that if the fit of the valve is made reasonably tight, the operation would be hard and the device likely to jam, while if it is made sufficiently loose for easy operation, the complete expulsive effect may not be produced, as some of the air would leak out of the sound chamber, even before the valve is displaced to open position. On the other hand, where a slide valve with satisfactory sealing effectiveness is employed, the sound chamber may be opened too slowly to meet requirements, as the valve slides to open position in operation.

By my invention, I effect, with the use of a slide valve, the desirable rapid exposure or opening of the sound chamber. In the preferred embodiment, the sound chamber has a plurality of parallel relatively narrow slots, and the slide valve associated therewith, has corresponding slots adapted to register with those in the chamber for emission of sound in one position and to cover said slots in another position thereof. Thus, the apertures are uncovered concurrently in operation, the combined width and, therefore, the effective area of said apertures being considerably greater than the range of valve displacement, so that in operation, the sound chamber is opened with corresponding suddenness.

According to another preferred feature of the invention, I employ in lieu of the ordinary reed pipe, a sound chamber having a narrow throat and a diverging mouth. By this arrangement, the shape of the human mouth cavity is more nearly approximated and as will be readily understood, the sound produced is afforded a richer quality.

In the preferred embodiment, the sound chamber is mounted on a translatable bellows head. The slide valve is disposed across the mouth of the sound chamber against a correspondingly slotted plate and appropriate means is provided to shift the valve laterally along the plate at right angles to the direction of collapse of the bellows, preferably by an oscillatory movement, for alternately opening and closing the sound chamber to produce the desired emission of sound. In the preferred embodiment, the shift of the valve is produced by a stationary pilot bar extending transversely through the valve and anchored in the enclosing casing, said bar having offsets in the plane thereof, so that as the valve descends in the collapse of the bellows and moves past said offsets, the latter will effect the desired oscillation.

Other objects and features will appear from the detailed description hereinafter of the preferred embodiment.

In the accompanying drawings in which is shown one of various possible embodiments of the several features of this invention,

Fig. 1 is a view in longitudinal cross-section of a preferred embodiment of the invention, showing the valve in open position,

Fig. 2 is a transverse sectional view taken along the line 2—2 of Fig. 1,

Fig. 3 is a plan view on an enlarged scale illustrating the operation of the valve,

Fig. 4 is a fragmentary sectional view taken along the line 4—4 of Fig. 3,

Fig. 5 is a plan view of a preferred form of valve, and;

Fig. 6 is a perspective view of a preferred pilot bar.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawings, I have shown a voice mechanism comprising the

usual cylindrical casing 10 provided with a base cap 12 and a perforated closure cap. The usual generally cylindrical collapsible bellows 13 has a flange 14 secured to the bellows head 15, said head resting against the base cap 11. The opposite head of the bellows is preferably a casting 16 formed as a unit with the sound chamber 17 and is secured in place preferably by fitting into the open end of the bellows 13, which is adhesively secured thereto and, moreover, clamped in position by a split ring 18, encircling the casting and fitting into a corresponding groove 19 therein. The sound chamber formed in head 16 in the preferred embodiment shown, has a throat 20 and a widened mouth 21. Within the throat is mounted the usual reed element comprising a small generally semi-cylindrical stamping 22, narrowed at one end 23 and closed by a flexible reed 24. A packing 25 encircling the reed element fits tightly into a corresponding short pipe 26 within the throat 20 of the sound chamber.

In the preferred embodiment, a stationary cap or plate 27, in the form of a stamped metal disk is frictionally fitted in the mouth of the sound chamber and jammed against a shoulder 28 therein, and is provided with a plurality of narrow parallel slots 29, 30, 31, 32, 33 and 34. A disk slide valve 35 which is preferably of material different from that of the plate to reduce friction and may be of celluloid, has a series of slots 29′, 30′, 31′, 32′, 33′ and 34′ formed and arranged identically with those in the plate 27, so that the slots in the slide valve may be brought into complete registry with those in plate 27 in one position thereof and in another position, the slide valve may close all of said slots. The valve disk is of smaller diameter than the mouth of the sound chamber to permit sliding movement thereacross, and fits, as shown, in Figs. 1 and 4, against the inner surface of the plate 27 and is maintained in contact therewith by the pressure of a light coil spring 36 reacting against the hub 37 of the casting 16 at one end.

To oscillate the slide valve for alternately opening and closing the sound chamber, during the collapse of the bellows 13, I provide a pilot bar 38 extending preferably axially through the casing 10, extending through bellows head 15 and having reduced ends 40 fitting and anchored into a corresponding slot 41 in caps 11 and 12. The pilot bar, as shown, projects through a transverse slot 42 which extends along a diameter of slide valve 35, at right angles to the valve slots 29 and across the bridge between the pairs of slots 31′, 33′ and 32′, 34′. The pilot bar, moreover, extends through a corresponding rectangular passage 44 in the hub 37, so that the head 16 is guided by the pilot bar to assure accurate translational slide without cocking of the sound chamber or of the bellows in operation. The pilot bar, as shown, extends through the valve seating spring 36 and, therefore, serves to retain the latter against loss or displacement. A slot 43 is provided in plate 27 for passage of pilot bar 38. A closure disk 45 with slot 46 for the pilot bar, may be snapped, if desired, in the extreme end of the casting 16.

The pilot bar is formed with a pair of identical lateral offsets 47 and 48 extending in the plane of the bar toward the left, as shown in the drawings, each preferably an equilateral trapezoid with oblique legs 49 and 50 and a flat crest 51. The opposite edge 52 of the bar has corresponding trapezoidal cutouts 53 and 54 aligned with the offsets, so that while the pilot bar is of sinusoidal form, its transverse cross-sectional area is at all points uniform, to fit the slot 42 in the slide valve 35, with only sufficient clearance to permit relative sliding movement.

In operation, when the doll is placed in prone position in the usual manner, the casting 15 drops toward cap 12 and the bellows is distended. When the doll is now placed on its back, the parts are in the relation shown in Fig. 1. The relative heavy bellows head 16 thereupon descends by gravity and is guided by pilot bar 38, accurately in a low-friction translational movement toward the head 11. As the closed valve 35 approaches the oblique edge 49 of the offset 47, it will be seen that said valve is shifted by the cam action of said edge against the contiguous end of slot 42, laterally toward the left, as best shown in Fig. 4, and while the flat crest 51 of the offset is in registry with the valve, the latter is held in its extreme position to maintain all of the slots 29′ etc., in the valve 35, out of registry with the corresponding slots 29, etc., in the plate 27, so that the sound chamber is completely closed. As the descent of the head and collapse of the bellows proceeds, the lower oblique edge 55 of the cutout 53 acts as a cam to shift slide valve 35, by contact with the contiguous end of the slot 42, toward the right, until when the trough 56 of the cutout comes into the plane of the valve, the valve slots are again in registry with the corresponding closure plate slots.

It will be seen that in this operation, although the lateral shift of the slide valve is but equal to the small altitude of the offset 47, which is only little in excess of the width of the slots 29, all of the slots are completely opened. By my invention, it will thus be seen that I expose, during the shift of the valve, a combined width of slot, several times as great as the displacement of the valve. This substantial area of slots is opened, it will be seen, in the minute fraction of a second required for the drop of the

head through the small altitude corresponding to the oblique edge 55, so that the completely sealed sound chamber is opened almost instantaneously, effecting the "ma" sound desired. As the descent of the head proceeds, the syllable is, of course, repeated, as desired, in the identical manner, by the action of the lower off-set 48, and cutout 54.

The slide valve it will be seen, oscillates in operation, in a direction at right angles both to the axis of the sound chamber and to the direction of collapse of the bellows.

By reason of the widening of the sound chamber to approximate roughly the shape of the human mouth, the sound is rendered richer in quality and more realistic than where the ordinary reed pipe is employed. Moreover, the large mouth of the sound chamber lends itself more readily to the application of the multi-slot valve control. than would the much smaller open end of an ordinary reed pipe.

My mechanism, it will be seen, is exceedingly simple and easy to produce. It merely comprises the sound chamber casting 16, the ordinary bellows 13, light spring 36 and a few ordinary stampings, viz, the closure plate 45, the valve plate 27, the slide valve 35 and the pilot bar 38. The assembly is particularly expeditious, the bellows being connected to the head in the usual manner, the pilot bar is passed through hub 44, the spring, and the slide valve being simply slipped over the pilot bar, followed by plate 27 which is snapped in place. Thereupon closure disk 45 is snapped into position at the upper end of the casting 16 and the cap 12 is finally applied to the enclosing cylindrical casing 10, said cap serving, moreover, to anchor the upper or free end 40 of the pilot bar, and to thereby maintain the opposite end of said pilot bar pressed against bellows head 15, and the latter pressed against casing cap 11.

It will thus be seen that there is herein described apparatus in which the several features of this invention are embodied, and which apparatus in its action attains the various objects of the invention and is well suited to meet the requirements of practical use.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a sound controlling device, in combination, a bellows, a sound chamber translatable with a head thereof, a perforated plate across the mouth of said sound chamber, a slide valve resting against said plate and shiftable within said sound chamber and transversely thereof to uncover said plate in one position and to close the same in another, and a stationary cam member extending longitudinally through said sound chamber and coacting with said slide valve to effect shifting movement thereof for alternately opening and closing the sound chamber, during the collapse of the bellows.

2. In a sound controlling device, in combination, a bellows, a sound chamber having a restricted or throat end, a vibratory reed member therein, said sound chamber having a widened mouth, a perforated plate across said mouth, a slide valve resting against said plate and movable transversely thereof within the mouth of said sound chamber to alternately uncover and close said plate, and means extending longitudinally through said sound chamber and coacting with said valve to oscillate the same during the collapsing movement of said bellows.

3. In a sound controlling device, in combination, a bellows, a sound chamber communicating therewith, a vibratory reed adjacent said bellows and associated with a reduced throat of said sound chamber, said sound chamber having a widened mouth, a perforated plate across said mouth, a valve, spring means within said sound chamber urging said valve to rest against the inner surface of said plate, and a stationary cam member extending longitudinally of said bellows and through said valve, said cam member having a lateral offset to cause shift of said valve transversely across said plate during the movement of said sound chamber in the collapse of said bellows.

4. In a sound controlling device, in combination, a cylindrical casing having end caps, a bellows secured to one end thereof, a sound controlling chamber rigid with the movable head of said bellows, said chamber having a restricted throat and a widened mouth, a vibratory reed in said restricted throat, a valve across said widened mouth, and a guide bar fixed in the end caps of said casing and extending through said valve, said guide bar having lateral offsets coacting with said valve to shift it by oscillatory movement during collapse of the bellows for alternately opening and closing the mouth of the sound chamber.

5. In a sound controlling device, in combination, a casing having end caps, a bellows having a head rigid with one of said end caps, said bellows having a second head, a sound chamber movable with said latter head, said sound chamber comprising a restricted throat communicating with the in-

terior of said bellows and a widened mouth, a plate across said mouth, a slide valve between said plate and said throat, spring means urging said valve against said plate, and a bar extending longitudinally of said casing and secured against displacement at the end caps thereof, said bar extending transversely through said valve and through said plate and having cams at the opposite edges thereof, whereby said valve is automatically urged by a sliding movement past said cams alternately to open and close the sound chamber during collapse of said bellows.

6. In a sound controlling device, in combination, a sound chamber, a plate across the mouth thereof having one or more apertures therein, a slide valve pressed against said plate and having apertures adapted to register with those in said plate, a bar extending transversely through a corresponding aperture in said valve and having lateral offsets, whereby upon relative movement of said sound chamber and said bar, said valve will be urged laterally by said offsets as the same move past said valve.

7. In a sound controlling device, in combination, a casing, a bellows therein, a sound chamber translatable with one head of said bellows, stationary guide means extending through said bellows and said sound chamber to assure translational movement of the latter, a shiftable closure across the mouth of said sound chamber, and stationary means coacting with said closure as the sound chamber reaches predetermined points in its movement during collapse of the bellows to shift the closure alternately to open and closed position.

8. In a sound controlling device, in combination, a sound chamber, a plate across the mouth thereof, said plate having a plurality of narrow slots therein, a slide valve resting against one side of said plate and having narrow slots corresponding with those in said plate, and means coacting with said valve to oscillate the same by a sliding movement for alternately bringing the slots in said valve into and out of registry with the corresponding slots in the plate, whereby the combined width of apertures exposed by opening of the valve is materially greater than the displacement of said valve.

9. In a sound controlling device, in combination, a sound chamber having a restricted throat, a vibratory reed therein, a diverging mouth, a plate across said mouth having a plurality of parallel narrow slots therein, a valve resting against said plate and adapted to be slid laterally along said plate to open and close the slots in said plate, and a pilot bar of uniform width extending transversely through said cap and said valve and having oblique conformations at its opposite longitudinal edges, whereby upon relative movement of said sound chamber and said pilot bar, the valve will slide laterally as said conformations come into registry therewith to alternately open and close the slots in said plate.

10. In apparatus of the character described, in combination, a slide valve, a seat therefor, a control bar for guiding said valve, said control bar being sinusoidal in form and being uniform in transverse cross-section, said valve having portions in contact with the opposite edges of said control bar, whereby upon shift of said control bar longitudinally relative to said valve, the latter will oscillate alternately to open and closed position.

Signed at New York in the county of New York and State of New York this 27th day of September, 1922 A. D.

GASPAR P. BENES.