Oct. 13, 1942. S. MARCUS 2,299,023

ARTICULATIVE VOICE

Filed June 10, 1940

Fig. 1

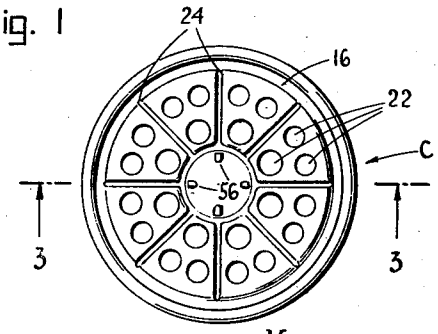


Fig. 2

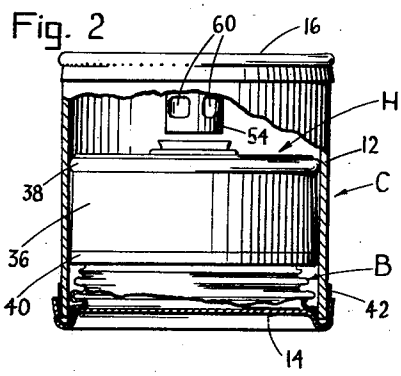


Fig. 3

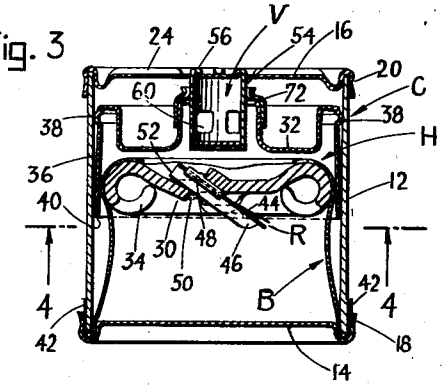


Fig. 4

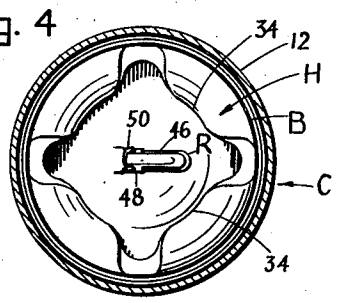


Fig. 5

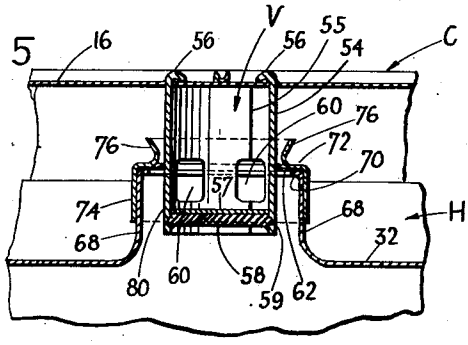


Fig. 7

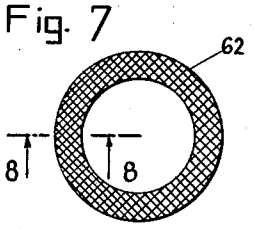


Fig. 8

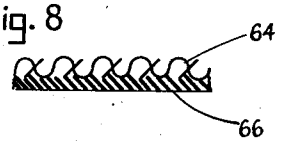
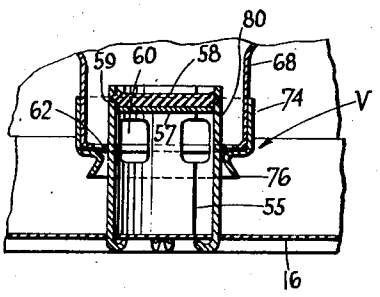


Fig. 6



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ARTICULATIVE VOICE

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Application June 10, 1940, Serial No. 339,651

9 Claims. (Cl. 46—187)

This invention relates to voices, most frequently used in dolls, and more particularly to articulative voices.

The primary object of my invention is to generally improve articulative voices. Such voices commonly employ a weighty head for gravitationally operating a flexible bellows in order to force air past a sound-producing reed. The resulting sound is controlled by a valve arrangement which affords intermittent free and constricted sound discharge. In this way the word "mama" may be simulated, the constrictions corresponding to the consonants, and the free discharge corresponding to the valves. Some features of the invention are applicable to such a voice.

The word "papa" may be simulated by producing a complete or nearly complete cut-off of sound for the consonants. Heretofore successful mama voices have been produced in a commercial way, but the same is not true of papa voices, and a further object of the present invention is to produce an efficient, inexpensive, and commercially usable papa voice.

The difficulty has been that to produce a sharp cut-off of sound requires the use of closely fitting valve or gasket members. This requires precision manufacture of a character disproportionate to the low price at which the voices must be sold. Moreover, such an arrangement conflicts with the desire for sensitive gravitational operation of the voice, for the movable head may stick if it must move a closely fitting valve or gasket.

Accordingly, one specific object of the present invention is to overcome the foregoing difficulties, which I do by employing a very thin flexible gasket, the outer edge only of which is secured in position by a suitable gasket retainer, while the inner edge is free to flex back and forth during reciprocations of the working parts of the voice. Such an arrangement necessitates the use of other means independent of the valve mechanism for guiding the gasket and gasket retainer during operation of the valve. In accordance with a feature and object of the present invention, the weighty head of the voice is provided with a smooth cylindrical skirt of substantial axial dimension, said skirt being slidably received within and guided by the cylindrical casing of the voice.

To the accomplishment of the foregoing, and such other objects as will hereinafter appear, my invention consists in the articulative voice elements and their relation one to the other as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by a drawing, in which:

Fig. 1 is a plan view of an articulative voice embodying features of my invention;

Fig. 2 is a side elevation of the same with a part of the casing cut away;

Fig. 3 is a section through the voice taken in the plane of the line 3—3 of Fig. 1;

Fig. 4 is an inverted horizontal section taken in the plane of the line 4—4 of Fig. 3;

Fig. 5 is a section similar to Fig. 3, but showing the parts in a different position and to enlarged scale;

Fig. 6 is a section similar to Fig. 5, but with the voice inverted to restore the bellows to expanded position;

Fig. 7 illustrates a gasket which forms a part of the valve arrangement of the voice; and

Fig. 8 is a section taken in the plane of the line 8—8 of Fig. 7 and drawn to enlarged scale.

Referring to the drawing, the voice comprises a casing C within which is housed a flexible bellows B operated by means of a weighty head generally designated H. The desired sound is produced by the flow of a air past a vibratile reed R carried by the head H. The sound is controlled or articulated by means of valve mechanism generally designated V. Assuming the bellows B to be expanded, the voice is operated by turning the same to the position shown in Fig. 3, whereupon the weighty head is gravitationally moved downwardly from the position shown in Fig. 3 to that shown in Fig. 2. This compresses the bellows B, and so discharges air therefrom. The valve mechanism V is operated during the movement of the head H relative to the stationary valve tube. To again operate the voice, it is merely necessary to invert the same in order to expand the bellows B, and to then restore the voice to upright position, whereupon it is again operated. Ordinarily the voice is mounted within a doll body and is operated by appropriately changing the position of the doll.

Considering the structure in greater detail, the casing C comprises a cylindrical side wall 12, an imperforate end 14, and a perforate or sound-discharging end 16. The cylindrical part 12 may be made of cardboard, pasteboard, or the like, while the ends 14 and 16 are preferably formed of sheet metal. The ends have flanges 18 and 20 which are compressed against the side wall 12 in order to anchor the parts together. The perforations through end 16 are clearly shown at

22 in Fig. 1. The end may, if desired, be bent to form stiffening ribs 24.

The head H is built up of two main parts; one is a weighty disc 30, and the other is a sheet metal cap 32. The disc 30 may be formed in a number of ways, but I prefer to make the same by rolling up the corners of a square piece of very heavy gauge metal. The rolled corners are indicated at 34 in Figs. 3 and 4. The cap 32 is provided with a wide flange or skirt 36 within which the disc 30 is received with a force fit. The skirt is preferably provided with a rounded bead at 38, and in general is so shaped as to slide readily within and to be guided by the cylindrical wall 12. The skirt 36 is large enough in axial dimension to prevent tipping of the head, and it is preferably turned inwardly or tapered a slight amount at the lower edge 40 to make sure that there will be no obstruction to free sliding movement of the head.

The bellows B consists of a generally tubular piece of non-porous fabric. The fabric may be made non-porous by suitable treatment, as by rubberizing the same. The sleeve of fabric is preferably made slightly tapered or frusto-conical in configuration, rather than truly cylindrical. The lower end is the larger end and the fabric is turned outwardly as is indicated at 42. Inasmuch as the fabric is clamped on both sides by the sheet metal end 14, the bellows B is thereby closed with an airtight fit. The other or smaller end of the bellows is clamped between the disc 30 and the skirt 36 of the head H, as is clearly shown in Fig. 3. This forms an airtight fit at the upper end of the bellows, except for an air passage at the sound-producing reed R.

The reed R consists of a thin vibratile member 44 preferably made of brass and disposed over a channel-shaped support 46, the two parts being clamped together at the stationary end of the reed by a suitable clip 48. The reed assembly is disposed in a hole in disc 30 and is sealed therein by a deposit of wax 50 disposed therearound. Air is adapted to flow through the channel member 46, and is discharged at the open upper end 52 thereof. The air thus flows into the space within head H between disc 30 and cap 32.

The continued flow of air is controlled by the valve mechanism V. This comprises a tubular member 54, the upper end of which is provided with a plurality of tongues 56 which are passed through mating holes in end 16 and are bent to anchor sleeve 54 in place. The lower end of the sleeve is stopped in any desired fashion. For example, the sleeve might be drawn to cup shape with a closed lower end. I find it cheaper, however, to simply insert a disc 57 in the end of tube 54, said disc being made, for example, out of cardboard and being cemented in position or coated with wax or liquid rubber 58 in order to form an airtight seal. The sleeve 54 is most cheaply made by rolling sheet metal to cylindrical shape, the edges being brought together, as at the longitudinal seam 55. The sealing material 58 may be locked in position by means of a peripheral channel 59. The sleeve 54 has a series of large openings or ports 60 extending thereabout, as is clearly shown in the drawing. The channel 59 and ports 60 are preferably stamped while the metal is still flat, following which it is rolled to cylindrical shape.

A part of cap 32 cooperates with sleeve 54, it being slidably related thereto. The cap is preferably fitted with an extremely thin flexible gasket 62. This gasket is an annular piece of non-porous material, as is best shown in Fig. 7. It may be a thin rubberized fabric similar to that used for the bellows. This is schematically indicated in Fig. 8 in which the woven fabric 64 is coated with rubber, as is indicated at 66. The internal diameter of gasket 62 is preferably slightly less than the external diameter of valve tube 54.

Referring now to Fig. 5, the center portion of the cap 32 is drawn upwardly at 68 and then flanged to form a gasket seat 70. The gasket seat is preferably substantially larger in diameter than tube 54 and receives only the outermost peripheral portion of gasket 62. The gasket is locked in position by means of a gasket retainer 72. This has a cylindrical part 74 which is received with a snug friction fit over the upwardly drawn part 68 of cap 32. Part 76 of the gasket retainer is turned outwardly as shown in order not to interfere with free self-adjustment and flexing of the gasket 62.

In Fig. 5 the voice is in upright position and the head is falling. Under these circumstances, the gasket bends toward the sound-discharging end 18, as is clearly shown in the drawing. In Fig. 6 the voice is in inverted position, and the gasket now bends away from the sound discharge end 18. The gasket fits the tube 54 closely and provides a definite cut-off of sound without, however, appreciably resisting the free gravitational movement of the weighty head of the voice. The valve need not fulfill any guide function, and the parts need not be made with extreme precision, for the head is guided by the skirt 36 as was previously described.

During downward movement of the head, the sound is first cut-off as is shown in Fig. 3, because the gasket is above the ports 60. This corresponds to the letter "P." As the head moves downwardly, the gasket reaches the port 60 as is shown in Fig. 5. Sound then flows freely through ports 60, corresponding to the vowel "A." The gasket then reaches the lower imperforate portion 80 of tube 54, whereupon the sound is again cut off, corresponding to the letter "P." The gasket then leaves the tube 54, as is indicated in Fig. 2, whereupon the sound is discharged freely through the end 18, corresponding to the vowel "A." Altogether this cycle of operation produces the sound "papa."

When the voice is inverted, no sound is produced, because the air flows past the reed in the wrong direction, there being no resulting vibration of the same.

It is believed that the construction and operation, as well as the many advantages of my improved articulative voice, will be apparent from the foregoing detailed description thereof. It will be understood that the voice may be changed from a papa voice to a mama voice by modifying the valve mechanism to produce a constricted sound discharge, rather than a complete cut-off. For one example, the internal diameter of the gasket may be increased slightly. It will be apparent that while I have shown and described my invention in a preferred form, many changes and modifications may be made in the structure disclosed without departing from the spirit of the invention, as sought to be defined in the following claims.

I claim:

1. An articulative voice comprising a cylindrical casing having an imperforate end and a perforate sound-discharging end, a flexible bellows one part of which is connected to the imperforate end of the casing and another part of which is

connected to a weighty head slidable axially within the casing, said head comprising a weighty disc, a sheet metal cap thereover, said cap being shaped to form a raised gasket seat and a wide peripheral skirt, a gasket retainer ring forced over said raised seat, a sound producing reed assembly comprising a channel and a reed, said reed assembly being received in and forming a passage through the disc, but not through the cap, a ported hollow valve tube cooperating with a thin flexible gasket for relative sliding movement in response to movement of the head, said gasket being secured solely at its outer edge and in such a manner that the inner edge of said gasket is free to flex in one direction or the other as the weighty head moves relative to the casing, the outer edge of the gasket being clamped between the aforesaid raised seat and the retainer ring.

2. An articulative voice comprising a cylindrical casing having an imperforate end and a perforate sound-discharging end, a flexible bellows one part of which is connected to the imperforate end of the casing and another part of which is connected to a weighty head slidable axially within the casing, said head comprising a weighty disc, a sheet metal cap thereover, the top of said cap being annularly recessed to form a raised gasket seat and a wide peripheral skirt, a gasket retainer ring forced over said raised seat, a ported valve tube secured to the perforate end and cooperating with a mating opening in the weighty head, said head having a thin flexible gasket, said gasket being secured to said head solely at its outer edge and in such a manner that the inner edge of said gasket is free to flex in one direction or the other as the weighty head moves relative to the valve tube, the outer edge of the gasket being clamped between the aforesaid raised seat and the retainer ring, and a sound-producing reed subjected to air moved by said bellows.

3. An articulative voice comprising a cylindrical casing having an imperforate end and a perforate sound-discharging end, a flexible bellows one part of which is connected to the imperforate end of the casing and another part of which is connected to a weighty head slidable axially within the casing, said head comprising a weighty disc and a thin sheet metal cap, said cap having a cylindrical skirt of substantial axial dimension for accurately guiding the head during its axial movement wholly independently of the valve tube, said weighty disc being secured within said skirt with the bellows material clamped between said disc and skirt, a sound producing reed assembly comprising a channel and a reed, said reed assembly being received in and forming a passage through the disc, but not through the cap, a ported hollow valve tube secured to the perforate end of the casing and cooperating with a mating opening in the cap, the center portion of said cap being drawn away from the disc to provide a gasket seat, a gasket retainer received with a force fit over the gasket seat, a thin flexible gasket, the outer edge of said gasket being clamped between the gasket seat and gasket retainer at a diameter substantially larger than the diameter of the valve tube, the inner part of said gasket being freely flexible as the gasket moves in one direction or the other along the valve tube.

4. An articulative voice comprising a cylindrical casing having an imperforate end and a perforate sound-discharging end, a flexible bellows one part of which is connected to the imperforate end of the casing and another part of which is connected to a weighty head slidable axially within the casing, said head comprising a weighty disc and a thin sheet metal cap, said cap having a cylindrical skirt of substantial axial dimension for accurately guiding the head during its axial movement wholly independently of the valve tube, said weighty disc being secured within said skirt with the bellows material clamped between said disc and skirt, a ported hollow valve tube secured to the perforate end of the casing by tongue and slot connections and cooperating with a mating opening in the cap, the center portion of said cap being drawn away from the disc to provide a gasket seat, a gasket retainer received with a force fit over the gasket seat, a thin flexible gasket made of an annular stamping of rubberized fabric, the outer edge of said gasket being clamped between the gasket seat and gasket retainer at a diameter substantially larger than the diameter of the valve tube, the inner part of said gasket being freely flexible as the gasket moves in one direction or the other along the valve tube, the movement of the head being greater than the length of the tube, and a vibratile sound-producing reed carried by the weighty disc.

5. An articulative voice comprising a cylindrical casing having an imperforate end and a perforate sound discharging end, a flexible bellows one part of which is connected to the imperforate end of the casing and another part of which is connected to a weighty head slidable axially within the casing, said head comprising a weighty disc which is imperforate except for a sound-producing reed and associated air channel carried thereby, and a thin sheet metal cap fitted over said disc, said cap having a generally cylindrical skirt of substantial axial dimension for guiding the head during its axial movement, said skirt having an outwardly pressed rounded bead for smooth sliding contact with the inside surface of the casing, said bellows being clamped directly between the skirt and the weighty disc therewithin, a stationary valve member secured to the perforate end and projecting for a short distance toward the opposite end of the casing, said sheet metal cap having at least a part of its top raised from the weighty disc enough to receive the aforesaid valve element, there being a large clearance and no contact between said cap and valve element, a thin flexible gasket slidable on the valve element, said gasket being secured to the cap solely at its outer edge and in such a manner that the inner edge of the gasket is free to flex in one direction or the other as the weighty head moves relative to the casing.

6. An articulative voice comprising a cylindrical casing having an imperforate end and a perforate sound-discharging end, a flexible bellows one part of which is connected to the imperforate end of the casing and another part of which is connected to a weighty head slidable axially within the casing, said head comprising a weighty disc which is imperforate except for a sound-producing reed and associated air channel carried thereby, and a thin sheet metal cap fitted over said disc, said cap having a generally cylindrical skirt of substantial axial dimension for guiding the head during its axial movement, a stationary valve member secured to the perforate end and projecting for a short distance toward the opposite end of the casing, the top of said sheet metal cap being drawn outwardly to form a raised gasket seat spaced from the weighty disc enough to receive the aforesaid valve element, there being a large clearance and

no contact between said cap and valve element, a thin flexible gasket slidable on the valve element, the inner edge of the gasket being free to flex in one direction or the other as the weighty head moves relative to the casing, the outer edge of the gasket being clamped between the aforesaid raised gasket seat and a retainer ring forced thereover.

7. An articulative voice comprising a cylindrical casing having an imperforate end and a perforate sound discharge end, a flexible bellows one part of which is connected to the imperforate end of the casing, and another part of which is connected to a weighty head slidable axially within the casing, said head comprising a weighty disc and a sheet metal cap thereover, said cap being shaped to form a raised gasket seat and a wide peripheral skirt, a gasket retainer ring forced over said raised seat, a ported valve tube one end of which is secured to the sound discharge end of the casing, the ends of said valve tube being closed, a thin flexible gasket, the inner edge of which is slidable along said ported valve tube, and the outer edge of which is secured between the gasket seat and the retainer ring in such a manner that the inner edge of said gasket is free to flex in one direction or the other as the weighty head moves relative to the casing, the head being guided by the skirt and not by the valve tube, and a sound-producing reed subjected to air moved by said bellows.

8. An articulative voice comprising a cylindrical casing having an imporforate end and a perforate sound discharge end, a flexible bellows one part of which is connected to the imperforate end of the casing, and another part of which is connected to a weighty head slidable axially within the casing, said head comprising a weighty disc and a sheet metal cap thereover, the bellows being secured between the disc and cap, said cap being shaped to form a raised gasket seat and a wide peripheral skirt, a gasket retainer ring forced over said raised seat, a valve tube one end of which is secured to the sound discharge end of the casing, the ends of said valve tube being closed and the body of said valve tube having only one ring of large ports, the length of said tube being less than the travel of the slidable head, a thin flexible gasket, the inner edge of which is slidable along said ported valve tube, and the outer edge of which is secured between the gasket seat and the retainer ring in such a manner that the inner edge of said gasket is free to flex in one direction or the other as the weighty head moves relative to the casing, the head being guided by the skirt and not by the valve tube, and a sound producing reed assembly comprising a channel and a reed, said reed assembly being received in and forming a passage through said disc.

9. An articulative voice comprising a cylindrical casing having an imperforate end and a perforate sound discharge end, a flexible bellows one part of which is connected to the imperforate end of the casing, and another part of which is connected to a weighty head slidable axially within the casing, said head comprising a weighty disc and a sheet metal cap thereover, the bellows being secured between the disc and cap, said cap being shaped to form a raised ring and a wide peripheral skirt, a valve tube one end of which is secured to the sound discharge end of the casing, the ends of said valve tube being closed and the body of said valve tube having only one ring of large ports, the length of said tube being less than the travel of the slidable head, said raised ring fitting about said valve tube with appreciable clearance, the head being guided by the skirt and not by the valve tube, and a sound-producing reed assembly comprising a channel and a reed, said reed assembly being received in and forming a passage through said disc.

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