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L. J. GRUBMAN

SOUND PRODUCING DEVICE

Filed Dec. 15, 1924

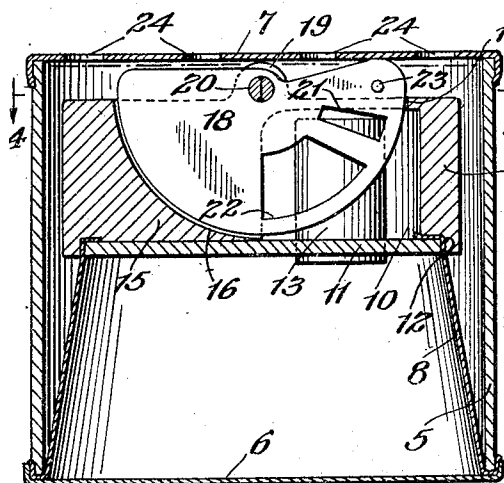


Fig. 1.

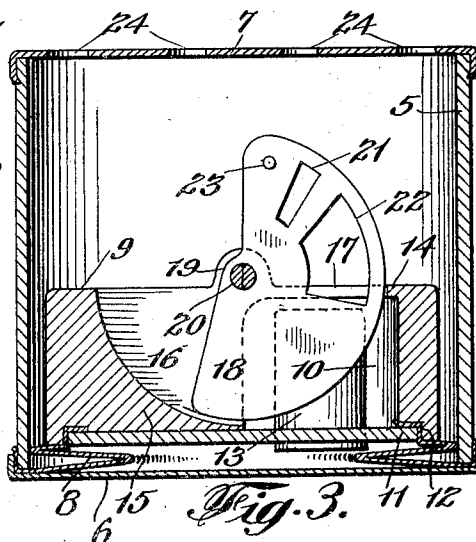


Fig. 3.

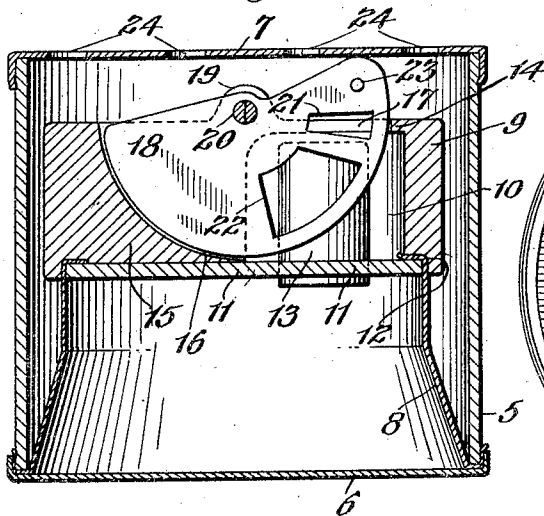


Fig. 2.

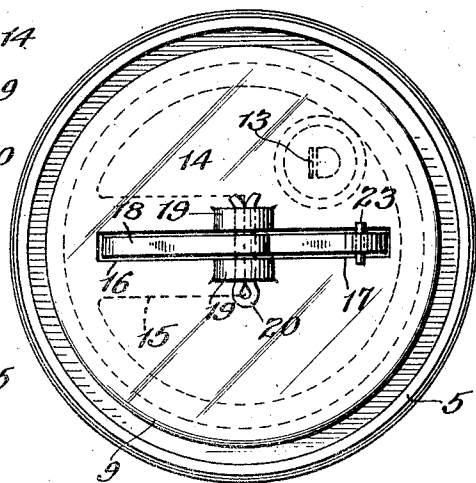


Fig. 4.

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UNITED STATES PATENT OFFICE.

LEO J. GRUBMAN, OF NEW YORK, N. Y., ASSIGNOR TO VOICES, INCORPORATED, OF
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SOUND-PRODUCING DEVICE.

Application filed December 15, 1924. Serial No. 755,896.

This invention relates to sound producing devices, and more particularly to a device adapted to be incorporated within the body of a doll or other toy, for simulating a characteristic cry thereof, such, for instance, as the word "ma ma".

Prior inventors in the art have suggested various different devices for securing the desired articulation of the emitted sound. The modern sound producing device, or "voice", as it has come to be known in the trade, is provided with a cylindrical chamber, and means for expelling air therefrom through a sound producing reed, usually consisting of a weighted head fixed to one end of a flexible collapsible bellows wall. Invariably, such devices as are now known in the art, having means for articulating the sound produced, include a relatively stationary part or member independent of the bellows head and cooperating with valve means on said head. Some of these prior art devices are uncertain in operation, and they are all comparatively costly to produce. It is accordingly the primary object of my present improvements to materially simplify and thereby reduce the manufacturing cost of such articulative sound producing devices. To this end, my improvements herein broadly comprehend the provision of what may be aptly termed a self-acting sound emission control means carried by the weighty air expelling member and automatically operative, independently of any other or additional actuating means, during the air expelling movement of said member, to effect a proper articulation of the emitted sound.

It is another object of my present invention to provide a self-acting automatic sound emission control valve on the gravity movable air expelling member, which is in the form of a very simple metal stamping.

More particularly, in one practical embodiment of the invention, I provide a self-acting sound emission control valve, mounted upon the movable air expelling member for gravity movement about a pivot or axis disposed at right angles to the path of movement of said member, said valve moving through a sound escape opening in one wall of said member and being provided with spaced apertures to coincide with said opening and vary the volume of the sound emitted.

It is also the purpose of my invention to

provide an articulating means for such sound producing device which is capable of very quick and accurate assemblage in operative relation with the movable bellows head or air expelling member.

With the above and other objects in view, the invention consists in the improved sound producing devices and in the form, construction and relative arrangement of its several parts as will be hereinafter more fully described, illustrated in the accompanying drawings and subsequently incorporated in the subjoined claims.

Referring in detail to the drawing wherein I have illustrated one simple and practical embodiment of the invention and in which similar reference characters designate corresponding parts through the several views,—

Figure 1 is a vertical sectional view of a device constructed in accordance with my present improvements and showing the weighted air expelling member positioned at the start of its operative movement,

Figure 2 is a similar showing an intermediate position of said weighted member,

Figure 3 is a vertical sectional view showing the weighted member at the end of its air expelling movement, and

Figure 4 is a horizontal sectional view taken on the line 4—4 of Figure 1.

In the accompanying drawing, wherein I have shown a preferred practical embodiment of my present improvements, the operative parts of the device are preferably mounted within a housing or casing having a body wall 5, which may consist of a section of a cardboard tube. The sheet metal caps 6 and 7 respectively are engaged over the opposite ends of this tubular casing wall and may be permanently fixed thereon in any preferred manner.

Within the casing or housing there is provided an air receiving chamber which, in the present embodiment of the invention, consists of a tubular flexible bellows wall 8 fixed at one of its ends upon one end edge of the casing wall 5 by the end cap 6, or in any other preferred manner. To the other end of this tubular bellows wall 8 there is attached a weighty gravity movable member or head, which, in one position of the device, causes the collapse of the bellows wall 8 and expels the air under pressure from the bellows

chamber. As herein shown, this weighty air expelling member includes a heavy metal body 9, said body being hollow to provide a sound receiving chamber 10, one side of which is closed by the disc 11, which is engaged within the other end of the tubular flexible bellows wall 8 and frictionally clamps or binds the end edge of the bellows wall against the surfaces of an annular rabbet or recess 12 surrounding the sound receiving chamber 10. This disc 11 carries a suitable sound producing reed, generally indicated at 13, which projects into the chamber 10. The opposite side of this chamber, 15 opposed to the end cap 7 of the casing, is closed by the wall 14. This wall is also integrally connected with the body wall of the member 9 by a radially extending web 15. This web terminates at its inner end in line 20 with the axial center of the body member 9 and is provided with a slot or recess 16 therein in radial alignment with a sound emission or escape opening 17 provided in the wall 14.

For the purpose of controlling the emission of sound from the chamber 10 through the opening or aperture 17, and effecting the proper articulation thereof, in the present instance, I provide a valve plate 18 pivotally mounted or supported between spaced ears 19 on the member 9 by the pin 20. This valve plate is in the form of a section of a disc which is of slightly less thickness than the width of the recess 16 and the slot or opening 17 so that said valve plate has free rocking motion through said recess and opening. At one side of its pivotal axis, the plate 18 is provided with spaced openings 21 and 22 of relatively different widths which are adapted to cooperate with the slot or aperture 17 to articulate the sound, in the manner which will presently be explained. By the provision of these openings 21 and 22, it will be apparent that considerable material is removed so that the remaining portion of the plate extending on the opposite side of the pivot pin 20, acts as a counter-balance and operates by gravity to normally dispose said plate in a predetermined position with respect to the wall 14 of the member 9, substantially as shown in Figure 3 of the drawings.

One end of the gravity movable valve plate 18, adjacent to the opening 17 therein, is provided with a transversely extending stop pin 23 which is adapted to engage the wall 14 and limit the turning or rotational movement of said valve plate when the device is inverted from the position illustrated in Figure 3.

The other end cap 7 of the casing or housing is provided with the usual sound escape openings 24 therein.

In the operation of the device, assuming that the air expelling member or head of the

collapsible bellows is in the position shown in Figure 1, at the start of its air expelling movement, it will be observed that one end of the valve plate 18 is in contact with the end plate or cap 7 of the casing and the openings 21 and 22 in said plate are located entirely within the sound chamber 10. During the initial part of the air expelling movement of the bellows head, the sound produced by the reed 13 escapes from the chamber 10 in relatively small volume through the narrow crevice or passage between the opposite sides of the valve plate and the edges of the slot or opening 17 and simulates the phonetic articulation of the letter "m". As the air expelling member continues its gravity movement, progressively therewith, the valve plate 18 also moves or rocks upon the pin 20 by the action of gravity, maintaining one end thereof in contact with the metal cap 7. In this rocking movement of the valve plate, the relatively narrow opening 21 therein is brought into registering relation with the slot 17 and connects the sound chamber 10 with the space exteriorly of the air expelling member through the slot 17, thus causing the sound to be emitted from said chamber in greater volume and thereby simulating the phonetic articulation of the letter "a". In the further movement of the air expelling member, the solid part of the valve plate between the apertures 21 and 22 enters the slot 17 and again restricts the volume of sound emitted from the chamber 10 and thereby simulates the sounding of the letter "m" for a second time. During this portion of the movement of said bellows head 7, the end of the valve plate 18 by the action of gravity is maintained in engagement with the metal cap 7 and during the final portion of the air expelling movement of the bellows head, said valve plate continues its gravity swinging movement so that the second larger opening 22 therein registers with the slot 17 and emits the sound in larger volume from the chamber 10, until the air expelling member or head reaches its final position of rest, and the bellows is fully collapsed, thus effecting a relatively prolonged sounding of the final letter "a".

In this manner, it will be understood that the device, as herein described, is capable of simulating in a very realistic manner, the phonetic articulation of the word "ma ma".

In the claims appended to this description, I have employed the expressions "self acting sound emission control means" or "self acting valve means," and such definitive expressions are to be construed and understood as meaning an automatically acting valve means or device, wherein said means or device is so constructed, mounted or arranged as to provide within itself the necessary force for the operation thereof, whereby the proper articulation of the sound is ef-

5 fected. In other words, the distinguishing
 characteristic of my present disclosure over
 prior art devices of a similar nature, re-
 sides in the fact that the structural elements
 10 of the sound control means do not require
 the cooperation therewith of other or addi-
 tional means to effect the proper actuation
 thereof in the progressive gravity movement
 15 of the air expelling member, whereby proper
 articulation of the sound may be produced.
 It is accordingly to be understood that the
 foregoing description and the accompany-
 ing drawing, are to be considered as merely
 20 illustrative of one practical example of my
 present improvements. However, it may be
 stated that the device as herein shown, has
 been fully tested, and has been found to
 produce a very sharp and distinct articula-
 25 tion of the desired word syllables. It is
 nevertheless possible that other alternatives
 for the gravity movable apertured valve
 plate 18, as herein referred to, may be found,
 which would produce comparatively satis-
 30 factory results, and it is therefore to be
 clearly understood that I do not consider
 myself as necessarily limited to such spe-
 cific form of this self-acting sound emission
 control valve. Further, the described con-
 35 struction of the air expelling member or
 gravity movable bellows head, as well as the
 mounting and arrangement of the reed may
 be variously modified, and as to such de-
 tails I also reserve the privilege of adopting
 all such legitimate modifications thereof, as
 may be fairly embodied within the spirit
 and scope of the invention as claimed.

I claim:—

1. In a sound producing device, an air
 40 chamber and a weighty gravity movable
 member for expelling air from said cham-
 ber, a sound producing reed through which
 the air is expelled, and self acting sound
 emission control means carried by said mem-
 45 ber and continuously movable relative there-
 to in one direction during a portion of the
 air expelling movement of said member to
 effect an articulated emission of the sound
 produced by said reed.

2. In a sound producing device, an air
 50 chamber and a weighty gravity movable
 member for expelling air from said cham-
 ber, a sound producing reed through which
 the air is expelled, and a single gravity con-
 55 trolled valve element carried by said member
 and continuously movable in one direction
 independently thereof during the air expel-
 ling movement of said member to effect an
 interrupted emission of the sound produced
 by said reed.

3. In a sound producing device, an air
 60 chamber and a weighty gravity movable
 member for expelling air from said chamber,
 a sound producing reed through which the
 air is expelled, and a pivotally mounted
 65 valve plate having continuous gravity move-

ment during a part of the air expelling
 movement of said member to interrupt the
 emission of sound and effect an articulated
 emission of the sound produced by said
 70 reed.

4. In a sound producing device, an air
 chamber and a weighty gravity movable
 member for expelling air from said chamber,
 said member having a sound receiving cham-
 75 ber and an emission opening in one wall
 thereof, a sound producing reed through
 which the expelled air is emitted into the
 latter chamber, and self acting valve means
 carried by said member and moving through
 80 said opening in the air expelling move-
 ment of said member to control the passage
 of sound therethrough and effect an articu-
 lated emission of the sound.

5. In a sound producing device, an air
 chamber and a weighty gravity movable
 85 member for expelling air from said cham-
 ber, said member having a sound receiving
 chamber and an emission opening in one
 wall thereof, a sound producing reed
 90 through which the expelled air is emitted
 into the latter chamber, and a pivotally
 mounted gravity controlled valve plate
 mounted upon said member and movable
 through said sound emission opening to ef-
 95 fect an articulated emission of the sound
 therethrough.

6. In a sound producing device, an air
 chamber and a weighty gravity movable
 member for expelling air from said cham-
 100 ber, said member having a sound receiving
 chamber and an emission opening in one
 wall thereof, a sound producing reed
 through which the expelled air is emitted
 into the latter chamber, and an independ-
 105 ently operating gravity controlled valve ele-
 ment carried by said head and movable
 through said sound emission opening to con-
 trol the passage of sound therethrough and
 effect an articulated emission of the sound.

7. In a sound producing device, an air
 110 chamber and a weighty gravity movable
 member for expelling air from said chamber,
 said member having a sound receiving cham-
 ber and an emission opening in one wall
 115 thereof, a sound producing reed through
 which the expelled air is emitted into the
 latter chamber, and a gravity controlled
 valve plate carried by said member and pro-
 120 gressively movable through said sound emis-
 sion opening independently of said member
 and in a plane parallel with the direction of
 movement thereof to effect an articulated
 emission of the sound.

8. In a sound producing device, an air
 125 chamber and a weighty gravity movable
 member for expelling air from said cham-
 ber, said member having a sound receiving
 chamber and an emission opening in one wall
 130 thereof, a sound producing reed through
 which the expelled air is emitted into the

latter chamber, and an independently movable gravity controlled valve plate pivotally mounted upon said member and progressively movable through said sound emission opening to effect an articulated emission of the sound.

9. In a sound producing device, an air chamber and a weighty gravity movable member for expelling air from said chamber, said member having a sound receiving chamber and an emission opening in one wall thereof, a sound producing reed through which the expelled air is emitted into the latter chamber, and an independently movable gravity controlled valve plate pivotally mounted upon said member for movement through said sound emission opening, said valve plate having spaced openings therein cooperating with said sound emission opening to effect an articulated emission of the sound.

10. In a sound producing device, an air chamber and a weighty gravity movable member for expelling air from said chamber, said member having a sound receiving chamber and an emission opening in one wall thereof, a sound producing reed through which the expelled air is emitted into the latter chamber, an independently movable gravity controlled valve member positioned through said sound emission opening, and relatively stationary means with which said member coacts to retard and progressively control the gravity movement of said valve member during a part of the movement of said air expelling member and thereby effect the articulation of sound through said sound emission opening.

11. In a sound producing device, an air chamber and a movable member closing one end of said chamber, a sounding reed operated by the passage of air therethrough in the movement of said member, and means for controlling the emission of sound produced by said reed including a valve element having independent continuous movement in one direction during the movement of said member and provided with means operable during movement of the movable member in one direction to repeatedly interrupt the emission of the sound.

12. In a sound producing device, an air chamber and a movable member closing one

end of said chamber, a sounding reed operated by the passage of air therethrough in the movement of said member, and means for controlling the emission of sound produced by said reed including a valve plate pivotally mounted for continuous movement in one direction in a planetary path during movement of said member and provided with means for repeatedly interrupting the emission of the sound during such movement thereof.

13. In a sound producing device, an air chamber and a movable member closing one end of said chamber, a sounding reed operated by the flow of air in the movement of said member, said member being provided with a sound receiving chamber having an emission opening in one wall thereof, and sound emission control means including an independently movable valve element positioned in said opening and having spaced means successively passing through said opening to interrupt the emission of the sound.

14. In a sound producing device, an air chamber and a movable member closing one end of said chamber, a sounding reed operated by the flow of air in the movement of said member, said member having a sound receiving chamber and an emission opening in one wall thereof, and a relatively movable valve element positioned in a plane at right angles to the plane of said wall and having spaced means successively passing through said emission opening during the movement of said valve element in one direction to interrupt the emission of the sound.

15. In a sound producing device, an air chamber and a movable member closing one end of said chamber, a sounding reed operated by the flow of air in the movement of said member, said member having a sound receiving chamber provided with an emission opening in one wall thereof, and a counter-balanced valve plate pivotally mounted upon said member for continuous gravity movement in one direction with respect thereto through said sound emission opening and having means to repeatedly interrupt the emission of sound from said opening.

In testimony that I claim the foregoing as my invention, I have signed my name hereto.

LEO J. GRUBMAN.