

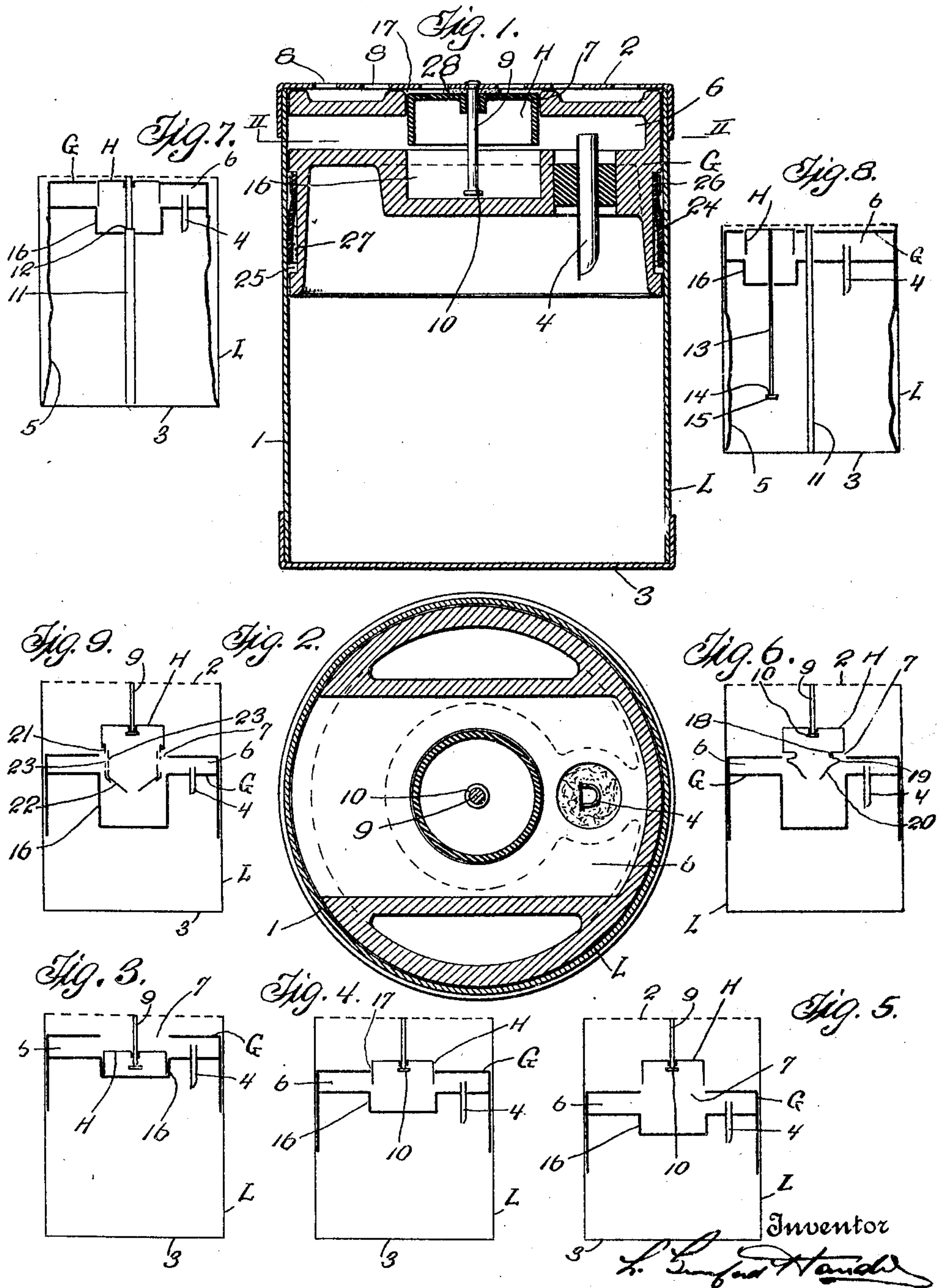
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VOICE DEVICE

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## UNITED STATES PATENT OFFICE.

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## VOICE DEVICE.

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This invention relates to a voice device and particularly to a device intended for production of words such as "ma-ma" and the like, the customary use of the device being within the body of dolls and in similar locations, the device being arranged so that when the doll is moved from one position, say an upright position, to another, say a reclining position, the device will operate to produce the desired word.

It is now common practice to manufacture devices of this general type to include a suitably weighted bellows adapted to move from a distended to a collapsed position by gravity so as to expel the contained air through a reed or like sounding device, and to provide parts cooperative as the bellows collapses to interrupt the sound being emitted by the reed, and to thereby cause articulation, and a particular object of the present invention is to provide an improved means for interrupting and controlling the sounding of the reed.

A more detailed object is to so construct and arrange the parts which control the sounding of the reed as to cause a certain inflection of the sound waves and thereby render the emitted sounds more pleasing, natural, and attractive.

A further object is to provide a sounding device of the type indicated and in which the emitted sounds will vary within desirable limits at each operation, that is one in which the cry of "ma-ma" or the like will have a desirably different inflection for each cry.

A further object is to so construct the device that it may operate equally well whether embodying a tight friction type of bellows or a bellows of the flexible membrane type.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles constituting the invention, and the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawings which are to be taken as a part of this specification, and in which I have shown merely a preferred form of embodiment of the invention:—

Fig. 1 is a vertical central sectional view

through a voice device constructed in accordance with this invention.

Fig. 2 is a horizontal sectional view taken substantially upon the plane of line II—II of Fig. 1.

Figs. 3, 4, and 5 are diagrammatic views corresponding with the disclosure in Fig. 1 but illustrating the relative positions of moving parts at different stages of a single operation of the device.

Fig. 6 is a diagrammatic view similar to the views in Figs. 3, 4, and 5 but illustrating an auxiliary arrangement which may be employed for determining the inflection of emitted sounds.

Fig. 7 is a further diagrammatic view but illustrating the use of a continuous central post for supporting and guiding the moving parts, and

Fig. 8 is a further diagrammatic view illustrating a modified arrangement of the moving parts in combination with a central guiding post.

Fig. 9 is a further modification.

Referring to the drawings for describing in detail the structures therein shown the reference character L indicates a suitable casing. This may be of the usual or any suitable construction adapted to contain the moving parts of the mechanism. In the instance illustrated it is shown to consist of cylindrical side walls 1 and top and bottom walls 2 and 3.

Within this casing is arranged a movable head or piston G adapted to slide longitudinally of the casing for cooperating therewith as a bellows to expel air through a reed or other sounding device as 4 carried preferably by the head G. It may have suitably tight frictional engagement with the walls 1 or it may be provided with a flexible tubular membrane or bellows member 5 for insuring proper bellows action to displace air when the head slides toward the end wall 3.

The head G is of sufficient weight so that it operates by gravity to distend and collapse the bellows whenever the casing is moved from an upright to an inverted position, and vice versa, and it thus automatically produces sounding of the reed 4 by the exhausting air from within the bellows.

Within the head G is formed an appropriate sound box 6 with which the reed



communicates. A suitable opening as 7 is provided in this sound box through which sound waves from the reed and sound box must pass on the way to the outer atmosphere.

The top wall as 2 of the casing is suitably perforated as at 8—8 in order that the sound waves may pass freely out of the casing.

To control the passage of the sound waves outwardly through the opening 7 of the sound box and to thereby determine the operation of the reed and the inflections of the passing sound waves the present invention proposes the use of a single separately formed valve member H mounted to move to and fro through the opening 7 during the operation of the bellows. In the illustrations Figs. 1 to 6 this valve member is slidably supported upon a guide pin 9 connected to and depending from the top wall 2 of the casing and having a shoulder or head as 10 at its lower end to prevent disconnection of the valve.

In the modification Fig. 7 the valve H is slidably supported upon a central post 11 which serves also to slidably support the head G, a suitable shoulder as 12 being formed upon the post to limit the sliding movement of the valve.

In the modification Fig. 8 the valve is fixed to the upper end of a separate stem as 13 which projects slidably downwardly through the head and has its lower end as 14 arranged to engage against the upper surface of the bottom wall 3 of the casing to limit the downward movement of the valve. A head as 15 is formed at the lower end of the stem 13 so as to prevent its displacement from the head G at any time.

Aligned with the opening 7 the head G is provided with a dash-pot 16 directly below said opening and of a size to receive the valve H when said valve slides down the stem 9, the relation of the valve to the dash-pot being such as to retard the falling movement of the valve and to properly time said movement in proportion to the movement of the head and prevent the valve from moving entirely through the opening 7 prematurely. By the same means also the valve is prevented from falling with a metallic crash against the material of the head, and other ends are attained as will be presently pointed out.

The operation of the device as thus far described will be understood from the drawings Figs. 1, 3, 4 and 5 as follows, it being understood that the position of all of the parts as illustrated in Fig. 1 is the position in which said parts will stand when the device is first brought to an upright position after having been held in an inverted position.

The weighted head G will begin to de-

scend and the displaced air from beneath it will cause sounding of the reed 4, the sound waves passing into the sound box 6 and issuing therefrom in a suitably subdued manner through the opening 7, it being noted that at this time the valve H is standing within said opening and that the valve is sufficiently smaller than said opening so as to leave a crevice as 17 between itself and the opening of just the right size to produce the desired result, that is the momentary purring sound mm preceding the syllable ma of the word "ma-ma".

The valve H will at the same time begin to slide down the pin 9. Except for the presence of the dash-pot 16 the valve would fall almost instantly through the opening 7, it being noted that the fall of the head G carrying said opening 7 is relatively slow owing to the requirement for displacing air from within the bellows, while the valve H has not this pressure to contend with. The dash-pot 16 however operates to support the valve to the desired extent for maintaining it within the opening 7 for an appropriate period.

As the parts continue to descend and the valve finally falls free of the opening 7, as illustrated in Fig. 3, the sound waves now pass freely from the sound box outwardly through said opening and produce the main portion of the syllable ma.

It is to be noted that during at least part of the above period the weight of the valve is in varying degrees added to the weight of the head to increase the gravity pull of the head, being least complete when first beginning to feel the lifting force of the dash-pot, and being fully complete when resting in the bottom of the dash-pot just before engaging the head 10. A slight but desirable inflection of the sound waves at different momentary periods is thus produced, and this will vary to some extent at least in each operation of the device.

As the parts continue further to descend the valve H comes to rest upon the head or shoulder 10 whereupon the continued downward movement of the head G will cause the valve to be relatively lifted again into the opening 7, as indicated in Fig. 4.

The first syllable of the word "ma-ma" will be terminated by thus closing the opening 7 and a second purring sound "mm" will result from the again restricted passage through which the sound waves must pass from the sound box.

At this point it is noted that as the head G fell away from the now stationary valve the dash-pot action between the valve and the dash-pot 16 momentarily detracted from the gravity pull of the head by retarding the fall of the head. The force, or draught, of air through the reed was thus momentarily reduced just prior to the termination of the



first syllable "ma" with the result that the syllable was ended smoothly and merged gradually into the purring of "mm" period with a desirable inflection of the sound waves.

The second or intermediate purring "mm" period will continue until the valve has passed again through the opening, that is until the opening 7 has fallen entirely free of the valve or to the position indicated in Fig. 5. As the dash-pot 16 fell free of the valve and the retarding force of the dash-pot was thus relieved, the head G suddenly again resumed its former speed of descent and there was created for the moment an excess of air pressure through the reed. This occurred at a moment when the valve stood directly within the opening 7 with the result that the purring or "mm" sound then issuing from the device was momentarily accentuated and thereby given a desirable and natural inflection, closely approximating the aspirated cry of an infant.

The second or final syllable of the word "ma-ma" will begin just as the opening 7 passes below the lower edge of the valve and will continue so long as air continues to move through the reed, that is until the head G comes to rest for instance by striking against the bottom wall 3 of the casing. The volume of sound during the pronunciation of this syllable will depend upon the freedom with which the air will pass through the opening 7, and it is a feature of the present invention to provide means for altering the size of the free passage at different stages of descent of the head. An arrangement for accomplishing this result is diagrammatically illustrated in Fig. 6 in which it will be seen that the lower end of the valve H is shaped to provide a relatively deep recess as 18 immediately below the main portion of the valve, and a relatively raised portion as 19 below said recess, and a gradual inclining or tapered portion as 20 below said portion 19. As these parts pass successively through the opening 7 the available free passage for the outflowing air will be altered, and the volume of sound produced accordingly modified, the object being to produce a pronunciation of the final syllable "ma" which varies in volume and therefore more closely approximates the natural cry of an infant.

In the modification Fig. 9 is illustrated a different means for improving the inflexion of the final syllable, the arrangement shown in this figure being designed furthermore to cause the inflexion to be different in different operations of the device. In this modification the main valve H is provided with a plurality of supplementary valve members as 21 and 22 telescoped into the lower end of the valve H and adapted to move freely both longitudinally and rotatably within

said valve H. The valve members 21 and 22 consist of small cylinders of sheet metal or other suitable material and each is formed with a plurality of openings as 23 radially therethrough. These openings are of different sizes and proportions and are so arranged that they will overlap each other in different relations according to the rotary positions in which the valve members stand at different times.

During the normal use of the device the act of moving the device from an inverted to an upright position and vice versa, as well as other and more erratic movements to which the device is subjected in use, the valve members 21 and 22 will rotate relative to each other to a greater or lesser extent and thus bring into register the openings 23—23 in different relationships so that the aggregate amount of open space present within the opening 7 of the head for accommodating free passage of air outwardly through said opening 7 will vary in successive operations of the device.

As illustrated in Fig. 1, the head G when used as a sliding piston type of bellows, may be provided with a gasket member as 24 thereon for engaging against the inner cylindrical surface of the side walls 1 and thus render it unnecessary for the head itself to have a too tight engagement with said wall surface. The gasket member 24 consists of an annular band of suitable material such as thin leather, or a properly treated fabric. It is fitted into an annular groove 25 formed in the head and is held tightly within said groove by means of a binding strip or wire 26 at its upper annular edge, the arrangement being such that the entire lower annular portion of the gasket strip is left free and of such circumference as to afford a suitably tight frictional engagement against the casing walls. A suitable annular space as 27 is afforded between the inner surface of the gasket band and the outer underlying surface of the head so that air from within the bellows may move into said space and act to urge the gasket band outwardly whenever the head G is descending.

Also, as illustrated most clearly in Fig. 1, the head G is formed as a single integral casting with the sound box 6 provided therein and the opening 7 and dash-pot 16 being at opposite sides above and below the sound box. By forming the head in this manner, instead of using a separately formed top wall member for the upper side of the sound box as is now a common practice, the opening 7 may readily be formed in accurate axial alignment with the dash-pot and thus insure a proper cooperative fit of the valve H at all times in moving from one of said elements to the other.

Also shown in Fig. 1 is a small washer



as 28 placed in position to silence the impact of the valve H in its movements toward the top wall 2 of the casing.

With regard to the illustration Fig. 8 it should be noted that although this figure illustrates the use of a central guiding post 11 it will be understood that such a post may be used as a support and guide for the head G or it may be omitted and said head G be supported and guided by its sliding engagement against the walls of the casing. It should also be noted that the flexible bellows member 5 may be used or not in either instance as may be desired according to whether the head G is intended to have a suitably air-tight fit within the casing.

In all of the structures described the co-operative action of the single valve member and its dash-pot for controlling the articulation of sound is substantially the same in each case, and the timing, and degree of accentuation given to the succeeding phases of sound, is merely a matter of proportion as between the weight of the covering parts and the efficiency of the dash-pot action. In each instance the available free air passage through the opening 7 will, at least sufficiently for the purposes of this description and for a proper interpretation of the following claims, control the volume of sound while the gravity pull controlling effect of the dash-pot action will control the air pressure and consequently the tonal quality of the sound.

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

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

1. A voice device comprising a bellows having a head adapted to move by gravity for expelling air from the bellows, a sounding device arranged to be sounded by the outgoing air and there being an opening through which the sound issues, a valve member movable through said opening to interrupt the sounding of the sounding device, and means whereby said valve member will pass relatively successively in opposite directions through said opening during each air expelling movement of said head.

2. A voice device comprising parts movable relative to each other to create a draught of air, a sounding device arranged to be sounded by the passing air and there being an outlet opening in one of said movable parts through which the sound issues, a single valve member to control said opening, and means controlling movement of the

valve member independently of said movable part whereby at each air draught creating movement of the movable part of the bellows said valve member will move to uncover said opening and thereby permit the sounding of the first syllable of a word and whereby also at each air draught creating movement of the movable part of the bellows the part carrying said opening will move relative to the valve member to cause said opening to be first closed by said valve member and then uncovered to permit the sounding of a second syllable.

3. A voice device comprising a bellows having a head adapted to move by gravity for expelling air from the bellows, a sounding device arranged to be sounded by the outgoing air, and sound interrupting means comprising a movable part cooperating with means on the bellows head to momentarily increase the weight of the head and thereby accentuate the sound.

4. A voice device comprising a bellows having a head adapted to move by gravity for expelling air from the bellows, a sounding device arranged to be sounded by the outgoing air, and sound interrupting means comprising a movable part cooperating with means on the bellows head to momentarily detract from the gravity pull of said head and thereby alter the sound.

5. A voice device comprising a bellows having a head adapted to move by gravity for expelling air from the bellows, a sounding device arranged to be sounded by the outgoing air, and sound interrupting means comprising a movable part cooperating with means on the bellows head to momentarily first increase the normal weight of said head and then detract from the normal gravity pull of said head for thereby altering the sound.

6. A voice device comprising parts movable relative to each other to create a draught of air, a sounding device arranged to be sounded by the passing air and there being an outlet opening from which the sound issues, a single valve member arranged to pass relatively in opposite directions through said opening to control the passage of sound through said opening, dash-pot means to govern the movement of the valve member as it passes through said opening in one direction, and means to retain the valve member relatively stationary while the part carrying said opening moves to cause the valve member to pass relatively in the opposite direction through said opening.

7. A voice device comprising parts movable relative to each other to create a draught of air, a sounding device arranged to be sounded by the passing air and there being an outlet opening through which the sound issues, and sound interrupting means comprising a valve member arranged to move



by gravity through said opening and a dash-pot arranged to receive said valve member at the end of its operative movement.

8. A voice device comprising parts movable relative to each other to create a draught of air, a sounding device arranged to be sounded by the passing air and there being an outlet opening through which the sound issues, a valve member movable through said opening to interrupt the issuance of sound, and means with which said valve member co-operates to control the air pressure through said sounding device.

9. A voice device comprising parts movable relative to each other to create a draught of air, a sounding device arranged to be sounded by the passing air and there being an outlet opening through which the sound issues, and means to produce articulation of said sound comprising additional relatively movable parts co-operative to open and close said opening, and one of said latter parts cooperating with means on the air draught creating part to govern the tonal quality of the sound.

10. A voice device comprising parts movable relative to each other to create a draught of air, a sounding device arranged to be sounded by the passing air and there being an outlet opening through which the sound issues, and means to produce articulation of said sound comprising additional relatively movable parts co-operative to open and close said opening, and one of said latter parts cooperating with means on the air draught creating part to cause variations in the tonal quality of the sound during the time while said opening is open.

11. A voice device comprising parts movable relative to each other to create a draught of air, a sounding device arranged to be sounded by the passing air and there being an outlet opening through which the sound issues, and means to produce articulation of said sound comprising a dash-pot, and a member cooperating with said dash-pot to vary the air pressure through said sounding device.

12. A voice device comprising parts movable relative to each other to create a draught of air, a sounding device arranged to be sounded by the passing air and there being an outlet opening through which the sound issues, and means to produce articulation of said sound comprising a valve member movable through said opening to interrupt the issuance of the sound, and a dash-pot cooperating with said valve member and governing the duration of the period of sound interruption.

13. A voice device comprising a bellows having a head adapted to move by gravity for expelling air from the bellows, a sounding device arranged to be sounded by the outgoing air, a casing for said parts, and

means to produce articulation of said sound comprising a movable member, means limiting movement of said member relative to the casing and bellows head, said member during part of its movement in one direction being supported by said head independently of said means to momentarily add the weight of said member to that of said head and to at other times be supported by said means free of said head.

14. A voice device comprising a bellows having a head adapted to move by gravity for expelling air from the bellows, a sounding device arranged to be sounded by the outgoing air, a casing for said parts, and means to produce articulation of said sound comprising a member at times supported stationary with the casing and at other times supported by and movable with said head.

15. A voice device comprising a bellows having a head adapted to move by gravity for expelling air from the bellows, a sounding device arranged to be sounded by the outgoing air, a casing for said parts, and means to produce articulation of said sound comprising a member at times supported stationary with the casing and at other times supported by and movable with said head, together with a dash-pot provided in the head to receive said member.

16. A voice device comprising parts movable relative to each other to create a draught of air, a sounding device arranged to be sounded by the passing air and there being an outlet opening through which the sound issues, and means to produce articulation of said sound said means comprising a valve member for said opening, said valve member and the movable draught creating part having cooperating means operable during different operations of the voice device to differently alter the tonal qualities of the sounds produced.

17. A voice device comprising a cylindrical casing, a sounding device, a head within said casing movable by gravity to create a draught of air for operating the sounding device, said head being annular and having a loose sliding fit within said casing, and a gasket member carried by the head comprising a broad band of flexible material surrounding the head but being normally of a size to fit closely against the cylinder walls, one annular edge portion of said band being fixed to the annular surface of the head but the remainder of said band being not attached to the head and thus allowing air pressure between it and the head, and the head having annular portions above and below the band for engaging the cylinder walls to guide the head.

In testimony whereof I affix my signature.

L. GESSFORD HANDY.