W. W. YOUNG.

SOUND REGULATOR.

APPLICATION FILED JAN. 9, 1907.

940,109.

Patented Nov. 16, 1909.

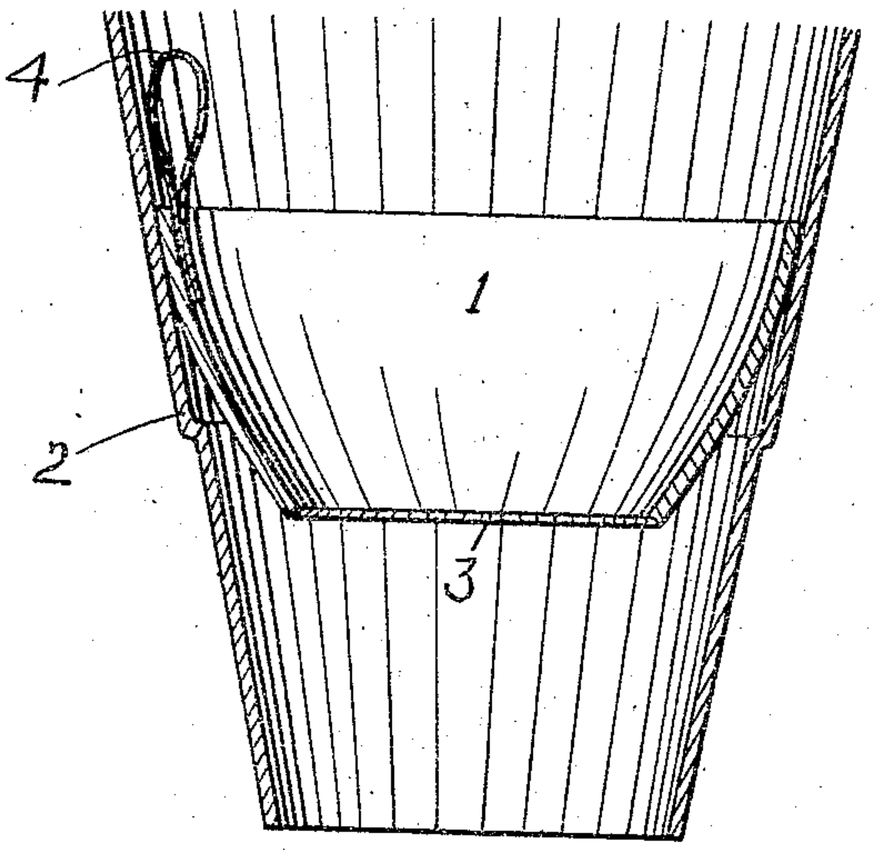


FIG. 1.

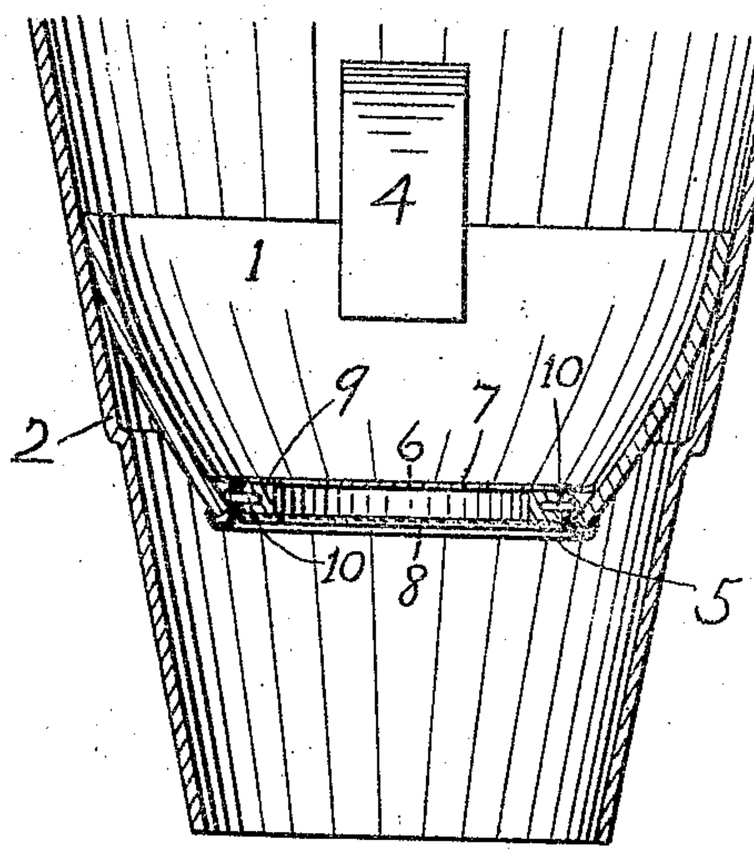


FIG. 2.

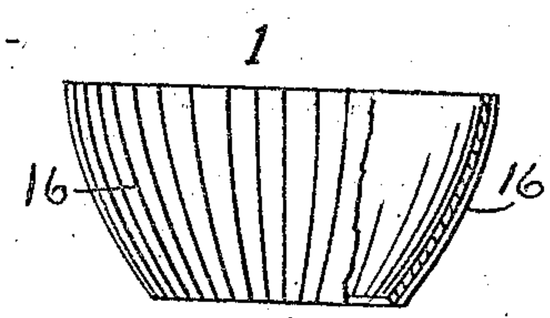


FIG. 6.

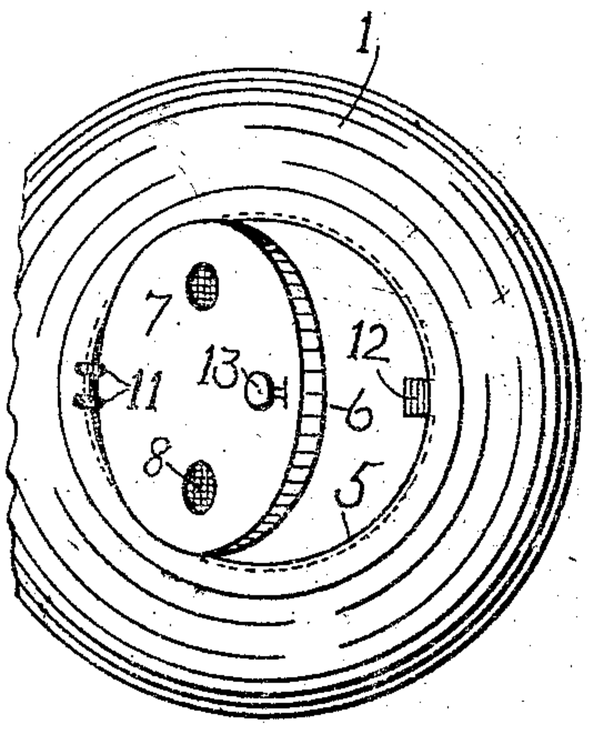
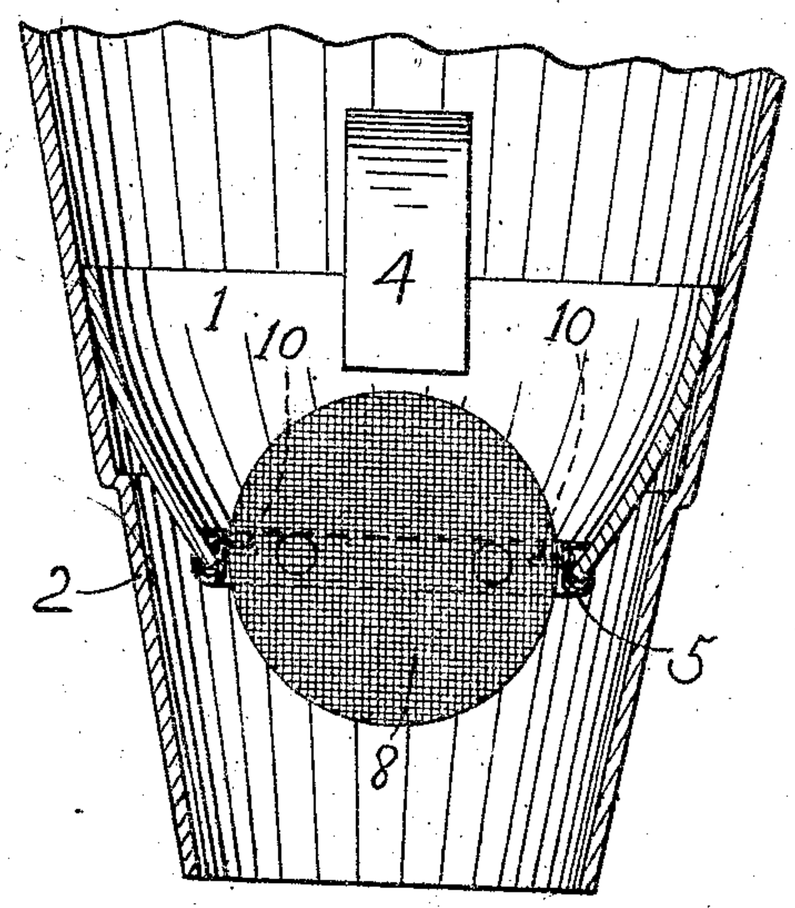


FIG. 4.



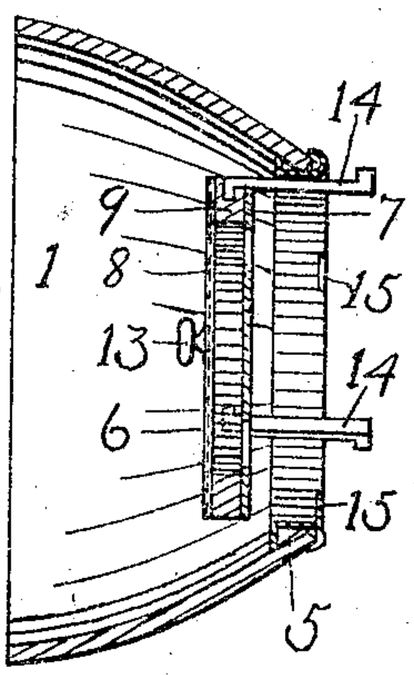


FIG. 3.

FIG 3

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SOUND-REGULATOR.

940,109. Specification of Letters Patent. Patented Nov. 16, 1909.

Application filed January 9, 1907. Serial No. 351,419.

To all whom it may concern:

Be it known that I, WILLIAM W. YOUNG, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Sound-Regulator, of which the following is a specification.

My invention relates to improvements in devices designed to be placed in tubular parts, generally the horns, of sound-reproducing or talking-machines and in tubular parts of musical instruments such as cornets, trombones, and the like, for the purpose of changing the tone, and comprises a flaring holder as hereinafter claimed designed to fit in the tubular part best adapted to receive it, and a shutter arranged to open and close the mouth of said holder. The holder on account of its shape and other inherent characteristics is capable not alone of adapting itself to tubular parts of different sizes and styles, but of being employed without the shutter when it will give good results. The shutter can consist of any suitable material or any combination of such materials and is so fastened in the mouth of the holder as to be readily opened and closed.

The objects of my invention are, first, to produce a device, especially intended for use in horns of talking-machines and in the capacity of mutes in wind instruments, whereby the sound waves are more or less modified in their passage through a tubular member containing said device so that a softened and mellowed tone is given off; second, to provide a device of this kind which is applicable to a great variety of different tubular parts or horns; third, to afford means in such a device for changing the relation of the parts for the purpose of varying the volume and quality of sound emitted, and, fourth, to embody my invention in a simple and inexpensive device which is entirely practicable and efficient and which has all of the advantages noted above. I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a sectional view of the neck of a horn and of one form of my improved holder in such neck; Fig. 2, a similar view showing also one form of shutter, the same being in its closed position; Fig. 3, a view like the preceding one except that the shutter is shown open; Fig. 4, an outside view of a holder and shutter showing the diaphragmal or movable shutter member hinged to the supporting ring or collar instead of being pivotally mounted therein as in Figs. 2 and 3; Fig. 5, a sectional view of a holder and shutter showing the movable shutter member slidingly-mounted relative to the collar, and, Fig. 6, a side elevation on a reduced scale and partly in section of a slightly modified form of holder.

Similar figures refer to similar parts throughout the several views.

The holder which constitutes an important and essential element of my invention, since it possesses inherent properties which render it alone adequate for modifying tone to a considerable degree hence can be used independently, consists of a bell-shaped piece 1, preferably of rubber or other suitable yielding or flexible material, although said piece may be made of metal or other comparatively unyielding material in which case it should generally have a rubber, felt, or other yielding cover, or in place of a cover one or more external rings or bands, to assist in holding the device in the tubular part. This bell-shaped piece or holder is open at both ends. The exterior outline of the holder longitudinally may be plain or curved either inward or outward—the outwardly curved or convex configuration shown having been found to be very satisfactory. A holder of this description owing to its shape can be fitted into a tubular part of almost any instrument or machine for producing or reproducing sound, as into the neck portion 2 of a talking-machine horn, with the small end or mouth 3 of said holder adjacent to the small end of said neck portion of the horn. Although as before stated the holder may be made, if of the proper shape, out of material which is not flexible, a flexible holder is generally to be preferred owing to its adaptability as a modifier of sound and for the reason that it is so well qualified for proper adjustment in the horn. The holder 1 is provided with a suitable tab 4 to facilitate the introduction of the holder into a horn and removal of the same therefrom. The holder is inserted in the neck 2 through the large end of the horn and the flaring sides of said holder find lodgment against the tapering sides of said neck to which they readily adjust themselves.

The holder 1 constricts the passage in the neck 2 in consequence of which the sound waves from the machine impinge thereon and are thereby rendered sweet and mellow.

To enhance the mellowing effect of the device a flanged ring or collar 5 is inserted in the mouth 3 of the holder 1, the lips of such mouth encircling said ring between the flanges of the same, and a diaphragmal member or shutter proper 6 is connected with the ring to normally fill the space therein. This shutter may be variously constructed, the one shown in the drawings consisting of a perforated leather disk 7, a wire gauze disk 8 and an interposed fibrous ring 9, all fastened together in any suitable manner. As already intimated, however, the shutter may be made up in numerous ways and of various materials.

The holder 1 affords a convenient medium for the ready insertion and withdrawal of the diaphragmal member, even though such member were not in the form of a shutter, nevertheless, I prefer to employ the shutter construction as I am thus able to secure any desired amount of adjustment which may be required to accommodate the device to the different volumes of sound which the machine or instrument will produce, and to this end I so connect the shutter with the holder or with the aforesaid collar as to permit said shutter to be closed and opened. Furthermore, the provision for opening and closing is such that the shutter can be either opened wide or only partially, can, in short, be opened to whatever extent may be desired or required. A number of different ways for movably mounting the shutter 6 relative to the collar 5 may be devised, but either of the three methods illustrated is practicable. These several illustrated mountings will now be explained.

Taking the first, that shown in Figs. 2 and 3, it will be seen that two pins 10 are inserted in opposite sides of the ring member 9 of the shutter 6 after passing through adjacent points in the collar 5. The edges of the mouth 3 of the holder 1 keep the pins 10 in place. The shutter is thus hung so that it can rotate on a diametral axis and is closed when it lies within the collar and open when turned since then the portions of the edges intermediate of the pivotal points emerge from said collar on both sides. When the shutter is turned so that the planes of the collar and shutter are at right-angles the latter is wide open, as shown in Fig. 3, and said shutter can be opened to any less degree, of course, by not turning it so far. The influence which the shutter exercises over the sound emanating from the machine or instrument with which the device is associated is greatest when the shutter is closed, becomes less when the shutter is opened, the amount of such influence then depending upon the extent of the opening, and practically ceases when the shutter is wide open; this is also true of the other forms of construction.

In Fig. 4, the shutter 6 is hinged at 11 to the collar 5 and swings outward to open the same. Said shutter is shown partly open in this view. A lug 12, formed by cutting and bending inward a part of the collar, is provided to receive the side of the shutter which is opposite the hinge 11 when the shutter is swung inward and thus insure the proper closing thereof. A knob 13 is placed on the outer face of the shutter to be grasped for the purpose of operating the latter.

The construction shown in Fig. 5 is such that the shutter is moved bodily in and out of the collar on the same axis with that of the collar to effect the closing and opening. In this case the shutter 6 is provided with a plurality of guide-rods 14 adapted to center said shutter relative to the center of the collar 5 and to play back and forth in and through said collar. The guide-rods 14 extend from the periphery of the shutter, parallel with the axis thereof, into and through the collar, having their outer ends bent so as to engage the adjacent edge of said collar when said shutter is drawn out of and away from the collar into its extreme open position and thus limit such movement. When the shutter is closed it comes to rest against one or more lugs 15, similar to the lug 12, formed on the inside of the collar. The shutter in this instance is provided with a knob 13 as in the preceding case and for the same purpose. The shutter in Fig. 5 is only part way open hence will have some influence on the passing sound, more than if it were drawn as far away as possible from its collar—then it would have little or no influence.

It is obvious that the collar and shutter shown in Fig. 4 can be oppositely disposed relative to the holder so that the shutter will open inward, that is, into the holder, instead of outward as it does now; furthermore, a similar rearrangement or readjustment of the parts shown in Fig. 5 can be made so as to have the shutter there open outward, that is, away from or beyond the holder, instead of inward or into the interior of said holder. With the knob 13 on the outside of the shutter in the Fig. 4 arrangement it is necessary to remove the device from the horn in order to close it, unless a knob be placed on the inside of the shutter, and a rearrangement of the parts in the Fig. 5 device also calls for a knob on the opposite face of the shutter.

It is to be understood that the modified forms of my device which include the shutter are to be applied to a horn in the same way in which the device shown in Figs. 2 and 3 is applied. To change the volume of sound or the tone, when one of these devices is in use, either reach into the horn and rearrange the shutter as required, or take out the whole device, rearrange the shutter and

then return the device to its former position in the horn.

The holder 1 shown in Fig. 6 has external corrugations 16 which with the sides of an inclosing horn provide passages for the escape of sound and obviate any unsatisfactory muffled effect that might be otherwise produced by the shutter when closed, it being understood that the corrugated holder may have a diaphragm like the non-corrugated holder. The corrugated holder can be used without a diaphragm as well as the other holder and when so used produces much the same effect as the other.

All changes and modifications which may justly be said to fall within the scope of my invention I desire and intend to include in and cover by my claims.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a tube of a sound producing or reproducing instrument or machine, of a removable sound regulator consisting of a flaring cup-shaped member open throughout and bearing at its larger end directly against the sides of said tube and otherwise curved inwardly and out of touch with such sides, the sides of said member being imperforate.

2. As a new article of manufacture, a regulator, of the class described, consisting of an externally-corrugated bell-shaped member open at both ends adapted to be inserted in and removed from a tubular part of a sound-producing or -reproducing instrument or machine, such member having an unobstructed passage therethrough and arranged at one terminal to bear directly against the sides of said tubular part.

3. As a new article of manufacture, a regulator, of the class described, consisting of a soft flexible or yielding bell-shaped member open at both ends adapted to be inserted in and removed from a tubular part of a sound-producing or -reproducing instrument or machine, such member having an unobstructed passage therethrough and arranged at one terminal to bear directly against the sides of said tubular part.

4. As a new article of manufacture, a regulator, of the class described, consisting of a bell-shaped member open at both ends adapted to be inserted in and removed from a tubular part of a sound-producing or -reproducing instrument or machine, such member having an unobstructed passage therethrough and arranged at one terminal to bear directly against the sides of said tubular part, and a diaphragmal member in the mouth or most constricted part of said bell-shaped member.

5. As a new article of manufacture, a regulator, of the class described, consisting of a bell-shaped member open at both ends adapted to be inserted in a tubular part of a sound-producing or -reproducing instrument or machine, of a diaphragmal member in the mouth of said bell-shaped member adapted to open and close such mouth.

6. The combination, in a regulator, of the class described, with a bell-shaped holder open at both ends adapted to be inserted in a tubular part of a sound-producing or -reproducing instrument or machine, and a ring or collar in the mouth of said holder, of a shutter connected with said collar and adapted to open and close the passage therethrough.

7. The combination, in a regulator, of the class described, with a bell-shaped holder open at both ends adapted to be inserted in a tubular part of a sound-producing or -reproducing instrument or machine, and a ring or collar in the mouth of said holder, of a shutter pivotally mounted in said ring or collar and adapted to open and close the passage therethrough.

8. The combination, in a regulator, of the class described, with a collar, and a shutter connected with said collar and adapted to open and close the passage in such collar, of means to support the collar with its shutter in a tubular part of a sound-producing or -reproducing instrument or machine, such means being independent of and separable from such tubular part.

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