

## UNITED STATES PATENT OFFICE

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## TONE AMPLIFIER FOR MUSICAL INSTRUMENTS

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7 Claims. (Cl. 84—383)

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This invention relates generally to mouthpieces for use with musical instruments, and more particularly to mouthpieces of the type used in conjunction with musical instruments of the so-called woodwind type.

An object of the present invention lies in the provision of a mouthpiece in which tonal qualities may be obtained which are substantially different from those obtained when using a conventional mouthpiece.

Another object herein, lies in the provision of a mouthpiece the use of which will enable the musician to produce a tone of large volume without the necessity of overblowing the instrument, thereby distorting the tone quality to an objectionable degree.

Another object herein lies in the provision of a mouthpiece in which the tone quality may be varied by the musician without removing the mouthpiece from the mouth.

A further object lies in the provision of a mouthpiece, having the above mentioned qualities which may be used in conjunction with conventional reeds, and the standard tuning barrel of instruments of this type.

A still further object of the invention lies in the provision of a mouthpiece having the above mentioned qualities in which the cost of fabrication may be of a relatively low order with consequent wide sale and distribution.

A feature of the present invention lies in the fact that a portion of the tone chamber may be comprised of a flexible membrane, capable of expansion under increased pressure of the air column.

Another feature of the present invention lies in the fact that the column of air from the lips of the musician is introduced into the tone chamber of the mouthpiece at a considerably higher velocity than in the case where a conventional mouthpiece is employed, thereby permitting greater turbulence within the tone chamber.

These objects and features, as well as other incidental objects and advantages will become more fully apparent during the course of the following specification and be pointed out in the appended claims.

In the drawing similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a side elevational view of a first embodiment of the invention, in position on the tuning barrel of an instrument.

Figure 2 is a bottom elevational view of the

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embodiment detached from the tuning barrel with the reed and ligature removed.

Figure 3 is a vertical longitudinal central sectional view of the embodiment.

5 Figure 4 is a vertical transverse sectional view as seen from the plane 4—4 on Figure 1.

Figure 5 is a vertical transverse sectional view similar to that of Figure 4 showing a second embodiment of the invention.

10 Figure 6 is a side elevational view of a third embodiment of the invention, in position on the tuning barrel of an instrument.

Figure 7 is a bottom elevational view of the embodiment detached from the tuning barrel with the reed and ligature removed.

15 Figure 8 is a vertical longitudinal central sectional view of the embodiment.

Figure 9 is a vertical transverse sectional view as seen from the plane 9—9 on Figure 6.

20 Turning now to the first embodiment, the device generally indicated by reference character 10, has been shown in a form suitable for use with a saxophone. It will be readily understood, however, by those skilled in the art to which the present invention pertains that this particular mouthpiece is by way of example, the device being capable of ready adaptation for use with a clarinet with merely the usual modification.

25 The device 10 comprises broadly a tone chamber 12, a mouth engaging portion 14, and supplemental chambers 16 and 18.

30 The tone chamber 12 may be of a conventional type having a bore 20 of substantially constant diameter. As may be seen on Figures 1 and 3, it is engageable with the tuning barrel 22 of the instrument in a well known manner, a cork gasket member 24 providing a leakproof seal therebetween. The lay 26 provides a seat for the reed 28, which is maintained in place by the ligature member 30.

40 The mouth engaging portion 14 has external configurations similar to those of a conventional mouthpiece, thereby allowing the new user of the device to retain his original lip embouchure. It includes the angularly disposed upper lip engaging surface 32 and side surfaces 34 and 36. The opening in the forward portion of the lay for the entrance of the air column may also be of conventional design, being bounded by the curved edge 38, the rectilinear edges 40 and 42, and the edge 44 of the surface 32. As in the case of a standard mouthpiece the lay is curved slightly in a direction away from the tongue 46 of the reed 28 to facilitate vibrating thereof.

45 50 The interior of the mouth engaging portion 14



is provided with a fluted guide 50 preferably formed integral with the other portions of the mouthpiece. As may be best seen in Figures 2 and 3 the guide portion 50 includes a rectilinear portion 52 the plane of which is substantially parallel to the lay of the mouthpiece, followed by a gently curved portion 54 leading into another rectilinear portion 56 disposed substantially at a 60° angle with respect to the lay. The flutes 50 are preferably three in number and may be omitted if desired as they principally serve an ornamental function. It will be readily understood that the guide serves to confine the column of air introduced into the instrument to a narrow channel immediately above the reed. As the cross-sectional area of the channel is considerably less than that of the tone chamber in the standard mouthpiece, the velocity of the air column is consequently of an appreciably higher velocity, and lower pressure when entering therein.

The supplemental chambers 16 and 18 are substantially alike in purpose and structure, and consequently, they avoid needless repetition, a description of the chamber 16 will serve to also describe chamber 18 as well.

The chamber 16 is generally conical in shape, and is preferably formed integral with the other portions of the mouthpiece. The chamber 16 intersects the tone chamber 12 substantially in a circle at a point just juxtaposing the rectilinear portion 56 of the guide 50. The exact internal shape of the chambers is optional depending upon the type and amount of turbulence it is desired to create therein. As has been mentioned the preferred embodiment features a chamber of substantially conical shape, having a spherical terminus 58.

Turning now to the second embodiment of the invention in which to avoid needless repetition, certain of the parts corresponding to those of the first embodiment have been designated by similar reference characters with the addition of the prefix "1."

The second embodiment, as may be seen on Figure 5, differs from the first embodiment principally in the structure of the chambers 116 and 118. These chambers, unlike those of the first embodiment are not formed integral with the tubular portion 12 of the mouthpiece, but instead are formed from a thin membrane of ductile material such as thin rubber. It will be understood that the chambers 116 and 118 shown on Figure 5 are of an exaggerated thickness for purposes of clarity. This membrane permits the chambers 116 and 118 to be expanded under the pressure of the air column introduced therein. By the use of the flexible chamber, the shape of the chambers may be altered while playing by orally increasing or decreasing the pressure of the air column.

The membranes forming the chambers are secured to the tone chamber 12 by any suitable means such as rubber cement.

#### Operation

The operation of the device is readily understandable from a study of the drawing. The column of air orally introduced in the normal manner passes over the tongue 46 of the reed 28 and strikes the rectilinear portion 52. It is then subsequently guided through the narrow channel formed by this portion and the thicker portion 60 of the reed, wherefrom it emerges at a relatively high velocity and reduced pressure, into

the tone chamber 12. At this point a turbulence is set up, a portion of the air column passing directly into the tuning barrel 22, as in the conventional mouthpiece, while the remaining portion passes into and out of the chambers 16 and 18. This portion of the air column is thus set into a vibration which tends to reinforce the other portion, thereby creating tonal qualities different from that obtained from the ordinary mouthpiece.

It may thus be seen that I have invented a novel and highly useful improvement for use with saxophones, clarinets and other woodwinds of similar type. Through its use a wide variety of tonal effects are obtained, with a brilliance and volume heretofore unobtainable.

Turning now to the third embodiment of the invention, to avoid needless repetition, certain of the parts corresponding to those of the first and second embodiments have been designated by similar reference characters with the additional prefix "2."

As may be seen on Figures 6 to 9, inclusive, the third embodiment differs from the first embodiment principally in the provision of means to adjust the guide 150. As it is often desirable to change the tonal effect being produced during the course of a particular musical selection, such adjustment should be made without the necessity of changing to another mouthpiece. By employing the third embodiment such change is unnecessary.

To accomplish this end the guide 150 is formed separately from the other portions of the mouthpiece, and is slidably disposed by means of a pin 162 which is mounted on the extremity 164 of the tongue 166, which in turn is adjustably mounted on the upper surface of the mouthpiece by means of a set screw 168. A finger engaging portion 170 permits of rapid adjustment, and if desired the set screw may be left in an untightened position during playing, thereby facilitating adjustment.

Since the above described structure is so disposed as to interfere with proper positioning of a conventional type of ligature, it is necessary in the case of the third embodiment to provide a ligature of somewhat altered structure. The ligature 172 differs from the conventional type in that it does not extend completely about the mouthpiece, but is formed in two portions 174 and 176. The portions 174 and 176 are substantially similar in configuration, and are secured together by the conventional tightening screws 178. Extending from opposed surfaces of the mouthpiece are two pairs of ligature engaging pins 180, which are detachably connectable with corresponding edges of openings 182. The ligature, when properly positioned, will accordingly receive the equivalent tension as compared with the conventional or unitary type of ligature.

Referring again to the means for adjusting the guide, I have found that merely sliding the same by hand provides adequate sensitivity of adjustment. In the case of larger instrument mouthpieces, however, such as the baritone saxophone, bass clarinets and saxophones, or the like, where a larger range of adjustment is possible, the means may if desired be provided with screw thread adjustment (not shown).

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the craft.

I claim:

1. A mouthpiece for use with single reed woodwind musical instrument, comprising a tone

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chamber, a mouth engaging portion and a plurality of supplemental chambers each extending laterally of the longitudinal axis of the tone chamber, said supplemental chambers being adapted to vary the tone quality by permitting greater turbulence and a sustained tone coming from said musical instrument.

2. A mouthpiece for use with single reed woodwind musical instruments including a tone chamber, a mouth engaging portion and at least one supplemental chamber integral with the tone chamber, said supplemental chamber being adapted to produce a sustained tone when said mouthpiece is used in connection with said instrument; said mouth engaging portion having a guide including a first rectilinear portion, a curved portion and a second rectilinear portion.

3. A mouthpiece for use with single reed woodwind musical instruments including: a tone chamber, a mouth engaging portion and a plurality of substantially conical, supplemental chambers, each extending from the tone chamber and having a spherical terminus merging with the tone chamber to permit the production of a tone of large volume; said mouth engaging portion having a guide including a first rectilinear portion, a curved portion, and a second rectilinear portion; said first rectilinear portion being disposed parallel to the lay of said mouthpiece.

4. A mouthpiece for use with a single reed woodwind musical instrument comprising: a tone chamber, a mouth engaging portion and a plurality of substantially conical supplemental chambers each extending from the tone chamber and having a spherical terminus merging with the tone chamber to permit an accumulation of increased volume of air therein and the formation of a sustained tone in the instrument; said mouth engaging portion having a guide including a first rectilinear portion, a curved portion, and a second rectilinear portion; said supplemental chamber joining said tone chamber at a point juxtaposing said second rectilinear portion of said guide.

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5. A mouthpiece for use with a single reed woodwind musical instrument comprising: a tone chamber, a mouth engaging portion having a guide including a first rectilinear portion, a curved portion and a second rectilinear portion; a plurality of supplemental chambers each closed at one end and at its other end joining said tone chamber at a point juxtaposing said second rectilinear portion of said guide; and means to adjust said guide within said tone chamber.

6. A mouthpiece for use with a single reed woodwind musical instrument comprising a tone chamber, a mouth engaging portion and a pair of supplemental substantially conical shaped tone chambers, and a guide including a rectilinear portion, each of said supplemental tone chambers intersecting the tone chamber substantially in a circle at a point juxtaposing the rectilinear portion of said guide, said supplemental chambers being closed at one end and adapted to contain additional volumes of air and create turbulence and sustained tone of air passing through the mouthpiece.

7. A mouthpiece according to claim 6 in which each of said supplemental tone chambers has a spherical terminus merging with the rectilinear portion of said guide.

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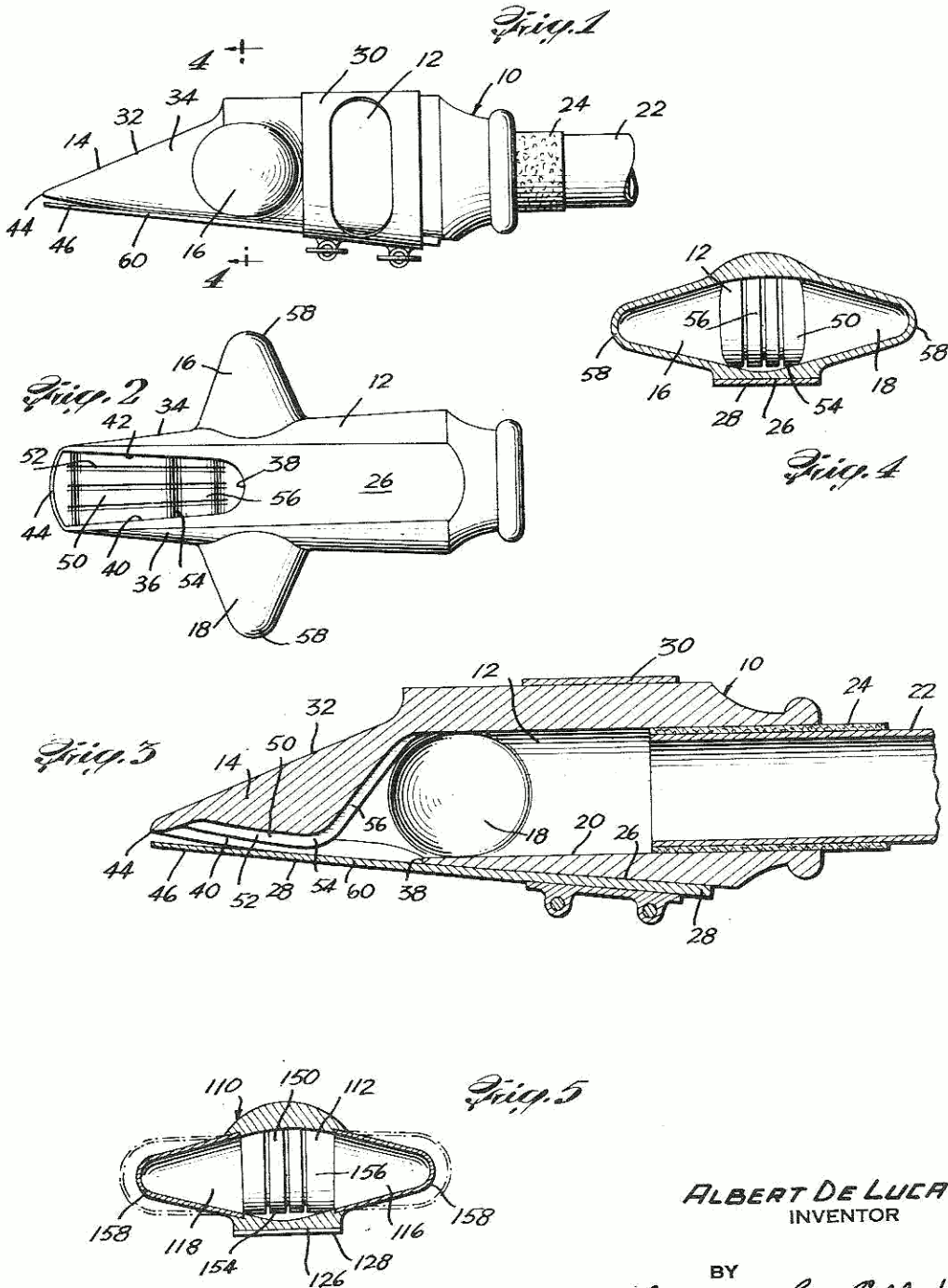
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2 Sheets-Sheet 1



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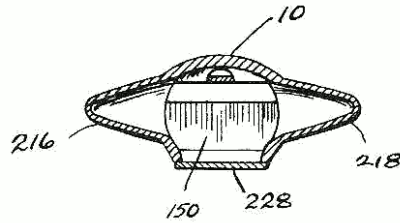
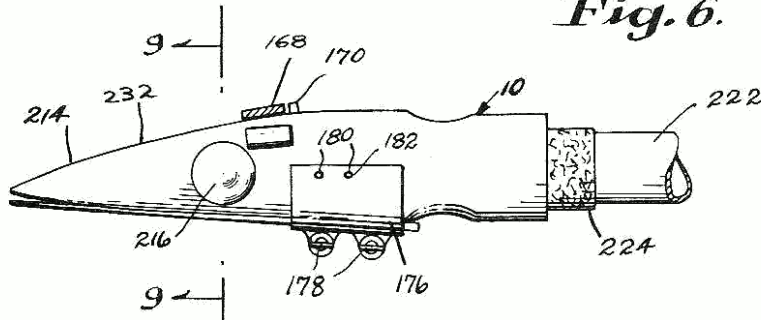
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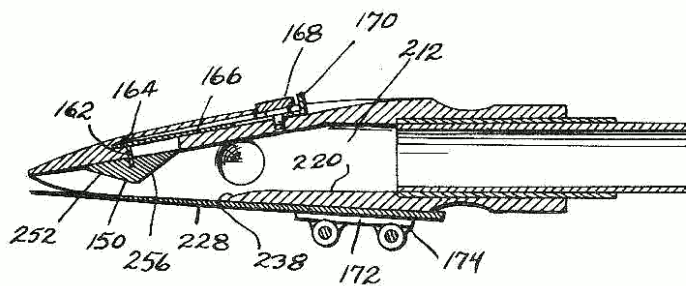
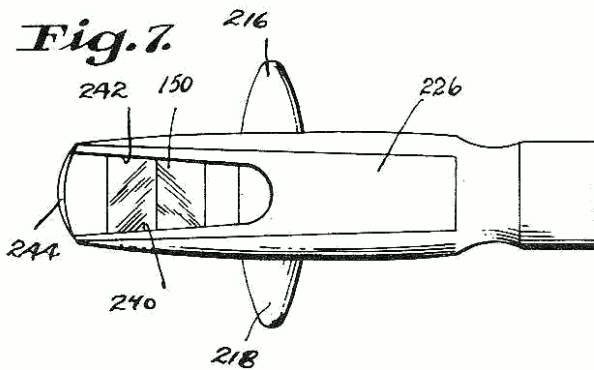
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*Fig. 6.*



*Fig. 9.*



*Fig. 8.*

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