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MOUTHPIECE FOR REED INSTRUMENTS

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12 Claims. (Cl. 84—383)

This invention relates to an improved mouthpiece assembly for wind instruments of the striking-reed types. Such instruments include inter alia clarionets and saxophones.

A mouthpiece assembly of the striking-reed type to which the invention relates comprises three main components: (1) a mouthpiece body of generally tubular shape cylindrical at one end and tapered at the other with a wind passage therethrough which opens axially of the mouthpiece body at said cylindrical end for connection to the wind instrument with which the mouthpiece is to be used and opens more or less tangentially at the opposite, tapered end of the body to provide an elongated aperture at said end; (2) a striking reed pivotally supported on the flatted upper wall of the body and extending over the afore-said aperture so as to be capable of vibrating under wind pressure to open and seal said aperture; and (3) a so-called "tie" device serving to bind the reed to the mouthpiece body while permitting the vibrational motion thereof as just described.

In recent years a considerable amount of research has been undertaken with the purpose of improving the tone quality of wind instruments of the striking reed type and various changes have been proposed in the respective components of the mouthpiece assembly. While the present constructions are often able to achieve excellent tone at least in the initial stages of use of the mouthpiece, it is found that in many cases performance tends to deteriorate with time and may lack uniformity as between seemingly identical assemblies. Differences in tone quality or timbre tend to arise in certain registers, and difficulties and delays may be encountered in the emission of higher-pitch notes. On replacement of the mouthpiece assembly in a given instrument accurate tuning is difficult to obtain.

Objects of this invention include the provision of an improved mouthpiece assembly of the striking-reed type wherein uniformly high tone quality and general performance are ensured over long periods of time; uniformity between separate similar assemblies is improved; the above-mentioned and other related deficiencies in sound utterance are considerably reduced; and tuning operations facilitated.

More specific objects include: modifying the shaping of the mouthpiece body on the side thereof engaged by the striking reed, so as to facilitate effective vibrational motion and positive positioning of the reed with respect to the body; the provision of a vent in said side of the body for preventing the objectionable formation of an air cushion under the reed impeding the free vibrations thereof; the provision of an improved tie arrangement for mounting the reed on the mouthpiece body whereby a self-aligning and/or self-balancing mounting of the reed is obtained facilitating free and true vibrational movement; and the provision of an improved tie arrangement which facilitates assembly while improving the general weight balance of the mouthpiece assembly.

The above and further objects of the invention as well as the novel features thereof will be made clear from the ensuing description relating to a preferred, but non-limiting, embodiment of the invention and the accompanying drawings wherein:

FIGS. 1 and 2 relate to the prior art and respectively show a longitudinal sectional view and an overhead view of a conventional mouthpiece body for a striking-reed musical instrument, neither the reed nor the tie means being shown;

FIGS. 3 and 4 are respectively similar views of an improved mouthpiece body embodying certain novel features of the invention;

FIG. 5 is a perspective view of a complete mouthpiece assembly according to a preferred embodiment of this invention;

FIG. 6 is a cross sectional view on line VI—VI of FIG. 5;

FIG. 7 is a developed or flattened-out view of the tie clamp used in the assembly of FIGS. 5 and 6; and

FIG. 8 is a perspective view of one of a pair of clamping blocks used in conjunction with the tie clamp collar.

Referring first to FIGS. 1 and 2 wherein a conventional mouthpiece body is shown for purposes of comparison, such body generally designated **1** is seen to be of generally tubular shape with a wind passage **1***d* therethrough. At its one end the body **1** has a generally cylindrical end section **1***a* for connection with the wind instrument, the section **1***a* being formed with an annular recess in which is seated a flat ring seal **2** made of cork or the like for effecting a tight connection with the instrument. The arrangement shown is more especially suited for use with instruments of the clarionet type. In other types of instruments, e.g. saxophones, the end part **1***a* of the mouthpiece is adapted to be fitted around, rather than inserted into, a corresponding end section of the instrument pipe; in such cases seal ring **2** is of course omitted and may then be replaced by a simple annular reinforcement of the mouthpiece end section **1***a*.

The upper wall **1***b* of the body **1** is flatted, and the under wall is curved upwardly towards the opposite (or mouth) end of the body, and the upper wall **1***b* has a generally rectangular elongated aperture or slot at its end to provide an end opening for wind passage **1***d*. The flat upper surface **1***c* of upper wall **1***b* forms a seating surface for the under surface of a reed member, not shown in there figures, which is suitably bound at its rear (left hand hercin) end to the wall **1***b* while its front end extends over the afore-mentioned aperture in wall **1***b* so as to vibrate with respect thereto under wind pressure, from the player's mouth.

In the improved mouthpiece body of the invention shown in FIGS. 3 and 4 parts corresponding in function to parts of FIGS. 1 and 2 bear the same references, and only the differences between the two constructions will be expressly referred to. It will be apparent from a comparison of FIGS. 1 and 3, and of FIGS. 2 and 4, that the flat upper wall **1***b* is extended forwardly a somewhat greater distance in the construction of the invention than in the prior construction, and preferably substantially as far as point C, where the apertured wall of the mouthpiece body begins to curve, which curvature enables vibration of the reed. Further, the upper surface **1***c* of wall **1***b* is recessed to provide a shallow depression as at **1***e*, which is defined laterally by a pair of longitudinal ridges or lips **1***f* and rearwardly by a transverse ridge **1***g*. A small vent opening **1***h* is provided through the upper wall **1***b* preferably towards the rear end of the recess **1***e*. Owing to recess **1***e*, the longitudinal fibers of the reed are freed. Thus breaking of the inner fibers of the reed, which would occur along line X—X' when the reed is mounted on a known mouthpiece, such as shown in FIGS. 1 and 2, is prevented.

The prolongation of upper wall **1***b* in a mouthpiece being provided with the shallow depression **1***e* brings about an appreciable improvement in tone quality and facilitates emission of high-pitch notes.

Owing to vent opening **1***h* the formation of air cushions

between the bottom of the depression **1***e* and the reed during vibration of the latter is prevented.

Reference will now be made to FIGS. 5 and 6 for a description of the improved reed mounting or tie means of the invention. The reed is shown at **4** and may be of conventional form. The tie assembly generally designated **3** includes a clamping collar **10** later described in detail and surrounding an intermediate region of the body **1**. The upper part of collar **10** includes a flat and recessed portion spaced above the upper surface of the body, and within the recess a cage **7** is supported for free pivotal movement about a pivot pin **9** extending through flanges such as **10***a* of collar **10**. Cage **7** has a pair of downwardly extending side flanges visible in FIG. 6, across which a second pivot pin **6** extends transversely, in orthogonal relation to the first pivot pin **9** and spaced below it. Both pins **9** and **6** may be retained in position between their flanges by means of enlarged ends thereof providing rivet heads as shown. Freely pivoted about pin **6** between the flanges of cage **7** are a pair of rod-like presser elements **5***a*, **5***b* formed with holes intermediate their ends through which pin **6** freely projects. The two rod elements **5***a*, **5***b* are identical, each being in the form of a partial cylinder as shown, with the flatted sides surfaces of the two elements **5***a*, **5***b* engaging the inner surfaces of the flanges of cage **7**. A small coil spring **8** surrounding pin **6** between the elements **5***a*, **5***b* presses them outwards into engagement with said flanges.

With the arrangement described and shown it will be seen that the presser elements **5***a*, **5***b* bear against the upper surface of reed **4** along lower generatrices of the cylindrical surfaces of said elements (see especially FIG. 6 where reed **4** is shown in chain outline).

The clamp collar **10** is retained in position around body **1** by means of a screw tensioning device **11–12**. As shown in FIG. 7, the clamp collar is shaped from a flat strip or the like stamped out with recesses and flanges as shown. Before mounting the collar **10** around the body **1** the flanges are bent at right angles to the plane of the strip at the lines indicated at AB, CD, EF and GH. Bending along the lines AB and CD provides the end flanges such as **10***a* (FIG. 5) which are formed with aligned holes for passing upper pivot pin **9**. Bending along the lines EF and GH provide a further pair of flanges such as **10***b* (FIG. 6) also formed with holes aligned with those in flanges **10***a*. The intermediate flanges **10***b* serve to limit the displacements of cage **7** along longitudinal pin **9**. Intermediate cutouts **10***c*, **10***d* in the collar **10** serve lightening purposes. End cutouts **10***e*, **10***f* serve for attachment of the screw tightening arrangement as will now be described.

Each of the end cutouts **10***e*, **10***f* is generally T-shaped, with an outer rectangular portion elongated in the transverse direction of the collar strip, and an adjoining inner rectangular portion of smaller transverse extent. A pair of generally cylindrical blocks or studs **12** are provided, one of which is shown separately in FIG. 8. The blocks **12** are formed with kerfs **12***a* and **12***b* extending from their end surfaces in a common diametric plane. The dimensioning is such that each block **12** can be inserted into the outer portion of an end cutout such as **10***f* with one of its kerfs, say **12***a*, engaging a smaller side edge of said rectangular outer portion, whereupon the block **12** can be slid longitudinally to engage its opposite kerf, **12***b*, over the opposite smaller side edge of said rectangular cutout portion. Then the block **12** can be shifted transversely on to the smaller, inner rectangular portion of said cutout **10***f* to be firmly retained in position owing to the smaller transverse dimension of that portion. When both blocks or studs **12** have been inserted in this way in the cutouts **10***e* and **10***f* at both ends the clamping collar **10**, the ends of the collar strip, which has first been suitably positioned around body **1** and deformed to the shape shown e.g. in FIG. 6, can be rolled outwards around the blocks **12** in the manner shown in that figure,

pressed inwards into engagement, and holes are bored in coaxial alignment through both blocks (as shown at **12***c* in FIG. 8) as well as through the intervening thicknesses of the collar strip. One of the holes **12***c* is screw threaded, and tensioning screw **11** is inserted first through the smooth hole and then engaged with the threaded hole to tighten the collar in position.

A mouthpiece assembly constructed as described herein has been found to impart greatly enhanced musical characteristics to wind instruments with which it is used, especially in regard to uniformty and constancy in tone quality and general performance. This is ascribable primarily to the improved guiding and retention of the striking reed **4** relative to the mouthpiece body and aperture, and to the self-aligning properties of the universal, two-axis, suspension provided for the reed retaining means about the orthogonal pivots **6** and **9**. That is, the reed **4** is held down against the ridges **1***f* along the two parallel spaced lines of contact at the lower generatrices of presser elements **5***a*, **5***b*. Since said elements are each independently pivoted about the transverse pivot **6**, perfect contact engagement of each element with the reed surface throughout the full length of the line of contact is ensured. And since both presser elements are bodily pivoted through cage **7** about the longitudinal pivot **9**, the pressures of contact as between the two sides of the reed **4** are equally well balanced.

Owing to the shape of rod elements **5***a* and **5***b*, and depending on the size of their flat portion, the distance between the line of contact of the rod elements with the reed and the edges of said reed can be modified; said empirically determined modification allows of obtaining optimum results for the mouthpiece-reed assembly.

Said rod elements may also be of any other shape which ensures a rectilinear line of contact of said elements with the reed, parallel to the edges thereof.

The mechanical characteristics described combine to assure greatly improved freedom for natural vibration of the reed as well as its positive retention in proper position. Tuning operations are facilitated. The clamping collar construction disclosed facilitates assembly and also improves the weight balance of the mouthpiece assembly in that it distributes the weights of the parts substantially equally between the upper and lower regions of the mouthpiece body.

It will be understood that various changes and modifications may be introduced into the constructions shown and described without exceeding the scope of the invention. Certain of the features disclosed may be applied independently of others.

What I claim is:

1. In a mouthpiece assembly for a reed instrument having a body formed with a wind passage therethrough opening axially of said body at one end thereof and opening into an aperture in a flatted side wall of said body at the opposite end thereof, a reed positioned over said flatted side wall and having an end portion overlying said aperture, and means mounting said reed for vibrational movement relative to said aperture; the improvement comprising a shallow recess formed in the outer surface of said flatted side wall of the body for freely seating the reed thereon, including a pair of longitudinal ridge portions on said side wall on opposite sides of the reed, and defining the sides of the recess, and a transverse ridge portion of said side wall, defining an end of said recess towards said one end of the body.

2. In a mouthpiece assembly for a reed instrument having a body formed with a wind passage therethrough opening axially of said body at one end thereof and opening into an aperture in a flatted side wall of said body at the opposite end thereof, a reed positioned over said flatted side wall and having an end portion overlying said aperture, and means mounting said reed for vibrational movement relative to said aperture; the improvement comprising a shallow recess formed in the outer surface

of said flatted side wall of the body for freely seating the reed thereon, including a pair of longitudinal ridge portions on said side wall on opposite sides of the reed, and defining the sides of the recess, and a transverse ridge portion of said side wall, defining an end of said recess towards said one end of the body, and a vent hole through said flatted side wall beneath the reed, communicating with said wind passage.

3. The improvement claimed in claim 1, wherein said body side wall curves towards the opposite side wall in the region of said aperture, and wherein said flat upper wall is extended forwardly, preferably substantially as far as the point where the apertured wall of the mouthpiece body begins to curve, which curvature enables vibration of the reed.

4. A mouthpiece assembly for a reed instrument having a body formed with a wind passage therethrough opening into an aperture in a flatted side wall of the body at one end, a reed positioned over said flatted side wall and having an end portion overlying said aperture, and tie means mounting the reed on the body for vibrational movement relative to said aperture, said tie means comprising: presser means engaging the outer surface of said reed in the other end portion thereof; and means mounting said presser means for universal pivotal movement relative to the body.

5. A mouthpiece assembly for a reed instrument having a body formed with a wind passage therethrough opening into an aperture in a flatted side wall of the body at one end, a reed positioned over said flatted side wall and having an end portion overlying said aperture, and tie means mounting the reed on the body for vibrational movement relative to said aperture, said tie means comprising a pair of elongated presser elements engaging the outer reed surface along parallel spaced longitudinal lines in the other end portion of the reed, first pivot means mounting said elements for independent pivotal movement about an axis transverse to the body, and second pivot means mounting both elements for pivotal movement about an axis longitudinal to the body.

6. The assembly claimed in claim 5, wherein said

presser elements are in the form of at least partly cylindrical rods having their lower generatrices engaging said reed surface along said parallel spaced lines.

7. The assembly claimed in claim 5, wherein said first pivot means comprise a flanged member having a pivot pin extending across the flanges thereof transversely of said body and said presser elements have holes intermediate their length freely engaging said pivot pin and are positioned on said pin inwardly of said flanges.

8. The assembly claimed in claim 7, including spring means outwardly biassing said presser elements into engagement with the inner surfaces of said flanges.

9. The assembly claimed in claim 5, wherein said first pivot means comprise a flanged member having a pivot pin extending across the flanges thereof transversely of said body and said presser elements have holes intermediate their length freely engaging said pivot pin and are positioned on said pin inwardly of said flanges, and said second pivot means comprise a clamp collar surrounding said body, a second pivot pin supported by said collar longitudinally of said body above said first pivot pin, and means pivotally mounting said flanged member about said second pivot pin.

10. The assembly claimed in claim 9, wherein said clamp collar comprises a strip having free ends positioned under said body, and screw tensioning means engaging said free ends for drawing them together and thereby tightening said collar around the body.

11. The assembly claimed in claim 5, including means defining a shallow recess in the outer surface of said flatted side wall of the body, said recess being defined by a pair of longitudinal ridge portions of said side wall on opposite sides of the reed.

12. The assembly claimed in claim 5, including means defining a shallow recess in the outer surface of said flatted side wall of the body, said recess being defined by a pair of longitudinal ridge portions of said side wall on opposite sides of the reed, and a vent hole through said flatted side wall beneath the reed communicating with said wind passage.

No references cited.

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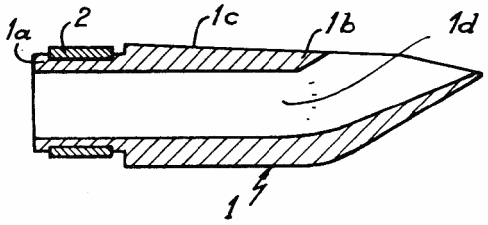

Fig. 1

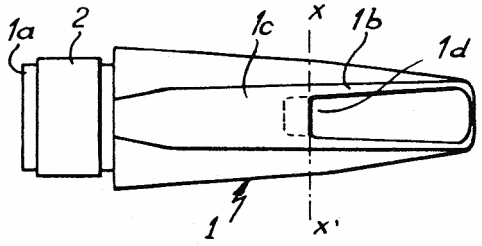

Fig. 2

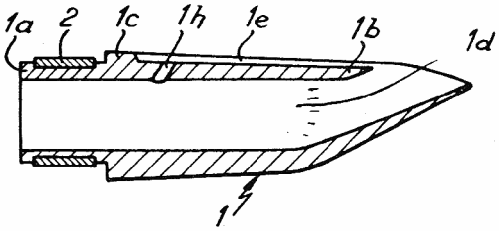

Fig. 3

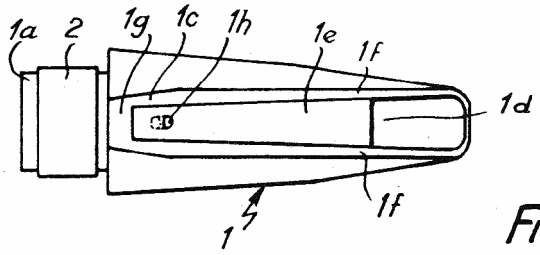

Fig. 4

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Fig. 6

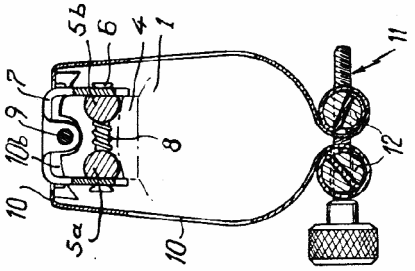
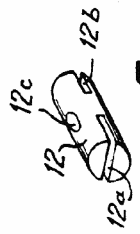


Fig. 8



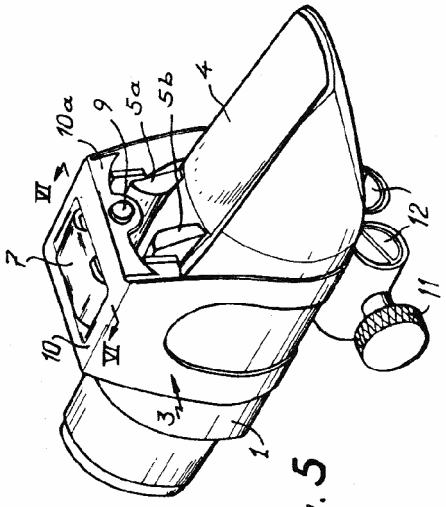


Fig. 5

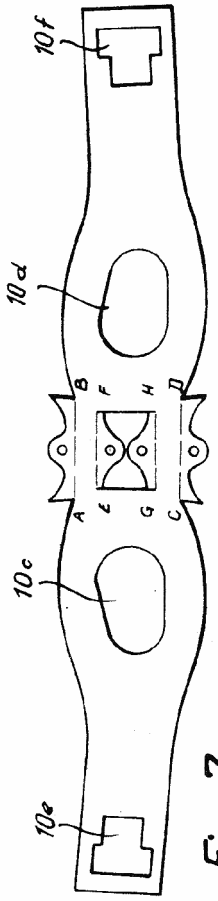


Fig. 7