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3,410,170

LIGATURE FOR REED INSTRUMENTS

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Fig. 2

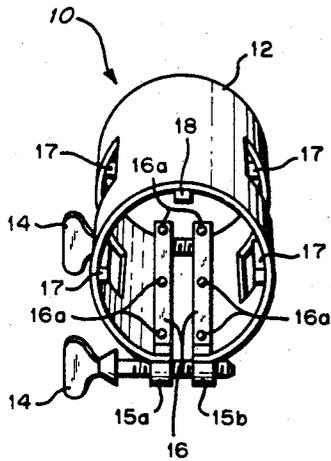
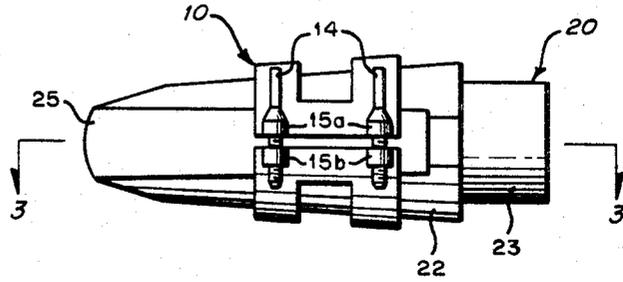


Fig. 1

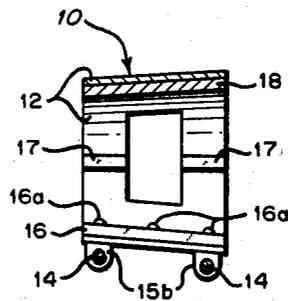


Fig. 3a

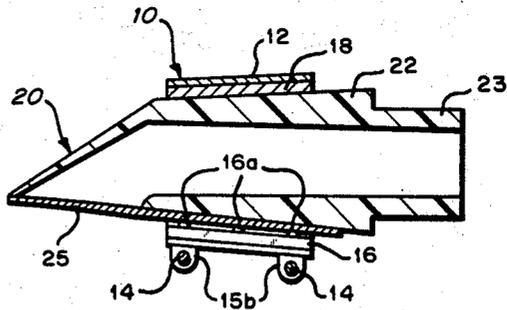


Fig. 3b

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LIGATURE FOR REED INSTRUMENTS
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ABSTRACT OF THE DISCLOSURE

A ligature to secure a vibrating reed to a mouthpiece of a clarinet or other single reed woodwind instrument. The ligature is made entirely of non-damping material and is provided with two different types of interior spacers. One set of spacers provides selected and limited contact between the ligature and the reed to promote free vibration of the reed, and the other set of spacers provides selected and limited contact between the ligature and the mouthpiece, to promote free vibration of the mouthpiece.

BACKGROUND OF THE INVENTION

Field of the invention.—Broadly, this invention applies to all musical instruments using a single beating reed held against a mouthpiece. Such instruments include clarinets and all members of the clarinet family, such as bass clarinets, and all members of the saxophone family. While the foregoing are the principal reed instruments of this class, other and lesser known instruments using the same principles are also deemed to be included in this field. For example, oboes are not normally in this class, but occasionally an oboe is provided with a mouthpiece and a single beating reed of small proportions and the ligature of this invention is applicable here also.

There is a well developed art relating to single reed mouthpieces, reeds, and the ligature for fastening the reed to the mouthpiece. This invention has particular and special applicability to the B flat and A soprano clarinet as used for serious chamber music and concert playing. The improved responsiveness results in a subtle increase in the control and tone production capability of the instrument. The ligature of this invention may be applied to a standard pre-existing clarinet mouthpiece without any structural alteration of the mouthpiece. For serious and artistic playing, the characteristics of established or standard mouthpieces are important and even specific individual mouthpieces are known to have certain desirable characteristics and are prized. Such mouthpieces should not be structurally altered.

Description of the prior art.—There have been a number of attempts to provide more freedom of vibration for a single reed. Attempts to provide for this greater reed freedom are found for example in U.S. Patents 1,449,868, 1,801,421, 2,411,380, 2,483,327, 2,791,929, and 3,150,554. Certain attempts to promote freer vibration have required a change in the structure of the mouthpiece. Patents such as 2,837,003 and 2,411,380 have required such structural changes. Such expedients preclude the possibility of use with specially prized individual mouthpieces, or even with mouthpieces of standard and established characteristics, since following the teachings of these patents required gouging or other changes in the shape of the mouthpiece itself, even if mouthpiece vibration is promoted. Patent 2,292,584 is an attempt toward another ideal, since it discloses the use of felt strips and also what are described as "sound-deadening plastics."

Summary of the invention.—It is an object of this invention to provide a ligature for single reed wind musical instruments.

It is another object of this invention to provide a ligature of vibration-enhancing properties to hold a single reed against a mouthpiece.

It is yet another object of this invention to provide a vibration-enhancing ligature to hold a single reed on a mouthpiece, said ligature including non-damping means to space said ligature away from said mouthpiece except at selected areas.

It is yet another object of this invention to provide a vibration-enhancing ligature to hold a single reed on a mouthpiece, said ligature including a non-damping means to space said ligature away from said mouthpiece except at selected areas, and including means to provide contact between said ligature and said mouthpiece at only certain selected points.

Other aims and objects of the invention are made apparent in the following specification and claims.

Briefly, the invention and its advantages are described as follows. A ligature is provided which in its main body structure is basically of the currently standard type. That is, it comprises a resilient collar or ring, having a longitudinal split, and being adjustably held together across the split by adjustable screws. Such ligatures commonly are used to hold reeds on the tables or lays of mouthpieces and the preceding brief description is of a conventional device. Longitudinal spacers are provided as part of the interior of the ligature. These spacers hold the ring or main portion of the ligature out of direct contact with the body of the mouthpiece, and contact is effected only at the areas under spacers. The ring or main portion, the spacers, and the other portions of the ligature described below are all made of non-damping or vibration enhancing materials, that is, materials chosen for low sound adsorption properties. Metal is a preferred material, and among metals, steel has been found suitable.

The provision of these spacers is a most important aspect of the invention. It has been found that the use of the non-damping spacers results in greater vibration in the body of the mouthpiece than is found without their use. It might not be immediately apparent that this change in the ligature pressure distribution on the surface of the mouthpiece would enhance the vibration of the mouthpiece, or if it did, that such increased vibration would be of significant enough degree to have any effect on the total performance of the instrument. However, it has in fact been found that the use of the spacers provides definite and significant improvement in the instrument as a whole, when evaluated by skilled players. The improvement is characterized in the lexicon of musicians as producing a freer response. It has also been described as providing a quicker response and of contributing to a greater over-all volume obtainable from the instrument. These characteristics in turn contribute to the flexibility and control of the instrument as a whole, and enhance its value as a music producing device. Highly skilled musicians playing such instruments can sense and evaluate the effects of the ligature, even though they may not be able to accurately explain or describe how the vibration patterns in the mouthpiece are affected. It is the effect on the capabilities of the instrument as a music producing device that is the ultimate purpose of the ligature.

With the spacing means described above, it is also highly desirable to combine a second type of spacing device. This second type is a series of pointed members arranged longitudinally on each side of the gap or split in the ligature ring. These pointed members are the means by which the ligature contacts the reed and holds it on the lay or table of the mouthpiece. This contributes to the freedom of vibration of the reed and together with the first described spacing means, contributes to the over-all response of the instrument.

Brief description of the drawing.—FIGURE 1 is a perspective view of the ligature;

FIGURE 2 is a plan view of the ligature in position on a mouthpiece and holding a reed on the mouthpiece;

FIGURE 3a is a cross-sectional view of the ligature taken along line 3—3 of FIGURE 2; and

FIGURE 3b is a cross-sectional view of the ligature in position on a mouthpiece and holding a reed on the mouthpiece, taken along line 3—3 of FIGURE 2.

Description of the preferred embodiment.—The ligature is generally designated 10. Its overall general shape is that of a truncated cone. It comprises a main portion, ring, or collar 12. The ring 12 is provided with cut-away portions or windows whose shape and extent is best shown for example in FIGURE 3a as the central aperture in that figure.

The ring 12 is provided with a longitudinal split or gap extending its entire length. Near each end of this gap are provided means to adjustably close the gap. These means include a pair of thumbscrews 14. For each thumbscrew 14, the following associated structure is provided. On each side of the gap in ring 12, and closely adjacent to the gap, an internally threaded extension is provided on the ring 12. The extension on one side of the gap is identified as 15a and the extension on the other side is identified as 15b. Each thumbscrew 14 is provided with a pair of these extensions 15a, 15b.

A mouthpiece generally designated 20 is provided. This is a conventional mouthpiece and its structure is internally and externally unaltered from conventional or standard structure. Such mouthpieces are generally of synthetic plastic, wood, or glass. The structure and material of the mouthpiece is not part of the present invention. The main body of the mouthpiece is designated 22, and it is provided with a shank 23. The shank is intended to be inserted in the main body of an instrument, not shown, so as to effect a coupling of the mouthpiece to the main body of the instrument. The mouthpiece 20 is provided with a channel therethrough and the main body 22 of the mouthpiece has a general taper to a reduced diameter away from the shank end. The conical surface of the main body 22 is interrupted to provide a relatively flat table or lay against which a reed 25 is held. In fact, the table is not exactly flat but is furnished with a certain specific longitudinal curve. This curve, and other dimensions and characteristics of the mouthpiece are very carefully designed and are critical to the finest playing, but are beyond the scope of this invention. Reed 25 is generally of cane, and its characteristics and dimensions are critical, but the reed itself is beyond the scope of this invention. As best shown in FIGURE 2, the reed 25 is held against the relatively flat lay of the mouthpiece body 22 by the ligature 10 which embraces the mouthpiece body 22 and the reed 25. The thumbscrews 14 are tightened to produce the necessary gripping effect. The amount of tightening of the thumbscrews and the differences in tightening between the two thumbscrews are matters that are important to the musicians art, but are not in the scope of this invention.

Each side of the gap in the ring 12 is interiorly provided with a raised land or extension 16 which borders the gap and extends its length. The structure of the preferred embodiment so far described is conventional. The lands 16, in known structures, are means which actually press against the reed 25 and hold it in position. It has been found by others that reeds perform best when they are restrained by forces exerted in this region of the reed.

In the preferred embodiment of the present invention, there are two additional features or aspects of the ligature 10. One of these aspects lies in the provision of certain additional spacing means in conjunction with the reed-restraining lands 16, which may be termed reed-ligature spacing means. These additional means are a plurality of relatively pointed members 16a which extend inwardly from each of the lands 16. These relatively pointed members may also be described as small buttons or knobs extending inwardly from the surface of the lands 16. That is, the members 16a should not be brought to an actual sharp point. They are here generally described as pointed members because in comparison to the area on the surface

of a reed which would be contacted by a land 16, the area contacted by the surface of the member 16a is very much smaller and lends itself to be characterized as a point contact. As shown, each land 16 is provided with three pointed members 16a which are arranged longitudinally along the land 16 and are evenly spaced.

There are several criteria followed in providing the pointed member 16a on the land 16. It is desirable to apply all the pressure on the reed within the area that otherwise would have the pressure applied by the land 16. It is also desirable to have the pressure distributed evenly or regularly throughout this area, that is, not all applied merely in one portion of the area. Finally, and importantly to this invention, it has been found desirable to approach more nearly a point contact application of the pressure rather than to apply it over the relatively broad surface of a land 16. Following these criteria, the provision of the three pointed members 16a provided as shown, with two of them adjacent the ends of the land 16 and the ligature, and the third centrally located, has been found preferable.

The other aspect of this ligature, in which it differs from previous ligatures is that it is provided with means to enhance the vibration of the mouthpiece. These means are spacing means to space the main portion 12 of the ligature 10 away from the main body 22 of the mouthpiece 20 except for contact at certain selected areas and are broadly called mouthpiece-ligature spacing means. In the embodiment as shown, three spacing bars are provided in the interior of the ligature. Each of the spacing bars runs longitudinally in the ligature and extends its length. One of the bars is positioned diametrically opposed to the gap, and for reference, this is identified as top spacing bar 18. Two other spacing bars are similarly provided, each approximately 90° on opposite sides of the top spacing bar 18. These two bars are identified as side spacing bars 17. In the embodiment shown, each of the side spacing bars 17 is intercepted by one of the cut-away portions or windows provided in the main portion 12 of the ligature 10. As best shown in FIG. 3a, each bar 17, after its interruption by the cut-out portion, thereafter continues so that each side bar 17 is considered as a single bar, although it is interrupted by the cut-out portion of the ligature. As has been explained, the provision of these spacing bars has been found to enhance the desirability of the musical instrument as a whole. It is believed that this is due to an enhancement of the freedom of vibration in the mouthpiece itself.

Since a major purpose of the entire disclosed new structure is to increase the freedom of vibration of all associated parts of the instrument, that is, the reed and the mouthpiece, it is apparent that it is important to make all the elements of the ligature of material that will contribute to this freedom of vibration, or at least will not defeat the purpose. The material used may be broadly described as vibration-enhancing, non-sound deadening, or non-sound absorbing. It is highly preferred that all the elements be made of metal, and preferably of the same metal. It has been found that steel is highly satisfactory. The steel may or may not be plated.

The arrangement of the side and top spacing bars which comprise the spacing means between the ligature and the mouthpiece as shown is a preferred embodiment. However, the spirit of the invention is followed by providing modifications of these bars. For example, a different number of bars, and different positions from those shown are within the scope of the invention. As the surface pressing against the mouthpiece increases in area, the degree of vibration enhancement goes down, and the structure is less desirable. It would be possible within the theoretical scope of this invention to provide breaks or interruptions in the mouthpiece-ligature spacing bars, and perhaps reduce them to a series of studs, but this is less desirable because there would be an increased tendency to mar the surface of the mouthpiece if enough compression is applied by means of

thumbscrews 14 to hold the ligature firmly on the mouthpiece.

Provision of a lesser member of pointed members 16a, or a distribution of members less regularly and evenly along the length of the ligature is less desirable than the preferred embodiment. This is believed to be because such a reed-holding pressure distribution conforms less closely to the holding conditions for which standard reed and mouthpieces are designed. If a greater number of pointed members 16a are provided, the decrease in desirability is a matter of degree. That is, as more members are added, for example four to eight on each land 16, the desired increased freedom of vibration of the reed is less manifest, and the condition more nearly approaches that of the simple pressure of the land 16. The elimination of the lands 16 and the mounting of the members 16a directly to the main portion 12 is theoretically equivalent, but presents structural difficulties, due for example to the excessive length thus required for the pointed members, particularly if the ligature is provided with mouthpiece-ligature spacing means.

Present day preferred ligatures are made with cut-out portions as shown, but if a ligature should be provided without such cut-out portions, it is apparent that the structure of this invention would be equally applicable.

The combination of the two different spacing aspects of the present invention has been found highly desirable. It is apparent however that each spacing aspect taken alone also provides some measure of improvement in the performance of the musical instrument.

I claim:

1. A ligature for single reed musical instruments to hold a reed on a mouthpiece, comprising a main portion having a longitudinal gap extending the entire length thereof and adjustable means on said ligature to tend to close said gap, mouthpiece-ligature spacing means provided on the interior of said ligature, said mouthpiece-ligature spacing means permitting said ligature to contact said mouthpiece only at areas under said spacing means, and said ligature and said mouthpiece-ligature spacing means both being of vibration-enhancing material.

2. A ligature as set forth in claim 1 wherein said spacing means comprises at least one bar running longitudinally within said ligature and at least part of its length.

3. A ligature as set forth in claim 2 wherein said mouthpiece-ligature spacing means comprises a top spacing bar diametrically opposed to said gap and at least one other side spacing bar running at least partly the entire length of said ligature.

4. A ligature for single reed musical instruments to

hold a reed on a mouthpiece, comprising a main portion having a longitudinal gap extending the entire length thereof, and adjustable means on said ligature to tend to close said gap, reed-ligature spacing means provided on the interior of said ligature, said reed-ligature spacing means being provided closely adjacent each side of said gap and comprising a plurality of pointed members on each side of said gap and being distributed along the entire length of said gap, said ligature and said reed-ligature spacing means both being of vibration-enhancing material.

5. A ligature as set forth in claim 4 wherein said reed-ligature spacing means comprises a pair of lands, extending along the entire length of said gap on each side thereof and closely adjacent thereto, and said pointed members extend inwardly from said lands.

6. A ligature as set forth in claim 5 wherein three said pointed members are provided on each said land, two of said pointed members being adjacent the end of said land and the other said pointed member being spaced equidistantly from the first named two pointed members.

7. A ligature for single reed musical instruments to hold a reed on a mouthpiece, comprising a main portion having a longitudinal gap extending the entire length thereof, and adjustment means on said ligature to tend to close said gap, mouthpiece-ligature spacing means provided on the interior of said ligature, said mouthpiece-ligature spacing means permitting said ligature to contact said mouthpiece only at areas under said mouthpiece-ligature spacing means, and reed-ligature spacing means provided on the interiors of said ligature, said reed-ligature spacing means being provided closely adjacent each side of said gap and comprising a plurality of pointed members on each side of said gap and being distributed along the entire length of said gap, all of said ligature, said mouthpiece-ligature spacing means and said reed-ligature spacing means being of vibration-enhancing material.

8. A ligature as set forth in claim 7 wherein said mouthpiece-ligature spacing means comprises at least one bar running longitudinally within said ligature and at least part of its length, and said reed-ligature spacing means comprises a pair of lands extending along the entire length of said gap on each side thereof and said pointed members extend inwardly from said lands.

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