This invention relates to wind instruments in general and, more particularly, relates to means to mute such instruments.

For the purpose of disclosure the invention is described herein as embodied in a wind instrument of the type known as a musical pipe. This disclosure will provide adequate guidance to enable those skilled in the art to apply the same basic concepts to other types of wind instruments.

A serious disadvantage of learning to play a musical instrument is that the hours of practice required for attaining proficiency are disturbing to people within hearing range and this problem is especially pressing where people live in closely spaced houses and apartments. Consequently, learn to be handicapped and many are reluctant to learn to play.

Various expedients are commonly tried to mute the sound of a wind instrument to keep from disturbing others but no simple improvisation by a player is satisfactory. For example, partially blocking the sound-producing window of a musical pipe by finger manipulation reduces the sound level but at the same time unconsciously changes the pitch. Attempting to mute the sound by blocking the open end of the musical pipe also is self-defeating because it sets up back pressure and destroys the desired air flow pattern at the window.

The present invention meets the problem by advancing two concepts. One concept is to throttle or restrain the air flow in the air passage of the mouthpiece upstream from the window. The second concept is to provide the restriction by variably projecting into the air passage a permeable or porous body having numerous small passages for restricted air flow through the body.

While various porous and fibrous materials may be employed, it has been found that excellent results are obtained without affecting pitch by using a muting body made of resilient open-celled foamed plastic. Such a body permits some air flow even when it completely spans the air passage in the mouthpiece. The resiliency of the foamed plastic minimizes the possibility of damaging the air passage by mechanical impingement and the resiliency is further advantageous in permitting liberal dimensional tolerances.

As will be explained, further objects of the invention include: providing such a muting means that is of simple inexpensive construction; providing for adjustment of the degree of muting as may be desired; providing visual means to indicate the degree of adjustment of the muting means; providing a muting means that is inconspicuous and does not detract from the appearance of the instrument while the instrument is being played; providing cam action for adjusting the muting effect; and, in the preferred practice of the invention, providing a screw action cooperative with the cam action for adjusting the muting effect.

The various features and advantages of the invention will be apparent from the following detailed description and the accompanying drawing.

In the drawing, which is to be regarded as merely illustrative:

FIG. 1 is a perspective view of a musical pipe embodying the presently preferred practice of the invention;
FIG. 2 is a longitudinal sectional view of the mouthpiece that incorporates the muting means;
unimpeded air flow through the air passage 26. When the control member 36 is rotated to shift its bent end 40 to the upper end of the inclined cam slot 32 the material of the porous strip 46 substantially completely spans the air passage 26 for maximum muting effect. It is apparent that the control member may be adjusted anywhere in the range between the two limit positions. For example, FIGS. 2 and 3 show the bent end 40 at a midpoint of the inclined cam slot 32 to cause the porous material of the strip 46 to partially block the air passage 26 for only a moderate muting effect.

It is apparent that the two effects are additive in raising and lowering the permeable strip 46 relative to the air passage 26, one effect being the longitudinal bodily shift of the control member 36 by cooperation of the bent end 40 with the inclined cam slot 32, the other effect being the screw action between the block 42 and the control member which lifts the block relative to the control member when the bent end 40 is shifted to the upper end of the inclined cam slot. It will be readily appreciated by those skilled in the art that various control arrangements may be utilized for raising and lowering the permeable muting material relative to the air passage. The described arrangement is advantageous however in combining screw action with cam action to provide a relatively long range of vertical adjustment in response to relatively small rotation of the control member 36.

The manner in which the invention serves its purpose may be readily understood from the foregoing description. Normally the muting means is fully retracted to permit unimpeded air flow through the air passage 26. Whenever desired, however, the bent end 40 of the control member 36 may be adjusted by finger manipulation to cause the porous material of the strip 46 to protrude into the air passage 26 to any selected degree. If the porous material is elevated to completely span the air passage 26, the air flow through the air passage is restricted to the capacity of the numerous minute tortuous passages through the material of the porous strip to cause the instrument to play at true pitch but at an exceedingly low decibel level. Usually it is desirable to employ an intermediate adjustment of the control member 36 which permits the player to hear and enjoy the music he creates but at a sound level low enough to avoid disturbing others.

The provision for muting the sound produced by the instrument is inconspicuous and an audience would ordinarily be unaware of the extent of the muting means. It is to be noted, however, that although the muting arrangement is inconspicuous, it does provide the player with visual means for indicating its adjustment since the position of the bent end 40 of the control member relative to the inclined cam slot 32 may be readily observed at a glance. It is contemplated that the control arrangement will maintain any position to which it may be adjusted, the parts fitting close enough for static friction to keep the control member stationary at whatever position to which it may be adjusted. A further feature is that the bent end 40 of the control member may be manually adjustable while the instrument is being played so that the player may arrive quickly at a preferred adjustment.

It is apparent that the construction is simple and inexpensive because the parts shown in FIG. 5 may be fabricated economically. In this regard a feature of the invention wherein the two limit positions of the clip 50 is a simple matter to clamp the porous strip 46 to the block 42 by means of the clip 50. With the plug 16 separate from the tubular member 15 it is a simple matter to place in the recess 39 the block 50 with the porous strip 46 attached to it and then the control member 36 into the block through the transverse passage 28. The plug 16 is then inserted into its assembled position in the tubular member 15 thereby bringing the two projections 34 and 35 into relative positions to form the inclined cam slot 32 for the bent end 40 of the control member 36.

FIG. 6 shows how the control member 36 may be provided with a left hand screw thread 38 instead of the right hand screw thread 38 for a differential effect wherein the screw action is opposite to the cam action but less effective than the cam action. Such an arrangement permits fine adjustment by reducing the ratio between the shift of the permeable strip 46 and the rotation of the control member 36 that produces the shift.

My description in specific detail will suggest various changes, substitutions and other departures from my disclosure within the spirit and scope of the appended claims. For example, the permeable strip 46 may be simply adhesively bonded to the block 42 instead of using the clip 50.

I claim:

1. Means to mute a wind instrument having a hollow body with a mouthpiece forming an air passage to the interior of the body, comprising:
   permeable muting means movable between a retracted position permitting free air flow through the air passage and a operative position at least partially blocking the air passage, said muting means having a plurality of small passages for restricted air flow therethrough.
2. Muting means as set forth in claim 1 which includes manually operable control means to adjust the muting means between its two positions.
3. Muting means as set forth in claim 2 in which the control means includes visible means to indicate the adjustment of the muting means.
4. Means to mute a wind instrument having a hollow body with a mouthpiece forming an air passage to the interior of the body comprising:
   a recess in the wall of the air passage;
   a permeable body dimensioned to fit into the recess; and
   manually operable means to shift the permeable body between a retracted position in the recess and an effective position at least partially blocking the air passage.
5. A combination as set forth in claim 4 in which said permeable body is a porous body of resilient material.
6. A combination as set forth in claim 4 in which said permeable body is a body of open-cell foamed plastic.
7. Means to mute a wind instrument having a hollow body with a mouthpiece forming an air passage to the interior of the body comprising:
   a transverse passage in the mouthpiece from the exterior thereof to the air passage;
   a permeable muting body moveable between a retracted position in the transverse passage for free air flow through the air passage and an effective position at least partially blocking the air passage, said body having a plurality of small passages for restricted air flow therethrough; and
   manually operable control means in the transverse passage moveable axially to move the muting body between its two positions.
8. A combination as set forth in claim 7 in which the control means is rotatable and which includes cooperative means on the control means and on the mouthpiece respectively to shift the control means axially in response to rotation thereof.
9. A combination as set forth in claim 8 in which said cooperating means includes an inclined cam surface on one of said control means and said mouthpiece and includes follower means on the other of said control means and mouthpiece to traverse the cam surface.
10. A combination as set forth in claim 8 in which said cooperating means includes an inclined cam slot formed in the mouthpiece adjacent the transverse passage together with follower means projecting from the control means into the cam slot.
11. Means to mute a wind instrument having a hollow body with a mouthpiece forming an air passage to the interior of the body, comprising:
a non-circular recess in the air passage;
a transverse passage extending from the recess to the exterior of the mouthpiece;
an inclined cam slot extending from the transverse passage radially thereof to the exterior of the mouthpiece;
a non-circular muting means movable from a retracted position in the recess permitting free air flow through the air passage to a second position at least partially blocking the air passage, the muting means having a plurality of small passages for restricted air flow therethrough; and
manually operable control means rotatably mounted in the transverse passage and operatively connected to the muting means,
a portion of the control means extending into the inclined cam slot to cause axial shift of the control means and corresponding movement of the muting means in response to rotation of the control means.
12. A combination as set forth in claim 11 in which said control means has a screw thread in engagement with the muting means to cause relative movement between the muting means and the control means.
13. A combination as set forth in claim 12 in which the screw thread has a pitch direction to add to the effect of cam slot.
14. A combination as set forth in claim 12 in which the screw thread has a pitch direction opposite to the effect of the cam slot for a differential control action.
15. In a wind instrument having a hollow body and a mouthpiece comprising a tubular member fitted with a plug member, wherein the tubular member is formed with a window having a beveled edge and the tubular member telescopically engages the end of the hollow body with the plug cooperating with the tubular member to form an air input passage directed past the window, the improvement comprising:
a transverse passage extending from the exterior of the mouthpiece to the air input passage;
a cam slot communicating with the transverse passage, one edge of the cam slot being formed by the plug, the other edge of the cam slot being formed by the tubular member;
a control member journaled in the transverse passage and extending into the cam slot to engage the edges thereof whereby rotation of the control member causes axial shift of the control member by cam action; and
a muting member on the end of the control member movable by rotation of the control member between the retracted position permitting free air flow through the air passage and an effective position at least partially blocking the air passage, the muting member being permeable for air flow therethrough.

No references cited.

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