Feb. 9, 1926. 1,572,418

F. C. BENDER

MUSICAL INSTRUMENT

Filed Feb. 14, 1924

Fig. 1.

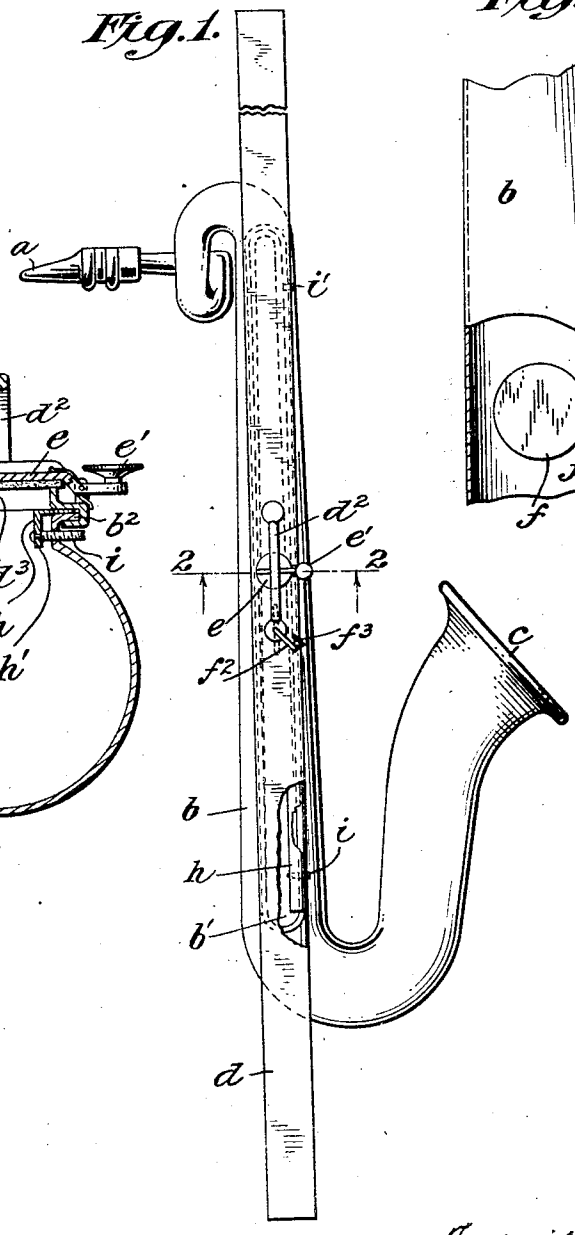


Fig. 2.

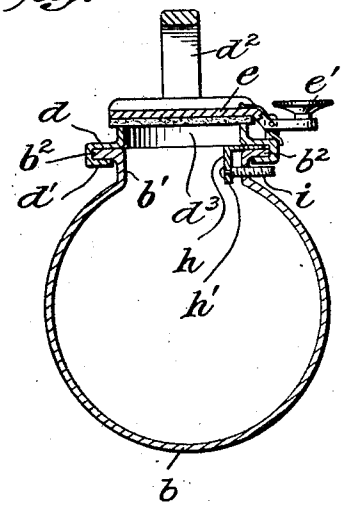
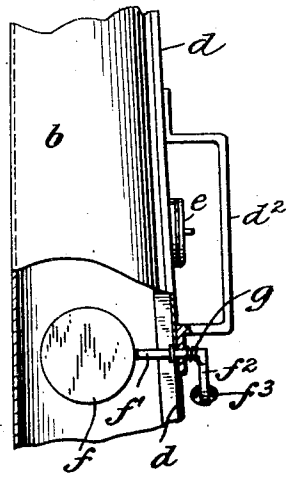


Fig. 3.



Frederick C. Bender INVENTOR

BY

Redding, Grealy, O'Shea & Coyle ATTORNEYS

Patented Feb. 9, 1926. 1,572,413

UNITED STATES PATENT OFFICE.

FREDERICK C. BENDER, OF HEMPSTEAD, NEW YORK.

MUSICAL INSTRUMENT.

Application filed February 14, 1924. Serial No. 693,641.

To all whom it may concern:

Be it known that I, FREDERICK C. BENDER, a citizen of the United States, residing at Hempstead, Long Island, in the State of New York, have invented certain new and useful Improvements in Musical Instruments, of which the following is a specification, reference being had to the accompanying drawing, forming a part hereof.

This invention relates generally to the type of instrument in which a mouth-piece and reed are employed with an enlarged bell-mouth at the end of the horn. More particularly, the improvements herein are designed with reference to their application to a type of instrument which may best be likened to a saxophone in which a plurality of keys are provided for manipulation to produce different tones. The general object of the invention is to eliminate from such a type of instrument the great number of keys and substitute therefor a slide carrying one or several keys which slide is movable over a tapered opening in the horn, the tonal effect depending upon the position of any one key with respect to the tapered opening. In practicing the invention the horn is slid longitudinally and the width of the slide increases from the upper end of the tube towards the lower end. The slide which is disposed over this opening is a little wider than the greatest width of the slot so that the latter is always entirely covered except at the points where the key or keys are operated.

Still another object of the invention is to incorporate in a reed instrument a deflector which is movable longitudinally of the horn and is operable to close it more or less at any desired point throughout its length thereby shortening the sound chamber and producing over-tones. In the preferred embodiment it is proposed to mount this deflector on the slide and provide suitable means for manipulating it manually, the deflector normally being held in operative position by a spring.

A further object of the invention is to associate with the longitudinal slot in the horn an adjustable means for varying the width of the slot as required, the adjustment serving to be of a more or less permanent nature.

These and other objects of the invention will be described with greater particularity hereinafter in connection with the detailed description of the embodiment shown in the accompanying drawings, in which:

Figure 1 is a view in side elevation showing the application of the improvements to a saxophone type of instrument, part of the slide being broken away to show the adjustable side wall for the slot.

Figure 2 is a view in transverse section through the key of the instrument in Figure 1 and taken on the plane indicated by the line 2—2 and looking in the direction of the arrows.

Figure 3 is a fragmentary view in side elevation of the horn part being broken away to show the deflector.

As indicated hereinbefore, the invention is not limited in principle to its application to any particular type of sound producing instrument but for the purposes of this application it has been illustrated in connection with a reed instrument that may best be likened to a saxophone. From the disclosure herein it will be evident to one skilled in the art as to how the same principle may be applied to other types of instruments for the desired purposes. In a saxophone different tones are obtained by manipulation of a series of keys. The finger action is difficult and the parts are numerous and expensive. As shown in Figure 1 the instrument which is illustrated more or less conventionally includes a mouth-piece a, a horn b and a bell-shaped mouth c. The horn b is slotted longitudinally for a substantial part of its length as indicated at b' and this slot is tapered being narrower at the top of the horn than at the bottom. While the slot may be formed at any part of the periphery of the horn it will probably be most convenient to locate it at the right side as shown in the drawings, for reasons which will later appear. The slot is closed by means of a slide d which may be conveniently secured in sliding engagement with the horn along the edges of the slot b' by flanging the latter as at b^2 and crimping the edges of the slide over these flanges as indicated at d'. Suitable stops may be carried with the slide to limit its range of movement so that when it is moved up or down the slot is never uncovered at either end. Movement of the slide may be effected conveniently by means of a hand-piece d^2 and within the span of this hand-piece the slide may be formed with an opening d^3 which is covered by a

hinged valve e provided with a finger key e' to facilitate rocking of the valve to uncover the opening d^3 in a manner commonly employed. As thus far described, the operation of the instrument should be apparent. The slide is moved up or down to different parts of the tapered slot and the valve e is opened by the finger when the slide has been moved to such a position as to give the desired tonal effect when the valve is opened. While only one valve e has been shown it is evident that it is within the spirit of the invention to provide a plurality of such valves on the slide although it is not contemplated that the tonal effects shall be produced by reason of the number of such valves but rather by the position to which they are moved with respect to the slot by operation of the slide.

In accordance with another object of the invention simple means are provided for producing over-tones. Such means are feasible in the improved construction by virtue of the use of the slide d. In the simplest form of device a deflector plate f in the form of what is commonly termed a butterfly valve is mounted on the slide by means of a rock shaft f' which has at its outer end a crank arm f^2 carrying a key f^3 readily engageable by a finger of the hand which manipulates the slide. A spring g may engage the rock shaft f' operatively so as to hold the valve f normally in a position parallel to the axis of the horn thereby offering no interference to the sound waves. This deflector, it will be noted, is located at a point beyond the valve d^3 so that when it is turned to a position at right angles to the axis of the horn it acts as a deflector limiting the length of the sound chamber and producing over-tones. Movement of the deflector, of course, is brought about by pressure on the key f^3 which turns the deflector against the action of the spring g, the latter serving to restore it to its normal position instantly when the key pressure is relieved.

Another feature of the invention has to do with the mounting of a false side wall for the slot b' which may be adjusted at either end to change the width of the slot at each end and also its degree of taper. Such a false side wall is shown as an angle piece at h, one flange of which may be located between the slide d and the flange b^2 of the horn. The other flange h' of the angle piece is disposed at right angles to the slide and constitutes one side wall of the slot. Adjusting screws i, i', at opposite ends of the angle piece pass through the flange h' and through the horn b and permit the flange h' to be moved in or out at either end for the purpose indicated.

The invention may be incorporated in various types of instruments and devices for producing sound without departure from the principle disclosed.

What I claim is:

1. In a sound producing device a sound chamber having an opening in the wall, a slide overlying the opening and movable thereover and a movable valve carried with the slide to release the air in any desired position of the slide.

2. In a wind instrument a sound chamber having a slotted wall, a slide overlying the slot to close it at all times and movable longitudinally thereof, said slide being provided with an opening in line with the slot, a valve covering the opening and means to open the valve in any position of the slide.

3. In a wind instrument a horn having a longitudinal tapered slot therein, a slide closing the slot at all times and movable longitudinally thereof, said slide being provided with an opening in line with the slot, and a finger valve to control said opening.

4. In a wind instrument a horn having a longitudinal tapered slot therein, a slide closing the slot at all times and movable longitudinally thereof, said slide being provided with an opening in line with the slot, a finger valve to control said opening, and a hand-grip in proximity to the finger valve to facilitate operation of the slide.

5. A wind instrument having a horn provided with a longitudinal opening, a slide to close the opening and having a port therein, means to control the port, and a manually operable deflector carried with the slide and disposed within the horn and means to operate the same.

6. A wind instrument having a horn provided with a longitudinal slot, a movable slide to close the opening and having a port in line with the slot, a finger valve to control the port, a deflector mounted on the slide at a point beyond the finger valve, yielding means to hold the deflector in one position, and manual means to move the deflector in another position with respect to the sound waves.

7. A wind instrument having a longitudinal slot, a movable slide to close the slot and provided with a port, a side wall and means for adjusting the same whereby the width and shape of the slot may be varied manually.

This specification signed this 11th day of February A. D. 1924.

FREDERICK C. BENDER.