C. A. NEEDHAM.

Mechanical Musical Instrument.

No. 221,695. Patented Nov. 18, 1879.

Fig. 1.

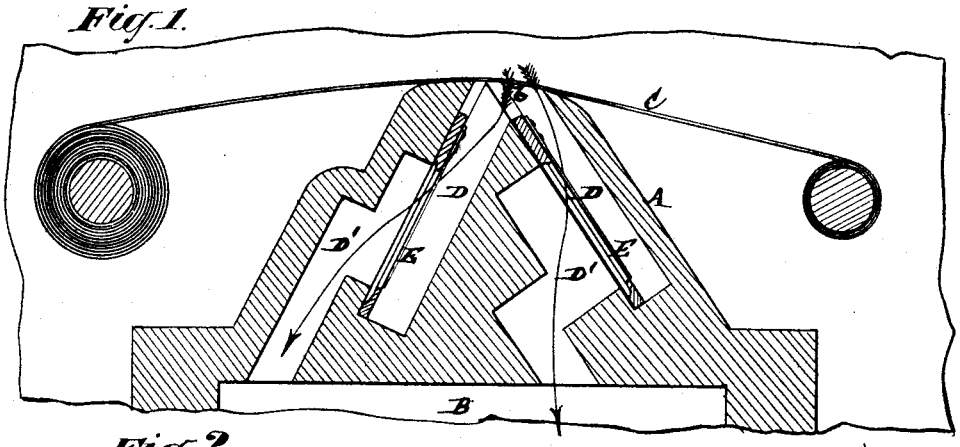


Fig. 2.

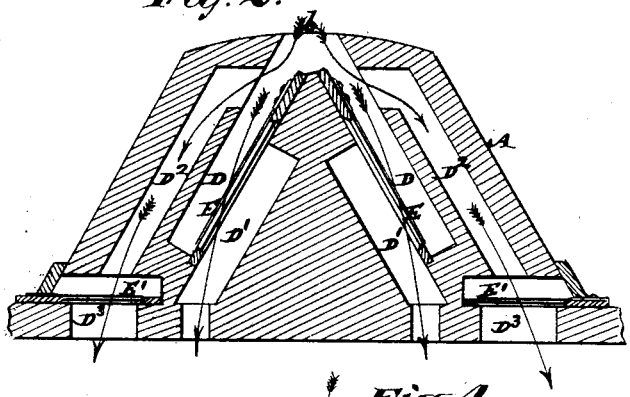


Fig. 3.

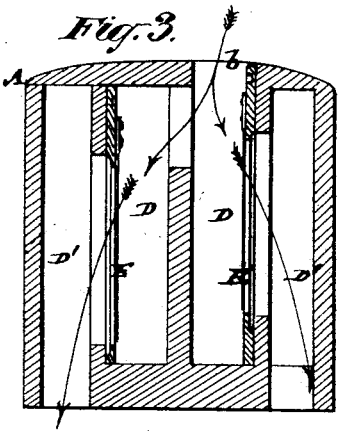


Fig. 4.

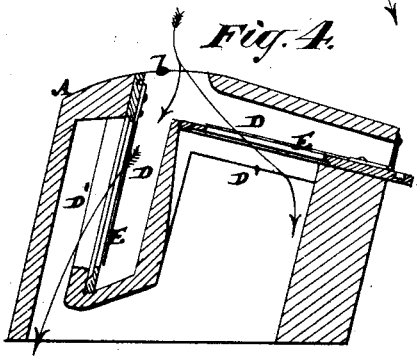


Fig. 5.

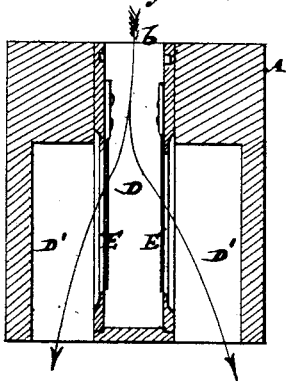
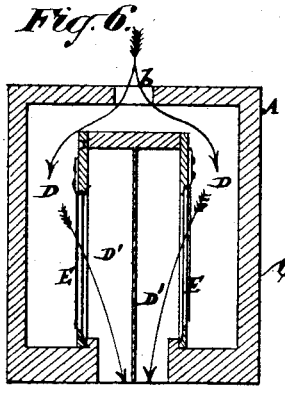


Fig. 6.



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IMPROVEMENT IN MECHANICAL MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. **221,695**, dated November 18, 1879; application filed March 15, 1879.

To all whom it may concern:

Be it known that I, CHARLES A. NEEDHAM, of the city and State of New York, have invented certain new and useful Improvements in Mechanical Musical Instruments, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to wind musical instruments, including both reed and pipe organs, which are mechanically played or controlled by a traveling perforated music strip, sheet, or band of paper or other flexible material arranged to operate as a valve to the reeds, pipes, or other sounding devices of the instrument.

The invention consists in the combination, in a mechanical musical instrument, adapted to be played by means of a perforated music-sheet acting as a valve to its reeds, pipes, or other sounding devices, with an action-board, constructed to form a seat or rest for the said music-sheet, having apertures controlled by said music-sheet, of two or more reeds, pipes, or other sounding devices, in communication with or under control of each or any one of said apertures.

It also consists in the combination of a traveling perforated music-sheet, an action-board, constructed to form a seat or rest for said music-sheet, having apertures controlled by said sheet, two or more air or wind ducts leading to or from each or any of said apertures, and two or more reeds, pipes, or sounding devices in communication with or under control of said air-ducts.

It also consists in an arrangement of reeds at opposite inclinations to the seat, over which the valve-acting perforated music-sheet moves.

In the accompanying drawings, Figure 1 represents a vertical transverse section of an action-board of a reed-organ constructed in accordance with the invention, and having two reeds simultaneously controlled by the same aperture as the latter is opened or closed by a perforated music strip or sheet passing over it; and Figs. 2, 3, 4, 5, and 6 are vertical transverse sections of modified constructions of the action-board, passages, and reeds therein.

Referring in the first instance, or more particularly to Fig. 1 of the drawings, A represents the action-board, and B the wind chest or chamber, of the instrument. This chamber is here supposed to be connected with a suction bellows or apparatus, but it might be connected with a forcing-bellows instead.

C is the perforated flexible music strip or sheet, here shown as attached at its opposite ends to rolls operating to deliver and take up the sheet; but it might be an endless band passing over rollers or other traveling flexible strip or sheet, having perforations in it corresponding to the notes or sounds to be produced, and passing or being mechanically moved over a series of apertures or orifices, *b*, arranged side by side along the action-board, either in the same longitudinal line or otherwise, for the purpose of sounding the reeds or other sounding devices accordingly as the apertures *b* in the action-board are uncovered by the perforations in the music-sheet.

The action-board A is constructed to form a seat or rest for the perforated music-sheet C.

These apertures *b*, supposing the wind-chest B to be a suction-chamber, form inlets for the incoming air to sound the reeds, but would form outlets were said wind-chest the receptacle for a forced current or blast of air.

D D are duplicate ducts or passages containing duplicate reeds E E, and arranged to meet, as at a focus or center, each aperture *b*, but diverving from each other toward the wind-chest B. These ducts D D form inlet-ducts for the air, and corresponding ducts D′ D′ on the opposite sides of the same reeds form outlet-passages for the air when the wind-chest B is a suction-chamber. The diverging arrangement of the ducts D D relatively to each or any one of the orifices or apertures *b* gives to the reeds E E an opposite inclination to the seat or action-board surface containing the orifices *b*, over which the valve or perforated music-sheet moves, whereby the air passes through or between the reeds with a reduced sharp angle or bend. The two reeds E E in the ducts D D are pitched to sound in unison with each other, and will simultaneously be sounded as the music-sheet C uncovers the aperture *b*, which is common to both of said ducts, thus producing an improved effect, or

causing a double sound to be produced as each perforation in the music-sheet passes over a single aperture, *b*, in the action-board.

Fig. 2 represents a modified construction of the action-board A, each air-inlet aperture, *b*, of which, controlled by the perforated music-sheet, is not only in communication with two inclined reed ducts or passages, D D, having inclined reeds E E within them and outlet-ducts D′ D′ at the backs of said reeds in communication with the wind-chest, but each inlet-aperture *b* of which action-board is also in communication with other inlet and outlet ducts D^2 D^3, having other two reeds, E′ E′, arranged between them, whereby the uncovering of the same aperture *b* by the perforated music-sheet will cause four reeds, all pitched to sound in unison, to be simultaneously sounded.

Fig. 3 shows the action-board as constructed with two parallel or upright reeds, E E, and reed-inlet ducts D D in communication with the same aperture *b*, over which the perforated music-sheet travels, and two parallel outlet-ducts, D′ D′, in communication with the wind-chest.

Fig. 4 shows a modification in which each aperture *b* in the action-board is in communication with two reed-inlet ducts, D D, arranged at right angles with each other, or thereabout, and outlet-ducts D′ D′ in communication with each other below.

Fig. 5 shows a modification in which each aperture *b* in the action-board is in communication with a single inlet-duct, D, having duplicate parallel reeds E E, at the backs of which are parallel outlet-ducts, D′ D′, communicating with the wind-chest.

Fig. 6 represents a modification in which each aperture *b* in the action-board is in communication with parallel inlet-ducts, D D, having parallel reeds E E within them, at the backs of which are parallel outlet-ducts D′ D′ connecting with the wind-chest.

In each and all of these modifications when a forced current of air is employed in the place of suction to sound the reeds, then not only the apertures *b* form outlets instead of inlets, but the action of the ducts on the opposite sides of the reeds is reversed as regards their being inlets and outlets. Furthermore, two or more pipes or other sounding devices may be substituted for two or more reeds and be simultaneously sounded as a perforation in the music-sheet uncovers an aperture in the action-board common to both or all of said pipes or sounding devices and connected with the latter by two or more ducts.

I claim—

1. In a mechanical wind musical instrument adapted to be played by means of a moving perforated music-sheet acting as a valve to its reeds, pipes, or other sounding devices, the combination, with an action-board constructed to form a seat or rest for said music-sheet having apertures controlled by said sheet, of two or more reeds, pipes, or sounding devices in communication with, or under control of, each or any one of said apertures, substantially as and for the purpose specified.

2. The combination of a traveling perforated music-sheet, an action-board constructed to form a seat or rest for said music-sheet having apertures controlled by said sheet, two or more air or wind ducts leading to or from each or any one of said apertures, and two or more reeds, pipes, or sounding devices in communication with or under control of said ducts, substantially as described.

3. In a wind musical instrument adapted to be played by a moving perforated music-sheet operating as a valve and having two reeds, the air-ducts of which communicate with one orifice in the seat provided for such valve, the said reeds arranged at opposite inclinations to the said seat, substantially as herein described.

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