(No Model.)

A. LEFORESTIER.

MUSICAL WIND INSTRUMENT.

No. 382,991. Patented May 15, 1888.

Fig. 1.

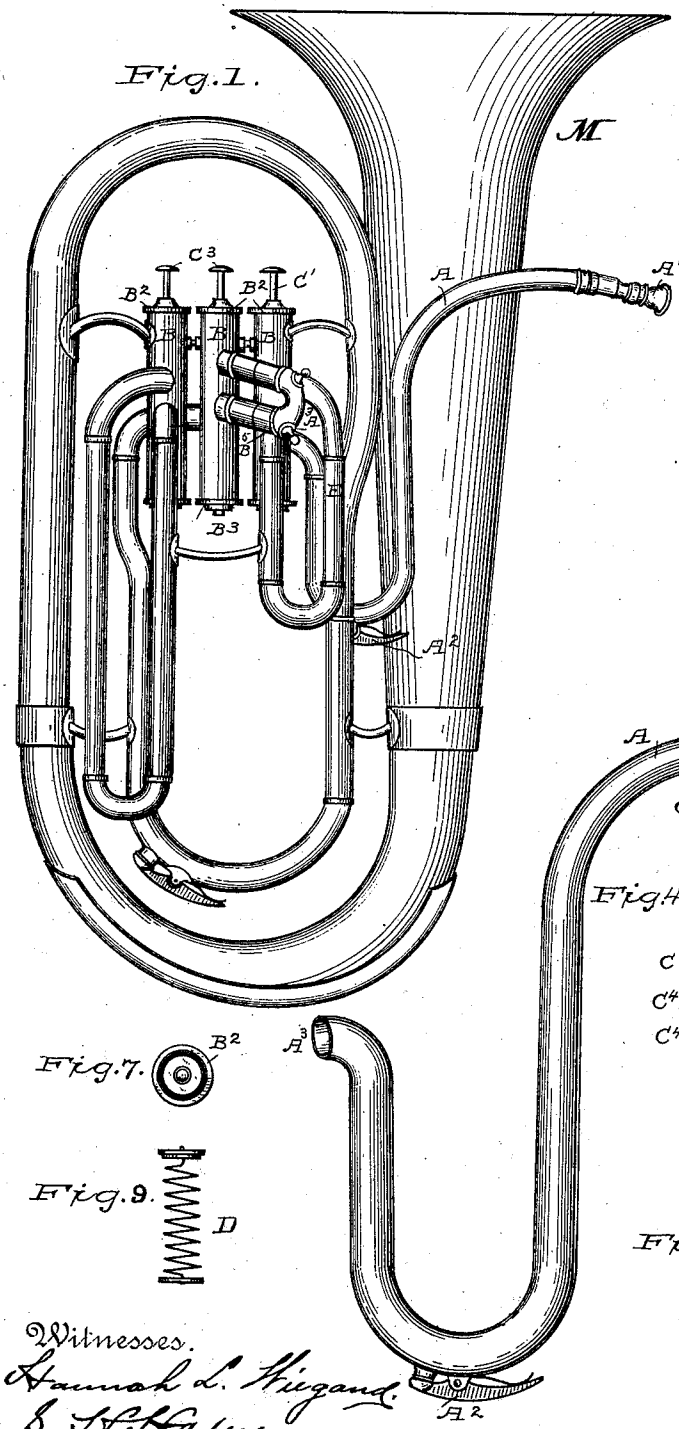


Fig. 2.

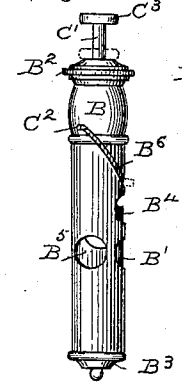


Fig. 3.

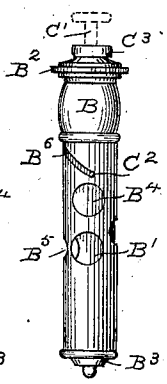


Fig. 10.

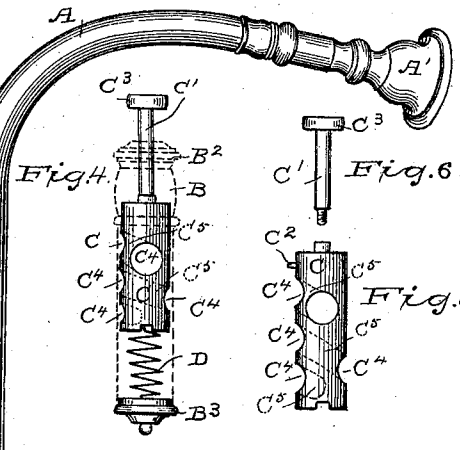


Fig. 4.

Fig. 6.

Fig. 5.

Fig. 7.

Fig. 9.

Fig. 8.



Witnesses.
Hannah L. Wiegand.
B. W. Haley.

Inventor,
Alexandre Leforestier.

By his Attorney,
Edmund Wiegand.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

ALEXANDRE LEFORESTIER, OF PHILADELPHIA, PENNSYLVANIA.

MUSICAL WIND-INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 382,991, dated May 15, 1888.

Application filed May 27, 1887. Serial No. 239,574. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDRE LEFORESTIER, a citizen of the Republic of France, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Musical Wind-Instruments; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof to enable others skilled in the art to make and use the said invention.

This invention relates to musical wind-instruments wherein the lengths of the vibrating columns of air required for notes or musical sounds of different pitches are varied and controlled by valves which open and close communication between loop-shaped tubes of different lengths.

The object of this invention is to effect the opening and closing of the valves with greater facility and promptness, to provide a more convenient mouth-piece, and to avoid the communication of the tubes not required for the production of the note with those through which the air-column is passing.

To effect these several desiderata, the nature of this invention may be briefly stated to consist of a mouth-tube formed and attached in the novel manner hereinafter described and claimed, and a novel construction of piston-valve having a helical motion for opening and closing, and suitable tubes connected therewith, as fully hereinafter set forth and shown.

Referring to the drawings annexed, Figure 1 shows a cornet with this improvement incorporated in it; Figs. 2 and 3, respectively, front and side elevations of one of the valve chambers or "pumps;" Fig. 4, an elevation of a valve and its connected operating attachments, the case or chamber being shown in dotted lines; Fig. 5, the valve proper; Fig. 6, the valve-stem and key for operating the valve; Fig. 7, the cap of the valve-chamber; Fig. 8, the bottom of the valve-chamber; Fig. 9, the helical spring for raising the valve, and Fig. 10 the mouth-pipe with the mouth-piece and draining-valve.

The same letters of reference designate the same parts in the several figures.

A represents the mouth-tube, having a mouth-piece, A′, and a draining-valve, A^2, at its lowest bend. The curves and diametral proportions shown in the drawings in Figs. 1 and 10 are found experimentally to produce the best results in clearness of note, and are new and original with this invention, and are important for its successful operation.

The mouth-tube A is of a continuously-increasing diameter or taper from the mouth-piece A′ to the point of its attachment to the valve-chamber B′, in contradistinction from mouth-tubes heretofore used, in which a series of tapering tubes were united by intermediate cylindric tubes. Such interruption in the expansion of the tube requires a greater force of blast and impairs the clearness of tone as compared with mouth-pieces having a continuously-increasing diameter throughout their length, as I have described.

The end A^3 of the mouth-tube A is attached to the first cylindric valve-chamber B at the point or opening B′. Three valve-chambers, B, are shown in Fig. 1.

The valve-chamber B is closed by a cap, B^2, at the upper end, through which the valve-stem C′ passes, fitting closely, but so as to slide and turn freely therein. The lower end of the valve-chamber B is closed by a bottom, B^3, which serves as a support to the base of the spring D. Connected with the valve-chamber B is a loop-shaped tube, E, both ends of which are attached to the chamber B at the openings marked B^4 and B^5.

Fitted air-tight within the valve-chamber B is the valve C, which slides and turns freely therein, and is forced upwardly by the spring D, the motion of the valve C being helical in consequence of a projecting pin, C^2, attached thereto fitting and sliding in a helical groove, B^6, in the valve-chamber B.

Upon the upper end of the valve-stem C′ is the key C^3, by means of which the valve is depressed by the finger of the player. The keys C^3 are fitted into the valve-stem C′, so as to turn freely therein, so that the pressure of the fingers on the keys C^3 shall not impede the helical or partially-rotative motion of the valve C.

The valves C are made hollow and as light as is consistent with strength. In each valve C there are openings C^4, made in pairs, the openings of each pair being connected by a

light curved tube, C^5. The location of the openings C^4 is such, in relation to the loop-shaped tubes E at their points of attachment to the valve-chambers B, as to coincide in one position with the tubes E and establish communication through the tube E with other coils of the instrument, and in another position to close such communication through the tube E and shorten the operative length of the tube and vibrating air-column contained therein, in all cases providing a smooth internal tube for containing the vibrating air-column.

By making the tubular connections C^5 through the valves C helical and providing a helical guide to control the motion of the valves C, I am enabled to place the apertures C^4 in the valves closer together, and a very small extent of motion of the valve C and its connected key C^3 is required, and I am enabled to so form the communication through the valves C with the looped tubes E that in every instance a perfectly smooth tube is presented for each note, and in no case is it impaired by partial communication with any of the looped tubes not forming part of the conduit required for the air-column demanded for such note.

By reason of the small extent of motion required and the extreme lightness of the valves, a rapidity and facility of motion is procured not heretofore practicable, and the smooth continuity of tube presented for the air-column required for each note secures a clearness of tone surpassing that of instruments containing breaks in continuity, or where the air-column in vibration passes over cavities not forming a proper part of the vibrating column.

The construction of the mouth-tube shown so disposes of the position of the keys and valves as to prove more convenient to the performer.

Having described this invention and the mode of operating the same, what I claim is—

1. In musical wind-instruments having looped tubes for varying the length of vibrating air-columns, the combination of said looped tubes with piston-valves provided with helical guides, substantially as set forth.

2. In piston-valves for musical wind-instruments, the combination of a piston-valve with a helical guide and rotatable key, substantially as set forth.

3. In piston-valves for musical instruments, the combination of helical tubular passages through the valve with a helical guiding mechanism, substantially as set forth.

4. The combination of helical tubular passages through the valve C, having a continuation of the taper of the mouth-pipe, with the mouth-pipe A, having a continuous gradual enlargement from the mouth-piece A′ to the said valve, substantially as set forth.

ALEXANDRE LEFORESTIER.

Witnesses:

J. DANIEL EBY,

EDWARD DE BETHIZY.