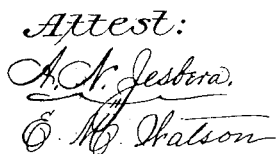


E. A. GATES.  
VALVE FOR CORNETS.

Patented July 7, 1891.



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# UNITED STATES PATENT OFFICE.

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## VALVE FOR CORNETS.

SPECIFICATION forming part of Letters Patent No. 455,562, dated July 7, 1891.

Application filed January 14, 1891. Serial No. 377,697. (No model.)

*To all whom it may concern:*

Be it known that I, ETHAN ALLEN GATES, of Del Norte, in the county of Rio Grande and State of Colorado, have invented certain new and useful Improvements in Valves for Cornets and Similar Wind-Instruments; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to improvements in the tone-changing valves of cornets and similar wind-instruments, and has for its object to simplify the construction thereof and to provide a simple, effective, and uniform arrangement of wind-passages in the valves and their connections, which shall present a clear and continuous bore through the instrument, free from abrupt or angular changes in direction, and thereby improve the quality and harmony of tone and will involve a minimum valve movement to produce the required effects.

It consists in the novel construction and arrangement of the valves and air pipes or chambers of the instrument, substantially as is hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a cornet in customary form, and Fig. 2 a similar elevation on a reduced scale of a "bell-up" cornet, each embodying my invention. Fig. 3 is a transverse section in line *x x* of Fig. 1; Fig. 4, a longitudinal section, on an enlarged scale, through the valve-section of the instrument in line *y y* of Fig. 3; and Fig. 5, a detail transverse section similar to Fig. 3, illustrating a modification in the arrangement of the valve-crooks and in the working mechanism of the valve.

Similar letters indicate like parts in all of the figures.

A represents the mouth-pipe of the instrument, fitted, as usual, with a mouth-piece *b*, and *A'* is the main pipe, terminating as usual in a flaring bell or trumpet C.

The valves by which the various air-passages of the instrument, intermediate its mouth-pipe and main pipe, are controlled so as to produce its open and valve tones are fitted

in a straight cylindrical case or shell D, whose axis is made to coincide with that of the mouth-pipe A, the bore of the main pipe *A'* in the portion thereof adjoining said case being likewise in a right line with that of the mouth-piece.

The valves consist each of a cylindrical block E, adapted to rotate freely within the cylindrical casing D upon the axis of the mouth-pipe A, instead of, as has heretofore been customary, at a right angle therewith, and are so fitted end to end as to make a close joint each with the other, although each rotates independently of the other. Their longitudinal movement in the casing is prevented by the re-entrant curve of the ends of the casing, whereby its diameter is reduced at each end to conform with that of the mouth-pipe and main pipe, as shown in Figs. 1 and 4, and re-entrant collars *ff* (see Fig. 4) may be formed in the inner periphery of the casing at the several joints between the valves.

The valve-casing or shell D is divided longitudinally and diametrically into two sections to facilitate fitting, repairing, adjusting, and cleaning the valves, and these sections are united by clamps, screws, or other suitable devices.

Each valve-block E is formed with two air-passages or sound-ways H and H' therein, one at each end thereof, as shown in Fig. 4. One end of the bore of each of said passages is central and concentric with the axis of the valve, and it extends thence radially with a regular uniform bend or curve to the periphery of the block, the peripheral openings of the two passages being in the same longitudinal plane. Since the openings of these air-passages H and H' in the ends of the several valve-blocks E are all central and axial, it follows that they will register each with the other to form a continuous passage from the one valve into the other, as well as from the two end valves, respectively, directly into the mouth-pipe A and main pipe *A'*, (see Fig. 4.) so that the sound-ways in the valves are constantly included in the bore of the instrument as a continuation thereof into whichever operative position the valves may be turned.

To provide for the open tones of the instrument, short external curved or bowed tubes

or crooks K K are fitted laterally to the shell or casing D, opposite each valve E therein, in position to connect with the peripheral openings of the air-passages through said valve, as shown in Fig. 4, and the valves are made to assume normally the position in which these air-passages and short bowed connecting tubes or crooks K K shall register, so that normally a continuous and comparatively short and direct passage is opened through the several valves in connection with said crooks between the mouth-pipe A and main pipe A' for the production of the open tones of the instrument. To vary the same and produce the several valve-tones, additional longer crooks L L are fitted to the shell or casing D, one or more opposite each valve, in position to connect with the peripheral ports of the air-passages H and H' in the valve when it is so far turned upon its axis as to carry said passages out of register with the short open-tone crook K. Thus the current or blast of air forced through the instrument may be directed from the short passage through the open-tone crooks K into a longer passage through one or more of the valve-crooks L L, so as to produce the valve-tones. The lengths of the several valve-crooks L vary, as is required in the production of different valve-tones in the instrument. Each valve E may be rotated, as required, to change the connection of its air-passages from the short or open-tone crook K to the long or valve crook L, and thereby alter the pitch of tone by means of a radial arm M, (see Fig. 3,) made to project outwardly from the periphery of the valve-block E through a radial slot in the shell or valve-casing D, said arm being operated by means of any appropriate mechanism—as, for example, by pivoted toggle-joint levers N and N', fitted exteriorly upon the casing and provided with a finger-plate P, so that pressure upon the plate will cause the valve to rotate. When left free, the valve is returned to its normal position by the stress of a suitable spring R.

My invention admits of placing several crooks or bowed tubes of various lengths in position to register with a single rotative valve, and such a modification is illustrated in Fig. 5 of the drawings, wherein a number of separate crooks K L L' L'', of different lengths, are shown as fitted to the casing D in position to connect with and complete the air-passages in the valve E when the valve is turned to bring its lateral ports severally into register with any of said crooks. It is evident that by increasing the diameter of the valve and providing means for its proper rotary movement the number of crooks thus arranged to radiate from the single valve-case D to connect with the one valve E for producing different tones may be largely increased, so that the one single-valve arrangement shown in Fig. 5 may be made to serve in the place of several separate valves fitted end to end, as shown in Fig. 4, said single-

valve arrangement being for the purpose of improving the quality of tone by lessening the number of curves in the air-passage and perfecting the tune of the instrument by using only one crook at a time, the separate crooks being adjusted to tune independently of each other, no one of them by its adjustment altering the tune of any other.

As a substitute for the radial arm M for rotating the valve-block E, the valve-block may be connected or combined with a toothed wheel M', mounted within the valve-casing D, to gear with a sliding rack or similar device for actuating it.

My invention secures equatoness and more perfect tune in the instrument by independent crooks presenting curves of the same number and having the same uniform radius in all the connections and by maintaining a constant uniformity in the curvature of the bore of the instrument throughout its valve portion, while by arranging the valves to rotate upon a common axis parallel with the general direction in length of the passages through them each may be operated with a very short finger action and with a minimum of friction.

I claim as my invention—

1. A valve for cornets and similar wind-instruments, rotating upon an axis coincidental and parallel with the center line of the mouth-pipe and main pipe of the instrument, substantially in the manner and for the purpose herein set forth.

2. In a cornet or similar wind-instrument, a cylindrical connecting-case whose axis coincides in direction with the axis of the mouth-pipe and main pipe of the instrument and with the axis of the valve, a valve rotating in said case, having two separate sound-passages severally opening at opposite ends of the valve in the center thereof and each terminating in separate lateral or peripheral ports, and two or more bent tubes or crooks attached to the casing and with whose open ends in the interior of the casing the lateral valve-ports are adapted to be brought into registry by a rotary movement of the valve, substantially in the manner and for the purpose herein set forth.

3. The combination, with a single valve in a cornet or similar wind-instrument, of a series of independent crooks disposed about its periphery to be severally brought into registry with its openings by a rotation of the valve, whereby the changes of pitch within the compass or registry of the instrument may be obtained by a movement of the one valve, substantially in the manner and for the purpose herein set forth.

4. The combination, with the mouth-pipe and main pipe in a cornet or similar wind-instrument, of an interposed cylindrical connecting-case whose axis coincides in direction with that of the mouth-piece, a valve rotating in said case, having two separate air-passages severally opening at opposite ends of the valve in the center thereof and each

terminating in a separate lateral or peripheral port in the periphery of the valve, one or more bent tubes or crooks attached to the casing and with whose open ends the lateral  
5 valve-ports are adapted to be brought into registry by a movement of the valve, and a device for producing said movement, substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ETHIAN ALLEN GATES.

Witnesses:

H. A. PATTERSON,  
J. B. MARSTON.