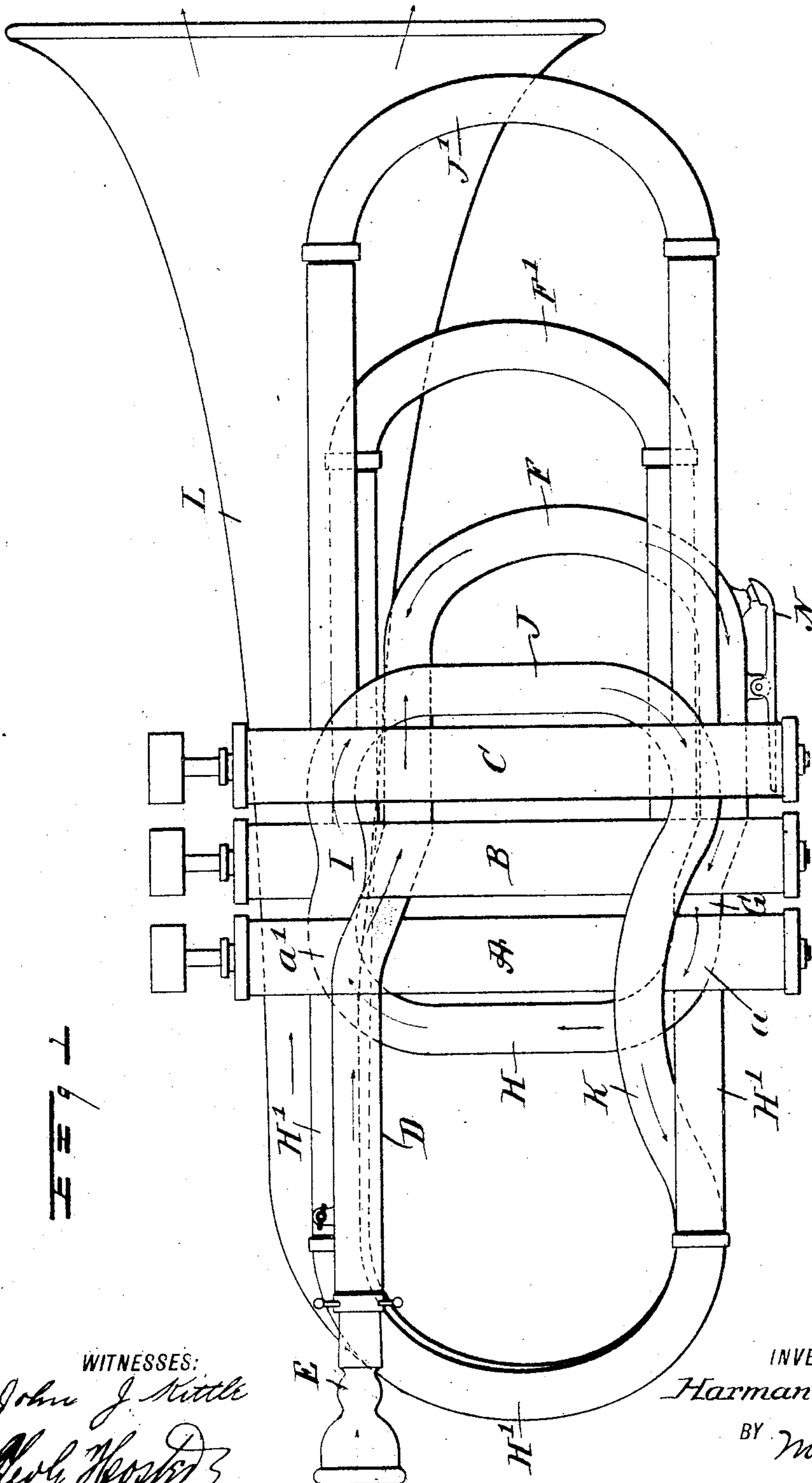


No. 798,025.

PATENTED AUG. 22, 1905.

H. J. ELLIS.  
WIND INSTRUMENT.  
APPLICATION FILED SEPT. 8, 1904.

2 SHEETS—SHEET 1.



**WITNESSES:**

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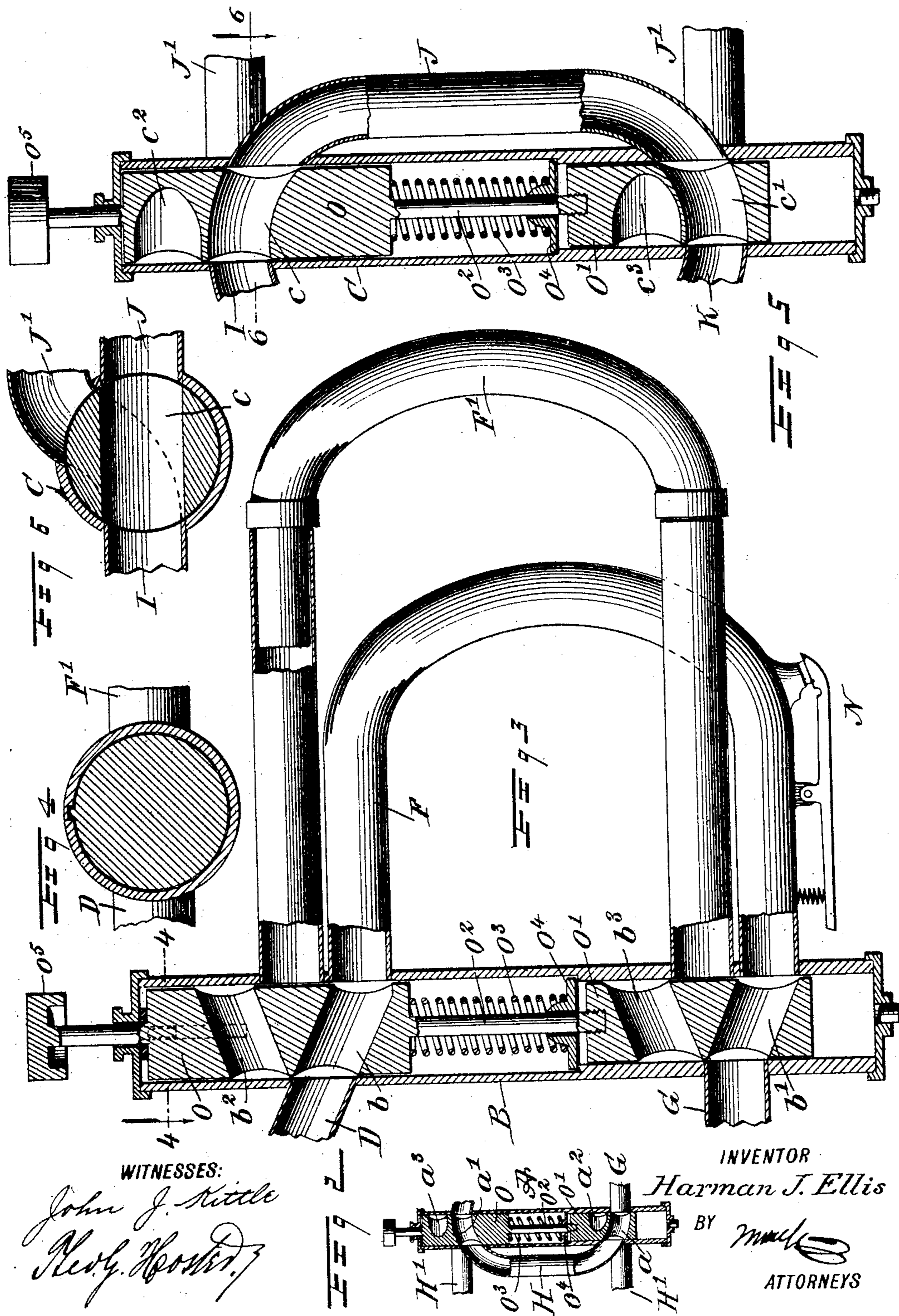
BY *Munn*  
ATTORNEYS

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ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS. WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

HARMAN J. ELLIS, OF BROOKLYN, WISCONSIN.

## WIND INSTRUMENT.

No. 798,625.

Specification of Letters Patent.

Patented Aug. 22, 1905.

Application filed September 8, 1904. Serial No. 223,679.

*To all whom it may concern:*

Be it known that I, HARMAN J. ELLIS, a citizen of the United States, and a resident of Brooklyn, in the county of Green and State of Wisconsin, have invented a new and Improved Wind Instrument, of which the following is a full, clear, and exact description.

The invention relates to musical instruments, such as cornets, horns, and the like; and its object is to provide a new and improved wind instrument arranged to permit of readily lowering or raising the tone by manipulating corresponding valves, the arrangement being such that the formation of abrupt bends for the air-passages is completely avoided to insure a rapid unobstructed flow of the air.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement. Fig. 2 is a reduced sectional side elevation of the first valve and its connections. Fig. 3 is an enlarged sectional side elevation of the middle valve and its connections. Fig. 4 is an enlarged sectional plan view of the same on the line 4 4 of Fig. 3. Fig. 5 is an enlarged sectional side elevation of the third valve and its connections, and Fig. 6 is an enlarged sectional plan view of the same on the line 6 6 of Fig. 5.

The wind instrument is provided with three valves A, B, and C, arranged one alongside the other and each having a spring-pressed piston-valve adapted to be manipulated by the player, the valve A having two sets of ports  $a$   $a'$  and  $a^2$   $a^3$ , the piston-valve for the valve B having two sets of ports  $b$   $b'$  and  $b^2$   $b^3$ , and the piston-valve for the valve C having two sets of ports  $c$   $c'$  and  $c^2$   $c^3$ .

The valve B is connected at its forward side with a mouthpiece-tube D, carrying the usual mouthpiece E, and when the several valves are in their normal non-pressed positions then the air forced through the mouthpiece E and tube D passes by way of the port  $b$  (see Fig. 3) into a U-shaped or return-bend tube F, connected with the valve B at the port  $b'$ , which latter connects with a short connecting-tube G, leading to the valve A at the port  $a$ , and this latter port  $a$  connects by a tube H with the port

$a'$ , connected by a short connecting-tube I with the port  $c$ , connected by a tube J with the port  $c'$ , connected by a tube K with the bell L of the instrument.

Now from the foregoing it will be seen that each of the valves A, B, and C has a return or U-shaped tube connected at both ends to the corresponding valve-casing at or near the upper and lower ends thereof, and each tube registers with a set of ports in the corresponding valve. Thus the valve A is provided with the tube H, normally in register with the ports  $a$  and  $a'$ . The valve B is provided with the tube F, normally in register with the ports  $b$  and  $b'$ , and the valve C is provided with the tube J, normally in register with the ports  $c$  and  $c'$ . The valves A, B, and C are in addition provided with the tubes H', F', and J', respectively, similar in shape to the tubes H, F, and J, but longer, as will be readily understood by reference to Fig. 1. These tubes are normally closed; but when the corresponding valve is pressed the shorter tube H, F, or J is cut out and the longer tube H', F', or J' is brought into action to provide a correspondingly longer air-passage, the ends of the said tubes H', F', and J' being adapted to register with the sets of ports  $a^2$   $a^3$ ,  $b^2$   $b^3$ , and  $c^2$   $c^3$ , respectively, whenever the corresponding piston-valve is pressed.

When it is desired to lower the open tone one-half a tone, it is necessary to press the piston-valve of the piston B. When it is desired to lower the open tone one full tone, then the piston-valve of the valve A is pressed, and when it is desired to lower the open tone one and one-half tones then the piston-valve of the valve C is pressed, it being understood that the fundamental tone of the instrument is lowered by lengthening the air-duct.

When the piston-valve of the valve B is pressed, then the air instead of passing through the pipe F passes through the pipe F', connected at one end with the tube D by way of the port  $b^2$  and connected at its other end by the port  $b^3$  with the tube G. The tube F' is as much longer than the tube F as is necessary to lower the previous open tone one-half a tone. When the piston-valve of the valve A is pressed, then the air instead of passing through the tube H passes through the tube H', connected at one end with the pipe G by way of the port  $a^2$  and connected at its other end with the pipe I by way of the port  $a^3$ . The tube H' is sufficiently longer than the tube H to lower the open tone of

the instrument one full tone. When the piston-valve of the valve C is pressed, then the air instead of passing through the tube J passes through the tube J', connected at one end by way of the port  $c^2$  with the tube I and connected at its other end by way of the port  $c^3$  with the tube K, leading to the bell L. The tube J' is so much longer than the tube J as to lower the open tone of the instrument one and one-half tones.

By reference to the drawings it will be seen that the tone of the instrument can be readily lowered one-half, one full, and one and one-half tones by manipulating the valves B, A, and C correspondingly, and in order to produce the desired result it is not necessary to give abrupt bends to the tubes F F', H H', or J J', connected in sets with the respective valves, as above explained.

The tube F, as shown in Fig. 1, is preferably provided with a water-key N.

As shown in the drawings, each of the piston-valves is made in upper and lower sections O O', connected with each other by a stem O<sup>2</sup>, around which is coiled a spring O<sup>3</sup>, resting at its lower end on a washer O<sup>4</sup>, seated on a shoulder within the valve-casing. The upper section O carries the finger-piece O<sup>5</sup> for pressing the piston-valve normally held in an uppermost position by the spring O<sup>3</sup>. The upper sections O of the several valves A, B, and C are provided with the sets of ports  $a' a^3$ ,  $b' b^3$ , and  $c' c^3$ , respectively, while the lower sections are provided with the sets of ports  $a a^2$ ,  $b b^2$ , and  $c c^2$ . Now by spacing the sections O O' of each valve a considerable distance apart, the springs can be conveniently located in the middle of the valve and large bends can be given to the tubes F F', J J', and H H' to avoid all abrupt bends.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a wind instrument, three piston-valves A, B, C, each having sets of ports and comprising two sections, each section having two ports, a stem connecting the sections, and a spring for holding the valve in position, a connection between the lower ends of

valves A and B, a connection between the upper ends of valves A and C, a mouth-tube connected with the upper end of valve B, a tube leading from the lower end of the valve C to the bell, and a set of U-shape tubes for each valve, the tubes in each set being of different lengths and connected at their ends with the valve-casing of the corresponding valve, one set of ports being arranged to register with the ends of one of the tubes when the valve is in a normal position and the other set of ports being arranged to connect with the ends of the other tube at the time the valve is pressed, substantially as herein shown and described.

2. A wind instrument provided with a plurality of valves, each having a movable piston-valve provided with sets of ports, the valve being formed of spaced and connected sections and having a spring for holding the valve in position, a set of tubes for each valve, the tubes in each set being of different lengths and connected at their ends with the valve-casing of the corresponding valve, one set of ports being arranged to register with the ends of one of the tubes when the valve is in a normal position and the other set of ports being arranged to connect with the ends of the other tube at the time the piston-valve is pressed.

3. A valve for a wind instrument, comprising a casing having an internal shoulder, and a piston-valve in the casing and consisting of two sections each provided with two ports, a stem connecting the sections and spacing them apart, a washer on the stem and seating on the shoulder of the casing, and a spring surrounding the stem and bearing against one section and the washer, as set forth.

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

HARMAN J. ELLIS.

Witnesses:

H. M. HASKELL,

A. G. ELLIS.