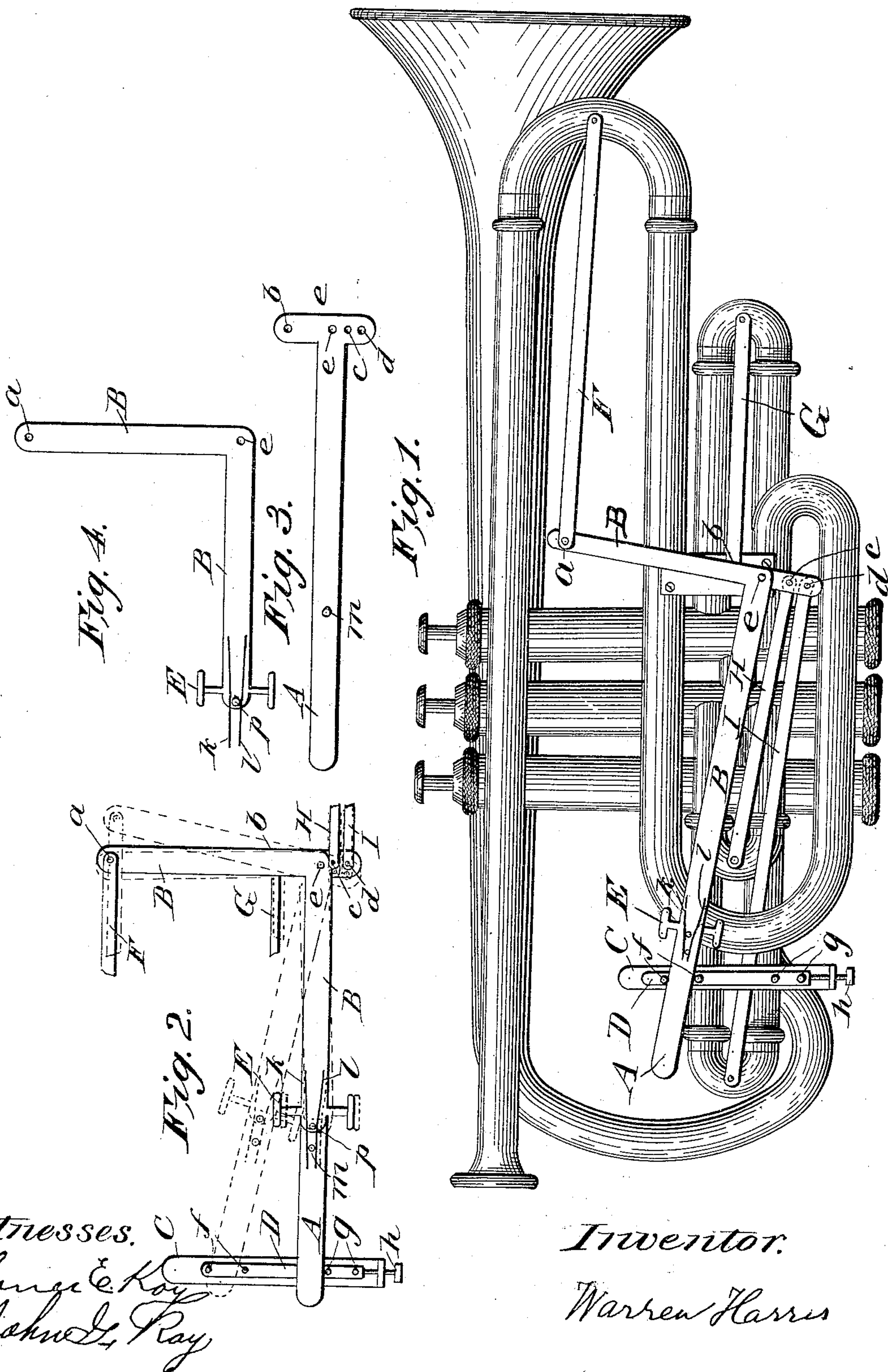


(No Model.)

W. HARRIS.  
VALVE INSTRUMENT.

No. 550,967.

Patented Dec. 10, 1895.



Witnesses.  
Charles E. Roy  
John L. Roy

Inventor.  
Warren Harris



# UNITED STATES PATENT OFFICE.

WARREN HARRIS, OF BARNET, VERMONT.

## VALVE INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 550,967, dated December 10, 1895.

Application filed April 3, 1891. Serial No. 387,575. (No model.)

*To all whom it may concern:*

Be it known that I, WARREN HARRIS, a citizen of the United States, residing at Barnet, in the county of Caledonia and State of Vermont, have invented new and useful Improvements in Valve Wind Instruments, of which the following is a specification.

My invention relates to improvements in wind instruments in which pistons or valves are used to alter the length of the tube; and the objects of my invention are, first, to change the key of the instrument by altering the length of the main tube and at the same time to move the valve-slides so that the length of the valves shall always maintain the same ratio to the length of the main tube; second, to vary slightly the length of the main tube for the purpose of obtaining perfect intonation, and, third, to afford facilities for tuning the instrument while playing. I attain these objects by the mechanism illustrated in the accompanying drawings.

Figure 1 is a view of the instrument complete with the levers and connecting-rods. Fig. 2 is a view of the two levers, showing the position of one upon the other. Fig. 3 is a view of the lever which moves the valve-slides. Fig. 4 shows the lever which moves the key-slide or changes the length of the main tube.

A is a lever, which turns on a pivot at *e*. This pivot is fastened to the instrument and serves as a fulcrum. At *b* the rod *G* is attached, the other end of which is connected with the third or longest valve-slide. At *d* the rod *I* connects it with the first valve-slide, and at *c* the rod *H* connects it with the second or shortest valve-slide.

B is another lever, which is placed upon A and has the same fulcrum at *e*. At *a* the rod *F* connects it with a slide in the main tube, called a "key-slide." This slide is similar to a valve-slide, but is fitted to move easily, like the slide of a slide-trombone.

*k* and *l* are springs fastened to B and resting against the pin *p*.

*m* is a pin in A, against which the same springs rest. These springs are sufficiently strong to hold B parallel with A, so that when A is moved B moves along with it, making them equivalent to a single lever with four

connecting-rods. However, by pressing on the projection *E*, or the one opposite, while A is fixed at any point the springs will allow B to move by itself, and thus lengthen or shorten the main tube, so as to correct the intonation, without being obliged to do it by the use of the lips. When the lever A is moved, the third valve-slide should move about one-fifth as far as the key-slide, the first one-eighth, and the second one-fifteenth. Therefore the rods should be connected with the levers at those relative distances from the fulcrum.

C is a plate fastened to the instrument, and D is a smaller plate fitted to slide on C by means of the thumb-screw *h*.

*f* and *g* are pins to hold A at the different points. By turning the thumb-screw *h* D is moved, carrying A along with it, making it possible to tune the instrument even while playing.

Since valve instruments are made in many different shapes, it is necessary to attach the fulcrum sometimes to one part and sometimes to another part of the instrument, and the levers may sometimes point in one and sometimes in another direction to suit the construction of the instrument or the convenience of the player. When the slides all draw in the same directions, the connecting-rods are all attached to the levers on one side of the fulcrum; but when they draw in opposite directions some are attached on one side of the fulcrum and some on the other. When one of the valve-slides draws at right angles to the others, it may be necessary to have an intermediate lever; also, a compound lever may be necessary to move the key-slide a sufficient distance.

What I claim as my invention, and wish to secure by Letters Patent, is—

1. The combination, in a valve wind-instrument, of the lever "A" and the connecting rods "G," "H," "I" with the valve-slides, substantially as described, and for the purpose specified.

2. In a valve wind-instrument, the combination of the lever "B" and connecting rod "F" with the key-slide, substantially as described, and for the purpose set forth.

3. The combination, in a valve wind-instrument,

ment, of the levers "A" and "B" with the springs "*k*" "*l*" and pins "*m*" "*p*," substantially as described and for the purpose specified.

- 5 4. In a valve wind-instrument the combination of the permanent plate "C," sliding plate "D," and thumbscrew "*h*" with the le-

ver "A," substantially as described and for the purpose specified.

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Witnesses:

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