No. 832,257. PATENTED OCT. 2, 1906.

# E. HARRISON.

## MUSICAL WIND INSTRUMENT.

APPLICATION FILED MAR. 22, 1905.

Fig. 1

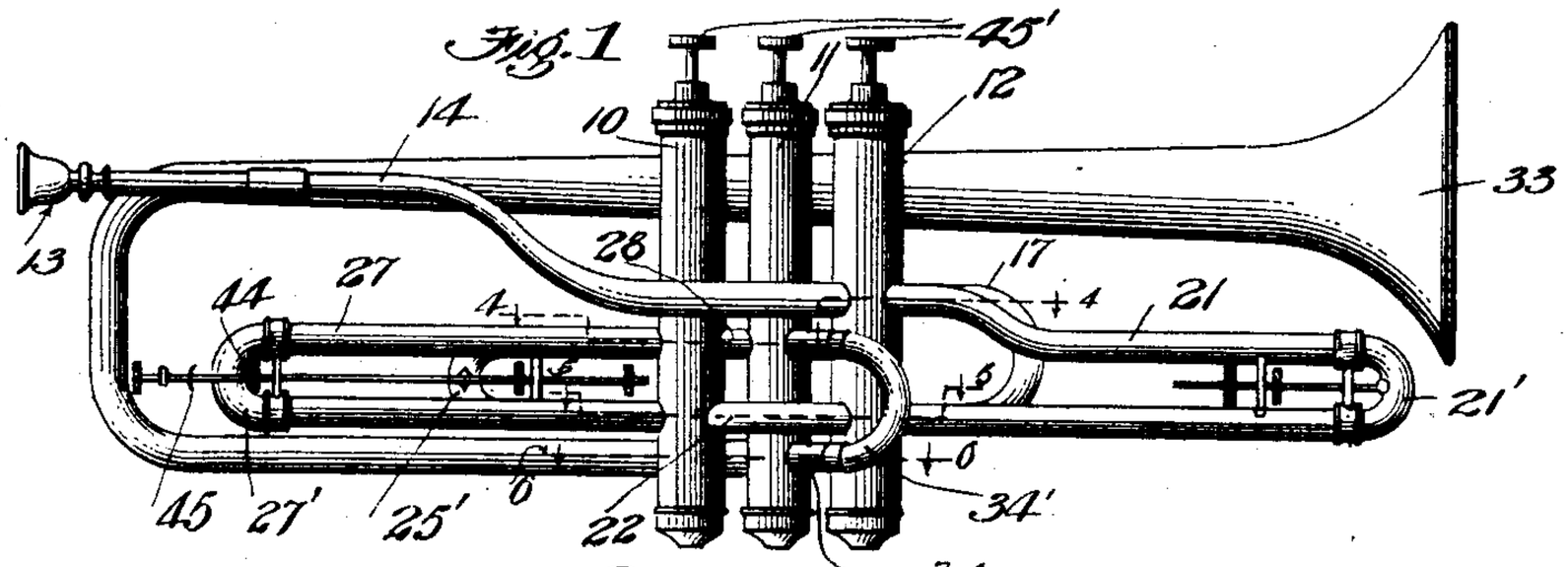



Fig. 2

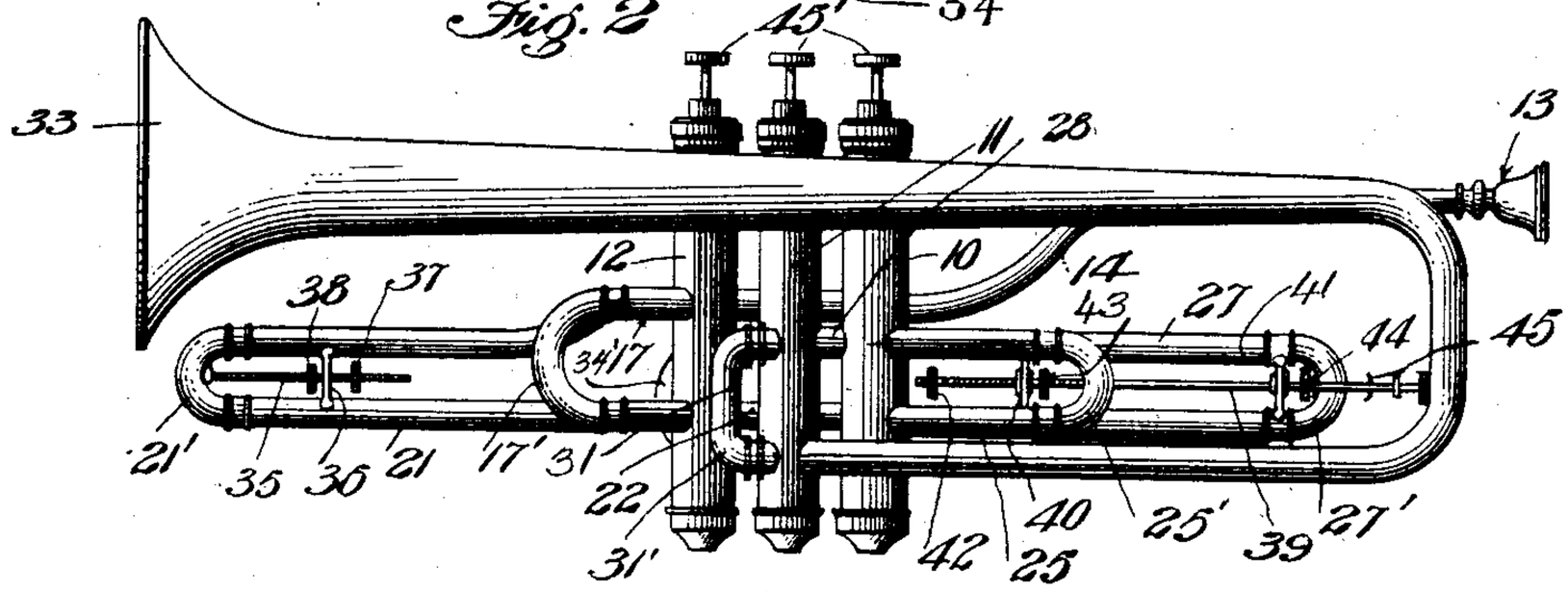



Fig. 3

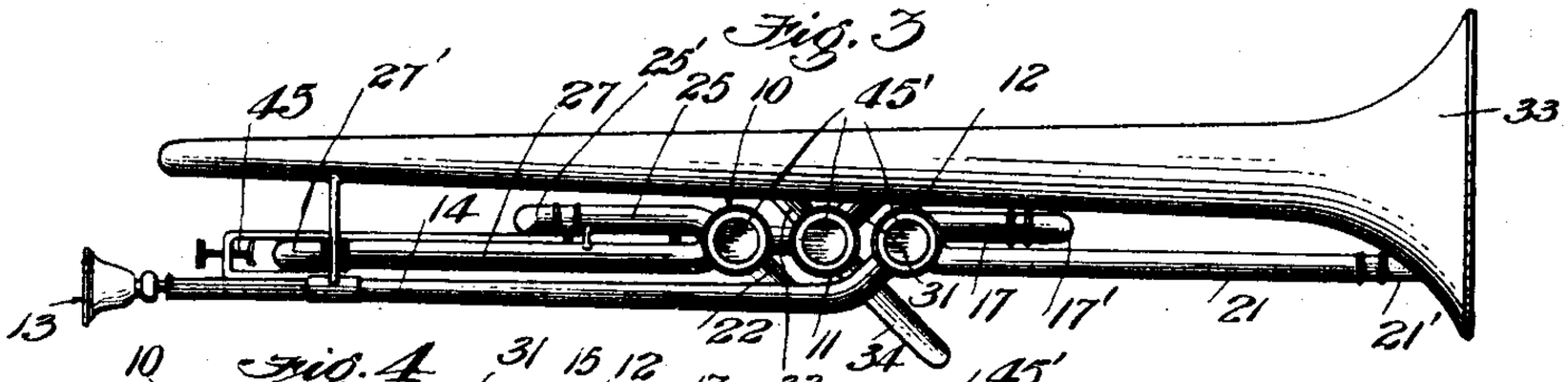



Fig. 4

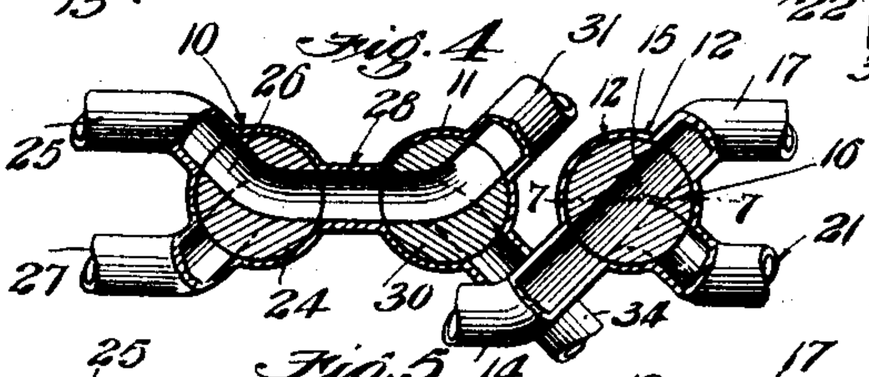



Fig. 5

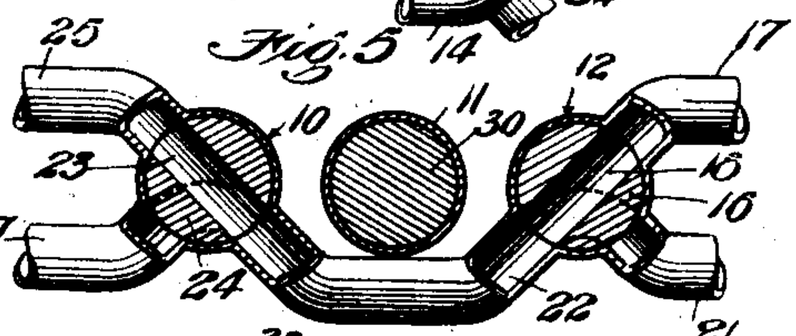



Fig. 6

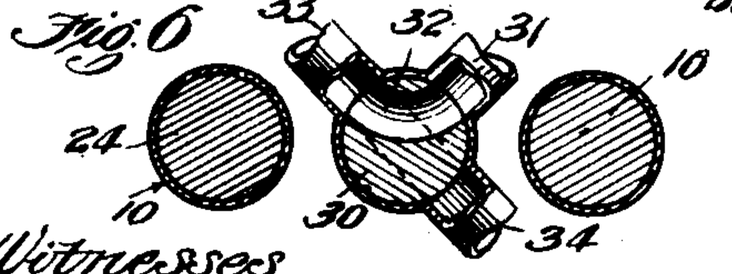



Fig. 7

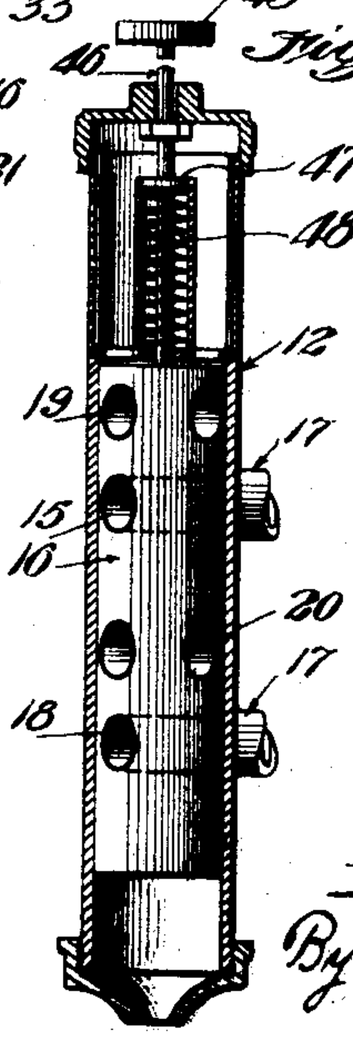
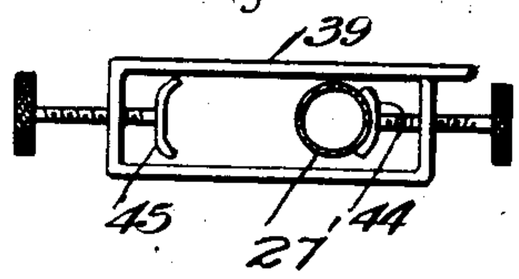



Fig. 8.

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# UNITED STATES PATENT OFFICE.

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## MUSICAL WIND INSTRUMENT.

No. 832,257. Specification of Letters Patent. Patented Oct. 2, 1906.

Application filed March 22, 1905. Serial No. 251,500.

*To all whom it may concern:*

Be it known that I, EDGAR HARRISON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Wind Musical Instruments, of which the following is a specification.

My invention relates to that class of wind musical instruments which are controlled by valves; and the object thereof is to produce an instrument in which there is the greatest amount of straight tubing and to reduce the resistance therein by reason of return-curves to the minimum.

Another object is to enable the operator to instantly change the key of the instrument without the necessity of inserting therein supplemental return-curves or other parts.

I accomplish these objects by means of the peculiar construction of the valves and the air-column and position of the return-curves for the valves and by having an independent or extra return-curve for each valve, making two return-curves for each valve, and by providing each return-curve with a tuning-slide.

In the drawings I have illustrated my invention as applied to a trumpet and will explain it as applied thereto, although it is equally applicable to other instruments.

Figures 1 and 2 are side elevations thereof of the different sides of the instrument. Fig. 3 is a plan view. Figs. 4, 5, 6 are sections taken on lines 4, 5, and 6, respectively, of Fig. 1 looking in the direction indicated by the arrows. Fig. 7 is a central longitudinal cross-section on the line 7 7 of Fig. 4, the valve being shown in elevation. Fig. 8 is a detail of the end of the regulating-bar to show the adjustability of the stops.

In the drawings the trumpet is provided with valve-casings 10, 11, and 12, which are provided with valves working longitudinally therein. The construction of such valves is shown in detail in Fig. 7, which illustrates the valve in casing 12. The mouthpiece 13 of this instrument is connected by tube 14 with casing 12. This tube opens at a point which registers with a passage 15, extending through the valve 16, as shown in dotted lines in Fig. 7 and in full lines in Fig. 4. Passage 15 registers with return-curve 17, the movable portion of which forms the pitch tuning-slide 17′ of the instrument, and the lower end thereof registers with a passage 18 through the valve 16. (Shown in dotted lines in Fig. 7 and full lines in Fig. 5.)

At equal distances above passages 15 and 18 valve 16 is provided with passages 19 and 20, which when the valve is depressed will bring passage 19 into register with tube 14 and with the upper end of return-curve 21 and will bring passage 20 into register with the lower end of return-curve 21. Casing 12 is connected by tube 22 to casing 10 at a point which will register with a passage 23, which passage extends through valve 24 in casing 10. Tube 22 normally registers with passage 18 of valve 16. Casing 10 is provided with return-curve 25, the lower end of which registers with passage 23, and the upper end is connected to the casing at a point which registers with passage 26 in valve 24. Casing 10 is provided with an auxiliary return-curve 27, which is connected by passages through valve 24, similar to passages 19 and 20 for valve 16, when said valve 24 is depressed, as hereinafter explained, thereby cutting off communication through the return-curve 25 and establishing communication through return-curve 27. Casing 10 is connected by tube 28 with casing 11, which tube connects passage 26 of valve 24 with passage 29 of valve 30, which valve is located in casing 11. This passage is connected by return-curve 31 with passage 32 in valve 30. Bell 33 is connected to casing 11 at a point which registers with passage 32. Casing 11 is provided with an auxiliary return-curve 34, which is connected by passages through valve 30, similar to passages 19 and 20 of valve 16, when said valve 30 is depressed, as hereinafter explained, thereby cutting off communication through the return-curve 31 and establishing communication through the return-curve 34, which curves are provided with the usual tuning-slides 31′ and 34′. Return-curves 21, 25, and 27 are provided with B-flat and A tuning-slides 21′, 25′ and 27′. Slide 21′ is provided with the regulating-bar 35, which passes through a guide 36, which guide is secured to the rigid part of the return-curve 21. The regulating-bar is threaded and is provided with nuts 37 and 38, which may be adjusted thereon to act as front and back stops for movement of slide 21′. Slides 25′ and 27′ are connected to the regulating-bar 39, which bar passes through guide-rod 40, secured to the rigid part of curve 25, and guide-bar 41, which is secured to the movable

slide 27′. Regulating-bar 39 is also rigidly secured to the movable slide 25′.

In the use of the trumpet the pitch thereof is tuned to the instrument with which it is to be played by means of the tuning-slide 17′. Slide 21′ is then regulated to its proper movement by means of the front and back stops on the regulating-bar 35. Slides 25′ and 27′ are also regulated. Slide 25′ is regulated by front stop 42 and the back stop 43, which stops are threaded on the regulating-bar 39 and are adjustable thereon. Slide 27′ is regulated by the front stop 45 and the back stop 44, which stops can be adjusted. Slides 25′ and 27′ are connected together, so that whether the valve in casing 10 be in its normal or depressed position the return-curves 25 and 27 will be adjusted to the right pitch. In adjusting these slides the operator grasps the slide 27′ and moves it backwardly or away from the mouth of the bell. As soon as said section engages stop 45 bar 39 moves and slide 25′ of return-curve 25 begins to travel with slide 27′, and both slides travel together until the front stop 42 engages the guide-bar 40, when the slides are in their adjusted position. By this construction in whatever position the valves may be, whether in the normal position, as shown in the drawings, or whether one or more be depressed, the air travels through the instrument through only three return-curves, which are changed in length by shifting the valves to cut out a return-curve and throw a longer or shorter return-curve into the air-column, as a higher or lower note is required, through the chromatic register of the instrument without the use of extra parts. By this construction the operator is able to set his instrument and to instantly change it to other keys without inserting in the instrument any extra parts.

It will be observed that the valves are each provided with four passages therethrough which operate in sets of two each, one set operating with the shorter return-curve and the other set operating with the longer return-curve, and that the shifting of the valve from its normal position to its depressed position cuts out the shorter return-curve and throws the longer return-curve into the air-column. This shifting is performed by placing the finger upon the press-buttons 45′ on the end of the stem which is attached to the valve. A washer 47, rigidly secured to the stem, bears upon the spiral spring 48 and when the valve is depressed compresses said spring, and when the pressure is released the spring returns the valve to its normal position, thereby making the valves double air-passage valves. In this construction it will be seen that each valve controls an alternative or substitute tube, which may be thrown into the air-column and when thrown into the air-column changes the pitch of that column according to length thereof. Return-curve 34 of casing 11 when thrown into the air-column by the shifting of the valve in said casing changes the pitch a half-tone. Return-curve 27 of casing 10 when thrown into the air-column by the shifting of the valve in said casing changes the pitch a whole tone. Return-curve 21 of casing 12 when thrown into the air-column by the shifting of the valve in said casing changes the pitch a tone and a half. By making the curved portion of the return-curves movable I am able to utilize them for a double purpose, that of the return-curve proper and also as a pitch tuning-slide, valve tuning-slides, and B-flat and A quick-changing tuning-slides without the addition of any extra parts or supplemental return-curves, whereby only three return-curves are in the air-column at any one time.

Having described my invention, what I claim is—

1. In a wind musical instrument a valve-casing; two return-curves of unequal lengths secured to said casing, each of said curves being provided with a movable section forming a tuning-slide; and a valve in said casing having four passages therethrough arranged in pairs, each pair being adapted to register with a different return-curve.

2. A wind musical instrument, a valve-casing therein; two return-curves of unequal lengths secured to said casing, each of said curves being provided with a movable section, one of said sections having a greater movement than the other; adjustable mechanism connecting said movable sections together during a portion only of the travel of that section having the greater length of travel, said movable sections forming tuning-slides; and a valve in said casing having four passages therethrough arranged in pairs, each pair being adapted to register with a different return-curve.

3. A wind musical instrument provided with a plurality of valve-casings; return-curves of unequal lengths secured to said valve-casings, there being two return-curves of unequal lengths secured to each of said valve-casings, each of said curves being provided with a movable section forming a tuning-slide; and a valve in each of said valve-casings provided with four passages therethrough arranged in pairs, each pair being adapted to register with a different return-curve.

In witness that I claim the foregoing I have hereunto subscribed my name this 9th day of March, 1905.

EDGAR HARRISON.

Witnesses:
G. E. HARPHAM,
MYRTLE JONES.