July 23, 1935. C. L. DEWEY 2,008,900

WIND INSTRUMENT

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Fig. 1

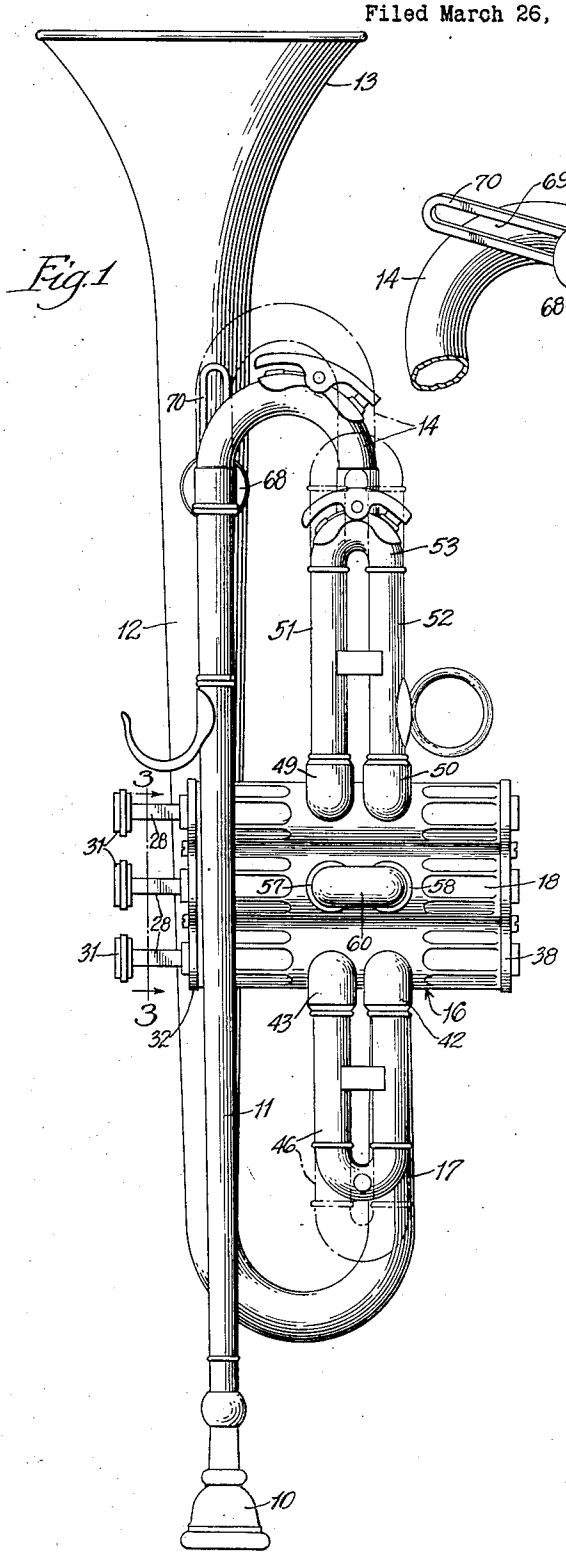


Fig. 2

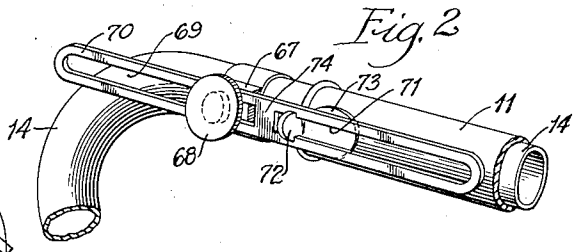
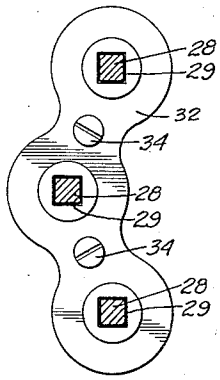


Fig. 3



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Fig. 4

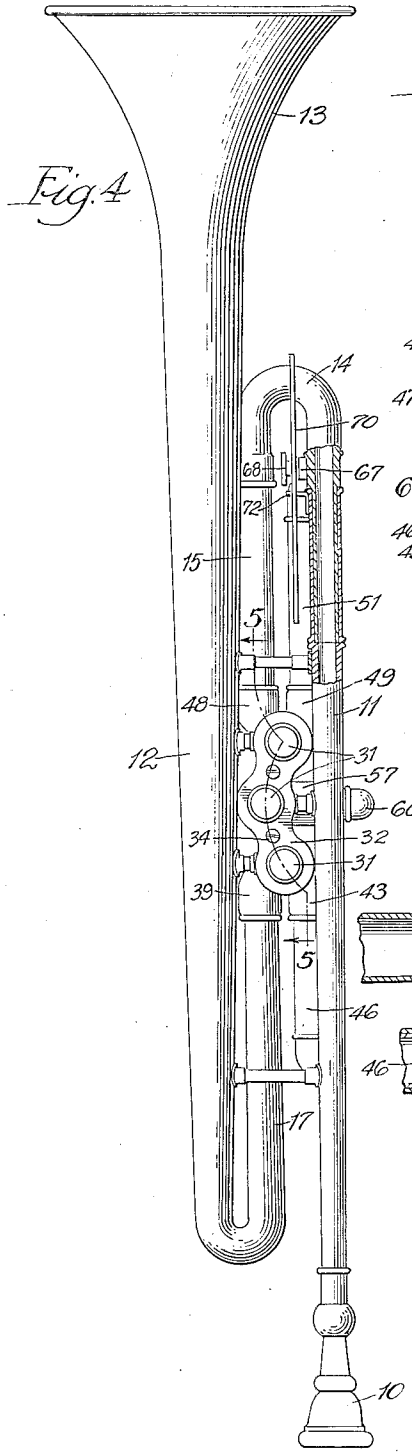


Fig. 5

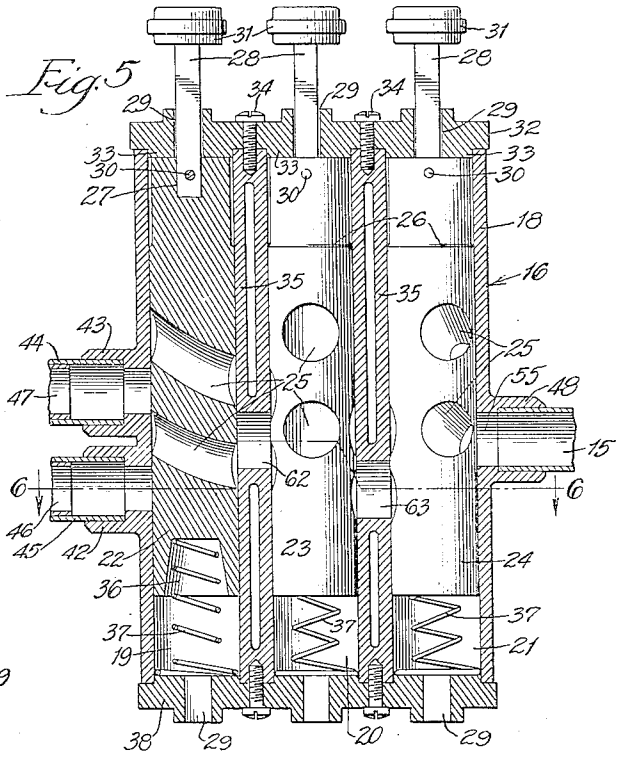
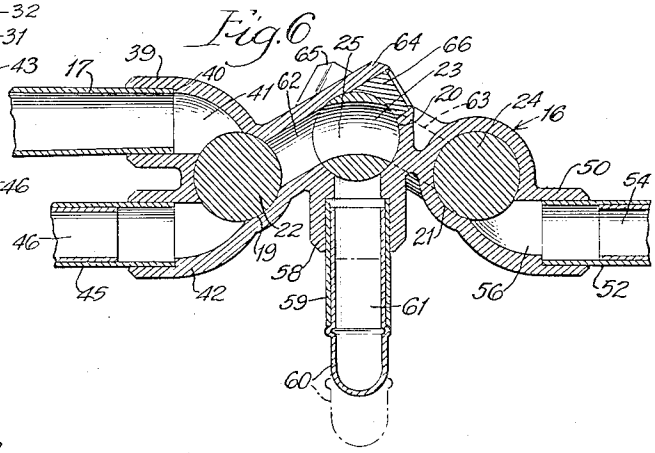


Fig. 6



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UNITED STATES PATENT OFFICE

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WIND INSTRUMENT

Clarence L. Dewey, Elkhart, Ind.

Application March 26, 1934, Serial No. 717,328

6 Claims. (Cl. 84—392)

The features of the present invention are directed primarily to the valve construction of wind instruments such as trumpets, cornets or the like, in which finger valves are provided for controlling the pitch of the tones.

Heretofore it has been customary to construct the valve casings of sheet metal or tubes cut and fabricated to the desired form, but the object of the present invention is to so design the casing that it may be formed integrally by die casting methods, with the exception of the head plates, which, however, are likewise formed integrally, thereby reducing the cost of production and insuring exact accuracy in dimensions and uniformity in the product.

The invention further relates to the arrangement of the three valve stems provided with the customary finger buttons, which are so positioned as to best conform to the natural movements of the player, which result is accomplished by placing the row of three finger buttons in arcuate arrangement which better accommodates the group arrangement of the three fingers of the player's hand, including the middle finger which is naturally longer than the index finger and the third finger, so that by the arrangement mentioned the tips of the fingers will lie naturally and easily upon the finger buttons, which is not the case where the buttons are arranged in straight alignment which is the customary or conventional practice.

The invention further relates to the means provided for adjusting and locking one of the slides in such a way as to limit the normal movement of the slide and at the same time to permit more accurate tuning as occasion may require.

Further objects and details will appear from a description of the invention in conjunction with the accompanying drawings, wherein,—

Figure 1 is a side elevation of a wind instrument embodying the features of the present invention;

Fig. 2 is a perspective detail showing the adjusting bar for one of the slides;

Fig. 3 is a top or plan view of the head plate for the valve casing taken on line 3—3 of Fig. 1;

Fig. 4 is a top or plan view of the instrument;

Fig. 5 is an enlarged sectional elevation of the valve casing with the plungers in position; and

Fig. 6 is a sectional plan view taken on line 6—6 of Fig. 5.

The features of the present invention are applied to an instrument which in the main is of conventional form and includes a mouth piece 10, a primary tube section 11, and a secondary tube section 12 terminating in the usual bell-shaped mouth 13.

The primary tube section at its inner end has telescoped thereinto one of the legs of a U-shaped tubular slide 14, the other leg of which telescopes into a tube section 15 connecting with the valve casing 16 presently to be described.

The secondary tube section 12 has its forward or reduced end 17 recurved and entered into the valve casing, thus in general completing the circuit from the mouth piece to the bell.

The valve casing, which more particularly constitutes the subject matter of the present invention, is preferably constructed to afford a body portion 18 integrally formed by suitable die casting process and provided with three cylindrical bores 19, 20, 21, which may be conveniently referred to as the first, second and third bores, and which constitute the cylinders within which operate the piston valves 22, 23, 24.

The valves are provided with the usual air passages 25, but since the present invention is not concerned with any peculiar formation of these passages, it is not deemed necessary to describe them in detail, since they follow the conventional practice in location and arrangement.

Each of the piston valves is of elongated cylindrical formation and is slightly reduced in diameter at its upper end by the provision of a shoulder 26. Each of the piston valves at its upper end is preferably provided with a square socket 27 for the reception of a square valve stem 28 which operates through a square aperture 29, which arrangement serves to prevent rotative movement of the piston valves, which is necessary in order to maintain the passages in proper relation to the ports with which they co-operate. Each of the valve stems 28 is secured in place by a cross pin 30 and each of the valve stems carries a finger button 31 at its upper end.

The apertures 29 are formed through an integral cap plate 32 which is common to the three valve bores, and is provided on its inner surface with properly spaced bosses 33 which fit snugly into the ends of the respective bores. The cap plate is held in place by screws 34 which are entered through the cap plate and into the intermediate walls 35 of the valve casing, thereby closing the upper ends of the bores and holding the pistons in properly adjusted relation.

Each of the pistons at its lower end is provided with a recess 36 which receives the upper end of a coil spring 37, the lower end of which bears against a cap plate 38 which is in all respects a duplicate of the cap plate 32, so that the cap

plates at each end are interchangeable one with the other.

The arrangement of the cylinder bores with respect to one another is best illustrated in Fig. 6, from which it will be noted that the second or intermediate bore stands in offset relation to the other two, so that as viewed from above the three finger buttons 31 will stand in arcuate relation to one another, the intermediate button occupying a position slightly more distant from the palm of the player's hand than the two others in order to accommodate the greater length of the middle finger, so that with the arrangement shown the tips of the index, middle and third fingers will lie evenly upon the three buttons without the necessity for normally lifting or bowing the middle finger for the purpose of bringing the middle finger tip into alignment with the other two finger tips which is necessitated by the conventional arrangement heretofore observed of arranging the finger buttons in straight alignment with one another.

The valve casing is provided on its forward end wall with a rear knuckle 39 of elbow-shape, which is shouldered at the point 40 to receive the recurved end 17 of the secondary tube section 12, which is closely fitted into the end of the knuckle and into abutting relation with the shoulder and is soldered in position to bring the tube section into communication with a curving bore 41 through the interior of the knuckle and in communication with the bore 19.

The casing is further provided with a lower knuckle 42 and an upper knuckle 43 which stand in superposed relation and are similarly shouldered to receive the female tube sections 44 and 45 of a U-shaped slide valve having legs 46 and 47 which are slidably mounted within the tube sections 44 and 45. Similarly, on the rear side of the valve casing, an interiorly shouldered knuckle 48 is provided which receives the end of the tube section 15, and forwardly of the knuckle 48 are located upper and lower interiorly shouldered knuckles 49 and 50 which receive the female tube sections 51 and 52 of a slide valve 53, the legs 54 of which slidably co-operate with the tube sections 49 and 50 in the usual manner. The knuckle 48 communicates with the third valve bore through a port 55, while each of the knuckles 49 and 50 is provided with a port 56.

The valve casing is further provided with upper and lower knuckles 57 and 58 which communicate with the second bore 20 and are shouldered to receive the female tube sections 59 of a slide valve 60, the legs 61 of which reciprocate within the tube sections.

The valve casing above described is provided with ports 62 and 63 which establish communication between the respective bores, and in order to facilitate the casting operation the valve casing is extended to afford bosses 64 and 65 which are obliquely bored to align with the ports 62 and 63 and are provided with plugs 66 which when inserted give the casing the characteristics of an integral construction.

The slide valve 14, which connects the tube 11 with the tube 15, is provided with a base block 67 which receives a locking screw 68 entered through an outer slot 69 in a slide bar 70 provided with an inner slot 71 which embraces an undercut stop finger 72 outstanding from a plate 73 which is secured on the inner side to the end of the tube section 11.

Between the slots 69 and 71 there is a cross bridge 74 which establishes the operating length of each of the slots. The arrangement is one which permits the slide bar to be adjusted with relation to the slide valve, and thereafter locked in position to limit the outward draw of the slide valve to the regulation distance. Where accurate tuning is required, the locking screw 68 may be loosened and the slide valve adjusted to the degree required to properly tune the instrument.

It will be understood that the particular arrangement of slide valves and passages shown serves merely by way of exemplification and that the principles of the present invention may find embodiment in numerous variations in detail, depending upon the particular kind or style of wind instrument to which the valve mechanism is applied and the intended relationship of the passages to secure the kind or quality of tone intended.

By forming the valve casing in the manner described, it is possible by a single casting operation to furnish the cylinders required for the operation of the three pistons with the knuckles required for making attachment of the tubing to the valve casing and to insure exact dimensions in the parts and passages composing the casing, without possibility of leakage, so that instruments built in conformity with the principles of the present invention can be cheaply constructed without sacrifice of tone, and uniformity in the character and quality of the product obtained, in greater degree than is possible where the valve casings are fabricated in the usual manner.

By casting the head plates 32—38 for the valve casing in the manner described, the plates can be used interchangeably either at the top or bottom, and when used at the bottom the apertures 29 serve to admit air beneath the piston valves as the same return under the action of the springs, so that no other special provision for the air is required.

By squaring the valve stems 28, the piston valves are held against rotative movement without the necessity for providing additional safeguards against maladjustment, and the method of uniting the parts together is one which permits of the three pistons being readily assembled in relation to the head plate and the three parts thus assembled to be introduced as a unit in the valve casing, after which the springs are introduced and the lower plate 38 applied, which completes the assembly.

The knuckles are all shouldered to receive the intended tube sections so that the latter will fit exactly into the spaces provided for their retention and will be firmly and rigidly held in position to permit easy and accurate operation of the slide valves.

The construction is one which affords ample rigidity to maintain the parts in proper working relation and to prevent binding, cramping or maladjustment of the movable parts. As shown, the exterior wall of the casing may be paneled or otherwise configured or embellished to afford an attractive and ornamental appearance, and the castings can be made of suitable alloys of aluminum or other light metal, so that the weight of the instrument will not be increased to any objectionable degree.

I claim:

1. In a wind instrument of the class described, the combination of tube sections for the discharge of air, valve means interposed between said tube sections and consisting of a cast valve casing provided with a plurality of bores furnishing cylinders, piston means slidably mounted within said

bores and provided with air passages, knuckles integrally formed on the valve casing and having the tube sections entered thereinto, an integrally formed head plate at each end of the cylinder bores constituting a closure for the proximate ends of the bores, the head plate at the top of the casing being provided with a squared aperture for each of the cylinder bores, a squared valve stem connected with each of the pistons and entered through the corresponding aperture, and a finger button on each of the valve stems.

2. In a wind instrument of the class described, the combination of tube sections for the discharge of air, valve means interposed between said tube sections and consisting of a cast valve casing provided with a plurality of bores furnishing cylinders, piston means slidably mounted within said bores and provided with air passages, knuckles integrally formed on the valve casing and having the tube sections entered thereinto, an integrally formed head plate at each end of the cylinder bores constituting a closure for the proximate ends of the bores, each of said head plates having bosses entered into the bores, screw means for attaching the head plates to the valve casing, the head plate at the top of the casing being provided with a squared aperture for each of the cylinder bores, a squared valve stem connected with each of the pistons and entered through the corresponding aperture, and a finger button on each of the valve stems.

3. In a wind instrument, the combination of tube sections, a cast valve casing into which the tube sections are entered, said casing being cored to provide three valve cylinders, the middle cylinder being offset inwardly with respect to the other two cylinders, pistons within the respective cylinders, a cast head plate for the upper ends of all three cylinders, said head plate being provided with three squared apertures one for each cylinder, squared valve stems slidably mounted within said apertures, and finger buttons on the ends of the said valve stems, the middle button being inwardly offset to accommodate the greater length of the player's middle finger.

4. In a wind instrument, the combination of tube sections, a cast valve casing into which the tube sections are entered, said casing being cored to provide three valve cylinders, the middle cylinder being offset inwardly with respect to the other two cylinders, pistons within the respective cylinders, a cast head plate for the upper ends of all three cylinders, said head plate being provided with three squared apertures one for each cylinder, squared valve stems slidably mounted within said apertures, finger buttons on the ends of the said valve stems, the middle button being inwardly offset to accommodate the greater length of the player's middle finger, and a similarly formed cast head plate for the lower ends of the cylinders.

5. In a wind instrument, the combination of tube sections, a cast valve casing into which the tube sections are entered, said casing being cored to provide three valve cylinders, the middle cylinder being offset inwardly with respect to the other two cylinders, pistons within the respective cylinders, a cast head plate for the upper ends of all three cylinders, said head plate being provided with three apertures, one for each cylinder, valve stems slidably mounted within said apertures, and finger buttons on the ends of said valve stems, the middle button being inwardly offset to accommodate the greater length of the player's middle finger.

6. In a wind instrument, the combination of tube sections, a cast valve casing into which the tube sections are entered, said casing being cored to provide three valve cylinders, the middle cylinder being offset inwardly with respect to the other two cylinders, pistons within the respective cylinders, a cast head plate for the upper ends of all three cylinders, said head plate being provided with three apertures, one for each cylinder, valve stems slidably mounted within said apertures, and finger buttons on the ends of said valve stems, the middle button being inwardly offset to accommodate the greater length of the player's middle finger, and a similarly formed cast head plate for the lower ends of the cylinders.

CLARENCE L. DEWEY.