

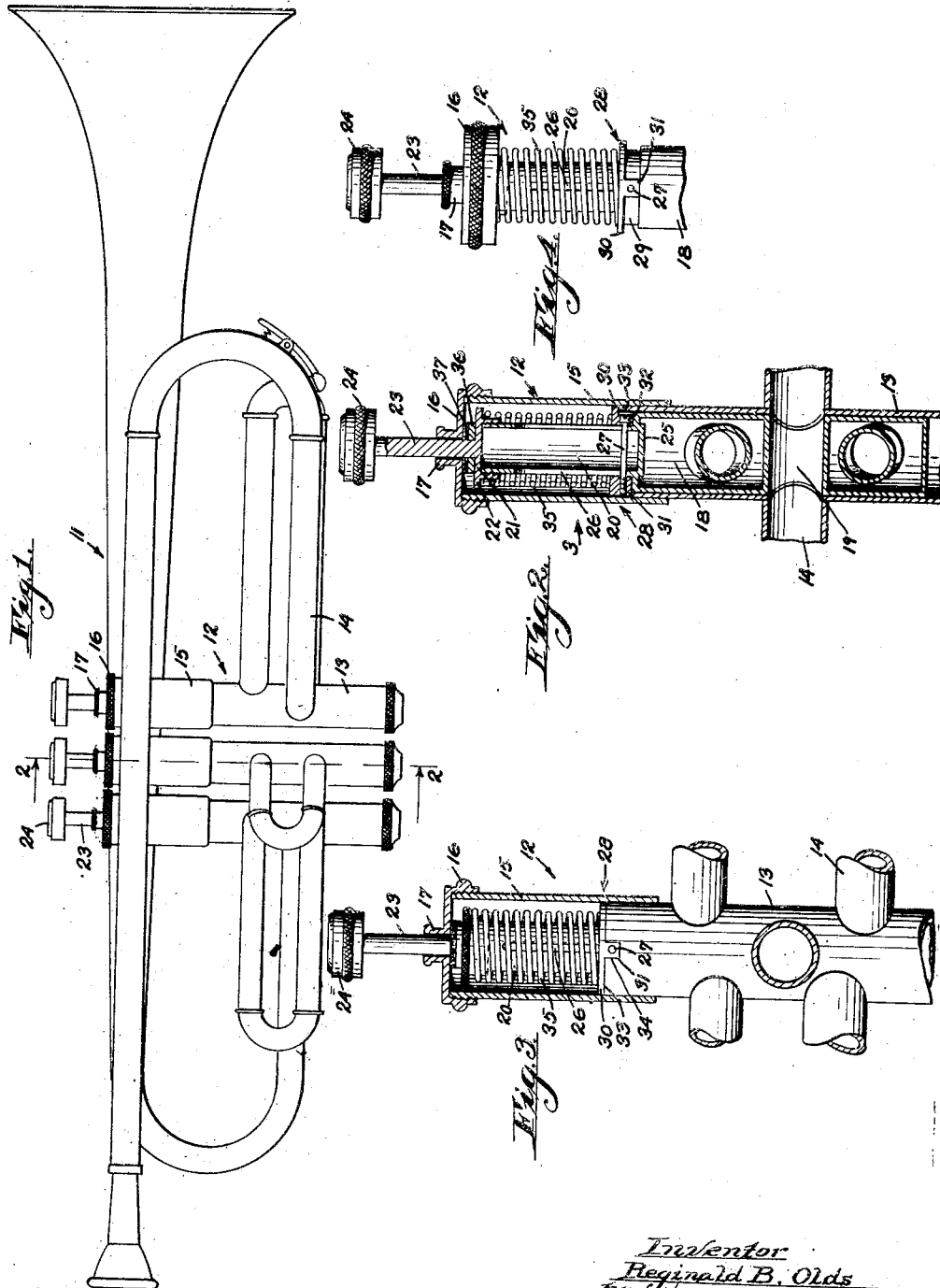
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PISTON VALVE FOR WIND INSTRUMENTS

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UNITED STATES PATENT OFFICE

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PISTON VALVE FOR WIND INSTRUMENTS

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My invention relates to a piston valve construction and mounting of such valve in a wind musical instrument.

A feature of my invention relates preferably to the mounting of the spring for retracting the piston into its outer-most position after depression of the keys; the mounting of the piston to prevent rotation whereby the ports through the piston are maintained in proper alignment with the tubes of the musical instrument; and also an arrangement for properly centering the piston to prevent this from being displaced laterally, particularly the guide structure for the stem connecting the keys to the piston.

I utilize a valve casing with a piston therein of a standard type. This piston having ports therethrough to register with the tubes of the musical instrument. Connecting with the valve casing at the top I utilize a tubular ballister of the standard type. However my construction departs from the standard in having an enlarged barrel secured to the upper part of the piston, and the stem for operating the piston is connected to the upper part of the barrel and operates through a cap in the ballister, the key being attached to the top of the stem. In order to prevent the piston from rotating and forming an incorrect guide, the barrel is provided with a longitudinal slot through which extends a pin. This pin is screw-threaded into a ring which is itself slidable on the barrel and this ring has a lug thereon which is engaged in a recess in the valve casing. A compression spring having a large number of coils and large diameter pins on the ring at one end thereon, an enlarged head on the barrel thus always maintaining the ring seated against the upper edge of the valve casing inside of the ballister and with the lug through which the pin is connected seated in the recess in the valve casing.

My invention is illustrated in connection with the accompanying illustrations in which,

Fig. 1 is a side elevation of a conventional trumpet,

Fig. 2 is a vertical section through one of

the piston valves taken on the line 2—2 of Fig. 1 in the direction of the arrows,

Fig. 3 is an elevation taken in the direction 3 of Fig. 2 with part of the ballister in section,

Fig. 4 is an elevation showing part of the piston valve, the barrel, spring and other details.

In Fig. 1 I illustrate a conventional trumpet designated by the numeral 11 which trumpet has a series of piston valves 12, each of these valves is generally of the same construction. They have a valve casing 13 with various tubes 14 leading to the casing. Connected to the upper part of the casing there is a tubular ballister 15, which ballister has a closure cap 16 screw-threaded thereon with a tubular guide-neck 17 above the cap.

The piston 18 is provided with a series of ports 19 extending therethrough to register with the different tubes of the instrument. Above the piston, there is a barrel 20 having a head 21 screw-threaded thereon. This head has an extended flange 22. Stem 23 extends upwardly from the head through the guide-neck 17 and has a key 24 thereon. There is a closure 25 at the lower end of the barrel closing this off from the hollow space in the interior of the piston.

To prevent rotation of the piston the barrel is provided with a pair of longitudinal slots 26 through which extends a screw-threaded pin 27, which pin extends through a ring 28. This ring has a cylindrical section 29 and a flange section 30 extending outwardly therefrom and on one side of the ring there is a lug 31. The pin is screw-threaded into this lug, the head 32 of the pin fitting against the cylindrical section 29 of the ring. The flange of the ring is adapted to bear on the upper edge 33 of the valve casing and this casing has a recess 34 to accommodate the lug 31. A horizontal spring 35 with a large number of coils and of relatively large diameter has its lower end bearing on the upper part of the ring and its upper end engaging the flange 22 of the head 21. Above the head there is the usual cork buffer 36 with a felt pad 37 to engage the under side of the cap 16.

In operation of the piston valve due to depression of the keys it will be seen that the ring 28 on account of being constantly pressed downwardly towards the valve casing by the spring 35 that the lug 31 is always maintained in the recess 34. Therefore as the ring cannot rotate, the pin 27 is held from rotation and this pin operating in the slots 29 through the barrel prevents rotation of the barrel and hence of the piston. The spring is of relatively large diameter being substantially as large as the interior of the ballister will allow and this is provided with a large number of turns of coils. Therefore the compressing action due to a pressure on the keys compresses the spring evenly and as the spring is not overtaxed the pressure required to depress the key is substantially uniform for the full stroke of the piston and the reaction of the piston gives a smooth motion of the piston outwardly exerting substantially a constant pressure against the player's finger when operating the keys.

The key 24 is provided with the usual interior pad which engages the upper part of the neck 17 thus forming a stop or limit on inward movement of the piston.

I claim:

1. A musical instrument having a valve casing with a tubular ballister connected thereto, and a cap on the ballister, a piston slidable in the casing, a barrel connected to the piston, a stem attached to the upper end of the barrel and sliding through an opening in the cap with a key at the upper end of the stem, a ring on the barrel engaging the upper end of the casing, a spring coiled on the barrel and interconnecting the upper end of the barrel and the ring, and means to prevent rotation of the barrel and piston.

2. A musical instrument having a valve casing, a tubular ballister connected thereto, a cap on the upper end of the ballister, said cap having a guide-neck, a piston in the casing, a barrel connected to the piston, a stem connected to the barrel and sliding through said neck, with a key on the upper end of the stem, a spring coiled on the barrel, means interconnecting the spring to one end of the barrel and to the valve casing, the barrel having a slot with a pin extending therethrough, and means to prevent the pin from rotation.

3. A musical instrument having a valve casing, a tubular ballister connected thereto, a cap on the ballister having a guide-neck, a piston in the casing, a barrel connected thereto having a stem at its upper end sliding through the said neck, with a key on the stem, a ring on the barrel having a portion to engage the valve casing, a spring coiled on the barrel and having means to engage one end of the barrel and the said ring, means to prevent rotation of the barrel.

4. A musical instrument having a valve casing, a tubular ballister connected thereto,

a cap on the ballister having a guide-neck, a piston in the casing, a barrel connected thereto having a stem at its upper end sliding through the said neck, with a key on the stem, a ring on the barrel having a portion to engage the valve casing, a spring coiled on the barrel and having means to engage one end of the barrel and the said ring, means to prevent rotation of the barrel comprising slots in the barrel, a pin in the ring extending through said slots and means to prevent rotation of the ring.

5. A musical instrument having a valve casing, a tubular ballister connected thereto with a cap on the ballister having a guide-neck, a piston slidable in the casing, a tubular barrel connected thereto having a slot therethrough, a stem connected to the barrel and sliding through the neck with a key at the upper end of the stem, a ring on the barrel having a pin therethrough engaging in the said slot, the ring engaging the upper end of the casing, a spring coiled on the barrel and extending between the upper end of the barrel and the ring, the said ring having a lug there being recesses in the casing in which the said lug fits.

6. A musical instrument having a tubular valve casing, a tubular ballister connected thereto with a cap having a guide-neck, a piston slidable in the casing, a barrel connected to the piston having a head attached thereto, a stem extending from the head and sliding through the said neck with a key on the upper end of the stem, a ring surrounding the barrel and having a flange to engage the valve casing there being a slot in the barrel with a pin through the ring engaging the said slot, a spring between the head and the ring coiled on the barrel and means to prevent rotation of the ring.

7. A musical instrument having a tubular valve casing, a tubular ballister connected thereto with a cap having a guide-neck, a piston slidable in the casing, a barrel connected to the piston having a head attached thereto, a stem extending from the head and sliding through the said neck with a key on the upper end of the stem, a ring surrounding the barrel and having a flange to engage the valve casing there being a slot in the barrel with a pin through the ring engaging the said slot, a spring between the head and the ring coiled on the barrel, and means to prevent rotation of the ring comprising a lug on the ring, there being a recess in the casing with the lug fitted therein, and one end of the pin being threaded to the said lug.

In testimony whereof I have signed my name to this specification.

R. B. OLDS.