April 21, 1931. J. H. BROOKS 1,801,717

AIR VALVE

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Fig. 1.

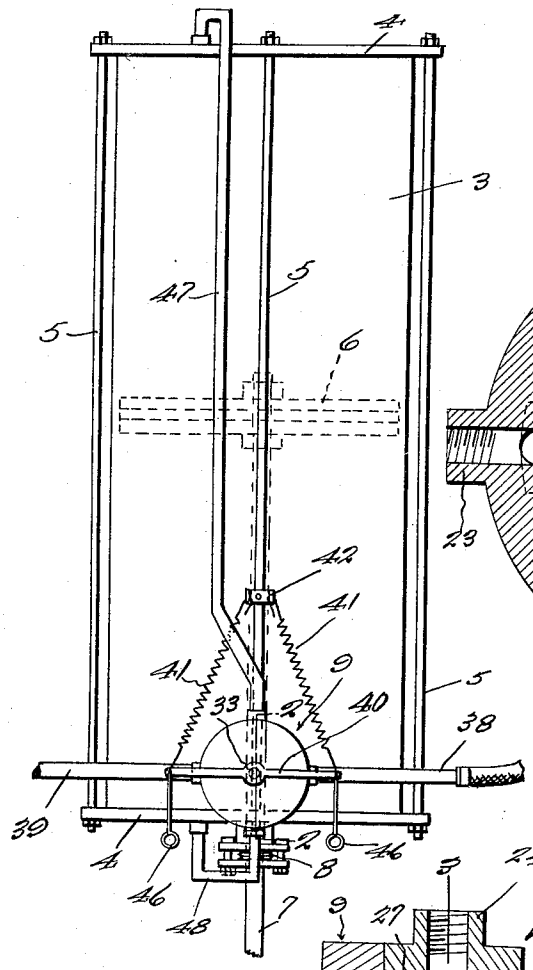
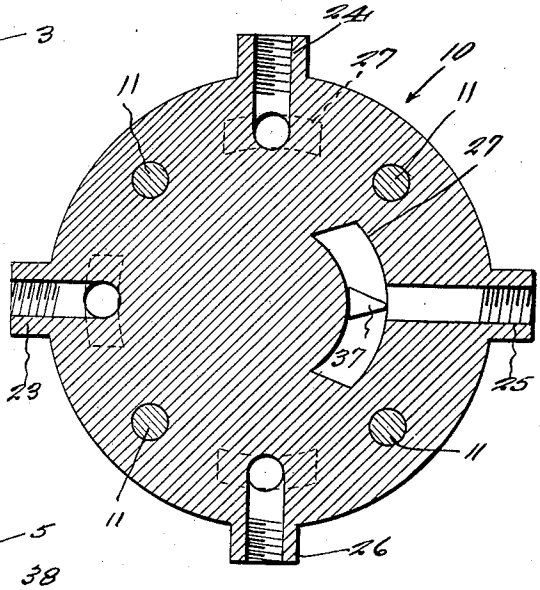


Fig. 3.



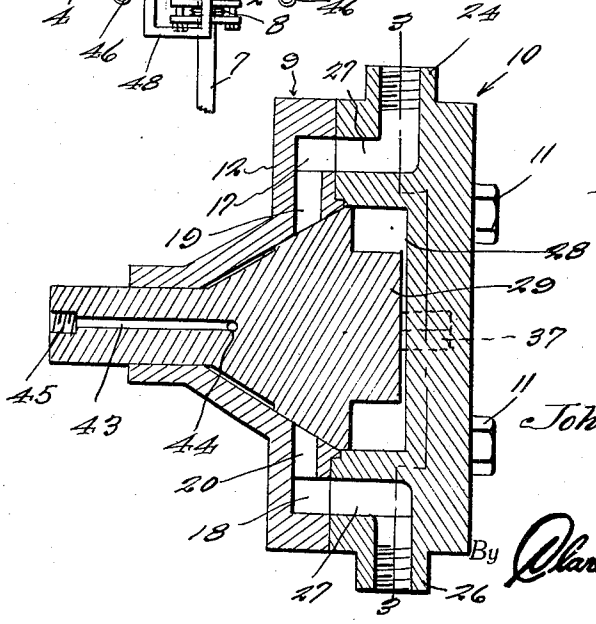


Fig. 2.

Inventor
John H. Brooks

By Clarence A. O'Brien
Attorney

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Fig. 5.

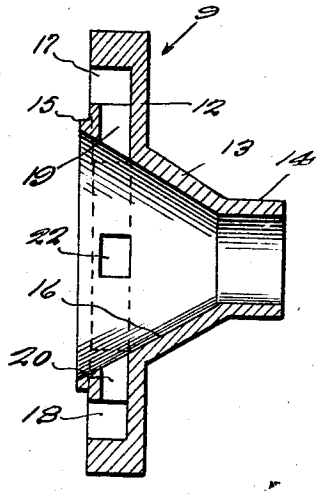


Fig. 4.

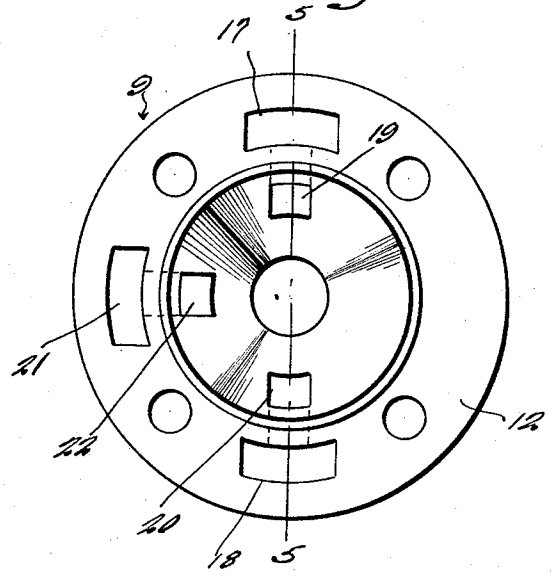


Fig. 6.

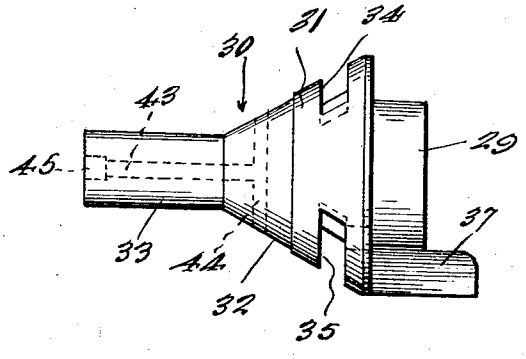
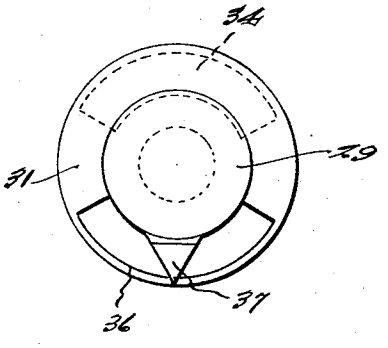


Fig. 7.



Inventor

John H. Brooks

By Clarence A. O'Brien

Attorney

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UNITED STATES PATENT OFFICE

JOHN H. BROOKS, OF MUSKEGON, MICHIGAN

AIR VALVE

Application filed May 16, 1929. Serial No. 363,628.

The present invention appertains to new and useful improvements in valves and more particularly to a valve for distributing compressed air in the operation of a compressed air operable hoist.

The principal object of the invention is to provide a valve of such special construction as to obviate the necessity of providing any form of packing for the valve member.

Another salient object of the invention is to provide a valve for distributing compressed fluid wherein the valve element is tensionally maintained in an equalized position.

After considering the following specification and claim, other important objects and advantages of this invention will readily become apparent.

In the drawings:

Figure 1 represents a side elevation of an air expansible chamber shown equipped with the novel valve structure.

Figure 2 represents a vertical sectional view of the valve structure taken substantially on the line 2—2 of Figure 1.

Figure 3 is a vertical sectional view, taken substantially on the line 3—3 of Figure 2.

Figure 4 represents an inside elevation of one section of the valve body.

Figure 5 represents a vertical sectional view through the valve body section shown in Figure 4 and being taken substantially on the line 5—5 of Figure 4.

Figure 6 is a side elevation of the rotary valve element.

Figure 7 is an end elevation of the valve element looking toward its enlarged end.

Referring to the drawings wherein like numerals designate like parts, Figure 1 shows a vertically disposed cylinder 3, closed at its ends by header plates 4—4. These plates are tightly secured to the ends of the cylinder 3 by interconnecting tie rods 5. A piston 6 is operable within the cylinder 3 and is suitably secured to a rod 7 which is slidably disposed through a packing gland 8, depending below the lower header plate 4.

The novel valve structure is generally referred to by numeral 9 and the body portion thereof consists of a pair of sections 9 and 10 adapted to be connected together by bolts 11.

The body section 9 consists in construction of an annular plate 12, merging at its central portion into a tapering protuberance 13, the outer reduced end portion of which merges into a cylindrical extension 14. The inner face of the annular plate 12 is provided with a concentrically disposed rib 15. The inner surface of the conical portion 13 as well as the inner surfaces of the plate 12 and rib 15 form an inwardly flaring valve seat 16. The inner side of the plate 12 is provided with upper and lower arcuate shaped pockets 17 and 18. These pockets have openings 19 and 20 which open on the surface of the seat 16. An inlet opening 21 of arcuate formation has a duct 22 leading therefrom and opening through the surface of the seat 6.

The section 10 of the valve body is provided with four equi-distantly spaced internally threaded nipples 23, 24, 25, and 26, which are radially disposed from the periphery thereof. Each of the nipples communicates with an arcuate channel 27 on the inner side of the section. The channel 27 with which the inlet nipple 25 communicates is relatively deep and more elongated than the other channels. The section 10 is also constructed to provide a pocket 28 at the central portion of its inner side to accommodate the reduced extending portion 29 of the rotary valve plug generally referred to by 30.

The valve plug consists in construction of a conical intermediate portion 31, reduced at 32, and merging at its reduced end into an elongated cylindrical shank 33. The conical intermediate portion 31 of the valve element has a circumferentially extending cut-out portion 34 and a second circumferentially extending cut-out portion 35 at a diametrically opposite portion thereon. An opening 36 opens the cut-out portion 35 through the enlarged end of the conical portion 31. The opening 36 is arcuate and is of the same extent as the cut-away portion 35 as is apparent from the perusal of Figure 7. A finger 37 projects longitudinally from the enlarged end of the conical portion 31 at the periphery of the reduced extension 29. This finger is

of triangular cross section and has one edge portion disposed radially with respect to the reduced extension 29.

The valve assembled in position has an air inlet pipe 38 connected to the nipple 25, while an air exhaust pipe 39 leads from the nipple 23 at the diametrically opposite side of the valve body. An arm 40 is secured at its intermediacy to the shank 33 of the valve element 30 and has its respective ends connected by springs 41—41 to a suitable clamp 42 on one of the guy rods 5, for the obvious purpose of equalizing the position of the valve element 30. The shank portion 33 is provided with a longitudinally extending bore 33 which connects with a cross bore 34 opening at its ends on the reduced portion 32 of the valve 30, while the opposite end of the bore 33 opens into a threaded socket 45, which is adapted to receive a suitable lubricating fitting. Pull members 46 are attached to the ends of the arm 40, in the manner clearly shown in Figure 1. A pipe 47 extends from the nipple 24 to the upper end of the cylinder 3, while a pipe 48 extends from the nipple 26 to communicate with the cylinder 3 at its lower end.

It will thus be seen that normally the compressed fluid will enter the nipple 25 and channel 27 from where it passes into the pocket 28 at the inner side of the body section 10. This will exert a constant pressure against the valve element 30 tending to normally maintain the same snugly seated against the seat 16 of the complementary body section 9. When the valve element is swung clockwise or counter-clockwise, the cut away portion 34 of the valve will communicate the channel 27 of the inlet nipple 25 with the channel 27 of either the nipple 24 or 26, so that air may be delivered to either the upper end or lower end of the cylinder 3.

The foregoing description has been couched in definite terms, but it is to be understood that while this is so, various changes in the specific shape, size and material may be resorted to, without departing from the spirit and scope of the invention as claimed hereinafter.

What is claimed as new is:

A compressed air distributing valve comprising a sectional valve casing, one section of which consists of an annular plate merging at its central portion into a tubular conical protuberance terminating at its inner end in a cylindrical extension, the inner surface of the plate and conical portion forming a flared valve seat, said plate having a concentrically disposed rib on its inner face, and a plurality of circumferentially spaced arcuate pockets having ducts opening through the surface of the valve seat, the other section of the casing consisting of a relatively thick circular plate disposed against the inner face of the annular plate and presenting a central recess forming a continuation of the flaring valve seat, the outer edge of the wall of the recess being shouldered to engage over the said rib of the annular plate, said other section having a plurality of equi-distantly spaced nipples radially disposed from the periphery thereof, and an arcuate channel communicating with each nipple, one of said channels being deeper and more elongated than the other and opening into the said central recess, the other channels opening outwardly through the inner face of the section in communication with corresponding arcuate pockets of the annular plate, a conical valve plug engaged in the flaring valve seat and having at one end a cylindrical shank extending through the cylindrical extension of the annular plate, and at the other end the reduced circular extension engaging in the central recess of the other section, said conical plug having a pair of diametrically opposite cut-outs extending circumferentially thereof, one of said cut-outs being in communication with the circumferential recess and the other recess being elongated to effect communication between adjacent pairs of ducts, and an arm centrally mounted on the shank of the valve plug, and tensioning means at each end of the arm for equalizing the position of the valve plug.

In testimony whereof I affix my signature.

JOHN H. BROOKS.