

J. NOLAN.  
VALVE.

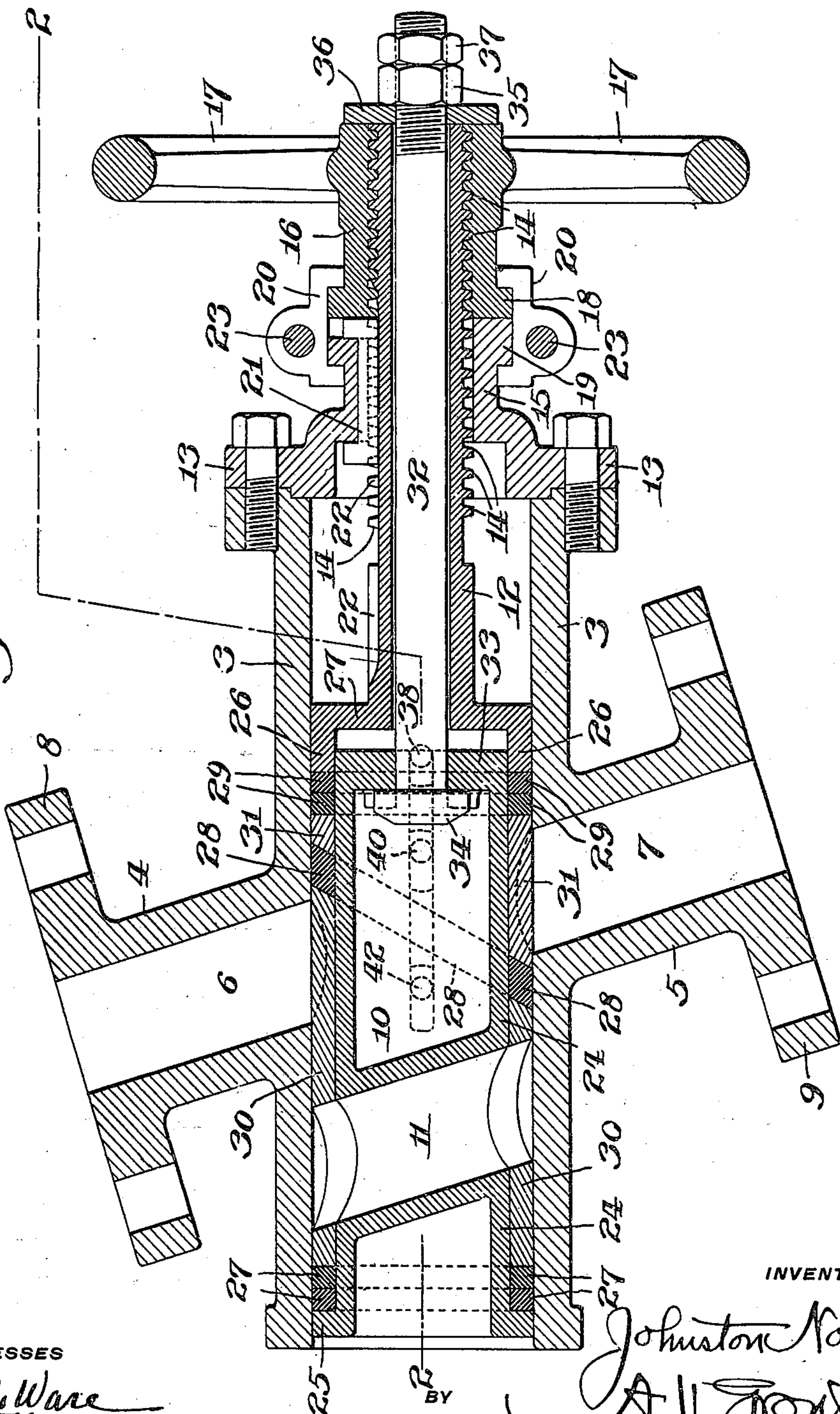
APPLICATION FILED FEB. 24, 1909.

963,314.

Patented July 5, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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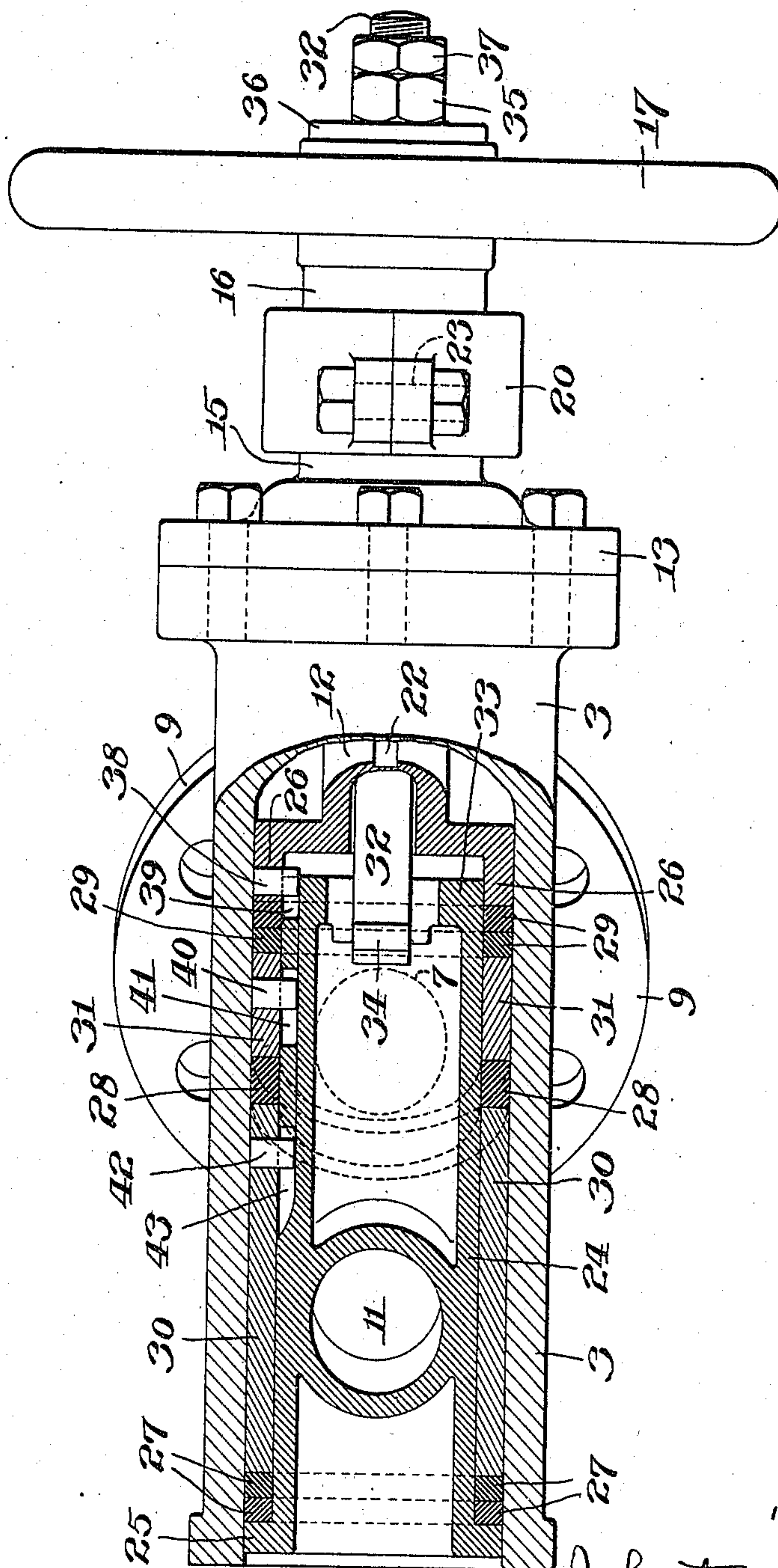
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3 SHEETS—SHEET 2.

Fig. 2.



WITNESSES

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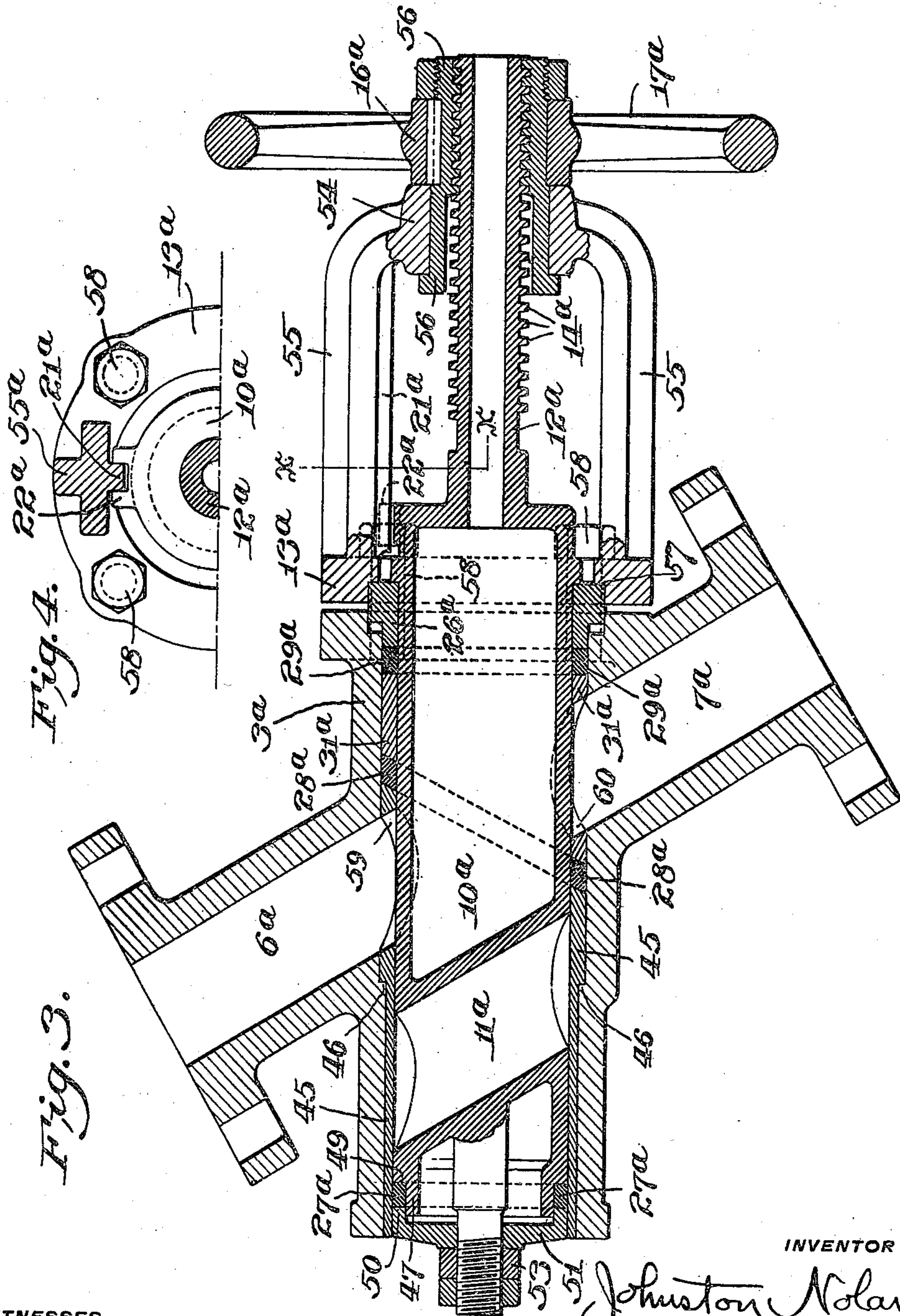
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3 SHEETS—SHEET 3.



WITNESSES

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# UNITED STATES PATENT OFFICE.

JOHNSTON NOLAN, OF PHILADELPHIA, PENNSYLVANIA.

## VALVE.

963,314.

Specification of Letters Patent.

Patented July 5, 1910.

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*To all whom it may concern:*

Be it known that I, JOHNSTON NOLAN, citizen of the United States, and resident of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Valves, of which the following is a full, clear, and exact description.

This invention relates to valves of the piston type, and particularly to steam blow-off valves of this type.

The object of the invention is to provide a simple, durable and efficient valve construction which will be easily operated, and which may be effectually adjusted to open and close communication between the inlet and outlet passageways of the valve.

Having this object in view, the invention consists in the novel construction and combinations of parts hereinafter fully described and claimed.

In the drawings:—Figure 1 is a longitudinal section of my improved valve. Fig. 2 is a section of the valve on the line 2—2 of Fig. 1. Fig. 3 is a view similar to Fig. 1, partly broken away, showing a modified form of the piston. Fig. 4 is a section on line X—X of Fig. 3.

The main body of the valve comprises a cylindrical casing 3 provided with oppositely-disposed, lateral extensions 4 and 5 through which extend lateral passageways 6 and 7 which communicate with the interior of the casing 3, and constitute the inlet and outlet passageways of the valve. The outer ends of the extensions 4 and 5 are provided with flanges 8 and 9 respectively, by means of which the valve may be attached to a pipe or pipes.

Fitted to the interior of the casing 3 is a longitudinally movable piston 10, having an opening 11 extending therethrough parallel to the openings 6 and 7, whereby, when the piston 10 is moved longitudinally within the casing 3, the opening 11 may be brought into and out of registry with the passageways 6 and 7 to open and close the valve by opening and closing communication between the passageways 6 and 7.

Extending from one end of the piston 10 is a hollow stem 12, which extends through a central opening in a head 13 secured to and closing one end of the casing 3. The stem 12 is exteriorly screw-threaded as at 14, and it extends outwardly through the

head 13 and is slidingly fitted to an opening in a boss 15 extending outwardly from the head 13.

Screwed on to the outer end of the stem 12 is the internally screw-threaded hub 16 of a hand wheel 17. The inner end of the hub 16 is provided with a flange 18 which abuts against a flange 19 on the outer end of the boss 15.

Surrounding the inner end of the hub 16 and the outer end of the boss 15 is a split or two-part collar 20, provided on its interior with a circumferential groove to which are fitted the flanges 18 and 19 in a manner to permit the wheel 17 to be rotated and to prevent the movement of the wheel 17 longitudinally of the stem 12. The two parts of the collar 20 are held together by suitable bolts or screws 23, as shown, and the collar 20 is made in two pieces held together by the bolts 23 for the convenience of assembling the parts.

In order to prevent rotation of the piston 10 and its stem 12 during the rotation of the hand wheel 17, I provide a suitable key 21 fitted to a groove in the boss 15, and to a keyway 22 in the stem 12. The ends of the key 21 are engaged with the ends of the boss 15 to prevent longitudinal movement of the key with the stem 12.

By the construction just described, it will be seen that by rotating the hand wheel 17, the piston 10 may be moved longitudinally within the casing 3 to bring the piston opening 11 into or out of registry with the openings 6 and 7 to open or close the valve, as desired.

The piston 10 shown in Figs. 1, 2, is of the following construction:—24 is the hollow body portion of the piston, provided with an integral flange 25 on its outer end and a collar 26 on its inner end, the collar 26 being formed on a head 27 from which the stem 12 projects. Surrounding the body portion 24 of the piston 10 are three packings, 27, 28 and 29. The packing 27 is arranged adjacent one end of the piston 10 against the flange 25 and is separated from the packing 28 by a cylindrical distance piece 30 which surrounds the body 24 of the piston 10; and the packing 29 is arranged adjacent the other end of the piston 10 against the collar 26, and is separated from the packing 28 by a cylindrical distance piece 31 which surrounds the body 24 of the



piston 10. It will be observed that the piston opening 11 extends through the main body of the piston and also through the distance piece 30.

5 By the piston construction just described, it will be seen that if the flange 25 and collar 26 be forced toward each other, the packings 27, 28, and 29 will be squeezed between the parts engaged therewith, thus forcing  
10 the packings into close contact with the cylinder 3 and body 24 of the piston. To thus adjust the packings I provide a rod 32 which extends through the hollow stem 12 and through the end wall 33 of the body 24 of  
15 the piston 10. The inner end of the rod 32 is provided with a head 34 which engages the wall 33, and the outer end of the rod 32 is screw-threaded and provided with a nut 35 which bears against a collar 36 surrounding the rod 32 and engaging the outer end of  
20 the stem 12. It will thus be seen that by tightening the nut 35, the flange 25 and body 24 of the piston 10 will be forced toward the collar 26 on the piston. A suitable jam nut 37 is provided on the outer end of  
25 the rod 32 to lock the nut 35 in place after the adjustment of the packing has been effected. The rod 32 not only serves as a means for adjusting the packing of the piston 10, but it also serves to hold all the parts  
30 of the piston 10 and its stem 12 together so that they may be adjusted as a unit by turning the hand wheel 17.

35 As previously described, the stem 12 is prevented from rotating by the key 21. The collar 26 being formed integral with the stem 12 is also prevented from rotating by the key 21. The body 24 of the piston 10 is prevented from rotating by a pin 38 extending  
40 from the collar 26 and into a slot 39 in the body 24; the distance piece 31 is prevented from rotating by a pin 40 extending from the distance piece 31 into a slot 41 in the body 24 of the piston; and the distance  
45 piece 30 is prevented from rotating by a pin 42 extending from the distance piece 30 into a slot 43 in the body 24 of the piston. The slots 39, 41 and 43, and pins 38, 40 and 42, engaged therewith respectively, thus prevent  
50 rotation of the parts of the piston with relation to each other, and at the same time permit their longitudinal adjustment with relation to each other for the purpose of adjusting the packing as hereinbefore described.  
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The diameter of the piston 10 is greater than the diameter of the lateral openings 6 and 7 of the valve, thus providing surfaces on the two sides of the interior of the  
60 casing with which the piston is engaged between the openings 6 and 7. The packing 28 extends obliquely through the interior of the casing 3 from a position adjacent one side of the opening 6 to a position adjacent  
65 the opposite side of the opening 7; and the

packing 28 is engaged with the piston 10 and the casing 3 entirely around the interior of the casing. This arrangement of the packing 28 causes it to entirely close communication between the passageway 6 and  
70 one end of the casing 3 and the passageway 7 and the other end of the casing 3 without exposing any of the packing to the passageways 6 and 7. Communication between the  
75 two ends of the casing and the openings 6 and 7 is closed by the packing 27 and 29, respectively.

The passageways 6 and 7 may be arranged opposite to each other on a line extending at right angles to the piston 10, in which case  
80 the opening 11 would also be arranged at right angles to the piston; but I preferably arrange the axes of the openings 6 and 7 on a line extending obliquely to the axis of the piston, so that the axes of the openings  
85 6 and 7 and the packing 28 will extend through planes that intersect each other at the axis of the piston, said planes on each side of the axis of the piston converging toward their intersection from opposite  
90 sides of a line at right angles to the axis of the piston, as shown in the drawings. The arrangement of the axes of the passageways 6 and 7 on the oblique plane just described, enables me to bring the plane of the packing  
95 28 closer to a plane at right angles to the piston 10 than if the openings 6 and 7 were arranged at right angles to the piston 10.

If desired, the packing 27, 28 and 29, instead of being carried by and movable with  
100 the piston of the valve as hereinbefore described, may be carried wholly or in part by the casing of the valve, as illustrated in the modification shown in Fig. 3 which I shall now describe.  
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3<sup>a</sup> is a casing which is substantially like the casing 3 hereinbefore described, the same being provided with lateral passageways 6<sup>a</sup> and 7<sup>a</sup>, corresponding with the passageways  
110 6 and 7. Fitted to the interior of the casing 3<sup>a</sup> is a longitudinally movable piston 10<sup>a</sup> corresponding with the piston 10, and having an opening 11<sup>a</sup> extending therethrough parallel to the openings 6<sup>a</sup> and 7<sup>a</sup> and corresponding with the opening 11. By moving  
115 the piston 10<sup>a</sup> longitudinally within the casing 3<sup>a</sup> the opening 11<sup>a</sup> may be brought into and out of registry with the passageways 6<sup>a</sup> and 7<sup>a</sup> to open and close the valve, similarly to the operation of the piston 10. Extending  
120 from one end of the piston 10<sup>a</sup> is a stem 12<sup>a</sup> which extends through a boss 54 carried by the upper end of arms 55 projecting from the head 13<sup>a</sup> on one end of the casing 3<sup>a</sup> corresponding with the head 13. The outer end  
125 of the stem 12<sup>a</sup> is exteriorly screw-threaded as at 14<sup>a</sup>, and screwed on to the outer end of the stem 12<sup>a</sup> is a collar 56 which is rotatably mounted in the boss 54. The outer end of the collar 56 has secured thereto the  
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hub 16<sup>a</sup> of a hand wheel 17<sup>a</sup>, by means of which the collar 56 may be rotated. Longitudinal movement of the wheel 17<sup>a</sup> and collar 56 with respect to the piston stem 12<sup>a</sup> is prevented by the engagement of the hub 16<sup>a</sup> of the wheel 17<sup>a</sup> with one side of the boss 54, and the engagement of a flange on the collar 56 with the other side of the boss 54. It will thus be seen that by rotating the hand wheel 17<sup>a</sup> longitudinal movement of the stem 12<sup>a</sup> may be effected to adjust the piston 10<sup>a</sup> longitudinally within the casing 3<sup>a</sup> to bring the opening 11<sup>a</sup> into and out of registry with the openings 6<sup>a</sup> and 7<sup>a</sup>. Rotation of the piston 10<sup>a</sup> is prevented during the longitudinal adjustment thereof by the engagement of a grooved projection 22<sup>a</sup> on the piston 10<sup>a</sup> with a rib 21<sup>a</sup> on one of the arms 55. The grooved projection 22<sup>a</sup> and rib 21<sup>a</sup> correspond with the keyway 22 and key 21, respectively. The interior of the casing 3<sup>a</sup> is provided with a bushing 45 which surrounds the piston 10<sup>a</sup> and is provided with a reduced portion forming a shoulder which abuts against a shoulder 46 on the casing 3<sup>a</sup>. This bushing 45 forms in effect a part of the casing 3<sup>a</sup>, and is only made separate therefrom for convenience of manufacturing. Surrounding the piston 10<sup>a</sup> are three packing rings, 27<sup>a</sup>, 28<sup>a</sup> and 29<sup>a</sup>, corresponding with the packing rings 27, 28 and 29. The packing 27<sup>a</sup> is arranged adjacent one end of the piston 10<sup>a</sup>, and it surrounds a reduced portion 47 of the piston and abuts against a shoulder 49 at the inner end of the reduced portion 47; and the packing 29<sup>a</sup> is arranged adjacent the other end of the piston 10<sup>a</sup>; while the packing 28<sup>a</sup> is arranged between the two packings 27<sup>a</sup> and 29<sup>a</sup>. The packing 27<sup>a</sup> is carried by and movable with the piston 10<sup>a</sup>, and the packing 27<sup>a</sup> is engaged by a collar 50 surrounding the outer end of the reduced portion of the piston 10<sup>a</sup>. The collar 50 projects from a head 51 which surrounds a screw-threaded stem 52 extending centrally from the piston 10<sup>a</sup>. The screw-threaded stem 52 is provided with a nut 53 by means of which the head 51 and therewith the collar 50 may be forced toward the shoulder 49, thus adjusting or tightening the packing 27<sup>a</sup> between the collar 50 and the shoulder 49. The packings 28<sup>a</sup> and 29<sup>a</sup> are not movable with the piston 10<sup>a</sup>. The packing 28<sup>a</sup> is arranged between the inner end of the bushing 45 and one end of a cylindrical distance piece 31<sup>a</sup> which surrounds the piston 10<sup>a</sup> and corresponds with the distance piece 31. The packing 29<sup>a</sup> is arranged between the other end of the distance piece 31<sup>a</sup> and the inner end of a collar 26<sup>a</sup> which surrounds the piston 10<sup>a</sup> and corresponds with the collar 26. It will thus be seen that if the collar 26<sup>a</sup> be forced toward the bushing 45, the packings 28<sup>a</sup> and 29<sup>a</sup> will be squeezed between the parts engaged there-

with, thus forcing the packings into close contact with the cylinder 3<sup>a</sup> and piston 10<sup>a</sup>. The outer end of the collar 26<sup>a</sup> is engaged by a shoulder 57 on the head 13<sup>a</sup> which surrounds the collar 26<sup>a</sup>. The head 13<sup>a</sup> is held in place by suitable cap-screws 58 extending therethrough and screwed into the casing 3<sup>a</sup>; and it will thus be seen that by tightening the cap-screws the head 13<sup>a</sup> and therewith the collar 26<sup>a</sup> may be forced toward the bushing 45 to adjust or tighten the packings 28<sup>a</sup> and 29<sup>a</sup> when desired. It will be observed that the bushing 45 is provided with an opening 59 in line with the passageway 6<sup>a</sup>, and that the distance piece 31<sup>a</sup> is provided with an opening 60 therein in line with the passageway 7<sup>a</sup>, so that the passageways 6<sup>a</sup> and 7<sup>a</sup> will extend to the outer face of the piston 10<sup>a</sup> to permit the opening and closing of the valve by bringing the opening 11<sup>a</sup> of the piston 10<sup>a</sup> into and out of registry with the openings 6<sup>a</sup> and 7<sup>a</sup>.

The arrangement of the packing ring 28 obliquely to the axis of the piston, forms a very important feature of my invention. It not only enables me to employ a comparatively narrow packing ring engaged with the piston and the casing entirely around the piston and entirely around the interior of the casing, but it also provides a construction in which communication between the two passageways 6 and 7 may be effectually shut off by a packing ring without exposing any of the packing to the passageways 6 and 7, thus obviating the consequent deterioration of the packing under the influence of the pressure fluid and foreign matter carried thereby.

I claim:—

1. In a valve, the combination of a casing having a lateral inlet opening and a lateral outlet opening therein, a piston within said casing for controlling communication between said openings, the axes of said openings being arranged on a line obliquely to the axis of the piston, means for moving the piston, and packing surrounding the piston and engaged therewith and with the casing entirely around the interior of the casing and extending obliquely through the casing from a position adjacent one side of one of said openings to a position adjacent the opposite side of the other of said openings.

2. In a valve, the combination of a casing having a lateral inlet opening and a lateral outlet opening therein, a piston within said casing and movable therein to close and open communication between said openings, means for moving the piston, packing surrounding the piston and engaged therewith and with the casing entirely around the interior of the casing and extending obliquely through the casing from a position adjacent one side of one of said openings to a position adjacent the opposite side of the other



of said openings, a distance piece surrounding the piston and engaged with said packing, and a second packing surrounding the piston and engaged therewith and with the casing and with said distance piece away from said openings.

3. In a valve the combination of a casing having a lateral inlet opening and a lateral outlet opening therein, a piston within said casing and movable therein to close and open communication between said openings, means for moving the piston, packing surrounding the piston and engaged therewith and with the casing entirely around the interior of the casing and extending obliquely through the casing from a position adjacent one side of one of said openings to a position adjacent the opposite side of the other of said openings, a distance piece surrounding the piston and engaged with said packing, a second packing surrounding the piston and engaged therewith and with the casing and with said distance piece away from said openings, and means for adjusting said packing.

4. In a valve, the combination of a casing having a lateral inlet opening and a lateral outlet opening therein, a longitudinally movable piston within the casing, the axes of said openings being arranged on a line obliquely to the axis of the piston, said piston having an opening extending therethrough parallel to the casing openings, means for moving the piston to bring its opening into and out of registry with the casing openings, and packing surrounding the piston and engaged therewith and with the casing entirely around the interior of the casing and extending obliquely through the casing from a position adjacent one side of one of said openings to a position adjacent the opposite side of the other of said openings.

5. In a valve, the combination of a casing having a lateral inlet opening and a lateral outlet opening therein, a longitudinally movable piston within the casing, packing surrounding said piston adjacent one end thereof, packing surrounding said piston adjacent the other end thereof, said piston having an opening therein extending there-through parallel to the casing openings and located between said packings, packing arranged between the first and second named packings and surrounding the piston and engaged therewith and with the casing entirely around the interior of the casing and extending obliquely through the casing from a position adjacent one side of one casing opening to a position adjacent the opposite side of the other opening, and means for moving the piston to bring its opening into and out of registry with the casing openings.

6. In a valve, the combination of a casing having a lateral inlet opening and a lateral outlet opening therein, a longitudinally movable piston within the casing, the axes

of said openings being arranged on a line obliquely to the axis of the piston, packing surrounding said piston adjacent one end thereof, packing surrounding said piston adjacent the other end thereof, said piston having an opening therein extending there-through parallel to the casing openings and located between said packings, packing arranged between the first and second named packings and surrounding the piston and engaged therewith and with the casing entirely around the interior of the casing and extending obliquely through the casing from a position adjacent one side of one casing opening to a position adjacent the opposite side of the other casing opening, and means for moving the piston to bring its opening into and out of registry with the casing openings.

7. In a valve, the combination of a casing having a lateral inlet opening and a lateral outlet opening therein, a longitudinally movable piston within the casing, packing surrounding said piston adjacent one end thereof, packing surrounding said piston adjacent the other end thereof, said piston having an opening therein extending therethrough parallel to the casing openings and located between said packings, packing arranged between the first and second named packings and surrounding the piston and engaged therewith and with the casing entirely around the interior of the casing and extending obliquely through the casing from a position adjacent one side of one casing opening to a position adjacent the opposite side of the other casing opening, means for moving the piston to bring its opening into and out of registry with the casing openings, and packing adjusting means.

8. In a valve, the combination of a casing having an inlet opening and an outlet opening therein, a piston within said casing and movable therein to close and open communication between said openings, said piston having a portion fitting the interior of the casing, and having also a reduced portion adjacent one end thereof, packing surrounding the piston adjacent the other end thereof, means for adjusting said packing, a second packing surrounding the reduced portion of the piston, an adjustable ring surrounding the reduced portion of the piston, means for adjusting said ring, and means for moving the piston.

9. In a valve, the combination of a casing having a lateral inlet opening and a lateral outlet opening therein, a longitudinally movable piston within the casing, said piston having a portion fitting the interior of the casing and having also a reduced portion adjacent one end thereof, and an opening extending through the piston away from the reduced portion thereof and arranged to register with said inlet opening and said outlet



opening, packing surrounding the piston adjacent the other end thereof, means for adjusting said packing, a second packing surrounding the reduced portion of the piston,  
5 an adjustable ring surrounding the reduced portion of the piston, means for adjusting said ring, and means for moving the piston.

In testimony whereof, I have hereunto affixed my signature.

JOHNSTON NOLAN.

Witnesses:

WM. HARRISON SMITH,  
A. V. GROUPE.