

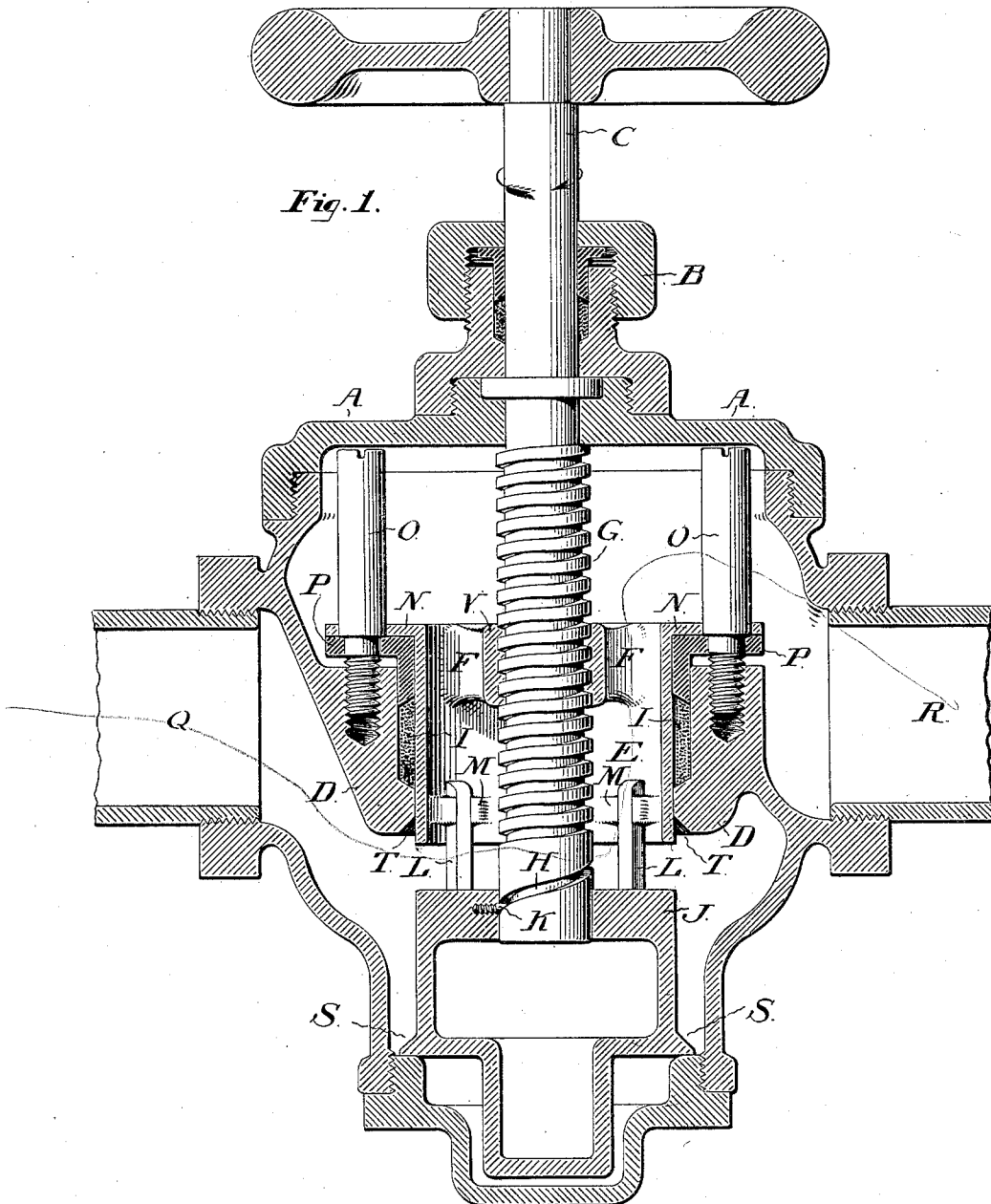
(No Model,)

2 Sheets—Sheet 1.

W. G. ADAMS.
VALVE.

No. 432,744.

Patented July 22, 1890.



WITNESSES
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E. Reese.

INVENTOR:
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(No Model.)

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Fig. 2.

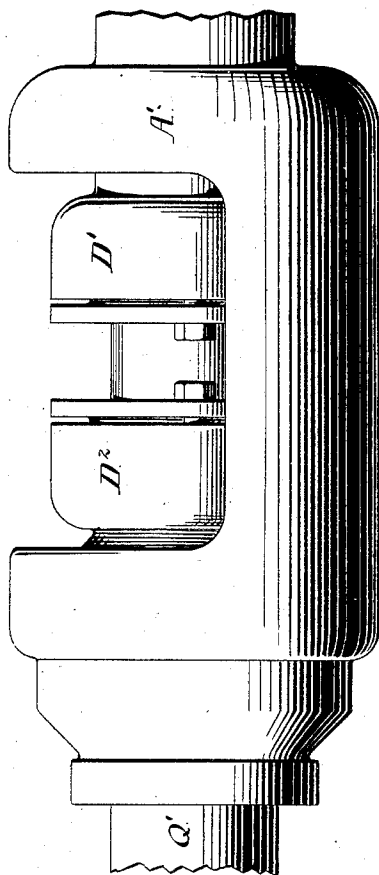


Fig. 4.

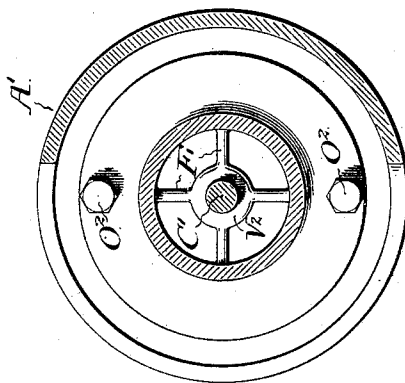
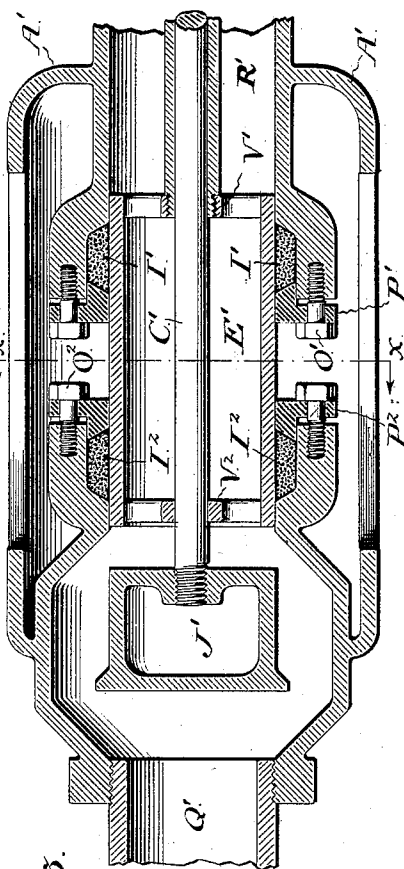


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM G. ADAMS, OF PHILADELPHIA, PENNSYLVANIA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 432,744, dated July 22, 1890.

Application filed October 23, 1889. Serial No. 327,912. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. ADAMS, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Valves, whereof the following is a specification, reference being had to the accompanying drawings.

In said drawings, Figure 1 represents a vertical longitudinal section through the valve-chest and valve. Fig. 2 is an exterior side view of an alternative form of valve-chest, differing somewhat in detail from that shown in Fig. 1, but operating upon the same principle. Fig. 3 is a plan view of a horizontal central section through the device shown in Fig. 2, and Fig. 4 is a vertical section of the same on the line *xx* of Fig. 3.

Referring to Fig. 1, A represents the valve-chest, which may be provided with screw-caps at top and bottom, as shown, and has an inlet-port Q and an outlet-port R for the steam or other fluid to be controlled. The valve-chest is divided by a transverse partition D, through which a central opening is formed. By analogy to other forms of valves the partition D may be conveniently termed the "seat," although, as will be seen hereinafter, it is not, strictly speaking, a valve-seat. A hollow cylinder E fits snugly but so as to slide freely in the opening through the seat D, and is surrounded with a packing-ring I, mounted in the seat itself, the tightness of whose joint is maintained by means of the gland P, adapted to be set up in the usual way by means of screw-bolts. Around one end of the cylinder E is an annular flange N, having openings that fit snugly upon the elongated heads O of the gland-bolts, which thus serve as guides for the longitudinal movement of the cylinder and prevent it from turning.

Longitudinal movement of the cylinder is produced (in the instance shown in Fig. 1) by means of a screw-stem C, which passes out through a stuffing-box B in the top of the chest, and is provided with an exterior hand-wheel, said stem being of course secured against longitudinal movement. The screw-thread G of said stem engages with a correspondingly-threaded hub V, supported upon the radial arms or spokes F, cast upon or otherwise secured to the interior of the cylin-

der E. A closed cylindrical head J, of the same external diameter as the cylinder E, is mounted to slide freely upon the lower end of the stem C, and is provided with a stud K, engaging with another portion H, of the screw-thread thereof.

By reference to the drawings it will be seen that a portion of the thread which is immediately adjacent to the lower end of the stem has a more rapid pitch, as seen at H, than the remainder of the thread G.

Guide-pins L are mounted upon the end of the head J adjacent to the open cylinder E, and slide between guiding-lugs M on the inner face thereof, so that the head cannot turn with the screw, but must be moved longitudinally thereby. It will be seen that by rotation of the stem C in the direction of the arrow an upward longitudinal movement of both the open cylinder E and the closed head J will be effected, and by reason of the differing pitch of the threads G and H the head J will move faster and overtake the cylinder. The point where the rapid thread H merges into the slow thread G exactly corresponds with an amount of movement on the part of the head J sufficient to bring its face into close contact with the proximate end of the cylinder E, and thereupon they will continue to move together with the same velocity throughout the remainder of their range of motion, which range may be conveniently determined (in that direction) by contact of a beveled flange S upon the head with the correspondingly-beveled surface T upon the seat D.

The packing-ring I makes a steam-tight joint between the inner surface of the opening through the seat D and the exterior surface of the cylinder E or head J, according as the one or the other may be opposite to said packing. Reversing the rotation of the screw-stem C will of course shift the cylinder E and head J in a direction opposite to that just described, maintaining them in close contact with one another during a portion of their time, but causing the head to open out from the cylinder when the differential threads become respectively operative. The head J and the cylinder E thus form a two-part piston, which, when separated, affords a free pas-

sage through the part remaining in the seat; but when the head J has been drawn close up against the end of the cylinder and shifted so as to bring its own surface opposite to the packing-ring I a tight joint is thereby formed.

It will be observed that the device is so constructed as to occasion a close contact between the two parts J and E before the line of contact gets opposite to the packing-ring I. This feature is one of great value, because the tendency of steam or other fluid under great pressure is to destroy and blow out the packing should there be any substantial exposure of its surface to the action of the steam. By causing a close approach between them this destructive action is absolutely prevented and the efficiency of the packing is maintained in use.

I will now proceed to describe an alternative form of construction of the valve chest and seat, which is shown in Figs. 2, 3, and 4, the object of which is to afford convenient access to the glands of the packing-rings without the necessity of taking the valve-chest apart. I accomplish this by the use of a divided or two-part seat mounted within an open support, in combination with a two-part piston whose hollow or perforate portion constitutes the duct between the two parts of the seat. In said Figs. 2, 3, and 4, A' represents what may by analogy be termed the "valve-chest," which is substantially cylindrical in form, but has about half of its periphery cut away for some distance on each side of its longitudinal center, so as to expose the interior. The inlet-pipe Q' and outlet-pipe R' for steam enter at opposite ends of the cylinder A' and terminate in two open heads D² D', respectively, which face each other with an opening or interval between them opposite to the cut-away portion of the cylinder. These two heads constitute the divided or two-part seat, and they are respectively provided with packing-rings I² I', controlled by glands P² P' and tightening-bolts O² O'. The valve is composed, as before, of a hollow cylinder E' and a closed head J', said hollow cylinder being mounted permanently within the divided seat and connecting the two parts thereof, though movable therein, as in the other case. The hollow cylinder E' is made of sufficient length to extend beyond both packing-rings at the same time, and space is of course to be afforded for its movement in the proper direction to close the valve.

The closed head is indicated by J', and the two together are mounted in such manner as to be moved in the desired relation upon the stem C'. As, however, any one of a great number of devices might be employed to shift the cylinders in the manner described, and as no particular form is essential to my claim, I have merely indicated the existence of a supporting and actuating stem in these figures. The steam or other fluid is admitted at Q' and may pass out at any convenient aperture on

the opposite side of the apparatus. The operation of this form of device is obvious. Thus to close the valve the head J' is drawn up into close contact with the end of the cylinder E', and the two are then shifted thus in contact until the periphery of the head J' is opposite to or extends across the face of the packing-ring I². Movement in the contrary direction to open the valve is so applied as to first shift the cylinder and head while in contact past the packing-ring I² and then allow them to separate. This organization of the parts in an open support or chest has the advantage, as above mentioned, of admitting access to the bolts O' O², so that the packing-rings I' I² can be easily set up and a close joint maintained. There is, however, no difference in the theory of operation of those parts which constitute the valve proper.

I am aware that the use of a piston in connection with a slide-valve is not new, and I do not broadly claim the same. The difference in the operation of my improved valve and an ordinary piston-valve is, however, sufficiently obvious, and I merely advert to such form of device to avoid misconstruction of my claims.

I am aware that the use of a piston having a packing-ring inserted therein, in combination with a tubular shield, is not new, and I do not claim such method of construction, the purpose of my invention being to permit the use of a packing-ring in the seat itself as distinguished from the valve, and to so combine therewith a two-part piston as that one of the parts shall afford a passage for the steam when the valve is open.

As before stated, I do not limit myself to any particular shifting mechanism for effecting the necessary movements of the valve; nor do I intend, by the use of the words "cylinder" and "head" in describing the two parts of the piston, to limit myself to the precise form of such parts shown in the drawings, it being only necessary that one of said parts should be imperforate or closed against the passage of fluid, while the other is perforated and so arranged as to remain within the seat when the valve is open. So, also, by the use of the word "seat" as a convenient term for that portion of the apparatus in which the piston parts act I do not intend to limit myself to the use of a partition between two chambers, as shown in Fig. 1, but I mean to include any duct, whether continuous or otherwise, whose inner surface is adapted to form a close joint around the piston parts, and whose configuration permits their proper movements.

Having thus described my invention, I claim—

1. The combination, with a seat, of a packing-ring mounted therein, a two-part piston each of whose parts is adapted to fit within said packing-ring, one of said piston parts being imperforate, the other of said piston parts being perforated, said perforated part

being arranged within the seat in contact with the packing-ring thereof, and means whereby said piston parts may be shifted relatively to one another and to the seat to bring
5 the periphery of either the perforated or imperforate part into contact with said packing-ring, substantially as set forth.

2. The combination, with an open support,
10 of a two-part seat mounted therein, packing-rings mounted in each part of the seat, a two-part piston, one of said piston parts being imperforate, the other of said piston parts being

perforated, said perforated part extending across the opening between the two parts of the seat, and means whereby one of said piston parts may be shifted relatively to the other and both may be shifted relatively to said two-part seat to bring either of said piston parts into contact with one of said packing-rings, substantially as set forth. 15

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