

(No Model.)

2 Sheets—Sheet 1.

G. H. F. SCHRADER.
VALVE.

No. 495,064.

Patented Apr. 11, 1893.

FIG. 1.

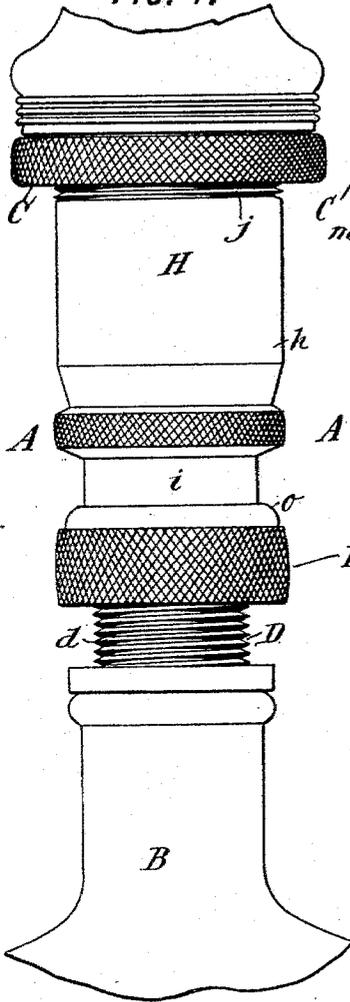


FIG. 2.

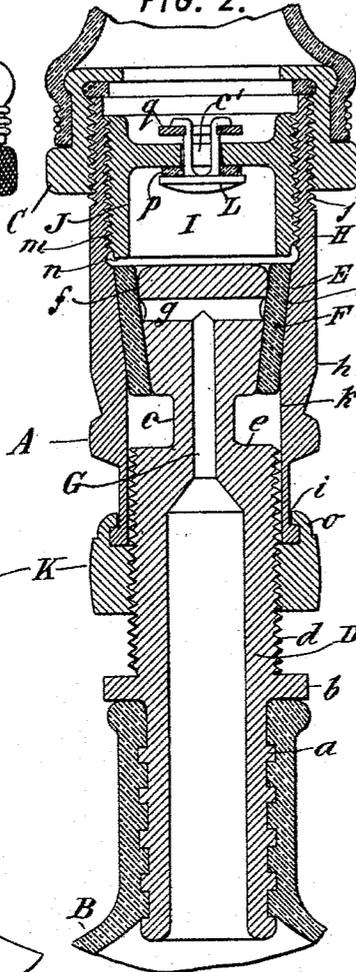


FIG. 3.

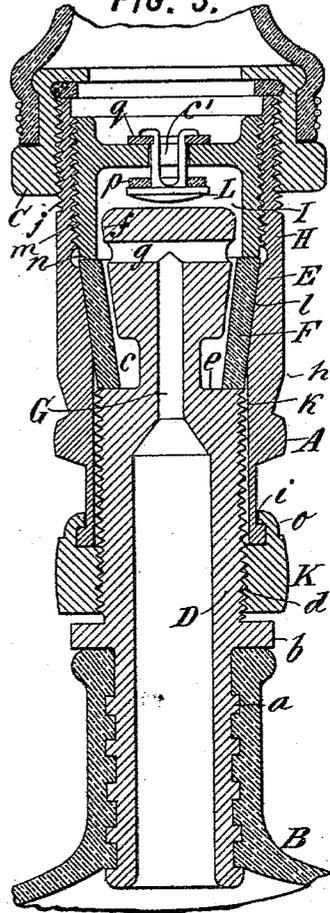
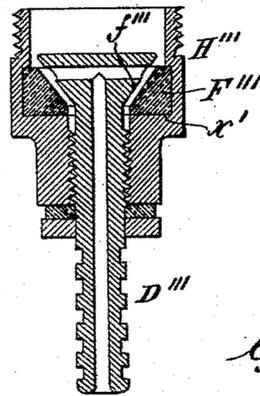


FIG. 7.



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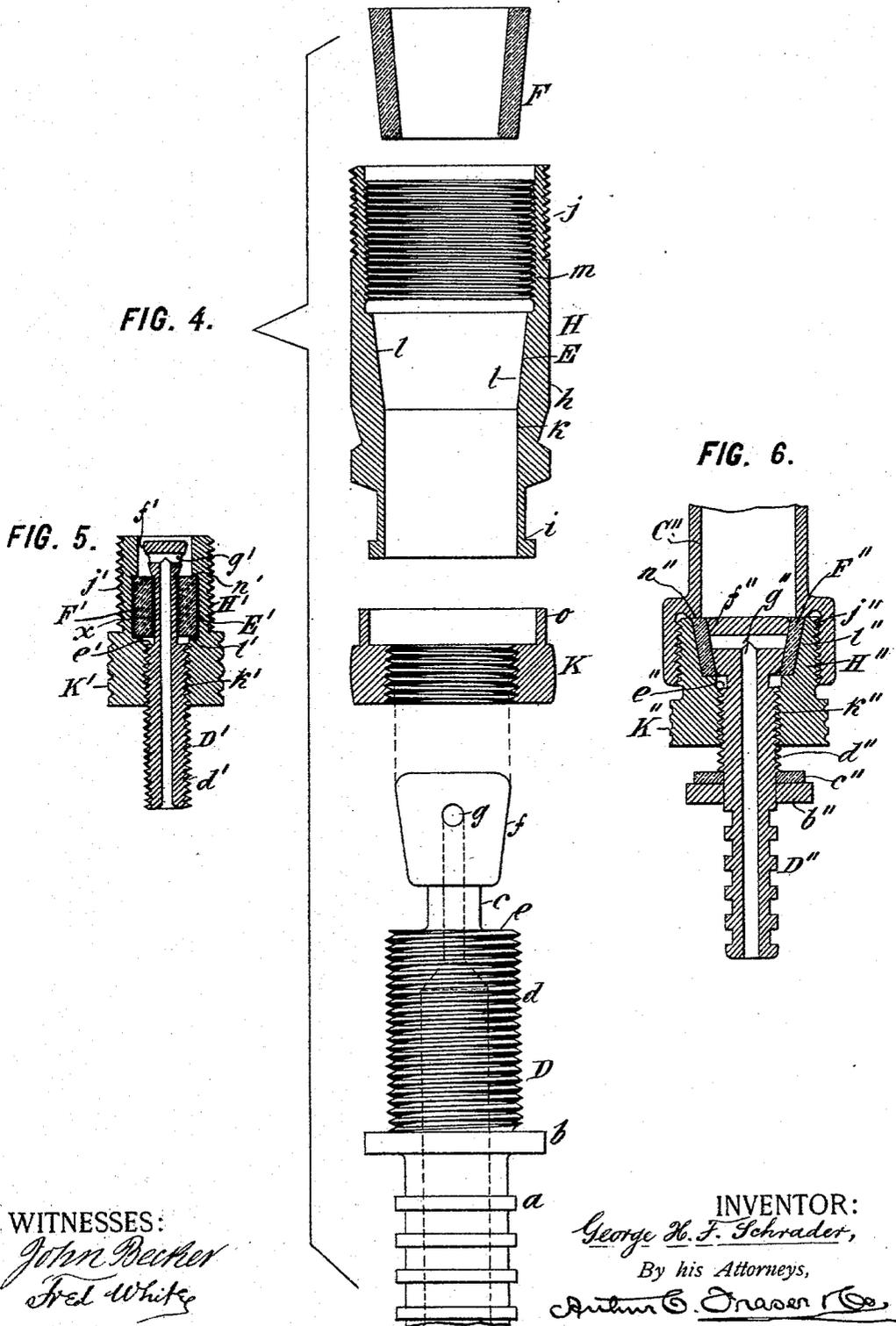
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UNITED STATES PATENT OFFICE.

GEORGE H. F. SCHRADER, OF NEW YORK, N. Y.

VALVE.

SPECIFICATION forming part of Letters Patent No. 495,064, dated April 11, 1893.

Application filed January 9, 1893. Serial No. 457,861. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. F. SCHRADER, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention relates most particularly to air valves of the class wherein a positive closure is made by screwing the valve against the seat, and the invention aims to provide an improved valve of this character which can be tightly closed when desired, and positively and completely opened by ordinary manipulation. To this end in carrying out the preferred form of my invention I construct the valve with a conical stem and seat, and intermediate annular packing constructed to be clamped between the stem and seat when in the closed position, and freed therefrom when in the open position, and I provide means whereby this packing shall be forced into intimate contact with the seat and stem when in the open position to prevent leakage between the two.

My invention also comprises certain other features of improvement which will be hereinafter set forth.

In the accompanying drawings, which illustrate certain adaptations of my invention, Figure 1 is a side elevation of an air valve constructed according to the preferred form of my invention. Fig. 2 is a vertical axial section thereof, the valve being shown in the closed position. Fig. 3 is a similar section showing the parts in the extreme open position. Fig. 4 is an axial section of the principal parts of the valve separated. Fig. 5 is an axial section of a modification and Fig. 6 is an axial section of another modification. Fig. 7 is a section of another modification.

Referring to the drawings, let A indicate the valve as a whole, B an air vessel to which it is applied, and C the coupling from an air pump connected to the valve for supplying air under pressure thereto for filling the vessel B.

Referring to Figs. 1 to 4 inclusive I will now describe the preferred form of my invention. The valve here shown consists of a tubular stem D, a seat E surrounding said stem and

a packing F between the stem and seat. The stem D has at bottom the usual roughened portion *a* for receiving the neck of the vessel B. Above this portion it has a flange *b*, above which the stem is externally screw threaded, preferably with a left hand thread *d*, above which the stem is constructed with a shoulder *e* formed by reducing the diameter of the stem, thus forming a recess *c*, and from this recess the stem is constructed with a tapering conical valve face *f*, of less diameter at its largest part than the smallest diameter of the screw threaded portion *d*. Internally the stem D is constructed with an axial duct G extending almost to its upper end and terminating in a cross duct *g* opening at opposite sides of its face *f*. This duct constitutes the egress duct from the valve seat to the vessel B. The seat E in this construction consists of a tubular shell H surrounding the upper end of the stem D. This shell preferably consists externally of a cylindrical body *h* constructed with a peripheral groove *i* at its lower portion and with external right hand screw thread *j* at its upper end. Internally the shell H is preferably constructed with a smooth cylindrical portion *k* loosely fitting on the screw threads *d* of the stem D and extending from the lower edge of the shell H and terminating in a smooth annular seating face *l* having an inclination or taper corresponding approximately to that of the face *f* of the stem, which face *l* ends at top in an internal screw thread *m* rising to the top of the shell H and constituting the remainder of the interior thereof. Preferably the packing F consists of an annular tapering ring of suitable packing material as rubber fitting the face *f* of the stem and extending from the recess *c* thereof at bottom up to and terminating near the upper end of the stem, beyond the duct *g* thereof.

The stem and seat are relatively movable to open or close the valve. In the closing movement the packing F is forced tightly against the face *f* of the stem by the face *l* of the seat, and in the opening movement the face *l* moves away from the packing F and thereby permits the removal of the latter from the face *f*. When the packing is removed from the face *f* it ceases to close the openings

of the duct *g* therein, and thereby permits free communication from the hollow interior I of the shell H, which hollow interior will be called the ingress duct of the valve to the egress duct G.

My invention comprises means for insuring the removal of the packing F from the face *f* to open the valve. Preferably this is accomplished by constructing the shell H with an internal shoulder engaging the packing F as the shell is moved toward the open position and engaging the packing to move it with the shell away from the face *f*. This shoulder is lettered *n* in the construction shown in Figs. 1 to 4, and here consists of the lower edge of a check valve thimble J, which is screwed into the upper end of the shell H, engaging the screw thread *m* thereof. Preferably this shoulder *n* is slightly removed from the upper edge of the packing F when the valve is in the closed position, and is constructed to engage the packing as the valve is moved to the open position and to draw it away from the face *f* of the stem and into the recess *c* thereof to insure the complete opening of the valve, and to force the packing into a contracted space between the shoulder *e* of the stem and the face *l* of the shell when the valve is completely opened as best seen in Fig. 3. By thus forcing the packing into this contracted space it makes intimate contact between the stem and shell and thereby prevents leakage around the stem.

Any suitable means for relatively moving the stem and seat may be provided, but I prefer to employ the nut K, shown in Figs. 1 to 4, which in this construction is exteriorly knurled, surrounds the portion *d* of the stem D and engages the left hand screw thread thereof and is constructed with a lip *o* on its upper side bent into and engaging the groove *i* of the shell H. By this provision the rotation of the nut K will cause it to travel on the stem, and its engagement with the shell H will cause the latter to move with it, while the shell need not itself rotate. Thus the tendency to rotative movement between the shell and stem is avoided and the liability to injure or distort the packing F by such rotation is obviated.

Preferably a check valve L of well known construction is provided within the ingress duct I.

In the construction shown the thimble J has a cross wall constructed with an aperture *c'*, and the valve L has an enlarged head bearing against a packing ring *p* at the inner side and a bifurcated stem carrying a shoulder *q* passing through the aperture *c'*, whereby when the ingress pressure exceeds that within the check valve, the check will open and ingress through the aperture *c'* will be permitted, while in case of excessive inner pressure the check will close to prevent escape. The check valve L will as a rule only be utilized when the valve is in the open position, as when it is being filled, since when the valve

is closed it will be sufficiently tight to prevent leakage beyond the packing F.

The coupling C may be any well known pipe coupling screwed upon the screw thread *j* of the shell for supplying the valve. Ordinarily when the filling of the vessel B is completed the coupling C will be unscrewed, and the end of the valve may be closed by a cap as usual.

It will be seen that my invention provides an improved valve which can be variously availed of, conveniently manipulated and which will insure a tight closure.

It will be understood that my invention is not limited to the particular construction hereinbefore set forth as its preferred form, but that it may be modified as circumstances, or the judgment of those skilled in the art may dictate, without departing from its essential features.

One modification of my invention is shown in Fig. 5, wherein the stem here lettered D' is constructed substantially as described with reference to Figs. 1 to 4, while the shell here lettered H' is constructed with a hand portion lettered K', external screw thread at the top lettered *j'* for receiving the usual coupling, and internally with a screw threaded portion *k'* directly engaging the screw thread lettered *d'* of the stem, and above this with a seating face lettered E', having at bottom a shoulder *l'* and at top a shoulder *n'*. In this construction the packing lettered F' consists of a tubular piece of packing material fitting the seating face E' and engaged at bottom by the shoulder *l'* and at top by the shoulder *n'*, whereby it is caused to move with the shell. Internally in this construction the packing surrounds the stem, loosely fitting the latter within recess *x* thereof between the shoulder *e'* thereof and the face *f'* thereof. In operation with this construction the shell in moving upwardly forces the packing against the face *f'* to close the duct *g'* of the stem, and in moving in a reverse direction wedges the packing between its shoulder *n'* and the shoulder *e'* of the stem, to prevent leakage between the stem and shell.

In the modification shown in Fig. 6 the stem here lettered D'', has the external screw thread *d''*, the shoulder *e''*, the tapering face *f''* and the duct *g''* as before described, and is provided with a washer *e''* above its flange *b''*. The shell here lettered H'' has external screw thread *j''* at top and hand portion K'' at bottom, and internally has screw thread *k''* engaging the screw thread of the stem, and above this seating face *l''*. The packing, here lettered F'' is a normally flat disk or ring of packing material seating between and distorted by the faces *f''* and *l''*. The pump coupling here lettered C'' is constructed to engage the screw thread *j''* of the shell and internally has an annular shoulder *n''* constructed to engage the top edge of the packing F'' when the coupling is in position on the shell and draw the packing away from the

face f'' as the shell is moved to open the valve.

In the construction shown in Fig. 7 the stem here lettered D''' passes through the shell lettered H''' from above, and has an enlarged tapering seating face f''' . The stem and shell screw together as described with reference to Fig. 6. The washer lettered F''' consists of a ring having a tapering inner face fitting the seating face at the stem, which ring is seated in a recess lettered x' in the shell.

What I claim is, in valves, the following-defined novel features and combinations, substantially as hereinbefore set forth, namely:

1. In a valve, the shell and stem, relatively movable and having the ingress and egress passages of the valve, in combination with a packing constructed to be clamped between said parts to close the valve and to be moved by one of said parts in the opening movement and wedged between said parts when the valve is open to prevent leakage between the stem and shell.

2. In a valve, a stem having a duct and a tapering valve seat, in combination with a packing engaging said seat for closing said duct and a shell engaging said packing, movable relatively to said stem and constructed to carry said packing toward and from said seat in its respective movements.

3. In a valve a stem having an annular tapering seating face and the duct opening in said face, in combination with an annular packing surrounding said seating face, and a shell having an annular tapering seating face coinciding with said face on said stem and constructed to engage said packing and when in one position to clamp the latter between said seating faces on said shell and stem to close the valve, substantially as and for the purpose set forth.

4. In a valve, a stem having an annular seating face a duct opening in said face, and a shoulder adjacent to said face, in combination with a packing surrounding said face,

and a shell, having an annular seating face engaging said packing and a shoulder engaging the latter beyond said face, said shell and stem being relatively movable and constructed when in the closed position to clamp said packing between said respective seating faces and when in the open position to clamp said packing between said respective shoulders.

5. In a valve, the stem D , having the duct G and the face f in combination with the packing F engaging said face, and the shell H engaging said packing to hold it in contact with said face, said stem and shell constructed to be relatively movable to open and close the valve, substantially as and for the purpose described.

6. In a valve, the stem D and shell H relatively movable, the former constructed with annular tapering seating face f and duct g opening therein, and the latter surrounding said face and constructed with the annular tapering seating face l and the shoulder n , of the annular packing F , fitting said face f and constructed to be clamped between the latter and said face l to close the valve, and projecting into the path of said shoulder n , whereby it is engaged by the latter during relative movement of the shell and stem to open the valve.

7. In a valve, the stem D having external screw thread d and seating face f in combination with the packing F and the shell H having seating face l movable on said stem, and the nut K engaging the screw thread d on said stem and swiveled to said shell.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE H. F. SCHRADER.

Witnesses:

GEORGE H. FRASER,
FRED WHITE.