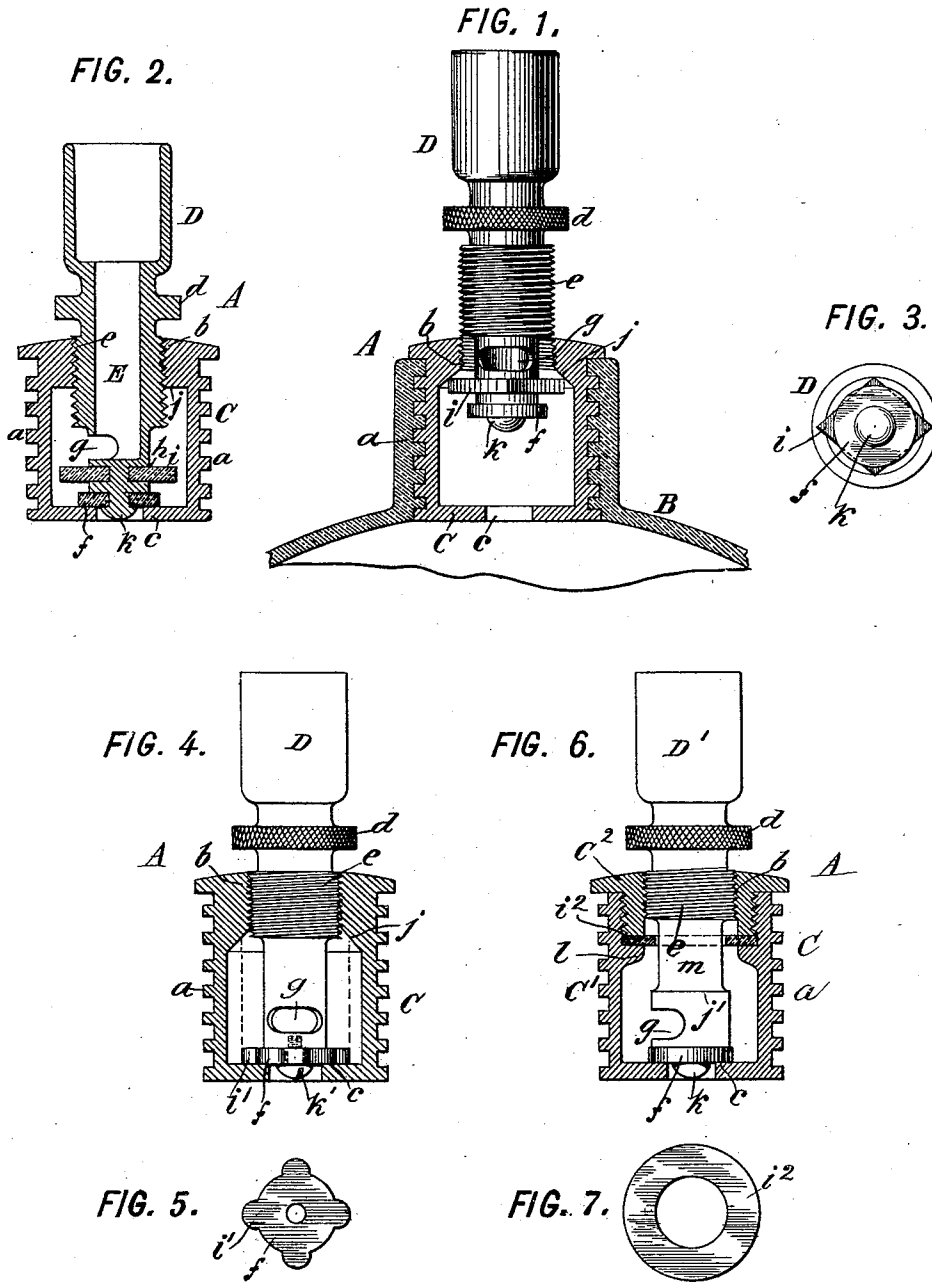


(No Model.)

G. H. F. SCHRADER.
VALVE.

No. 484,509.

Patented Oct. 18, 1892.



WITNESSES:

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

VALVE.

SPECIFICATION forming part of Letters Patent No. 484,509, dated October 18, 1892.

Application filed June 16, 1892. Serial No. 436,954. (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 to valves or stoppers generally of the class wherein it is desirable to separate the parts in order to get access to the valve-seat, but is more particularly designed for small hand valves or stoppers, such as are used for air-valves, for example. In such valves it is desirable to prevent the separation and consequent risk of loss of the respective parts under ordinary conditions, but to permit their separation in case excessive force is exerted to separate them, and to still leave abundant freedom of relative movement to permit convenient operation of the valve.

Heretofore various means have been provided for locking the parts together—such, for example, as illustrated in my patent, No. 473,672, dated April 26, 1892, wherein a stop or collar on one part of the valve engaged a similar stop on the other part, the two being provided with screw-threads the reverse of those for adjusting the valve, whereby the collars could be screwed past each other when it was desired to separate the parts. Such valves may be injured by the attempts of the users to separate them by force when unfamiliar with the operation necessary to their separation. My present invention aims to avoid this danger and to provide a simple valve in which the parts will be normally locked together, while they can be readily separated to get access to the interior by the exertion of an excessive force.

To this end in carrying out my invention in its preferred form I provide a yielding catch on one of the parts of the valve, which catch is constructed to engage the other part of the valve and ordinarily to resist their separation and to yield under force and permit their separation. In its preferred form this catch consists of a flexible ring surrounding and carried by the stem of the valve below its conduit and above its ordinary washer and extending beyond the stem and into the path of an annular shoulder on the socket portion of

the valve, against which it abuts after the screw-threads for adjusting the valve have disengaged in the opening movement, whereupon the flexible ring resists the further separation of the parts; but upon sufficient force being exerted its resistance can be overcome and the parts separated. To replace them, the flexible ring will be forced past the shoulder and into the socket, whereupon it will retain the parts together until they are again separated.

In the accompanying drawings, which illustrate certain adaptations of my invention, Figure 1 is an axial section of the socket of an air-valve, the stem being shown in elevation and the parts being constructed according to the preferred form of my invention and shown in the extreme open position. Fig. 2 is an axial section of the parts in the closed position. Fig. 3 is an end view of the valve-stem. Fig. 4 is a view corresponding to Fig. 1, showing the parts in the closed position and illustrating a modification. Fig. 5 is an elevation of the washer illustrated in Fig. 4. Fig. 6 is a view corresponding to Fig. 4, but showing another modification; and Fig. 7 is an elevation of the ring shown in Fig. 6.

Referring to the drawings, let A represent the valve as a whole, and B an air-vessel or other device to which it is applied. In the forms shown the valve A is constructed of two relatively fixed and movable parts, the one constituting a stem or neck D and the other a tube or socket C. In the form shown the socket C has an external portion *a*, adapted for its connection to a vessel according to any well-known manner, the construction shown being provided with peripheral spurs embraced by the neck of the vessel B by molding the latter around the socket. Internally the socket is constructed with the usual screw-thread *b* or other means for adjusting its position relative to the stem or that of the stem relative to it and with the usual apertured seat *c*. The movable part or stem D is shown in all the views as constructed in the form of a tube with the conduit E closed at its lower end, provided with the milled handpiece *d* for manipulating it, having the usual screw-thread *e* or other means for adjusting it relatively to the socket C, adapted to engage with the screw-thread *b* of the latter, and thereby

when the stem is turned to adjust the stem toward the valve-seat, carrying on its lower end the washer or packing *f*, adapted to come against the seat *c* as the valve is closed and insure a tight joint, and having the customary aperture *g*, affording communication between its tubular conduit *E* and the interior of the socket *C*. As thus far described the socket *C* and stem *D* are of ordinary construction.

According to my invention I provide a yielding catch on one of the parts of the valve and construct this catch to engage the other part of the valve to resist the separation of the parts, the catch being constructed to yield under force and permit such separation. This may be variously accomplished; but I prefer to accomplish it by providing a shoulder on the one part and a flexible projection on the other arranged in the path of said shoulder for engagement therewith. Preferably an annular shoulder is provided on the one and a flexible ring on the other, these parts being relatively disposed in such manner that during the ordinary operations of the valve they are out of engagement; but after the parts of the valve have been adjusted to the extreme open position, so that their adjusting-screws are disengaged, then these projections will abut to prevent separation under ordinary tension, and under strain the flexible ring will yield and permit separation without injury to the valve. In the preferred means for accomplishing this (shown in Figs. 1, 2, and 3) the stem *D* carries a flexible ring *i*, which is preferably seated in a deep groove *h*, formed near the end of the stem beyond its outlet *g* and in advance of its washer *f*, which ring *i* is here shown of rectangular shape with projecting corners extending beyond the diameter of the screw *e*, but leaving abundant room between the outer edge of the ring and the inner wall of the socket *C* for the conduits through the valve, and the socket *C* is shown as provided with an internal projection in the form of an annular shoulder *j*, extending from its inner wall inwardly to the screw-thread *b*, whereby its inner diameter is less than the extreme projection of the ring *i*, so that as the stem and socket are separated the ring *i* will abut against the projection *j* and resist separation of the parts until the strain necessary to distort the ring until it will pass the projection is applied. Preferably the screw-thread *b* is short and at the top of the socket *C* and the screw-thread *e* is of unnecessary length, whereby to separate the parts it is necessary to rotate the stem until the screw-threads are entirely disengaged. By this construction the user is not liable to separate the parts in the ordinary manipulation of the valve, since as a rule a few turns of the stem will satisfy the user that the valve is open, and hence he will not continue the rotation; but should the parts be entirely unscrewed, as shown in Fig. 1, then the yielding catch will interfere with their separation.

Preferably the screw-threads *b* and *e* and the ring *i* and projection *j* are so proportioned that the ring and projection will not engage until the screw-threads are disengaged. By this arrangement the looseness of the socket and stem incident to the disengagement of the screw-threads will indicate to the ordinary user that the valve is fully open and the parts could not be further separated, and ordinarily the user will thereupon partially close the valve. If, however, he should attempt to pull the parts separate and should exert a strain to this end, the ring *i* will yield and permit the escape of the stem. To restore it, the stem is forced into the socket with sufficient force to drive the yielding ring past the screw-thread *b* and the shoulder *j*. In ordinary use the ring *i* will not contact with the socket, and hence will not interfere with the normal operation of the valve. The valve is here shown as having the usual headed lug *k* on the end of the stem *D* for retaining the washer *f* in position.

It will be seen that my invention provides a simple valve which can be readily taken apart by any person desirous of so doing without impairment and in which the parts are not liable to accidental separation.

The invention is susceptible of various applications without departing from its essential features, and it will be understood that I do not limit myself to the particular construction shown and described as the preferred form of my invention, since the invention can be availed of according to such other forms or applications as will readily suggest themselves to those skilled in the art.

Figs. 4 and 5 show a simple modification of my invention in which the washer *f* is utilized as the flexible portion instead of employing a separate ring for this purpose. In this construction the washer is provided with one or more projecting lugs *i'* and is in the path of the projection *j* of the socket *C*. It is desirable in such a construction to use a wide-headed screw *k'* for attaching the washer to the end of the stem *D* to insure against its detachment when the projections *i'* engage the projection *j*.

Figs. 6 and 7 show another modification in which the flexible part of the catch is carried by the socket and the rigid shoulder or projection carried by the stem. In this construction the socket (here lettered *C'*) has an internal shoulder *l*, on which the flexible ring (here lettered *i''*) is clamped by a thimble *C''*, constituting the upper part of the socket and carrying the usual screw-thread *b*, while the stem (here lettered *D'*) has a reduced body portion *m* below its usual screw-thread *e* and a shoulder *j'* below this reduced portion. The shoulder *j'* is in this instance of greater diameter than the inner diameter of the ring *i''*, through which the reduced portion *m* of the stem passes, whereby as the parts are separated the shoulder strikes the ring, and its outward movement is resisted thereby.

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

5 1. In a valve or stopper, the combination of relatively fixed and movable parts, the one constituting a stem or neck and the other a tube or socket and the one having a seat and the other a valve or stopper, said parts con-
10 structed to be adjusted the one toward the other to open or close the valve, and a yielding catch on one of said parts constructed to engage the other of said parts and ordinarily resist their separation and to yield under
15 force and permit their separation, whereby normally said parts will be locked together, but under strain they will separate.

2. In a valve or stopper, the combination of relatively fixed and movable parts, the one
20 constituting a stem or neck and the other a tube or socket and the one having a seat and the other a valve or stopper, said parts constructed to be adjusted the one toward the other to open or close the valve and the
25 one having a shoulder and the other a flexible projection in the path of said shoulder and constructed to engage therewith to resist the separation of the parts and under force to yield and permit their separation.

30 3. In a valve or stopper, the combination of relatively fixed and movable parts, the one constituting a stem or neck and the other a tube or socket and the one having a seat and the other a valve or stopper, screw-threads on
35 said parts for adjusting the valve, and a yielding catch on one of said parts constructed to engage the other of said parts and ordinarily to resist their separation and to yield under force and permit their separation, whereby
40 normally said parts will be locked together, but under strain they will separate.

4. In a valve or stopper, the combination of relatively fixed and movable parts, the one
45 constituting a stem or neck and the other a tube or socket and the one having a seat and the other a valve or stopper, screw-threads on said parts for adjusting the valve, and a yield-
50 ing catch on one of said parts constructed to engage the other of said parts after said screw-threads are out of engagement and to then resist the separation of the parts and under force to yield and permit their separation, whereby normally said parts will be

locked together after they are unscrewed, but under strain they will separate.

55 5. In a valve or stopper, the combination of relatively fixed and movable parts, the one constituting a stem or neck and the other a tube or socket and the one having a seat and the other a valve or stopper, screw-threads on
60 said parts for adjusting the valve, and the one of said parts having an annular shoulder and the other carrying a flexible ring projecting into the path of said shoulder and constructed to engage therewith to resist the
65 separation of the parts and under force to yield and permit their separation, whereby normally said parts will be locked together, but under strain they will separate.

6. In a valve or stopper, the combination,
70 with the socket C, having a valve-seat, a hollow interior, and the screw-thread *b*, of the stem D, having a screw-thread *e*, engaging said screw-thread *b*, a conduit E, and an aperture *g* and adapted at its lower end to en-
75 gage said seat *c*, and a flexible projection, as *i*, carried by said stem within said hollow interior of said socket and projecting beyond the radius of said screw-thread *b*, whereby said parts can only be separated by distorting said
80 flexible projection.

7. In a valve or stopper, the socket C, hav-
ing valve-seat *c* and internal projection *j*, in combination with the stem D, entering said
socket, adapted to engage said seat, having
85 conduit E and aperture *g*, and the flexible ring *i*, carried by said stem between its aperture *g* and its end engaging said seat and adapted to engage said projection *j* to resist
90 the separation of the stem and socket.

8. In a valve or stopper, the socket C, hav-
ing a seat *c* and a projection *j*, in combina-
tion with the stem D, entering said socket and adapted to seat against said seat and
constructed with a groove *h*, and a flexible
95 ring, as *i*, carried in said groove of said stem and adapted to engage said projection *j* to resist the separation of the stem and socket.

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

GEORGE H. F. SCHRADER.

Witnesses:

GEORGE H. FRASER,
CHARLES K. FRASER.