F. GRINNELL.
Valve.

No. 218,523. Patented Aug. 12, 1879.

Fig. 1.

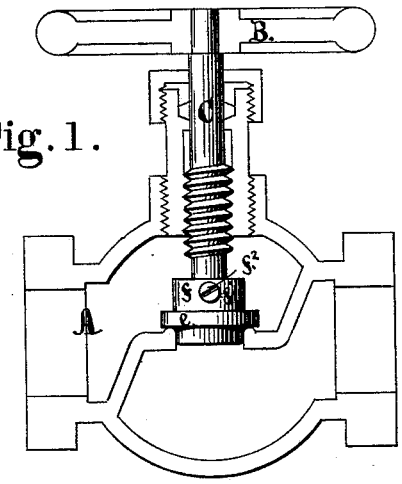
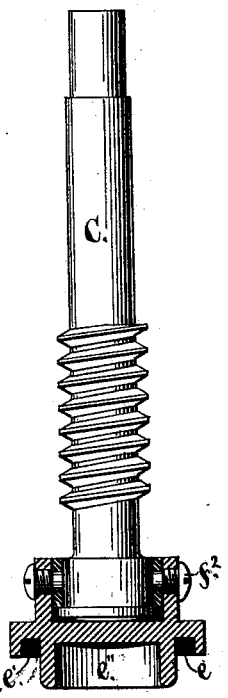


Fig. 2.



Soft metal ring

Fig. 3.

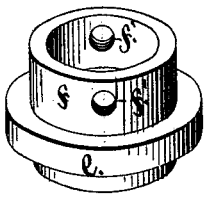


Fig. 4.

Fig. 5.

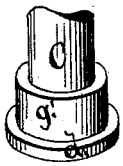
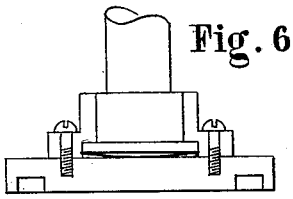


Fig. 6.



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UNITED STATES PATENT OFFICE.

FREDERICK GRINNELL, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN VALVES.

Specification forming part of Letters Patent No. **218,523**, dated August 12, 1879; application filed June 20, 1879.

To all whom it may concern:

Be it known that I, FREDERICK GRINNELL, of the city and county of Providence, and State of Rhode Island, have invented a new and useful Improvement in Valves; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

Figure 1 is a view of my improved valve-stem, shown in connection with a valve. Fig. 2 is a sectional view of the valve, showing the ring by means of which it is secured to the valve-stem. Fig. 3 is the valve proper, shown in perspective. Fig. 4 shows the ring by means of which the valve is secured to the stem, and Fig. 5 represents the lower part of the valve-stem.

The object of this invention is to provide for the removal of the valve from the stem with the least trouble and the simplest tools, and the renewal of the valve by a duplicate, so that a valve can be quickly removed and a new valve substituted.

The invention consists in the peculiar and novel manner by which the valve-stem is secured in the valve by a ring, which ring is secured to the valve by means of screws, as will be more fully set forth hereinafter.

In globe or other valves it is necessary that the valve-stem should be secured to the valve, so that the motion of the valve in the direction of the axis of the valve-stem should be controlled by the valve-stem, but so that the valve-stem shall rotate on its axis independent of the valve. To accomplish this the valve-stem has been provided with a projecting rim at its lower end, and the cup of the valve has been provided with a screw-thread, so as to form a nut. The stem was now inserted, and a follower provided with a screw-thread was screwed down into the cup and against the projecting rim of the valve-stem. The first objection to this arrangement is, that this follower cannot be unscrewed, so as to remove the valve, without first a vise to hold the valve and a wrench to turn the follower. A renewable valve constructed in this manner would be one in name and not in fact, as the tools and appliances of a machine-shop would be required to renew the worn valve by substituting a new one. Second, the cost of threading the cup is considerable, as a stub-tap must be used, and in large valves the threading is very imperfect, owing to the shortness of the thread with reference to its diameter. Such threads are often jammed and the follower cross-threaded, and the valve cannot be removed without great injury to the whole. In such valves the stem does not uniformly revolve free, as the follower does not rest evenly on the shoulder of the stem; and in view of my present invention, the worst feature in the old construction is, that by reason of the short thread to be cut within the cup of the valve and the constant wear of the stub-tap, such valves cannot be interchangeable—that is to say, when a valve becomes leaky, we cannot take any valve of the same diameter and replace the old valve with the new one with absolute certainty that they can be so exchanged. Such valves are usually made of brass or other similar metal; and as the screw-thread in the cup and the screw-thread on the follower are, and must be, tapering, and as the follower must be screwed into the cup so that the turning of the stem will not start the follower, as soon as the follower has been more than once firmly screwed down into the cup, the same will sufficiently press on the thread, so that by again screwing the same into the cup it can be turned by the hand, and is liable to get loose by the turning of the valve-stem, so that if the disk had to be rescrewed from time to time the follower would become so loose that the turning of the stem would unscrew it, particularly when the valve is used in liquids holding impurities in suspension, which are liable to fill up the space around the valve-stem.

In the drawings illustrating my invention, A represents the valve-case, and B the valve-stem wheel. C is the valve-stem, of the usual construction, provided with the projection *d*. *e* is the valve proper. This may be of any suitable construction. It may be a plain disk-valve, a yielding disk, a conical disk, or any other shaped valve. It may be provided with the soft-metal ring *e'* and with the projection *e''*, or without both or either. *f* is the cup arranged to receive the end of the stem. It is a plain bored-out cup, or rather an annular rim secured to the back of the valve-disk. The

two holes f^1 are threaded for the small screws f^2. g is a ring, the outside fitting loosely within the cup f, and the inside the rim g' on the valve-stem. The holes f^1 correspond with the holes in the cup and receive the ends of the screws f^2. The holes in the ring g are in the center of its width, so that the ring can be reversed and either end can rest on the flange d when secured.

Fig. 2 shows the whole connected. The stem is inserted into the cup and the ring secured on top of the flange d. Any person can now remove the valve with a screw-driver or a knife for removing the screws, and as all the parts are plain bored and turned, they can be readily exchanged and a practical renewable valve is the result. The parts of any given-sized valve being all made to standard gages, duplicates can be kept on hand and the valve renewed, when the removed valve can be made good and true and be ready to take the place of another of the same size.

Although this invention can be applied to all kinds of valves, yet it is more peculiarly applicable to valves in which the valve-seat is made of a hard and durable metal, and the valve-disk is provided with a soft-metal ring, as in this case all the wear comes on the valve-disk, and I therefore show such a valve provided with a soft-metal ring, e'.

Fig. 6 shows a modification in which the cup and ring are made in one part and secured to the valve-disk by screws. This modification can be used on some sizes of valves, and the disk can be connected and disconnected as readily as when the ring is separately connected to the valve-disk by means of the cup. In both cases the removal of the screws f^2 releases the valve-disk from the valve-stem, and makes a renewable valve-disk possible and practical.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination, with a valve-disk provided with a cup, f, of the valve-stem furnished with an annular bearing on its lower end, a smooth-surfaced ring, g, interposed between the cup f and valve-stem, and screws f^2, inserted through the valve-cup and smooth-surfaced or plain flat ring g, substantially as set forth.

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