March 3, 1931. F. H. MUELLER 1,794,636

GROUND KEY STOP WITH SPRING TENSION

Filed Feb. 15, 1929

Fig. 1.

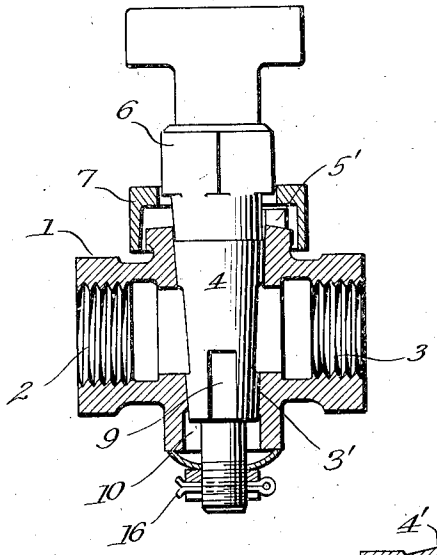


Fig. 3.

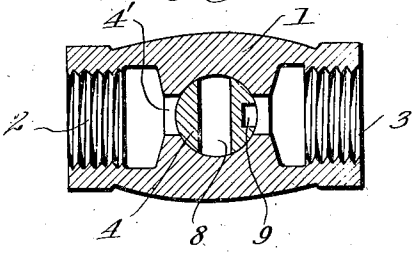


Fig. 2.

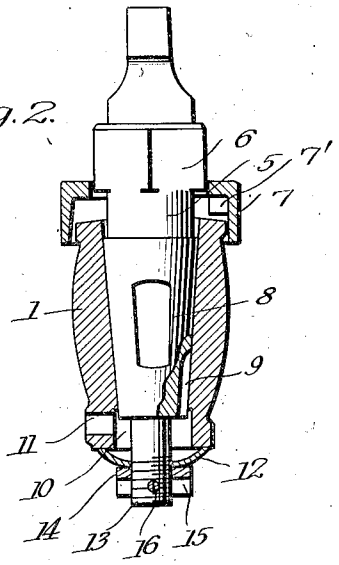
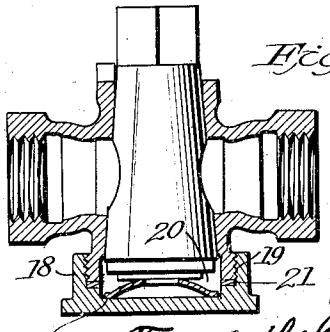


Fig. 4.



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UNITED STATES PATENT OFFICE

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GROUND-KEY STOP WITH SPRING TENSION

Application filed February 15, 1929. Serial No. 340,130.

The present invention relates to valves, and more particularly to those commonly called the ground key stop and drain type used particularly in connection with domestic water systems.

At the present time there is in use a fitting in which the drain opening is disposed within the normal lap of the plug, with the result that the inlet pressure acting against the plug seats it away from the inlet side, whereby water may leak past the lap into the drain opening. The drain opening, of course, is provided for draining the outlet or supply pipe of a house or other system and is brought into use when the plug is closed.

The objects of this invention are to overcome the leakage tendencies of the present type of construction, and to utilize the water pressure on the inlet side as a means for causing the plug to tightly engage its seat adjacent the outlet side, and provide a drain passage at the outlet side in such a manner that leakage is prevented past the lap when the valve is turned to draining position.

This results in providing a lap which is substantially uninterrupted throughout its entire area, except for a small extent adjacent the outlet side, where, as will be understood, the engagement between the plug and its seat is the more fluid-tight by reason of the tendency of the water pressure on the inlet side to force the valve against the seat at the outlet side.

The invention has for a further object to provide a chamber coextensive with the fitting into which the water draining from the outlet side is passed, and from whence it may be delivered in any suitable manner through a port in the casing.

An additional object of the invention is to provide means for maintaining the plug in its seat at all times, and to overcome any possibility of inequalities, due to wear, by the provision of resilient means tending not only to axially pull the valve into fluid-tight engagement with its seat, but also acting as a closure for the draining chamber.

The invention is a simple one and capable of easy manufacture and replacement.

In the drawings:—

Figure 1 is a transverse section.

Figure 2 is a sectional view with part of the casing cut away.

Figure 3 is a sectional view, and

Figure 4 is a view partly in section of a modification.

Referring to the drawings, the numeral 1 indicates a casing, which, it will be observed, is provided with outlets 2 and 3 in alignment, and a suitable valve seat 3′. The valve seat is adapted to accommodate a rotary plug or valve 4, as shown in Figure 1.

It will be observed that the openings 2 and 3 are enlarged, while the openings 4′ in the seat are of considerably less width, although of substantially the same height as the openings 2 and 3. In this manner narrow openings are provided in the valve seat, which are in alignment and communicate with the aligned openings 2 and 3 of the casing.

The plug, it will be observed, is tapered to conform to the taper of the seat, and is provided with a slightly reduced portion 5, which terminates in a squared portion 6. A cover 7, having a squared opening therein, engages the squared portion 6 in the usual manner. The cover 7 carries an internal lug 7′, adapted to engage a similar lug 5′ formed on the plug to control the rotary movement of the valve.

The said plug is provided with a passage or opening 8 therethrough, which is of the same area and dimensions substantially as the openings 4′ in the valve seat.

Formed in the body portion of the plug at a point substantially midway of the openings of the passage 8, is a drainage groove 9. This groove, as shown in Figure 1, extends from a point within the passage through the casing, to the end of the body portion of the plug. The casing is provided, co-extensive with the valve seat, with a suitable chamber 10, as shown in Figures 1 and 2, and it will be observed that this chamber is slightly larger than the smaller tapered end of the seat. A lateral port 11 communicates with the chamber, as shown best in Figure 2.

One end of the chamber is closed by a

washer 12, which is of resilient material, and is preferably formed of thin metal such as copper, or an alloy thereof. This washer has an opening receiving the threaded end 13 of the plug, and engaging about the said threaded end and holding the washer in position is a suitable nut 14. It will be understood that the washer is of sufficient area to completely enclose the bottom of the chamber, and that a packing, if necessary, may be interposed between the threaded portion 13 of the plug and the opening in the washer to prevent leakage if desired. The nut 14, as shown in Figure 2, is provided with a plurality of aligned grooves 15, and the threaded end of the plug is provided with an opening to receive a cotter pin 16, as shown in Figure 1. In this manner, the plug is axially forced into engagement with its seat by the resilient closure or washer 12, and it will be noted that any wear between the parts may be readily taken up, since the pin 16 may be removed and the nut 14 suitably tightened, whereupon the cotter pin may be re-inserted, and will lie in the grooves 15 and pass through the opening in the plug.

Referring to Figure 3, it will be noted that the groove 9 is of less width than the adjacent outlet opening 4′ in the valve seat. This groove, when the rotary plug is turned to closed position, as shown in Figure 3, is the only interruption in the lap between the plug and its seat. In other words, the plug throughout substantially its entire area is adapted to engage its seat.

It will be noted that the drain groove 9 is disposed at the outlet side of the chamber of the casing adjacent the openings 3 and 4′, and is, therefore, upon the opposite side of the casing from the inlet. Therefore, it will be understood that the water pressure upon the inlet side, which normally tends to move the plug away from its seat at the inlet side and in previous constructions, has resulted in leakage past the lap to the drain, in the present case will act to seat the valve in a thoroughly fluid-tight condition at the outlet side of the casing. Thus the plug is forced against its seat in such a manner that no water from the inlet side may leak past the lap at the outlet side, and it is at the outlet side that the drain groove 9 is positioned when the plug is in closed position, as shown in Figure 3.

It will be understood that in the closed position of the valve water in the system will drain through the opening 3 into the groove 9 down into the chamber 10 and out through the port 11, whereas heretofore water from the inlet side leaked about the port lap between the edge of the body opening and the drain port; such a condition has now been effectively overcome, since the valve is most firmly seated adjacent the outlet side and the drain port is disposed to communicate with the outlet in the closed position of the valve.

The resilient means in the nature of the washer 12 act to firmly position the valve at all times in its seat to prevent leakage, and the said washer likewise acts as the closure for the chamber 10.

In Figure 4 a modified structure is shown in which the resilient member 17 is disposed within a threaded closure 18 as shown, the said closure engaging the threaded portion 19 and defining with such portion a chamber 20. A suitable washer or packing 21 is placed in the joint between the members 18 and 19.

In this construction the parts are reversely tapered, but the construction is otherwise quite similar.

The invention is susceptible of further modification and changes without departing from the spirit of the claim which is hereto appended.

I claim:

A ground key stop and drain comprising a casing, aligned inlet and outlet openings, and a tapered valve seat in said casing, a tapered rotary plug valve disposed in said seat having a passage therethrough, a groove in said plug adapted when the plug is in closed position to be disposed in communication with said outlet opening, the normal lap of the plug with its seat in closed position being uninterrupted, except at the outlet side, and the fluid pressure on the inlet side forcing said plug tightly against the seat adjacent the outlet side, whereby leakage past the lap to the groove is prevented, a chamber co-extensive with the casing and having a lateral port, said groove communicating with said chamber, whereby when the valve is closed fluid on the outlet side may drain through said groove and chamber and out through said port, and resilient means comprising a flat disc closing said chamber and acting on said valve axially for maintaining said valve seated and closing said chamber.

In testimony whereof I have hereunto set my hand.

FRANK H. MUELLER.