Sept. 30, 1930. J. SWEET 1,776,936

VALVE

Filed July 27, 1928

Fig. 1.

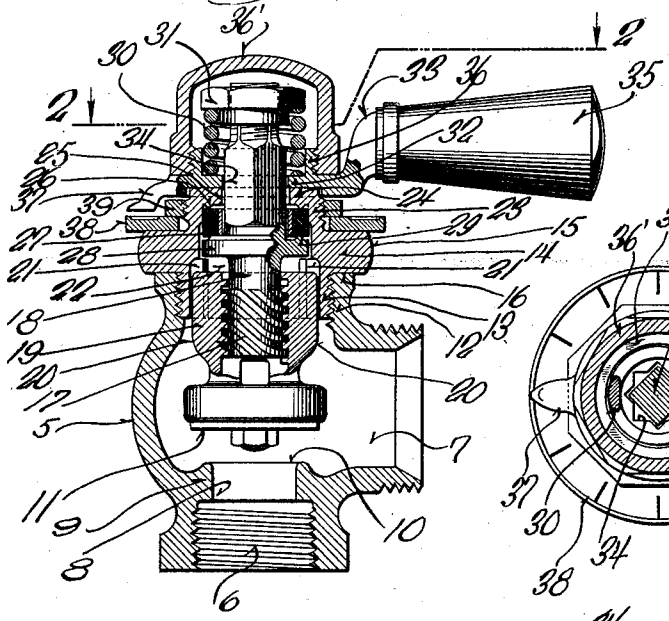


Fig. 2.

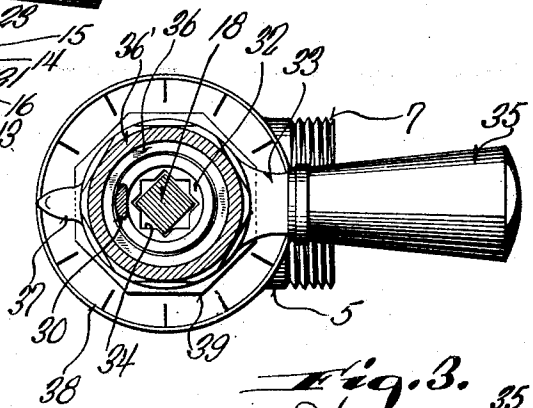


Fig. 3.

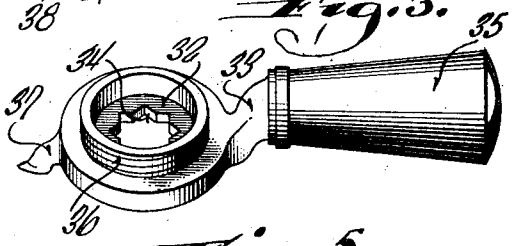


Fig. 4.

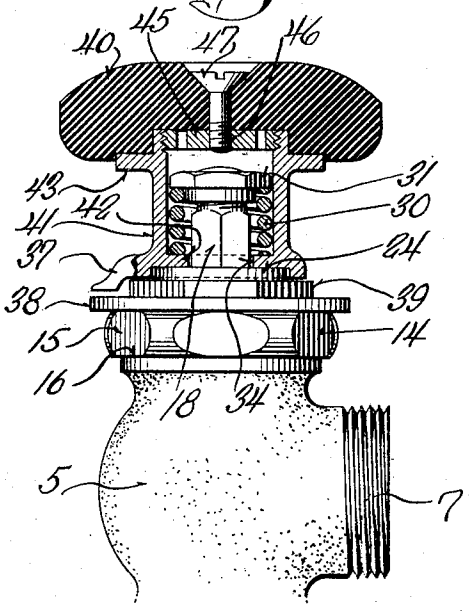
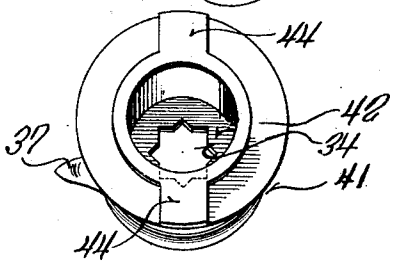


Fig. 5.



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UNITED STATES PATENT OFFICE

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VALVE

Application filed July 27, 1928. Serial No. 295,691.

This invention relates particularly to valves of the packless type and especially those adapted for use in connection with heating system radiators. Such valves are usually actuated from open to closed position through their intermediate positions by a handle or hand wheel and it has been found that where the actuating handle or hand wheel is fixed directly to the stem of the valve any exterior pressure placed on the handle or hand wheel such as persons accidentally or willfully standing thereon permits the steam to escape past the packing or seal, often causing serious damage to the adjacent flood or other surrounding objects and it is, therefore, an object of this invention to provide a valve of the character described with actuating means which is substantially flexibly mounted to preclude the possibility of leakage occurring when a downward pressure is applied to the actuating handle.

Another object of this invention resides in the provision of an actuating member which is nonrotatably connected with the stem of the valve but is substantially free to move angularly with respect thereto.

And a more specific object of this invention resides in the provision of an actuating member having a non-rotatable connection with the valve stem and being maintained in position by the main valve spring which is confined between a portion of the actuating member and the upper end of the valve stem whereby tilting of the actuating member increases the pressure applied to the packing by the valve spring.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawing, I have illustrated two complete examples of the physical embodiment of my invention constructed according to the best modes I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a transverse, sectional view, taken through a valve embodying my invention;

Figure 2 is a sectional view taken through Figure 1 on the plane of the line 2—2;

Figure 3 is a perspective view of the actuating member;

Figure 4 is a view, partly in elevation and partly in section, illustrating my invention applied to a valve having a hand wheel, and

Figure 5 is a perspective view of the hand wheel carrying member of the structure shown in Figure 4.

Referring now more particularly to the accompanying drawing, in which like numerals designate like parts throughout the several views, 5 represents a valve casing having an inlet 6 and an outlet 7 adapted to be connected through the valve port 8 of a partition 9, the upper edge 10 of the port forming a seat with which a valve 11 cooperates.

The wall or end of the casing 5 opposite the partition 9 has an internally threaded opening 12 in axial alignment with the valve port in which is threaded the boss 13 of a cap member 14 provided with a medial flange 15 adapted to have a snug engagement with the peripheral portion 16 of the valve casing surrounding the opening 12 to provide a fluid tight joint.

The valve 11 is movable vertically from open to closed position by a screw 17 on the lower end of a valve stem 18, the screw 17 being threaded in an upwardly projected shank 19 on the valve 11 which is maintained against rotation by ribs 20 positioned at diametrically opposite points and engageable in guides 21 extended from the inner wall of the bore 22 of the cap member 14. This structure is substantially as described in the patent issued to John Fraser, Jr., No. 1,675,172.

The cap 14 has an exteriorly threaded boss 23 on its upper end, the outer end of which is turned down for purposes to be later described. The upper or outer wall 24 of the boss is apertured, as at 25, to permit the valve stem 18 to pass outwardly of the cap member and the lower face of the wall is provided with

an annular bead 26 which engages one face of a packing ring 27. A flange 28 extended from the medial portion of the valve stem has a like annular bead 29 formed on its upper surface which engages the other face of the packing ring 27. The valve stem is at all times urged upwardly to compress the packing ring between the annular beads 26 and 29 to form a fluid-tight joint by an expansile spring 30 confined between a nut 31 threaded on the outer end of the valve stem and the transverse wall 32 of an actuating member 33 resting upon the reduced end of the boss 23.

The valve stem is square in cross section at the point at which it passes through the aperture 25 in the cap member and the wall 32 of the actuating member is provided with a substantially star shaped opening 34 which is adjustably engageable with the square portion of the valve stem to permit the handle 35 of the actuating member to extend in any desired direction at its limits of movement.

The star shaped opening 34 non-rotatably connects the actuating member with the square portion of the valve stem, but is sufficiently large to permit angular or tilting movement of the actuating member with respect to the stem.

An upwardly extending annular flange 36 formed on the actuating member encircles the lower end of the spring 30 and is exteriorly threaded to receive a hood 36′ which encloses the spring and the upper end of the valve stem. A pointer 37 formed on the actuating member and extended diametrically opposite the handle 35 cooperates with a dial 38 having suitable delineations to indicate the position of the valve, the dial being impinged between the upper face of the flange 15 and a nut 39 threaded on the boss 23.

It will be seen that the spring 30 normally maintains the actuating member in engagement with the upper face of the boss 23 and as the connection between the actuating member and the adjacent square portion of the stem is non-rotatable but substantially flexible, the actuating member is free to be tilted or moved angularly without diminishing the tension of the spring maintaining the packing in compression. Thus if downward pressure is exerted on the handle 35, the actuating member will pivot about the adjacent edge of the boss 23 raising its opposite end and thereby further compressing the spring 30, as will be readily obvious.

In Figures 4 and 5, I have illustrated a slightly modified form of my invention in which the handle 35 is replaced by a hand wheel 40 which is non-rotatably secured to a barrel member 41 in a manner to be later described. The barrel member 41 has its lower wall 42 provided with the star shaped opening 34 to receive the adjacent square portion of the valve stem and the spring 30 is confined between the wall 42 and the nut 31 threaded on the outer end of the valve stem. The pointer or indicating finger 37 is formed integral with the barrel 41 to cooperate with the dial as in the structure illustrated in Figure 1.

The hand wheel is positioned on the upper end of the barrel abutting an annular flange 43 formed thereon, being restrained against rotation by a pair of radial projections or ribs 44 extended upwardly from the flange 43. The upper end of the barrel is internally threaded to receive a threaded disc 45 having a centrally threaded aperture 46 in which a securing screw 47 is threaded, the screw passing through a counter-bored aperture in the hand wheel 40 to secure the same to the barrel.

In this form of my invention it will be apparent that the axis of the hand wheel may be moved angularly out of line with the axis of the valve without diminishing the pressure applied to the packing.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art to which an invention of this character appertains that I provide a valve having an actuating member which is so connected with the valve stem as to permit the axis of the same to be moved out of axial alignment with the axis of the valve which movement is sometimes caused by persons standing on the actuating member, without in any way affecting the fluid tight seal surrounding the valve stem and in which such movement of the actuating member increases the pressure applied to the packing seal.

What I claim as my invention is:

1. In a valve having a valve stem, a packing surrounding the valve stem and means connected with the valve stem for maintaining the packing in compression, an actuating member, and means non-rotatably connecting the actuating member with the valve stem, said means permitting the axis of the actuating member to be moved out of axial alignment with the axis of the valve stem without affecting the means for maintaining the packing in compression.

2. In a valve having a valve stem, a packing surrounding the valve stem, an actuating member non-rotatably and tiltably connected with the valve stem, and means confined between the actuating member and a valve stem carried part for maintaining the packing in compression whereby movement of the axis of the actuating member out of axial alignment with the axis of the valve stem increases the pressure applied to the packing.

3. A valve having a valve stem, a packing encircling the valve stem, means carried by the valve stem and engaging one face of the packing, an actuating member, means non-rotatably and tiltably, connecting the actuating member with the valve stem, and spring means confined between the actuating mem-

ber and a valve stem carried part, the connection between the actuating member and the valve stem permitting movement of the axis of the actuating member out of axial alignment with the axis of the valve stem.

4. A valve having a stem, an actuating member for turning the stem, said actuating member having a part surrounding the stem and being non-rotatably and tiltably connected with the stem, and yieldable means maintaining the actuating member assembled with the stem and valve casing, said yieldable means permitting tilting of the actuating member with respect to the stem without affecting the non-rotatable connection between the actuating member and the stem.

5. In a valve having a stem, a packing surrounding the stem, an actuating member non-rotatably and tiltably connected with the stem, and a single yieldable means for maintaining the packing in compression and the actuating member assembled with the valve stem and valve casing whereby movement of the axis of the actuating member out of axial alignment with the axis of the valve stem increases the pressure applied to the packing.

6. A valve having a valve stem, an actuating member non-rotatably and tiltably connected with the valve stem, yieldable means confined between the actuating member and a valve stem carried part for normally yieldably holding the actuating member in a position with its axis aligned with the axis of the valve stem, and said means permitting the axis of the actuating member to be moved out of axial alignment with the axis of the valve stem without affecting the non-rotatable connection between the actuating member and the valve stem.

In testimony whereof I have hereunto affixed my signature.

JOSEPH SWEET.