May 6, 1924. 1,493,253

L. W. EGGLESTON

VALVE

Filed March 1, 1923

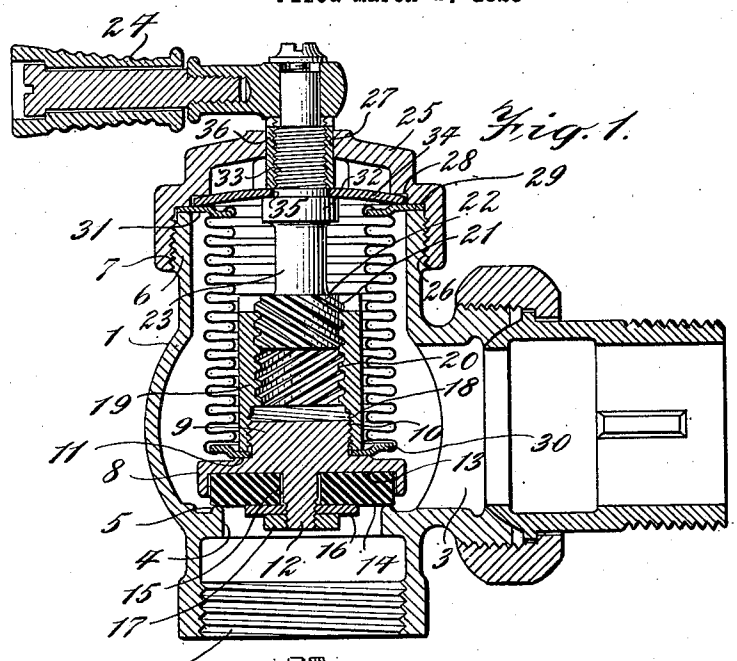


Fig. 1.

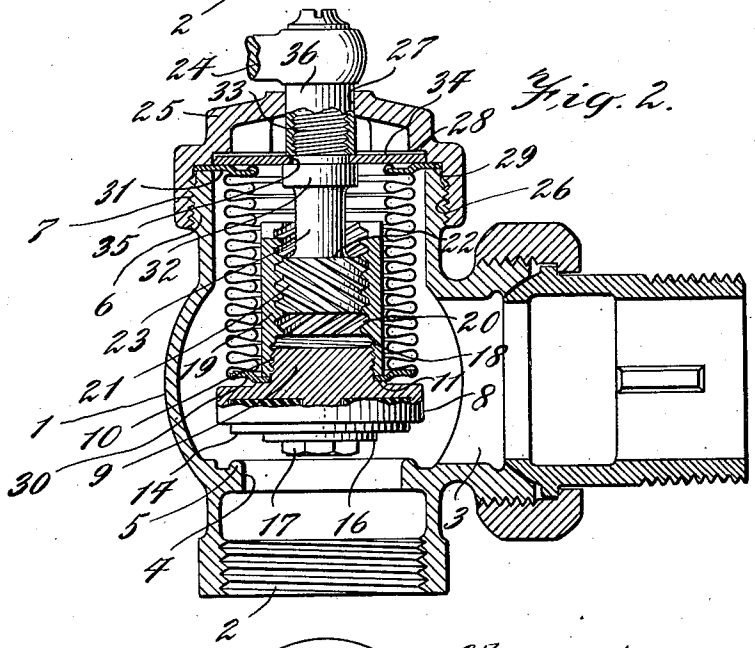


Fig. 2.

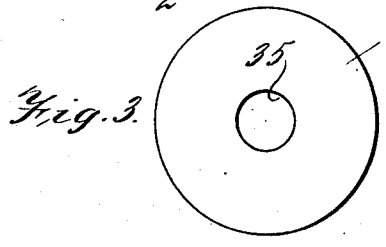


Fig. 3.

INVENTOR.

Lewis W. Eggleston

BY

C. F. Reylmer

his ATTORNEY.

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UNITED STATES PATENT OFFICE.

LEWIS W. EGGLESTON, OF BUFFALO, NEW YORK, ASSIGNOR TO AMERICAN RADIATOR COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

VALVE.

Application filed March 1, 1923. Serial No. 622,063.

To all whom it may concern:

Be it known that I, LEWIS W. EGGLESTON, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Valves, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to new and useful improvements in valves, and while it is capable of general application in various types of valves, it is particularly applicable to quick opening types of valves in which the operating member is connected to a valve closure by means of a quick-pitch screw, whereby rotation of the operating member moves the closure toward or away from its seat.

In valves of the character above mentioned, it sometimes occurs that the fluid pressure to which the valve closure is subjected when closed, and which tends to move the closure from its seat, reacts against the operating member, and by virtue of the screw connection rotates said operating member sufficiently in the valve-releasing direction to permit the valve to be moved from its seat to open the port through the casing when it is desired that the valve should be kept closed.

It is one of the objects of the present invention to provide an improved and simplified means whereby the valve will be held to its seat, and pressure against the valve tending to open the same will not result in the operating means being moved to permit the valve to open.

A further object is to provide a locking or holding means which will permit free movement of the parts when moving the valve toward or away from its seat, but which will be properly and automatically applied to hold the operating means against the valve-releasing movement when the valve is held to its seat by said operating means.

Other objects will be apparent from the description hereinafter given.

The invention consists in the construction and combination of parts to be more fully described hereinafter, and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawings I have shown a preferred embodiment of the invention, and in which—

Figure 1 is a longitudinal section through a valve embodying my invention, the parts being shown in position wherein a valve member is held in closed relation to its seat or port;

Fig. 2 is a sectional longitudinal section showing the position assumed by the parts when the same are operated to move the valve from its port or seat into open position, and

Fig. 3 is a detail plan view of a locking disk constituting one of the elements of the invention.

Referring to the drawings by characters of reference, 1 designates a casing having any suitable external design or contour, and provided with an inlet nipple or port 2 and an outlet nipple or port 3 which are adapted to be connected, in any suitable manner, to conduits or pipes conveying fluid to and from the casing. Surrounding the inlet port is an annular valve seat 4 surrounded by an annular upstanding rib or bead 5 with which a valve closure, to be presently described, cooperates to control flow from the inlet through the casing. Opposite to and in alinement with the inlet nipple or port 2, the casing is provided with a nipple 6 connecting with the chamber of the casing, in the present embodiment said nipple being externally threaded, as at 7.

Within the casing and movable toward and from the valve port 4 is a valve closure 8, preferably of the disk type, the same being provided with a central boss or stud 9, which is externally threaded, as at 10. At the base of the boss 9 is provided an annular shoulder or seat 11 which serves a purpose to be presently described. The lower portion of the disk valve is provided with an integral, threaded stud 12, which is surrounded by an annular recess 13, in which is seated a packing washer 14 formed with a central aperture 15 through which said stud 12 projects. The disk 14 is held in place in said recess 13 by means of a washer 16 and clamping nut 17 mounted on said stud 12.

Threaded, as at 18, on the boss 10, is a coupling sleeve 19, the upper inner portion of which is provided with an internal quick-pitch screw thread 20, which meshes with a cooperating thread 21 on a head 22 carried

by a rotatable and longitudinally movable operating member, preferably in the form of a stem 23, which projects through the upper open end of the valve chamber and is provided with a hand lever 24, or other suitable means, by which said operating member may be rotated. The upper open end of the casing is closed by a bonnet or cap 25 having a depending, internally-threaded flange 26 cooperating with the threads 7 on the nipple 6, said bonnet or cap being provided with a central opening 27 through which the upper end of said operating member projects. The bonnet is provided with internal, annular stepped surfaces 28 and 29, respectively, which are concentric with the casing, and the latter of which lies over the upper edge of the said nipple 6.

Arranged within the casing and surrounding the said stem 23 and the sleeve 19, is a packing or sealing element, preferably in the form of an expansible and collapsible element consisting of an annularly-corrugated bellows, preferably of suitable metal. The lower or innermost portion of this bellows is suitably connected and sealed to a washer or plate 30 which surrounds the stud 9 and is seated upon the seat or shoulder 11, heretofore described, the inner edge of said washer being clamped and sealed against said shoulder by the lower end of the sleeve 19, heretofore described. The upper end of the said bellows is connected and sealed to an outwardly-projecting annular disk or plate member 31, the outer portion of which is clamped and sealed securely between the upper end of the nipple and the surface 29 of the bonnet, heretofore described. The outer or peripheral portion of the washer 30 is arranged in a higher plane than the inner portion thereof, so that the upper surface of said outer portion will be above the point of connection of said washer with the bellows. It will be seen that the valve is sealed against the ingress of fluid into the said bellows at the point of its connection with the valve disk, and the escape of fluid from that portion of the chamber which surrounds the bellows is prevented, due to the fluid-tight joint made between the annular disk 31 and the casing at the point where the said disk 31 is clamped between the bonnet 25 and the nipple 6.

The upper end of the stem or operating member, at a point within the casing and preferably within said bellows, is provided with a fixed stop, preferably in the form of a shoulder or collar 32 formed integral with said stem, and that portion of the stem between said shoulder and the operating handle is threaded, as at 33.

34 designates a locking member in the preferred form, consisting of a resilient metallic disk, circular in form, and having a central aperture 35 through which the threaded end portion 33 of the stem is projected, said disk being clamped rigidly at its central portion against the shoulder 32 by a sleeve 36 threaded onto the threaded upper end of the valve stem, said sleeve being slidably and rotatably mounted in the opening 27 in the bonnet 25. By this arrangement the disk 34 is held against longitudinal and rotary movement relative to the operating member. The locking disk 34 overlies the upper portion of the bellows and is of such diameter that its peripheral portion projects into the space between the outer face of the said ring 31 and the surface 28 and overlaps said surface, as will be apparent from the drawings.

In the preferred embodiment shown and described, the diameter of the disk 34, and the diameter 1 of the bonnet, and the area of the contacting surfaces on the disk and the face 28, are so proportioned that a large and effective frictional contact will be afforded between said disk and surface so as to efficiently hold the valve to its seat.

The arrangement of the parts in the preferred embodiment being as above described, the operation of the various parts and their functions are as follows:

When it is desired to close the valve to the position shown in Fig. 1, the operator rotates the operating member or stem to cause the valve disk to move toward its seat. During this movement the disk 34 maintains the general position shown in Fig. 2 and turns freely in the space between the upper face of the ring 31 and the surface 28 until the valve disk positively engages its seat 5 to close the port through the latter, and upon further rotation of the handle the stem, under reaction of forces, will move longitudinally and outward, that is, away from the valve disk, which will result in the peripheral portion of the disk 34 being brought into strong frictional contact with the surface 28, and continued movement of the valve stem in the outward direction will flex the central portion of the locking disk outward, as shown in Fig. 2, whereby the peripheral portion of the locking disk is held in yielding frictional contact with the surface 28. It will thus be seen that when the valve is held to its seat the locking disk will be in strong and yielding frictional engagement with the part 28, so that any pressure of the fluid against the under face of the valve tending to unseat the same, will be prevented from rotating the valve stem, the latter being held against rotation by the locking disk.

When it is desired to open the valve, the operating member or stem is rotated in the opposite direction from that heretofore described, which will result in the tension on the spring disk being relieved, so that the

friction between said disk and the part 28 is reduced or removed, and the stem may be rotated freely to move the disk to open position. It is to be noted that the spring disk is so connected to the stem as to rotate therewith, and also so that the central portion of the disk is flexed when the reactive movement between the valve and the stem causes the latter to move longitudinally.

It will be seen that when the valve is in closed relation to its seat, it is yieldingly urged to and held in this position by the resilient disk 34, so that any expansion or contraction of the parts, due to temperature changes, will not result in the valve being separated from its seat.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A valve comprising a casing containing a seat, a valve closure cooperable with said seat, an operating member for moving the valve closure relative to said seat, a friction contact surface in the casing, a resilient metal disk held at its central portion on said operating member, and means whereby longitudinal movement of the operating member when urging the closure to its seat moves said resilient disk into frictional engagement with said friction contact surface.

2. A valve comprising a casing containing a seat, a valve closure cooperable with said seat, a rotatable and longitudinally movable operating member for moving said closure relative to its seat, an annular surface in the casing, and a resilient metal disk fixed to said operating member to rotate therewith and arranged in overlapping relation to said surface, the arrangement being such that longitudinal movement of said stem moves said disk to yieldingly and frictionally contact said annular surface.

3. A valve comprising a casing containing a seat, a valve closure cooperable with said seat, a stem for moving the valve closure relative to said seat, an annular surface in the casing and concentric with said stem, a resilient metal disk fixed at its central portion on said stem, and means whereby longitudinal movement of the stem when urging the closure to its seat flexes said disk into frictional engagement with said surface.

4. A valve comprising a casing containing a seat, a valve closure cooperable with said seat, a rotatable and longitudinally movable stem for moving said closure relative to its seat, an annular surface in the casing and concentric with said stem, and a resilient metal disk fixed to the stem to rotate therewith and arranged with its peripheral portion in overlapping relation to said surface, the arrangement being such that longitudinal movement of said stem flexes said disk to yieldingly and frictionally contact said peripheral portion with said annular surface.

5. A valve comprising a casing containing a seat, a valve closure, a rotary stem, means connecting said closure and stem whereby rotation of the stem moves said closure relative to its seat, an annular spring disk connected at its central portion to said stem to rotate therewith when the valve is moved toward its seat, and an annular surface carried by the casing and adapted to be frictionally and yieldingly engaged by said disk when the closure is engaged with its seat.

6. A valve comprising a casing containing a seat, a valve closure, a rotatable and longitudinally movable stem, a threaded connection between said stem and closure whereby rotation of said stem moves said closure relative to said seat, a spring metallic disk connected at its central portion to said stem to rotate therewith, and an annular surface on the casing and against which the said disk is yieldingly urged to hold the stem against rotation when the closure is held to its seat by said stem.

7. A valve comprising a casing containing a seat, a valve closure, a rotatable and longitudinally movable stem, a threaded connection between said stem and closure whereby rotation of said stem moves said closure relative to said seat, a spring metallic disk, and means for connecting the disk at its central portion to said stem so as to rotate with the stem and move longitudinally therewith, the casing having an annular surface against which said disk is flexed by longitudinal movement of the stem upon engagement of the closure with said seat.

8. A valve comprising a casing containing a seat, a valve closure, a rotatable and longitudinally movable stem, a threaded connection between said stem and closure whereby rotation of said stem moves said closure relative to said seat, a spring metallic disk, means for connecting the disk at its central portion to said stem so as to rotate with the stem and move longitudinally therewith, and a bonnet on the casing and having an annular surface against which said disk is flexed by longitudinal movement of the stem upon engagement of the closure with said seat.

9. A valve comprising a casing having a seat, a valve closure, a rotatable and longitudinally movable stem, a threaded connection between said stem and closure whereby rotation of said stem moves said closure relative to said seat, a collar on the stem, a spring metallic disk having a central opening through which said stem extends, and a sleeve threaded onto said stem and clamping said disk rigidly against said collar whereby said disk rotates with said stem

and moves longitudinally therewith, the casing having an annular surface against which said disk is moved and yieldingly held by longitudinal movement of the stem upon engagement of the closure with said seat.

10. A valve comprising a casing having a seat, a closure cooperable with the seat, a stem for moving the closure relative to said seat, said stem being rotatable and longitudinally movable, a spring disk fixed at its central portion to said stem, an annular part on the casing adapted to be engaged by the peripheral portion of the disk, and means whereby longitudinal movement of the stem due to reaction when said stem moves the valve onto its seat to flex said disk to cause the latter to engage said annular part to prevent rotation of the stem.

11. A valve comprising a casing containing a seat, a valve closure, a rotatable and longitudinally movable operating member, a threaded connection between said operating member and closure whereby rotation of said member moves said closure relative to said seat, an expansible and collapsible element connected to the valve disk, a member closing the casing and securing said expansible-collapsible member in sealed relation thereto, an annular friction surface on said member and facing the valve, and a spring disk rigidly connected at its central portion to the operating member and adapted to be flexed against said annular surface by movement of the operating member upon engagement of the valve closure with its seat.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

LEWIS W. EGGLESTON.

Witnesses:
J. C. ESCHBORN,
EVERETT STEELE.