Nov. 7, 1933. J. J. LAWLER 1,934,314

VALVE CONSTRUCTION

Filed Dec. 10, 1930 2 Sheets-Sheet 1

Fig. 1.

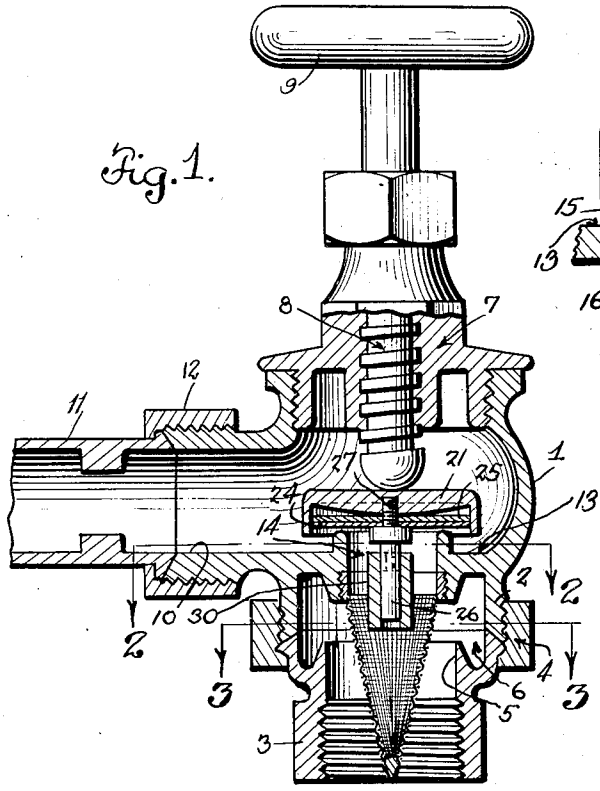
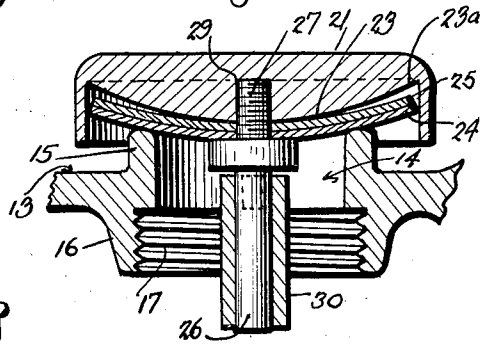


Fig. 4.



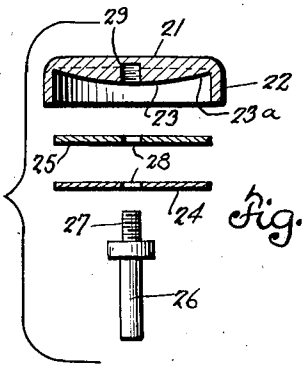


Fig. 5.

Fig. 2.

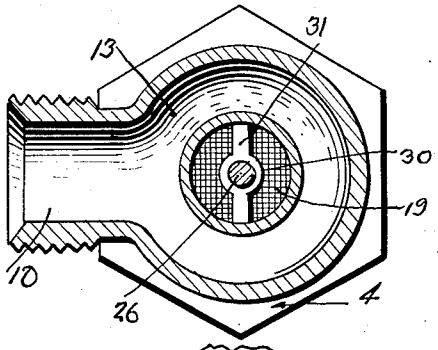
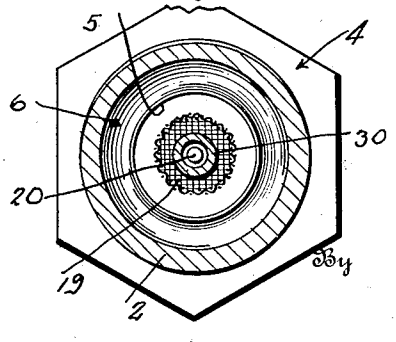


Fig. 3.



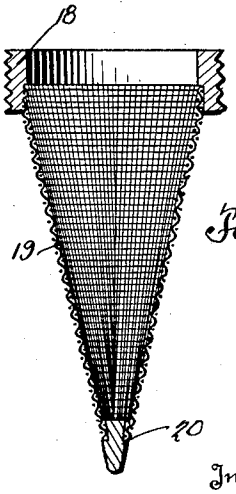


Fig. 6.

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Nov. 7, 1933. J. J. LAWLER 1,934,314

VALVE CONSTRUCTION

Filed Dec. 10, 1930 2 Sheets-Sheet 2

Fig. 7.

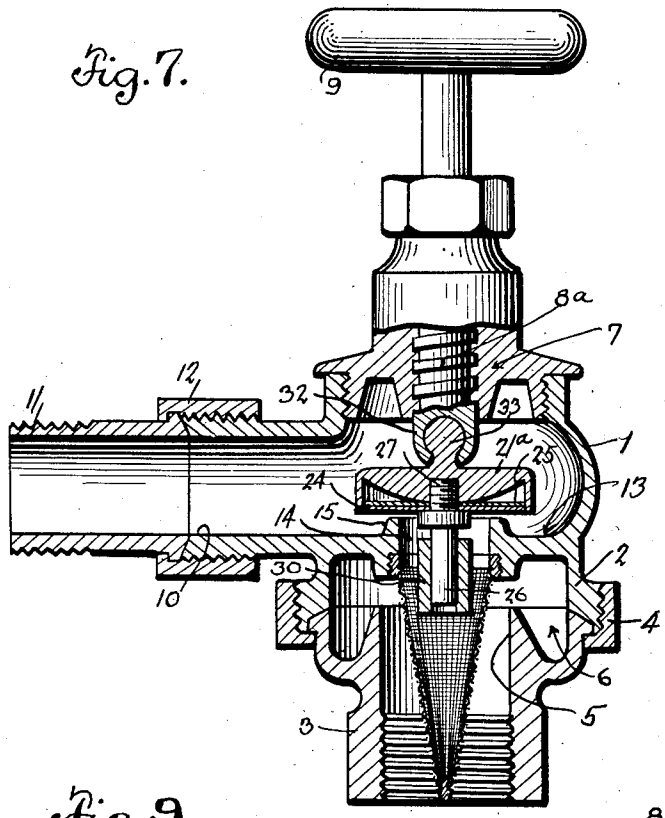


Fig. 9.

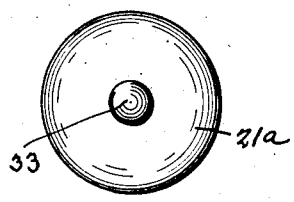


Fig. 10.

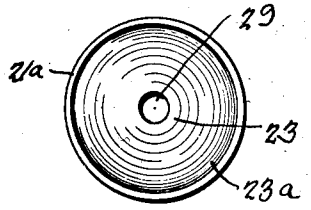
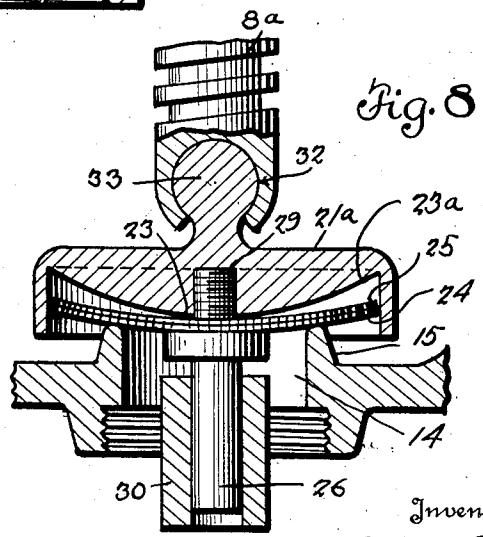


Fig. 8.



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VALVE CONSTRUCTION

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Application December 10, 1930
Serial No. 501,422

11 Claims. (Cl. 251—27)

This invention relates to certain new and useful improvements in valve constructions.

The primary object of the invention is to provide a valve construction comprising a rigid valve seat and a flexible valve engageable with the seat and wherein the flexible valve is in the form of a comparatively thin flexible disk preferably formed of tough and hard metal and backed by a similar valve disk of suitable material, such as brass, both valve disks being centrally supported on a valve member that is guided in its movements toward and away from the valve seat and with which valve member an operating handle may be freely engageable or have swivel connection therewith.

A further object of the invention is to provide a valve construction of the foregoing type wherein the valve casing is equipped with a strainer screen disposed at the inlet side of the valve opening with an annular sediment chamber on the inner wall of the valve casing below or inwardly of the valve opening.

With the above and other objects in view that will become apparent as the nature of the invention is better understood, the same consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings and claimed.

In the drawings:—

Figure 1 is a vertical sectional view of a valve constructed in accordance with the present invention and showing the rigid valve seat, flexible valves associated therewith, strainer screen and sediment chamber with the operating handle for the valve freely engageable therewith;

Figure 2 is a horizontal sectional view taken on line 2—2 of Figure 1 showing the spider support for the guide pin mounting for the valve;

Figure 3 is a horizontal sectional view taken on line 3—3 of Figure 1;

Figure 4 is an enlarged detail sectional view of the valve seat and valve showing the flexible valve seats carried by the valve member engaged with the rigid valve seat;

Figure 5 shows sectional and elevational views of the parts of the valve;

Figure 6 is an enlarged sectional view of the conical strainer screen removed from the valve casing;

Figure 7 is a vertical sectional view, similar to Figure 1 showing a swivel connection between the operating handle and valve member for positively moving the valve member away from its seat;

Figure 8 is an enlarged detail sectional view of the valve member and seat shown in Figure 7 with the valve disks engaged with the seat;

Figure 9 is a top plan view of the valve member; and

Figure 10 is a bottom plan view of the valve member.

The valve construction disclosed herein while capable of use in various arts has been especially designed for use in connection with radiators and as shown in Figures 1 to 6, the same comprises a casing 1 provided with an externally threaded nipple 2 at its inlet side with which a section 3 is engaged and so retained by the screw ring or collar 4. The section 3 is annularly enlarged at its upper end where engaged with the inlet nipple 2 and on the inner face of the section 3 at its upper end there is provided an annular upstanding flange 5 defining an annular sediment chamber 6. The section 3 is internally threaded at its lower end for attachment to a service pipe.

The open upper end of the casing 1 has a closure cap 7 threaded therein, the cap being provided with an internally threaded central bore in which is threaded the valve operating rod 8 carrying the handle 9 at its upper end, the valve operating rod at its lower end being freely engaged with the valve member presently to be described. The side outlet nipple 10 of the valve casing is engaged by the pipe 11 that is retained in position by the screw ring or collar 12, the pipe 11 extending to a radiator or the like.

A cross partition 13 is provided in the valve casing 1 and has a central opening 14 therein defining a valve passage, the wall of the opening 14 being surrounded by an upstanding annular rigid valve seat 15 and a depending annular flange 16 that is internally threaded as at 17 for the support of a strainer screen. The strainer screen as shown in Figures 1 and 6 comprises a screw ring 18 carrying a depending conical screen 19 that is reinforced at its lower apex end 20, the screw ring 18 being engaged with the threads 17 of the flange 16 while the conical screen is disposed centrally of the sections 3 and sediment chamber 6 that is shown in Figure 1.

The valve comprises a disk shaped member 21 carrying a depending annular flange 22, the lower face of the valve member 21 being convexed as at 23 defining a more pronounced annular depression 23a at the peripheral edge of the convexed face. A flexible metallic disk 24 preferably formed of monel metal is disposed for direct contact with the valve seat 15 and is backed by a similar disk 25, preferably formed of brass or the like, the two disks 24 and 25 being superposed and confined

within the annular flange of the valve member 21 by the guide pin 26 having a threaded end 27 passing through openings 28 centrally of the valve disks 24 and 25 and received in the central threaded socket 29 formed in the valve member 21 at the convex side 23 thereof. The mounting for the guide pin 26 of the valve member includes a tubular bearing 30 positioned centrally of the valve passage or opening 14 and there supported by the spider arms 31 attached to the walls of the opening 14.

It will be observed from an inspection of Figure 1 that when the valve is unseated, the valve disks 24 and 25 are unflexed with the peripheral edges thereof spaced from the depressions 23*a* in the underside of the valve member 21, being supported centrally of the valve member by the guide pin 26. Also, when the valve operating rod 8 is unscrewed, water or steam pressure entering the valve casing through the inlet section 3 automatically unseats the valve member to flow to the outlet pipe 11. The conical strainer screen 19 prevents the passage of foreign matter over the valve seat 15 while said foreign matter or other sediment is collected in the chamber 6. When the rod 8 is operated to move the valve member 21 onto its seat 15, the disk 24 is engaged with the valve seat 15 and continued movement of the valve toward its seat will cause both valve disks 24 and 25 to flex and assume the position shown in Figure 4, with the peripheral edges of the disk valves moving into the annular depression 23*a* in the convexed lower side of the valve body. The valve disk 24 is rendered non-corrodible by being formed of monel metal and assures proper closing of the valve to prevent flow and seepage of water or steam therethrough when the valve is seated. The valve disk 25 forms a backing for the disk 24 and acts as a reinforcment for the disk 24 as well as aiding the latter to assume a straight line position when disengaged from the valve seat 15.

In the form of the invention shown in Figures 7 to 10, the valve operating rod 8*a* has a swivel connection with the valve member 21*a*, the other elements of construction being substantially the same as described in connection with Figures 1 to 6. The lower end of the valve operating rod 8*a* is provided with a ball shaped socket 32 that receives the ball projection 33 rising centrally of the valve member 21*a*. It will be noted that in the operation of the rod 8*a*, the valve member 21*a* is positively removed toward and away from the valve seat 15 as contrasted with the showing in Figures 1 to 6, wherein the valve member 21 is unseated by the pressure of water or steam flowing through the valve casing.

While there is herein shown and described the preferred embodiment of the invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

I claim:—

1. In a valve construction of the character described, a casing having a valve seat therein and a rigid valve member movable toward and from the seat and including an axially supported normally flat flexible disk engageable with the seat, the valve member having a convexed lower face with the unsupported peripheral edge of the flexible disk movable toward the convexed face of the valve member when the valve member is moved toward the seat for engaging the flexible disk with the seat.

2. In a valve construction of the character described, a casing having a valve seat therein and a rigid valve member movable toward and from the seat and including an axially supported normally flat flexible disk of a tough sheet metal engageable with the seat, the valve member having a convexed lower face with the unsupported peripheral edge of the flexible disk movable toward the convexed face of the valve member when the valve member is moved toward the seat for engaging the flexible disk with the seat.

3. In a valve construction of the character described, a casing having a valve seat therein and a valve member movable toward and from the seat and including a flexible disk engageable with the seat, and a flexible backing disk for the first named disk, the valve member having a convexed lower face with the unsupported peripheral edge of the flexible disk movable toward the convexed face of the valve member when the valve member is moved toward the seat for engaging the flexible disk with the seat.

4. In a valve construction of the character described, a casing having a valve seat therein and a valve member movable toward and from the seat and including a flexible disk of tough metal engageable with the seat, and a flexible backing disk for the first named disk, the valve member having a convexed lower face with the unsupported peripheral edge of the flexible disk movable toward the convexed face of the valve member when the valve member is moved toward the seat for engaging the flexible disk with the seat.

5. In a valve construction of the character described, a casing having a valve seat therein and a valve member movable toward and from the seat and including an axially supported normally flat flexible disk engageable with the seat, the valve member having a rigid convexed lower face defining an annular depression within which the unsupported peripheral edge of the disk is received when engaged with the seat, and an annular peripheral flange projecting facially from the convex side of the valve member with the flexible disk located within the flange.

6. In a valve construction of the character described, a casing having a valve seat therein and a valve member movable toward and from the seat and including an axially supported normally flat flexible disk of hard sheet metal engageable with the seat, the valve member having a rigid convexed lower face defining an annular depression within which the unsupported peripheral edge of the disk is received when engaged with the seat, and an annular peripheral flange projecting facially from the convex side of the valve member with the flexible disk located within the flange.

7. In a valve construction of the character described, a casing having a valve seat therein and a valve member movable toward and from the seat and including a flexible disk engageable with the seat, and a flexible backing disk for the first named disk, the valve member having a convexed lower face defining an annular depression within which the unsupported peripheral edges of the disks are received when engaged with the seat, and an annular peripheral flange projecting facially from the convex side of the valve member with the flexible disks located within the flange, said disks being axially supported and normally assuming flat contacting positions.

8. In a valve construction of the character described, a casing having a valve seat therein and a valve member movable toward and from the seat and including a flexible disk

of tough sheet metal engageable with the seat, and a flexible backing disk for the first named disk, the valve member having a convexed lower face defining an annular depression within which the unsupported peripheral edges of the disks are received when engaged with the seat, and an annular peripheral flange projecting facially from the convex side of the valve member with the flexible disk located within the flange, said disks being axially supported and normally assuming flat contacting positions.

9. In a valve construction of the character described, a casing having a valve seat therein and a valve member movable toward and from the seat and including a flexible disk of monel metal engageable with the seat, and a flexible backing disk for the first named disk, the valve member having a convexed lower face defining an annular depression within which the peripheral edges of the disks are received when engaged with the seat, an annular peripheral flange projecting facially from the convex side of the valve member with the flexible disks located within the flange, and a valve rod having abutting engagement with the valve member.

10. In a valve construction of the character described, a casing having a valve seat therein and a valve member movable toward and from the seat and including a flexible disk of tough sheet metal engageable with the seat, and a flexible backing disk for the first named disk, the valve member having a convexed lower face defining an annular depression within which the peripheral edges of the disks are received when engaged with the seat, an annular peripheral flange projecting facially from the convex side of the valve member with the flexible disks located within the flange and a valve rod swivelly engaged with the valve member.

11. In a valve construction of the character described, a casing having a valve seat therein and a valve member movable toward and from the seat and having a convexed lower face and an axially supported normally flat flexible disk secured to the convex face of the valve member for engagement with the valve seat.

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