

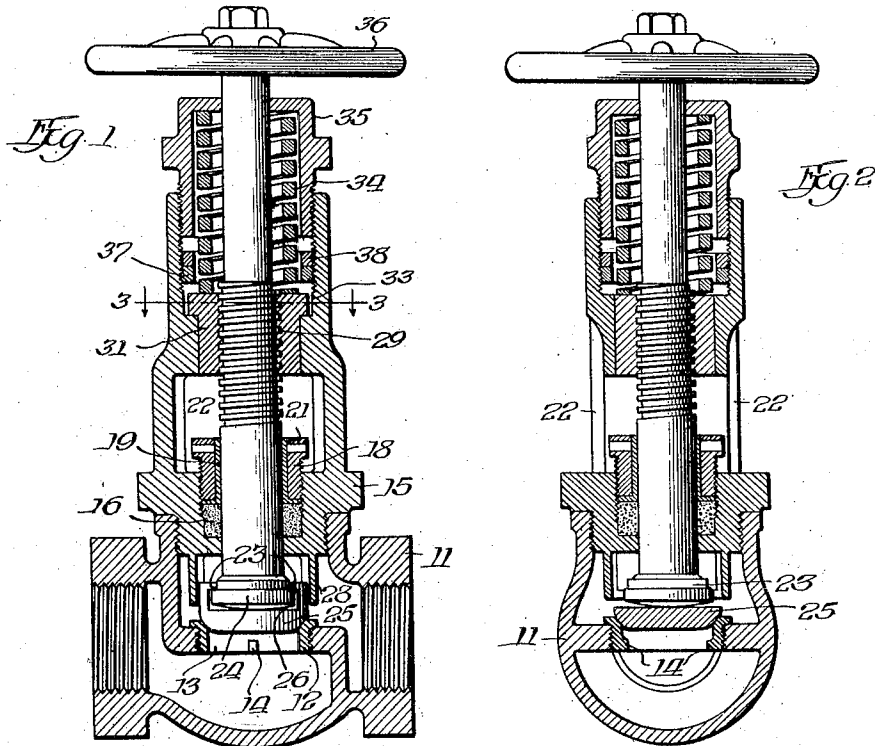
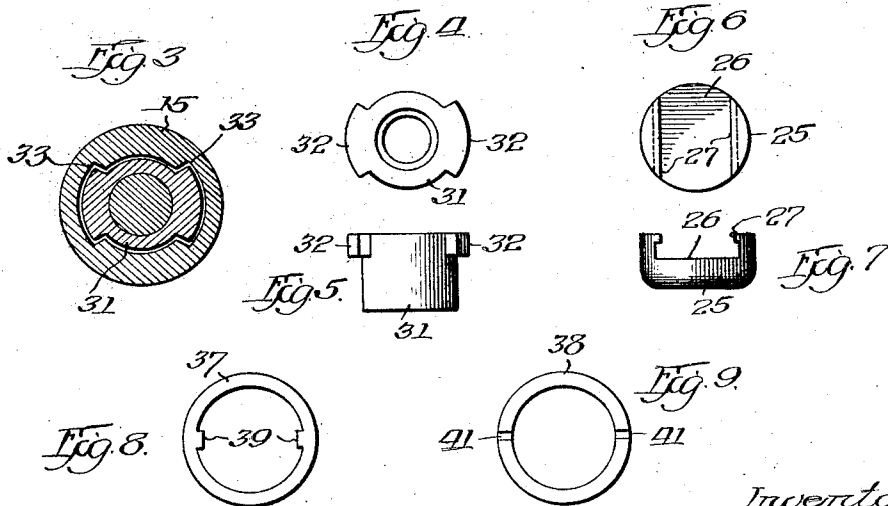
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J. F. KELLY

SELF GRINDING VALVE

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Inventor:
John F. Kelly
By Ira J. Wilson
Att'y

UNITED STATES PATENT OFFICE.

JOHN F. KELLY, OF MUSKEGON, MICHIGAN, ASSIGNOR TO KELLY VALVE COMPANY, OF MUSKEGON, MICHIGAN, A CORPORATION OF MICHIGAN.

SELF-GRINDING VALVE.

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This invention pertains to valves; and particularly to the self-grinding type in which a valve disk is adapted to be rotated against and in contact with its seat during the opening and closing movements of the valve for the purpose of grinding the face of the disk against the seat to insure a tight closing of the valve.

One of the primary purposes of this invention is the provision of adjustable means whereby the extent of grinding movement of the disk against its seat may be adjusted and regulated to adapt the valve for various conditions under which it may be used. In some installations a quarter turn of the disk in contact with the seat is sufficient, and further grinding movement is not only unnecessary but results in unnecessary wear upon the disk and seat. In other installations, a half or even a full turn of the disk against its seat is desirable, and my present invention aims to provide for adjustment and regulation of the grinding movement to adapt the valve for various conditions.

Another purpose of the invention is to provide a valve with a removable seat and a removable disk, either or both of which may be removed and renewed when occasion requires.

A further object is to dispose the working parts of the valve outside the valve body so that they are not subjected to the action of the fluid flowing through the valve, and to provide packing around the valve stem which may be tightened and adjusted when occasion requires, without in any way dismantling the valve structure, this desideratum being accomplished by the employment of an open bonnet through which access to the packing nut may be attained.

Other objects and advantages of this invention should be readily appreciated as the same becomes better understood by reference to the following description, when considered in connection with the accompanying drawings.

Referring to the drawings:—

Fig. 1 is a vertical sectional view through a valve embodying my invention;

Fig. 2 is a similar view taken at right angles to Fig. 1;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Figs. 4 and 5 are plan and elevational views, respectively, of the sliding sleeve;

Figs. 6 and 7 are plan and elevational views, respectively, of the removable valve disk;

Fig. 8 is a plan view of the lower adjusting ring; and

Fig. 9 is a similar view of the upper adjusting ring.

By reference to the drawings more in detail, it will be observed that the valve comprises a body 11 of conventional shape, provided with a flow-opening through the partition wall thereof, which is tapped, as indicated at 12, to receive the threaded removable valve seat 13, interiorly provided with inwardly extending lugs or bosses 14 adapted to receive a spanner or similar wrench by means of which the seat may be introduced and removed.

The bonnet 15 is threaded into the top of the body and provided with a depression to accommodate the packing material 16, which surrounds the valve stem 17 and is compressed to provide a leak proof joint by means of the packing nut 18 threaded into the pocket. A sleeve 19 is preferably interposed between the nut and the valve stem. The nut is provided at its upper end with a series of radially disposed recesses 21 adapted to receive the end of a tool by means of which the nut may be adjusted, and access to the nut for adjustment purposes is had through the openings 22, formed in the walls of the bonnet 15.

The lower end of the valve stem 17 is flattened at two sides, as indicated at 23, and provided with a flange 24 below the flattened portions. The valve disk 25 is provided with a transverse undercut groove 26, the inwardly projecting edges or flanges 27 of which overlie the flange 24 of the stem and engage the flattened portions 23 of the stem to insure rotation of the disk with the stem. To retain the disk against lateral displacement from the stem, the lower end of the bonnet 15 is provided with a depending guide or cage 28, disposed around the disk so as to prevent lateral displacement of the disk relatively to the stem and maintain the disk and stem in axial alignment. When the disk is to be removed or renewed, the bonnet is detached from the body, whereupon the stem may be projected downwardly sufficiently to clear the disk from the lower edge of the cage, whereupon the disk may be slid laterally off from the stem.

The stem 17 is screw threaded intermediate its ends, as indicated at 29, and a tapped sleeve 31 threaded onto the stem is provided with wings 32 disposed in recesses 33 formed in the walls of the bonnet, by which the sleeve is held against rotation. The sleeve, however, is slidable longitudinally in the bonnet, for a purpose which will be later explained.

The sleeve is normally held in depressed position, shown in Fig. 1, by a coiled expansion spring 34 interposed between the sleeve and the top of a cap 35, threaded into the tapped upper end of the bonnet. The tension of this spring may be regulated by adjusting the position of the cap, and when the valve disk is forced against its seat by manipulation of the hand-wheel 36, the sleeve will be raised, by further rotation of the stem, against the force of the spring 34, thereby yieldingly holding the disk against its seat while the same is being rotated thereon to perform the desired grinding action.

For the purpose of limiting the upward travel of the sleeve, an adjustable abutment against which the upper end of the sleeve abuts, in the form of a ring 37, is threaded into the bonnet. By adjusting this ring upwardly or downwardly in the bonnet, the travel of the sleeve, and thereby the extent of rotation of the valve disk before it becomes securely locked against its seat, may be regulated. To insure against accidental displacement of the ring 37, a second ring 38 is threaded into the bonnet above the ring 37, and when clamped against said ring serves the function of a lock nut to lock the ring in adjusted position. In order to provide for adjustment of the rings, the lower ring 37 is equipped with inwardly projecting bosses 39, and the upper face of the ring 38 is provided with depressions 41, both of which are adapted for engagement by suitably shaped wrenches, by which the adjustment of the rings may be effected. By adjustment of the cap 35, the tension of the spring 34 may be regulated to any desired pressure, and when the disk is closed against its seat, this spring will yield upon continued rotation of the valve stem, thereby permitting the disk to be ground against its seat until the sleeve is elevated sufficiently to engage the abutment ring, whereupon the disk is securely locked against the seat. The extent of grinding movement of the disk against its seat may be adjusted and regulated by adjusting the position of the abutment ring. The packing around the valve stem may be tightened or loosened by

adjusting the packing nut through the open sided bonnet. Furthermore, both the valve disk and the seat may be readily removed and repaired or renewed when occasion requires.

The structural details illustrated and described may obviously be varied within wide limits without departing from the essence of the invention, as defined in the following claims.

I claim:

1. A valve comprising a seat, a rotatable disk, means for yieldably holding said disk against its seat during rotative movement thereof to grind the disk against the seat, and adjustable means for regulating the extent of the grinding movement.

2. A self-grinding valve comprising a seat, a valve disk, means for rotating said disk in engagement with the seat, and means whereby the extent of such rotative movement may be adjustably limited.

3. A self-grinding valve comprising a seat, a rotatable valve disk, a spring for yieldingly urging said disk against its seat during rotative movement thereof to grind the disk against said seat, a movable member for locking said disk against said seat, and means adjustably disposed in the path of movement of said member whereby the grinding action between the disk and said seat may be regulated.

4. A self-grinding valve comprising a seat, a rotatable disk, a stem upon which said disk is carried, a sleeve threaded upon said stem, means for holding said sleeve against rotation, a spring urging said sleeve toward said seat, and an adjustable abutment in the path of travel of said sleeve whereby the grinding action of the disk against said seat may be regulated.

5. In a valve, the combination of a seat, a disk, a stem carrying said disk, a sleeve threaded on said stem, a bonnet surrounding said sleeve, a spring disposed above said sleeve, means for regulating the tension on said spring, and adjustable means for regulating the travel of said sleeve.

6. In a valve, the combination of a body, an open bonnet attached thereto, a stem extending through said bonnet into said body, a sleeve threaded onto said stem and held by said bonnet against rotation, a cap threaded into the upper end of said bonnet, a spring interposed between said cap and said sleeve, and an adjustable abutment ring threaded into said bonnet into the path of travel of said sleeve.

JOHN F. KELLY.