A. SCHUERMANN.

ROLLER BEARING FOR SELF CLOSING LIQUID SHUT-OFFS.

APPLICATION FILED NOV. 21, 1905.

900,598. Patented Oct. 6, 1908.

Fig. 1.

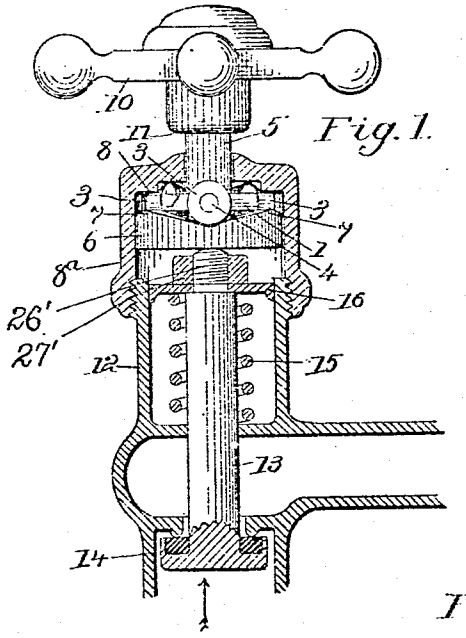

Fig. 2.

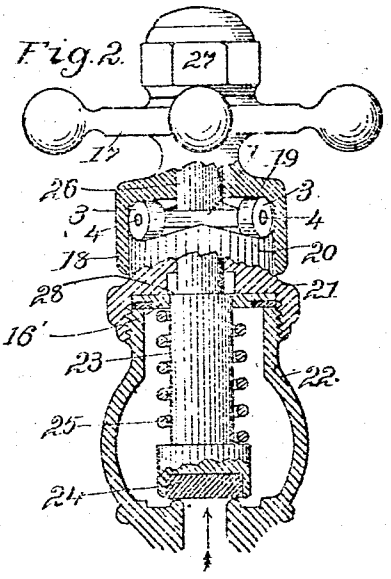

Fig. 3.

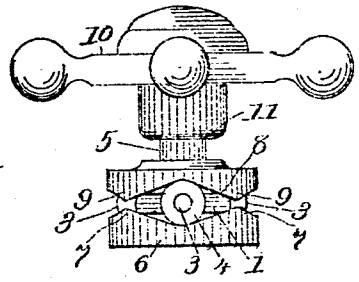

Fig. 5.

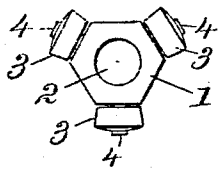

Fig. 7.

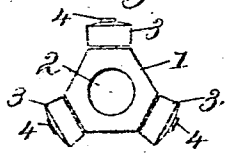

Fig. 4.

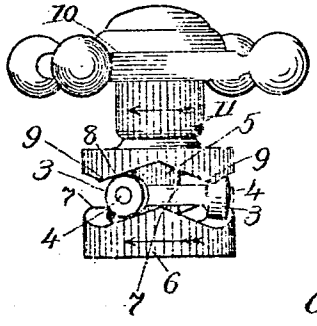

Fig. 6.

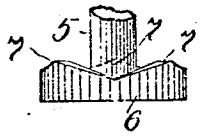

Fig. 8.



Witnesses.

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UNITED STATES PATENT OFFICE.

ANTON SCHUERMANN, OF DECATUR, ILLINOIS, ASSIGNOR TO THE H. MUELLER MANUFACTURING COMPANY, OF DECATUR, ILLINOIS, A CORPORATION OF ILLINOIS.

ROLLER-BEARING FOR SELF-CLOSING LIQUID SHUT-OFFS.

No. 900,398. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed November 21, 1905. Serial No. 288,483.

To all whom it may concern:

Be it known that I, ANTON SCHUERMANN, a resident of the city of Decatur, county of Macon, and State of Illinois, have invented a certain new and useful Roller-Bearing for Self-Closing Liquid Shut-Offs, of which the following is a specification.

This invention is designed to facilitate the opening of self-closing cocks, faucets and the like and it applies to liquid shut-offs in which the opening motion is produced by rotary motion against inclined planes and in which the closing is effected by spring tension.

In devices of this general type where loose balls or rollers have been employed, there was the objection that they often fell out when the parts were disconnected and become lost. Moreover, if one ball or roller were slightly larger than the other or others (as is almost invariably the case, either because of their imperfect formation or because of wear on them or on the track ways) the larger roller sustains the force of the thrust and is liable to become crushed, while the smaller roller or rollers often stick in place and cramp the device and certainly do not move simultaneously with the larger roller nor through the same path. Hence a slightly oblique movement is applied to the valve stem and valve, and they wear and the device soon leaks. Finally, the further objection exists that where the valve stem is connected with and rotated by the valve handle, the valve itself is ground upon its seat and wears or becomes loosened from the stem. These various objections it is the purpose of the present invention to overcome.

In the drawings forming part of this specification Figure 1 is a section through the body of a self-closing basin cock embodying my improvement; the valve of the cock being adapted to open against the water pressure. Fig. 2 is a section through a basin cock, the valve of which opens with the water pressure. Figs. 3 and 4 are details of essential features of my invention drawn separate from a cock structure to better illustrate the mode of operation. In Fig. 3 the opposing roller-ways are at their closest approach, and in Fig. 4 the roller-ways are forced apart somewhat by action of the rollers on the inclines, or of action of the inclines on the rollers. Fig. 5 is a plan of the roller-spider and rollers, showing the rollers occupying the position shown in Fig. 1. Fig. 6 is an elevation of the rotatable disk on which one of the roller-ways is formed, showing the disk in the position it occupies in Fig. 1. Fig. 7 is a plan of the spider and rollers, showing them in the position they occupy in Fig. 2. Fig. 8 is an elevation of the operative part of the stationary roller-way shown in Fig. 2.

Referring to the drawings, and more especially to Fig. 1, 12 designates the cock body within which moves the valve stem 13 carrying the valve 14 and within which is guided a sliding disk 16 that is held by a nut 27′ against a shoulder around the reduced and threaded upper end 26′ of the stem, and 15 is a spring encircling the stem between said disk and a fixed part of the body so as to normally close the valve. The cap or bonnet 8ª is screwed onto the cock body as shown and carries within its upper end a fixed roller-way 8 which is a circular track comprising preferably three like undulations whose apexes are indicated at 9 in Figs. 3 and 4. The handle 10 is rigid with its shank 5 which passes through a hole in the top of the cap and carries at its lower end a disk 6 which rests upon but is disconnected from the upper reduced end 26′ of the valve stem, and said disk has on its upper face a movable roller-way corresponding with said fixed way and having apexes 7. Between these two ways and upon the shank 5 is journaled the hole 2 through a spider 1, here shown as having three radial pins 4 on which are mounted rollers 3. Normally the latter stand between the depressions in the ways as seen in Fig. 3, but when the shank is turned by the handle the movable way rotates beneath the rollers and the latter travel at half speed so that said way is caused to descend as shown in Fig. 4, and the disk 6 thus engages the valve stem 13 by impinging against it and compressing the spring 15, and opens the valve. A shoulder 11 on the shank 5 strikes the top of the cap just before the rollers reach the apexes of the tracks, and limits the rotation of the disk so that the rollers will not pass over the apexes. Obviously the valve can be opened by turning the handle either way. The use of the spider keeps the rollers equally spaced, prevents their cramping or binding, and employs them simultaneously so that the downward thrust of the disk upon the valve stem is in a direct axial line and the stem and valve will not cramp. The fact

that the disk and stem are not connected permits the latter to have a straight longitudinal movement and obviates the grinding of the valve upon its seat.

In the construction shown in Fig. 2, 22 is the cock body and 21 the cap between which is clamped a fixed disk 16'. 24 is the valve mounted on a stem 23 which slides through this disk and is normally closed by a spring 25. Here also the fixed way 20 is on the cap though it faces upward.

17 is the handle whose shank 18 is tubular and cup shaped, and carries within its upper end the movable way 19 which preferably also consists of three undulations having apexes corresponding with those numbered 20^a on the fixed way as seen in Fig. 8. In this instance the valve stem is reduced as at 26 to form a shoulder 28 which impinges against the cap 21 when the valve has been opened, and—as in the other instance—just before the rollers 3 on the spider 1 reach the apexes of the tracks. The reduced end 26 of the valve stem passes through but is disconnected from the handle, and carries a nut 27 at its upper end and entirely above the handle. The latter can obviously be turned in either direction to open the valve, and here again the movable way engages the stem by impinging against its nut 27. As in the other type, the valve will not necessarily be rotated and therefore will not be ground upon its seat nor accidentally detached from its stem.

The operation of the two types will be readily understood, although the valve in one opens in the opposite direction from the valve in the other. In either case access can be had to the parts by removing the cap or bonnet, although in Fig. 2 the nut 27 must first be removed from the stem and then the tubular shank and handle can be lifted off. Suitable provision may be made for removing the shank 5 from the cap 8^a of Fig. 1, as by connecting said shank detachably with either the disk 6 or the handle 10, but this feature forms no part of the present invention. In separating the parts the spider is readily detachable, and as the rollers are journaled on the pins 4 they can not become lost accidentally as might be the case if they were loose. In Fig. 1 the rotation of the disk 6 does not rotate the stem 13, although in its descent it impinges against the stem and depresses it—in Fig. 2 the rotation of the tubular shank 18 does not rotate the stem 23, although in its rise it causes the handle to impinge against the nut 27 and raise the stem. Thus in either construction it would be possible if thought wise to provide some means for positively preventing the rotation of the stem, but this feature forms no part of the present invention.

Whne the spring is necessary in constructions where the valve closes against the pressure, as in Fig. 2, it might be omitted in constructions where the valve closes with the pressure, as in Fig. 1; although I consider its use preferable. So also the sliding disk 16 might be omitted, or replaced by some other form of guide.

What is claimed as new is:

1. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve, the valve stem, and means for normally closing the valve; of the cap, a fixed roller way carried thereby, the handle disconnected from said stem and rotatable with reference to the cap, a movable roller way carried by the handle and whose track is opposed to that of the fixed way, a spider between said ways and having radial pins corresponding to the depressions in said tracks, rollers journaled on said pins, and means for checking the rotation of the handle just before said rollers reach the apexes of the tracks.

2. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve, the valve stem, and the closing spring for the valve; of the cap, a fixed roller way carried thereby, the handle disconnected from said stem and rotatable with reference to the cap, a movable roller way carried by the handle and whose track is opposed to that of the fixed way, a spider between said ways and having radial pins corresponding to the depressions in said tracks, rollers journaled on said pins, and a shoulder on the handle shank abutting against the cap just before the rollers reach the apexes of the tracks.

3. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve stem, and the valve; of the cap, a fixed roller way carried thereby, the handle whose shank is journaled through said cap but disconnected from said stem, a movable roller way carried by said shank and impinging against the stem, the track of this way being opposed to that of the fixed way, a spider journaled on the shank between said ways and having radial pins corresponding to the depressions of the tracks, rollers journaled on said pins, and means for checking the rotation of the handle just before said rollers reach the apexes of the tracks.

4. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve, the valve stem, and the closing spring for the valve; of the cap, a fixed roller way carried thereby, the handle whose shank is journaled through said cap but disconnected from said stem, a movable roller way carried by said shank and impinging against the stem, the track of this way being opposed to that of the fixed way, a spider journaled on the shank between said ways and having radial pins corresponding to the depressions of the tracks, rollers journaled on

said pins, and a shoulder on the handle shank abutting against the cap just before the rollers reach the apexes of said tracks.

5. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve, the valve stem having a reduced upper end, and a disk held on said end and guided within said body; of the cap, a fixed roller way within its upper end, the handle whose shank is journaled through the cap but disconnected from the valve stem, a movable roller way fixed to said shank and impinging against the reduced upper end of said stem, the track of this way being opposed to that of the fixed way, a spider having a central hole journaled on the shank between the ways, and rollers carried by the spider and corresponding with the tracks.

6. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve, the valve stem, and a guide on the stem moving within said body; of the cap, the handle whose shank is journaled therethrough, fixed and movable roller ways carried by the cap and shank respectively, that on the latter impinging against said stem, rollers between said ways, and a spring between said guide and a fixed part of the body.

7. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve, the valve stem having a reduced upper end, and a disk held on said end and guided within said body; of the cap, fixed roller way within its upper end, the handle whose shank is journaled through the cap but disconnected from the valve stem, a movable roller way fixed to said shank and impinging against the reduced upper end of said stem, the track of this way being opposed to that of the fixed way, a spider having a central hole journaled on the shank between the ways, rollers carried by the spider and corresponding with the undulations of the tracks, and a shoulder on the shank abutting against the cap just before the rollers reach the apexes of said tracks.

8. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve, a spring for normally closing it, and the valve stem; of the cap, a handle having a rotary shank disconnected from the stem, fixed and movable roller ways carried by the cap and shank and having undulations, a spider between said ways, and rollers carried by the spider and corresponding with the depressions in the ways.

9. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve closing with the pressure, and the valve stem; of the cap, a handle having a rotary shank disconnected from the stem, fixed and movable roller ways carried by the cap and shank and having undulations, a spider between said ways, and rollers carried by the spider and corresponding with the depressions in the ways.

10. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve, means for normally closing it, and the valve stem; of the cap, a handle having a rotary shank disconnected from the stem, fixed and movable undulated roller ways carried by the cap and shank, a spider between said ways, and rollers carried by the spider and corresponding with the depressions in the ways.

11. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve closed by the pressure, a spring for holding it normally closed, and the valve stem; of the cap, a handle having a rotary shank disconnected from the stem, fixed and movable roller ways carried by the cap and shank, a spider between said ways, and rollers carried by the spider, the movable way in its movement engaging said stem and opening the valve.

12. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve closed by the pressure, means for holding it normally closed, and the valve stem; of the cap, a handle having a rotary shank disconnected from the stem, fixed and movable roller ways carried by the cap and shank, a spider between said ways, and rollers carried by the spider, the movable way in its movement engaging said stem and opening the valve.

13. In a self-closing liquid shut-off, the combination with the body having a valve seat, the valve adapted to be moved in one direction by the pressure, a spring for holding it normally closed, and the valve stem; of the cap, a handle having a rotary shank disconnected from the stem, fixed and movable roller ways carried by the cap and shank, a spider between said ways, and rollers carried by the spider, the movable way in its movement engaging said stem and opening the valve.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

ANTON SCHUERMANN.

Witnesses:
ANNA MURPHY,
JOHN L. WADDELL