W. D. PUTNAM.

LIQUID DOOR CLOSER.

APPLICATION FILED SEPT. 27, 1920.

1,383,339. **Patented July 5, 1921.**

Fig. 1.

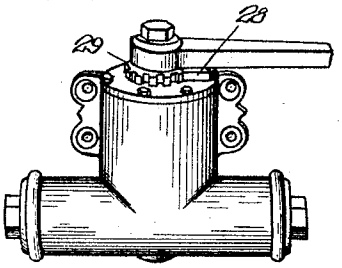


Fig. 2.

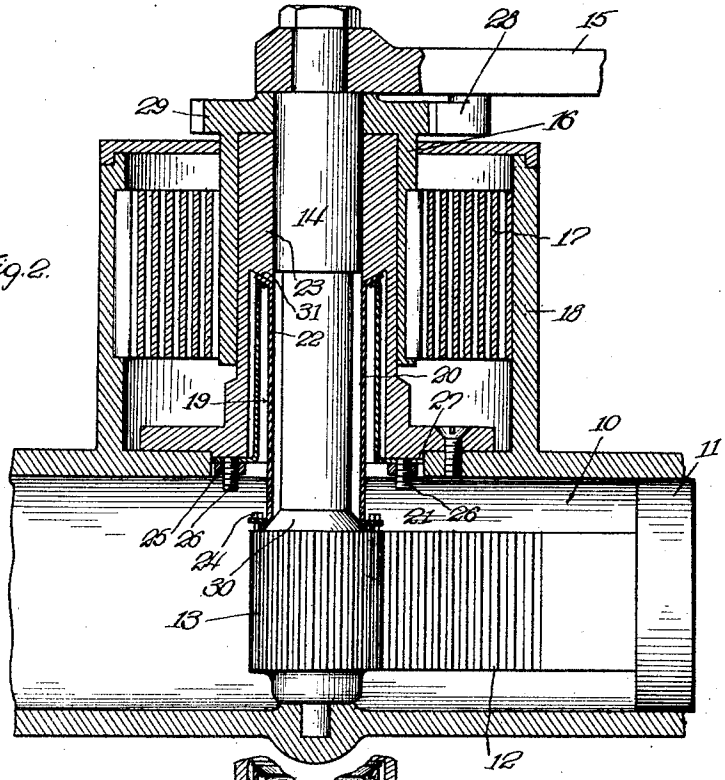
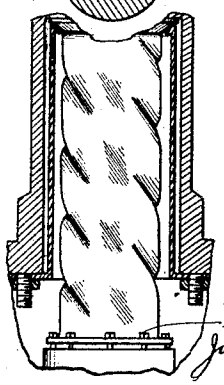


Fig. 3.



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UNITED STATES PATENT OFFICE.

WALDO D. PUTNAM, OF WINNETKA, ILLINOIS.

LIQUID DOOR-CLOSER.

1,383,339. Specification of Letters Patent. Patented July 5, 1921.

Application filed September 27, 1920. Serial No. 413,241.

To all whom it may concern:

Be it known that I, WALDO D. PUTNAM, a citizen of the United States, residing at Winnetka, in the county of Cook and State of Illinois, have invented new and useful Improvements in Liquid Door-Closers; of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to liquid door closers and more particularly to means for preventing the liquid under pressure from escaping from the chamber.

In liquid door closers in which a dashpot construction is provided, great difficulty has been experienced in preventing the liquid which is under very high pressure from escaping around the oscillating shaft, due to the fact that it is very difficult to prevent oil getting in between said surfaces which have movements relative to each other.

One of the objects of my invention is to do away with the relative movement between surfaces which are exposed to the liquid under pressure.

A further object of my invention is to provide a liquid door check which will be durable and efficient in operation and simple in construction.

A further object of my invention is to provide a flexible, twistable sleeve packing or leak-stop around the oscillatable rod.

Further objects will appear from the detailed description to follow and from the appended claims.

In the drawings in which an embodiment of my invention is shown;

Figure 1 is a perspective view of a liquid door closer and check;

Fig. 2 is an axial section of the liquid door check, and

Fig. 3 is a fragmentary view showing the flexible, twistable sleeve which surrounds the oscillatable shaft.

The construction shown in the drawing includes in a general way, a dashpot construction comprising a liquid chamber 10, for the liquid, such as oil, which is used in the dashpot, a piston 11, operating in the liquid chamber 10, a rack 12 to which the piston 11 is secured, a pinion 13, meshing with the rack 12, an oscillatable shaft 14, to which the pinion 13 is secured, a door-actuating arm 15 secured to the oscillating shaft 14, a spring drum 16 for driving the oscillating shaft 14 (and also the door-actuating arm 15 and dashpot piston 11) a coil torsion spring 17 having one end connected with the spring drum 16, a spring housing 18 to which the other end of the spring 17 is secured and a leak-stop construction 19 for preventing the escape of liquid from the dashpot chamber 10 around the oscillating shaft 14.

The leak-stop construction 19 comprises a flexible twistable sleeve 20, impervious to the liquid in the dashpot chamber, of any suitable material, such as rawhide, secured together in sleeve or cylindrical form in any suitable manner, as by a suitable cement which will withstand the action of the liquid and the twisting action of the oscillating shaft 14, a collar 21 for securing the lower end of the flexible, twistable sleeve in liquid-tight engagement with the lower portion of the oscillatable shaft 14, and a clamping tube 22 for securing the upper end of the flexible, twistable sleeve 20 in liquid-tight engagement with the cap member 23 in which the oscillatable shaft 14 is journaled. The collar or ring 21 may be held in clamping engagement by means of a plurality of small screws 24, which extend through openings in the collar or ring 21 and are threaded into the shoulder portion of the pinion 13. The sleeve or tube 20 may be held in clamping engagement by means of a plurality of nuts 25, threaded onto studs 26 extending through openings in a flange portion 27 of the sleeve 22.

The cap 23 provides a journal portion for the spring drum 16, which extends down over this cap portion, so that a portion of this spring drum 16 and the spring 17 surrounds the flexible, twistable sleeve 19, whereby compact construction is secured.

The door-actuating arm 15 is adjustably connected with the spring drum 16 by means of a pawl 28 which engages a ratchet portion 29 on the spring drum 16 in the usual manner.

In operation, the oscillatable shaft 14 is never called upon to oscillate through an angle of more than 180 degrees, so that by making the flexible, twistable sleeve 20 of sufficient diameter and length the required relative movement between the oscillatable shaft 14 and the cap 23 is permitted without destroying the flexible sleeve 20, or pulling

it loose from its end connection with the oscillatable shaft 14 and the cap 23. The surfaces 30 and 31 against which the ends of the twistable sleeve 20 are held in clamping engagement may be conical in shape, in order that the clamping members 21 and 22 may get a good hold on the twistable sleeve.

While I have shown but one embodiment of my invention, it is obvious that it may be embodied in other forms as covered and defined in the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A door check construction comprising a dashpot chamber for the fluid under pressure, having an opening therein, an oscillatable shaft extending through said opening, and means for preventing liquid from escaping through said opening, comprising a flexible, twistable sleeve surrounding said shaft, and having one end secured to rotate with said shaft.

2. A door check construction comprising a dashpot chamber for the fluid under pressure, having an opening therein, a cap for said chamber, having an opening therethrough, an oscillatable shaft extending through the openings in said chamber and cap, and means for preventing liquid from escaping through said opening comprising a flexible, twistable sleeve surrounding said shaft, and having one end secured to rotate with said shaft, and having its other end secured to said cap.

3. A door check construction comprising a dashpot chamber for the fluid under pressure, having an opening therein, a cap for said chamber, having an opening therethrough, an oscillatable shaft extending through the openings in said chamber and cap, and means for preventing liquid from escaping through said opening comprising a flexible, twistable sleeve surrounding said shaft, and having one end secured to rotate with said shaft, and having its other end secured to said cap, said cap having a chamber surrounding said shaft into which said sleeve extends.

4. A door check construction comprising a dashpot chamber for the fluid under pressure, having an opening therein, an oscillatable shaft extending through said opening, and means for preventing liquid from escaping through said opening, comprising a flexible, twistable sleeve surrounding said shaft, and a clamping ring for securing one end of said sleeve to rotate with said shaft.

5. A door check construction comprising a dashpot chamber for the fluid under pressure, having an opening therein, a cap for said chamber having an opening therethrough, an oscillatable shaft extending through said openings, and means for preventing liquid from escaping through said openings, comprising a flexible, twistable sleeve surrounding said shaft, said cap having a recess surrounding said flexible shaft into which said twistable sleeve extends, and means for securing the upper end of said flexible sleeve to the cap, comprising a sleeve surrounding the flexible sleeve and extending up into said recess.

6. A door check construction comprising a dashpot chamber for the fluid under pressure, having an opening therein, an oscillatable shaft extending through said opening, means for preventing liquid from escaping through said opening, comprising a flexible, twistable sleeve surrounding said shaft, and having one end secured to rotate with said shaft, and a coil torsion spring acting on said shaft and surrounding said flexible sleeve.

7. A door check construction comprising a dashpot chamber for the fluid under pressure, having an opening therein, an oscillatable shaft extending through said opening, means for preventing liquid from escaping through said opening, comprising a flexible, twistable sleeve, surrounding said shaft, and having one end secured to rotate with said shaft, and a spring drum acting on said shaft and surrounding said flexible sleeve.

8. A door check construction comprising a dashpot chamber for the fluid under pressure, having an opening therein, a cap for said chamber having an opening therethrough, an oscillatable shaft extending through said openings, said cap having a recess surrounding said shaft, and means for preventing liquid from escaping through said opening comprising a flexible, twistable sleeve surrounding said shaft and having one end secured to rotate with said shaft, said flexible sleeve extending into said recess, and a spring drum surrounding said flexible sleeve and rotatably mounted on said cap.

In witness whereof, I have hereunto subscribed my name.

WALDO D. PUTNAM.