No. 654,522. Patented July 24, 1900.

L. E. COWEY.

SELF CLOSING TAP.

(Application filed May 7, 1900.)

(No Model.)

Fig. 1.

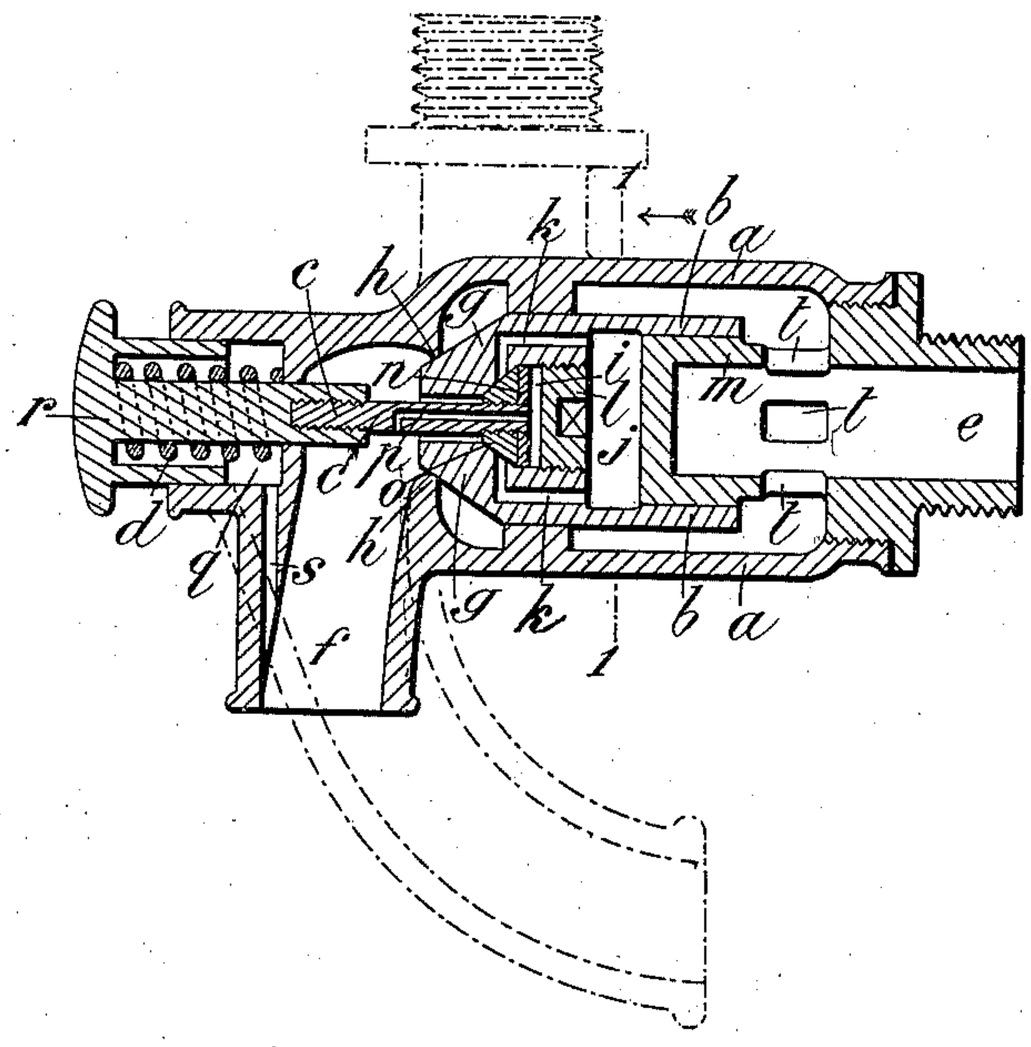


Fig. 2.

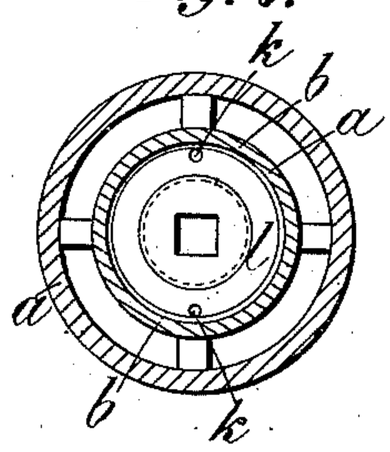
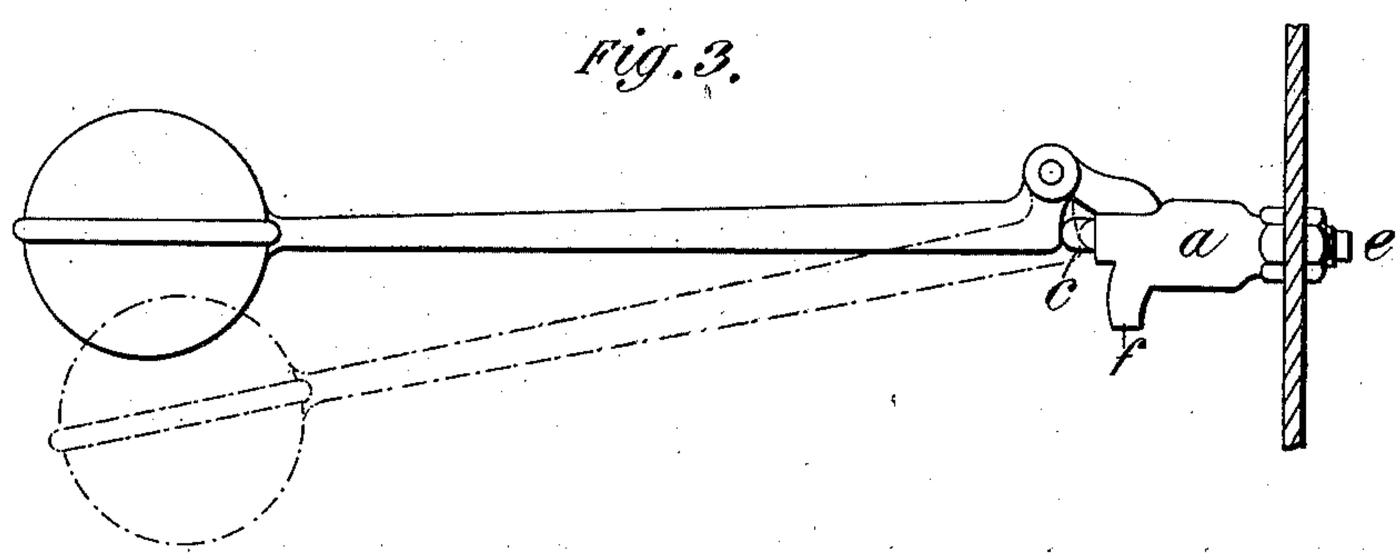


Fig. 3.



Witnesses:
Wathen M. Manning.
E. S. Clarkson

Inventor:
Leonard Eugene Cowey.
By Knight Bros
Attorneys.

UNITED STATES PATENT OFFICE.

LEONARD EUGENE COWEY, OF LONDON, ENGLAND.

SELF-CLOSING TAP.

SPECIFICATION forming part of Letters Patent No. 654,522, dated July 24, 1900.

Application filed May 7, 1900. Serial No. 15,747. (No model.)

To all whom it may concern:

Be it known that I, LEONARD EUGENE COWEY, engineer, a subject of the Queen of Great Britain, residing at 33 Holborn Viaduct, London, England, have invented certain new and useful Improvements in Self-Closing Taps, of which the following is a specification.

This invention relates to self-closing non-concussive taps, particularly those of the kind in which the valve is of the longitudinally-sliding type and controlled by a dash-pot device situated between the said valve and the inlet to the tap for the purpose of preventing or reducing the concussion or "hammering" in the inlet-pipe due to the sudden stoppage or recoil of the fluid on closing the tap.

It is the chief object of my invention to so construct such taps that although the valve when closed will be held against its seating with the full pressure of the fluid within the tap this pressure will be relieved in the act of opening the tap, so that in shifting the valve from its seating the user will have no pressure of the fluid to overcome, and, further, that in the act of relieving the aforesaid pressure on the valve there will be likewise no pressure of fluid to overcome. Consequently instead of the user having to exert great force, which is oftentimes necessary in order to open taps of this kind as hitherto constructed, a very small amount of effort on his part will be sufficient, no matter what may be the pressure of the fluid supplied by the tap. For this purpose I make the valve with a cavity at each end, the rear cavity receiving a plug and serving as the dash-pot device and the front cavity receiving the inner end of a sliding spring-controlled stem or push-rod which is adapted to open and close passages through which the aforesaid cavities communicate.

In order that my invention may be clearly understood and readily carried into effect, I will proceed to describe the same more fully with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of a tap constructed according to my invention. Fig. 2 is a cross-section taken on the line 1 1 of Fig. 1. Fig. 3 is an elevation of another form of the tap.

a is the valve-casing; *b*, the valve; *c*, the sliding-stem or push-rod by which the valve is operated, and *d* the spring which returns the sliding stem and the valve to the closed position. *e* is the inlet, and *f* the outlet, of the tap. The said valve *b* is formed with a conical end or shoulder *g* where it fits the valve-seating *h* and with the two cavities or recesses *i j*—one at the front and one at the rear—such cavities or recesses communicating with each other by means of the passage or passages *k*.

The inlet-port of the valve-casing *a* is formed with a hollow longitudinal plug *m*, which enters the aforesaid rear cavity or recess *j* in the valve *b*. The plug *m* is closed at the end which enters the valve *b*, in which it is so disposed that when the valve is in the closed position there will exist between the wall or partition *l* and the closed end of said plug *m* a space into which the fluid under pressure can enter by passing between the hollow plug *m* and the valve *b*. The slow entrance of the liquid into the space retards the closing of the valve under the action of the spring *d*. In other words, the plug *m* and the rear cavity *j* in the valve together operate like a dash-pot.

The cavity *i* at the front end of the valve *b* receives the inner end of the sliding stem *c* for operating said valve. This inner end of the said stem has an enlarged portion or piston *n*, which fits the front cavity *i* of the valve *b*, which cavity is of such a length that a space is left between the wall or partition *l* and the enlarged portion or piston *n* when the valve is in the closed position, so that a certain amount of free movement can take place between the valve *b* and valve-stem *c*.

The front of the enlarged portion or piston *n* is provided with a conical portion or packing-ring *o*, of suitable material, seating against a correspondingly-shaped portion of the front cavity *i*, where the communicating passages *k* enter said cavity. Normally these passages *k* are covered by the conical portion *o* of the stem. Should any fluid leak past the inner end of the stem when the tap is open and enter the cavity *i* behind the piston *n*, such fluid escapes to the outlet *f* of the tap by a longitudinal passage *p* in the aforesaid piston and stem and is thus prevented from

offering any resistance due to pressure of the fluid to the inward movement of the stem.

The outer end of the stem projects through a chamber *q*, formed in the front part of the valve-casing *a*, where it is furnished with a push-knob *r* or other device for enabling it to be conveniently operated. This chamber also contains the spring *d* for normally maintaining the stem and valve in the closed position. Should any liquid enter the chamber *q*, it can escape into the outlet *f* by a passage *s*.

The dimensions of the valve *b*, the plug *m*, and the valve-seating *h* are so proportioned that the pressure of fluid within the tap acts upon as large an effective surface on the front of the valve as on the rear thereof when said valve is opening or closing, so that the pressure required to be exerted by a user of the tap to push open the valve will be only that which is necessary to overcome the resistance of the spring *d* and the friction of the moving parts. When, however, the valve is actually closed and the fluid has filled the rear cavity *j*, the pressure of the fluid acting on the front wall *l* of said cavity exerts its full force in keeping the valve closed. When the stem *c* is pushed inward, it does not immediately act on the valve *b*, but first uncovers the passages *k*, leading from the rear cavity *j* to the front cavity *i*, whereby the fluid-pressure in the cavity *j* is relieved. Then the pushing in of the stem being continued, the piston *n* comes against the end wall *l* of the front cavity *i* and opens the valve by pushing it inward, the fluid in the said cavity *j* escaping through the passages *k* without offering any material resistance to the movement of the valve. The fluid from the source of supply then enters the tap through the openings *t*, and by passing through the casing *a* and around the valve *b* thus reaches the outlet *f*. When the steam *c* is released, it returns to its original position under the action of its spring *d* and the piston *n* closes the passages *k*. The valve itself does not, however, immediately return to its closed position, because the fluid cannot enter the rear cavity with sufficient freedom to fill the vacuous space which the forward movement of the valve tends to form in said cavity. Gradually, however, this cavity will become filled with the liquid passing between the meeting surfaces of the plug *m* and the said cavity, and the valve will gradually close and be maintained on its seating by the aforesaid spring and the pressure of the liquid within the tap-casing. The wall or partition *l*, separating the two cavities from one another, is preferably made detachable to permit the enlarged end of the stem *c* to be placed in position.

I prefer to make the diameter of the interior surface of the cavity *j* in the valve larger than that of the portion of the valve which surrounds and lies in contact with the plug *m* and to decrease the diameter of the plug *m* at the part where the plug lies beyond the rear of the valve when said valve is closed, so that the area of the surfaces in contact decreases as the plug is pushed inward in opening the tap.

In the drawings I have shown the tap adapted to be used in a horizontal position; but obviously it may be arranged in a vertical position, in which case the inlet and outlet openings would occupy the position represented by the dotted lines in Fig. 1. The said tap may also be arranged as a ball-tap, as represented in Fig. 3, in which case the lever carrying the ball is pivoted in a position to enable a shoulder on said lever to actuate the sliding stem and valve of the tap.

What I claim is—

1. In a self-closing non-concussive tap, the combination of a sliding valve having a cavity at each end and passages through which said cavities communicate, of a fixed plug fitting the rear cavity and acting therewith like a dash-pot, of a sliding stem whose inner end is enlarged and enters the front cavity of the valve, and of a spring for normally maintaining the said stem in a position to close the aforesaid passages and to assist in keeping the valve against its seating substantially as described.

2. In a self-closing non-concussive tap, the combination of a sliding cylindrical valve having a cavity at each end and passages through which such cavities communicate, of a fixed plug fitting the rear cavity and acting therewith like a dash-pot, of a sliding stem whose inner end is enlarged to form a piston and enters the front cavity of the valve, and is adapted to engage with a shoulder on the interior of said front cavity, and of a spiral spring for normally maintaining said stem in a position with its piston closing the aforesaid passages and pressed against the aforesaid shoulder in the front cavity substantially as described.

3. In a self-closing non-concussive tap, the combination of a sliding cylindrical valve having a cavity at each end and passages through which such cavities communicate, of a fixed plug formed with lateral passages for the inlet of the liquid to the body of the tap, said plug fitting the said rear cavity and acting therewith like a dash-pot, of a sliding stem having its inner end formed as a piston with a longitudinal passage leading from behind said piston to a point in front thereof for the escape of liquid from the front cavity when the piston and its stem are pushed inward, of conical packing on said piston to engage with a correspondingly-shaped shoulder at the front portion of said cavity, of a spiral spring located within a chamber at the front of the tap-casing and surrounding the portion of the stem passing through such chamber, of a head at the outer end of said stem, said head fitting said chamber and serving to compress the spiral spring when the stem is pushed inward and of means for

enabling any liquid that may enter this chamber to escape substantially as described.

4. In a self-closing non-concussive tap, the combination of a sliding cylindrical valve having a cavity at each end separated by a transverse detachable partition and communicating with each other through passages formed in the wall of the valve, of the fixed plug fitting the rear cavity and acting therewith like a dash-pot, the diameter of said plug being less than the diameter of said rear cavity at the part thereof immediately behind the said partition, of the sliding stem and its piston and longitudinal passage, and of the spiral spring for acting in conjunction with said stem substantially as and for the purpose described.

5. In a self-closing non-concussive tap, the combination of a sliding cylindrical conical-headed valve of less diameter than the valve-casing and having a cavity at each end separated by a transverse detachable partition and communicating with each other through passages formed in the wall of the valve, of a fixed plug fitting the rear cavity, and acting therewith like a dash-pot the diameter of said plug being less than the diameter of said rear cavity at the part thereof immediately behind the said partition and also being less at the part immediately behind the rear end of the valve, of the sliding stem and its piston and longitudinal passage, and of the spiral spring for acting in conjunction with said stem substantially as and for the purpose specified.

6. In a self-closing non-concussive tap, the combination of a sliding cylindrical conical-headed valve, having a cavity at each end separated by a transverse detachable partition and communicating with each other through passages formed in the wall of the valve, of a surrounding casing inclosing said valve and of greater diameter so that the liquid surrounds the valve, of a fixed plug formed with lateral passages for the inlet of the liquid to the body of the tap, said plug fitting the said rear cavity and acting therewith like a dash-pot, of a sliding stem having its inner end formed as a conically-shaped piston with a longitudinal passage for the escape of liquid from the front cavity when the piston and its stem are pushed inward, of a conical packing on said piston to engage with a correspondingly-shaped shoulder at the front portion of said cavity, of a spiral spring located within a chamber at the front end of the tap-casing and surrounding the portion of the stem passing through said chamber, and of a head at the outer end of said stem, said head fitting said chamber and when pushed inward serving to compress the spiral spring, said chamber being formed with a passage for the escape of liquid therefrom, all substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 23d day of April, 1900.

LEONARD EUGENE COWEY.

Witnesses:

WM. J. DOW,

F. J. SHERRINGTON.