G. P. ABORN.

PUMP VALVE.

APPLICATION FILED NOV. 7, 1913.

1,116,341. Patented Nov. 3, 1914.

Fig. 1.

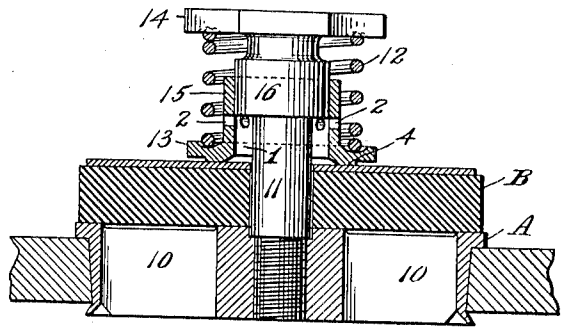


Fig. 2.

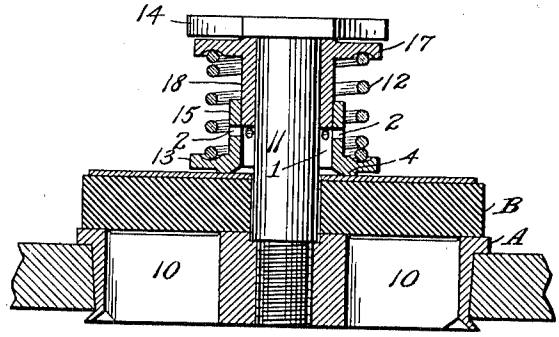


Fig. 3.



Witnesses:
P. N. Tilden.
J. F. Donovan

Inventor:
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by his Attys:
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UNITED STATES PATENT OFFICE.

GEORGE P. ABORN, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR TO THE BLAKE & KNOWLES STEAM PUMP WORKS, A CORPORATION OF NEW JERSEY.

PUMP-VALVE.

1,116,341. Specification of Letters Patent. Patented Nov. 3, 1914.

Application filed November 7, 1913. Serial No. 799,672.

To all whom it may concern:

Be it known that I, GEORGE P. ABORN, a citizen of the United States, residing at Brookline, county of Norfolk, and State of Massachusetts, have invented certain new and useful Improvements in Pump-Valves, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to pump valves of that class in which the valve is rotated slightly on each lifting movement, so that the portions of the valve resting upon the valve seat ribs are constantly changed and undue wear of the valve prevented, the especial object being to provide a simple and efficient valve backing by which the proper rotation of the valve shall be assured.

In the accompanying drawings forming a part of this specification, the invention is shown as applied in preferred forms, and these constructions will now be described in detail and the features forming the invention then specifically pointed out in the claims.

In the drawings:—Figure 1 is a vertical central section of the valve seat, valve and backing. Fig. 2 is a similar view showing a slightly modified construction. Fig. 3 is a plane layout of the valve seat of Figs. 1 and 2.

Referring now particularly to Fig. 1, A is the valve seat having its ribs 10 inclined as shown in Fig. 3, so that water flowing through the passages between the ribs acts with a tangential component upon the valve to rotate it at each lift. Upon the valve seat A is the valve B, shown as a rubber metal-backed valve of common type, sliding vertically upon the valve stem 11 screwed into the valve seat, as usual. The valve spring 12 is held between the guards 13, 14, the latter, in the construction now being described and shown in Fig. 1, being formed by the fixed head of the valve stem 11. The guard 13 is formed on a sleeve 15 sliding on an enlargement 16 of the valve stem, this enlargement forming a piston below which is a water chamber 1, between the piston 16 and the top of the valve B, this water chamber 1 connecting to the space outside the sleeve 15 through holes 2 in the sleeve. These holes 2 are arranged so as to be opened below the piston 16 when the valve is closed, but to be closed by passing over the piston 16 immediately upon the lifting of the valve with guard 13. The guard 13 preferably is formed with a narrow bearing rib or studs 4 bearing upon the metal back of the valve, and finished to reduce friction between the guard and valve.

The operation of the construction is as follows:—As the valve B lifts, the openings 2 are closed by passing over the piston 16, and the pressure of the opening valve upon the liquid in the chamber 1 then forces the water out between the bearing 4 and the back of the valve B, thus forming a liquid antifriction bearing between the guard and valve. The valve thus rotates with very little friction, and the tangential component of the water pressure as it passes the valve from the inclined seat ribs 10 is sufficient to rotate the valve slightly at each lift and thus constantly bring new surfaces of the valve upon the ribs 10.

The construction shown in Fig. 2 is the same as that of Fig. 1, except that the top spring guard is loose on the valve stem 11, this valve guard 17 being carried by a sleeve 18 within sleeve 15 of the lower guard 13. This sleeve 18 thus forms a piston and performs the functions of the piston 16 of the construction shown in Fig. 1.

The operation of the construction shown in Fig. 2 is the same as previously described, except that the upper valve guard 17 and sleeve 18 may rotate somewhat in the rotation of the valve, although this is not essential.

The invention provides a simple, cheap and efficient valve backing, in which the weight of the revolving parts is quite small, so that with the reduction of friction resulting from the liquid bearing between the bottom valve guard and the valve, an efficient rotating action can be secured with the inclined seat ribs shown.

While the invention is intended especially for use with a valve seat having ribs inclined or otherwise so formed that the water acts upon the valve to rotate it, it will be understood that this backing may be used, also, with any other suitable arrangement for rotating the valve, as, for instance, with any well-known or suitable type of rotating valve in which the rotating effect is secured by inclined surfaces or wings on the valve itself.

What I claim is:—

1. The combination with a reciprocating and fluid rotated valve, of a spring backing for the valve on which the valve is free to rotate, and means for forcing water between the backing and valve by the opening of the valve to form a liquid bearing for the rotating valve.

2. The combination with a reciprocating and fluid rotated valve, of a valve backing including a sleeve bearing upon the valve, and a piston upon which the sleeve slides with a water chamber within the sleeve between the piston and valve whereby the opening of the valve moves the sleeve to force water outward from the chamber between the sleeve and valve to form a liquid bearing for the rotating valve.

3. The combination with a reciprocating and fluid rotated valve, of a valve backing including a sleeve bearing upon the valve, and a piston upon which the sleeve slides with a water chamber within the sleeve between the piston and valve, said sleeve having one or more openings connecting the water chamber to the water space outside the sleeve in the closed position of the valve and closed by the piston as the valve opens, whereby the opening of the valve moves the sleeve to force water outward from the chamber between the sleeve and valve to form a liquid bearing for the rotating valve.

4. The combination with a reciprocating and fluid rotated valve, of a backing including a valve spring, a spring guard bearing upon the back of the valve and carrying a sleeve moving with the guard against the spring, an outer spring guard, a piston within the sleeve arranged to form a liquid chamber within the sleeve between the piston and valve, and one or more openings from the liquid chamber through the sleeve arranged to be closed by movement over the piston as the valve opens, whereby the opening of the valve forces liquid from the chamber outward between the spring guard and valve to form a liquid bearing for the rotating valve.

5. The combination with a pump valve and its valve seat formed with inclined ribs to rotate the valve by the fluid passing through the valve seat, of a valve backing including a sleeve bearing upon the valve, and a piston upon which the sleeve slides with a water chamber within the sleeve between the piston and valve, whereby the opening of the valve moves the sleeve to force water outward from the chamber between the sleeve and valve to form a liquid bearing for the rotating valve.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

GEORGE P. ABORN.

Witnesses:
JOHN J. FINLEY,
ERIC J. LIFNER.