

J. C. THOMPSON.
VALVE.

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976,010.

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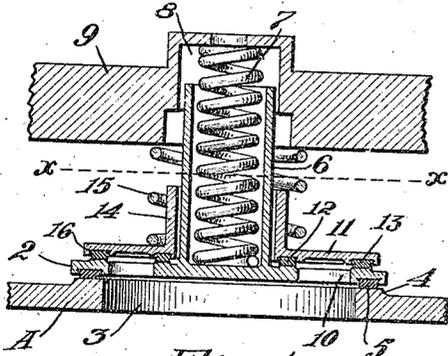


Fig. 1.

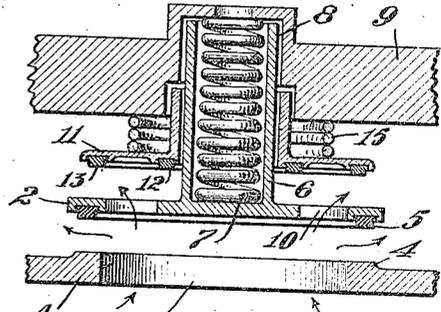


Fig. 2.

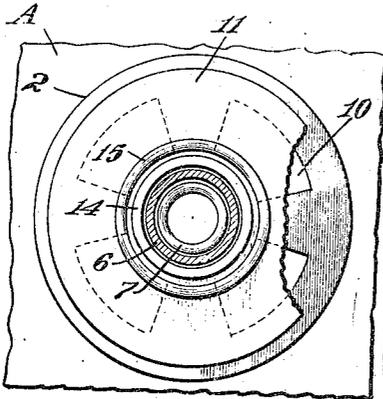


Fig. 3.

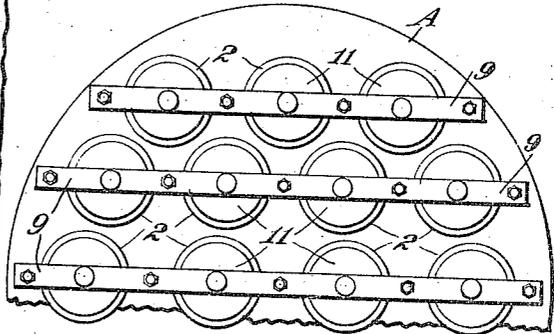


Fig. 4.

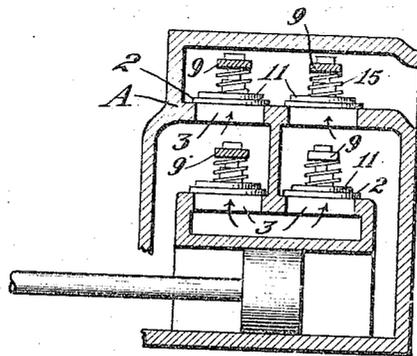


Fig. 5.

Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN C. THOMPSON, OF BELMONT, CALIFORNIA.

VALVE.

976,010.

Specification of Letters Patent.

Patented Nov. 15, 1910.

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To all whom it may concern:

Be it known that I, JOHN C. THOMPSON, a citizen of the United States, residing at Belmont, in the county of San Mateo and State of California, have invented new and useful Improvements in Valves, of which the following is a specification.

This invention relates to duplex valves of the lifting type.

The object of this invention is to provide a valve which has a greater port area than the ordinary type of lift valve, and which will close quickly, thereby decreasing the "slip" which is responsible for a great loss of efficiency in pumps, air compressors and the like wherein lift valves are employed.

A further object is to provide a duplex lift valve that is durable, simple in construction and economical in cost of manufacture, and which does not readily get out of order and is easily repaired.

The invention is especially adapted for use in high pressure pumping machinery in which a large volume of water is lifted to a considerable height, such for instance as is employed in municipal water plants.

The large port area of this valve increases the capacity of a pump and permits of greater speed with less power by reducing the frictional resistance of water entering and leaving the pump.

The invention consists of the parts and the combination and construction of parts as hereinafter more fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of the invention showing the valves seated. Fig. 2 is a like view showing the valve disks in their open position. Fig. 3 is a cross section on the line X—X, Fig. 1. Fig. 4 is a fragmentary plan view showing the manner of mounting the valves in multiple. Fig. 5 is a sectional view showing the invention as applied to the ordinary duplex pump.

In the drawings A is the plate or valve deck formed in a pump or air compressor, on which the lower disk 2 of the valve seats. A port opening 3 is provided in the plate A and has a rib or raised seat 4 around its upper periphery upon which the leather packing ring 5 on the underside of the valve disk 2 normally rests.

The lower valve disk 2 has an upwardly extending cylindrical stem 6, centrally disposed, in which a coil spring 7 is mounted.

The lower end of the spring 7 rests upon the disk 2 and the upper end bears against the underside of a recess 8 formed in a guide bar 9, which extends horizontally above the valve and is secured to the pump casing or valve deck in any suitable manner. The stem 6 is adapted to move up and down freely within the recess 8.

The valve disk 2 is provided with a number of port openings 10, Fig. 3, exterior of the stem 6 and inside the gasket ring 5, and these port-openings 10 are normally closed by an upper valve disk 11, provided with gasket rings 12—13, which seat upon the lower disk 2; the inner ring 12 normally bearing upon that part of the disk 2 adjacent to the stem 6, and the outer ring 13 outside the port openings 10. A cylindrical stem 14 is formed on the upper disk 11, surrounding and slidable upon the stem 6. A coil spring 15 bearing upon the disk 11 and against the rigid bar 9, tends to retain the upper valve disk 11 seated upon the lower disk 2. The guiding of the two valve stems in the manner shown insures both valves coming down square on their seats without chatter. All these valves, of which there may be any number, seating on the valve deck A will do an equal duty. With the ordinary type of valve the central ones do most of the work.

In operation as a fluid is forced or drawn by suction through the port 3, its pressure is distributed upon the under surfaces of both the valve disks 2 and 11, causing each disk to lift and compressing the springs 7—15, as shown in Fig. 2, and thus allowing the passage of the fluid. As soon as the fluid pressure is discontinued the springs 7 and 15 force their respective valve disks 2 and 11 downward to their seated position. The comparatively low lift of each valve disk insures its speedy closure, thereby decreasing the slip. The spring 15 on the upper disk 11 is of comparatively light tension and is compressed approximately twice the length of the lift of the lower valve, thus causing the upper valve to come to rest while the lower one is doing the same. The gasket rings 5—12—13 are preferably made of leather with gutta percha filler under combined heat and pressure and forced into a dove-tailed groove 16 formed in the disks 2—11. The action of the valve when working has a tendency to drive the leather into the dove-tail, thereby

insuring it against loosening. By using these two successively acting valves, the port 3 is given a full quick opening with a minimum lift of the valve. It is a quick-opening, wide-opening, quick-closing valve, capable of being run as experience shows at high speed and with less power than the valves commonly on the market, and it gives about 65% increased port area. The valve has been working for many months night and day and every hour of the day in a 20" x 36" x 36" Cross Corliss compound engine with 12 1/2" plungers, making 45 R. P. M. against 290' head, in the plant of a great municipal water system and has given entire satisfaction.

Having thus described my invention, what I claim as new and desire to secure by Letters-Patent, is—

1. The combination with a valve seat, of a ported valve plate normally seating thereon, said valve plate having a stem, a guide bar having a recess forming a guide for the upper end of the stem, a second valve provided with a hollow valve stem concentric with the first-named valve stem, said second valve adapted to seat over the ports in said valve plate, and said guide bar having a second recess into which the stem of the second valve is secured when said valve is lifted, and independent means by which the valves are maintained closed, said second valve having a limited opening and closing movement independent of the first valve.

2. The combination with a valve seat, of a ported valve plate seating thereon, said valve plate having a hollow stem, a guide bar having a recess in its under side in which the stem is slidable, a spring housed in said stem and bearing against the same and against the bottom of said recess, to main-

tain the valve plate normally seated, a second valve plate seating over the ports in the first valve plate, said second valve plate having a hollow stem concentric with and slidable on the first-named stem, said guide bar having a second recess to receive the stem of the second valve when said valve is lifted, and a spring acting against the guide bar and said second valve plate to maintain the latter normally seated.

3. The combination with a valve seat, of a ported valve plate seating thereon, said valve plate having a hollow stem, a guide bar having a recess in its under side in which the stem is slidable, a spring housed in said stem and bearing against the same and against the bottom of said recess, to maintain the valve plate normally seated, a second valve plate seating over the ports in the first valve plate, said second valve plate having a hollow stem concentric with and slidable on the first-named stem, said guide bar having a second recess to receive the stem of the second valve when said valve is lifted, and a spring acting against the guide bar and said second valve plate to maintain the latter normally seated, said valve plate having on its underside an annular groove dovetailed in cross section, which groove surrounds the port opening in the valve seat, and a gasket of leather and gutta percha filler inserted into said groove and projecting below the face of the valve plate and seating on the valve seat.

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

JOHN C. THOMPSON

Witnesses:

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EDWARD E. PINE.