J. H. CHRISTMAN.

VALVE.

APPLICATION FILED DEC. 11, 1919.

1,405,968. Patented Feb. 7, 1922.

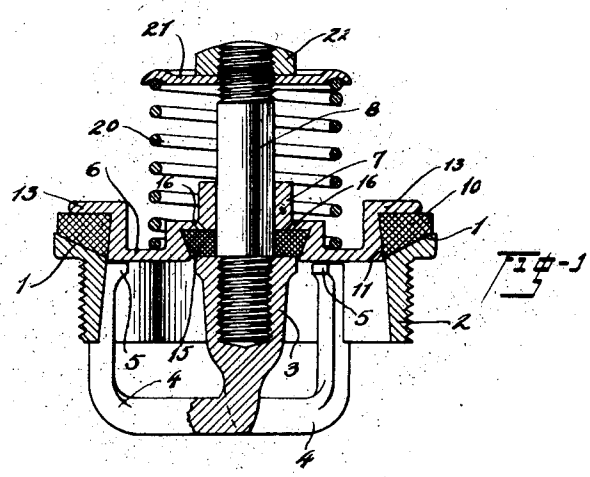

Fig-1

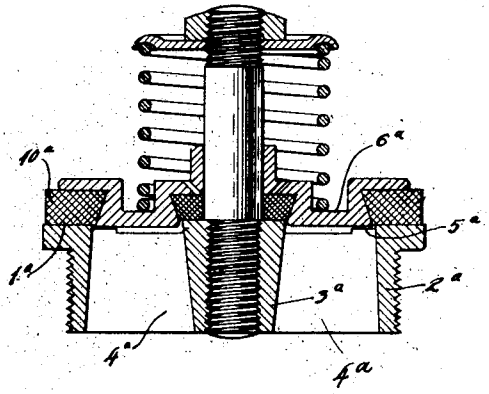

Fig-2

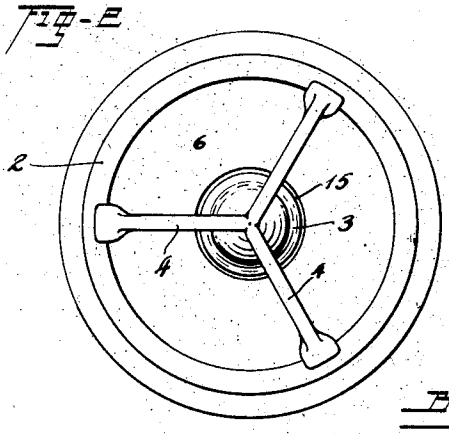

Fig-E

Inventor

John H. Christman

By Hull. Smith. Brock & West

Attys

UNITED STATES PATENT OFFICE.

JOHN H. CHRISTMAN, OF CLEVELAND, OHIO.

VALVE.

1,405,968. Specification of Letters Patent. Patented Feb. 7, 1922.

Application filed December 11, 1919. Serial No. 344,067.

To all whom it may concern:

Be it known that I, JOHN H. CHRISTMAN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to improvements in valves of the type used extensively as discharge valves for pumps; and it has for its objects to provide a compact valve of this character that is highly efficient; that is very durable, wherein the parts are readily accessible for the purpose of inspection and repair, and wherein those parts especially susceptible to wear are convenient of replacement.

Further objects will appear as I proceed to describe my improvements by reference to the accompanying drawing wherein Fig. 1 is a sectional view through a valve constructed in accordance with my invention; Fig. 2, a bottom plan view thereof; and Fig. 3 a view similar to Fig. 1 of a modification.

Describing the two forms of the invention herein illustrated in the order named, the seat 1 of the valve is incorporated in a spider comprising a threaded ring or bushing 2 that is adapted to be screwed into the valve deck of a pump or the like, and a boss 3 is supported centrally of the ring or bushing by a series of ribs 4.

The ribs 4, it will be noted, are well below the plane of the bottom of ring 2 so as not to obstruct the flow of liquid through the valve or decrease the effective cross-sectional area of the ring. This insures the maximum capacity of the valve when the same is fully open. The ribs 4 are shown as extending upwardly along the inner wall of the ring 2 where they terminate adjacent the valve seat in stops 5. These stops serve to prevent undue movement of a metal valve cap or disk 6 toward the valve seat, the cap having a central boss 7 that is guided upon a spindle or stud 8 shown as having its inner end threaded into the boss 3.

A valve element 10 is carried by the cap 6 for cooperation with the seat 1, and the same is composed of a suitable yielding or compressible material such as rubber, that is sufficiently resilient to permit it to be stretched over the enlarged portion 11 of the cap and contract within the shallow groove that is formed thereabove by the upwardly converging peripheral wall of the cap and a horizontal flange 13 which extends outwardly from the upper edge of said wall. The valve seat 1 and element 10 are shown as having correspondingly tapered cooperating surfaces; and the edge portion of the valve element preferably extends beyond the edge of the flange 13 so that the liquid pressure may act upon it to assist in forcing it against the seat. From the foregoing, it will be seen that the valve element must necessarily be reasonably resilient, and to prevent undue compression and consequential speedy deterioration of the element I provide the previously described stops 5 for limiting the inward movement of the valve cap.

To prevent leakage about the spindle or stud 8 I employ a packing ring 15 which may be of the same material as the valve element 10, and the ring 15 is preferably held in place by its fitting within a recess that gradually enlarges inwardly. The packing ring is designed for cooperation with the top of the boss 3, and the inner edge portion is adapted to be forced against the surface of the boss by the pressure of liquid communicated to it through ports 16 in the cap.

A coil spring 20, which is interposed between the cap and a plate 21 that is threaded on the stud 8 and held in place by a lock nut 22, serves to seat the valve.

In Fig. 3 I have shown a modification wherein the seat 1^a and valve element 10^a are flat, and the ribs 4^a radiate from the boss 3^a in the plane of ring 2^a, the outer ends of the ribs incorporating stops 5^a for the cap 6^a. This design, being somewhat more compact than the former may be advantageously employed where the space is limited.

Having thus described my invention, what I claim is:—

1. A valve comprising a seat and a cap movable toward and from the seat, an annular member of resilient material carried by one of said parts and adapted to be stretched over an enlargement thereof and beyond which enlargement it is adapted to contract for holding the member in place, said member being arranged for cooperation with the other part, and a stop for preventing undue movement of the cap toward the seat after said member has been compressed against the seat.

2. A valve comprising a seat and a cap

movable toward and from the seat, an annular member of resilient material carried by the cap for cooperation with the seat, the cap having an enlargement over which the member is adapted to be stretched and beyond which it contracts for holding the member in place, and a stop for preventing undue movement of the cap toward the seat after said member has been compressed against the seat.

3. A valve comprising a seat, a cap movable axially toward and from the seat, the cap having a tapering peripheral wall with its larger end disposed toward the seat and a flange extending outwardly from the wall in opposed relation to the seat, an annular member of resilient material surrounding said wall and engaging said flange and arranged for cooperation with the seat, and a stop for preventing undue movement of the cap toward the seat after said member has been compressed against the seat.

4. A valve comprising a member having a central seat and a peripheral seat, a guide rising from the central seat, a cap movable along the guide toward and from the seat and having an aperture through which the guide extends, an annular member of resilient material for cooperation with the peripheral seat, the cap having an enlargement over which the member is adapted to be engaged and beyond which it is arranged to contract for holding said member in position, the cap having also a cavity that is opposed to the central seat and which enlarges inwardly, a packing ring of resilient material surrounding the guide and adapted to expand within the cavity, said ring being arranged for cooperation with the central seat, and a stop for limiting the movement of the cap toward the seat beyond a given distance thereby to prevent undue compression of the member and packing ring.

5. In a valve of the character set forth, the combination of a spider comprising an annular part incorporating a valve seat at one end and a central boss connected to said part by a series of ribs disposed beyond the opposite end of the annular part, a guide rising from the boss, a cap movable along the guide toward and from the seat, the ribs being extended through the annular part to serve as stops for limiting the movement of the cap toward the seat, and a member of compressible material carried by the cap for cooperation with the seat.

In testimony whereof, I hereunto affix my signature.

JOHN H. CHRISTMAN.