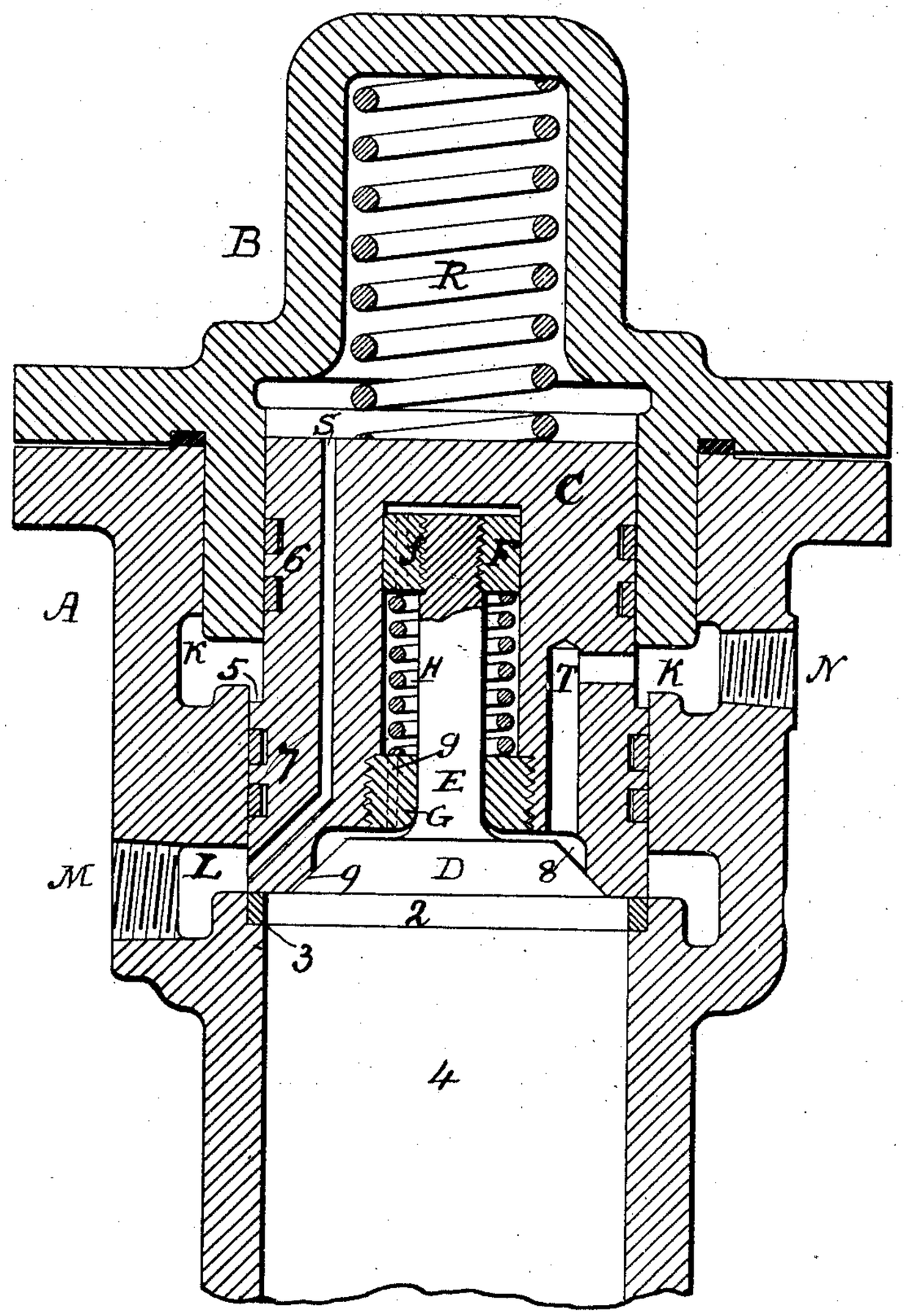
No. 737,809. PATENTED SEPT. 1, 1903.

R. WHITAKER.

VALVE FOR PUMPS.

APPLICATION FILED OCT. 10, 1902.

NO MODEL.



Witnesses
D. H. Storm.
J. H. Newman

Inventor
Richard Whitaker
By E. E. Masson
Attorney

No. 737,809. Patented September 1, 1903.

UNITED STATES PATENT OFFICE.

RICHARD WHITAKER, OF NEW BRUNSWICK, NEW JERSEY, ASSIGNOR OF TWO-THIRDS TO ROBERT W. JOHNSON AND JAMES W. JOHNSON, OF NEW BRUNSWICK, NEW JERSEY.

VALVE FOR PUMPS.

SPECIFICATION forming part of Letters Patent No. 737,809, dated September 1, 1903.

Application filed October 10, 1902. Serial No. 126,707. (No model.)

To all whom it may concern:

Be it known that I, RICHARD WHITAKER, a citizen of the United States, residing at New Brunswick, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Valves for Pumps, of which the following is a specification.

The invention relates to valves for pumps operating on a suitable fluid, the essential feature being the means for protecting the back of the discharge-valve from a portion of the discharge-pressure; and it consists in details of construction, which will be fully described in the following specification in connection with the accompanying drawing, which represents a vertical central section through the valves of a portion of a pump constructed in accordance with my invention.

In said drawing, A represents the pump-cylinder, which has in its interior a valve-seat, which consists, preferably, of a steel ring 2 to obtain a smooth and hard surface. Said ring rests upon an annular shoulder 3, formed in the interior of the cylinder above the piston-chamber 4. The pump-cylinder is bored above its ring 2 to fit the periphery of the lower portion of the discharge-valve C, but the upper portion of the interior of the cylinder is formed by the pendent cylindrical flange of the corer B and is of smaller diameter to fit the periphery of the upper portion of the valve C, there being an annular shoulder 5 around said valve between its upper and lower portions, this annular shoulder representing the difference in area between the upper and lower surfaces of the valve C exposed to discharge-pressure. The head B of the cylinder is suitably attached to the body of the pump and has a pendent cylindrical flange that fits also the periphery of the upper portion of the valve C. Around the periphery of the upper portion of said valve there are packing-rings 6 and around its lower portion are packing-rings 7 of suitable construction. Within the wall of the cylinder A, about halfway of the length of the valve C, there is an annular suction-chamber K, which is protected from the discharge-pressure on both its top and bottom by packing-rings 6 and 7; but discharge-pressure is admitted on top of the valve C at suitable times through the passage S, formed in the body of the valve C from the bottom discharge-chamber L of the pump-cylinder. Within the hollow head B of the cylinder is placed a coiled spring R of predetermined strength according to the pressure intended to be exerted. One end of said spring bearing upon the top of the discharge-valve C acts to seat said valve against the discharge-pressure acting on the under side of said valve.

The sucked-in fluid, which may be air, gas, or liquid, is admitted into the annular suction-chamber K through the opening N in the side of the pump A. From the chamber K the fluid is admitted into the lower suction-chamber 8 through the passages T, of which there are a series arranged in a circle within the body of the valve C. From the chamber 8 the fluid enters the piston-chamber 4 through the passage shown closed by a conical valve D, which is a suction-valve having a stem E vertically slidable in the center of the valve C. Said stem is guided at its upper end by the nut F, mounted upon said stem, and by the interior of a nut G, secured to the valve C. A coiled spring H between the nuts F and G assists in closing the valve D and the lower suction-chamber 8. In the periphery of the nuts F and G are small vertical grooves *f* and *g* for the passage of fluid and to prevent a vacuum on top of the nut F. By this arrangement of valves when the limit pressure is reached the machine does not stop working then, but continues to run and requires only enough power to overcome the friction of the parts. In using a single-cylinder machine the gas is alternately compressed and reëxpanded; but if a two-cylinder machine is used with cranks at one hundred and eighty degrees the gas or fluid is seesawed between the two cylinders, both discharge-valves remaining open as long as the pressure in the receiver exceeds the pressure for which the spring R is designed and provided. This spring R is assisted in closing the discharge-valve C by the discharge-pressure of the fluid acting on the

top of the valve C and the suction-pressure acting upon the annular shoulder 5 of said valve C. The pressure against which the valve C will close is regulated by the predetermined strength of the spring R or by the amount of width or area of the annular shoulder 5, or by both of said means together, thus limiting the pressure to which the pump can force a fluid into a receiver.

The discharge gas or fluid taken from the annular discharge-chamber L passes out through the discharge-opening M. On the bottom face of the discharge-valve C is formed a beveled seat 9, against which bears the conical periphery of the suction-valve D.

Having now fully described my invention, I claim—

1. The combination of a pump-cylinder having in its interior an annular shoulder dividing it into two chambers of different diameters, and having an annular suction-chamber alongside of said shoulder, and a discharge-chamber on a lower level, a valve-seat within the cylinder alongside of the discharge-chamber, a discharge-valve slidingly retained within the cylinder, and a spring having the upper end bearing against the under side of the top of the cylinder, and its lower end pressing upon the top of the discharge-valve, substantially as described.

2. The combination of a pump-cylinder having an annular suction-chamber K and also a discharge-chamber L in its walls, a discharge-valve having an annular shoulder in communication with the said suction-chamber, a spring having its upper end pressing against the under side of the top B, and its lower end pressing upon the discharge-valve, the bottom of said discharge-valve having both a flat seat and a conical valve-seat, and within the discharge-valve a conical suction-valve, and a spring pressing the suction-valve on its seat against the discharge-valve, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD WHITAKER.

Witnesses:

GEO. F. MCCORMICK,

FRANK E. FISHER.