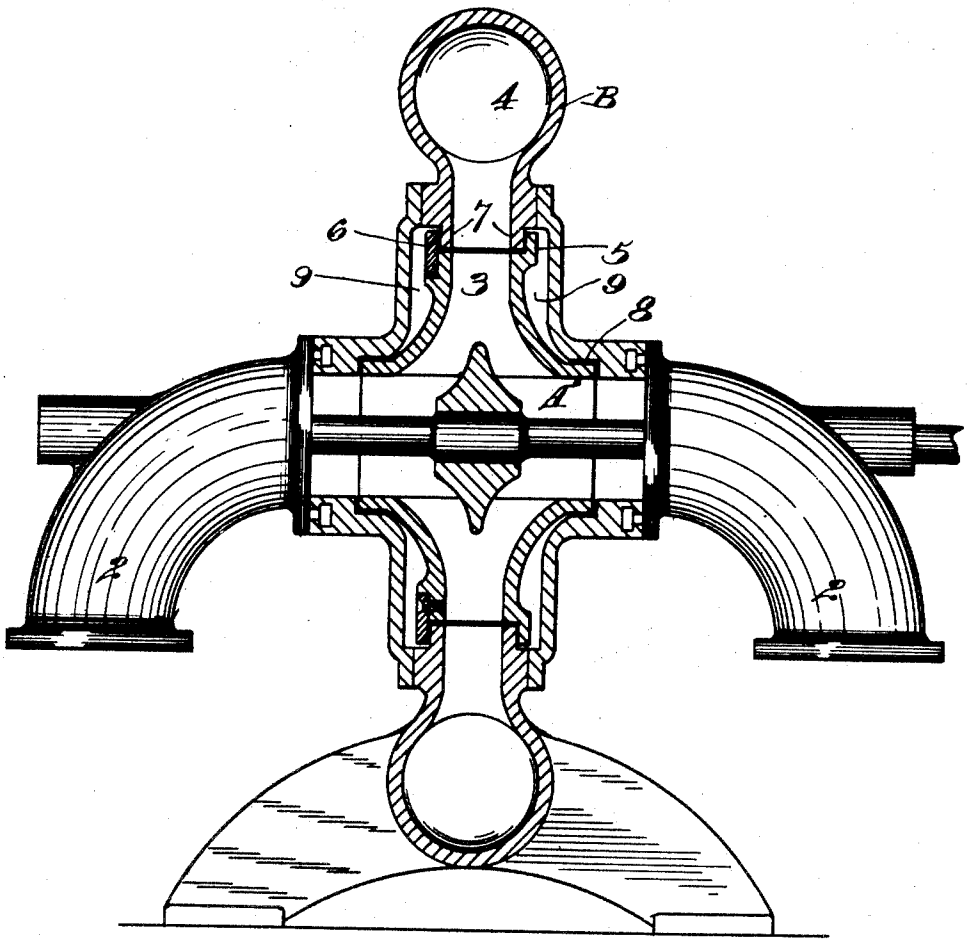
A. C. PAULSMEIER.

AUTOMATIC BALANCE DOUBLE SUCTION PUMP.

APPLICATION FILED APR. 8, 1912.

1,068,072. Patented July 22, 1913.



Witnesses;
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UNITED STATES PATENT OFFICE.

ALBERT C. PAULSMEIER, OF ALAMEDA, CALIFORNIA, ASSIGNOR TO BYRON JACKSON IRON WORKS, OF WEST BERKELEY, CALIFORNIA, A CORPORATION OF CALIFORNIA.

AUTOMATIC-BALANCE DOUBLE-SUCTION PUMP.

1,068,072. Specification of Letters Patent. Patented July 22, 1913.

Application filed April 8, 1912. Serial No. 689,116.

To all whom it may concern:

Be it known that I, ALBERT C. PAULSMEIER, citizen of the United States, residing at Alameda, in the county of Alameda and State of California, have invented new and useful Improvements in Automatic-Balance Double-Suction Pumps, of which the following is a specification.

This invention relates to centrifugal pumps and pertains especially to an automatic, hydraulically balanced, double suction runner.

The invention consists of the parts and the combination and construction of parts as hereinafter more fully described and claimed having reference to the accompanying drawing, in which the drawing is a sectional view representing the invention.

A is a double suction runner having double opposed inlets 2 uniting in the center of the runner and discharging peripherally at 3 into the volute 4 of the case B. On each side of the runner and at its perimeter is provided a runner ring; one of which 5 is stationary, the other 6 being removable. The object of these projecting rings 5—6 is to provide a simple means for retaining the runner in a balanced position without the use of set collars of any kind. Each ring 5—6 co-acts with a corresponding inwardly projecting annular flange 7 on the pump case. The hub of the runner on each side forms a running joint 8 with the case.

9 is a pressure chamber receiving pressure from the discharge through the running joints as provided between the rings 5—7, 6—7.

It is a fact in double suction pumps that owing to very slight inaccuracy pertaining to the diameter of the suction rings on the runner, there may be more leakage on one side of the runner than on the other, because there happens to be a less close fit between the cover and the runner rings on one side, tending to decrease the pressure on that side of the runner and causing the runner to be forced in the direction of the weaker side, and, as it ordinarily happens, when a runner begins to thrust in one direction, its shifting in the case causes the space between the runner and the cover on the stronger side to be increased, thereby, permitting still more pressure water to find its way into the stronger side and making it all the worse, *i. e.*, when a runner once begins to thrust and shifts in the case, the condition of thrusting becomes worse and worse. End thrust is not alone occasioned by a greater or lesser amount of leakage around the suction rings, but also through the fact that in a double suction pump on account of difficulties in construction, it occasionally happens that one side pulls more water than the other, throwing the runner out of balance. Also, as experience shows, the cover on one side of the pump when cast in the foundry may be somewhat out of shape and reduce the clearance between its inner face and the runner to about one-half of the clearance that exists on the other side between the face of the runner and its cover; thereby "jet action" sets in on the narrow side, pumping out all the water that was therein and forcing the runner closer and closer toward the side that had the least amount of clearance. This is what I am overcoming in the application of the rings or flanges projecting beyond the actual diameter of the runner arms.

In operation, suppose that on the left-hand side of the pump adjacent to the ring 6, there is a greater amount of leakage between the cover and the circular suction ring than on the opposite side, which would cause the pressure water on the left side to be more rapidly discharged back into the suction, causing the runner to thrust toward the left. The moment this happens, the clearance between the runner plate 6 and its corresponding face 7 on the pump shell is increased, while the corresponding space on the right side is decreased, thus, automatically a greater amount of water will leak through the space between 6 and 7 and, as the clearance on the other side is decreased, a lesser amount of water will leak through the space between 5 and 7, thus again equalizing the pressures on both sides of the runner. There is a film of water at all times between the running faces of the runner rings and the corresponding faces in the pump case. These faces never touch, because water is forced through them from the volute chamber into the two side chambers, the amount depending upon the respective clearances between the faces. If 10 gallons per minute should leak through on the left side, and only 5 gallons per minute on the right side, it would indicate that the distance between the faces at 6—7

is twice as great as the distance on the opposite side and that the clearance around the suction ring 6 is about twice as great as that on the other side.

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

A double suction centrifugal pump consisting of a completely incased runner having a suction inlet at each side, a casing in which said runner revolves, said runner being formed of a lesser thickness than the interior of said casing to provide pressure chambers on each side of said runner, a fixed ring formed upon one side of said runner, a removable ring upon the other side of said runner, a volute member provided with a discharge opening, said opening being located outwardly beyond the rings and the pressure chambers, and an inwardly projecting ring flange extending from said volute member between the rings.

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

ALBERT C. PAULSMEIER.

Witnesses:
H. H. R. HUNT,
R. N. FORD.