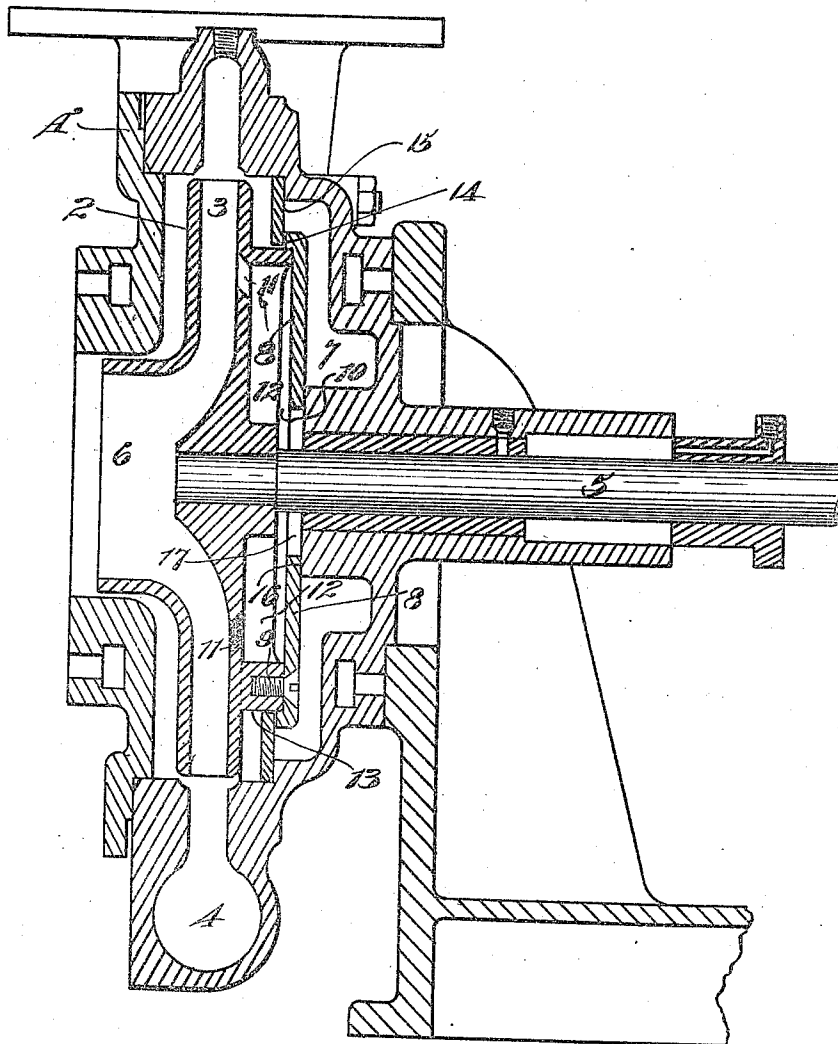


A. C. PAULSMEIER.
 AUTOMATIC CENTRIFUGAL PUMP.
 APPLICATION FILED APR. 10, 1912.

1,045,432.

Patented Nov. 26, 1912.



Witnesses,

F. E. Maynard.
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UNITED STATES PATENT OFFICE.

ALBERT C. PAULSMEIER, OF ALAMEDA, CALIFORNIA, ASSIGNOR TO BYRON JACKSON
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AUTOMATIC CENTRIFUGAL PUMP.

1,045,432.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed April 10, 1912. Serial No. 639,779.

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 Centrifugal Pumps, of which the following is a specification.

This invention relates to centrifugal pumps and pertains especially to improvements in the means for effecting an automatic balance.

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 illustrating the invention.

1 is a pump casing.

2 is the impeller having the radial discharge passages 3 opening into the volute 4 of the case.

5 is the shaft carrying the runner.

6 is the suction inlet.

7 is a variable pressure chamber formed on the side of the runner opposite the suction between the adjacent wall of the case and an annular disk plate 8, which is removably secured to the back of the runner by suitable means as the screws 9.

10 is a vacuum chamber formed within the runner between the disk plate 8 and the integral opposite wall of the runner; this vacuum chamber 10 having a discharge into the runner through the ports 11.

12 are pumping vanes by which the chamber 10 may be provided. The disk plate 8 fits snug against an annular flange 13 on the back of the runner and which flange 13 forms the circumferential wall for the vacuum chamber 10. The disk plate 8 has a peripheral projection 14 beyond the flange 13 adapted to co-act with a fixed ring plate 15 on the case, and regulate the entry of water from the space of uncontrolled pressure 4 in the case into the variable pressure space 7. The inner edge of the disk plate 8 on the side opposite the fixed plate 15 is designed to co-act with the vertical surface 16 on the fixed hub or box of the runner shaft and control the release of water from the variable pressure chamber 7 into the vacuum chamber 10.

The operation is as follows: Uncontrolled

pressure water is prevalent on both sides of the runner. It finds its way through a slight clearance between the stationary ring 15 and the runner plate 8. These two surfaces do not touch, a film of water under pressure separating the two faces. The amount of clearance between these two faces is governed by the clearance between the back of the runner plate and the face 16 of the hub, so that the circumference of the runner plate, times the thickness of the film of water between the stationary ring and the runner plate represents the area through which pressure water finds its way into the variable pressure chamber 7, and, further, this amount of water must find its way back into the runner through the central port 17 into vacuum space 10, and thence through the ports 11 back into the main pumping ports of the runner. To accomplish this, it is necessary to have sufficient clearance between the runner plate 8 and the hub 16 to discharge an amount of water equal to that passing into the variable pressure chamber 7; thus, it is seen that approximately if the runner plate should be 10" diameter and the clearance between the runner plate and the stationary ring $\frac{1}{4}$ ", we must have about $\frac{1}{4}$ " clearance, should the diameter of the central port 17 be 5". The theory is that the more clearance is given between the stationary ring 15 and runner plate 8, the more clearance it is necessary to provide between the faces of the hub 16 and the back of the runner plate. The runner will find some position between the face of the stationary ring 15 and the face of the hub 16 where the pressure in the variable pressure chamber will be such as to offset any pressure from the other side of the runner, which would tend to throw it out of balance.

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

1. A centrifugal pump consisting in the combination of a casing, a runner therein, the casing having a suction inlet and a peripheral discharge, the runner having on the side opposite the suction an annular vacuum space formed by an annular flange on that side of the case and a disk plate secured to the flange, the central portion of this plate extending inwardly toward the runner shaft, and coöperating with a fixed surface concentric with and at right angles

to the shaft, a ring plate on the case co-acting with an annular rim portion of said disk plate which projects beyond the annular flange, and which ring plate is on the side of said rim opposite to the said concentric fixed surface, said disk plate having a limited movement between said concentric surface and said ring plate, said disk plate and the back of the casing inclosing an annular variable pressure chamber through which the water circulates from the space of uncontrolled pressure outside the runner and within the case through the running joints formed by said plates and surfaces, into the said vacuum space and thence back into the runner discharge.

2. A centrifugal pump consisting in the combination of a case, an inclosed runner in the case having a suction inlet and a peripheral discharge, a variable pressure chamber formed on the side of the runner opposite the suction and between the back

of the runner and the adjacent wall of the case, the runner inclosing a vacuum chamber with pumping vanes, which chamber has a discharge back into the runner, said vacuum chamber also in communication through an annular slit at right angles to the shaft between the runner hub and the adjacent wall on the shaft bearing, a ring plate forming a portion of a wall of said variable pressure chamber, an opposed annular projection on the runner and between which annular projection and said ring plate a running joint in a plane normal to the shaft is formed.

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.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."