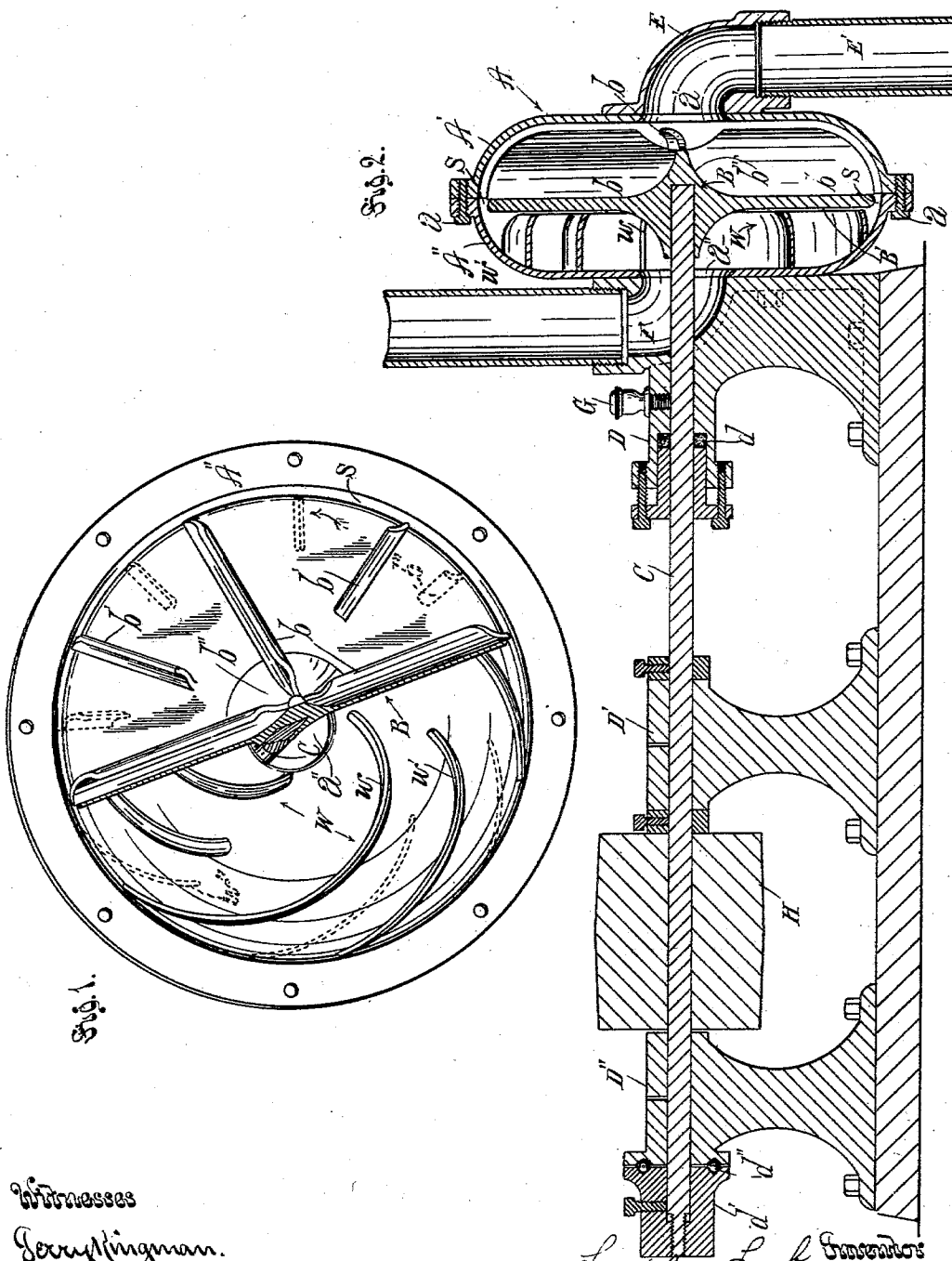


No. 753,154.

PATENTED FEB. 23, 1904.

L. LOOK.
CENTRIFUGAL PUMP.
APPLICATION FILED JUNE 27, 1898.

NO MODEL.



Witnesses

George Kingman.

Julia Townsend

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UNITED STATES PATENT OFFICE.

LUTHER LOOK, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO NEW
STANDARD CONCENTRATOR COMPANY, OF LOS ANGELES, CALI-
FORNIA, A CORPORATION OF CALIFORNIA.

CENTRIFUGAL PUMP.

SPECIFICATION forming part of Letters Patent No. 753,154, dated February 23, 1904.

Application filed June 27, 1898; Serial No. 684,618. (No model.)

To all whom it may concern:

Be it known that I, LUTHER LOOK, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Centrifugal Pumps, of which the following is a specification.

The object of my invention is to provide a centrifugal pump of great compactness and superior power.

The accompanying drawings illustrate my invention.

Figure 1 is a view, partly in section, with half the runner broken away to show the ribs upon the discharge side of the case. Fig. 2 is a longitudinal vertical mid-section of a pump embodying my invention.

In the drawings, A represents a casing, which is preferably formed in two parts A', as shown, secured together by bolts *a* to form an oblate spheroidal chamber. This casing is provided on one side with an inlet *a'* and is provided upon the opposite side with an outlet *a''*. The inlet and the outlet are centrally arranged with relation to the case and the runner B, which is mounted upon a shaft C, which passes centrally through the discharge-opening *a''* and is mounted in bearings D D' D'', respectively. A stuffing-box *d* is provided in the bearing D, and *d'* is a collar which is secured upon the outer end of the shaft and thrusts against the bearing D''. Balls *d''* are arranged in this bearing to relieve the friction.

The runner B is provided on the inlet side with an axially-arranged water-spreading cone *b'''* and around the cone with radial wings or blades *b*, which are respectively sections of a hollow cylindroid, four of which blades preferably extend to the center of the runner, as shown, and four of which blades *b'* are arranged midway between the longer wings, but do not extend to the center of the runner.

I have discovered that in order to gain efficiency in a pump of this character it is essential that the water be given as high a velocity as possible, and therefore in pumps of larger size I increase the number of blades

by arranging shorter blades *b''* in the spaces between the longer blades, as indicated by dotted lines in Fig. 1, so that therefore at the rim of the runner there are a large number of blades, which catch the water and insure that it travels with the same velocity as the runner.

b''' is a cone which is provided at the center of the runner and against which the inflowing water strikes and is deflected outward at a gentle curve between the blades.

The main body of the runner B is a disk, and upon its rear face B' this disk is made as smooth as is practical in order to avoid friction against the water. The disk is smaller than the casing, so as to provide an annular discharge-slot S around the entire circumference of the disk.

The discharge member A'' of the case is provided with spirally-arranged inwardly-curving-guides or ribs W, a portion of which, *w*, extends to the center or to the mouth of the discharge-orifice *a''* and another portion, *w'*, of which extends only part way to the center. These guides start at a gentle spiral curve at the circumference of the case, gradually curving inward more acutely toward the center, so that the change of direction of travel of the water thrown against the guides is very gradual.

w'' indicates in dotted lines additional ribs which will be provided in pumps of larger diameter corresponding to the wings or blades *b''*.

E is an elbow which is secured to the case and surrounds the inlet *a'*, and E' is a suction-pipe screwed into the elbow.

F is a discharge-elbow which is formed integral with the bearing D and is secured to the discharge member A'' of the casing and surrounds the discharge-opening *a''*. The elbow E and the bearing D are secured to the casing by means of machine-bolts, which do not extend through the casing into the way of the runners.

The wings or blades *b b'* are practically sections of a hollow cylindroid, being curved at their outer edges into practically a trough-shaped form, so as to hug the water inward toward the runner and to also insure that the

water shall travel with the runners, and thereby gain the desired velocity. The guide-ribs W are also curved to hug the water toward the casing and away from the runner.

5 G is an oil-cup to oil the bearing D.

In practice, the parts being arranged as shown in the drawings, power is applied to rotate the pulley-wheel H, which is keyed to the shaft C, and to thus rotate the runner B in the direction indicated by the arrow in Fig. 1. As the speed of the runner increases the water is drawn in through the suction-pipe E' and the opening or inlet a' , striking against the cone b''' , which deflects it outward between the wings, and when the wings engage therewith they throw the water gradually outward to the ends thereof and sweep it around rapidly within the casing. The high velocity of the water which is caught and hugged toward the runner by the forwardly-curved edges of the wings causes a great pressure within the casing at the extremities of the wings and next to the runner, and since the egress of the water is prevented, excepting through the slot S, it is thrown and forced spirally over the edge of the runner through the slot to the discharge side of the runner. As the water with its rapid motion flies into contact with the wings W it is turned from its rotary motion and is guided inward toward the center thereby. Its velocity being thus reduced its momentum is largely converted into pressure, thus forcing the water out through the discharge-opening a'' and the discharge-pipe F at a greater pressure than would otherwise exist. The wings or blades project slightly beyond the rim of the disk, so as to insure that the water discharging through the slot S will move with the same velocity as do the wings.

40 It will be observed that the weight of the suction draws the runner toward the inlet and also that the weight of the column of water in the discharge-pipe is exerted against the plain face of the runner, so that the entire strain upon the shaft C is endwise and is sustained by the roller-bearing.

It is obvious that if deemed desirable the inlet and discharge pipes may lead axially

into and from the casing instead of being provided with an elbow, as shown, and that the shaft C may pass downward inside the discharge-pipe any required distance to the runner. Therefore I do not limit my claims to the specific construction shown.

The shorter wings b' are located in the wider spaces between the blades b to intercept and throw outward any water which might otherwise drag along the face of the disk, and thereby produce friction, which is avoided by the interposition of the shorter wings. The longitudinal hollows on the forward sides of the wings catch the water and direct the same in streams toward the edge of the disk with but little loss by friction.

Now, having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A centrifugal pump comprising an oblate spheroidal chamber having an axial inlet on one side and an outlet on the other side; a disk to revolve in the chamber and provided on the inlet side with an axially-arranged cone and radiating wings which are, respectively, sections of a hollow cylindroid the chords of said wings being at an angle with the plane of rotation substantially as set forth.

2. A centrifugal pump having its runner provided with radial wings and blades each of which is curved transversely to form a radial channel along its forward side, substantially as and for the purpose set forth.

3. In a centrifugal pump, the combination set forth of a cylindrical chamber provided with a centrally-arranged inlet and outlet; spirally-arranged wings leading to the outlet and each having its outer edge curved over to hug the water toward the casing; a runner comprising a disk of less diameter than the chamber, journaled to revolve in the chamber and provided on its suction side with radial wings or blades, each curved to form a longitudinal channel on its forward side.

LUTHER LOOK.

Witnesses:

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