R. C. DAWSON.

PUMP.

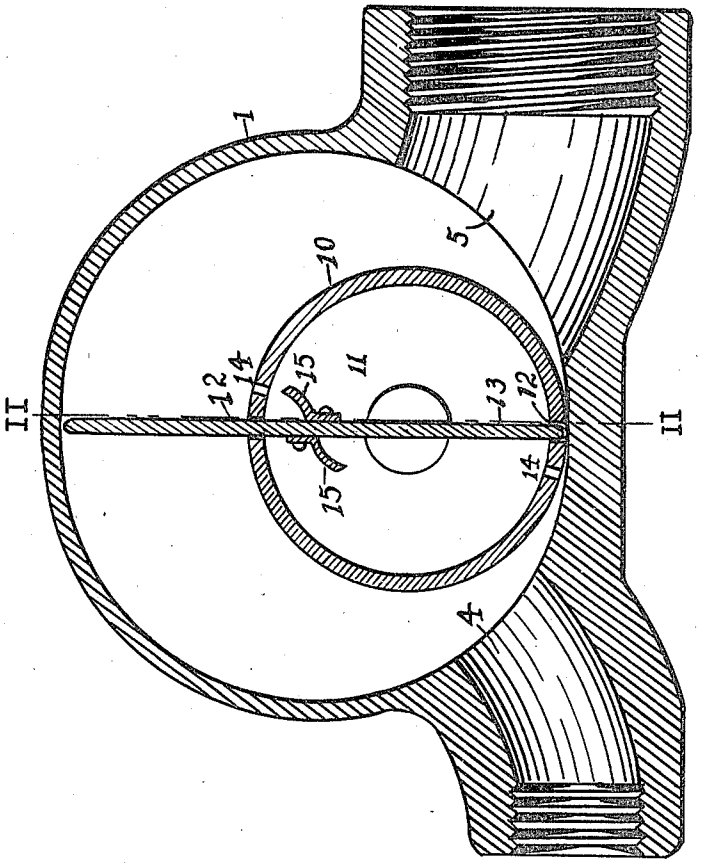
APPLICATION FILED DEC. 29, 1911.

1,029,977.

Patented June 18, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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Geo. A Harrison

INVENTOR

Robert C. Dawson,

by Edward A Lawrence,

his Att'y.

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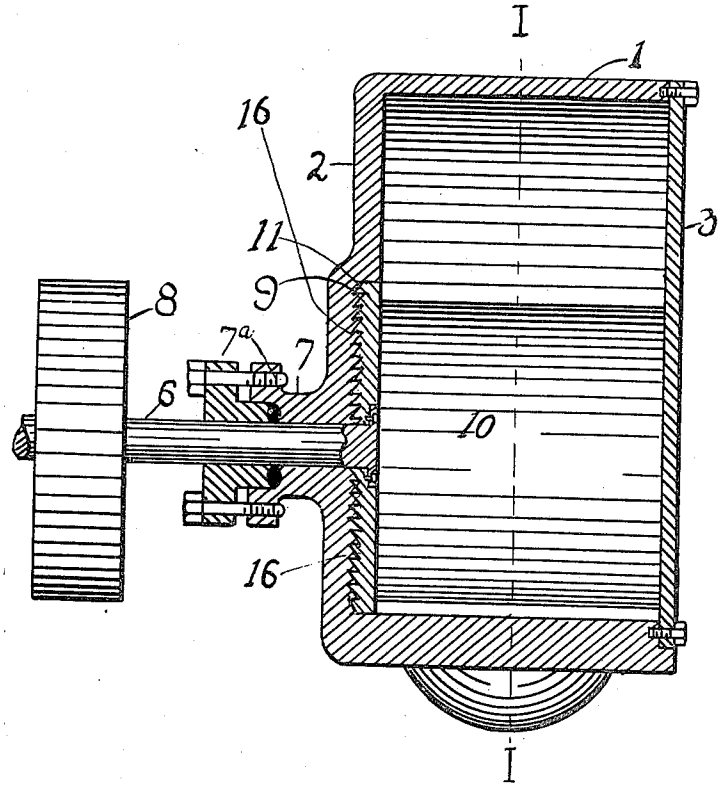

Fig. 2.

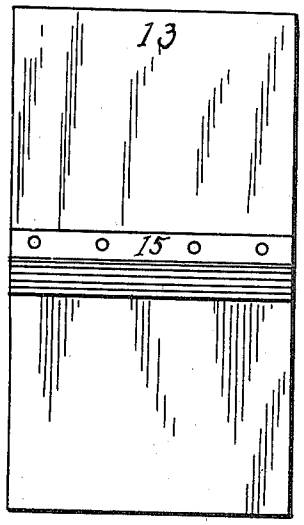

Fig. 3.

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UNITED STATES PATENT OFFICE.

ROBERT C. DAWSON, OF EAST McKEESPORT, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD TO THOMAS F. WILEY AND ONE-THIRD TO LEWIS N. MORGAN, BOTH OF McKEESPORT, PENNSYLVANIA.

PUMP.

1,029,977. Specification of Letters Patent. Patented June 18, 1912.

Application filed December 29, 1911. Serial No. 668,506.

To all whom it may concern:

Be it known that I, ROBERT C. DAWSON, a citizen of the United States, and residing in the borough of East McKeesport, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Pumps, of which the following is a specification.

My invention consists in a new and improved rotary suction pump intended for pumping water, but applicable to pumping other liquids or fluids, as may be desired.

Generally speaking, the pump is composed of a cylindraceous casing provided with opposing inlet and outlet ports, the inlet port being preferably of less capacity than the outlet port. Eccentrically mounted in said chamber and having its perimeter substantially in contact with the perimeter of said casing between said ports is a rotary cylindrical drum in which is slidingly mounted a blade of sufficient length to span the casing leaving a slight interval between its ends and the perimeter of the casing, for instance a sixty-fourth of an inch at either end of the blade, and of sufficient width to fit between the front and rear walls of the casing. The space between the ends and side edges of the blade and the casing, when the blade is rotated, is filled with water, forming an effectual water-seal whereby suction efficiency is maintained. Ports are provided for the admission of the water into the interior of the drum where it acts upon vanes fixed on the blade, cushioning the longitudinal movement of the blade and preventing its impact against the perimeter of the casing, thus maintaining the water-seal and preventing the wearing away of the ends of the blade.

Other novel features of construction and arrangement will appear from the following description.

In the accompanying drawings, Figure 1 is a vertical section on the line I—I in Fig. 2; Fig. 2 is a vertical section on the line II—II in Fig. 1, the blade being omitted for the sake of clearness, and Fig. 3 is a side elevation of the blade dismounted.

The following is a detailed description of the drawings:

1 is the casing having a cylindraceous bore and a fixed end wall 2. The other end wall is composed of a removable plate 3 which is attachable by an air-tight connection.

4 is the inlet port at one side of the vertical axis of the casing and 5 is the outlet port on the other side of said axis, the outlet port being preferably of greater capacity than the inlet port.

6 is a driving shaft mounted in the journal box 7 integral with or mounted on the wall 2 of the casing, and provided with a pulley 8. The shaft 6 passes through a stuffing box 7^a in the wall 2 and is eccentric to said wall, preferably below the horizontal axis thereof.

9 is a circular seat in the inner surface of wall 2 concentric with the shaft 6.

10 is a cylindrical drum within the casing 1. The drum 10 has one closed end, 11, which is seated in seat 9 and concentrically mounted on the end of shaft 6 to rotate therewith. The perimeter of drum 10 is in light rotary contact with the perimeter of the casing 1 between the ports 4 and 5. The other end of drum 10 is preferably open and said drum is provided in its perimeter with two longitudinal slots 12—12 extending from its open end to the closed end 11. Inasmuch as the end 11 of said drum is contained in seat 9, said slots 12—12 extend the full width of the interior of the casing.

13 is a blade slidingly mounted in slots 12—12 of the drum 10 and spanning the interior of the casing 1. The ends of said blade, however, do not contact with the perimeter of the casing but a slight space or interval is left between the same at either end of the blade. The blade 13 is of sufficient width to fill the space between the end walls 2 and 3 of the casing with sufficient play to rotate easily with the drum.

14—14 are a pair of small ports through the perimeter of drum 10 adjacent to the slots 12—12, and in advance of the blade 13 in the direction of rotation, which is clockwise in the drawings.

15—15 are a pair of oppositely curved vanes fixed, on either side of the blade 13 at the longitudinal center thereof, each vane being curved toward the port 14 on the same side of blade 13 and being preferably of a length equal to the shortest distance between the longitudinal center of the blade and the perimeter of the drum.

16—16 are concentric and co-acting annular recesses and projections on the end wall 11 of drum 10 and the inner face of wall 2 of casing 1, which, when the pump is in operation, form a water-seal to prevent the escape of water from the casing or the entrance of air from without.

In pumping water, the operation of my device is as follows: The shaft 6 is rotated, causing the drum 10 and the blade 13 to revolve, the blade sliding in said drum to accommodate itself to the perimeter of the casing 1. In designing the casing, its horizontal diameter through the axis of the drum 10 is preferably equal to its vertical diameter through the same point. The water drawn in through the port 4 forms an aqueous sheet or lining on the perimeter of the casing which fills the space between the ends of the blade and the perimeter of the casing and also fills the space between the side edges of the blade and the side walls of the casing. A water-seal is also formed between the perimeter of the drum and the casing. The water entering between the wall 2 of the casing and the end wall 11 of the drum 10 forms a water-seal in seat 9 thus preventing air from entering between such elements. I thus obtain a perfect seal between the two chambers formed by the blade spanning the casing and the full suction force of the rotating blade is made effectual and preserved.

The tendency of centrifugal force upon the blade 12 is, of course, to throw it outward toward the casing 1, which would cause said blade to contact with said casing; but this centrifugal action is, with my construction, resisted, balanced and offset in the following manner: The water enters (in the position of the parts shown in Fig. 1) the port 14 on the side of the blade toward the outlet-port 5 (the discharge pressure of a pump being greater than the pressure in the suction-chamber thereof) and presses down upon the vane 15 on that side of the blade. At the same time, of course, the water in the rotor 10, on the other side of the blade 12, acts as a drag upon the vane 15 on this said other side, assisting in overcoming the tendency of the blade 12 to move outward by centrifugal action, as above referred to. By this means the movement of the blade 13 is cushioned so that its ends will not be impacted against the perimeter of the casing 1, but will be balanced or held with its ends out of contact with said perimeter, thus preventing the wearing away of the ends of the blades and preserving the water-seal between the perimeter of the casing and said blade.

The suction obtained is the full effect of the rotation of the blade 13, since the water-seal obtained prevents the entrance of air into the casing or its passage from one side of the blade 13 to the other, so that the full suction force is utilized in drawing in the water through the port 4. It has been found in practice that the outlet port must be made of larger capacity than the inlet port to carry away the water sucked in through the inlet port. It has also been found that without the provision of the vanes 15—15 or means for balancing the blade, said blade tends to impact against and scrape along the perimeter of the casing, destroying the water seal and wearing away at a very rapid rate, as for instance, as shown by test, at the rate of a half-inch per hour of operation. This is entirely obviated by the provision of the vanes co-acting with the water ports in drum 10, a test of fifty hours showing no wear on the ends of the blade, the file marks being clearly visible

To prevent the blade in its rotation spanning the two ports 4 and 5 and thus losing its vacuum, said ports are located, as shown, so that a line drawn from the top of one port to the top of the other port will intersect the vertical diameter of the drum 10 below the center of said drum so that the one end of the blade will pass above the port 4 before the other end of the blade in its downward movement reaches the top of port 5. It is advantageous to bring the port 5 as near the bottom of the drum 10 as possible so that the full throw of the blade will be exerted to discharge water through said port 5.

What I claim is:—

1. In a pump, a casing having a cylindraceous bore and provided with an inlet port and an outlet port, a rotary drum eccentrically mounted in said casing and having its perimeter bearing upon the perimeter of said casing between said ports, a blade slidingly mounted in said drum and rotating therewith, means for admitting water to said drum, and means co-acting with the water in said drum for maintaining the ends of said blade out of contact with the perimeter of said casing while said blade is rotating.

2. In a pump, a casing having a cylindraceous bore and provided with an inlet port and an outlet port, a rotary water containing drum eccentrically mounted in said casing and having its perimeter bearing upon the perimeter of said casing between said ports, a blade slidingly mounted in said drum and rotating therewith, and members mounted on said blade within said drum and co-acting with said water to maintain the ends of said blade out of contact with the perimeter of said casing while said blade is rotating.

3. In a pump, a casing having a cylindraceous bore and provided with an inlet port and an outlet port, a rotary drum eccentrically mounted in said casing and having its perimeter bearing upon the perim-

eter of said casing between said ports, said drum being provided with ports for the admission of water into the interior thereof, a blade slidingly mounted in said drum and rotating therewith, and vanes mounted on said blade within said drum and co-acting with the water in the latter to maintain the ends of said drum out of contact with the perimeter of said casing while said blade is rotating.

4. In a pump, a cylindraceous casing provided with an inlet port and an outlet port, a water filled drum eccentrically mounted in said casing and having its perimeter bearing upon the perimeter of said casing between said ports, a blade slidingly mounted in said drum and rotating therewith, vanes curved in opposite directions fixed on opposite sides of said blade adapted to be acted upon by the water in said drum to cushion the movement of said blade, and means for rotating said drum.

5. In a pump, a casing provided with an inlet and outlet port, a water-containing drum revoluble within said casing, a blade slidingly carried by and movable with said drum and projecting thereinto, and means disposed within said drum and co-acting with the water therein for overcoming centrifugal force upon said blade.

6. In a pump, a casing provided with an inlet and outlet port, a water-containing drum revoluble within said casing, a blade slidingly carried by and movable with said drum and projecting thereinto, and means disposed within said drum and carried by said blade and co-acting with the water in the drum for overcoming centrifugal force upon said blade.

Signed at McKeesport, Pa., this 27th day of December, 1911.

ROBERT C. DAWSON.

Witnesses:
WILLIAM E. O'TOOLE,
ISRAEL A. SIMON.