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J. MÜLLER.

ROTARY PUMP.

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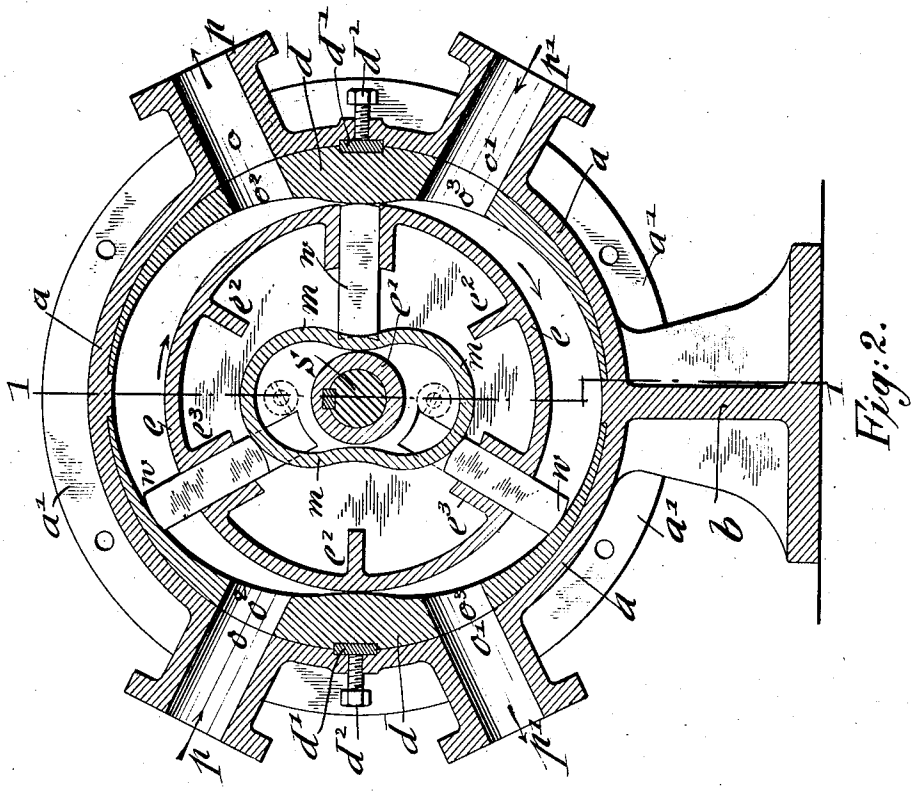


Fig. 2.

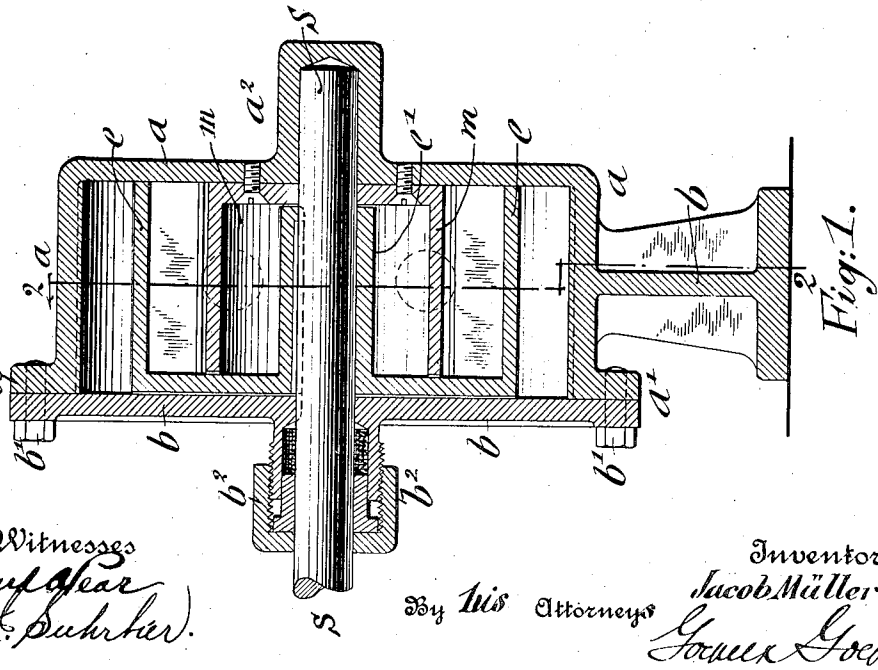


Fig. 1.

Witnesses
Edward Gear
H. C. Sherbert.

Inventor
Jacob Müller
By his Attorneys
Gosnell & Goepel

UNITED STATES PATENT OFFICE.

JACOB MÜLLER, OF NEW YORK, N. Y., ASSIGNOR TO CAROLINE H. MÜLLER, OF NEW YORK, N. Y.

ROTARY PUMP.

No. 888,838. Specification of Letters Patent. Patented May 26, 1908.

Application filed February 28, 1906. Serial No. 303,497.

To all whom it may concern:

Be it known that I, JACOB MÜLLER, a citizen of the United States, residing in New York, in the borough of the Bronx and State of New York, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention relates to an improved rotary pump which is run as a double-acting pump and which can be readily reversed so as to run in the opposite direction, the wear of the pump being taken up by the adjustment of the abutments in the pump-cylinder or by replacing the same from time to time with new abutments; and for this purpose the invention consists of a rotary pump which comprises a stationary pump-cylinder provided with abutments that decrease in thickness from the center towards the ends, said abutments being provided with openings at both sides of the center-portion of greatest thickness, for the inlet and outlet of the liquid, a cylindrical piston rotating in the pump-cylinder and provided with radially-guided wings, and a central actuating-piece having depressions at opposite sides corresponding to the central portions of the abutments, said actuating-piece being attached to the end of the cylinder.

The invention consists further of certain details of construction and combinations of parts which will be fully described hereinafter and finally pointed out in the claim.

In the accompanying drawing, Figure 1 represents a vertical transverse section of my improved rotary pump taken on line 1—1, Fig. 2, and Fig. 2 is a vertical longitudinal section on line 2—2, Fig. 1.

Similar letters of reference indicate corresponding parts in the two figures of the drawing.

Referring to the drawing, *a* represents the cylinder of my improved rotary pump. The cylinder *a* is supported stationary on a suitable pedestal *b* and made closed at one end, the closed end being provided with a closed bearing for the end of the rotary shaft *s*. The cylinder *a* is provided at its opposite side with a circumferential flange a^1, to which is attached the detachable head *b* of the cylinder by means of screw-bolts b^1. The head *b* is provided with a central opening for the shaft *s* and with a stuffing-box b^2 for the same. The stationary cylinder *a* is provided with abutment-receiving recesses at its interior, which are arranged symmetrical to the vertical longitudinal center-plane of the cylinder. Above the horizontal center-plane of the cylinder *a* are arranged, equidistantly, respectively inlet and outlet openings *o*, o^1 and short connecting-pipes *p*, p^1 which are preferably cast integrally with the cylinder, one pair of openings and pipes at each side of the same. To the closed end of the cylinder is attached, at the interior of the same, a stationary actuating-member *m* which is provided with rounded-off ends and depressions between said ends, as shown in Fig. 2, the longer axis of said actuating-member being in line with the vertical center-plane of the cylinder *a*, while the centers of the depressions are in line with the horizontal plane of the same.

Into the recesses at the interior of the cylinder *a* are inserted abutments *d*, which taper from the thick portions at the center towards the ends, the centers of the thick portions being in line with the horizontal center-plane of the cylinder *a*. The center-portions of the abutments are provided with transverse grooves on the sides adjacent to the cylinder so as to fit on keys d^1 which are inserted in transverse grooves in the recesses at the interior of the cylinder, so that the abutments, when they are inserted in the cylinder from the open side of the same, are guided on the keys and on the shoulders formed at the upper and lower portions of the cylinder *a*. Acting on the keys d^1 are two set-screws d^2 which pass through the cylinder *a*, and which serve for adjusting the keys and the abutments for taking up the slight wear of the latter. The abutments are provided, equidistantly from the center-plane of the cylinder, with openings or ports o^2, o^3 that register with the openings *o*, o^1 in the cylinder.

Into the cylinder *a* is inserted, from the open end of the same, a piston *e*, the outer diameter of which is equal to the distance between the center-portions of the abutments *d*, said piston being of cylindrical shape, open at one and closed at the other end, the closed end being provided with a hub e^1 that is splined onto the shaft *s* and rotated therewith. The cylindrical piston *e* is reinforced by interior radial ribs e^2 and provided with equidistant openings intermediately between said ribs e^2, and guide-pieces e^3 for radial wings *w* which are rounded off at

their outer and inner ends, said wings being guided in recesses of the end-wall of the piston, the outer ends moving in contact with the inner surface of the abutments and cylinder *a*, and the inner ends moving in contact with the outer surface of the stationary actuating-member *m*, when the piston is rotated by power applied to the shaft *s*. When the piston is moving in the direction of the arrow shown in Fig. 2, the liquid of the pump is drawn through the upper left-hand ports *o*, o^2 by the action of one of the wings *w* and pushed by the next following wing *w* as soon as the same passes the left-hand abutment *d*, through the outlet-ports *o*, o^2 at the upper right-hand side of the cylinder, while simultaneously the liquid is drawn through the lower right-hand ports o^1, o^3, into the lower part of the cylinder, and forced by the piston to the outside, producing thereby an effective double action of the pump. When the direction of the motion is reversed, the upper left-hand ports *o*, o^2 and the lower left-hand ports o^2, o^3, o^1 serve as the inlet-ports, while the upper left-hand ports *o*, o^2 and the lower right-hand ports o^1, o^3 serve as the outlet-ports respectively.

When the abutments of the cylinder or the radial wings of the piston commence to wear out, the wear is taken up by adjusting the abutments by means of the set-screws d^2, so that a reliable and tight contact between the inner surface of the abutments and the outer ends of the wings *w* is always obtained. When the wear of the piston becomes too great, so as to affect the function of the pump, a new piston may be inserted, or when the wear is in the abutments, new abutments may be inserted in the cylinder. This can be readily accomplished by removing the head of the pump, and then removing the piston with its shafts, so that the cylinder is in condition for inserting new abutments. In case the stationary actuating-member *m* shows considerable wear, a new member may be readily inserted and attached to the closed end of the cylinder *a*. Therefore, any repairs which are necessary on account of the wear of the parts of the rotary pump, can be readily made in a quick and easy manner, so that the main objection to rotary pumps, viz., the difficulty in keeping all the working parts in tight fit, is overcome, and a very efficient rotary pump obtained.

It is obvious that the rotary pump may also be worked as a rotary engine, if desired, in which case the expansive force of the steam applied to the spaces between the cylinder, piston and the radial wings is made use of for imparting rotary motion to the shaft.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

In a rotary pump, the combination of a cylinder provided interiorly at opposite sides with abutment-receiving recesses, there being transverse grooves in the cylinder-wall at the middle parts of said recesses, abutments seated in said recesses and having transverse grooves in their outer surfaces opposite the transverse grooves in the cylinder-wall, keys interposed between the abutments and the cylinder-wall in the opposing transverse grooves, said abutments being guided on said keys and slidable thereon into and out of the cylinder, set-screws threaded in the cylinder-wall and abutting against said keys, a piston within the cylinder having wings to coöperate with said abutments, and actuating mechanism for the wings.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

JACOB MÜLLER.

Witnesses:
PAUL GOEPEL,
HENRY J. SUHRBIER.