J. H. MYERS.

ROTARY PUMP.

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1,102,288.

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Fig. 1.

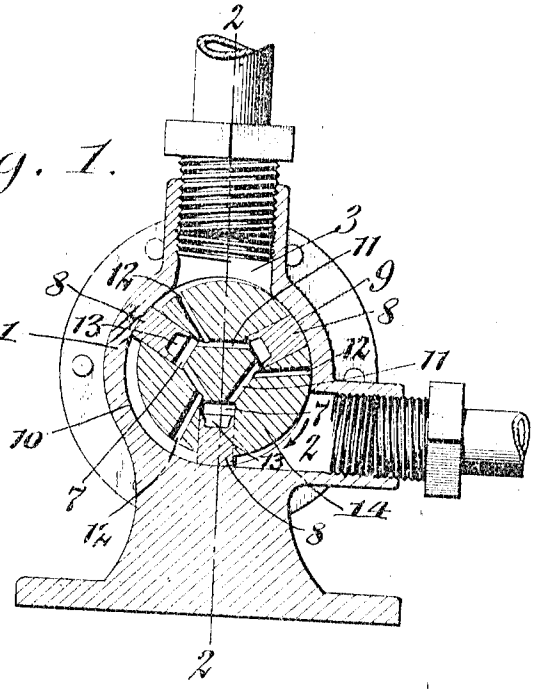
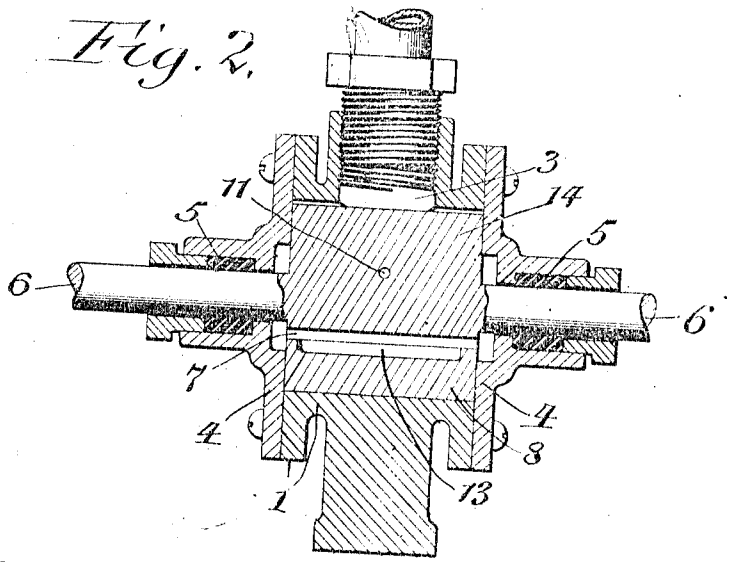


Fig. 2.



Witnesses:-

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UNITED STATES PATENT OFFICE.

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ROTARY PUMP.

1,102,288. Specification of Letters Patent. Patented July 7, 1914.

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To all whom it may concern:

Be it known that I, JOHN H. MYERS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention relates to that type of rotary pumps in which a drum rotates eccentrically within a cylinder and is provided with one or more radially movable pistons engaging with the inner surface of the wall of the cylinder.

The purpose of this invention is to provide a pump of this character in which the pistons are forced outwardly by liquid pressure instead of by springs or equivalent means and thus permit of simplifying the construction, reducing the cost and also avoiding noise and undue wear as is the case when springs or cams are used.

Another object of my invention is the utilization of this principle in such a manner as to obtain quick and positive action of the working pistons or wings by compelling the liquid pressure-agent to travel the shortest possible distance and act directly against the inner faces of said pistons or wings.

With these and other objects in view, my invention consists in the provision of a rotatable member or drum having radially or otherwise movable pistons or wings adapted to travel in contact with the inner surface of the pump cylinder or casing, distributing passages arranged in said rotatable member between the ends thereof and leading to the inner ends of said pistons or wings, and pressure ports leading from the periphery of said rotatable member and having their inner ends connecting with said distributing passages; thus causing the liquid pressure-agent to act against the pistons without possibility of the liquid being forced through the pump casing acting as a retarder to the action of that part of the liquid used as a pressure-agent; and also to prevent the action of the liquid being forced through the casing acting as a suction agent to cause the liquid intended to serve as the pressure-agent acting as a suction agent and withdrawing it from the distributing passages and the pressure parts.

My invention further consists in the novel construction and arrangement of parts to be hereinafter described and particularly pointed out in the subjoined claims.

In the accompanying drawings: Figure 1 is a vertical cross section of a rotary pump embodying my improvements. Fig. 2 is a vertical longitudinal section of the same in line 2—2, Fig. 1.

Similar letters of reference refer to like parts in both figures.

In its general organization the rotary pump shown in the drawings comprises a body, a drum and pistons mounted on the drum. The body comprises a horizontal cylinder or casing 1 which is provided at different parts of its periphery with a liquid inlet 2 and a liquid outlet 3 and heads 4, 4 closing opposite ends of the cylinder and provided with alined bearings 5, 5 and depressions 15, 15, preferably circular, on their inner surfaces.

The drum or member 14 is of cylindrical form and rotatable within the cylinder about an axis arranged eccentrically relatively to the axis of the cylinder and provided at its opposite ends with shafts 6, 6 which are journaled in the bearings 5. The drum is provided with a plurality of radial guide ways 7 which open at the periphery of the drum, three of such chambers being preferably employed and arranged equidistant, as shown in the drawings. In each of the guide chambers is arranged a radially movable piston or wing 8 which engages at its outer end with the inner surface of the cylinder or casing.

As the drum rotates forwardly, in the direction indicated by the arrow in Fig. 1, each piston or wing reciprocates in its guide chamber as it sweeps successively in contact with the parts of the wall of the cylinder which are near and far from the periphery of the drum. As each piston passes over the near side 9 of the cylinder between the liquid outlet and inlet the same is in its fully retracted position. As the piston passes the inlet it begins to move outwardly in its guideway and reaches its point of greatest projection at the far side 10 of the cylinder. Thereafter the piston during its continued forward rotary movement is gradually moved inwardly as it approaches the liquid outlet and is in its fully retracted position by the time it passes the liquid outlet. By this means the water is drawn from the inlet into the cylinder and forced out through the outlet in a manner well known in this type of pump.

The inward movement of the piston is

produced by engagement of the outer ends of the pistons with the wall of the cylinder which is eccentric relatively to the periphery of the drum.

The pistons are moved automatically outward and held in operative engagement with the wall of the cylinder by the pressure of the liquid which is being pumped. This is effected by providing the drum with a plurality of distributing passages 11 arranged in a plane between the ends of the drum, which passages connect the inner ends of the several guideways with each other, a plurality of pressure ports 12, each of which extends from one of said distributing passages outwardly to the periphery of the drum between the front of one guideway and the rear of another and the depressions 15, 15, in the heads of the cylinder. Each of the pistons is preferably provided at its inner end with a pocket or cavity 13 which increases the volume of water contained in the guideway and insures better distribution of the liquid in the guideway at the beginning of the outward movement of the pistons, at the same time serving as a means to cause a freer and quicker outward movement of the pistons owing to the increased weight of the outer half thereof, the action of which, under centrifugal force caused by the rotation of the drum, is similar to an arrow traveling through space. It is to be noted, however, that the liquid within said depressions cannot pass behind the pistons until the latter have commenced their outward movement caused by the liquid pressure-agent in the distributing passages; consequently, when employing said depressions, the liquid therein comes into action only after the pressure-agent in said distributing passages is in action. The pistons are therefore moved outward by pressure applied first at points between their ends, thereby creating a central pressure region which assures a balanced outward movement of the pistons so as to minimize, if not entirely eliminate, all binding action. The instant the pistons move outwardly the pressure-agent within the depressions 15, 15, moves into action and assists in retaining the pistons or wings in contact with the casing.

As the liquid in front of the several pistons is subjected to pressure the same enters the inner ends of the guideways through the pressure ports and distributing passages, and the inwardly-moving pistons displace the liquid in their receiving guideways and in the depressions 15, 15, forcing the liquid from said depressions into the guideways of the outwardly moving pistons from the ends of the drum, thereby holding the pistons positively in their outermost position solely by water pressure. By this means the use of springs and equivalent devices may be dispensed with and the construction is not only simplified but the cost is reduced, wear is minimized and repairing can be effected more easily. Moreover, by placing the distributing passages 11 and pressure ports 12 between the ends of the drum, preferably medially, a quicker response is obtained in the action of the wings when starting the pump due to the short distance the pressure-agent is compelled to travel.

By placing the distributing passages between the ends of the drum, short straight passages may be used whereby the possibility of the passages becoming clogged is greatly minimized.

Although one of the ports while passing the liquid inlet tends to discharge some of the liquid in this port the other two ports which are receiving water under pressure more than offset any leakage through the one port, thereby conserving sufficient water pressure within the distributing passages and guide chambers to hold the pistons firmly in engagement with the cylinder and enabling the pump to work to its fullest capacity.

Inasmuch as liquid does not compress to any appreciable extent the pressure applied thereto by the rotary movement of the pistons and drum is transmitted positively to the pistons for projecting the same. Owing to the connection between the several guideways by the distributing passages and the depressions 15, 15, the pressure in the same is equalized and the pump is caused to work uniformly and noiselessly.

It will be noted that each guideway on one side of the periphery of the drum communicates with a pressure port leading to the opposite side of the periphery of the drum, so that pistons on the receiving or suction side of the drum are exposed to the full pressure of the water which is being delivered on the discharge side of the pump.

By providing the pistons with pockets or cavities at their inner ends, any foreign matter in the liquid being pumped that may lodge behind them will enter said pockets and prevent wedging of the pistons in passing from the outlet to the inlet, at which point the wall of the cylinder is nearest the axis of the drum, thus greatly increasing the efficiency of the pump due to the impossibility of creating undue friction in the event of foreign matter lodging behind the pistons.

I claim as my invention:

1. A rotary pump comprising a casing having an inlet and an outlet spaced apart, a rotatable member therein, said rotatable member having a plurality of guideways, distributing passages connecting the inner ends of said guideways in a plane between the ends of said rotatable member, a pressure port in said rotatable member extending from the periphery thereof to one of

said distributing passages in the plane of the latter, and a piston or wing movable inwardly and outwardly in each of said guideways.

2. A rotary pump comprising a cylinder having inlet and outlet ports, a rotatable member eccentrically mounted in the cylinder and having a plurality of communicating guideways, said guideways being in communication centrally between the ends of said rotatable member, pressure ports leading inward from the periphery of said rotatable member between said guideways and being in communication with the latter, said pressure ports being arranged centrally between the ends of said rotatable member, and pistons or wings guided in said guideways and movable inwardly and outwardly therein.

3. A rotary pump comprising a cylinder having heads provided with depressions on their inner faces, a rotatable member eccentrically mounted in said cylinder and having a plurality of guideways extending inwardly from the periphery and being in communication with the depressions in said heads, pressure ports leading inwardly from the periphery of said rotatable member and having communication with the inner ends of said guideways at points centrally between said depressions, and pistons or wings movable inwardly and outwardly in said guideways.

4. A rotary pump comprising a cylinder having heads at opposite ends provided with depressions on their internal faces, a rotatable member eccentrically mounted in said cylinder and provided with a plurality of guideways in communication at opposite ends with said depressions, distributing passages connecting said guideways centrally between their ends, pressure ports leading inwardly from the periphery of said rotatable member and having their inner ends connecting with said distributing passages, and pistons or wings movable inwardly and outwardly in said guideways.

Witness my hand this 11th day of March, 1911.

JOHN H. MYERS.

Witnesses:
E. M. GRAHAM,
ANNA HEIGIS.