No. 628,989. Patented July 18, 1899.

W. E. PENN.

ROTARY PUMP.

(Application filed Dec. 1, 1898.)

(No Model.) 2 Sheets--Sheet 1.

Fig. 1.

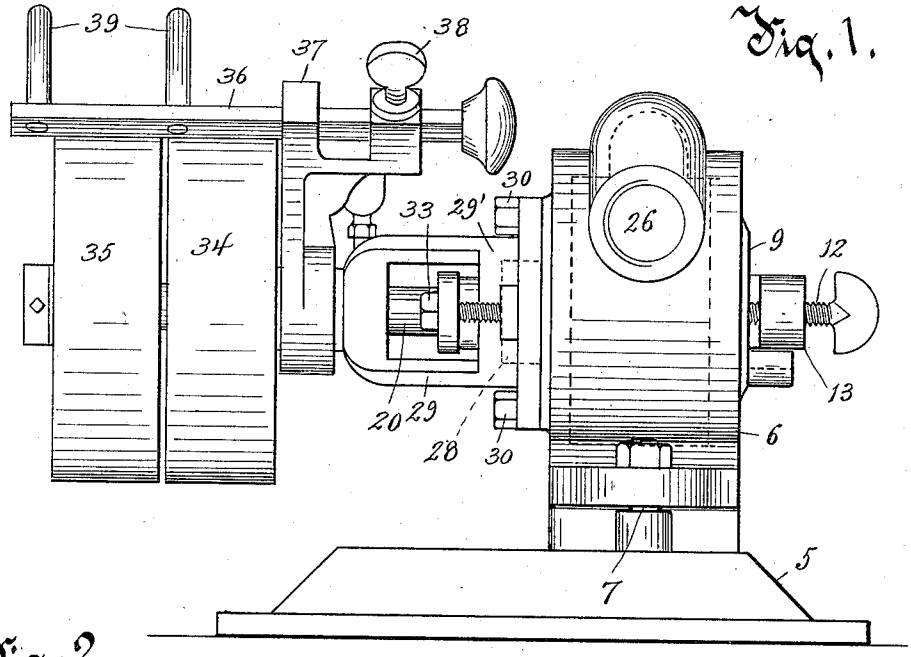
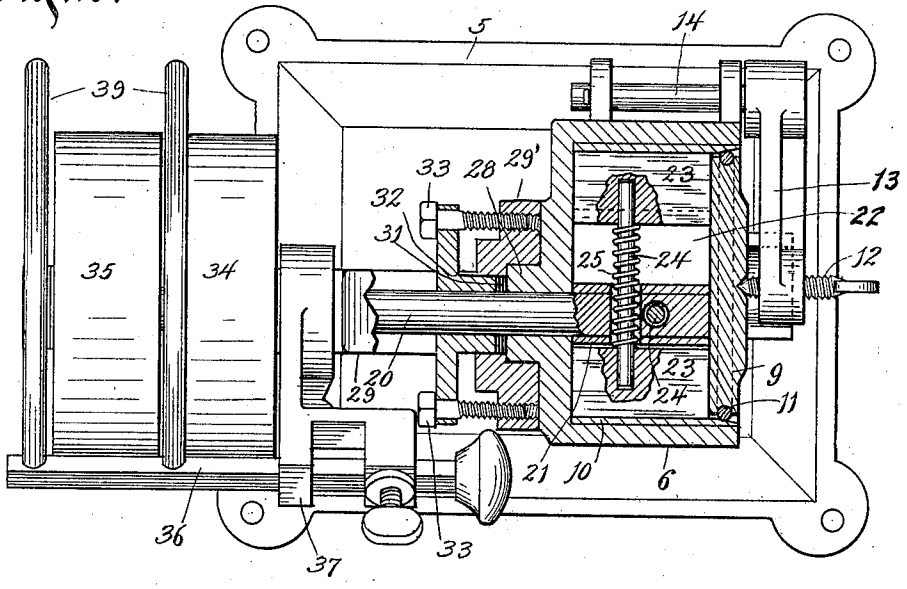


Fig. 2.



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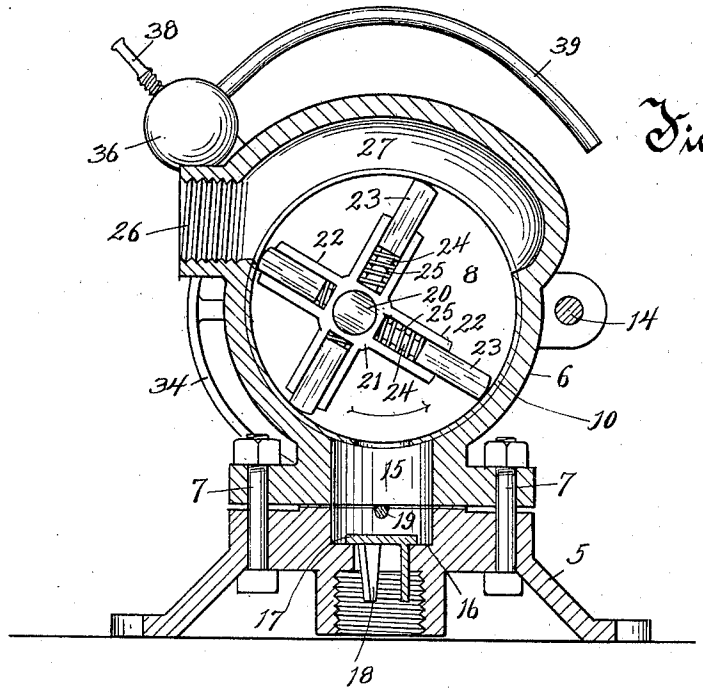
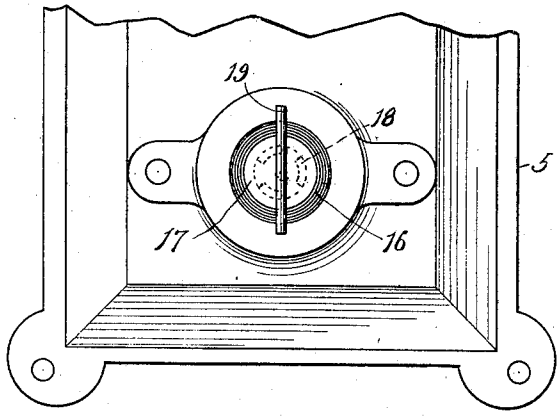


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM E. PENN, OF LAKE MILLS, WISCONSIN, ASSIGNOR TO THE F. B. FARGO & COMPANY, OF SAME PLACE.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 628,989, dated July 18, 1899.

Application filed December 1, 1898. Serial No. 697,953. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. PENN, of Lake Mills, in the county of Jefferson and State of Wisconsin, have invented a new and useful Improvement in Rotary Pumps, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

The object of my invention is to provide an improved rotary pump especially adapted for use in creameries for pumping up milk, though the pump is also adapted for raising or moving any liquid whatever.

The invention consists of the mechanism, its parts, and combinations of parts, as herein described and claimed, or their equivalents.

In the drawings, Figure 1 is a side elevation of my improved pump. Fig. 2 is a top plan view of the improved pump, parts being broken away and other parts shown in section for convenience of illustration. Fig. 3 is a transverse section of my improved pump about centrally thereof. Fig. 4 is a top plan view of the pedestal of the pump, showing the construction of a valve located therein.

In the drawings, 5 is the pedestal of the pump, being, in fact, a portion of the pump-case, the upper portion 6 of which case is supported thereon and secured detachably thereto by removable bolts 7. The pump-case 6 is provided with a cylindrical chamber 8, closed at one end by the detachable head 9. The pump-case 6 is conveniently constructed of cast-iron, and the chamber 8 is lined on its annular wall with a brass lining 10, which adjacent to the open end of the chamber is beveled off to its extremity outwardly. The head 9 is of such size as to fit loosely in the end of the chamber 8 and is provided with an annular rubbing packing-ring 11, secured in its periphery by being let into an annular groove therefor in the edge of the head 9, and this packing-ring 11 contacts with and bears liquid-tight against the beveled edge of the lining 10 when the head is held to its seat in the pump-case chamber. The head 9 is held releasably to its seat by means of a cone-pointed screw 12 turning through an arm 13 against the head 9, the cone-pointed end of the screw fitting loosely in a corresponding recess in the outer surface of the head 9 at its center. The arm 13 is provided with a laterally-projecting pin 14, which has its bearings revolubly in ears therefor on the case, whereby the arm 13 is so pivoted to the case as to be adapted to swing in front of the open end of the chamber 8 at a right angle to the longitudinal axis of the chamber. This construction is adapted to secure the head 9 firmly in its seat in the end of the pump-case, while at the same time permitting it to be properly adjusted or trued up to the piston in the chamber.

The inlet or supply port 15 opens into the chamber, coming thereto through the pedestal 5. A check-valve in the supply-port is conveniently formed in the pedestal by contracting the size of the port in the pedestal, forming a shoulder 16, on which rests a flat plate 17 over the passage leading thereto, the plate 17 being provided with depending guide-legs 18, that extend downwardly into the passage and are adapted to hold the plate-valve 17 in position against lateral displacement, while permitting its movement away from and toward the passage closed by it that opens into the port 15. A little bar 19, extending transversely across that portion of the port 15 that is in the pedestal 5, rests at its ends in recesses therefor in the pedestal and is located at such distance above the plate-valve 17 as to prevent the legs of the valve from escaping from the inlet-port and is thereby adapted to retain the valve in place with such limited movement toward and from the shoulder 16 as permits of the free passage of a liquid through the valve toward the pump-chamber, but prevents its reflow. The bar 19 is held against displacement by the pump-case 6 when in position on the pedestal and secured thereto by the bolts 7.

A driving-shaft 20 extends through the solid end of the pump-case into the pump-chamber and is provided with a piston 21 thereon in the pump-chamber. The shaft 20 is disposed parallel with the central longitudinal axis of the pump-chamber, but eccentrically thereof, and the piston 21 is provided with radially-extending buckets as long in the direction of the length of the shaft as the length of the chamber 8. These radially-extending buckets consist of radially-projecting wings 22, provided with sockets or grooves, in which the slides or wing extensions 23 are fitted, movable freely radially, the outer edges of the slides

being fitted and adapted to bear movably against the inner curved and end surfaces of the chamber 8. A slide-rod 24, located diametrically and movably through the shaft 20, has its ends fitted loosely in sockets therefor in the two opposite slides 23, the width of the slides and the length of the rod 24 and its disposition in sockets in the slides being regulated, by being held outwardly radially but yieldingly, by a spring 25, coiled about the rod 24 and bearing at its ends against the inner edges of the opposite slides 23. A rod 24, with a spring 25 thereon, is employed with each two opposite slides 23, the construction being adapted to hold the slides constantly outwardly radially against the curved wall of the chamber, while at the same time permitting of the movement radially and correspondingly of the two opposite slides, as the slides respectively come to the part of the chamber having the shorter and greater radial distance from the shaft to the curved wall of the chamber. This construction divides the pump-chamber into compartments of different capacities, because of the eccentricity of the driving-shaft 20, each compartment varying in capacity as its position changes with the rotation of the piston, the disposition of the parts being such that each compartment is of greatest capacity just as its rear wall, formed by a wing 22 and its slide 23, passes and closes the compartment from the inlet-port 15 and is of the least capacity just after the same rear wall of the compartment has passed and closed the compartment from the discharge-port 26. The result is that a compartment which is at its smallest capacity immediately after passing the discharge-port 26 begins to enlarge directly, so that as it comes to the inlet-port 15 very soon thereafter it is already enlarged somewhat, and as the piston continues to rotate is rapidly enlarged more until it reaches its greatest capacity directly after passing the inlet-port 15, and thereafter begins directly to be reduced in capacity as the compartment advances toward the discharge-port, and as this produces an undesirable and detrimental pressure of the liquid therein when the pump is in use I provide a relief-duct 27, formed on the curved wall of the chamber 8 and consisting of a channel constructed outside of the curved wall of the chamber 8, but opening thereto along its inner side throughout its length, which duct begins at a point on the peripheral wall of the chamber 8 a little in advance of the front wall or slide 23 of the piston-compartment at the moment its rear wall or slide 23 has passed the inlet-port 15, and the duct extends thence along the peripheral wall of the chamber around to the discharge-port 26, into which also it opens. This construction provides for relieving the compression on the fluid in the pump as each compartment of the pump-chamber becomes smaller as it advances toward the discharge-port 26, thus obviating undesirable compression of the fluid in the pump and permitting of a freer and more effective action of the pump.

For satisfactorily mounting the driving-shaft 20 in and on the pump-case the integral end wall of the pump-case is provided with a cylindrical boss 28, concentric with and pierced by the shaft 20, which end wall of the case, enlarged and strengthened by this boss 28, forms a bearing for the shaft 20 adjacent to the piston 21, and a more distant bearing for the shaft is formed by the detachable bracket 29, provided with a laterally-expanded foot 29', that is bored out to fit around the boss 28 and rests against the outer surface of the end of the pump-case and projects laterally a distance therefrom, preferably in yoke form, and provides in its outer end a second bearing for the driving-shaft. The bracket 29 is secured firmly but detachably to the pump-case by screws 30. Outside of the end of the box 28 the bracket 29 is provided with a circular aperture about the shaft 20, forming a packing-chamber 31, the end of which is closed removably by a gland 32, secured to the bracket by screws 33.

The shaft 20 is provided with a tight belt-pulley 34 and a loose belt-pulley 35. A shiftable belt-guide consists of the bar 36, located in front of the pulleys 34 and 35, parallel with the shaft 20 and slidable endwise in the bracket 37, fixed on the outer extremity of the bracket 29. A set-screw 38, turning in the bracket 37 against the bar 36, is adapted to lock the bar in position. Two fingers 39 39, fixed in the bar 38, are so disposed as to allow the driving-belt to be run between them and to guide the belt onto the pulley 34 or the pulley 35, conforming with the position of the slidable and adjustable bar 36.

What I claim as my invention is—

1. In a rotary pump, the combination with a pump-case having a cylindrical chamber open at one end, of an independent removable head fitted to the open end of the pump-chamber by yielding (rubber) packing against a beveled bearing, and a swinging laterally-disposed arm provided with means bearing against said head centrally adjustably adapted to hold the head to the case tightly but so as to be capable of being trued up by the bearing of the end of the revolving piston against it.

2. In a rotary pump, the combination with a case having a cylindrical chamber with an open end, of an independent head fitting to the case closing the open end of the chamber, an arm pivoted on the case arranged to swing in a plane at a right angle to the length of the chamber to position in front of the head, and a screw turning in the arm against the head centrally.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM E. PENN.

Witnesses:

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C. F. GREENWOOD.