F. LAMPLOUGH.

VALVELESS ROTARY PUMP.

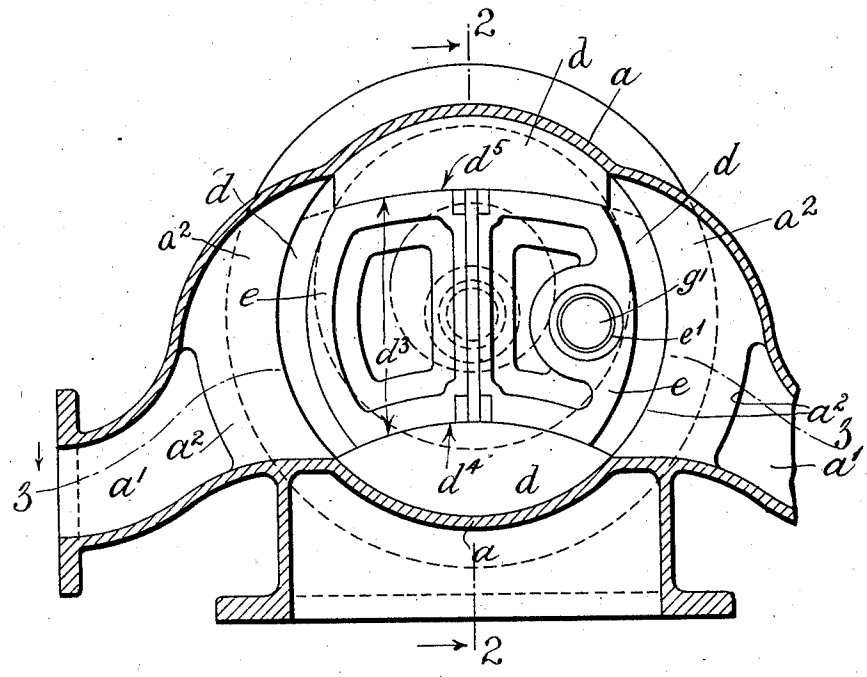
APPLICATION FILED OCT. 21, 1910.

1,044,195.

Patented Nov. 12, 1912.

3 SHEETS—SHEET 1.

Fig. 1



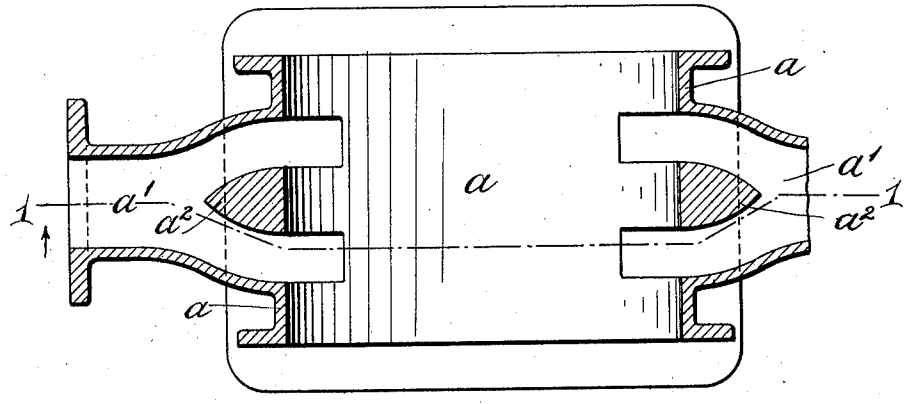


Fig. 3

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3 SHEETS—SHEET 2.

Fig 2

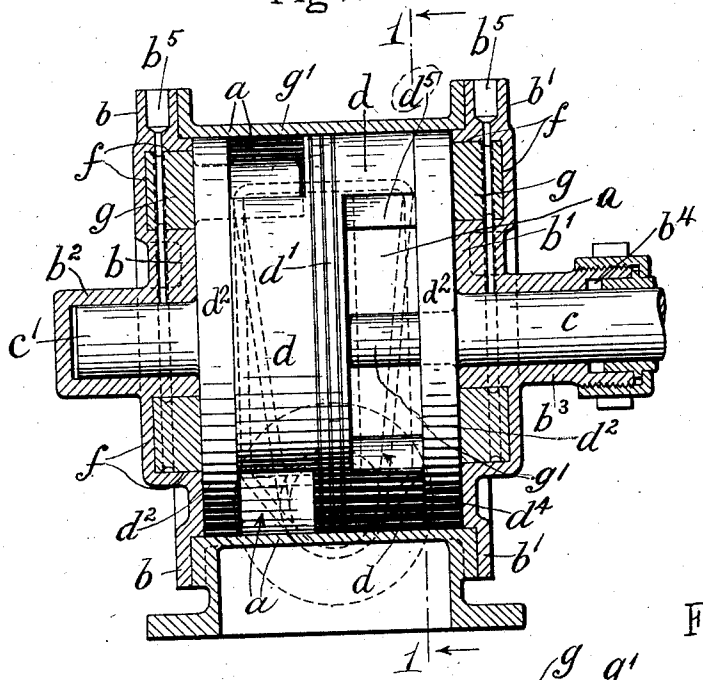


Fig. 4

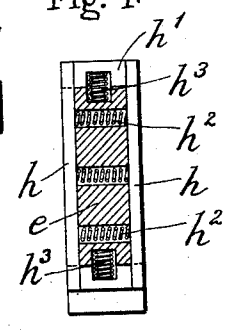


Fig. 7

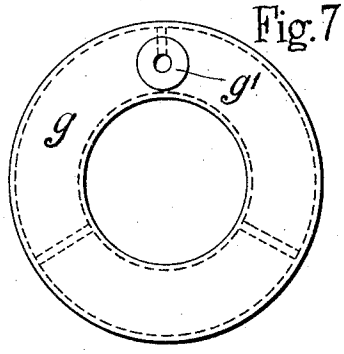
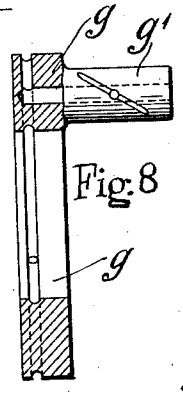


Fig. 8



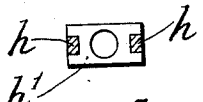


Fig. 5

Fig. 6

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3 SHEETS—SHEET 3.

Fig. 9

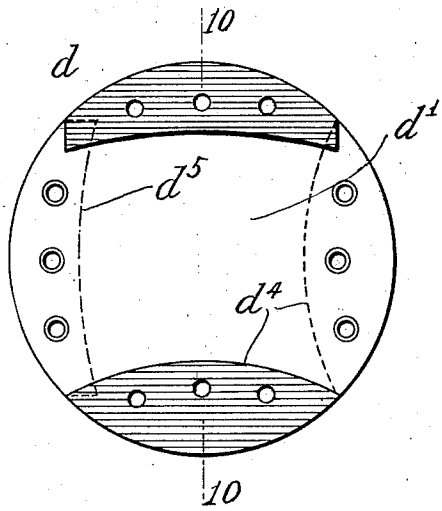


Fig. 10

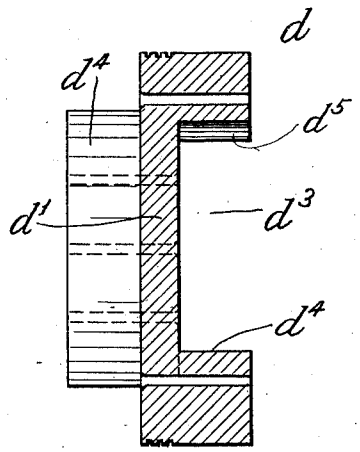
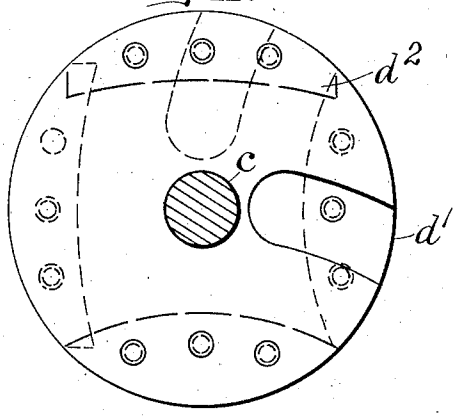


Fig. 11.



Witnesses.

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UNITED STATES PATENT OFFICE.

FREDERICK LAMPLOUGH, OF LONDON, ENGLAND, ASSIGNOR TO LAMPLOUGH AND SON, LIMITED, OF WILLESDEN JUNCTION, ENGLAND.

VALVELESS ROTARY PUMP.

1,044,195. Specification of Letters Patent. Patented Nov. 12, 1912.

Application filed October 21, 1910. Serial No. 588,274.

To all whom it may concern:

Be it known that I, FREDERICK LAMPLOUGH, a subject of the King of Great Britain, residing at London, England, have invented a new and useful Valveless Rotary Pump, of which the following is a specification.

The invention has for its object an improved valveless rotary pump consisting of the novel arrangement and combination of parts hereinafter described and represented in the accompanying drawings, in which:—

Figure 1 is a vertical section through the pump body or casing on the line 1—1 of Fig. 3, showing some of the internal rotating parts in elevation. Fig. 2 is a vertical section on the line 2—2 of Fig. 1, showing some of the rotating parts in elevation the pistons being omitted. Fig. 3 is a sectional plan of the casing on the line 3—3 of Fig. 1. Fig. 4 is a central vertical section of one of the pistons showing the arrangement of the packing pieces. Fig. 5 is an underside view of the upper end packing piece. Fig. 6 is a horizontal section of one of the pistons, and Figs. 7 and 8 are respectively a side view and a vertical cross section of one of the eccentric rings with its pin for giving motion to a piston. Fig. 9 is an elevation of a central division wall carrying the guides for the pistons the end wall being omitted. Fig. 10 is a section on the line 10—10 of Fig. 9. Fig. 11 is an end elevation of the guides for the pistons showing the driving shaft in section.

In carrying the invention into effect a cylindrical pump body or casing a is employed, which is provided with removable end covers b, b', each of which is formed with a bearing b^2 or b^3, the bearing b^2 being closed at the outer end, while the bearing b^3 is provided with a stuffing box b^4, as is well known.

c is the driving shaft, on which is formed or fixed a cylindrical rotating yoke or body d which fits on its periphery the cylindrical portion of the pump body or casing and against the end covers b, b'. This rotating yoke or body d is formed with a central cylindrical division d' and with end walls d^2 between which are formed spaces d^3 at right angles to each other and which are open at the ends and are bounded on each side of the axis with convex and concave sliding surfaces d^4, d^5, struck from the same center. The end walls d^2 are riveted to the part d as seen in Fig. 11. The rivet holes in the part d are seen in Figs. 9 and 10.

The driving shaft c projects from one of the end walls d^2 and passes through the bearing b^3 and stuffing box b^4, while a neck or trunnion c' in the axial line of the driving shaft projects from the other end wall d^2 and is carried by the bearing b^2.

Within the spaces d^3 are fitted reciprocating pistons e having curved surfaces corresponding with and fitting against the surfaces d^4, d^5. Each piston e near its periphery is fitted with a bush or sleeve e', one end of which projects on one side of the piston.

Within each end cover is formed an eccentric ring-shaped housing f, within which is fitted a rotating ring g, and each of said rings is formed or fitted with a pin g' fitting within the bush or sleeve e' of one of the pistons e. Each end cover b, b', is fitted at b^5 with a lubricator, not shown, which lubricators supply oil to the rotating rings g, the pins g' and the bearings b^2, b^3, in said end covers.

The pistons e are fitted on the center lines of their flat and curved bearing surfaces with packing pieces h, h', fitting in suitable spaces and pressed outward respectively by springs h^2, h^3.

Each inlet and outlet passage a' is divided by a tapered division a^2 extending from the cylindrical body a to a suitable distance.

The pump is reversible and one passage a' is the inlet when the shaft c is driven in one direction, and the other passage a' is the inlet when the shaft c is driven in the other direction. Whichever passage a' is the inlet, the other passage a' is the outlet.

The working of the pump above described is as follows:—As the yoke or body d is rotated, the pistons e rotate with it and in addition reciprocating motion is imparted to the two pistons e guided by the curved faces d^4, d^5. The reciprocating motion is imparted by means of the pins g' on the rings g entering the bushes or sleeves e'. Each endwise movement of each piston e produces a suction and a delivery stroke, the suction taking place at one end of the piston and the delivery at the other end of the piston. The suction and delivery parts a' coincide at one part of the rotation of the yoke d with the openings in the periphery of the

yoke or body d as shown in Fig. 1. At each end of the stroke of the piston the yoke d will close the suction and delivery ports; at that point the action of the piston is reversed, that is to say, the end of the piston which has just completed the delivery at the delivery port will commence drawing in a fresh charge of water from the suction port and the end of the piston which has produced the suction at the suction port will at the same moment commence delivery at the delivery port. As there are two pistons a quadruple action is obtained which is equivalent to a pair of double acting pumps with four suction and four delivery valves, that is to say, at every half revolution of the improved pump two suctions and two deliveries will take place. If desired a pump may be arranged in a similar manner to the above but having only one piston e. In this case only a single eccentrically mounted ring g carrying a pin g' operates the piston e and the central division d' of the yoke or body d is dispensed with as it is unnecessary.

What I claim is:—

1. In a valveless rotary pump having a cylindrical body or casing, an inlet and an outlet passage on opposite sides of said casing, removable end covers to the casing, a bearing closed at the outer end on one end cover, an open ended bearing fitted with a stuffing box on the other end cover and a driving shaft mounted in said bearings, the combination therewith of a rotating yoke or body fixed on the driving shaft and fitting within the cylindrical portion and ends of the pump casing, a piston housing space having two curved and two flat faces in said yoke or body, the curved faces to said space being struck from the same center, a curved piston fitting and sliding within said space, an eccentric ring shaped housing on the inner side of each end cover, a rotating piston operating ring within said housing and a pin formed integral with said ring fitting a sleeve on the piston.

2. In a valveless rotary pump having a cylindrical body or casing, an inlet and an outlet passage on opposite sides of said casing, removable end covers to the casing, a bearing closed at the outer end on one end cover, an open ended bearing fitted with a stuffing box on the other end cover and a driving shaft mounted in said bearings, the combination therewith of a rotating yoke or body fixed on the driving shaft and fitting within the cylindrical portion and ends of the pump casing, a central cylindrical division in the yoke or body, cylindrical end walls to said yoke or body, two piston housing spaces at right angles to each other between the central division and the end walls of the rotating yoke or body, curved faces to said spaces struck from the same center, curved pistons fitting and sliding within said spaces, an eccentric ring shaped housing on the inner side of each end cover, rotating piston operating rings fitting within said housings, and a pin formed integral with each of said rings fitting a sleeve on each of the pistons.

In witness whereof I have hereunto set my hand in presence of two witnesses.

FREDERICK LAMPLOUGH.

Witnesses:

RIPLEY WILSON,

WM. GIRLING.