F. LAMPLOUGH.

ROTARY MOTOR, PUMP, AND THE LIKE.

APPLICATION FILED MAY 22, 1908.

953,474.

Patented Mar. 29, 1910.

2 SHEETS—SHEET 1.

Fig:1

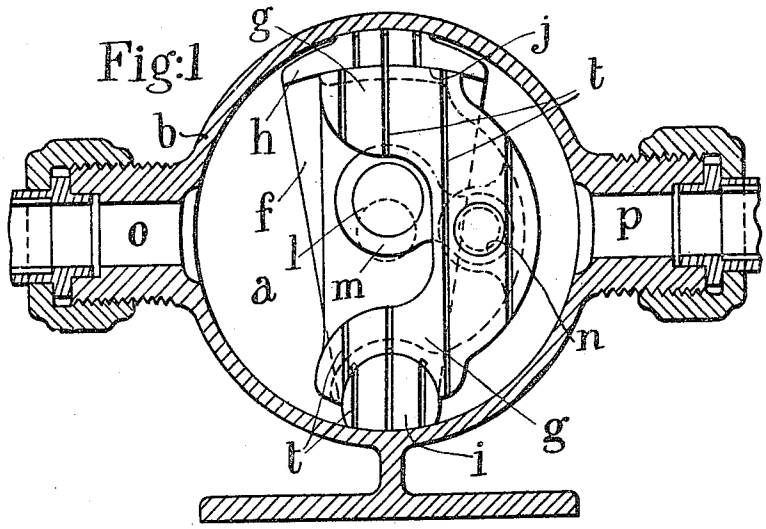
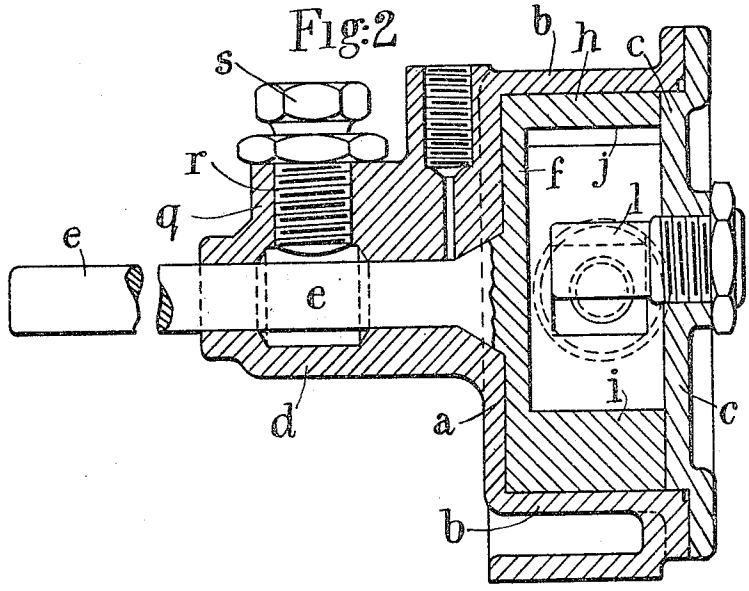


Fig:2



Witnesses,
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2 SHEETS—SHEET 2.

Fig: 3

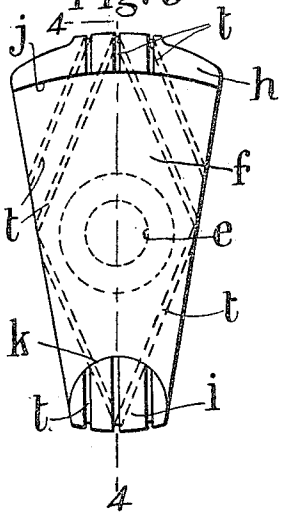


Fig: 4.

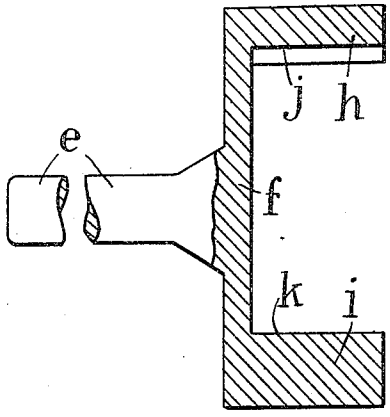


Fig: 5

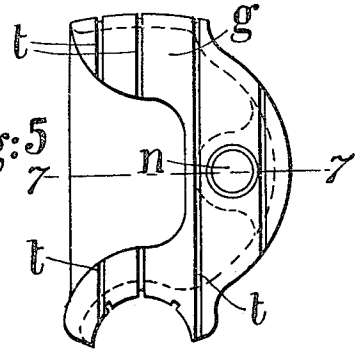


Fig: 6

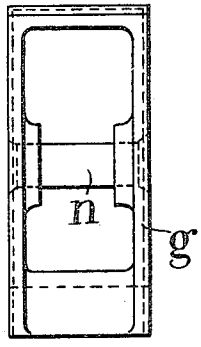
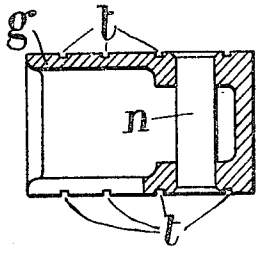


Fig: 7



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UNITED STATES PATENT OFFICE.

FREDERICK LAMPLOUGH, OF LONDON, ENGLAND.

ROTARY MOTOR, PUMP, AND THE LIKE.

953,474. Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed May 22, 1908. Serial No. 434,321.

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 new and useful Improvements in Rotary Motors, Pumps, and the Like, of which the following is a specification.

The invention has for its object improvements in rotary motors, pumps and the like.

The improved motor, pump or the like, which I will hereafter refer to as a pump, comprises, as has heretofore been proposed, a hollow cylinder, a rotating shaft, a sleeve like extension or bearing on one cover of the cylinder to receive the rotating shaft, a disk or cross piece on said shaft fitting against one cover of the cylinder, diametrically opposite arms or projections on said disk or cross piece extending across and closely fitting against the inner periphery of the cylinder, a rotating and oscillating piece or piston mounted on a fulcrum or center of motion formed on one of said arms or projections and closely fitting against the concave face of the opposite arm or projection, and a pin fixed in the removable cover of the cylinder to give the oscillating motion to the rotating and oscillating piece or piston.

As hitherto constructed the rotating and oscillating piece or piston was formed with a central longitudinal slot working directly on the fixed pin, but it is found that such construction gives a very injurious spasmodic motion to the oscillating piston.

According to the present invention means are provided in order to obtain an even vibration or oscillation of the piston, a special construction of the piston is devised to enable such oscillating mechanism to be used, an improved construction of the fulcrum arm and of the coacting part of the piston is provided in order to obtain greater strength, and the outer faces of the arms or projections are each of such width as to completely close the ports of the cylinder at the conclusion of each stroke.

I will describe my invention by the aid of the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section and Fig. 2 is a vertical transverse section of my improved rotary pump; Fig. 3 is a face view or elevation and Fig. 4 is a sectional view drawn on the line 4—4 of Fig. 3, of the part of the piston which is fixed to the rotating shaft and Fig. 5 is a face view or elevation, Fig. 6 an elevation drawn at right angles to Fig. 5, and Fig. 7 is a horizontal section drawn on the line 7—7 of Fig. 5 of the oscillating portion of the piston.

The body of the pump consists, as heretofore, of a hollow cylinder *a*, *b*, *c*, having a sleeve-like extension or bearing *d* on the fixed cover *a*, while the other cover *c* is removable. To this body is fitted, as heretofore, a rotating shaft *e* which has attached to it a piston consisting of a disk or cross piece *f* and an oscillating piece *g* rotating with it. The back of the disk or cross piece *f* fits, as heretofore, against the fixed cover *a* of the cylinder and it carries, as heretofore, diametrically opposite arms or projections *h*, *i*, which extend across the inner periphery *b* of the cylinder to the inner face of the removable cover *c* and are shaped truly to fit against such parts. The projection *h* is, as heretofore, formed concavely cylindrical on the inner face *j*, but the projection *i*, instead of being concave as has heretofore been proposed is according to the present invention formed convex on its inner face *k* to a radius struck from the same center as that from which the concavely cylindrical inner face *j* of the projection *h* is struck by which means greater strength is obtained. In combination with this cross piece *f* and its arms or projections *h*, *i*, is the oscillating piece or piston *g*, which, instead of being constructed, as heretofore, with a central longitudinally slotted web to receive a pin fixed in the removable cover, is according to my invention formed of a trough-like cross section with a portion of one cheek removed in order to permit of its oscillation without coming into contact with the fixed pin *l*. This oscillating piece or piston *g* is also according to my invention hollowed out at one end to truly fit the convex cylindrical projection *i*, thereby affording a large bearing surface and greatly increasing its strength at such part. The other end of the oscillating piece *g* is, as has heretofore been proposed, formed of a similar radius to that of the interior concave cylindrical face *j* of the projection *h* which it truly fits, and is made on one side to fit truly against the inner face of the cross piece *f* and on the other side against the inner face of the removable cover *c*. A fixed pin *l* is, as heretofore, carried by the removable cover *c* at a short distance from the

center of said cover. On this pin *l*, according to the present invention, is placed one end of a link *m*, which is housed within the hollow piston *g* and the other end of which is placed on a cross pin *n* fixed in the sides of the oscillating piston *g* and extending across the same from one side to the other thereof.

By this arrangement of parts for giving the oscillating motion to the piston *g*, an even vibration is given to the latter, instead of the spasmodic motion which it would receive if the fixed pin were caused to enter a slot in such piston *g* as has heretofore been proposed.

The body of the pump, as heretofore, is provided on its periphery *b* with diametrically opposite ports *o*, *p*, and those parts of the outer faces of the arms or projections *h*, *i*, which are in contact with the cylinder are, according to my invention, each of width to completely close such ports at the conclusion of each stroke, that is to say, twice in each revolution.

The sleeve-like extension or bearing *d* for the rotating shaft *e* is provided with a stuffing box *g* which has a lateral opening *r* into which a gland *s* is screwed.

The faces of the cross piece *f* and of its arms or projections *h*, *i*, which bear against the covers *a*, *c*, and inner periphery *b* of the pump body, are provided with grooves *t* such as are known as hydraulic water joints, and the outer faces of the sides and ends of the oscillating piece *g* are also provided with similar grooves.

The action of the pump can be reversed by reversing the position of the removable cover *c* so as to place the fixed pin *l* on the opposite side of the axis of the pump. Thus, while revolving in only one direction, the pump can be made to pump either way at will.

As the outer faces of the piston arms or projections move over the ports *o*, *p*, another cycle of the rotation commences with a fresh suction and delivery stroke, that is to say, the pump has two suction and two delivery strokes for each revolution of the piston.

The application of the above construction to a motor or the like will be readily understood.

What I claim is:

The combination in a rotary motor, pump or the like, having a hollow cylinder formed with a fixed cover, a removable cover having an eccentric pin fixed thereto, a rotating shaft, a sleeve-like bearing for the rotating shaft, diametrically opposite ports on the periphery of the cylinder, a cross piece on the rotating shaft adjacent the fixed cover, diametrically opposite arms on such cross piece extending across the periphery of the cylinder to the removable cover and truly fitting such parts, of an oscillating piston having a cavity and fitting against the inner face of the cross piece and against the arms or projections and the removable cover, a cross pin fixed in the cheeks of the oscillating piston, a link fitting the fixed eccentric pin and the cross pin, and a recess in one of the cheeks of the oscillating piston to enable the latter to free the fixed eccentric pin in working, substantially as herein set forth.

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

FREDERICK LAMPLOUGH.

Witnesses:
B. J. B. Mills,
Wm. Girling.