No. 658,364. Patented Sept. 25, 1900.

H. A. & R. J. HANCOX.

ROTARY PUMP.

(Application filed Jan. 16, 1900.)

(No Model.)

Fig 1.

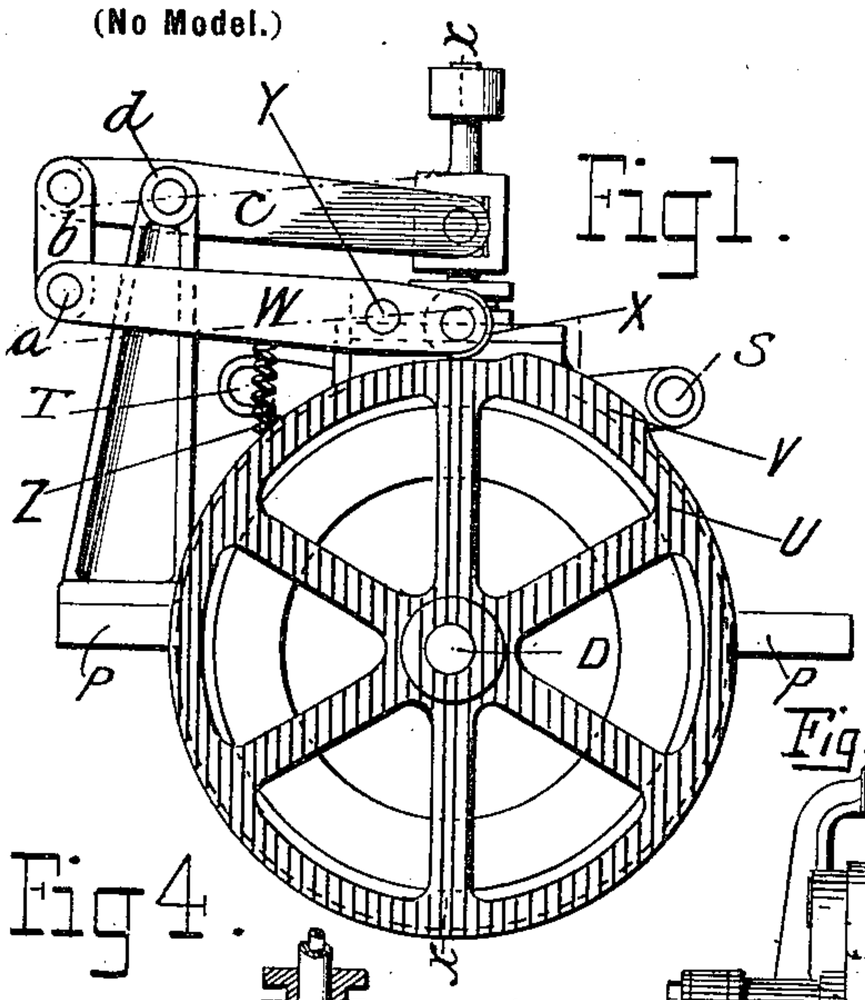


Fig 2.

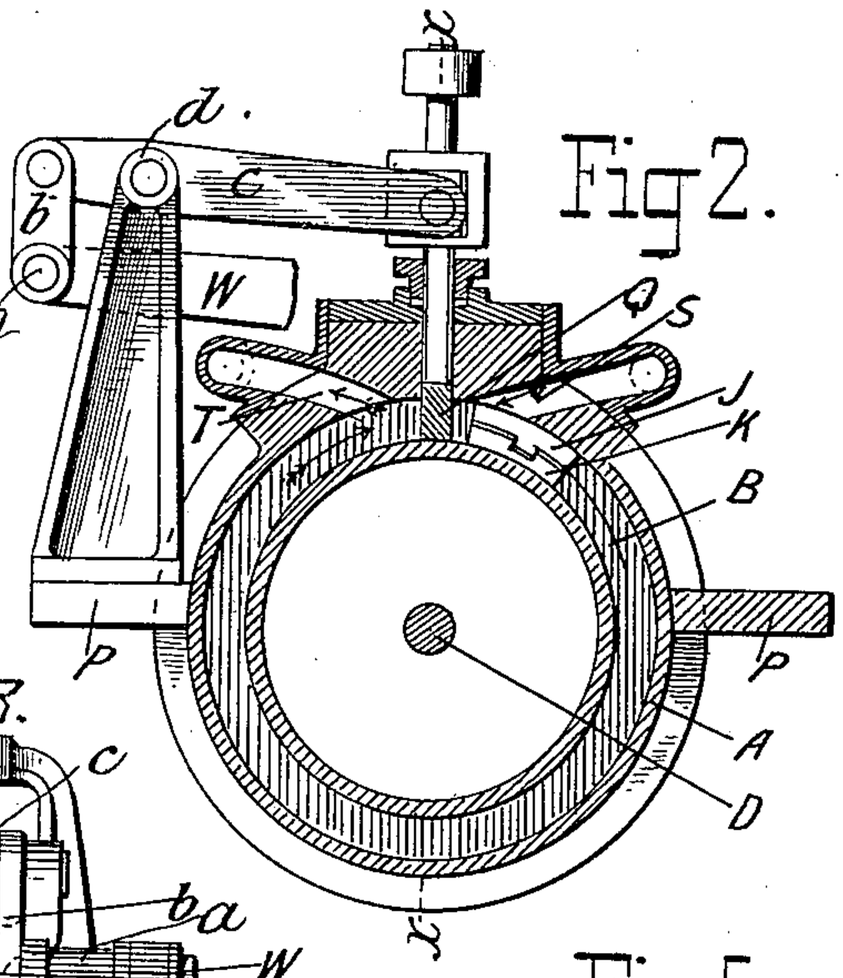


Fig. 3.

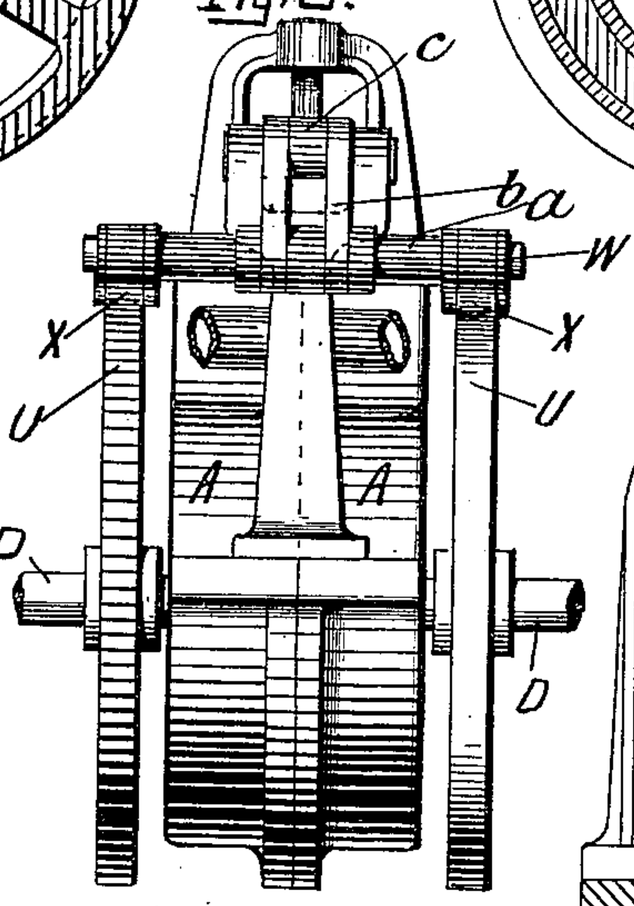


Fig 4.

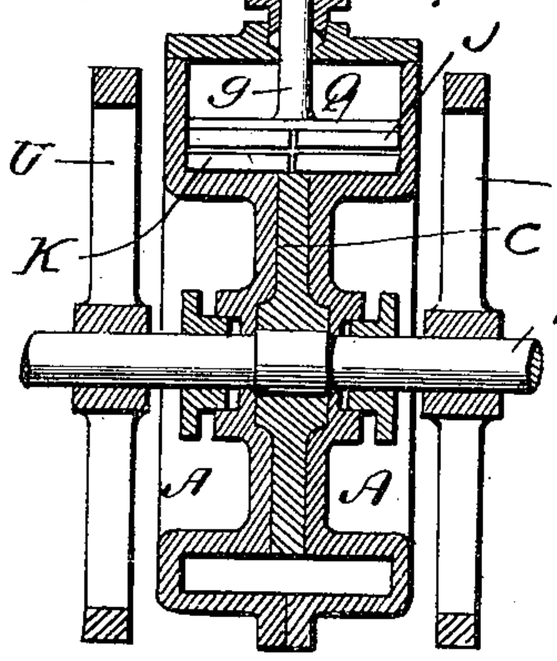


Fig 5.

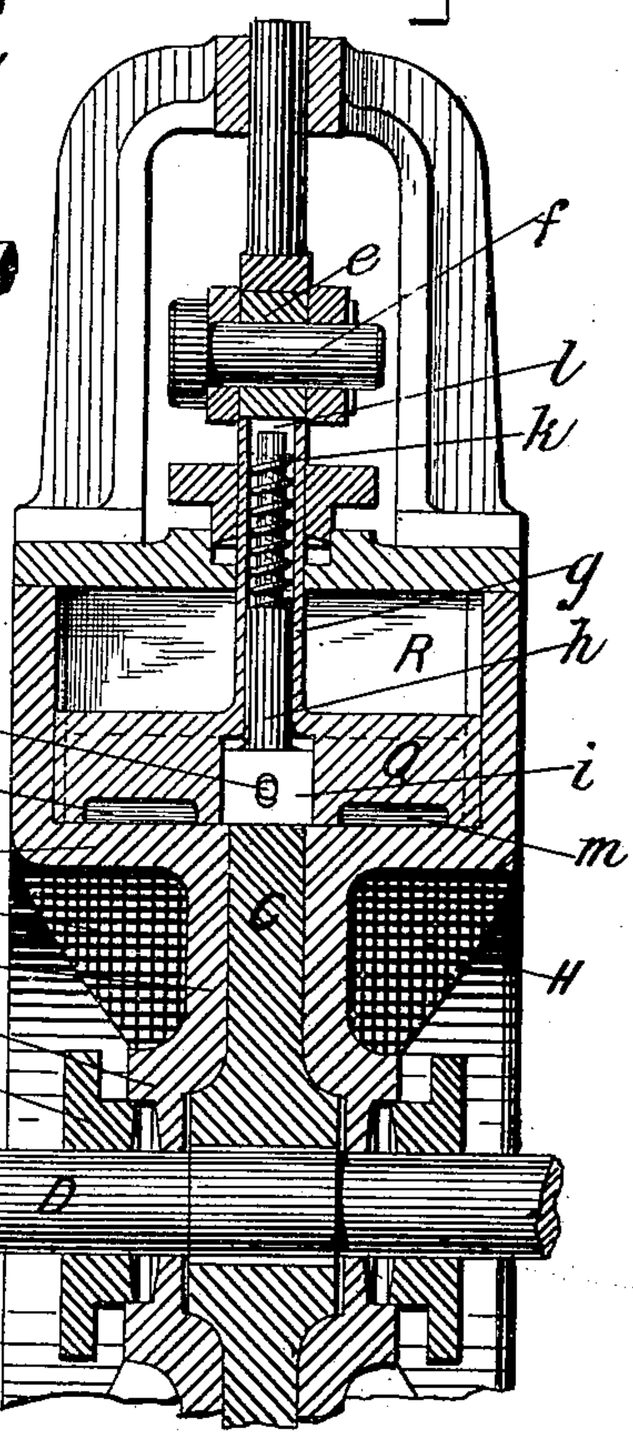


Fig 6

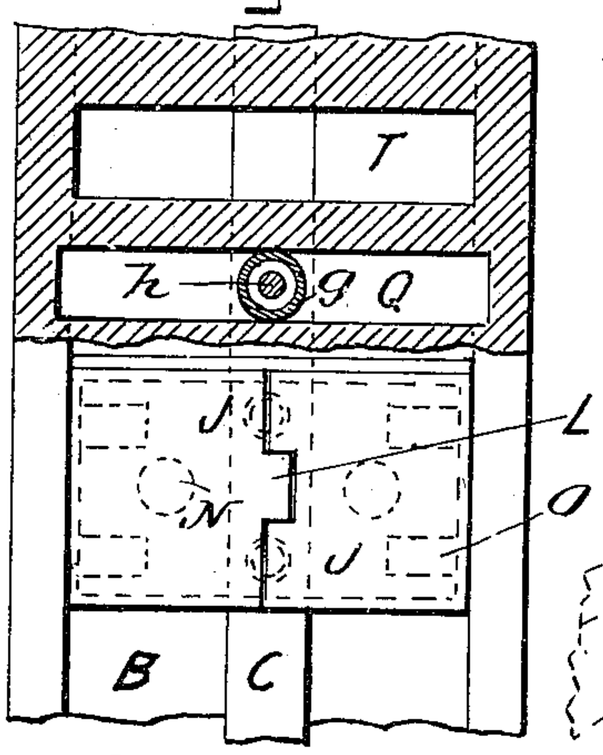


Fig 7.

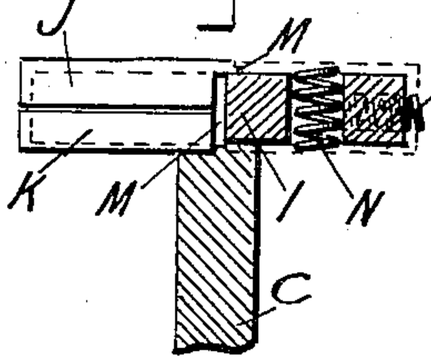
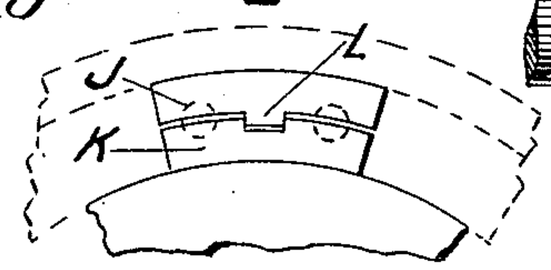


Fig 8.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY ALEXANDER HANCOX AND ROBERT JAMES HANCOX, OF SYDNEY, NEW SOUTH WALES.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 658,364, dated September 25, 1900.

Application filed January 16, 1900. Serial No. 1,709. (No model.)

To all whom it may concern:

Be it known that we, HENRY ALEXANDER HANCOX, draftsman, and ROBERT JAMES HANCOX, engineer, subjects of the Queen of Great Britain and Ireland, and residents of No. 151 Mansfield street, Balmain, Sydney, in the Colony of New South Wales, have invented a certain new and useful Improved Rotary Pump, of which the following is a specification.

The object of this invention is to improve the construction and mode of operating rotary pumps, and comprises the use of a rotary disk whose piston is made expandible by means of concealed springs to insure its neatly and accurately fitting the annular chamber in which it rotates, such annular chamber being constructed with a divided outer casing, which also incloses the piston-disk. In combination with the said rotary piston an automatically-operated slide is used whose central spindle is chambered to receive an impulse-rod operated by an encircling spring, the said slide being associated with operating-levers which derive their motion from rotary cams secured to the spindle which carries the piston-disk. Suitable inlet and discharge pipes and orifices are provided in close proximity to the aforesaid slide. In the casing of the annular chamber suitable covers are provided to give access to the piston when desired. These pumps are alike serviceable for air and water.

Referring now to the accompanying drawings, which form part of this specification, and in which similar letters are used throughout the different views to indicate similar parts, Figure 1 is an end elevation of a rotary pump constructed with these improvements. Fig. 2 is a transverse section of Fig. 1 with one-half of the casing removed to show rotary piston, slide, and inlet and delivery ports. Fig. 3 is a side elevation showing mechanism for operating radial slide. Fig. 4 is a cross-section on line *x x* of Figs. 1 and 2. Fig. 5 is a sectional detail showing casing and radial slide in association with piston-disk. Fig. 6 is a detail, partly in section and plan, showing piston and radial slide in position and delivery-port. Fig. 7 is a detail, partly in section and elevation, showing piston-block and covering-plates. Fig. 8 is a side elevation of Fig. 7, showing portion of a rotary disk with piston attached.

The outer casing A (shown divided centrally) is provided with accurately-fitting flanges securely bolted together. The annular chamber B, forming part of the said casing, is bored to receive a rotary piston consisting of the disk C, keyed to the spindle D, which revolves in the stuffing-boxes E and the glands F. The boxes form an essential part of the outer casing A, which not only serves the purpose of an annular chamber, but by means of the sides G provides for incasing the disk C, which is thus rendered practically air or water tight. The stiffening-ribs H assist in giving rigidity to the casing. To the disk C is suitably attached the piston-block I, (*vide* Fig. 7,) which may be removed, if desired, and is incased with the detachable and adjustable top and bottom covering-plates J and K, provided with the tongues L at both sides and top and having accurately-fitting overlapping margins M to provide a tightly-fitting piston, which when rotating in the annular chamber B will press equally against the rubbing-surfaces and prevent the escape of the fluid. To provide for the continuous contact of the piston-plates, the piston-block I is pierceed with openings for the vertical springs N and the side springs O. (*Vide* Fig. 7 and also shown dotted in Figs. 6 and 8.)

The outer casing A is provided with foot-plates P, which serve as a support for the pump. In any convenient part of such casing openings are provided having suitable covers to give access to the annular chamber for the removal of the piston, of which there may be more than one, if desired. The annular chamber B is divided by means of the radial slide Q, running in its chamber R, which is used to separate the inlet-port S from the outlet-port T. The said radial slide is made to travel by means of the cam U, attached to the spindle D and made, preferably, in halves. The raised surface V is suitably located relatively to the piston, so as to insure the raising of the radial slide Q in ad-

vance of the piston as it rotates. The bottom levers W, carrying friction-rollers X, are suitably pivoted upon the pins Y, the side springs Z serving to keep the aforesaid rollers in contact with the cam-faces. The levers W are united by the cross-spindle *a*, the links *b* connecting the cross-spindle to the top lever *c*, which is supported in the bearing *d* and connected to the lever-block *e* by the pin *f*. The radial slide Q, which is used to temporarily close the annular chamber B, is conected to the hollow stem *g*, (*vide* Fig. 5,) which receives the spindle *h* of the slide-block *i*, having a retaining-pin *j*. The said block is intended to accommodate itself to bear upon the circumferential part of the piston-disk C. The spring *k* is used to operate the slide-block *i* and is retained in position by means of the cap *l*, covered by the lever-block *e*. The cavities *m* in the radial slide Q are provided to retain the fluid which enters them during the downward stroke. These cavities are two in number, of equal size, and arranged on opposite sides of a radial line passing through the piston-disk and the stem of said slide and coinciding with the axis or central line of the latter.

The action of the pump is as follows: In Fig. 2 the piston is shown in advance of the radial slide Q, by which the annular chamber B is closed, to permit of the fluid entering the inlet-port S. As the piston advances in the direction indicated by the arrow the fluid will fill the annular chamber in rear of the piston and will continue to do so until a complete circuit has been made, and as the piston reaches the rearward side of the radial slide the cams U begin to operate and cause the levers W and *c*, which are in association with the radial slide Q, to lift it clear of the annular chamber B, and thus allow the piston to pass. It immediately reseats itself by means of the action of the springs Z, and the fluid again enters by the passage S; but the previous quantity of the fluid will then be on the reverse side of the piston and when another revolution has been made will be discharged through the aperture T. Similar action will take place whether the pump be used for air or water.

Having now described our invention, we desire to state that we are aware that a rotary pump having an annular chamber is not in itself novel, but when combined with the distinctive features herein set forth greater efficiency is obtained than heretofore.

Therefore what we consider novel, and desire to secure by Letters Patent, is—

1. In rotary pumps having an annular chamber and inlet and outlet passages, a radial slide reciprocating in said chamber between the said passages and provided with cavities and a central tubular stem, in combination with cams and levers for operating the said slide, a slide-block, a spindle attached to the said block and a spring encircling the said spindle, the said spring and spindle being within the said stem, substantially as set forth.

2. In rotary pumps having an annular chamber and inlet and outlet passages, a radial slide reciprocating in said chamber between said passages and provided with cavities and a central stem, in combination with cams and levers for operating the said slide, a slide-block, a spindle attached to the said block, a spring encircling the said spindle and acting on the said slide-block, and a cap retaining the said spring in position, substantially as set forth.

3. In rotary pumps having an annular chamber and inlet and outlet passages, a radial slide reciprocating in the said chamber between the said passages and having a central tubular stem, in combination with a slide-block, a spindle attached to the said block and a spring encircling the said spindle, the said spindle and spring being within the said stem, substantially as set forth.

In witness whereof we have hereunto set our hands in presence of two witnesses.

HENRY ALEXANDER HANCOX.
ROBERT JAMES HANCOX.

Witnesses:
JOHN J. STONE,
LESLIE L. PHILLIPS.