T. J. LOFTUS.

ROTARY PUMP.

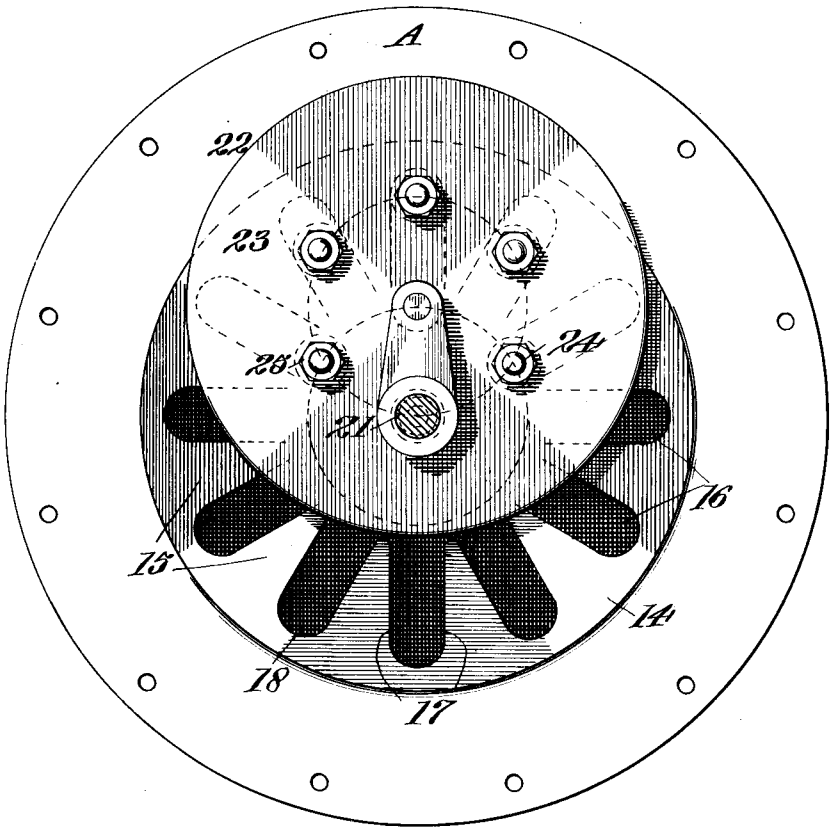
APPLICATION FILED JULY 12, 1915.

1,183,309.

Patented May 16, 1916.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Charles Rokes

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2 SHEETS—SHEET 2.

Fig. 2.

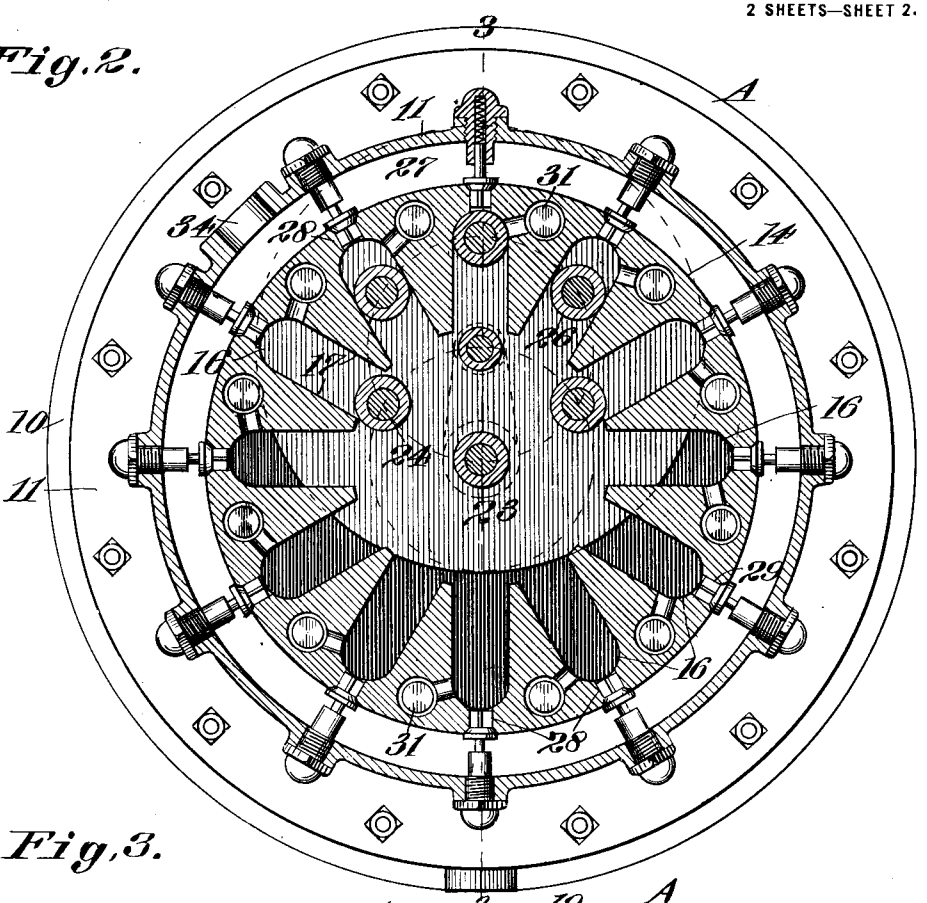
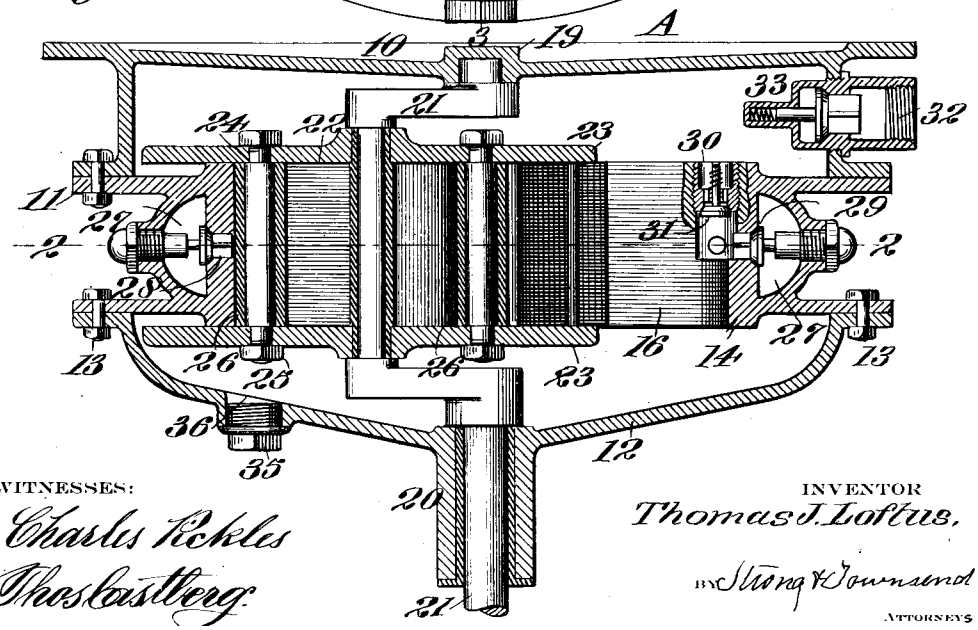


Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS J. LOFTUS, OF CASTELLA, CALIFORNIA, ASSIGNOR OF ONE-HALF TO HARMON BELL, OF OAKLAND, CALIFORNIA.

ROTARY PUMP.

1,183,309. Specification of Letters Patent. Patented May 16, 1916.

Application filed July 12, 1915. Serial No. 39,282.

To all whom it may concern:

Be it known that I, THOMAS J. LOFTUS, a citizen of the United States, residing at Castella, in the county of Shasta and State of California, have invented new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention relates to rotary pumps, and has for its object to provide a novel device of this nature which will be simple in construction and highly efficient in operation. I accomplish this object by the use of epicyclic gearing, the cavities between the internal teeth of one of the gears forming chambers and the teeth of the other gear forming pistons to operate in said chambers, and controllable means in communication with each of the chambers, whereby a pumping action is obtained when the gearing is driven.

One form which my invention may assume is exemplified in the following description and illustrated in the accompanying drawings, in which—

Figure 1 shows a plan view of the device, with the cover plate removed. Fig. 2 shows a circumferential, sectional view of the same, taken on the line 2—2 of Fig. 3. Fig. 3 shows a vertical, central, sectional view of the device in inverted position.

Referring in detail to the form of my invention illustrated, it will be seen that it comprises a casing A, cylindrical in form and preferably formed in three parts, namely, a base plate 10, an intermediate portion 11, and a cover plate 12, all flanged and detachably connected by bolts 13. The intermediate portion has a ring 14 integrally formed thereon and provided with internal teeth 15, tapered in such a way as to form between them elongated cavities 16 having parallel faces 17 and curved end portions 18.

Journaled in a closed end bearing 19, formed in the bottom plate 10, and in an elongated hub 20, formed on the cover plate, is a crank-shaft 21 carrying a lantern gear 22 in mesh with the internal toothed ring. The lantern gear has opposite face-plates 23 embracing the sides of the teeth 15 and held in close sliding engagement therewith by means of transverse pins 24 fitted with taps 25, and carrying rollers or sleeves 26 which form the teeth of the lantern gear and operate in the cavities 16 after the manner of pistons.

An annular water chamber 27 surrounds the ring 14; and a port 28, formed in the ring and fitted with a one-way valve 29, establishes communication between the water chamber and each of the cavities 16, and, as at present operated, serves as a discharge port. Transversely of the ring, in the side thereof adjacent to the face of each tooth 15, is a port 30 fitted with a one-way valve 31, and opening into the adjacent cavity, forming, as at present operated, an inlet port to communicate with the interior of the casing A and each cavity. A main inlet port 32 is provided in the side of the bottom section 10 and is fitted with a suction valve 33 controlling the admission of water to the interior of the casing and a main outlet 34 is formed in the side of the intermediate portion 11 in communication with the annular water chamber 27 and the exterior of the casing. A priming opening 35 is preferably formed in the top plate 12 and fitted with a screw plug 36, being useful to permit the introduction of water to the pumping parts whereby to facilitate starting.

In the operation of this device, the crank-shaft 21, being rotated, will carry the lantern gear around in an epicyclic path; the teeth or rollers thereof meshing with the teeth 15 of the surrounding ring. As each roller starts to enter a cavity between the teeth 15, a piston fit occurs by reason of the engagement of the face-plates 23 with the sides of the adjacent teeth 15, acting to inclose the sides of the cavities. Then as the pin or roller travels outwardly toward the end of the cavity compression takes place which will force the air or water within the cavity through the valve 29 and into the surrounding chamber 27, from whence it will be discharged through the outlet 34. The return movement of the pin, as the lantern gear continues to rotate, will create a suction within the cavity, opening the valve 31 and permitting the admission of water or air to the cavity from the interior of the casing A; the supply of water in the casing being controlled by the valve 33.

In practice, I prefer to provide the ring 14 with twelve teeth and the lantern gear with six teeth. It must be seen that upon

each rotation of the crank-shaft 12 successive cycles of the piston pins will take place, resulting in a continuous pumping of water. This pump, I find, is positive in its action and operates without jar or vibration. Due to the provision of rollers for each of the pins of the lantern gear, friction between the parts is reduced to a minimum, inasmuch as the roller works upon opposite faces of the cavity in entering and withdrawing. The entire structure, it will be noted, is so arranged as to be readily accessible for adjustment and inspection.

While I have shown and described but one form of this device herewith, it will be understood, nevertheless, that the same is susceptible of modification, and, therefore, many changes in the construction and arrangement of the several parts may be resorted to without departing from the spirit of my invention as disclosed in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A rotary pump including a fixed internally toothed ring having elongated cavities with parallel faces between its radiating teeth, an epicyclic lantern gear in mesh therewith, each tooth of said gear having a piston fit within said cavities and the end plates inclosing the cavities, an annular water chamber surrounding the ring, valve controlled ports between the annular chamber and each tooth cavity, a water chamber at the side of the ring, and valve controlled ports between said chamber and each of the tooth cavities.

2. A rotary pump comprising a fixed internal toothed ring having parallel-faced, elongated chambers formed between its teeth, an epicyclic gear of the lantern type embracing the sides of said teeth and having its own teeth in mesh therewith, and inlet and discharge ports for each of said chambers.

3. A rotary pump comprising a fixed internal toothed ring having parallel-faced, elongated chambers formed between its teeth, an epicyclic gear of the lantern type in mesh therewith and comprising face-plates inclosing the sides of said chamber. transverse pins between said plates, rollers on said pins fitting closely within said chambers, and inlet and discharge ports for each of said chambers.

4. A rotary pump comprising a fixed internal toothed ring having parallel-faced, elongated cavities formed between its teeth, an epicyclic gear of the lantern type in mesh with said teeth and comprising face-plates inclosing the sides of said cavities, transverse pins between the plates, rollers on said pins fitting closely within said concavities, an annular water chamber surrounding said ring, a controllable port between the water chamber and each of the tooth cavities, a water chamber at the side of the ring, and a controllable port between said side chamber and each of the tooth cavities whereby, when the epicyclic gear is driven, a pumping action occurs.

5. A rotary pump comprising a casing, a ring fixed within said casing, internal, tapered teeth on said ring forming between them parallel-faced, elongated cavities, an epicyclic gear adapted to mesh with said teeth and comprising face-plates to inclose the sides of said cavities, transverse pins fitting closely within said cavities, an annular water chamber surrounding said ring, a discharge port between said chamber and each of the tooth cavities, and an inlet port in the side of said ring adjacent to each tooth cavity.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS J. LOFTUS.

Witnesses:
WILLIAM RUFFUS CONANT
HUGH C. NEWTON.