No. 872,133. PATENTED NOV. 26, 1907.

J. R. KINNEY.

ROTARY MOTOR.

APPLICATION FILED APR. 29, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

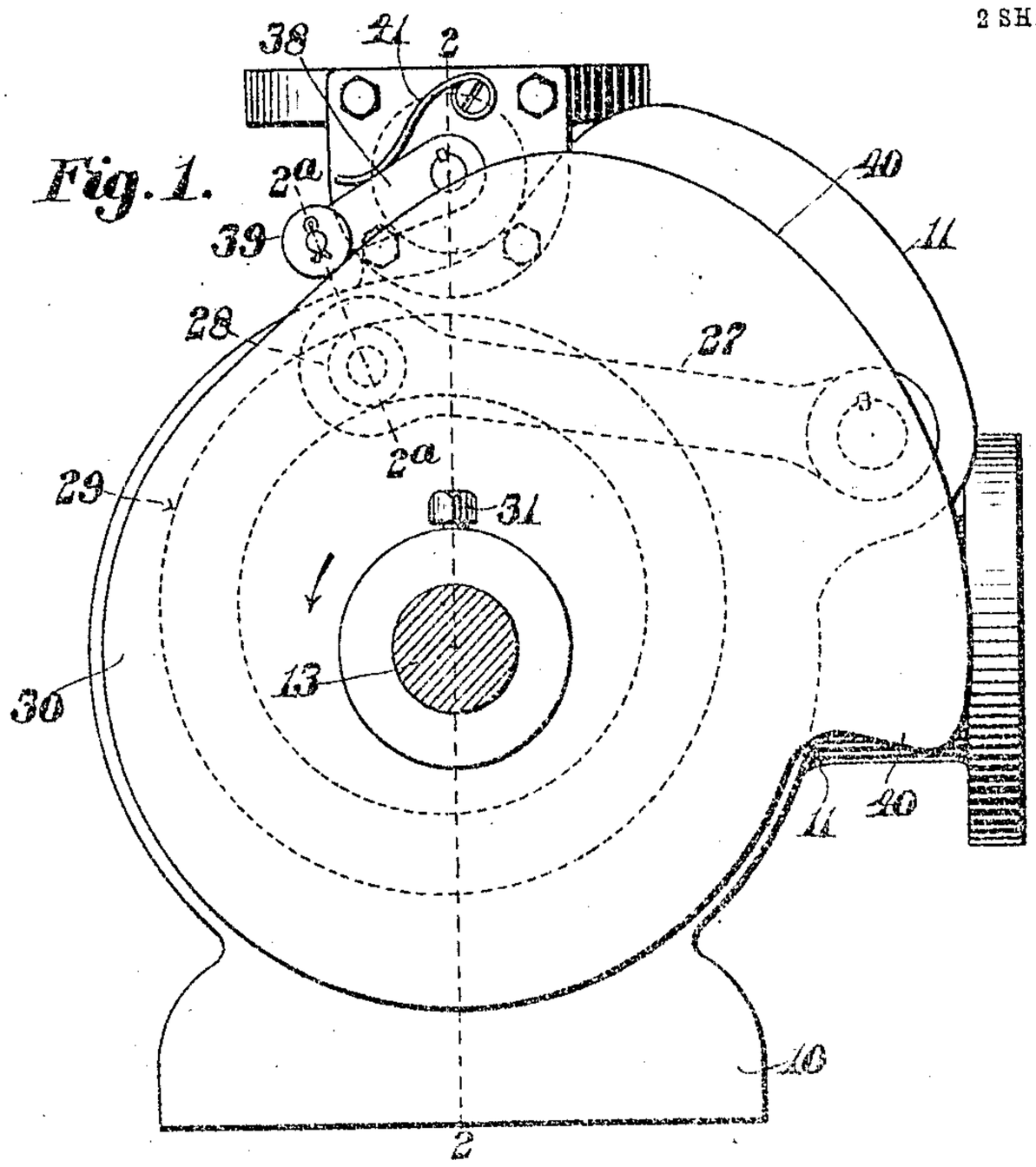
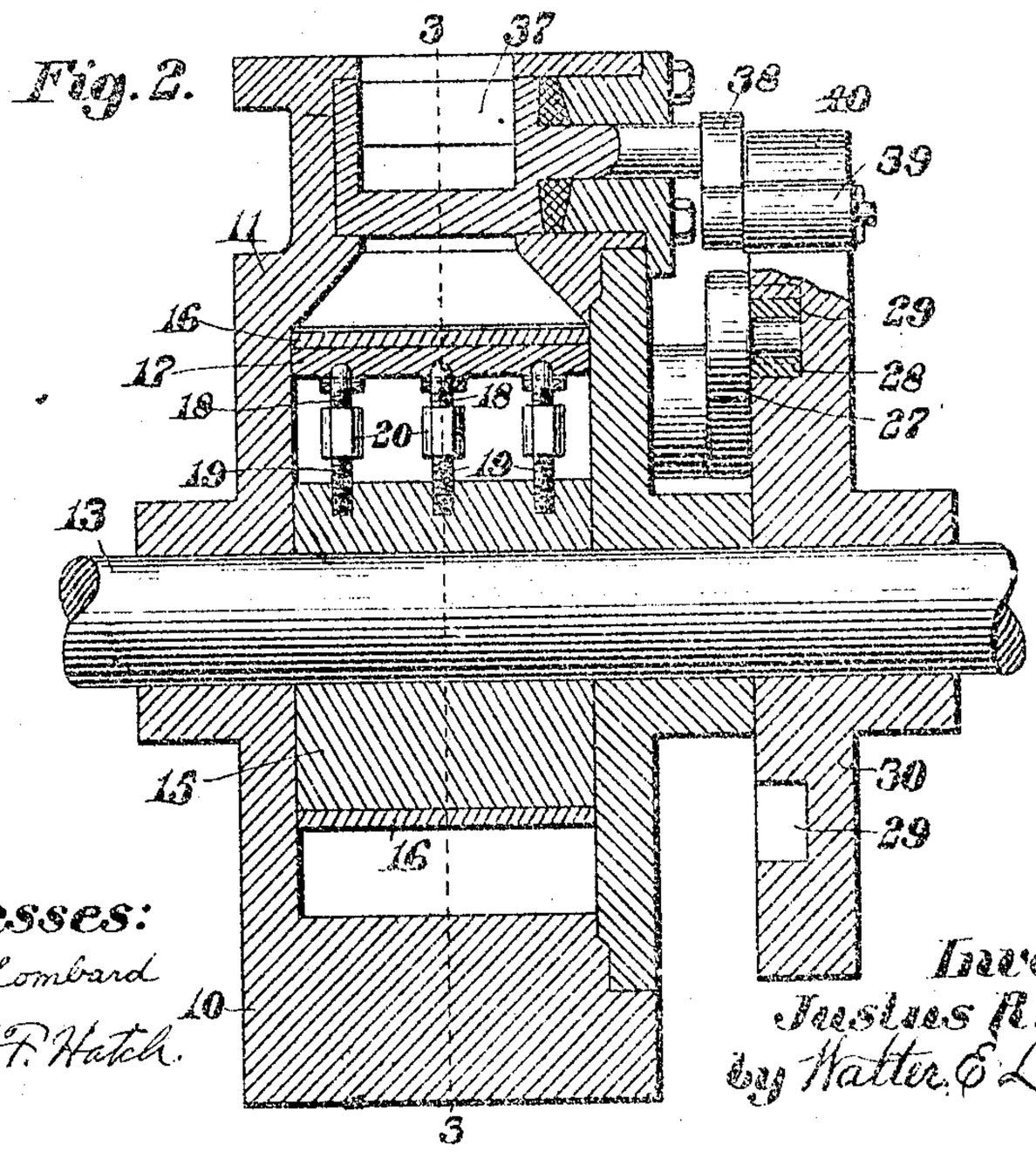


Fig. 2.



Witnesses:
Nathan C. Lombard
Roswell F. Hatch.

Inventor:
Justus R. Kinney,
by Hatter & Lombard,
Atty.

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2 SHEETS—SHEET 2.

Fig. 6.

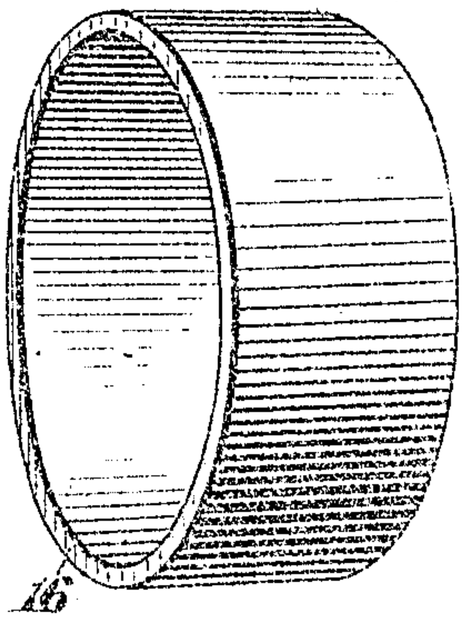


Fig. 5.

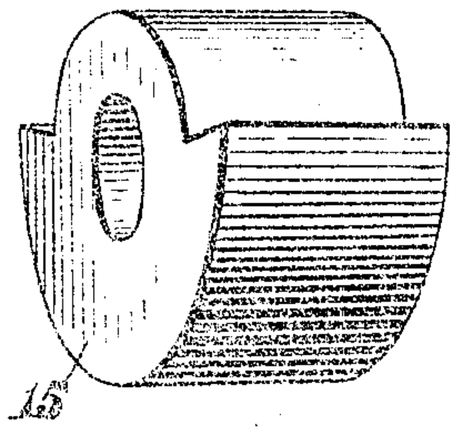


Fig. 4.

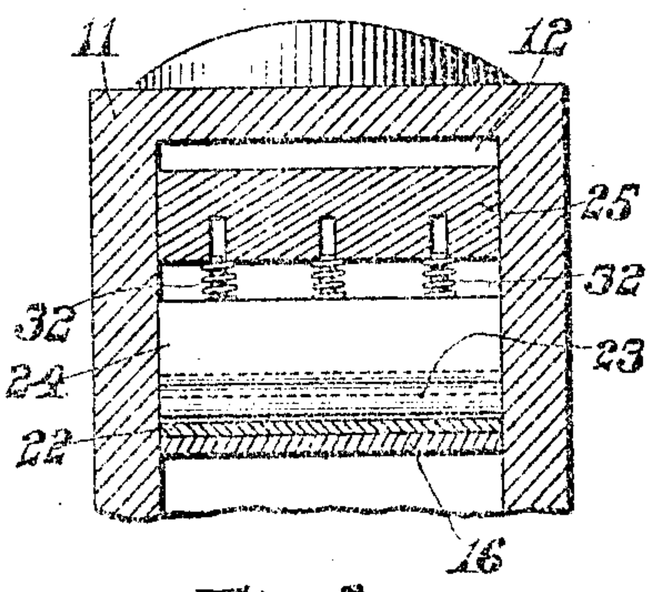
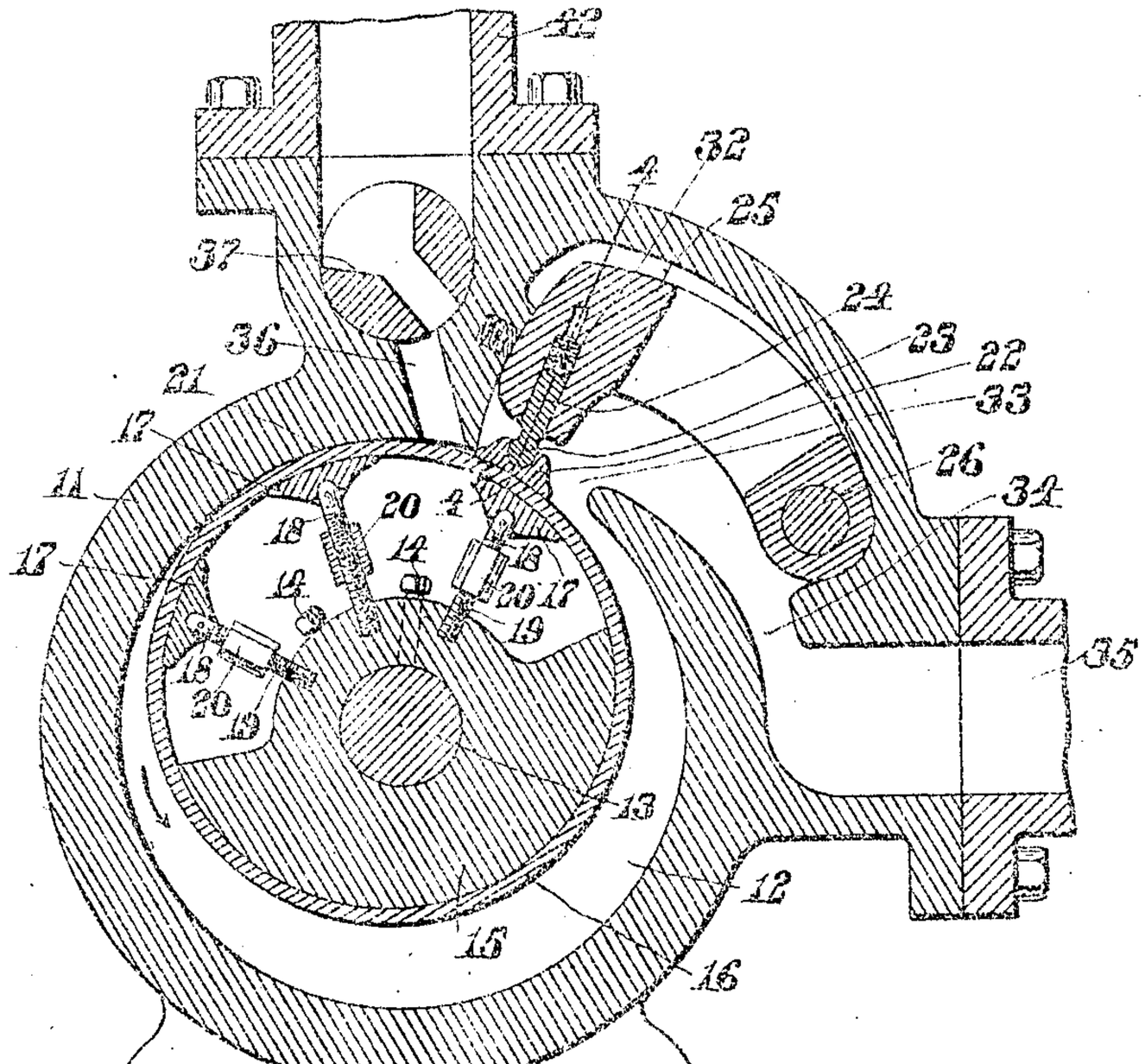


Fig. 3.



Witnesses:
Nathan C. Lombard
Pozerski F. Hatch.

Inventor:
Justus R. Kinney,
by Walter C. Lombard,
Atty.

UNITED STATES PATENT OFFICE.

JUSTUS R. KINNEY, OF DORCHESTER, MASSACHUSETTS.

ROTARY MOTOR.

No. 872,133. Specification of Letters Patent. Patented Nov. 26, 1907.

Application filed April 29, 1907. Serial No. 370,967.

To all whom it may concern:

Be it known that I, JUSTUS R. KINNEY, a citizen of the United States of America, and a resident of Dorchester in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Rotary Motors or Pumps, of which the following is a specification.

This invention relates to rotary motors and pumps, and has for its object the production of such a motor or pump, the casing of which is provided with a cylindrical chamber, in which is eccentrically mounted a rotary piston, the periphery of which is provided with a band capable of peripheral adjustment on said piston, said piston being also provided with other means for adjusting the position of said band toward and from the axis of said piston to take up the wear and insure contact between the piston and the cylindrical walls of said chamber.

The invention consists also in certain novel features of construction and arrangements of parts which will be readily understood by reference to the description of the drawings and to the claims hereinafter given.

Of the drawings: Figure 1 represents a side elevation of a device embodying the features of this invention. Fig. 2 represents a section of the same on line 2—2 on Fig. 1, the operating cam being cut in section on line 2^a—2^a on Fig. 1. Fig. 3 represents a vertical section on line 3—3 on Fig. 2. Fig. 4 represents a sectional detail on line 4—4 on Fig. 3. Fig. 5 represents a perspective view of the piston segment, and Fig. 6 represents a perspective view of the cylindrical band for said piston segment.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings, 10 represents a suitable base upon which is mounted the casing 11 provided with the cylindrical chamber 12. Extending transversely through the casing 11 is a shaft 13 to which is secured by the set screws 14 a segment of a cylinder 15 the periphery of which is eccentric to the peripheral walls of the chamber 12. Upon the outer periphery of the segment 15 is mounted a continuous cylindrical band 16 the diameter of which is such as to extend to and contact with the inner peripheral walls of the chamber 12 when mounted upon said segment. Against the inner face of said band 16 are a plurality of shoes 17 having pivotally connected thereto threaded members 18, while other threaded members 19 are suitably mounted in the segment 15 and extend radially therefrom.

Interposed between the threaded members 18 and 19 is a turnbuckle 20 by which the shoes may be forced outward to force the band 16 outwardly to retain it in contact with the wall of the chamber 12. This band 16 is made sufficiently flexible to permit this to be accomplished. It is obvious that this contact may be secured when the band is new by simply adjusting the turnbuckles 20 to bring the band into contact with the cylindrical walls of the chamber 12 but as the band wears by its contact with the wall during the rotation of the piston these adjusting devices may be again operated to stretch the band slightly and to again force its outer periphery into contact with the cylindrical wall of the chamber. When the band has been stretched in this manner to its limit it is obvious that by a slight distortion of the band the point 21 may be made to contact with the cylindrical wall of the chamber while the shoes 17 on either side thereof are moved slightly inwardly toward the axis of the shaft 13 to permit of this distortion. When the point 21 of the band is worn to any extent it is obvious that by operating the adjusting members and loosening the band 16 this band may be moved about the periphery of the segment thereby bringing a fresh concentric portion of the band into position to contact with the cylindrical wall of the chamber 12. With the outer periphery of the band 16 coöperates a shoe 22 pivotally connected at 23 to a blade 24 slidably mounted in a chamber in the member 25 secured to the pivotal shaft 26 about the axis of which it is moved.

The outer end of the shaft 26 has secured thereto a lever 27 the free end of which is provided with a truck or roller 28 which cooperates with the path 29 in the cam 30 secured to the shaft 13 by means of the set screw 31. The center of the cam path 29 conforms to the periphery of the band 16 so that any movement of the lever 27 caused by the cam path 29 will cause a similar movement to be imparted to the shoe 22 through

the pivoted member 25. It is obvious therefore that as the cam path and the band 16 conform to each other the shoe 22 will be mechanically held in contact with the periphery of the band 16 at all times.

The pivotal connection between the shoe 22 and the radial blade 23 permits said shoe to rock about the pivotal connection to conform to the varying positions of the eccentric piston band 16. Should there be any inequalities in the band as it rotates about its axis, as, for instance, when it has become worn or when it has been distorted slightly from its cylindrical shape by the adjustment of the devices interposed between the band and the segment 15, the blade 24 is adapted to move radially against the tension of the spring 32 which normally retains the shoe 22 in contact with the periphery of the band 16.

The shoe 22 moves through an opening 33 also serving as an outlet when the device is used as a motor and an inlet when the device is used as a pump. This opening 33 communicates through the passage 34 with a suitable pipe 35 secured to the flanges of the casing 11 in any well-known manner. The casing 11 is also provided with another passage 36 communicating with the chamber 12 at a point in close proximity to the shoe 22. The passage of the liquid or any other element through said passage is regulated by the valve 37 which has secured to its outer end an arm 38 the free end of which is provided with a truck 39 coöperating with a cam throw 40 which acts upon said arm 38 to open and close the valve 37 as required.

A pipe 42 is secured to the flanges of the casing 11 in any well-known manner. It is obvious from an inspection of the drawings that the cam throw 40 moves the truck 39 outwardly from the axis of the shaft 13 while the spring 41 operates upon the arm 38 to retain said truck in contact with its cam at all times.

In the operation of the device when in use as a motor the steam or other motive force is admitted through the pipe 42 and as the point 21 of the piston band 16 reaches the position shown in Fig. 3 the cam 40 commences to operate upon the truck 39 to open the valve 37 and permit the motive force to pass through the passage 36 into the interior of the chamber 12. Inasmuch as the abutment 22 prevents the motive force from passing in the direction of the outlet 33 from the chamber 12 it is obvious that this motive force will be directed in the opposite direction and cause the piston to be moved in the direction of the arrow on Fig. 3. As the piston moves about its axis the valve 37 closes and the motive force back of the piston is permitted to expand this expansion assisting in the movement of the piston about its axis. When the device is used as a pump the piston is driven in the opposite direction to the arrow on Fig. 3 and as it rotates about its axis creates a suction in the chamber 12 which will draw liquid through the pipe 35, passage 34, and opening 33 to said chamber 12, said liquid being delivered through the passage 36 and pipe 42.

It is obvious that as the piston rotates within its chamber a contact with the cylindrical wall of the chamber is insured by means of the adjustable devices interposed between the peripheral band 16 of the piston and the segment 15 secured to the revoluble shaft 13. It is also obvious that in view of the fact that this band is continuous and is practically cylindrical at all times and bears against the wall of a cylindrical chamber, that the operation of the motor or pump will be perfectly noiseless.

It is evident, (although not shown in the drawings,) that a pulley must be secured to the revoluble shaft 13 from which power may be transmitted when the device is in use as a motor and by which the piston may be driven when in use as a pump. It is also evident that any number of pistons may be secured to said revoluble shaft 13, each in an independent chamber 12, without altering the principles of this invention.

It is believed that the operation of the invention will be thoroughly understood without any further description.

Having thus described my invention, I claim:

1. In a device of the class described, the combination of a casing having a cylindrical chamber; a rotary piston therein; a continuous peripheral band thereon; and means whereby said band may be adjusted about the periphery of said piston and clamped in adjusted position.

2. In a device of the class described, the combination of a casing having a cylindrical chamber; an eccentric piston therein; a continuous peripheral band thereon; and means whereby said band may be adjusted about the periphery of said piston and clamped in adjusted position.

3. In a device of the class described, the combination of a casing having a cylindrical chamber; a rotary piston therein composed of a segment of a cylinder; a continuous cylindrical band thereon; and means for adjusting the position of said band toward and from said segment.

4. In a device of the class described, the combination of a casing having a cylindrical chamber; a rotary piston therein; a peripheral band therefor; and means in different radial planes for adjusting the position of said band toward and from the center of said piston.

5. In a device of the class described, the combination of a casing having a cylindrical chamber; a rotary piston therein; a continuous peripheral band therefor; and means in

different radial planes for adjusting the position of said band toward and from the center of said piston.

6. In a device of the class described, the combination of a casing having a cylindrical chamber; a rotary piston therein; a peripheral band therefor; and a plurality of adjusting members interposed between said band and piston and radiating from said piston in different planes.

7. In a device of the class described, the combination of a casing having a cylindrical chamber; a rotary piston therein; a peripheral band therefor; threaded members interposed between said band and piston in different radial planes; and means for operating said members to adjust the position of said band relative to the axis of said piston.

8. In a device of the class described, the combination of a casing having a cylindrical chamber; a rotary piston therein; a peripheral band therefor; threaded members interposed between said band and piston in different radial planes; shoes on the ends of said members bearing on the inner face of said band; and means for operating said members to adjust the position of said band relative to the axis of said piston.

9. In a device of the class described, the combination of a casing having a cylindrical chamber; a rotary piston therein; a pivoted blade; a spring-pressed shoe pivotally connected to said blade; and a cam for mechanically operating said blade.

Signed by me at Boston, Mass., this 25th day of April, 1907.

JUSTUS R. KINNEY.

Witnesses:

WALTER E. LOMBARD,

EDNA C. CLEVELAND.