J. R. KINNEY.

ROTARY PUMP.

APPLICATION FILED JAN. 16, 1911.

1,007,033.

Patented Oct. 24, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

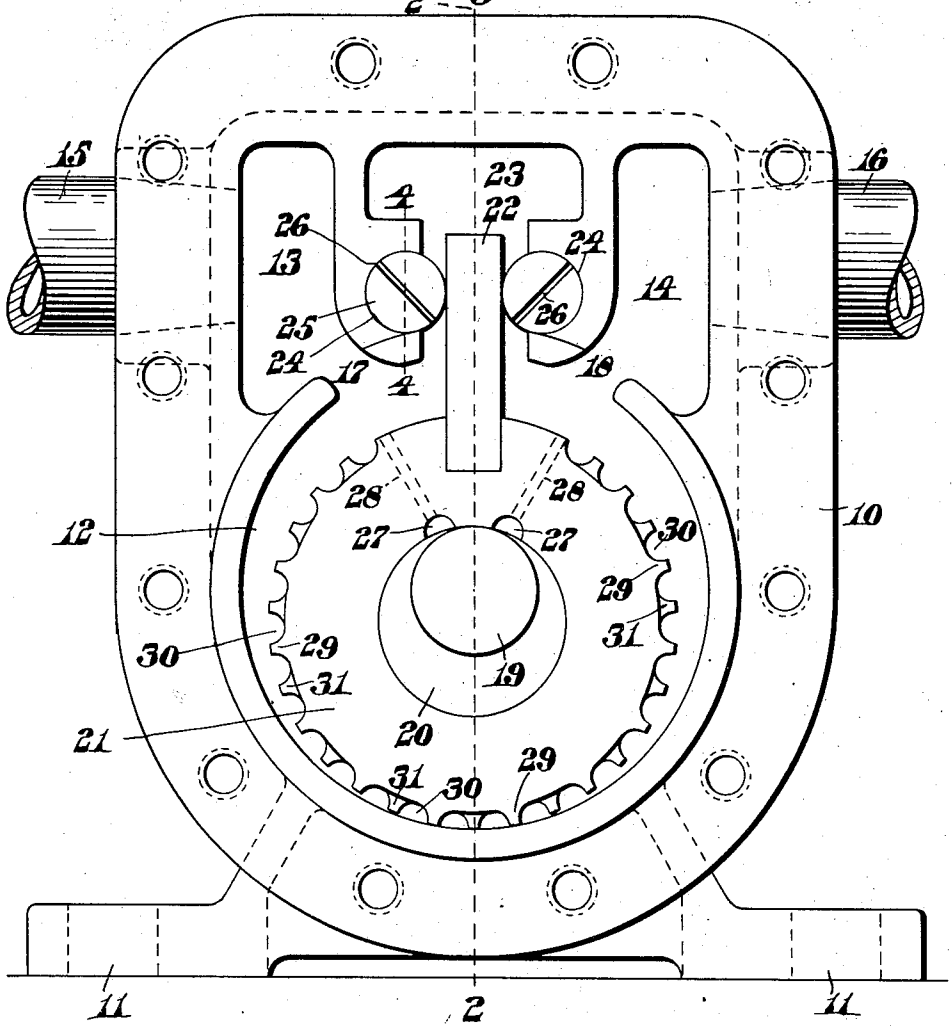
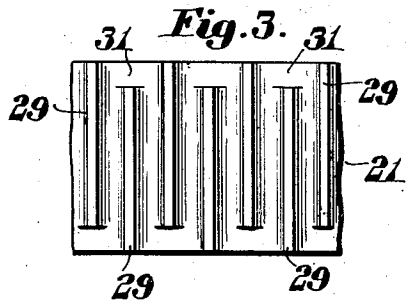


Fig. 3.



Witnesses:

Nathan C. Lombard

Mary C. Smith

Inventor:

Justus R. Kinney,

by Walter E. Lombard,

Atty.

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2 SHEETS—SHEET 2.

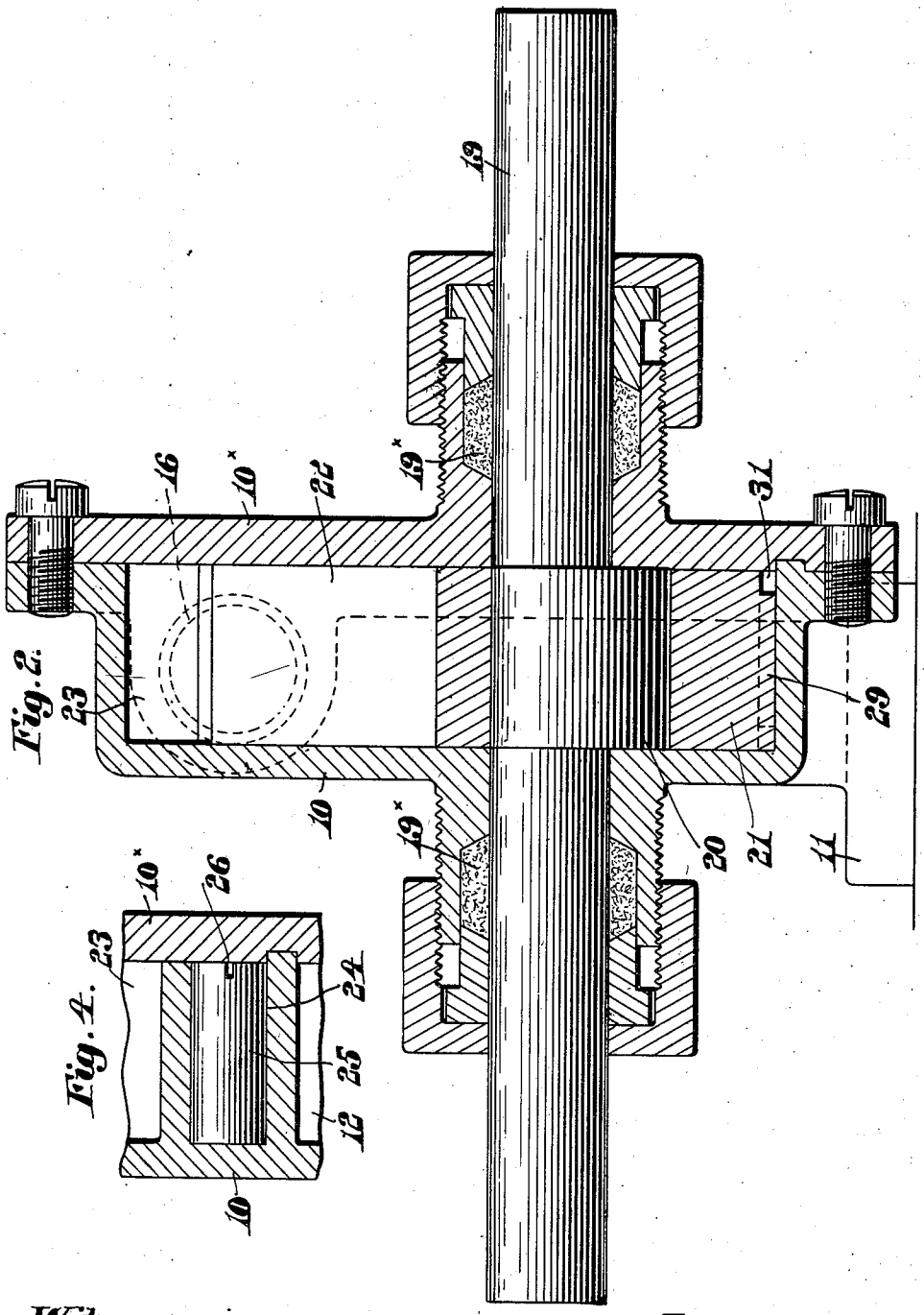

Fig. 2.

Fig. 4.

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Nathan C. Lombard

Mary C. Smith.

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Justus R. Kinney,

by Walter E. Lombard

Atty.

UNITED STATES PATENT OFFICE.

JUSTUS R. KINNEY, OF BOSTON, MASSACHUSETTS.

ROTARY PUMP.

1,007,033. Specification of Letters Patent. Patented Oct. 24, 1911.

Application filed January 16, 1911. Serial No. 602,999.

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 Boston, in the county of Suffolk and State of Massachusetts, have invented certain 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 the production of a pump of simple construction having comparatively few operating parts, special provision being made whereby any liability to clog during its operation by the presence of foreign substances within the piston chamber is entirely obviated.

Another object of the invention is to provide a means whereby the fluid may circulate through the pump when not in operation.

The invention consists in certain novel features of construction and arrangement 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 an elevation of a pump embodying the features of the present invention with the end plate removed therefrom. Fig. 2 represents a vertical section of the same, the cutting plane being on line 2—2 on Fig. 1. Fig. 3 represents an elevation of a portion of the periphery of the rotor, showing the staggered ribs thereon, and Fig. 4 represents a section of a portion of the pump, the cutting plane being on line 4—4 on Fig. 1.

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

In the drawings, 10 represents a casing supported by the feet 11, and having a cylindrical piston chamber 12 and inlet and outlet compartments 13 and 14 respectively. An inlet pipe 15 leads to the inlet compartment 13 and a pipe 16 from the outlet compartment 14. A passage 17 forms a means of communication between the inlet compartment 13 and the piston chamber 12, while a similar passage 18 forms a means of communication between the piston chamber 12 and the outlet compartment 14. Extending through the piston chamber 12 is a shaft 19, revoluble in bearings 19* in the casing 10 and end plate 10* and having formed thereon the eccentric 20 to which is fitted the annular piston or rotor 21, one part of the periphery of which is adapted to be in contact with the cylindrical wall of the piston chamber 12 throughout the rotation of the eccentric 20. Radiating from this piston or rotor 21 is a blade 22, the outer end of which extends into a chamber 23 formed in the casing 10. In suitable pockets 24 formed in the casing 10 on either side of the blade 22 are cylindrical members 25, one portion of the peripheries of which bear upon the opposite faces of the radial blade 22, thereby preventing the direct passage of fluid from the inlet compartment 13 to the outlet compartment 14. It is obvious, therefore, that when the pump is in operation, no fluid can pass from the inlet compartment 13 to the outlet compartment 14, except that which is forced through the piston chamber 12 by the revolution of the rotor 21. The continuous reciprocation of the radial member 22 in contact with the cylindrical bearing members 25 will gradually wear the surfaces of these members, and it is therefore necessary that some provision be made whereby when this wearing occurs a new bearing surface may be presented. This is accomplished by providing each cylindrical member 25 with some means for rotating, such as the slot 26, which is adapted to receive the end of an ordinary screw driver, by which it may be turned slightly about its axis until another unworn portion of its periphery is brought opposite the face of the radial member 22. These cylindrical members 25 fit into the pockets 24 so tightly that the reciprocation of the radial blade 22 will not turn them in the pockets, but at the same time they are not so tightly fitted to the pockets but that they may be turned radially by means of a screw driver when sufficient force is applied thereto. This makes a very convenient form of packing the blade 22 and preventing any leakage thereby. In the rotation of the eccentric 22, the annular piston or rotor 21 moves thereon, and in order to lubricate the surfaces between the periphery of the eccentric 20 and the inner cylindrical wall of the piston or rotor 21, the latter is provided with two grooves 27 in the cylindrical wall thereof, which communicate by means of passages 28 with the piston chamber 12 directly opposite the inlet and outlet passages 17 and 18. It is obvious, therefore, that in whichever direction the rotor is revolved, a certain amount of the fluid entering the piston chamber on either side of the blade 22 will be admitted through

a passage 28 into a groove 27 and lubricate the contacting surfaces between the eccentric 20 and the annular rotor 21.

In pumps of this class, where an annular rotor is mounted upon an eccentric and one portion of the periphery of the annular rotor is contacting at all times with the cylindrical wall of the piston chamber, it has been found that the pump works satisfactorily when absolutely clear water or other fluid is passing through the same, but when any foreign substance such as sand or grit flows into the piston chamber, the smallest particles thereof will sometimes wedge in between the periphery of the rotor and the inner wall of the piston chamber and prevent the further operation of the pump. Naturally, this is a serious objection, and as in most cases the liquid being admitted contains sediment or other foreign substances, it is essential that some provision be made in the pump to overcome these objections and prevent the rotor from being clogged. This objection has been wholly overcome by providing the periphery of the rotor 21 with a plurality of radial ribs 29. Where the rotor is provided with these ribs 29, and any sand or other foreign substances are carried into the piston chamber 12, such substances will enter the transverse grooves 30 formed by the ribs 29, and will be carried therein until they pass the point of contact between the rotor and the chamber wall.

It has been found in practice that where the ribs 29 are used that any fluid of any nature can be readily pumped notwithstanding the amount of foreign substances contained therein, and in no case is any clogging liable to occur which will stop the rotation of the rotor, as has been experienced when a continuous cylindrical periphery was used. This forms a very important part of the present invention, as it makes a most effective pump which can be used for all classes of work. When the pump is used for some classes of work, however, as for instance in connection with motor cars, it has been found advisable to provide some means whereby there may be a circulation of the fluid through the pump even when the rotor is at rest. This is accomplished by making the transverse blades 29 of less length than the width of the rotor and staggering them so that every alternate rib 29 extends from an opposite face of said rotor, thereby leaving the connecting passages 31 between the grooves 30. By this construction an indirect passage through the grooves 30 and the connecting passages 31 is made, through which the fluid may circulate when the pump is not operating. As each rib overlaps the one preceding it when the rotor is in operation the effect upon the substances being pumped is practically the same as would be the case if each blade extended from one face of the rotor to its opposite face.

It is believed that the operation and many advantages of the invention will be thoroughly understood from the foregoing.

Having thus described my invention, I claim:

1. In a device of the class described, the combination with a casing having a cylindrical piston chamber; and a rotor eccentrically positioned therein, and provided with a plurality of transverse peripheral ribs, the ends of which are adapted to contact successively with the cylindrical wall of said casing during the rotation thereof.

2. In a device of the class described, the combination with a casing having a cylindrical piston chamber; and a rotor eccentrically positioned therein, and provided with a plurality of transverse peripheral ribs the ends of which are adapted to contact with the cylindrical wall of said casing during the rotation thereof, said ribs being of less length than the width of said rotor and extending alternately from opposite faces thereof.

3. In a device of the class described, the combination with a casing having a cylindrical piston chamber and inlet and outlet passages thereto; a rotor eccentrically positioned within said chamber and provided with a plurality of transverse peripheral ribs, the ends of which are adapted to contact successively with the cylindrical wall of said chamber; and a radial blade on said rotor interposed between said inlet and outlet passages.

4. In a device of the class described, the combination with a casing having a cylindrical piston chamber and inlet and outlet passages thereto; a rotor eccentrically positioned within said chamber and provided with a plurality of transverse peripheral ribs, the ends of which are adapted to contact with the cylindrical wall of said chamber, said ribs being of less length than the width of said rotor and extending alternately from opposite faces thereof; and a radial blade on said rotor interposed between said inlet and outlet passages.

5. In a device of the class described, the combination with a casing having a cylindrical piston chamber and inlet and outlet passages thereto; an eccentric revoluble in said chamber; an annular rotor on said eccentric provided with a plurality of transverse peripheral ribs the ends of which are adapted to contact successively with the cylindrical wall of said chamber during the rotation thereof; and a blade radiating from said rotor and interposed between said inlet and outlet passages.

6. In a device of the class descsribed, the combination with a casing having a cylindrical piston chamber and inlet and outlet

passages thereto; an eccentric revoluble in said chamber; an annular rotor on said eccentric provided with a plurality of transverse peripheral ribs the ends of which are adapted to contact with the cylindrical wall of said chamber during the rotation thereof, said ribs being of less length than the width of said rotor and extending alternately from opposite faces thereof; and a blade radiating from said rotor and interposed between said inlet and outlet passages.

7. In a device of the class described, the combination with a casing having a cylindrical piston chamber; and a rotor eccentrically mounted in said chamber and provided with a plurality of transverse peripheral working members, having indirect passages therethrough for the circulation of fluid when said rotor is at rest.

8. In a device of the class described, the combination with a casing having a cylindrical piston chamber; and a rotor eccentrically mounted in said chamber and provided with a plurality of transverse peripheral working members, having indirect passages therethrough for the circulation of fluid when said rotor is at rest, and provided with transverse grooves in its inner wall communicating with said piston chamber through passages in said rotor opposite said inlet and outlet passages.

9. In a device of the class described, the combination with a casing having a cylindrical piston chamber and inlet and outlet passages thereto; a rotor eccentrically positioned therein and provided with a radial blade interposed between said inlet and outlet passages; and a cylindrical member in a pocket on each side of said blade and contacting therewith each adapted to be rotated about its axis to present a new bearing surface for said blade.

10. In a device of the class described, the combination with a casing having a cylindrical piston chamber and inlet and outlet passages thereto; a rotor eccentrically positioned therein and provided with a radial blade interposed between said inlet and outlet passages; a cylindrical member in a pocket on each side of said blade and contacting therewith; and means for rotating said members to present a new bearing surface for said blade.

11. In a device of the class described, the combination with a casing having a cylindrical piston chamber; and a rotor eccentrically positioned therein, and provided with a plurality of semi-cylindrical depressions in those portions of the periphery thereof which are adapted to contact successively with the cylindrical wall of said casing during the rotation of said rotor.

Signed by me at 4 Post Office Sq., this 10th day of January, 1911.

JUSTUS R. KINNEY.

Witnesses:

WALTER E. LOMBARD,

NATHAN C. LOMBARD.