J. R. KINNEY.

ROTARY MOTOR OR PUMP.

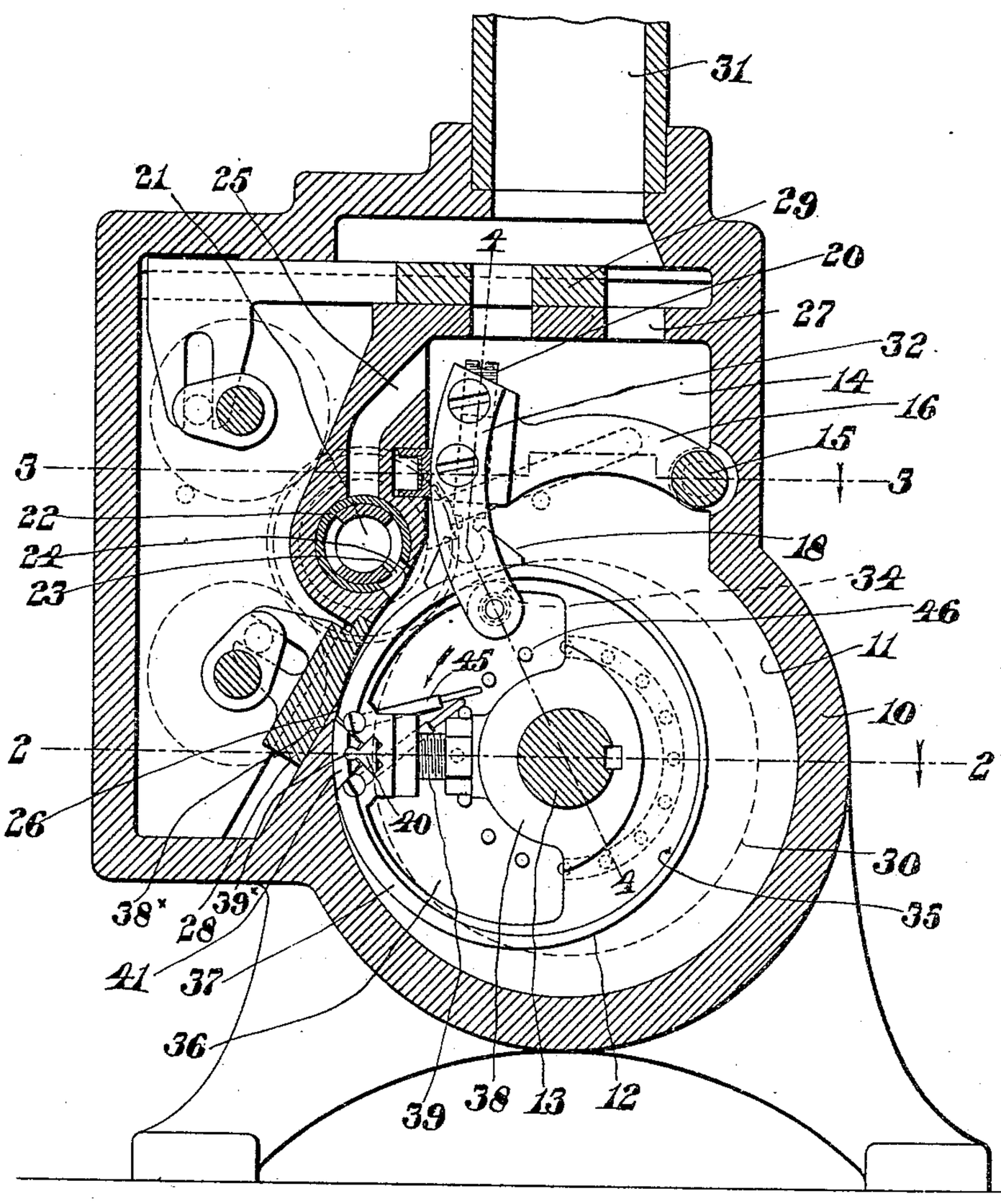
APPLICATION FILED AUG. 17, 1908.

936,542.

Patented Oct. 12, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Howard Hanscom

Nathan C. Lombard

Inventor:

Justus R. Kinney,

by Walter E. Lombard,

Atty.

J. R. KINNEY.

ROTARY MOTOR OR PUMP.

APPLICATION FILED AUG. 17, 1908.

936,542.

Patented Oct. 12, 1909.

2 SHEETS—SHEET 2.

Fig. 3.

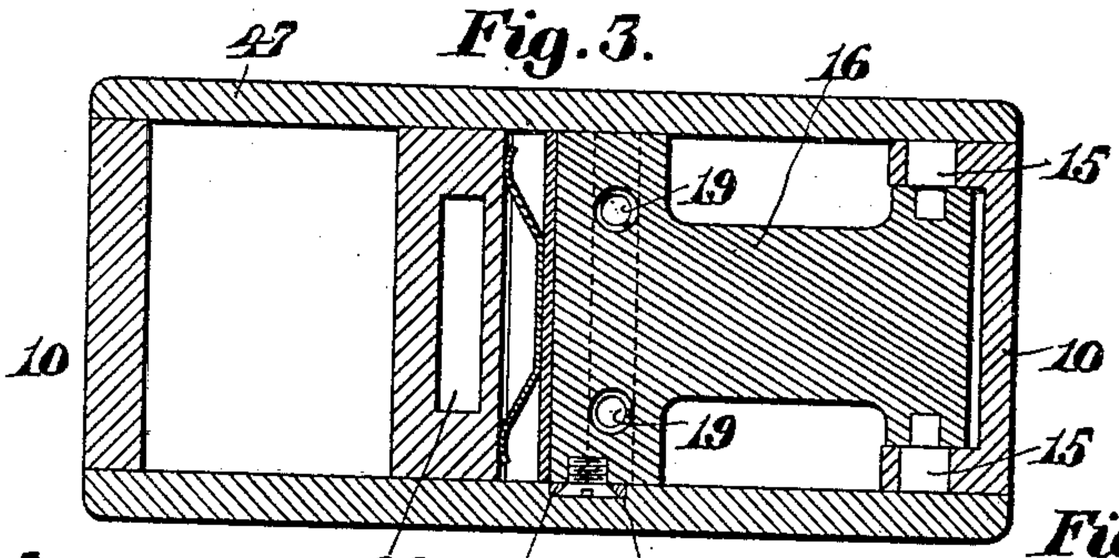


Fig. 4.

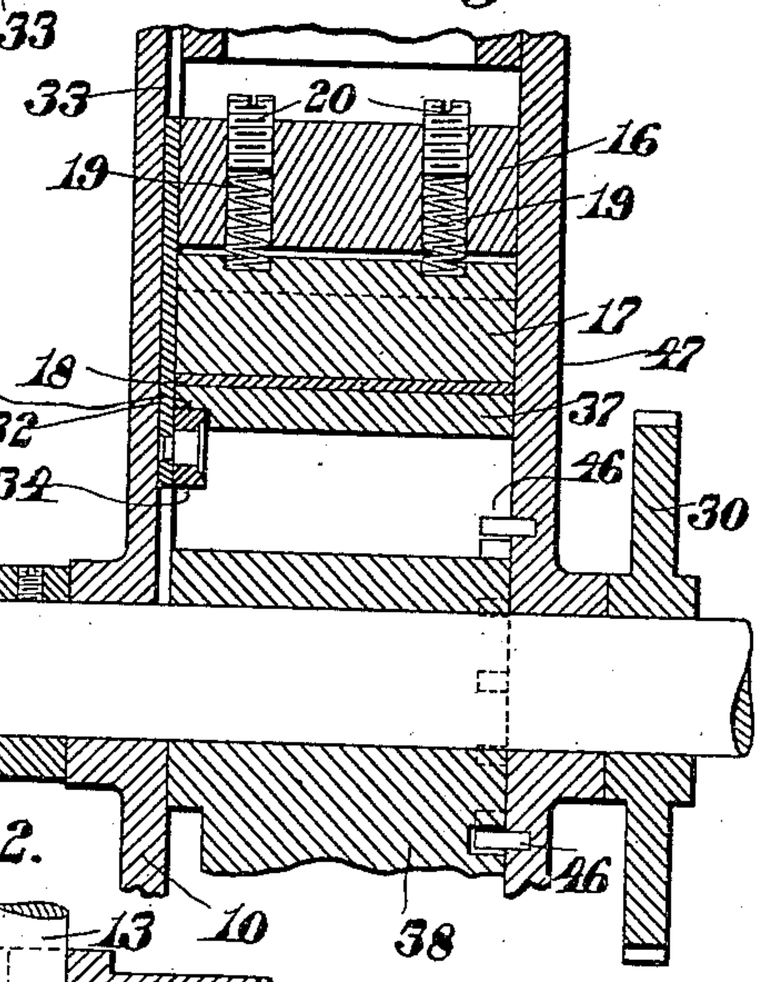


Fig. 5.

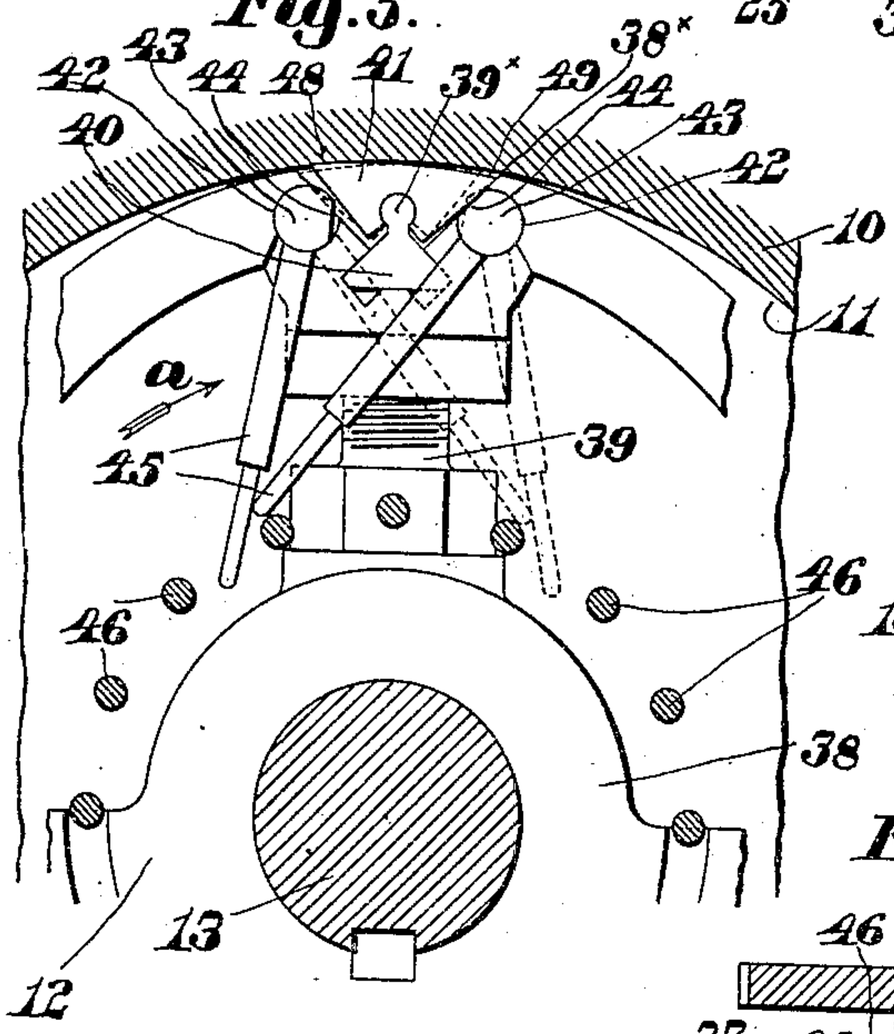
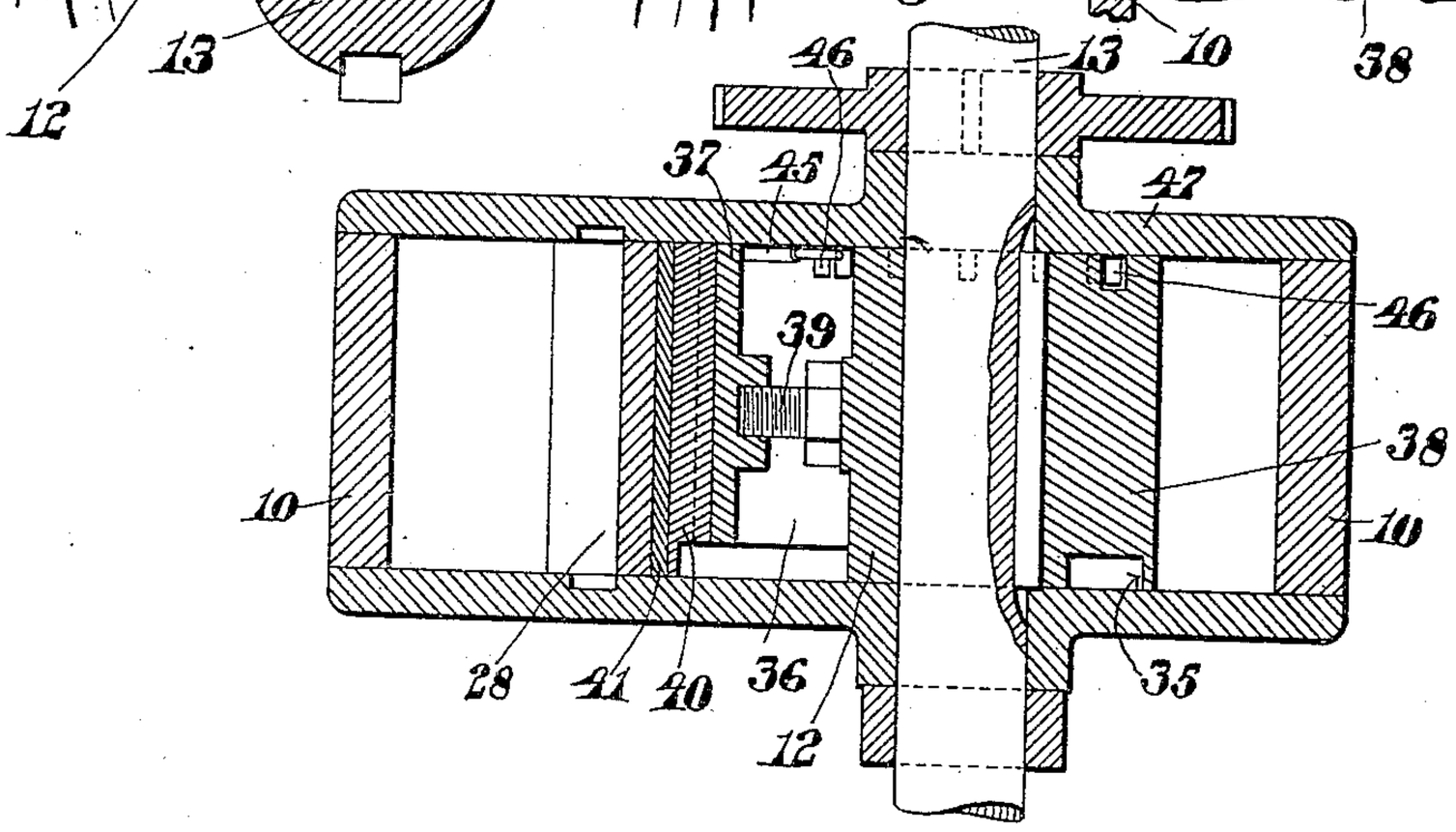


Fig. 2.



Witnesses:

Howard Hanscom

Nathan C. Lombard

Inventor:

Justus R. Kinney,

by Walter C. Lombard,

Atty.

UNITED STATES PATENT OFFICE.

JUSTUS R. KINNEY, OF DORCHESTER, MASSACHUSETTS.

ROTARY MOTOR OR PUMP.

936,542. Specification of Letters Patent. Patented Oct. 12, 1909.

Application filed August 17, 1908. Serial No. 448,970.

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 one of its objects the production of a device of this class in which the rotary piston is provided with a peripheral depression in which is pivoted a member adapted to be moved about said pivot to project one end thereof into firm contact with the inner cylindrical wall of the piston chamber.

It has for another object the provision of means for limiting the movement of said pivoted member in one direction while it is adapted to be freely moved in the other direction into contact with said wall.

It has for a further object the provision of a means for automatically reversing the position of said pivoted member when the direction of movement of the piston is changed.

It has for a further object the provision of a means confined entirely within the casing for retaining the pivoted blade in contact with the periphery of said piston and it also has for a further object the production of a piston in which a peripheral band is made integral with the main portion thereof and which is adapted to be forced outwardly from the axis of rotation of said piston to secure a better contact with the interior cylindrical wall of the piston chamber.

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 a sectional elevation of a device embodying the features of this invention. Fig. 2 represents a horizontal section of the same, the cutting plane being on line 2—2 on Fig. 1 looking in the direction of the arrow. Fig. 3 represents a horizontal section of the same, the cutting plane being on line 3—3 on Fig. 1 Fig. 4 represents an enlarged vertical section through a portion of the piston and the pivoted blade co-acting therewith and the side casing walls inclosing the same, the cutting plane being on line 4—4 on Fig. 1, and Fig. 5 represents an enlarged view of a portion of the piston showing the peripheral depression therein and the mechanism for mounting the bearing plate therein and adjusting the same about its pivot when the direction of movement of the piston is reversed.

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

In the drawings, 10 represents a casing member provided with a cylindrical chamber 11 in which is mounted a rotary eccentric piston 12 keyed to and revoluble with the shaft 13. The chamber 11 has an extension 14 at the upper end thereof in which is pivoted at 15 the arm 16, the movable end of which has slidably movable therein a blade 17, to the inner end of which is pivoted a shoe 18 in any well-known manner. The shoe 18 on the blade 17 is held in contact with the periphery of the piston 12 by means of the springs 19, the tension of which is adjusted by means of the adjustable members 20.

The motive agent for operating the device is admitted at 21, a tubular valve 22 provided with a port 23 controlling the admission of said motive agent to the chamber 11, this port 23 being adapted to register with the port 24 to admit the motive agent into the chamber 11 at one side of the shoe 18 or with the passage 25 to admit the motive agent into the chamber 11 at the opposite side of said shoe.

Communicating with the chamber 11 is an exhaust port 26 and communicating with the extension 14 of the chamber 11 is the exhaust port 27. The port 26 is adapted to be closed by the valve 28 while the ports 27 are adapted to be closed by the valve 29, these valves being operated simultaneously, one opening while the other is closed, the mechanism for operating them being controlled by a member such as the gear 30 in any well-known manner.

31 is the exhaust pipe through which the exhaust passes after it has passed from the chamber 11 through either the ports 26 or 27. It has been found in practice that it is desirable to control the movement of the pivoted member 16 wholly within the casing 10 and to this end the outer end of the pivoted member 16 has secured thereto a segment 32 of a ring which is concentric with the pivot

15. This segment 32 fits into a curved groove 33 into one of the interior walls of the casing 10 and has secured to its inner end a roller 34 which contacts with a bearing face 35 cut into one end of the piston 12. This bearing 35 is in the present instance eccentric to the periphery of the piston 12 in order that the shoe 18 may be retained in contact with the periphery of the piston in any position the piston may be during its rotation in the chamber 11. The spring 19 operating against the slidable plate 17 permits the shoe 18 to adapt itself to any slight inequalities in the periphery of the piston 12 in its rotation. By this construction the contact between the shoe 18 and the periphery of the piston is wholly controlled from the inside of the casing, making the mechanism more simple to construct while it is more effective in its operation owing to the fact that there is less liability for leakage.

In the present construction of the piston an opening 36 extends through the same from side to side leaving a peripheral band 37 which is integral with the main portion of the piston 12 and between this peripheral band and the hub 38 is an adjustable member 39 which is adapted to force the peripheral band outwardly into firmer contact with the interior wall of the chamber 11.

Cut into the periphery of the piston 12 at the point of contact with the cylindrical wall of the chamber 11 is an angular depression 38* and mounted therein midway of the inclined walls of said depression 38* is a pivot member 39* provided with two angular extensions 40 embedded in diverging slots in said piston.

Mounted upon the pivot member 39* so as to oscillate slightly in either direction is an annular packing member 41, the outer face of which when in mid position conforms to the periphery of the piston 12. Embedded in cylindrical pockets 42, one of which communicates with each side of the depression 38*, are the semicylindrical cam members 43 one side of which is provided with a flattened surface, as 44 said cam members serving as stops to limit the movement of said angular packing member in either direction. Each of the cam members 43 is provided with an arm 45 the outer ends of which are adapted to engage with a plurality of fixed members 46 projecting from the side wall 47 of the casing 10. It is obvious from an inspection of Fig. 5 that when the piston is traveling in the direction indicated by the arrow *a* thereon the arms 45 will ride over the projecting pins 46 and the bearing member 41 will be free to move into a tilted position in one direction only and that is with the end 48 in firm contact with the inner cylindrical wall of the chamber 11, the flattened surface 44 of the right hand cam member 43 permitting the bearing member 41 to be so tilted while the cylindrical surface of the left hand cam member 43 will contact with the inclined wall of said member when the bearing member 41 is in a central position thus preventing its becoming tilted in the opposite direction and thereby injuring the inner wall of the casing member with which it coacts. Should, however, the direction of movement of the piston be reversed and the piston move in the opposite direction to the arrow *a* on said figure the arms 45 will come into contact with the pins 46 and be carried to the right, into the position shown in dotted lines in said figure, thus permitting the motive agent to act upon said bearing plate 41 to cause the end 49 thereof to be moved into contact with the inner cylindrical wall of the chamber 11. This automatically permits the reversal of the position of the bearing plate 41 whenever the direction of movement of the piston is changed and in reversing the movement the end of the bearing plate in advance is always at or below the periphery of the piston 12 so that there is no protruding shoulder which could possibly engage with any obstructions which might extend into the chamber 11. At the same time it insures a positive packing of the piston at all points during its rotation and prevents any leakage past the point of contact and as a consequence better results are secured than would otherwise be the case. This feature of an automatic device operable by the reversal of the engine to limit the movement of the bearing plate 41 about its pivot so that the motive agent acting thereon can tilt it in one direction only is an important feature of this invention as thereby all damage to or injury of the casing is prevented while at the same time said bearing member is freely movable about its pivot to permit said member to remain in constant contact with the casing wall notwithstanding the inequalities that there may be therein.

It is believed that from the foregoing the operation and many advantages of the invention will be fully understood without further description.

Having thus described my invention, I claim:

1. In a device of the class described, having a cylindrical chamber, the combination with a revoluble shaft positioned in the center of said cylindrical chamber, a cylindrical rotary piston eccentrically mounted upon said shaft and having an angular depression extending transversely of that portion of its periphery farthest removed from the axis of said shaft, and a blade mounted on the chamber casing and co-acting with the periphery of said piston; of an angular packing member pivoted in said piston having an exterior face conforming to its periphery which face is adapted to normally

contact with the cylindrical wall of said chamber throughout the rotation of said piston; and an adjustable stop for limiting, in the movement of said member about said pivot, the extent that either end of its peripheral surface may be projected beyond the periphery of said piston.

2. In a device of the class described, having a cylindrical chamber, the combination with a revoluble shaft positioned in the center of said cylindrical chamber, a cylindrical rotary piston eccentrically mounted upon said shaft and having a depression extending transversely of that portion of its periphery farthest removed from the axis of said shaft, and a blade mounted on the chamber casing and co-acting with the periphery of said piston; of a packing member pivoted in said piston having an exterior face conforming to its periphery, which face is adapted to normally contact with the cylindrical wall of said chamber through the rotation of said piston; and an adjustable stop for limiting, in the movement of said member about its pivot, the extent that either end of its peripheral surface may be projected beyond the periphery of said piston.

3. In a device of the class described, having a cylindrical chamber, the combination with a revoluble shaft positioned in the center of said cylindrical chamber, a cylindrical rotary piston eccentrically mounted upon said shaft and having an angular depression extending transversely of that portion of its periphery farthest removed from the axis of said shaft, and a blade mounted on the chamber casing and co-acting with the periphery of said piston; of a pivot member on said piston with the pivot portion within said depression and central thereof; an angular packing member having an exterior face conforming to the periphery of said piston and a transverse semi-cylindrical opening through its inner end adapted to fit said pivot portion, the exterior face of said angular packing member being adapted to normally contact with the cylindrical wall of said chamber throughout the rotation of said piston; and an adjustable stop for limiting, in the movement of said angular member about its pivot, the extent that either end thereof is projected beyond the periphery of the piston.

4. In a device of the class described, the combination with a rotary piston having an angular peripheral depression extending transversely thereof, and a blade co-acting with the periphery of said piston; of a pivot member provided with two diverging extensions embedded into said piston with the pivot member within said depression and central thereof; an angular member having an exterior face conforming to the periphery of said piston and a transverse semi-cylindrical opening through its inner end adapted to fit said pivot portion; and means for limiting, in the movement of said member about its pivot, the extent that either end thereof may be projected beyond the periphery of the piston.

5. In a device of the class described, having a cylindrical chamber, the combination with a revoluble shaft positioned in the center of said cylindrical chamber, a cylindrical rotary piston having a depression extending transversely of that portion of its periphery farthest removed from the axis of said shaft, and a blade mounted on the chamber casing and co-acting with the periphery of said piston; of a packing member pivotally mounted in said piston; and means mounted on said piston permitting the movement of said member about said pivot in either direction to project either end thereof beyond the periphery of the piston and regulating the extent of this movement, the end thus projected being dependent upon the direction of movement of said piston.

6. In a device of the class described, the combination with a rotary piston having a peripheral depression; of a member pivotally mounted therein; a pair of cams pivotally mounted on said piston and adapted to limit the movement of said member about its pivot and insure that only one end thereof may project beyond the periphery of the piston; and fixed means adapted to operate said cams during the rotation of said piston in either direction.

7. In a device of the class described, the combination with a rotary piston having a peripheral depression; of a member pivotally mounted therein; a pair of cams pivotally mounted on said piston and adapted to limit the movement of said member about its pivot and insure that only one end thereof may project beyond the periphery of the piston; and a plurality of projections extending into the piston chamber from the casing and adapted to operate said cams during the rotation of said piston in either direction.

8. In a device of the class described, the combination with a rotary piston having a peripheral depression; of a member pivotally mounted therein; a pair of cams pivotally mounted on said piston and adapted to limit the movement of said member about its pivot; radial arms on each of said cams; and fixed means adapted to engage with said arms and operate said cams during the rotation of said piston in either direction.

9. In a device of the class described, the combination with a rotary piston having a peripheral depression; of a member pivotally mounted therein; a pair of cams pivotally mounted on said piston and adapted to limit the movement of said member about its pivot; and a plurality of fixed pins arranged in a circle concentric with the shaft of said

piston and adapted to operate said cams during the rotation of said piston in either direction.

10. In a device of the class described, the combination with a rotary piston having a peripheral depression; of a member pivotally mounted therein and adapted to project either end beyond the periphery of said piston; two semi-cylindrical cam members mounted in transverse pockets in said piston and adapted to serve as limiting stops for the two opposite walls of said pivoted member; and means for simultaneously moving said cam members during the movement of the piston in either direction to cause said member to be moved about its pivot.

11. In a device of the class described, the combination with a rotary piston having a peripheral depression; of a member pivotally mounted therein and adapted to project either end beyond the periphery of said piston; two semi-cylindrical cam members mounted in transverse pockets in said piston and adapted to serve as limiting stops for the two opposite walls of said pivoted member; a radial arm to each cam member; and a plurality of fixed pins in the path of said arms adapted to operate said cam members to reverse the position of said pivoted member whenever the direction of movement of said piston is reversed.

12. In a device of the class described, having a cylindrical chamber, the combination with a revoluble shaft positioned in the center of said cylindrical chamber, a cylindrical rotary piston having an angular depression extending transversely of that portion of its periphery farthest removed from the axis of said shaft, and a blade mounted on the chamber casing and co-acting with the periphery of said piston; of an angular packing member relatively smaller than said depression in which it is pivotally mounted, said member having an exterior face conforming to the periphery of said piston, which face is adapted to normally contact with the cylindrical wall of said chamber throughout the rotation of said piston; and an adjustable member in advance of said angular member against which said angular members is adapted to be retained by the motive agent actuating said piston with the rear end of said angular member projecting beyond the periphery of said piston, said angular member being adapted to be moved to the rear from contact with said adjustable member about said pivot under abnormal conditions.

13. In a device of the class described, having a cylindrical chamber, the combination with a revoluble shaft positioned in the center of said cylindrical chamber, a cylindrical rotary piston therein having an angular peripheral depression extending transversely thereof, and a blade mounted on the chamber casing and co-acting with the periphery of said piston; of a pivot member provided with two diverging extensions embedded into said piston with the pivot member within said depression and central thereof; an angular member having an exterior face conforming to the periphery of said piston and a transverse semi-cylindrical opening through its inner end adapted to fit said pivot portion; and means co-acting with one side of said angular member for limiting, in the movement of said member about its pivot, the extent that the opposite side thereof may be projected beyond the periphery of the piston.

14. In a device of the class described, having a cylindrical chamber, the combination with a revoluble shaft positioned in the center of said cylindrical chamber, a cylindrical rotary piston having a depression extending transversely of that portion of its periphery farthest removed from the axis of said shaft, and a blade mounted on the chamber casing and co-acting with the periphery of said piston; of a packing member pivoted in said piston and having an exterior face conforming to the periphery of said piston and freely movable about its pivot in either direction to normally retain said exterior face in contact with the cylindrical wall of said chamber; and a stop extending into said depression to limit the movement of said pivoted member in one direction.

15. In a device of the class described, having a cylindrical chamber, the combination with a revoluble shaft positioned in the center of said cylindrical chamber, a cylindrical rotary piston eccentrically mounted upon said shaft and having a depression extending transversely of that portion of its periphery farthest removed from the axis of said shaft, and a blade mounted on the chamber casing and co-acting with the periphery of said piston; of a packing member pivoted in said piston and having an exterior face conforming to the periphery of said piston and freely movable about its pivot in either direction to normally retain said exterior face in contact with the cylindrical wall of said chamber; and an adjustable stop extending into said depression to limit the movement of said pivoted member in one direction.

16. In a device of the class described, having a cylindrical chamber, the combination with a revoluble shaft positioned in the center of said cylindrical chamber, a cylindrical rotary piston eccentrically mounted upon said shaft and having an angular depression extending transversely of that portion of its periphery that is farther removed from the axis of said shaft and substantially in contact with the cylindrical wall of said chamber on each side of said depression, and a

blade mounted on the chamber casing and co-acting with the periphery of said piston; of an angular packing member pivoted in said piston and having an exterior face conforming to the periphery of said piston which face is adapted to normally contact with the cylindrical wall of said chamber throughout the rotation of said piston; and an adjustable stop for limiting, in the movement of said member about said pivot, the extent that one end of its peripheral surface may be projected beyond the periphery of said piston.

Signed by me at 7 Water st., Boston, Mass., this 13th day of August 1908.

JUSTUS R. KINNEY.

Witnesses:
WALTER E. LOMBARD,
NATHAN C. LOMBARD.