Jan. 3, 1928. 1,654,883

J. F. JAWOROWSKI

ROTARY PUMP

Filed Jan. 11, 1926 3 Sheets-Sheet 1

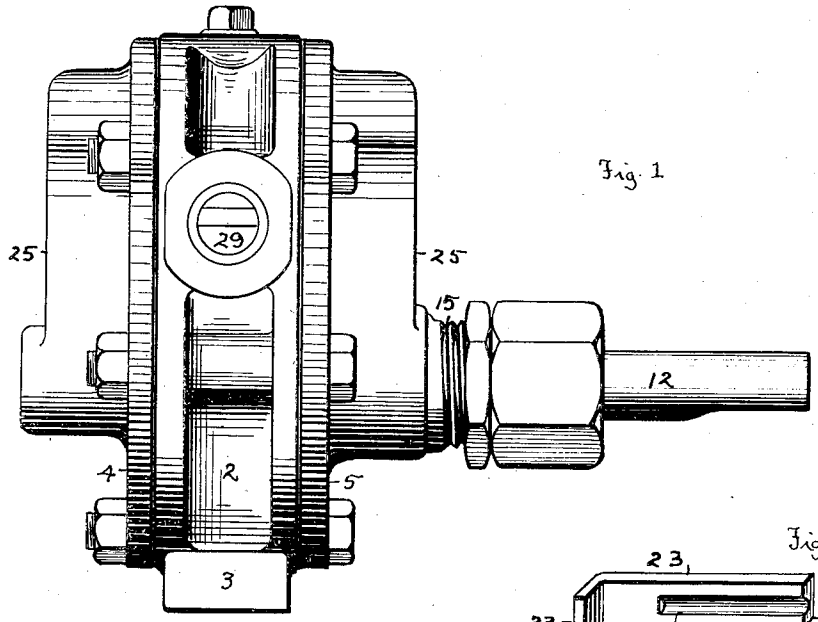

Fig. 1

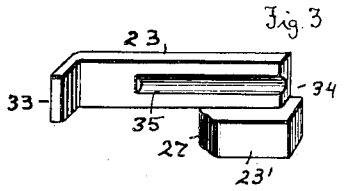

Fig. 3

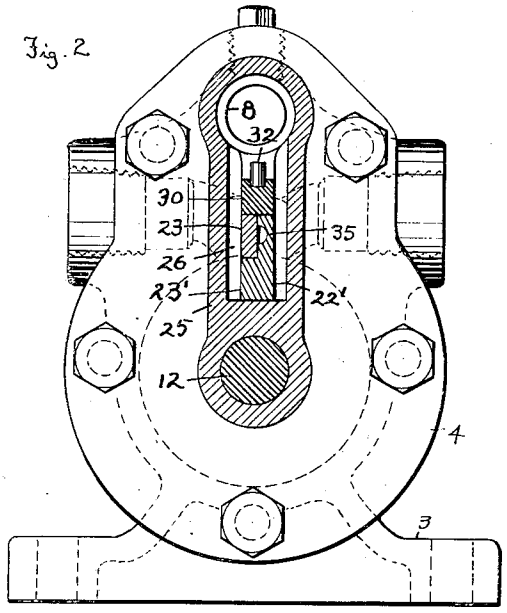

Fig. 2

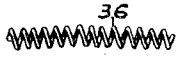

Fig. 4

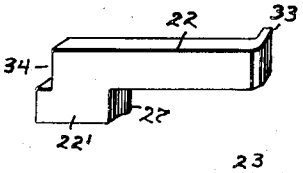

Fig. 5

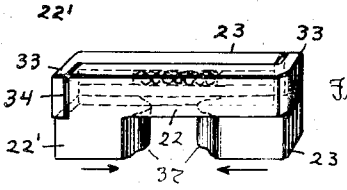

Fig. 6

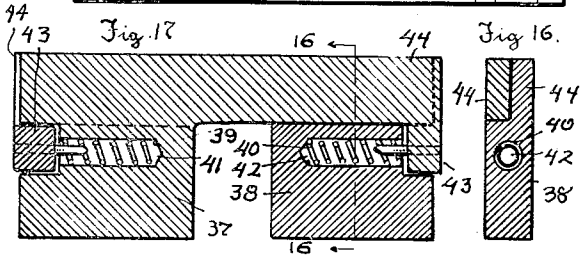

Fig. 17

Fig. 16.

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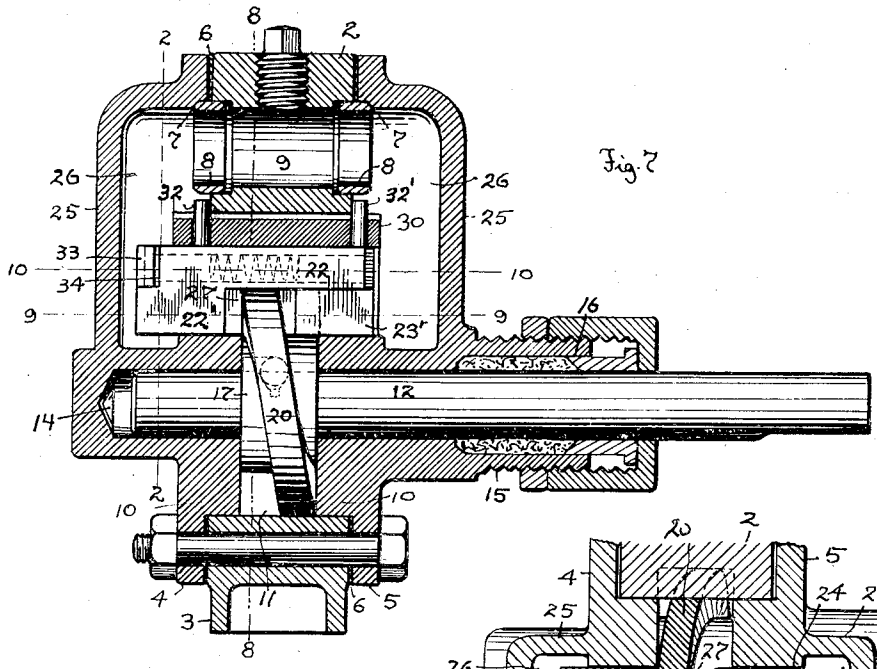
Fig. 7



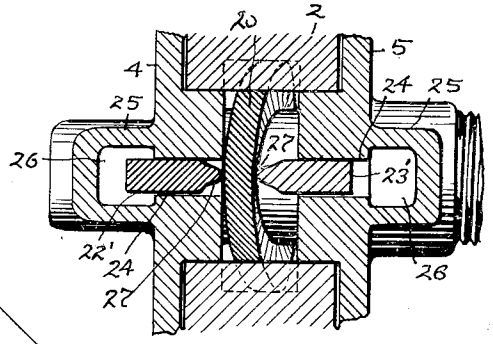


Fig. 9

Fig. 8

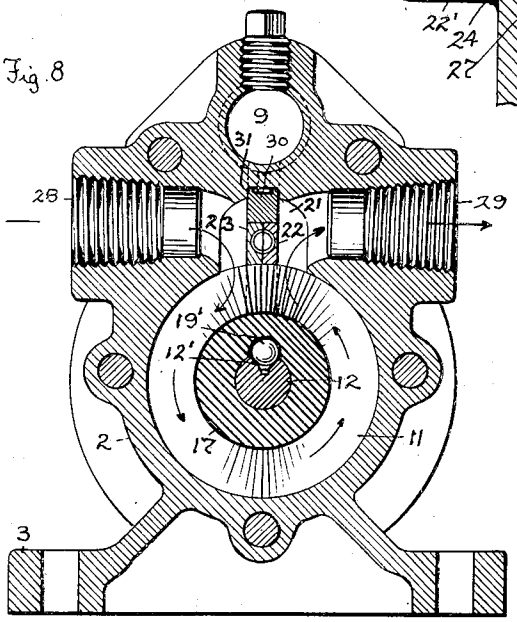
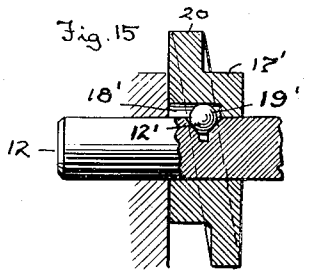


Fig. 15



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ROTARY PUMP

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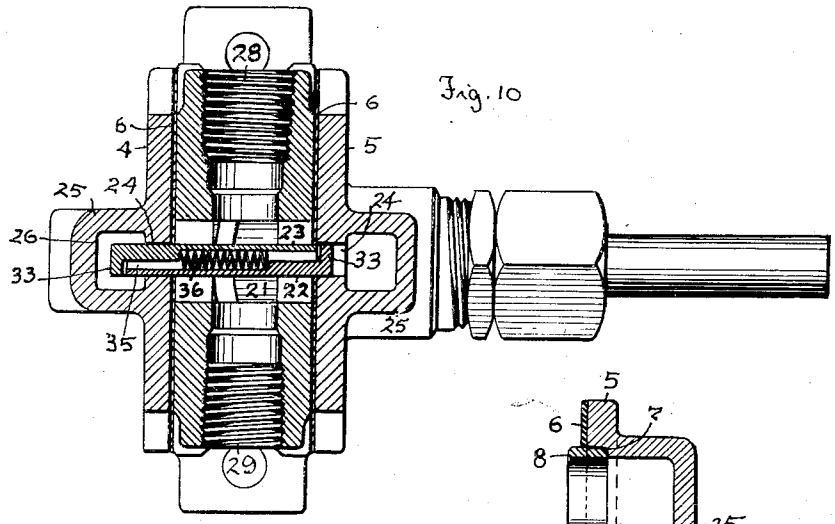

Fig. 10

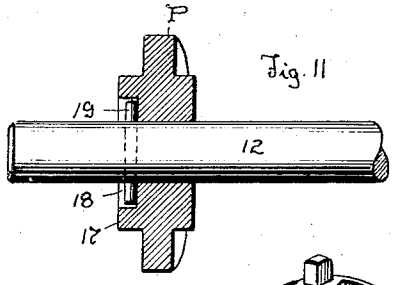

Fig. 11

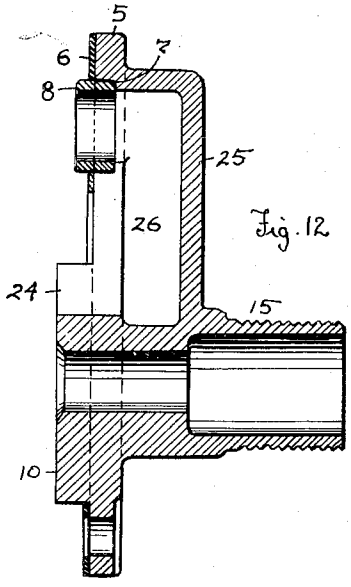

Fig. 12

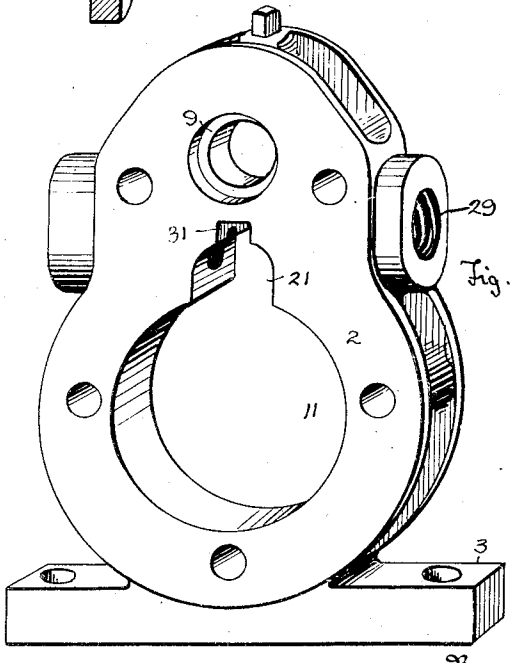

Fig. 13

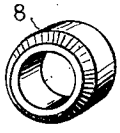

Fig. 14

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Patented Jan. 3, 1928. 1,654,883

UNITED STATES PATENT OFFICE.

JOSEPH F. JAWOROWSKI, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO JOSEPH F. JAWOROWSKI AND SAMUEL DETTELBACH, BOTH OF CLEVELAND, OHIO.

ROTARY PUMP.

Application filed January 11, 1926. Serial No. 80,497.

My invention relates to an improvement in a rotary pump, my object in general being to provide a pump of simple construction and high efficiency, all as embodied in the details of construction and the working aggroupment of parts substantially as hereinafter shown and described and more concisely pointed out in the claims.

In the accompanying drawings, Fig. 1 is a side elevation of my improved pump, and Fig. 2 is an end view and vertical section on line 2—2 of Fig. 7. Fig. 3 is a perspective view of one abutment section; Fig. 4 a side view of the spring used with the abutment sections; Fig. 5 a perspective view of the other half section of the abutment; and Fig. 6 a perspective view of the abutment section and spring assembled. Fig. 7 is a vertical section longitudinally of the pump, showing the main shaft and abutment member in elevation. Fig. 8 is a vertical section transversely of the pump on line 8—8 of Fig. 7. Fig. 9 is a horizontal section on line 9—9 of Fig. 7. Fig. 10 is another horizontal section on a higher plane as indicated by line 10—10 of Fig. 7. Fig. 11 is a sectional view of a pumping disk secured by a pin upon the main shaft. Fig. 12 is a sectional view of one side plate of the pump, and Fig. 13 is a perspective view of the main pump body. Fig. 14 is a perspective view of the connecting ferrule for the side plate. Fig. 15, sheet 2, is a sectional view of a pumping disk secured by a ball upon the main shaft. Figs. 16 and 17 are enlarged sectional views of a modified form of abutment member, Fig. 16 being a cross-section on line 16—16 of Fig. 17.

The pump comprises a main body 2 of partly circular outline having a spreading base 3 of narrower width than the main body which possesses perfectly flat faces on opposite sides thereof to permit a pair of closure plates 4 and 5 to be bolted thereto together with thin gaskets 6 of the same shape as each plate and the openings therein. To facilitate a true alignment between the body and side plates and the attachment thereof together with the thin gaskets, each plate is provided with a circular opening and seat 7 in the upper part of its flat face into which a beveled ferrule or connecting bushing 8 is tightly pressed, the ferrule extending about half its length beyond the face of the plate to permit its entrance into the counterboard end of a cross bore 9 in the top portion of body 2. Each counterbore is deep enough to receive the ferrule freely and permit the side plate to be bolted tightly against the gasket and body, but each gasket is sleeved tightly over the projecting part of a ferrule 8 and also sleeved snugly over a round hub 10 extending from the closure side of each plate, thereby aligning the gasket and its openings with the openings in the plate and permitting the gasket and plate to be removed and replaced together or as a unit, and the ferrule and hub also co-act to align the side plates and the several openings therein with the corresponding openings in body 2. Thus, body 2 has a large round opening 11 which receives the two hubs 10 and forms a working chamber for a rotary member or piston P mounted upon a shaft 12 extending through central openings in the hubs. Preferably one end of the shaft projects into a closed opening 14 in closure plate 4 and the other end extends through an elongated extension 15 on plate 5 and also through a packing gland 16 affixed to the extension.

Piston P comprises a round hub 17 sleeved and keyed upon shaft 12. Thus, in Fig. 11 I show a channel 18 milled diametrically in the end face of hub 17 to receive the projecting ends of a locking pin 19 carried by shaft 12. In Fig. 15 I show a steel ball 19′ projecting into a groove 18′ upon the inside of a hub 17′ the ball being seated within a tapering recess 12′ in the shaft. In either case it is desirable that the pin or ball shall be wholly confined within the hub 17 so that the circumference of the hub will be smooth and closed at each side of the annular wall or flange 20 of the piston, and which wall or flange extends annularly in an oblique plane around the hub to divide the working chamber or opening 11 in body 2 into two working spaces which communicate with or open into a cross chamber 21. This cross chamber is closed at its ends by the side plates 4 and 5, see Fig. 10, and divided into separate inlet and outlet passages by the flat extensions 22 and 23 of a pair of abutment members or sections 22′ and 23′, respectively. The flat extensions 22–23 are each one-half as thick as the abutment sections proper to permit them to overlap each other, and each extension is long enough to

project through a narrow slot 24 in the corresponding side plate, see Fig. 10. These side plates are formed with ribbed or offset portions 25 having vertical passages 26 which admit the abutment members and afford open communication with the ferrules or bushings 8 and the cross bore 9 in body 2, see Fig. 7. The abutment sections are rounded or tapered at their inner edges 27 where they are held oppositely in constant bearing engagement against the flat sides of the oblique wall or flange 20 of the piston. Each abutment section is seated in sliding contact with the round hub 17 so that the circular working space at each side of the oblique flange of the piston will be divided radially by the abutment, and the overlapping extensions of the abutment extend upwardly into chamber 21, centrally between two separate horizontal intake and discharge openings 28 and 29 adapted to be connected by pipes to the source of supply and a separate place of delivery.

Piston P is held in working position by a hardened steel bar 30 superposed directly upon the upper edges of the overlapping extensions 22–23 and confined at its upper edge within a shallow groove 31 in the top of chamber 21, see Figs. 8 and 13. In addition bar 30 carries two vertical pins 32–32′ which are spaced apart the same distance as the thickness of body 2 so that the pins may engage the flat sides thereof and lock the bar against longitudinal movement and displacement. Each abutment section has its reduced extension provided with a right-angled lip or lug 33 which projects into an angular recess 34 in the opposite abutment section, and the meeting faces of the overlapping extensions have parallel grooves 35 in which a coiled compression spring 36 may be confined to press the two abutment sections in opposite directions and hold the opposing edges 27 of the abutment members against the oblique wall or flange 20 of the piston. This working contact of the abutment sections with the piston is further fostered by reason of the differences in area at the inner ends of the abutment sections where a linear contact is provided with the piston and at the outer ends of the same abutment sections where fully exposed to the pressure of the fluid confined within the vertical passages 26 in the side plates. Thus the abutment sections slide freely through the slots 24 in the side plates and have a slight clearance in respect thereto on the side exposed to the fluid under pressure, thus permitting a constant pressure to be maintained in the vertical passages 26 and cross bore 9, which pressure is applied equally to the outer ends of both abutment sections at all times during the operation of the pump.

In Figs. 16 and 17, I show a modified form of abutment, comprising two overlapping blades 37 and 38 of substantially the same shape and form as the abutment sections 22′ and 23′ hereinbefore described, excepting that separate coiled springs 39 and 40 are confined within separate bores 41 and 42 in the main body part of each blade instead of a single spring 36 held in grooves 35. Springs 39 and 40 press outwardly against depending lugs 43 at the outer ends of the overlapping extensions 44, thereby holding the abutment sections or blades 37 and 38 against the oblique wall or flange 20 of the piston as indicated in Fig. 9.

What I claim is:

1. A rotary pump, comprising a body having a round working chamber, a sliding abutment formed of two sections overlapping each other and extending transversely of said chamber, a rotary member having an annular rib interposed between said sections and dividing said chamber obliquely into separate segmental spaces, and a removable separate bar superposed upon both sections.

2. A rotary pump, comprising a chambered body having inlet and outlet passages, a rotary member having an annular rib disposed obliquely within said chambered body, a sliding abutment member engaged by and adapted to be reciprocated transversely of said chambered body by said rib, closure plates for the sides of said chambered body having pockets adapted to receive the ends of said abutment member, and said body having a separate transverse communicating opening of substantial size for said pockets.

3. A rotary pump, comprising a body having a working chamber and inlet and outlet passages, closure plates for the sides of said body having slotted walls, a sliding abutment made in two sections having extensions overlapping each other supported and guided within and by said slotted walls, and a rotary member journaled within said plates having an oblique flange interposed between the abutment sections.

4. A rotary pump, comprising a body having a round chamber and inlet and outlet passages, closure plates for the sides of said chambered body having pockets and slots opposite said chamber intermediate said inlet and outlet passages, a sectional abutment seated within said slots having overlapping extensions projecting into said pockets, a rotary member having an annular flange obliquely related to the inner walls of said closure plates, and a spring confined between said abutment sections and arranged to press the sections in opposite directions against said flange.

5. A rotary pump, comprising a chambered body having removable closure plates at its sides, a rotary member journaled in said plates having an annular flange obliquely related to the axis of said member

and confined within said chambered body, a sliding abutment engaged by said rib, guide slots and receiving pockets within said closure plates for said sliding abutment, said body having inlet and outlet passages upon opposite sides of said abutment, and a transverse opening in its top portion, and said plates having ferrules connecting the ends of said transverse opening with said pockets.

6. A rotary pump, comprising a body having a round working chamber and a transverse space open to said chamber and inlet and outlet passages communicating with said space, closure plates for said chamber at opposite sides of said body having pockets and slots adjacent said space, a sliding abutment extending at its opposite ends into said slots, a drive shaft journaled within said plates having a round enlargement confined within said round chamber and formed with an annular flange extending obliquely around it, gaskets interposed between said plates and body, and said plates having hub portions and ferrules over which said gaskets may be sleeved.

7. A rotary pump, comprising a body having a working chamber and a rotary piston therein, an abutment member made in two overlapping pieces engaging said piston reciprocally, and a bar superposed upon said overlapping pieces having spaced pins interlocked with said body.

8. A rotary pump, comprising a body having a working chamber, a rotary piston having an oblique wall sub-dividing said chamber, a sectional abutment having overlapping extensions extending transversely across said piston wall and provided with blade portions depending into said chamber, and springs interposed between the abutment sections to press the same in opposite directions against said piston wall.

9. A rotary pump, comprising a body having a working chamber and a rotary piston therein, an abutment member made in two overlapping pieces engaging said piston reciprocally and spring means adapted to press the sections in opposite directions against said piston.

In testimony whereof I affix my signature.

JOSEPH F. JAWOROWSKI.