Nov. 6, 1928. 1,690,728

J. F. JAWOROWSKI

ROTARY PUMP

Filed June 16, 1927 2 Sheets-Sheet 1

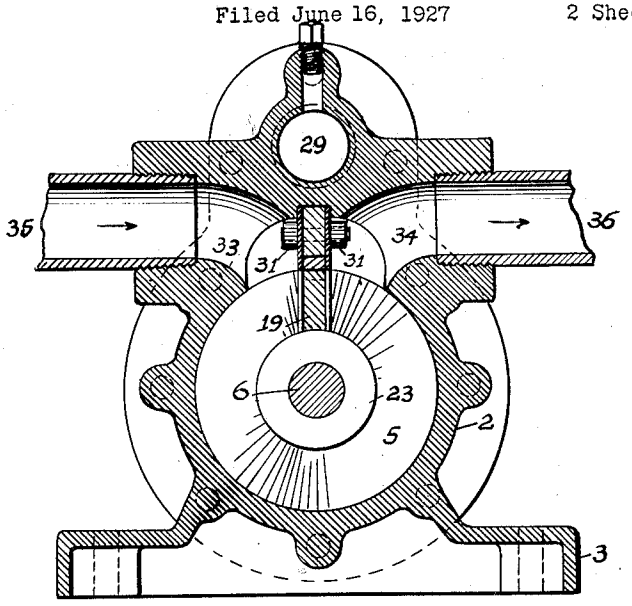


Fig. 1.

Fig. 3

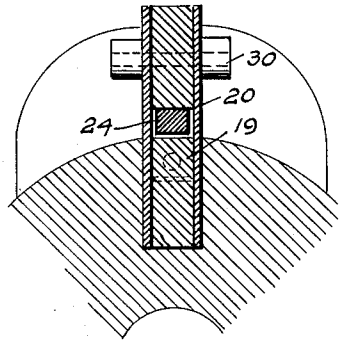


Fig. 2

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Fig. 4

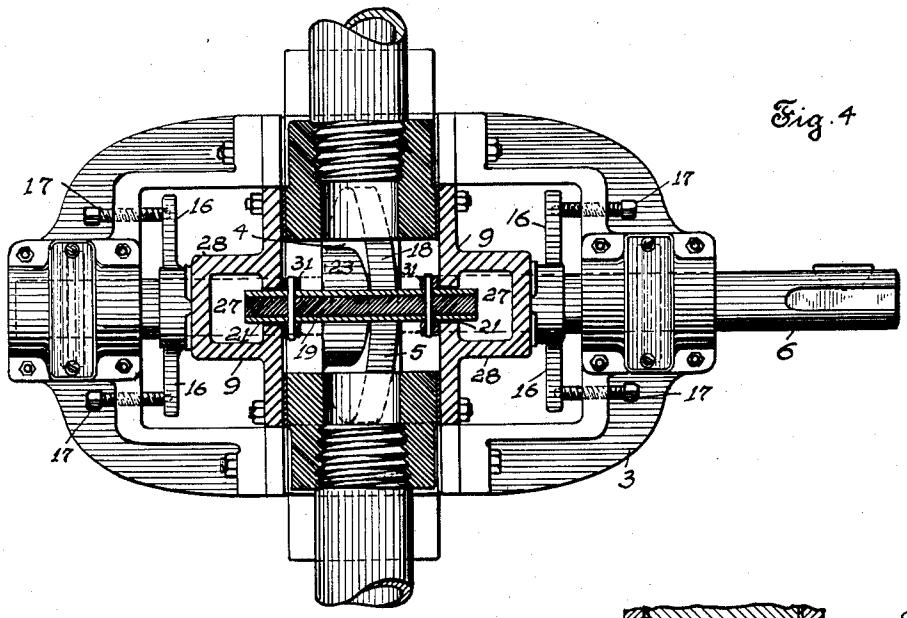


Fig. 5

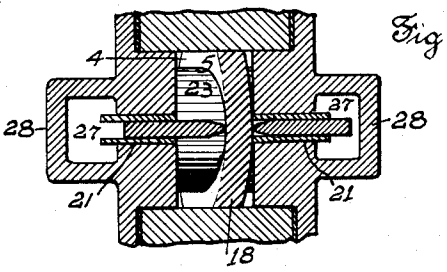


Fig. 6

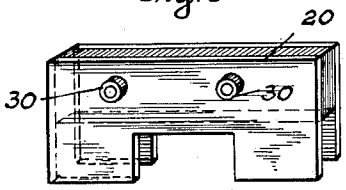


Fig. 9

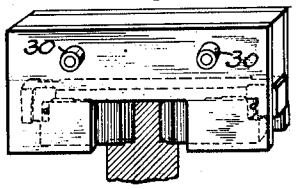
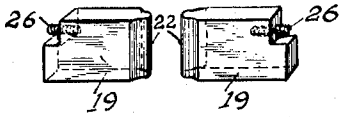


Fig. 7



Fig. 8



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UNITED STATES PATENT OFFICE.

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

ROTARY PUMP.

Application filed June 16, 1927. Serial No. 199,187.

This invention relates to rotary engines, and the device is more particularly constructed and arranged to operate as a pump, being an improvement in the pump shown and described in my application for patent filed January 11, 1926, Serial No. 80,497. Thus the present improvement resides more especially in the means for obtaining and maintaining good sealing relations between the working parts of the pump and for increasing the efficiency and working life thereof, and the parts involved are also constructed with a view to simplifying their production and promoting assembly thereof. The present pump is also particularly designed and constructed for heavy duty and large capacities, and embodies adequate means for preventing leakage at the driving shaft and for supporting and lubricating the shaft, all as hereinafter shown and described and more particularly pointed out in the claims.

In the drawings annexed hereto, Fig. 1 is a vertical section centrally through the pump transversely of the shaft, and Fig. 2 is a vertical section of the pump longitudinally of the shaft. Fig. 3 is a sectional view, enlarged, of the removable abutment for the pump. Fig. 4 is a horizontal section of the pump on line 4—4 of Fig. 2. Fig. 5 is a horizontal section of a part of the pump on line 5—5 of Fig. 2. Fig. 6 is a perspective view of the removable holder for the reciprocable abutment blades, and Fig. 7 is a perspective view of the connecting yoke and bearing member for the reciprocable abutment blades. Fig. 8 is a similar view of the two blades. Fig. 9 is a perspective view of the holder, yoke and blades, assembled, and a sectional view of a part of the rotor member interposed between the blades.

The pump comprises an irregular shaped main body 2 having a spreading base 3 and flat sides. The central part of this body is substantially circular and formed with a round opening or working chamber 4 within which a rotary driving member 5 is confined. Member 5 is a fixed or integral part of a drive shaft 6 supported at opposite sides of body 2 by bushed bearings 7—7. Each bearing is supported by lateral arms 8—8 cast integral with or bolted to a pair of side closure plates or heads 9—9. Each bearing may contain an oil chamber 10 within which an oil collecting ring 11 may be suspended from shaft 6, and these bearings are spaced apart from the side plates or heads 9 to permit an adjustable packing gland 12 to be sleeved upon the shaft opposite a packing ring 14 and packing 15 within a recess in the outer side of each side plate or head. Each packing gland 12 comprises two arms 16 adapted to be engaged by set screws 17 extending through the supporting arms 8 at opposite sides of each bearing 7, whereby the packing may be readily compressed and leakage prevented at opposite sides of working chamber 4 at the joint between shaft 6 and each side plate or head 9. This working chamber is divided obliquely into two working spaces by an annular wall or flange 18 which forms a part of rotatable member 5. Each working space is in turn divided by a blade or abutment member 19 which is supported in a sliding position within a channeled member or holder 20 held or fixed immovably within cross slots 21 in each side plate or head opposite driving member 5, see Fig. 5. The inner end 22 of each blade 19 is reduced in thickness or beveled on opposite sides to a narrow edge to effect linear contact with a flat side of the oblique flange 18 which operates as a cam to slide the blade. The bottom edge of each blade rides on the round surface of hub 23 of rotatable member 5, and the top edge of each blade is engaged by a rectangular bar 24 and bridge piece which extends lengthwise over both blades and spans the flange 18. The opposite ends of bar 24 are flanged or provided with depending portions 25, and the corners of the blades are notched or recessed to receive these depending portions, thereby confining the blades at their outer ends between the depending extremities of the bar or bridge piece. A small compression spring 26 is seated within an opening in the outer end of each blade 19, which spring presses against the depending portion 25 and serves to keep the blade in constant working engagement with rotatable flange 18 of member 5, and two springs press in opposite directions towards such flange. The connecting bar or bridge piece 24 causes both blades to move together in the same direction when a reciprocable movement is imparted to these parts by the inclined wall or flange 18 of rotatable member 5. Bar 24 is held against displacement by channeled holder 20 which

is made relatively long to provide a substantial support and guide for the blades and said bar. Thus the opposite ends of holder 20 extend beyond the flat sides of body 2 into vertical passages 27—27 in the offset walls 28 of the side plates or heads 9, which passages are connected in open communication with each other at their upper ends by a round cross port 29 in body 2. Holder 20 is a removable part but it is rigidly secured within body 2 when side plates 9 are bolted to the body. Thus a pair of pins 30—30 extend through the upper part of holder 20, which pins have exposed collars 31—31 adapted to bear against the inner faces of the side plate, see Fig. 4. A recess of space 32 is also provided transversely in body 2 above rotor member 5, which recess or space is divided centrally by holder 20 to provide two separate transfer passages between working chamber 4 and a pair of intake and outlet ports 33 and 34, respectively, to which supply and delivery pipes 35 and 36, respectively, may be connected, see Fig. 1. Holder 20 is in effect a removable division wall for the intake and outlet sides of the pump, and it also acts as a supporting guide for the reciprocating blades 19 and their common bar 24. The inner portions of these blades which extend into working chamber 4 and contact with the oblique wall of rotor 5 serve as movable abutments. Bar 24 rests upon the top edges of the blades, and the sides and bottom edge of this bar may be channeled or grooved as at 36, see Fig. 7, to permit the fluid under pressure to pass into the channeled part of the holder on opposite sides of the blades to offset the binding pressure on the blades. The bar and blades are thereby permitted to float or operate more freely, and a constant pressure is also built up and maintained in the vertical passages against the outer ends of the blades and bar whereby the blades are pressed into contact with the rotor. The tapering or beveled end edges of the blades reduce the area of contact to a minimum against the rotor wall, and inasmuch as only one side of a part of the blade is exposed to the pressure an overpressure against the square outer edge of each blade is obtained which keeps the blade in tight working contact with the rotor wall. The pressure against one side of the blade permits seepage at that side to the vertical passages containing the outer flat ends of the blades, and a part of this seepage passes underneath the connecting bar where notched and to the opposite side of the bar but only between the depending sides of the holder so that the pressure on one side of the blade is partly offset by the pressure on the other side, thereby preventing excessive wear and bind between the parts, especially in a pump of large size and capacity.

What I claim, is:

1. A rotary pump, comprising a body having a circular working chamber, a rotor obliquely mounted between the sides of said chamber, a pair of sliding abutment blades engaging said rotor and subdividing said chamber, and a channeled holder for said blades rigidly secured within said body opposite said working chamber removable therefrom.

2. A rotary pump, comprising a body having a round chamber therein, a rotor within said chamber, a pair of sliding abutment blades extending transversely of said chamber and engaged with said rotor, a connecting bar for said blades, and a removable holder for said blades and their connecting bar.

3. A rotary pump, comprising a body having a main working chamber in which a rotary pumping member is confined, together with a pair of slidable abutment blades, a connecting bar and springs to hold said blades in working contact with said rotary member, and a channeled holder removably secured within said body to support and guide said blades.

4. A rotary pump, comprising a body having a pumping chamber, removable heads on opposite sides of said body, a rotary member obliquely mounted within said chamber, a pair of abutment blades at opposite sides of said rotary member, and a channeled holder for said blades removably mounted within said body and rigidly held in place by said heads.

5. A rotary pump, comprising a body having a working chamber, a pair of reciprocating abutment blades and a rotary member mounted within said chamber, a channeled holder for said blades having pins extending therefrom, and removable closure plates for said chamber adapted to bear against said pins to secure said holder within said body.

6. A rotary pump, comprising a chambered body having a rotor therein and slidable abutment members on opposite sides of said rotor, a connecting bar for said slidable abutment members, and a holder having depending sides confining said bar and blades for joint movement opposite said rotor.

7. A rotary pump, comprising a chambered body, removable closure plates at opposite sides of said body having recesses therein, a rotor member within said chambered body, slidable blades engaging opposite sides of said rotor member, and a channeled holder member for said blades of greater length than the width of said body adapted to extend into the recesses in said closure plates to support and guide said plates full length thereof in their sliding movements.

8. A rotary pump, comprising a chambered body, a rotor member and slidable abutment blades within said body, and a connecting bar for said blades having fluid transferring spaces open to both sides of the blade and to the pressure side of said pump.

9. A rotary pump, comprising a chambered body containing a rotor and slidable abutment blades, and a channeled holder within which said blades are adapted to operate, having a notched bearing part for the top edges of the blades, whereby a communicating pressure space is provided within the holder between opposite sides of said blades.

10. A rotary pump, comprising a chambered body, a rotor member and slidable abutment blades within said body, a connecting bar for said blades having a notched bearing face for the blades, and a channeled holder for said bar and blades removably mounted within said chambered body opposite said rotor member.

In testimony whereof I affix my signature.

JOSEPH F. JAWOROWSKI.