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P. C. PETERSEN

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REVERSIBLY ASSOCIATED ROTARY PUMP AND VALVE DEVICE

Filed Oct. 24, 1935

2 Sheets-Sheet 1

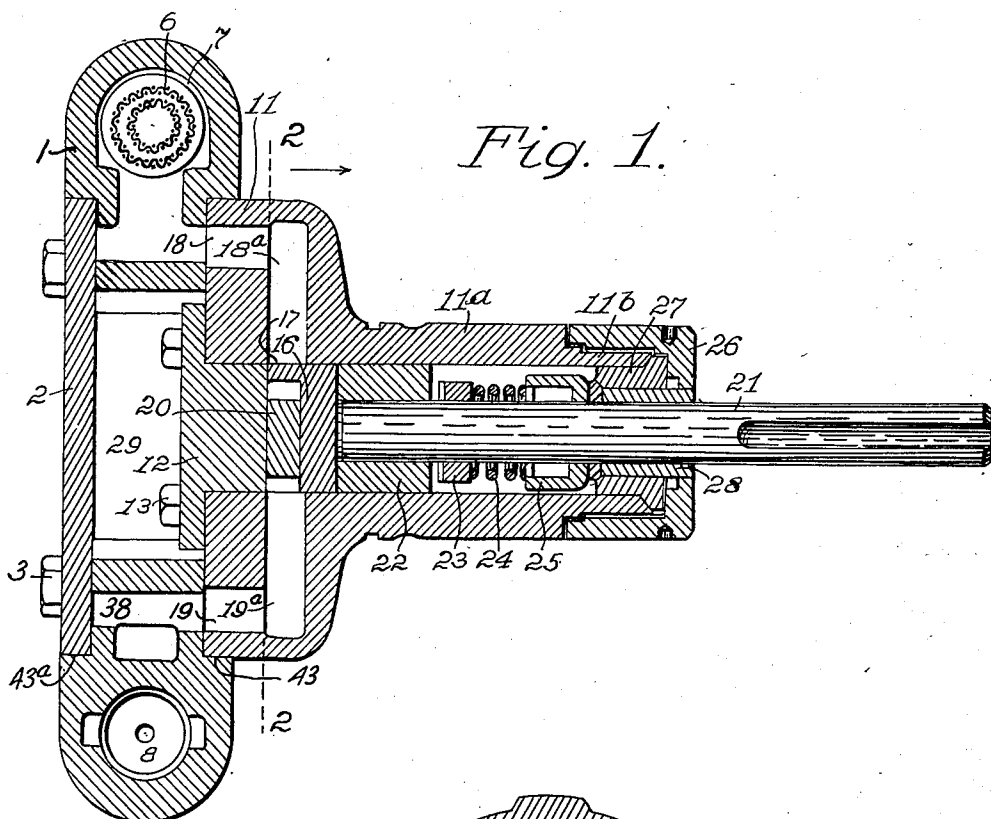


Fig. 1.

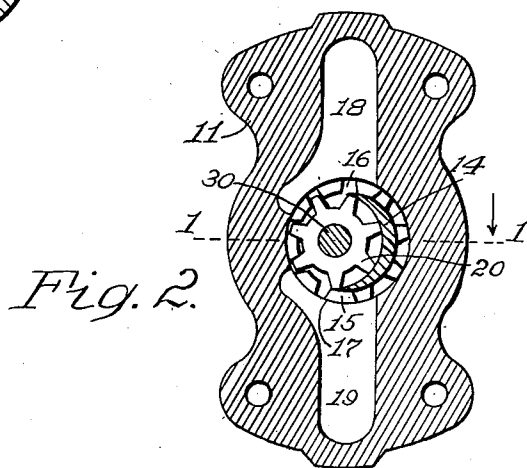


Fig. 2.

Inventor

Peter C. Petersen,

By

G. B. Kennedy,

Attorney

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P. C. PETERSEN

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Fig. 3.

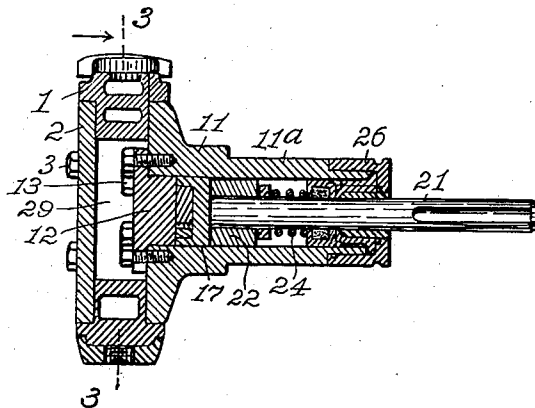
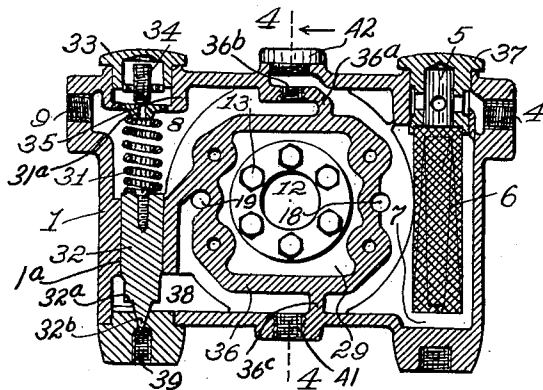


Fig. 4.

Inventor

Peter C. Petersen,

by

G. B. Kennedy,

Attorney

UNITED STATES PATENT OFFICE

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REVERSIBLY ASSOCIATED ROTARY PUMP
AND VALVE DEVICEPeter C. Petersen, Cedar Falls, Iowa, assignor to
Viking Pump Company, Cedar Falls, Iowa, a
corporation of Delaware

Application October 24, 1935, Serial No. 46,536

1 Claim. (Cl. 103—3)

My invention relates to improvements in reversibly associated rotary pumps and valve devices, and the principal object of my improvements is to provide a rotary pump with a removable valve chamber which latter contains the inlet and outlet ports for the pump, and the pump and valve chamber being respectively shaped for reversal of either relative to the other, for convenience in either case in emplacing the combined structures in any of various locations to conform thereto and without other changes in the pump and valve.

Another object of my improvement is to shape the valve chamber with like opposite faces having alike mating faces for an outer removable interchangeable closure, and the pump body having an end seat adapted to receive either of said valve mating faces when either the pump or the valve chamber are relatively reversed in position to effect the above mentioned first object.

These objects I have accomplished by the means which are hereinafter described and claimed, and which are illustrated in the accompanying drawings.

Fig. 1 is a longitudinal axial section of the adjustably connected and seated pump and valve chamber according to my invention, taken on the broken line 1—1 of Fig. 2. Fig. 2 is a transverse section of the head part of the pump containing the rotor chamber, taken on the broken line 2—2 of Fig. 1 looking in the direction indicated by the arrow. Fig. 3 is a transverse section on the line 3—3 of Fig. 4, and Fig. 4 a reduced longitudinal section of the pump and valve chamber on the line 4—4 of Fig. 3, both figures as indicated by the arrows.

I have shown herein a preferred form of my said invention of reversibly associated pump and valve chamber, including the interior devices of both for attaining their respective objects, but it is to be understood that this invention pertains to said association of pump and its valve chamber generally as being each reversible relative to the other according to the requirements of the emplacements, and that the special pump construction and that of the particular passageways of the valve chamber may be considerably varied without departing from this present invention.

The numeral 11 denotes the widened forward part of a pump body having a rearwardly directed and diminished integral bearing 11a of cylindrical axially hollowed shape with removable end cap 26 apertured to receive therethrough a bushing 28 seating the rear portion of a rotor stem 21 to project rearwardly therefrom. The pump part 11

contains a central rotor chamber 17 seating rotatably a rotor 16 fixed on the stem 21, the rotor having inwardly directed crown teeth to mesh with spur teeth on an idler 20 in said chamber, with the idler rotatable on a fixed pin 30 (see Fig. 2) projecting inwardly from a flanged cap 12 secured by screws 13 to and to close said chamber. A crescental body 14 is also fixed upon the inner face of the cap 12 closing an interior space between the rotor and idler to prevent a by-passage therebetween to opposite outlet passage 19—19a from an inlet passage 18—18a in the part 11.

The forward part of the stem 21 traverses a bushing 22 in the hollow of the pump part 11a. The flanged and beveled ring 27 is seated upon the rear bushing 28 for limited longitudinal adjustments therealong, the forward end of the ring engaging a sealing ring on said stem and the sealing ring engaging the rear closed wall of a forwardly cupped member 25 engaging the rear end of a compression spring 24 on said stem for adjustably compressing the spring against a fixed ring 23 on said stem. The above structures are not specifically claimed herein.

The numeral 1 denotes the valve chamber shown in Figs. 1 and 3 in detail, and removably associated with the pump head 11. This chamber has like forward and rear parallel faces having like central depressed circular seats 43a, and 43, in either of which may be removably fitted a circular closure plate 2, secured by screws 3. This closure plate is to close the forwardly directed depressed seat 43a in use. The forward end face of the pump chamber 11 is shaped to fit the rearwardly disposed depressed seat numbered 43, which, however is as stated the counterpart of the forward seat 43a. The screws 3 also removably fasten the valve chamber 1 to the pump head 11. A closed hollow 29 in the chamber 1 receives the forward portion of the flanged cap 12 when the chamber 1 is secured in place on the pump.

Referring to said Fig. 3, the chamber 1 has oppositely and diagonally disposed inlet and outlet ports 4 and 39 respectively. The inlet port 4 is in communication with a cavity 7 which in turn is in communication with the pump inlet port 18. A depending cylindrical reticulated sieve 6 in the cavity 7 has its upper end traversing a seat in a chamber in communication with the inlet port 4, to filter entering liquid before delivery to the pump chamber, and a rock-valve 5 having angularly disposed two-way ports may be rocked to open or close the communication of the inlet port 4 with the cavity 7 by way of said sieve.

A screw plug 37 closes the chamber seating said rock-valve for clean-out or valve removal purposes.

The valve chamber has an inner partition 36 around the said central hollow 29. Similar cavities 7 and 8 are at opposite sides of said partition. The partition 36 at the top has a web part 36a closing communication between it and said cavities, this part having a threaded seat closed by a removable screw body 36b, which when removed allows cleaning or flushing of both cavities when necessary, and made accessible by a threaded seat in the top of the chamber 1 having a screw closure 42. The partition 36 has a cross web at the bottom separating said cavities 7 and 8. The bottom wall of the valve chamber has a threaded port usually closed by a headless removable screw plug 41, for occasional drainage purposes.

The valve chamber 1 contains in its cavity 8 a cylindrical bearing 1a seating the cylindrical body of a solid valve 32 whose upper end is engaged by a compression spring 31, the upper end of which is below an aperture in a chambered seat 35 in which seat is an adjusting pressure screw 34 against a cap 31a of the spring to regulate its tension. A hollow screw-cap 33 closes said seat above. A by-pass port 9 leads out of the chamber 8 to discharge any seepage of liquid past the body of the valve 32 to any conduit to conduct it to the container which supplies the port 4. The lower part of the valve 32 has a flat end with a depending central conical valve-head which is seated in a conical seat leading into said outlet port 39. The port 39 may have tubular connections with an oil-burner nozzle not shown, or otherwise. The cavity 38 which is below said valve seat for the valve-body 32, communicates between the outlet port 19 of the pump 11 and said outlet port 39 of the valve chamber 1.

The above description of the specific communications between the inlet port 4 of the valve chamber 1 and the outlet port 39 by way of the pump chamber 11 shows pumping means not claimed herein, and which may be varied without departing from my invention, which pertains solely to the respective reversibilities of the pump body and its removable valve chamber as described. As best shown in Fig. 2, the valve chamber 1 is adapted to be reversed in position after its removal from the pump body and the transposition of its front closure 2 to the opposite depressed seat 43a or 43 as the case may be, and then re-secured by said screws 3 which hold both the closure 2 to the valve chamber, and the valve chamber 1 to the pump body.

In some of the uses of the pump and its valve-

chamber, it is found desirable to position the former, as when serving an oil-burning device, in a space restricted in certain directions, and where when so located the valve chamber must be reversed in position relative to the pump body for suitable clearance from interfering objects. In other cases, it is necessary to reverse the pump chamber relative to the valve chamber, and this is possible with my invention without affecting the operation of the one way rotor 16.

It should be noted that when the valve spring 31 is tensionally adjusted, the valve 32 is governed by the pressure contact of liquid under varying pressure in the valve-chamber cavity 38. The rotor may have a speed of 4000 revolutions per minute, or other desired normal working speed of rotation, and develops considerable pressure in the cavity 38 and against the lower annular flattened end of the valve 32 and upon the conical point thereof upwardly, and in case of a variation of such speed of rotation, the pressure of the liquid in said cavity is raised or lowered, to cause corresponding shifting of the valve to accommodate the changes in also varying the delivery of liquid, as by way of the port 39 to an oil-burner. However, this is not claimed, being not in issue herein.

The installation of the valve-chamber with the pump body removably, and both having means for permitting, as necessary, the valve chamber being reversed and its cap 2 re-seated relatively to the pump body, or in another case, when the pump-body is reversed in position with regard to the valve chamber, allows, without need for reversing the direction of rotation of the rotor 16, the functioning of the pump conveniently in any desired locations or to avoid adjacent impediments.

I claim:

In combination, a rotary pump chamber having a widened end face with inlet and outlet channels leading respectively into and out of the rotor chamber by way of said end face, a delivery head for the pump chamber having in opposite faces like shaped recessed seats which fit and seat said widened end face thereof, the delivery head having therein only inlet and outlet channels leading to and from the inlet and outlet channels of the rotor chamber, an imperforate closure shaped to fit either seat of the delivery head when the latter is reversed in position to reverse the positions of the inlet and outlet channels of the head, and means for securing both the delivery head and said closure when assembled to the pump chamber.

PETER C. PETERSEN.