Jan. 2, 1934. L. R. LEVEEN 1,942,064

ROTARY PUMP

Filed July 25, 1931

Fig. 1.

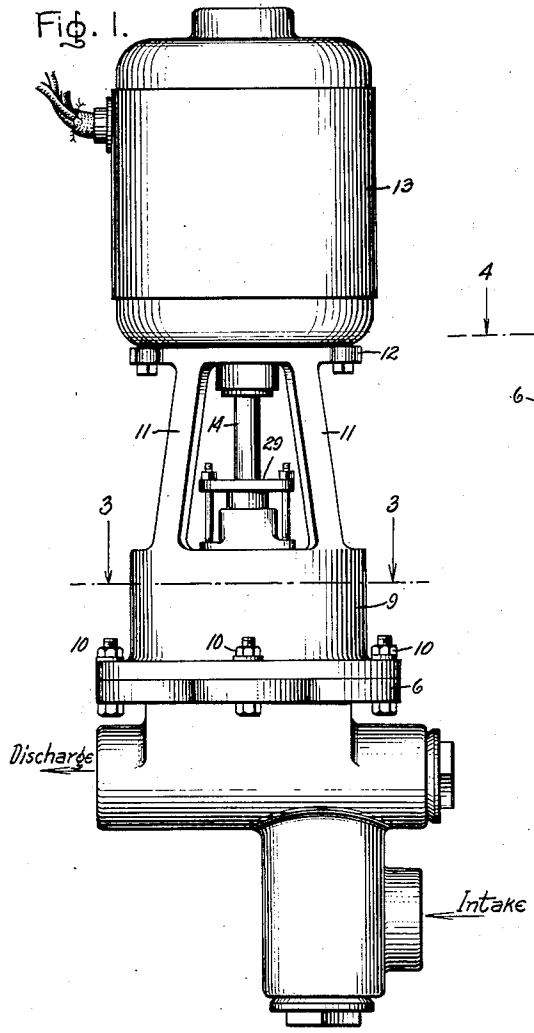


Fig. 2.

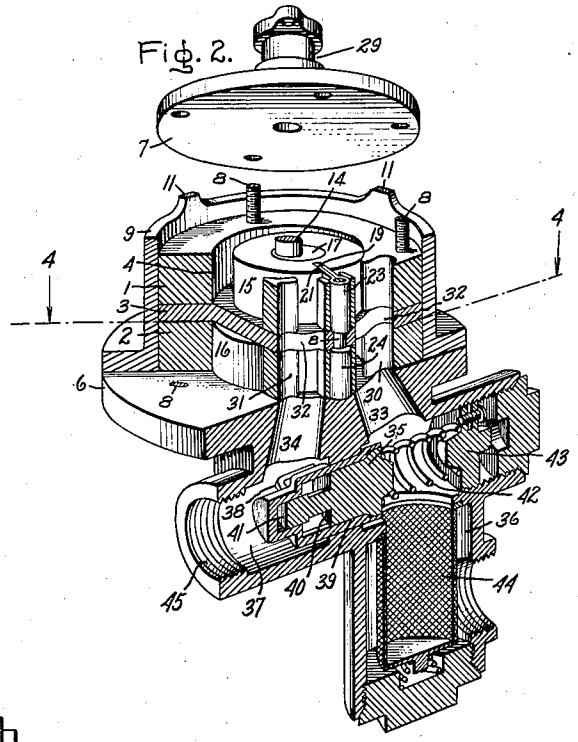


Fig. 3.

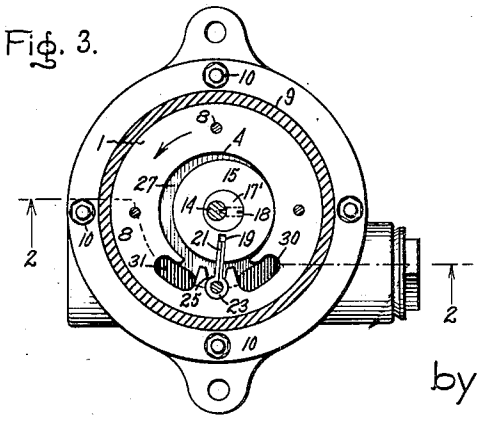
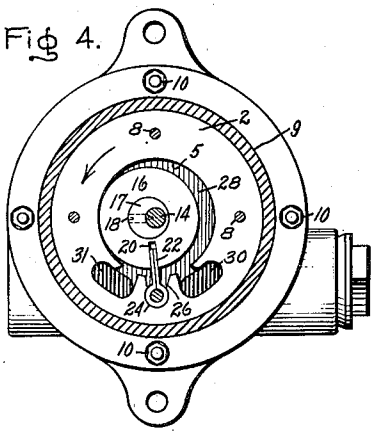


Fig 4.



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Patented Jan. 2, 1934

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UNITED STATES PATENT OFFICE

1,942,064

ROTARY PUMP

Laurence R. Leveen, Scotia, N. Y., assignor to General Electric Company, a corporation of New York

Application July 25, 1931. Serial No. 553,118

3 Claims. (Cl. 103—118)

My invention relates to rotary pumps.

An object of my invention is to provide an improved rotary pump of simplified construction which can be readily assembled.

Another object of my invention is to provide an improved rotary pump and an electric driving motor constructed as a single unit in such manner that the pump parts are accurately aligned and rigidly secured to the driving motor.

Further objects and advantages of my invention will become apparent as the following description proceeds, and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

In the drawing Fig. 1 is a side elevation of an electric motor and a pump in a single unit embodying my invention; Fig. 2 is a perspective sectional view taken on line 2—2 of Fig. 3; Fig. 3 is plan view taken on line 3—3 of Fig. 1, and Fig. 4 is a plan view taken on line 4—4 of Fig. 2.

Referring to the drawing, a two-cylinder pump which I have shown embodying my invention includes a pair of annular bodies or plates 1 and 2 coaxially arranged and separated by a spacing plate 3 so as to form two adjacent cylinders 4 and 5. The outer end walls of the cylinders are formed by a base plate 6 and an end plate 7 secured to the base plate by clamping bolts 8 loosely fitting in holes formed in the plates 1 and 2 and the spacing plate 3. A casing 9 bolted to the base plate 6, as indicated at 10, is bored to snugly fit about the outer periphery of the end plate 7, the plates 1 and 2, and the spacing plate 3, and is provided with arms 11 terminating in a flange 12 to which an electric motor 13, or other suitable driving means, is secured. The casing 9 accurately aligns the pump parts and the extending arms 11 provide a rigid and unitary motor and pump construction.

A shaft 14 of the motor 13 extends concentrically through the axes of the cylinders 4 and 5 for actuating oscillating cylindrical pistons or displacement members 15 and 16 in the cylinders by eccentrics 17 and 17′ angularly displaced 180 degrees and secured to the shaft 14 by set screws 18, the angular displacement of the eccentrics giving a corresponding displacement of the pistons 15 and 16 so as to obtain a smooth flow of fluid being pumped.

The pistons 15 and 16 do not rotate with the shaft 14, but oscillate in the cylinders, as they are slotted at 19 and 20 to slidably receive blades 21 and 22 which are provided with cylindrical portions 23 and 24 at one end thereof fitted into recesses 25 and 26 in the plates 1 and 2 and have openings to receive one of the clamping bolts 8, so as to obtain a rocking connection of the blades and the cylinders.

The pistons 15 and 16 are of such size that the outer surfaces of the pistons travel about the walls of the cylinders 4 and 5 in close contact and they are closely fitted between the end plate 7, spacing plate 3, and base plate 6 to minimize leakage in the cylinders of the pump. When the pistons move about the walls of the cylinders intake and compression spaces 27 and 28 are formed between the cylinders and pistons. A packing gland 29 is provided for the shaft 14 above the end plate 7 to prevent any leakage from the pump. If a liquid is being pumped a liquid film is formed between the surfaces of the cylinder and blade in contact with the piston so that there is very small leakage in the pump during its operation. In pumping gases these surfaces may be lubricated to form a seal in a manner well known in the art.

I provide the plates 1 and 2 with spaced notches or recesses 30 and 31 in the inner wall thereof which extend axially entirely therethrough on each side of the blades 21 and 22, and these recesses are in alignment with a pair of spaced openings 32 in the spacing plate 3 and an intake port 33 and a discharge port 34 in the base plate 6 so as to provide communication between the intake port 33 and the intake side of the cylinders and between the discharge port 34 and the compression side of the cylinders. A by-pass valve 35 is arranged in a bore extending in the base plate 6 between intake and discharge passages 36 and 37 so that when the discharge head pressure builds up to a certain value, by-pass valve 35 will open and prevent any damage to the pump. The cage 38 of the valve is pressed into the bore and is provided with a cylindrical portion 39 surrounding the ribbed valve body 40. The valve is provided with a dashpot 41 and is urged to its seat by a spring 42 which is secured in place by a plug 43 threaded into the base plate 6 of the pump. When the discharge pipe is closed during the operation of the pump the pressure builds up sufficiently to open the by-pass valve 35 against the spring 42.

From the foregoing it will be apparent that the parts of the pump are very simple to make and require only boring, turning, and facing of the parts employed. The pump parts are readily assembled and aligned by the casing 9, and the arms extending from the casing for securing the

frame of the driving motor provide a rigid and compact motor and pump unit.

In the operation of my improved pump, fluid is drawn in through the intake passage 36 having a screen 44 therein, the intake port 33 and the axially extending recesses 30 which communicate with the intake spaces 28 of the cylinders, as shown in Fig. 4. As the outer surfaces of the pistons 15 and 16 travel about the walls of the cylinders 4 and 5 in the direction of the arrows the pistons assume the position shown in Fig. 3 to decrease the intake spaces and increase the compression spaces. When the pistons have again taken the position shown in Fig. 4 the compression spaces have decreased to discharge the fluid through the axially extending recesses 31, the discharge port 34, and the discharge passage 37 which is connected to a suitable delivery pipe secured in the threaded outlet 45. The angular displacement of 180° of the pistons 15 and 16 gives a smooth flow of fluid from the discharge passage 37.

Although I have shown my improved rotary pump in connection with a two-cylinder pump, I do not desire my invention to be limited to the particular arrangement set forth, and I intend in the claims to cover all modifications which do not depart from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. A rotary pump comprising an annular body, a motor having a shaft extending concentrically through the annular body, means snugly fitting about said annular body for supporting said motor, a displacement member eccentrically supported on said shaft and in the annular body and in close contact therewith, said annular body having spaced recesses in the inner wall thereof and extending axially entirely therethrough, and means between said recesses for dividing the space between said displacement member and said body into intake and compression spaces, said recesses forming intake and discharge passages communicating with said intake and said compression spaces.

2. A rotary pump comprising a pair of annular bodies arranged coaxially and separated by a spacing plate, said spacing plate having a pair of openings, plates for the outer ends of the bodies, a motor having a shaft extending concentrically through the annular bodies, means snugly fitting about said bodies and spacing plate for supporting said motor, displacement members eccentrically supported on said shaft and in the respective annular bodies and in close contact therewith, said annular bodies having spaced recesses in the inner walls thereof and extending axially entirely therethrough and in alignment with the openings in said spacing plate, and means between said recesses for dividing the spaces between said displacement members and said bodies into intake and compression spaces, said recesses forming intake and discharge passages communicating with said intake and said compression spaces.

3. A rotary pump comprising a pair of annular bodies arranged coaxially and separated by a spacing plate, said spacing plate having a pair of openings, a supporting base plate for the outer end of one body and provided with intake and discharge ports, an end plate for the outer end of the other body and secured to the base plate, a motor having a shaft extending concentrically through the annular bodies, means snugly fitting about said bodies and spacing plate and end plate for supporting said motor, displacement members eccentrically supported on said shaft and in the respective annular bodies and in close contact therewith, said annular bodies having spaced recesses in the inner walls thereof and extending axially entirely therethrough and in alignment with the openings in said spacing plate, and means between said recesses for dividing the spaces between said displacement members and said bodies into intake and compression spaces, the recesses providing communication between the intake port and the intake spaces and between the compression spaces and the discharge port.

LAURENCE R. LEVEEN.