April 6, 1954 J. M. ALUJA 2,674,195

ROTARY PUMP

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Fig.1

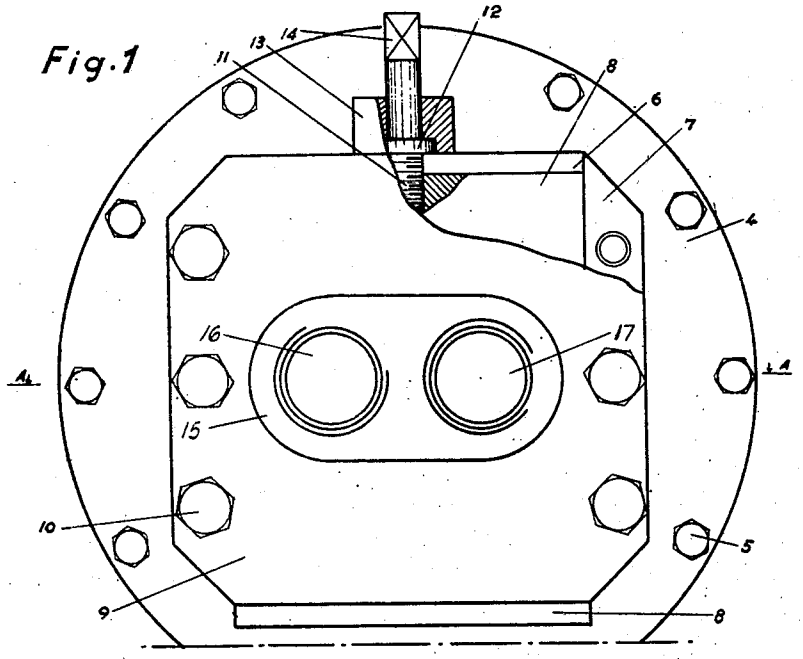
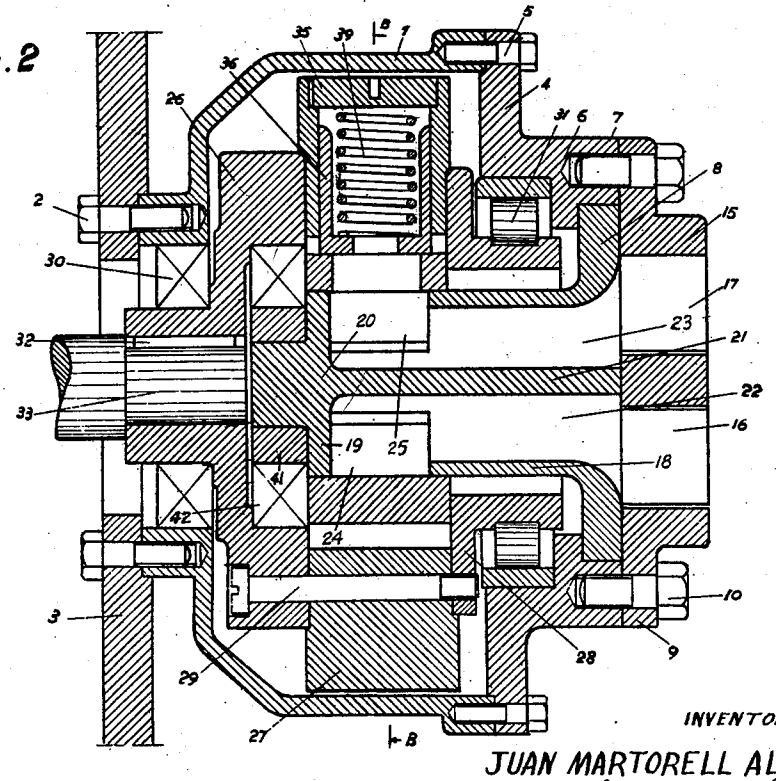


Fig.2



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Fig. 3

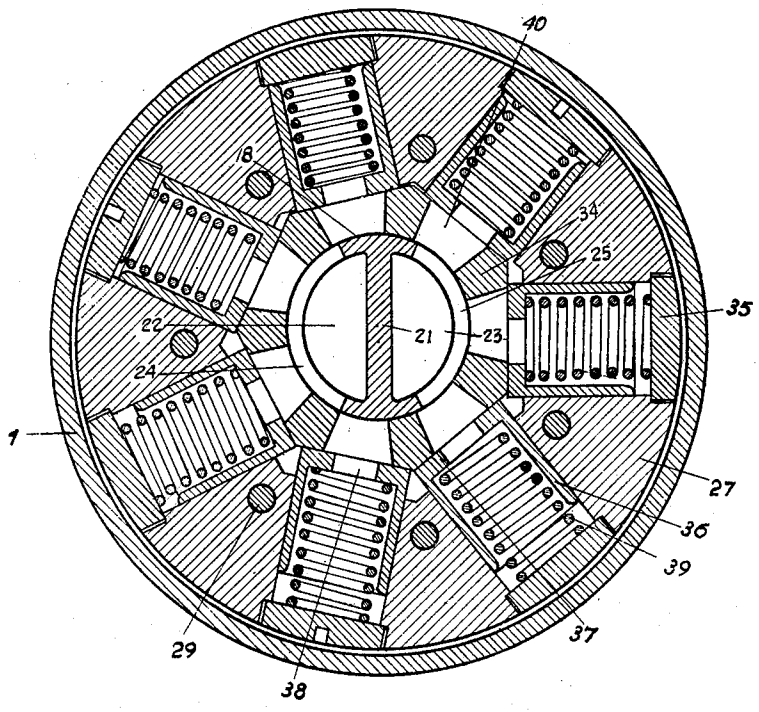


Fig. 4

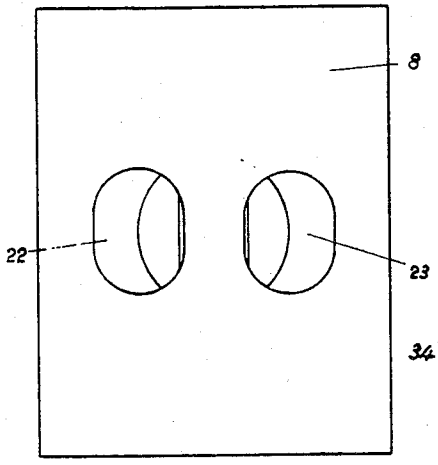
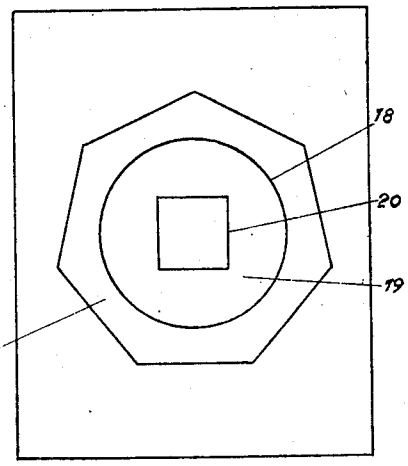


Fig. 5



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ROTARY PUMP

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Claims priority, application Spain
January 20, 1950

3 Claims. (Cl. 103—161)

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The present invention relates to rotary pumps and more particularly to those suitable for pumping at high pressures.

An object of the invention is to provide a high pressure rotary pump of a compact entity, of appreciably reduced size, comparatively easy to install, efficient in operation and yet has a conveniently located means for regulating the volume of liquid flowing therefrom.

In the accompanying drawings:

Fig. 1 is an end elevation partly in section of the pump embodying the invention;

Fig. 2 is a horizontal section taken on the line A—A of Fig. 1 in the direction of the arrow points;

Fig. 3 is a vertical transverse section taken on the line B—B of Fig. 2 in the direction of the arrow points;

Fig. 4 is a front elevation of the vertically adjustable nozzle casing; and

Fig. 5 is a rear elevation of the same.

The pump as herein shown comprises a bell-shaped casing 1 having a cylindrical inner end attachable by means of the stud-bolts 2 to a plate 3 or other support consisting of the platen of an electromotor or other device for driving the pump.

The outer or opened end of the casing 1 has detachably connected thereto a plate 4 by means of the stud-bolts 5. Formed with the plate 4 is an extension 6 provided with a pair of oppositely disposed and vertically extending guide members 7 to which are connected a cover plate 9 by means of the stud-bolts 10. Positioned axially within the casing of the pump is a pressure regulator having formed with one end thereof a plate 8 which latter is slidably retained between the guide members 7 by means of the cover plate 9 and the extension 6 of the plate 4.

To vertically adjust the plate 8 and the regulator carried thereby, I provide a stem 12 having a threaded connection 11 with the plate 8. This stem 12 and annular flange formed therewith as shown in Fig. 1 of the drawings is rotatably supported within a sectional bearing sleeve 13. One section of this sleeve 13 is formed with the extension 5, whereas the other section is formed with the cover plate 9 which when clamped together rotatably retains the stem 12 therein. The outer extremity of this stem 12 has a polygonal extension 14 capable of receiving a hand wrench for rotating the same whereby with the rotation of said stem the plate 8 and regulator carried thereby can be vertically adjusted between the guide members 7.

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Extending through the plate 9 and the boss 15 formed therewith is an inlet opening 17 and an outlet 16 to which may be connected suitable fluid conduits (not shown).

Formed with and extending from one side of the plate 8 is a cylindrical member 18 having formed therein a pair of conduits 22 and 23 which are separated from one another by means of the partition 21. The outer ends of these conduits are flared so as to at all times register and communicate with the openings 17 and 18 within the cover plate 9 during the sliding movement of plate 8.

The inner or opposite ends of the conduits 22 and 23 are closed by means of the plate 19 having formed therewith and extending therefrom a squared shaft 20 insertable within a sleeve 41 supported by and journalled within the bearings 42.

A ring 34 surrounds a portion of the cylindrical member 18 and has formed therein a plurality of radially extending port holes 40 which latter are adapted to communicate with the conduits 22 and 23 by means of the elongated slots 24 and 25 formed within the member 18. The outer periphery of the ring 34 is of a polygonal configuration and as herein shown has seven flat surfaces through each of which extend a port hole 40.

The rotor comprises a medial ring-shaped member 27 having a central aperture greater in diameter than that of the ring 34 and provided with flat surfaces corresponding in number to that upon the outer periphery of the ring member 34. Seated upon one side face of the ring-shaped member 27 is a plate 28 having extending from one end thereof a hollow shaft through which extends the cylindrical member 18 and this shaft is journalled with the roller bearings 31 supported by the plate 4. Upon the opposite side face of the medial ring-shaped member 27 is seated a sleeve 26 which latter supports the bearings 42 and the sleeve 26, medial ring-shaped member 27 and plate 28 are connected together by means of the bolts 29. The sleeve 26 is connected by means of the key 32 to the driven shaft 33 of the electric motor whereby upon the rotation of the shaft 33 the rotor will be carried therewith.

The medial ring-shaped member 27 has a plurality of radially extending cylinders formed therein and in each of which is slidably mounted for reciprocation a piston 36. The outer end of each cylinder is closed by means of a threaded plug 35 and arranged within each piston 36 between a plug 35 and the closed end or base 37

thereof is an expansible coil spring 39. The base ends of the pistons are each provided with an aperture 38 adapted to communicate with the port holes 40 formed within the ring 34 which latter is freely mounted upon the cylindrical member 18. However, upon the vertical sliding adjustment of the plate 8, the cylindrical member 18 and ring 34 will be caused to travel therewith in order that the ring 34 may be positioned concentric with the aperture of the medial ring shaped member 27 of the rotor or eccentric with respect thereto as to regulate the fluid pressure. The coil springs 39 constantly apply pressure to the pistons whereby the outer flat surface of the bottom bases 37 will be retained in sealed contact with its respective flat face of the ring 34 whereby the liquid may freely flow through the openings 40 and 38 into and out of the pistons 36. As the pistons are forced from their cylinders the opened area of the cylinders combined with the hollow pistons therein will have a greater capacity than when the ring returns the pistons within their cylinders against the action of the coil springs 39.

In operation the rotor is rotated by means of the driven shaft 33 causing the liquid to be drawn through the inlet port 17 and conduit 23 into the pistons 36 that are in communication with the conduit 23 by means of the elongated slot 25. Due to the eccentric position of the ring 34 with respect to the ring 27, it will while rotating with the rotor permit a greater capacity of the liquid to enter and be stored within the cylinders and their pistons which latter are forced outwardly by means of the coil springs 39. As the ring 34 returns the pistons within their cylinders the liquid therein is placed under compression and as the ports register with the elongated slot 24 said liquid will flow through the conduit 22 and exhaust port 16. When the ring 34 is concentric with the rotor the pressure upon the liquid as it passes through the latter will be reduced to zero, but by adjusting the plate 8 through the manually rotated screw 12, the ring can be moved to various eccentric positions in respect to the rotor whereby the pressure upon the liquid can be regulated.

I claim:

1. A rotary pump comprising in combination a casing, a rotor mounted for rotation therein, said rotor comprising a ring-shaped medial member and a pair of end plates, means for connecting said medial member and plates together, a driven shaft connected to one of said end plates, said medial member having a plurality of radially extending cylinders formed therein, a removable plug closing one end of each of said cylinders, a hollow piston mounted for reciprocation within each cylinder, coil springs arranged between said plugs and pistons for normally forcing the latter from their respective cylinders, a ring having port holes therein communicating with said hollow pistons and rotatable with said medial member for retaining said pistons in their respective cylinders against the action of said coil springs, an adjustable cylindrical member rotatably supporting said ring and having conduits communicating with the port holes thereof and means connected to said cylindrical member for adjusting the latter whereby said ring may be moved to various positions with respect to said rotor.

2. A rotary pump comprising in combination an open end pump casing, a cover plate for closing the open end of said casing and having inlet and outlet ports therein, a driven rotor journalled within said casing and having an axial bore, a plurality of radially extending cylinders arranged within said rotor and open to said rotor bore, a plurality of hollow pistons each mounted for reciprocating within one of said cylinders, an adjustable regulator extending within said rotor bore and having inlet and outlet conduits communicating at all times with said inlet and outlet ports, a ring rotatably mounted upon said regulator and extending within said rotor bore whereby with the adjustment of said regulator said ring will be positioned eccentrically of said rotor, said regulator having diametrically opposed elongated slots formed therein communicating with said conduits, said ring having port holes communicating with said hollow pistons and with said elongated slots at such times as said slots pass in front of said port holes upon rotation of said ring, said ring further having a plurality of flat surfaces formed upon its outer periphery, and means for normally forcing said pistons upon the flat surfaces of said ring whereby said pistons are reciprocated upon rotation of said rotor and ring around said regulator.

3. A rotary pump comprising in combination a pump casing having inlet and outlet openings, a driven rotor positioned within said casing and having an axial recess provided with a plurality of flat side walls, said rotor having a plurality of radially extending cylinders provided therein each opening through one of said rotor recess side walls, a plurality of hollow pistons each mounted for reciprocation within one of said cylinders, a shaft having inlet and outlet conduits axially thereof and extending within said rotor recess, a plate connected to and positioned laterally of one end of said shaft and adjustably mounted in said pump casing, said plate having openings communicating with said shaft conduits and said pump casing openings, a bearing mounted within said rotor recess, a sleeve rotatably mounted in said recess bearing and slidably supporting the end of said shaft opposite to said plate, a ring having a plurality of flat faces positioned with each face opposite one of said side walls of said rotor recess and rotatably mounted upon said shaft eccentrically of said rotor, said shaft having peripheral slots in communication with said conduits, said ring having ports in communication with said hollow cylinders and with said shaft slots at such times as said slots passs in front of said port holes upon rotation of said ring and resilient means tending to move said pistons each against one of said ring flat faces for reciprocation of said pistons upon movement of said ring relative to said rotor during rotation thereof around said shaft.

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