July 11, 1944. A. J. THOMPSON 2,353,373

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Filed Sept. 5, 1941 2 Sheets-Sheet 1

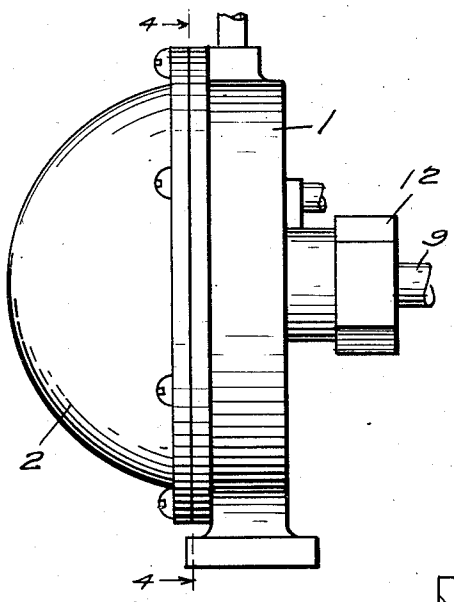


Fig. 1.

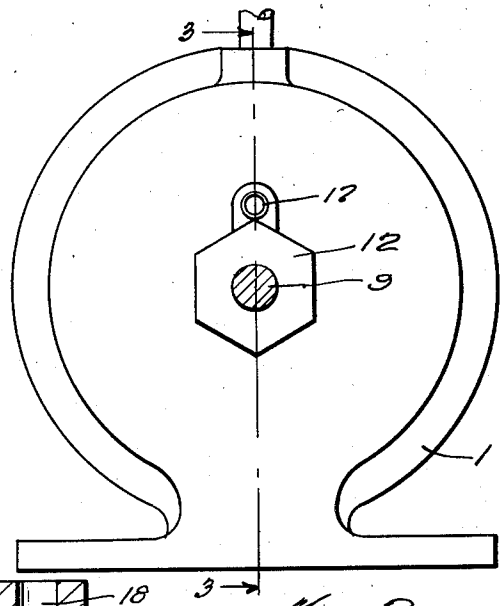


Fig. 2.

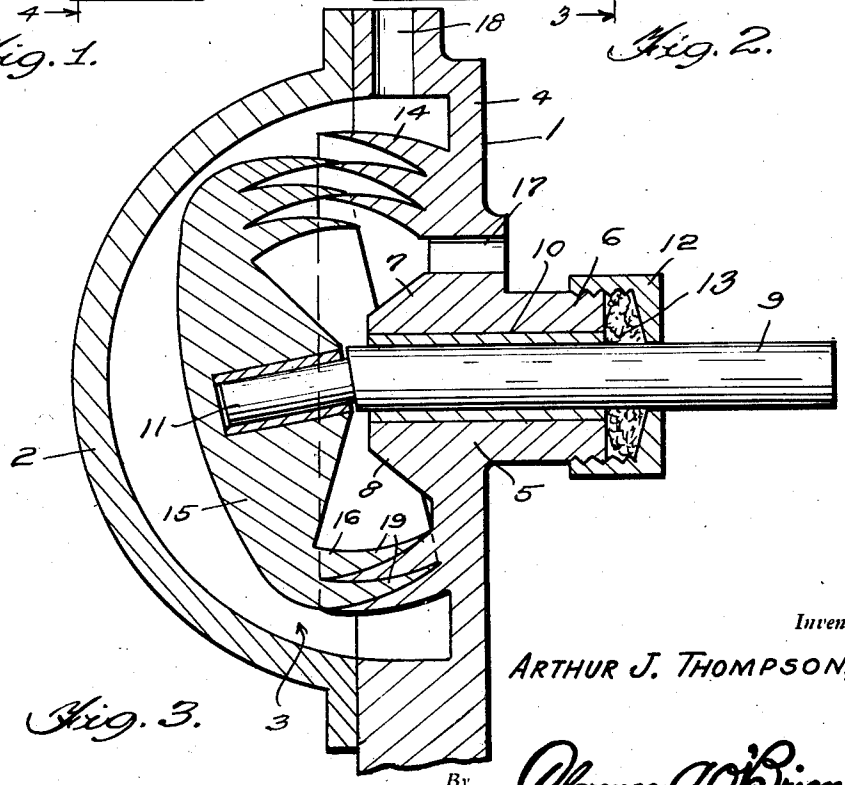


Fig. 3.

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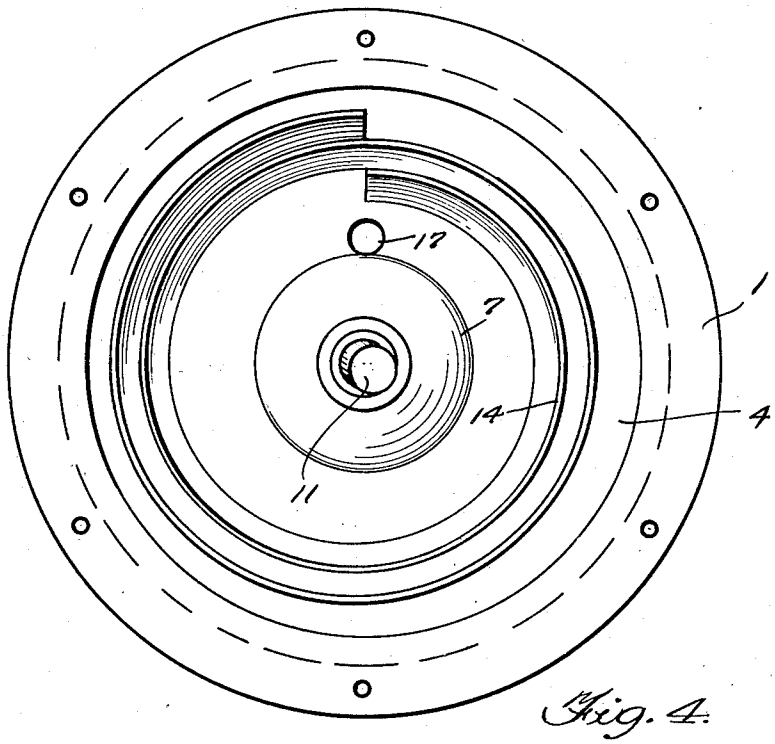


Fig. 4.

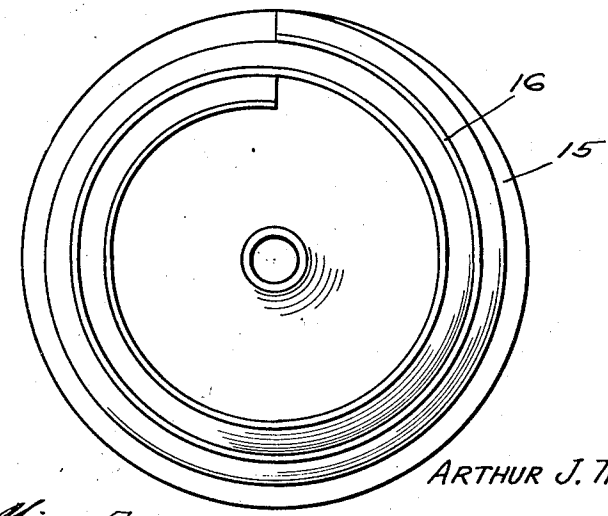


Fig. 5.

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UNITED STATES PATENT OFFICE

2,353,373

PUMP

Arthur J. Thompson, Deer Lodge, Mont.

Application September 5, 1941, Serial No. 409,721

2 Claims. (Cl. 103—133)

My invention relates to improvements in rotary pumps of the nutating axis type, the principal object in view being to provide a simply constructed, low volume, hydraulic pump in which loss of efficiency under wear is obviated and also loss, or slippage, of fluid from the high to the low pressure side.

Other and subordinate objects are also comprehended by my invention, all of which, together with the precise nature of my improvements, will be readily understood when the succeding description and claims are read with reference to the drawings accompanying and forming a part of this specification.

In said drawings:

Figure 1 is a view in side elevation of the preferred embodiment of my invention,

Figure 2 is a view in rear elevation,

Figure 3 is a view in vertical section taken on the line 3—3 of Figure 2 and drawn to an enlarged scale,

Figure 4 is a view in front elevation of the main section of the casing, and

Figure 5 is a view in rear elevation of the piston.

Referring to the drawings by numerals, the pump of my invention comprises a two-part casing including a pair of opposed main and cap sections 1, 2, respectively, suitably secured together and constructed and arranged to form therebetween a chamber 3, substantially semicircular transversely, and having a vertical rear wall 4 forming part of the main section 1. The main section 1 includes a bearing sleeve 5 in the axis of the wall 4 having an outer, externally threaded, end 6 projecting for a suitable distance exteriorly of said wall, and an inner end 7 projecting into said chamber 3 with a beveled edge as at 8. An operating shaft 9 extends through a bushing 10 fixed in said sleeve 5 and is provided in the chamber 3 with a reduced inner end section 11 oblique to the axis of the remainder of the shaft 9. A gland nut 12 is threaded on the end 6 of the sleeve 5 and secures the usual packing 13 around the shaft 9.

Extending laterally from the wall 4 of the main section 1, into the chamber 3, is a fixed, convolute flange 14 surrounding the inner end 7 of the sleeve 5 and spaced therefrom and from the circumferential wall of the chamber 3. The flange 14 tapers transversely from the wall 4 throughout the convolutions thereof.

Fixed against movement longitudinally thereof on the section 11 of shaft 9 concentrically thereof and in a plane at a right angle to the axis of said section is a circular cup-like piston 15 embodying a convolute, lateral edge flange 16 opposed to the flange 14 and similar thereto transversely, but, oppositely spiraled with respect to the flange 14. The flange 16, as will be clear, is designed to gyrate and fit, under rotation of the end section 11, into, or mesh with, the flange 14 and for this purpose the convolutions of the flanges 14, 16 are designed so that they fit, or mesh, at an angle equal to that of the section 11.

A low pressure port 17 is provided in the wall 4 to extend laterally therethrough into the chamber 3 intermediate the sleeve 5 and the flange 14.

A high pressure port 18 is provided in the main section 1 at the top of the chamber 3 directly over the flange 14.

As will be manifest, under rotation of the shaft 9, in the proper direction, the piston 15 is caused to wobble laterally relative to the fixed flange 14, so that a section, as at 19, of the flange 16 meshes with the flange 14 progressively around the same to form a fluid seal traveling around said flanges 14, 16 and whereby fluid in the space between the convolutions of the flanges 14, 16 is forced around the same in advance of said seal. The spaces between the convolutions of the flanges 14, 16 form a convolute fluid conduit which, under the described action of the piston 15 and flange 16 expands and contracts laterally to cause suction behind the seal and on the flanged or low pressure side of the piston 15, and compression in advance of the seal and on the other side of said piston.

The difference in pressures upon opposite sides of the piston 15 tends to effect slight rotation of the piston 15 in sufficient degree to force the flange 16 into the flange 14 without jamming but so as to tighten the described seal and take up wear between the flanges.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention without further explanation.

Manifestly the invention, as described, is susceptible of modification without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the subjoined claims.

What I claim is:

1. In a pump, a casing forming a chamber having a vertical wall, a drive shaft journaled in said wall and extending into said chamber and including an end section in the chamber oblique to the axis of the remainder of said shaft, a convolute lateral flange on said wall and in said chamber coiled around the axis of said shaft, a

circular cup-like piston loose on said section in a plane at a right angle to the axis of the section and embodying a convolute lateral flange oppositely coiled with respect to the first-mentioned flange and adapted to gyrate under rotation of said end section and to interfit with the latter, and a pair of inlet and outlet ports in said casing, respectively, leading into and out of said chamber, the inlet port opening into the chamber within the confines of the first-mentioned flange.

2. In a pump, a casing forming a chamber having a vertical wall, a drive shaft journaled in said wall and extending into said chamber and including an end section in the chamber oblique to the axis of the remainder of said shaft, a convolute lateral flange on said wall and in said chamber coiled around the axis of said shaft, a circular cup-like piston loose on said section in a plane at a right angle to the axis of the section and embodying a convolute lateral flange oppositely coiled with respect to the first-mentioned flange and adapted to gyrate under rotation of said end section and to interfit with the latter, and a pair of inlet and outlet ports in said casing, respectively, leading into and out of said chamber, the inlet port opening into the chamber within the confines of the first-mentioned flange said flanges interfitting at an angle equal to the angle made by said section with respect to the remainder of the shaft, said flanges being laterally tapered toward each other throughout the convolutions thereof.

ARTHUR J. THOMPSON.