G. OLSON.

COMBINED FLUID PUMP AND MOTOR.

APPLICATION FILED SEPT. 11, 1916.

1,291,618.

Patented Jan. 14, 1919.

2 SHEETS—SHEET 1.

Fig. 2

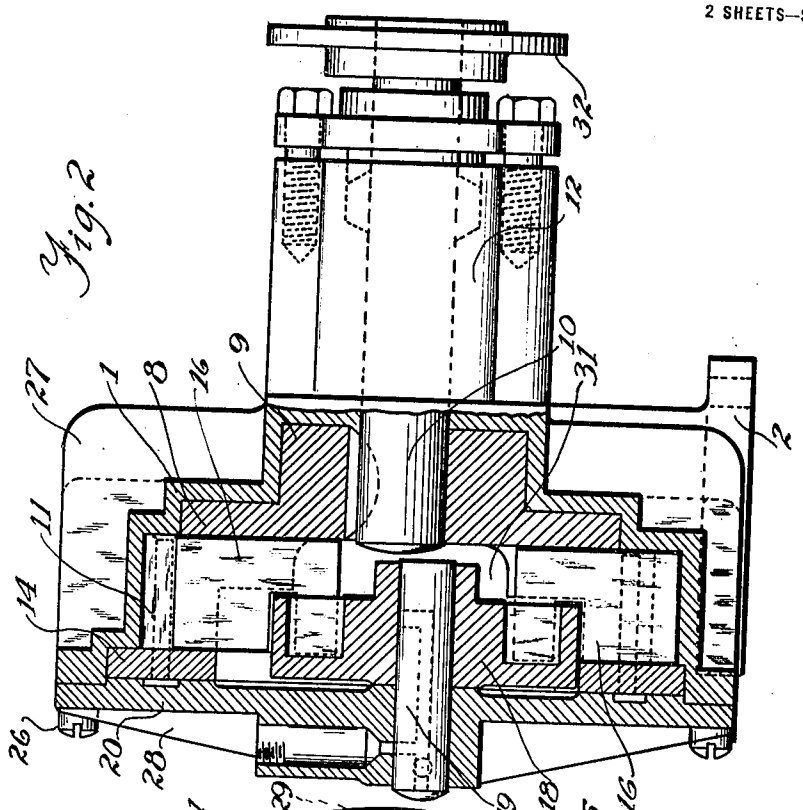
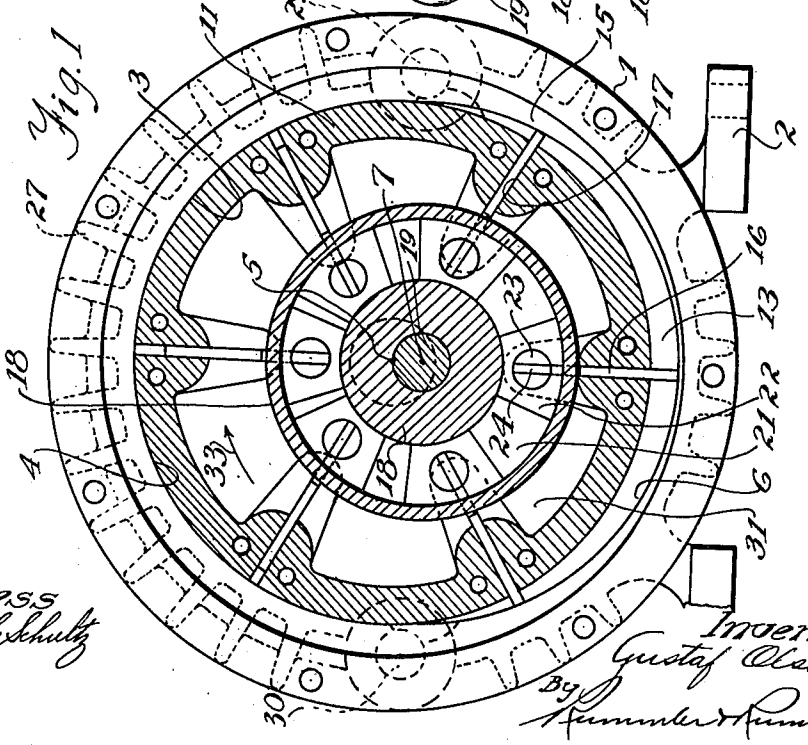


Fig. 1



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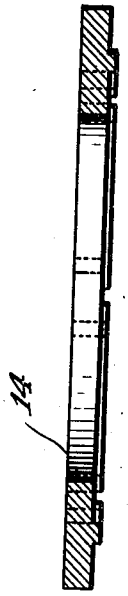


Fig. 4

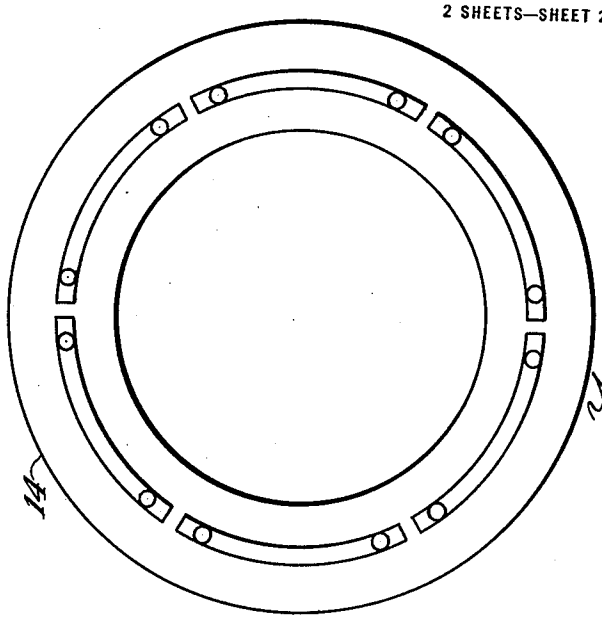


Fig. 5

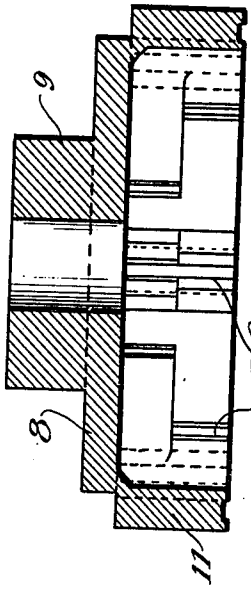


Fig. 3

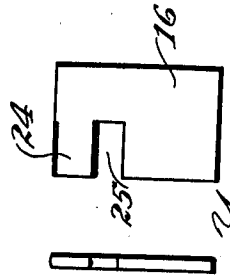


Fig. 7

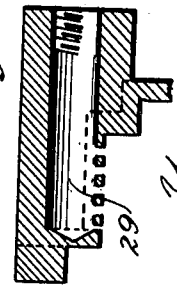


Fig. 8

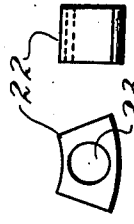


Fig. 6

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UNITED STATES PATENT OFFICE.

GUSTAF OLSON, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO WILLARD M. McEWEN, OF CHICAGO, ILLINOIS.

COMBINED FLUID PUMP AND MOTOR.

1,291,618. Specification of Letters Patent. Patented Jan. 14, 1919.

Application filed September 11, 1916. Serial No. 119,462.

To all whom it may concern:

Be it known that I, GUSTAF OLSON, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Combined Fluid Pumps and Motors, of which the following is a specification.

The main objects of this invention are to provide an improved device capable of being operated to compress or pump fluids or to be driven by fluids to act as a motor; to provide an improved construction and arrangement of the parts of said device; and to provide improved means for cooling and lubricating said device.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Figure 1 is an end elevation of the device, the end plate being omitted and some of the parts being shown in section.

Fig. 2 is a transverse sectional elevation of the device.

Fig. 3 is a sectional detail of the rotor.

Fig. 4 is a sectional detail of the rotor ring which coacts with the casing to provide a seal for the suction and compression chamber, and with the rotor to provide guideways for the vanes.

Fig. 5 is a face view of the same.

Fig. 6 shows in detail one of the bearing members to which the vanes are connected.

Fig. 7 shows in detail one of the vanes.

Fig. 8 is a sectional detail showing the formation of the fluid inlet and outlet.

The device has been shown in the drawings as an air compressor or pump and is hereinafter so described, but it will be understood that it is equally suitable for use with other fluids as a compressor or pump, or that it may be used as a fluid operated motor by an obvious reversal of some of the parts.

In the construction herein illustrated, a casing 1, supported on a standard 2, is provided with a chamber 3 which is a composite formation of two eccentrically arranged bores, the centers of which are designated 5 and 7 respectively. The wall of the chamber therefore comprises two opposed arcuate parts 4 and 6.

The rotor comprises a disk-shaped member 8 having a hub portion 9 keyed to the shaft 10 and having an axially disposed annular flange 11. The shaft 10 is journaled in a bearing 12 formed on the casing 1 with its axis coincident with the center 5, whereby the rotor is mounted so that the periphery of the flange 11 fits with the wall 4 and provides a space 13 between the periphery of said flange and the wall 6. A ring-shaped member 14 is secured to the flange 11 so as to overlap the inner and outer periphery thereof and provide a projecting flange which is rotatably supported in a circular recess 15. The recess 15, which is formed in the casing 1 with its center coincident with the center 5 of the wall 4 provides a circular shoulder portion against which the projecting flange part of the ring 14 fits. The ring 14 thus forms a closure for the space between the outer periphery of the flange 11 and the walls 4 and 6, and coacts with the disk 8 and flange 11 to provide guideways for the vanes 16.

A plurality of vanes 16 are carried by the rotor, being shiftably mounted in the radially disposed slots 17 formed in the disk 8 and flange 11. These vanes are reciprocated in their respective slots through the action of the guide member 18, so that they are urged into contact with the annular wall 6 as they are moved by the rotor around the lower part of the chamber 3 and are retracted as they are moved through the upper part of said chamber.

The guide member 18 is rotatably mounted on a shaft or pin 19 journaled in the casing cover 20, with its axis coincident with the center 7, thereby being eccentrically disposed with respect to the axis of the rotor. An annular groove 21 is formed in the face of the member 18, which is opposed to the rotor disk 8, in which is mounted the blocks or vane-bearings 22, illustrated in detail in Fig. 6. These bearings are provided with circular openings 23 which receive fingers 24 formed on the vanes 16 by the cutting of the recesses 25. This arrangement of the bearings 22 provides a rigid but shiftable pivotal support for the inner ends of the vanes 16 and allows for their swinging movement relative to the guide member 18 as they are rotated around the chamber 3.

Inlet and outlet ports 29 and 30 are formed in opposite sides of the casing 1, so as to communicate with respectively opposite ends of the space 13.

In the construction herein shown, these

ports are axially disposed and located so as to connect with the ends of the chamber 13 and are formed substantially as illustrated in Fig. 8.

The cover 20 which forms a closure for the entire chamber 3 is secured to the casing 1 by means of suitable bolts 26, so as to form a fluid-tight seal for said chamber. A series of fins 27 and 28 are formed on the exterior parts of the casing 1 and connection 20 respectively, which provide for the dissipation of heat created by the operation of the device.

The construction and arrangement of the rotor, the guide member 18 and cover 20 as herein illustrated provide an annular compartment 31 between all of the parts inwardly of the inner periphery of the flange 11. This space is adapted to contain a quantity of oil which serves the double function of providing a lubricant for all the moving parts of the device and keeping them cool.

The operation of the device herein shown is as follows:

The shaft 10 is to be driven by a suitable source of power which may be connected to the usual shaft coupling 32. For following out the operation of the device, it will be assumed that the rotation is in the direction of the arrow 33.

The rotation of the rotor and the guide member 18 about their eccentric centers 5 and 7 causes the vanes 16 to reciprocate so that as the vanes approach the right hand end of the space 13 (Fig. 1), they are caused to move out into contact with the annular wall 6, and recede as they approach the left hand end of said space. As each of the vanes passes the annular opening 29, a vacuum is created rearwardly thereof which is filled with air admitted through said inlet 29. As each of the vanes approaches the outlet 30, the air in advance of each of said vanes is compressed and discharged through said outlet 30, as will be obvious.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. In a device of the class described, the combination of a casing having a chamber therein, a rotor comprising a disk-shaped member journaled in said casing and having an axially disposed annular flange fitting with a part of the wall of said chamber and providing a space between the outer periphery of said flange and the remaining part of the wall of said chamber, said disk and flange having radially disposed recesses formed therein, vanes shiftably mounted in said recesses, a ring secured to said flange and overlapping the inner and outer peripheries thereof and coacting with said casing to form a closure for the space between said flange and the wall of said chamber, and a guide member arranged to cause said vanes to bear against said remaining part of the wall of said chamber during their movement through said space.

2. In a device of the class described, the combination of a casing having a chamber therein, a rotor comprising a disk-shaped member journaled in said casing and having an axially disposed annular flange fitting with a part of the wall of said chamber and providing a space between the outer periphery of said flange and the remaining part of the wall of said chamber, said disk and flange having radially disposed recesses formed therein, vanes shiftably mounted in said recesses, a ring secured to said flange and overlapping the inner and outer peripheries thereof and coacting with said casing to form a closure for the space between said flange and the wall of said chamber, a guide member arranged to cause said vanes to bear against said remaining part of the wall of said chamber during their movement through said space, and a cover attached to said casing and forming a closure for the entire chamber.

3. In a device of the class described, the combination of a casing having a chamber formed therein, a rotor journaled in a bearing formed on one side of said casing and having the periphery thereof fitting with a portion of the wall of said chamber and providing a space between said periphery and the remaining portion of the wall of said chamber, a plurality of radially movable vanes mounted on said rotor, a guide member rotatably mounted in a bearing formed on the opposite side of said casing eccentrically of said rotor bearings, said member having an annular groove formed in the face opposed to said rotor, fingers formed on said vanes and extending into said groove, and bearings pivotally connected to said fingers and shiftably mounted in said groove.

4. In a device of the class described, the combination of a casing having a chamber therein, a rotor comprising a disk-shaped member journaled in said casing and having an annular transversely disposed flange fitting with a part of the wall of said chamber and providing a space between the outer periphery of said flange and remaining part of the wall of said chamber, said disk and flange having radially disposed recesses formed therein, vanes shiftably mounted in said recesses, and a guide member arranged in said casing eccentrically of said rotor and adapted to be engaged by said vanes so as to cause them to bear against said other annular wall during the rotation of said

rotor, the opposed faces of said guide member and rotor being spaced apart axially so as to provide a compartment between them including the space between the outer and inner periphery thereof whereby to form a sealed chamber between said rotor and member to accommodate a quantity of lubricating and cooling fluid.

5. In a device of the class described, the combination with a casing having an oval recess with a circular shoulder portion concentric with the center of one end of the oval, a circular member mounted for rotation about this end of the oval having a flange seated in the said shouldered portion and with radial slots, vanes movable in the slots, and a guide member for positively engaging the vanes for moving them into and out of that portion of the oval recess not covered by the said circular member.

6. In a device of the class described, the combination with a casing having an opening for a shaft, an oval recess, of which one end is concentric with the shaft opening, a shouldered portion at the outer side of the recess which is also concentric with a shaft opening, a recessed rotary member with radial slots fitting the recess and with a flange fitting the shouldered portion of the casing, a shaft mounted in the shaft opening and secured to the said member, vanes slidable in the slots, a cover plate to fit over the recess having a projecting pin concentric with the other center of the oval, there being a space between the said rotary member and the recess at this end thereof, passages at the ends of the recess and a guide member freely mounted on the said pin in the recess of the rotary member having an annular recess for engaging the vanes to move them positively in both directions into and out of the said space when the rotary member is rotated.

Signed at Chicago this 9th day of September, 1916.

GUSTAF OLSON.