D. C. BAKER & H. F. HANSEN.

ROTARY PUMP.

APPLICATION FILED MAR. 12, 1912.

1,038,477.

Patented Sept. 10, 1912.

2 SHEETS—SHEET 1.

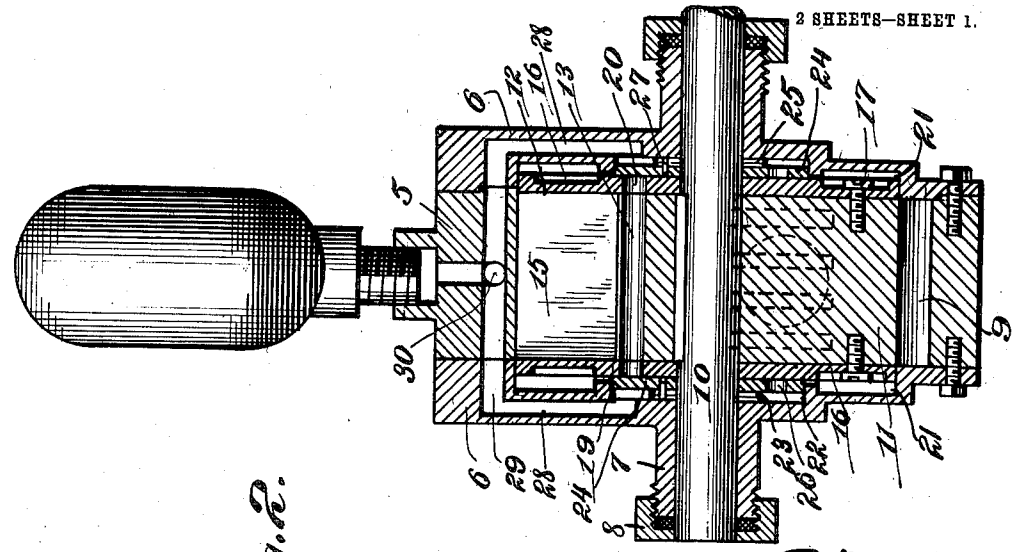

Fig. 2.

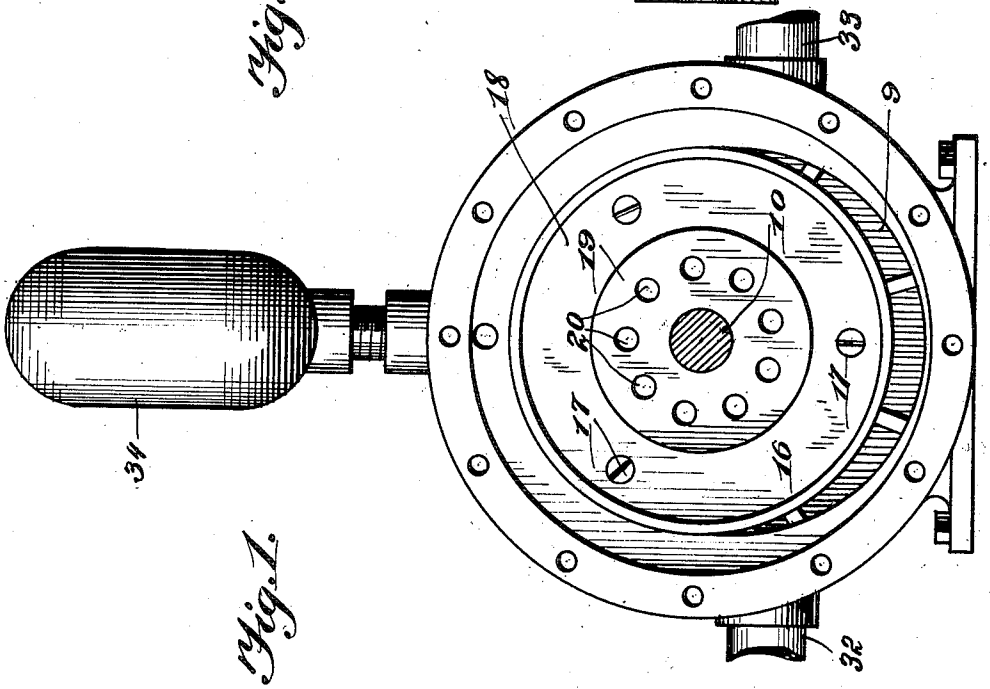

Fig. 1.

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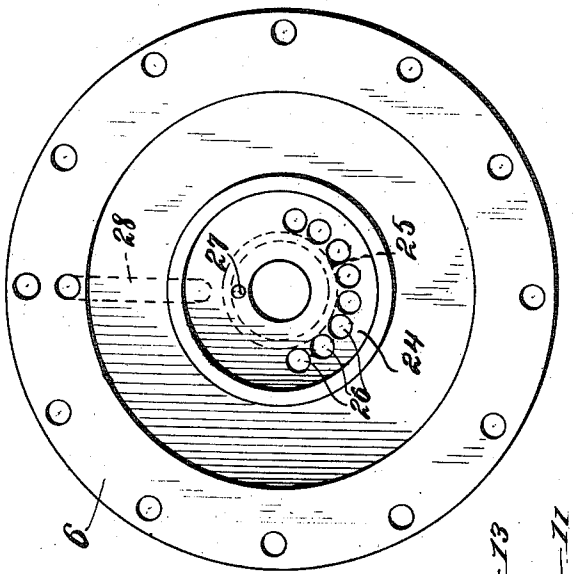

Fig. 4.

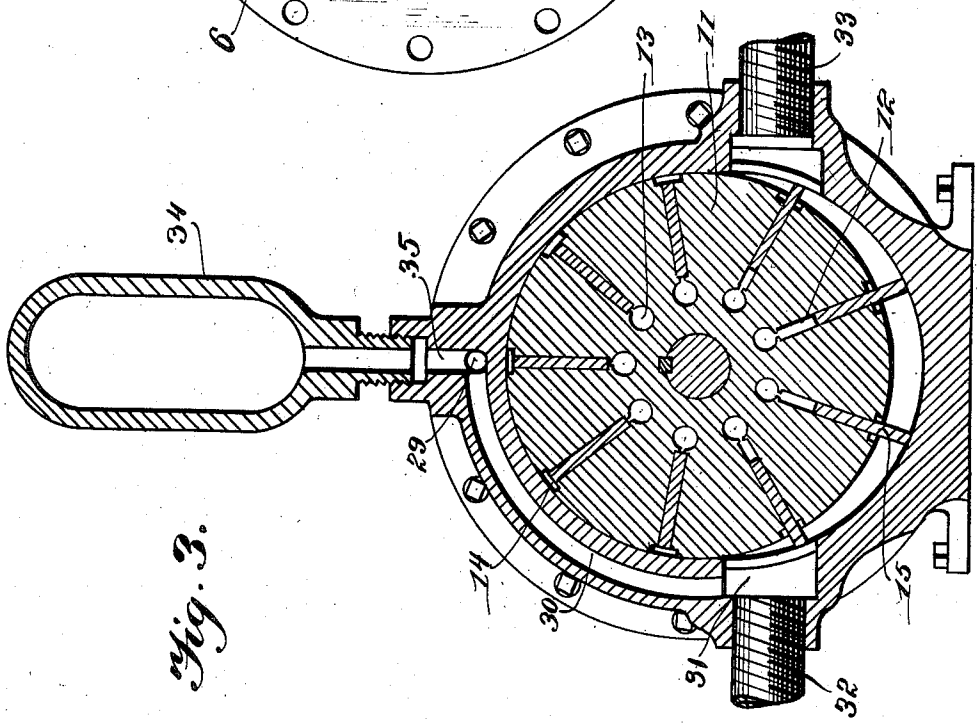

Fig. 3.

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UNITED STATES PATENT OFFICE.

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ROTARY PUMP.

1,038,477. Specification of Letters Patent. Patented Sept. 10, 1912.

Application filed March 12, 1912. Serial No. 683,391.

To all whom it may concern:

Be it known that we, DEXTER C. BAKER and HARVEY F. HANSEN, citizens of the United States, residing at San Jose, in the county of Santa Clara and State of California, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention relates to rotary pumps, of that type embodying a rotary piston having blades or vanes disposed eccentrically in a chamber provided with an inlet or intake at one side and an outlet or discharge at the opposite side.

The main object of this invention is to provide an improved rotary pump of this kind, so constructed and arranged as to relieve the sliding blades of the piston from resistance occasioned by air or liquid compression so that they will operate and thereby be unrestricted in their recessional movement and permit continuous rotation of the piston.

The invention consists of the construction and arrangement of the several parts which will be more fully hereinafter described and claimed.

In the drawings:—Figure 1 is an end elevation of the pump showing parts of the same removed; Fig. 2 is a cross section through the complete pump; Fig. 3 is a longitudinal section through the center of the pump; and Fig. 4 is an end elevation of the pump with one of the heads removed.

The numeral 5 designates a cylinder or drum of suitable dimensions having opposite removable heads 6, provided with outwardly projecting sleeve bearings 7, terminally engaged by packing caps 8. The cylinder 5 and heads 6 inclose a chamber 9 and eccentrically extending therethrough and through the bearings 7 and caps 8 is a shaft 10 which may be of any suitable length and in practice will be equipped with a preferred form of power transmitting device such as a band pulley. A rotary piston 11 is keyed on the shaft 10 and formed with a plurality of radial slots 12 opening out through its periphery, but inwardly terminating at a distance outwardly from the center of the piston. The inner ends of the slots 12 communicate with a corresponding plurality of cross bores or cylindrical channels 13 opening out through the opposite ends or faces of the piston. The outer terminals of the slots 12 enter clearance grooves or channels 14 for the blades or vanes 15 mounted in the slots and whereby the blades may be automatically projected in regular sequence without the least resistance from accumulations at the outer ends of the said slots 12.

On the opposite faces of the rotary piston 11 disks or circular plates 16 are secured by suitable fastenings such as screws 17, having their heads seated in annular grooves 18 formed in the outer sides of the disks. These grooves 18 also provide center bosses 19 which are bored to form apertures 20, registering with the bores 13. The disks or circular plates 16 rotate with the piston 11 and bear on the inner surfaces of lower offsets 21 of the heads 6 to fully expose the periphery of the piston to the lower portion of the chamber 9 to give free action of the blades or vanes 15 and at the same time provide a tight fitting or non-leakable jointure between the piston and adjacent walls of the chamber 9 at the working location of the blades and remove wear from the piston periphery direct. The centers of the heads 6 are also offset outwardly a greater distance than the offsets 21, as at 22, to form annular chambers 23 with the bosses 19, and mounted in these chambers and disposed loosely over opposite portions of the shaft 10 are fixed valve disks 24 held against the bosses 19 by coiled springs 25 interposed between the said valve disks and the inner surfaces of the walls of the offset centers 22, the said springs operating to maintain a close contact of the valve disks with the bosses 19. The valve disks are formed with a plurality of openings 26 in their lower portions adapted to register the apertures or openings 20 in the bosses 19, during rotation of the latter and the piston 11. To hold the valve disks 24 in fixed position, pins 27 project inwardly from the offset centers 22 of the heads 6 and enter the said valve disks above the plane of the shaft 10.

Communicating with the upper portions of the chambers 23 are vertical ducts 28, see Fig. 2, connected by an upper cross duct 29, with a vertical duct 30 centrally intersecting the same and terminating at the inner chamber 31 of a discharge 32, and thereby in communication with the chamber 9 which has an inlet or intake 33 at an opposite point, the inlet or intake and outlet both coöperating with the lower portion of the chamber 9 as shown by Fig. 3. On the top central portion of the cylinder or drum 5 an air

chamber or dome 34 is mounted and opens at its lower end through a port or passage 35 to the cross duct 29.

It will be understood that water or a fluid pressure medium, as may be desired, passing through the inlet 33 enters chamber 9 and engages the projected blades or vanes 15 in succession and rotates the piston 11 and passes out through the discharge 32. In pumps of this type the blades in the piston are frequently retarded in their action during inward movement into the piston with the result that the outer ends of the blades become worn, and owing to frictional resistance set up by irregular contact of the blades with the wall of the chamber in which they rotate, the piston is checked to a considerable degree with obvious disadvantages in the practical operation of the pumps. In the present construction the air that may accumulate adjacent to the inner ends of the blades 15 is driven or forced into the bores or cylindrical chambers 13 and from the latter escapes through the apertures 20 of the bosses 19 and openings 26 of the valve disks 24 into the chambers 23 and then passes out through the ducts 28 into the duct 29 and through the outlet duct 30 into chamber 31 and sequently into the piston chamber 9 and has egress through the outlet or discharge 32. The air is compressed in chamber 34 instead of being drawn down duct 30.

32 is the discharge of pump and the pressure the pump is working against is backed up conduit 30.

The pressure of the discharge end, whether it is one, or one hundred pounds to the square inch, goes up conduit 30 and down conduit 28 and into chamber 22 back of valve disks 24, through openings 20 and under the sliding pistons to force them out against the cylinder wall at the outer end of the sliding pistons. The liquid between the sliding pistons in chamber 9 is trying to bypass the outer ends of sliding pistons when pump is in action. The pressure acting on inner end of the pistons balances the former.

The function of the air chamber is to balance the pressure in the conduits 28, 29, 30 and the cylindrical chambers 22, it being understood that the receding of the pistons when approaching the exhaust passage 32 and after passing the exhaust causes the air behind the piston to be forced into the chambers 22 and from thence into the conduits 28, 30 and into the air chamber or dome 34, some of the pressure, however, being taken up by supplying air behind the pistons on the part of the cylinder while passing and after passing the intake 33.

It will be understood that packing means and other well known accessories will be added to the several parts of the pump where found necessary and desirable, and modifications in the proportions and dimensions will be adopted at will to compensate or accommodate various uses and applications.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:—

1. In a pump, a cylinder having a chamber therein, a rotary piston mounted in said chamber and having sliding blades and inner air or liquid chambers to supply the blades with liquid or air pressure at their inner ends, center chambers at opposite ends of the piston valve disks held against rotation in the center chambers and having lower openings to establish communication between the air or liquid chambers of the piston and said center chambers as the piston rotates, and air or liquid supply ducts leading from said center chambers, and having outlet into the discharge line.

2. In a rotary pump, the combination of a cylinder, having a piston chamber, a rotary piston mounted in said chamber and formed with radial slots having air or liquid chambers at their inner terminals, center chambers at opposite ends of the piston, valve disks held against rotation in the center chambers and provided with lower openings to establish communication between the latter chambers and the air or liquid chambers of the piston, a shaft extending through the piston and valve disks, inlet and outlet means communicating with opposite portions of the lower portion of the piston chamber, and ducts and an air chamber in continual communication with the center chambers and the inner portion of the discharge means and piston chamber.

In testimony whereof we affix our signatures in presence of two witnesses.

DEXTER C. BAKER,
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Witnesses:
WM. H. ROGERS,
F. H. BLOOMINGDALE.