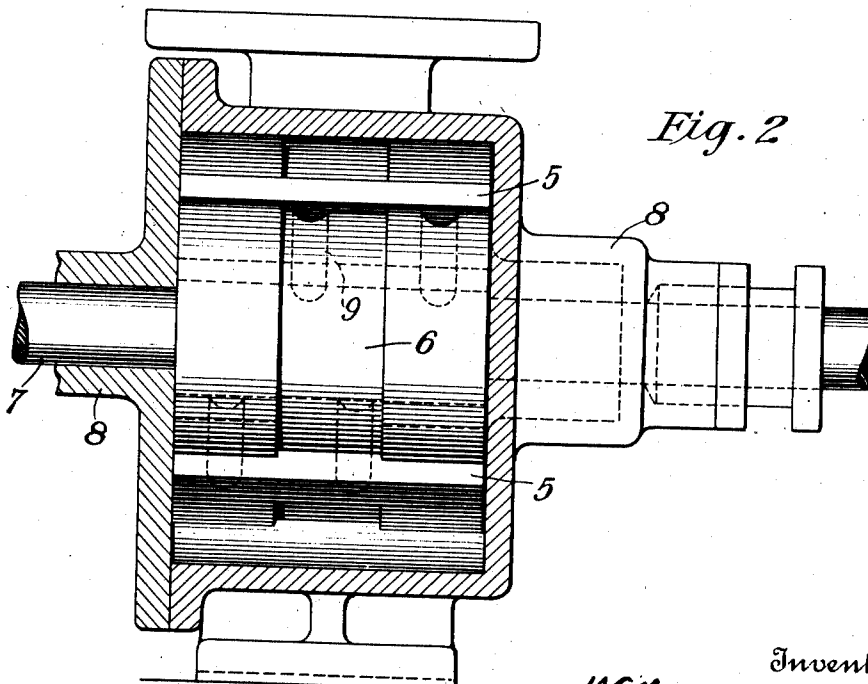
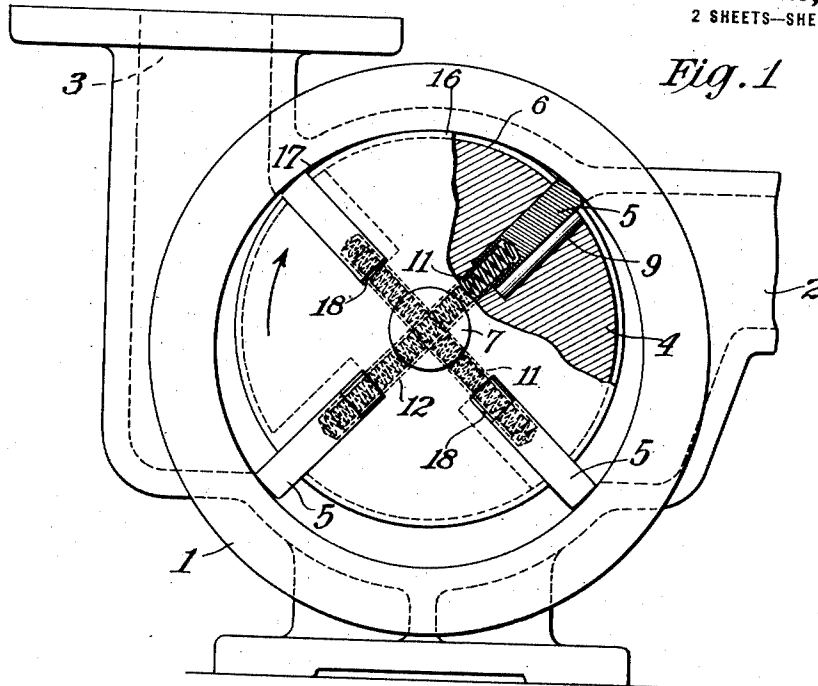


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ROTARY PUMP.
APPLICATION FILED FEB. 27, 1920.

1,366,139.

Patented Jan. 18, 1921.
2 SHEETS—SHEET 1.



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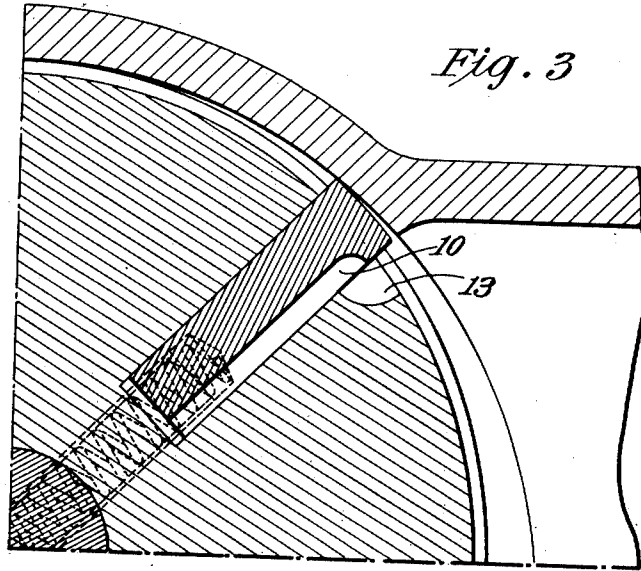


Fig. 4

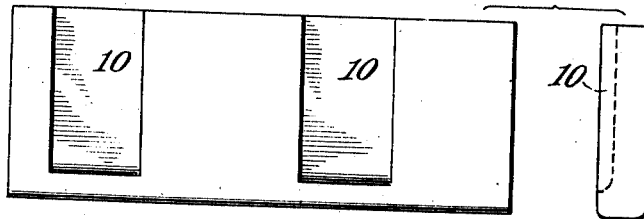
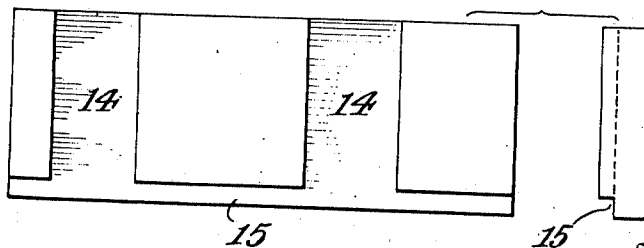


Fig. 5



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UNITED STATES PATENT OFFICE.

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ROTARY PUMP.

1,366,139.

Specification of Letters Patent. Patented Jan. 18, 1921.

Application filed February 27, 1920. Serial No. 361,772.

To all whom it may concern:

Be it known that I, WILLIAM F. TRAUDT, a citizen of the United States of America, residing at Buffalo, county of Erie, State of New York, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification.

My invention relates generally to that class of mechanism used for rotary pumps or rotary engines, and more specifically it finds its most successful application to that form of engine or pump which has a cylindrical rotor mounted eccentrically in a cylindrical casing so as to touch the casing along a common element of the two cylindrical surfaces between the inlet and outlet ports of the casing, and which rotor has two or more radial pockets each of which has a bucket mounted and movable therein so as to keep always in contact with the casing wall.

The present invention is an improvement on that described and shown in my pending application Serial No. 291,929, filed April 22, 1919.

The best form of apparatus embodying my invention at present known to me is illustrated in the accompanying two sheets of drawings in which—

Figure 1 is a vertical cross section of a pump with parts shown in section.

Fig. 2 is an axial, vertical section of the pump.

Fig. 3 is a detail sectional view showing a modified form of bucket, on an enlarged scale.

Fig. 4 is a detail face and end view of such bucket on a reduced scale, and

Fig. 5 is a similar view of another form of bucket.

Throughout the drawings like reference characters indicate like parts: 1, is a cylindrical casing mounted on a suitable base and having an inlet 2, and an outlet 3, spaced apart circumferentially and preferably at 180 degrees. 4, is the usual rotor mounted eccentrically of the casing on shaft 7, and in contact with the casing wall along a common element of the two cylinders at a point 16, midway between the inlet and outlet ports. 5, 5, are buckets, preferably four in number as shown, mounted and sliding in radial pockets 18, 18, in the rotor which are spaced apart at equal distances circumferentially thereof. 6 is a circum-

ferential groove extending around rotor 4. 8, 8, are housings formed on the casing 1, and in which rotor shaft 7, is journaled.

Each pair of oppositely disposed buckets are forced outward and against the casing walls by springs 11, 11, compressed between them. These springs are cased in tubes 12, 12, which pass diametrically through rotor and shaft, fitting tightly in the former but movable in both. 10, 10, Fig. 3, are channels in the faces of the buckets leading from their inner edges, located in the rotor pockets, to points in their pressure faces (*i. e.* the faces exposed to pressure of the liquid passing through the apparatus, whether used as a pump or as an engine) which are exposed during the period while the bucket is passing from the inlet to the outlet port. In Fig. 1, the rotor revolves clockwise, as indicated by the arrow, when the apparatus is used as a pump. It would revolve counter-clockwise if the apparatus were used as a motor. In the construction shown in Fig. 1 the channels 9, 9, are formed in the faces of the walls of pockets 18, 18.

As it is essential that the outer edge or lip of the bucket should be continuous, channels 10 do not extend to such outer edge, and in pumps for use on heavy oils, the channel is continued at 13, in the opposing face of the wall of the rotor pocket.

If the bucket channels are continued to the outer edge of the bucket, as shown at 14, 14, in Fig. 5, the outer lip of the bucket must be cut away to the same depth as shown at 15, so as to preserve an unbroken lip or bearing edge for the bucket.

In operation of an ordinary apparatus of this character, the fluid, being pumped, or used to drive the apparatus as a motor, gets between the outer edge of each bucket and the casing wall while under pressure, *i. e.* during its transportation by the pump rotor and bucket from inlet port to outlet port. Whenever this pressure is considerable and not counterbalanced it will overpower springs 11, and the fluid will escape to the other side of the bucket. The buckets then jump in and out with a loud chattering sound and much slip or leakage occurs. If the springs are made strong enough to prevent this, the wear and tear and loss of power through internal friction then becomes prohibitive. Efforts have been made to overcome this difficulty by admitting the fluid

under pressure to the bottom of the bucket pockets, but in prior apparatus where this has been done the mistake has been made of dispensing with the springs and relying on the pressure alone, or on centrifugal force, to hold the buckets out and up to the work. But as the pressures on the two edges of the bucket are of course approximately equal, there is not sufficient preponderance of the outward thrust of the fluid, if any, to hold the bucket against the casing, and moreover, centrifugal force varies with the speed of revolution, so that until the pump reaches a certain speed of revolution the friction of the bucket in its pocket and its inertia are not overcome. Consequently, in such construction, the bucket does not move out to contact with the casing wall and the slip, or leakage, is large until the pump reaches a high speed of revolution.

In my invention the pressures on the inner and outer edges of each bucket are equalized by the flow of liquid through the bucket passages 10, 10, or 14, 14, or through the rotor passages 9, 9, and so the springs 11 which are given just the right force to secure a tight joint between bucket and casing, are left free to exert their entire but relatively weak thrust for this purpose. As a result the most perfect conditions obtainable and so originally created by proper design, are maintained at all times.

If pumps of this character operate on heavy oil or similar material, the fluid trapped in front of each bucket after it has passed the closure edge of the outlet port 3, and between it and the point of contact 16, between the rotor surface and chamber wall, cannot escape fast enough, and the pump is partially slowed down by the resistance encountered, or something breaks. To avoid this difficulty, I employ a relief channel ex-

tending from said closure edge 17, to, and beyond the point 16. Preferably this relief channel consists of the circumferential groove 6, in the cylindrical face of the rotor. This permits the trapped fluid to pass beyond point 16 to the gradually opening space behind the next bucket ahead, and so all appreciable back pressure from such trapped fluid is avoided.

Having described my invention, I claim:

1. In a rotary pump or the like structure, the combination, with a cylindrical casing, an eccentric rotor journaled thereon having radial slots, radially sliding buckets mounted in said slots and springs pressing outward against the inner edges of said buckets, of means for equalizing the fluid pressure on the inner and outer edges of each bucket which comprises a channel formed in the face of the bucket from the inner edge thereof nearly to the outer edge thereof and then along the face of its containing pocket to the exterior of the rotor circumference.

2. In a rotary pump or the like structure the combination, with a cylindrical casing having radial oppositely disposed inlet and outlet ports, of an eccentric rotor journaled therein equipped with radially sliding buckets, and having a relief channel extending circumferentially of the rotor from the closure edge of the outlet port to and beyond the normal point of contact between rotor circumference and casing wall.

3. A combination such as set forth in claim 2 in which the relief channel consists of a circumferential groove extending around the rotor.

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Witnesses:

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