F. N. IMHOFF, J. HUTCHINSON, AND C. C. HAMILTON.

ROTARY PUMP.

APPLICATION FILED OCT. 20, 1920.

1,409,548. Patented Mar. 14, 1922.

2 SHEETS-SHEET 1.

FIG. 1.

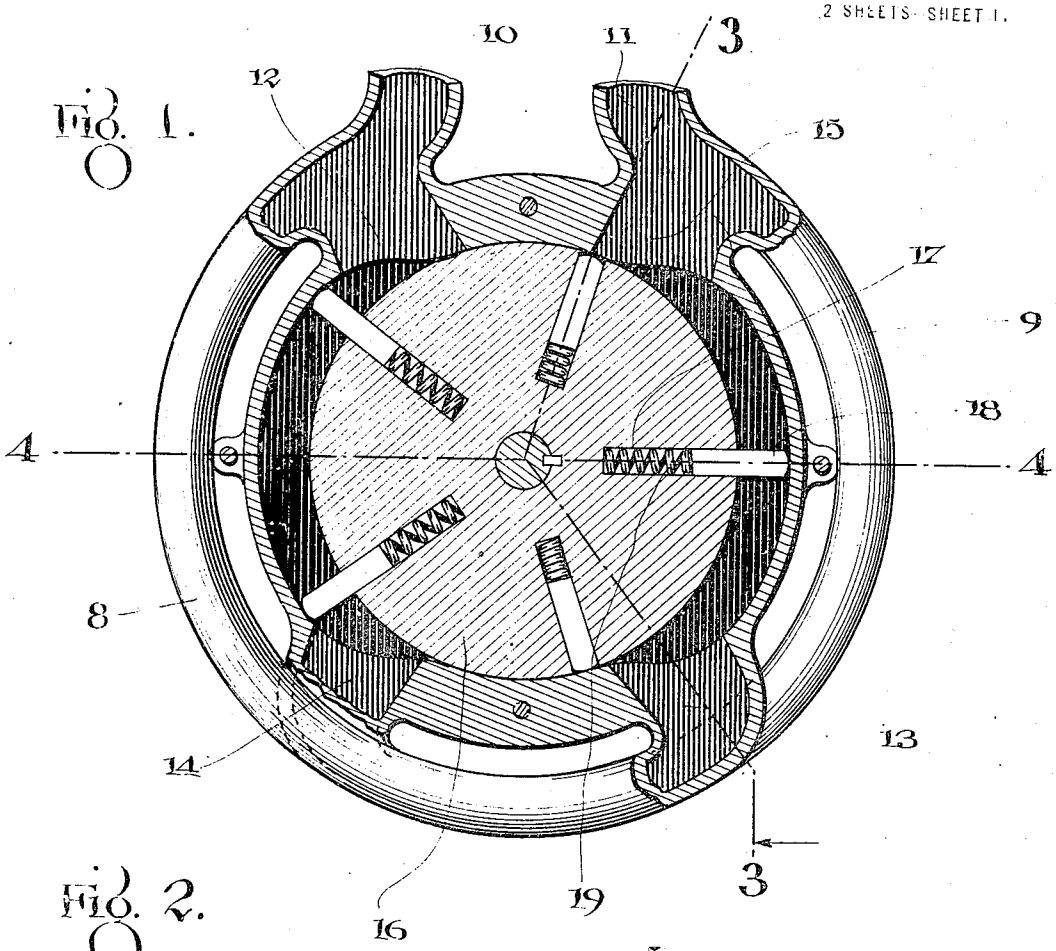
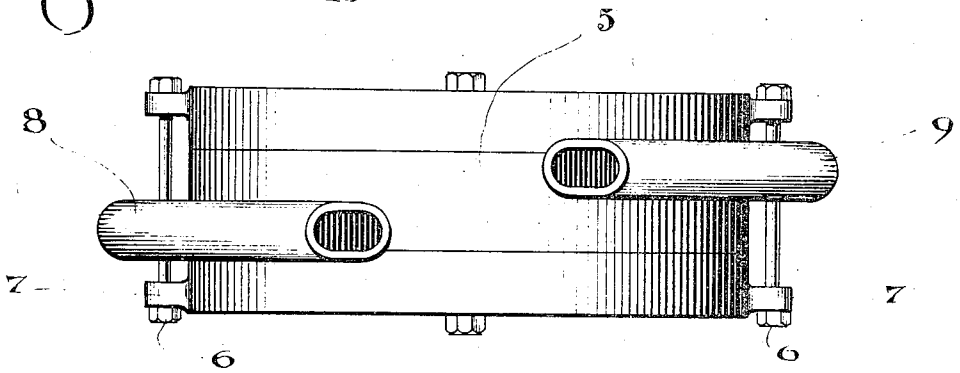


FIG. 2.



Floyd N. Imhoff.
Joseph Hutchinson.
Clifford C. Hamilton.

INVENTOR

WITNESSES

E. Tranor.

BY Munn & Co.

ATTORNEYS

F. N. IMHOFF, J. HUTCHINSON, AND C. C. HAMILTON.

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2 SHEETS—SHEET 2.

FIG. 3.

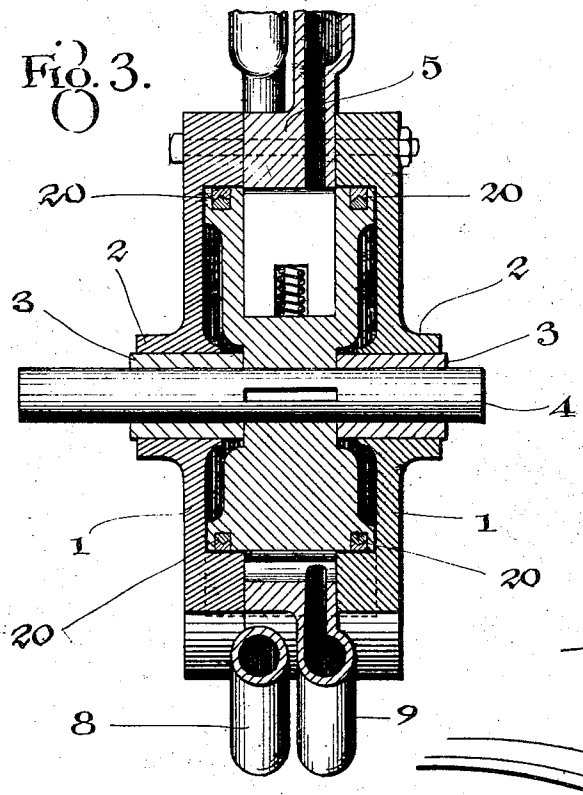


FIG. 5.

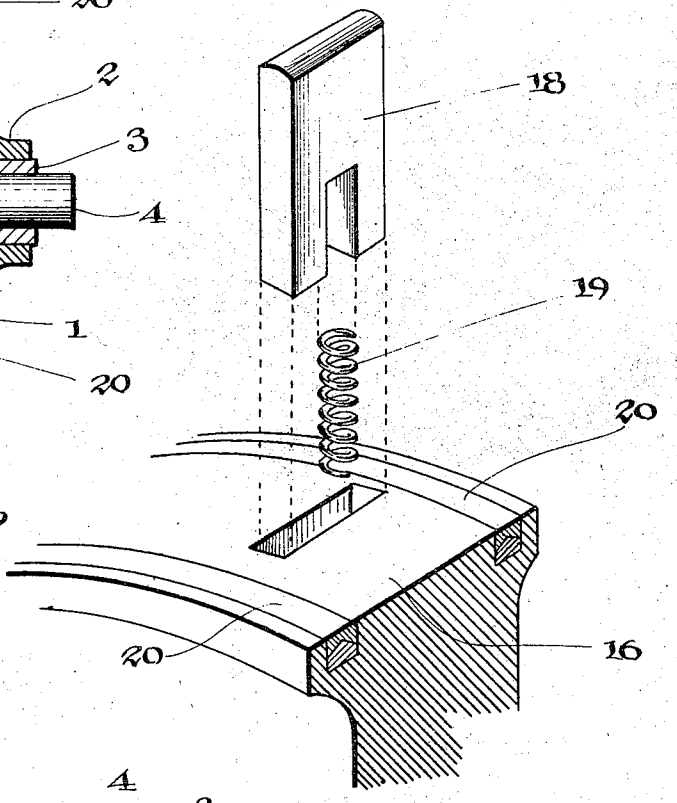
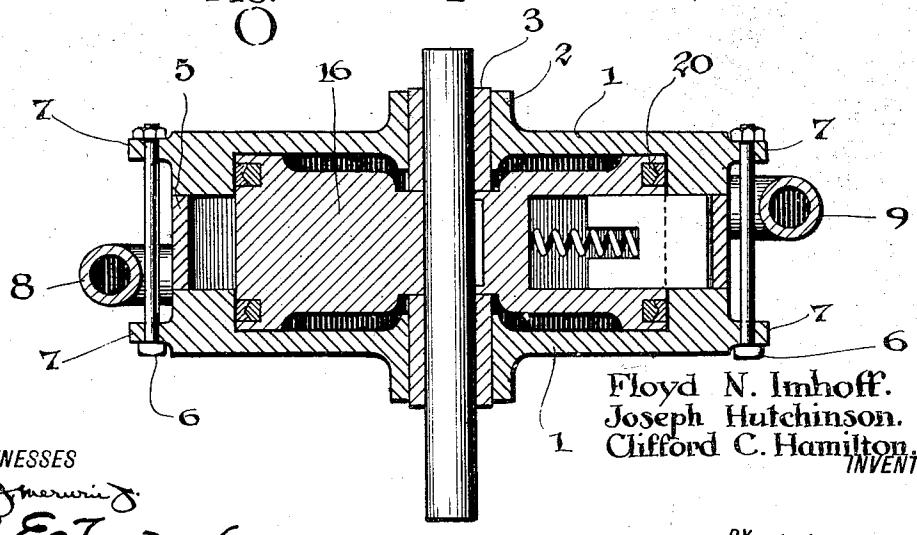


FIG. 4.



WITNESSES

E. E. Trainor.

Floyd N. Imhoff.
Joseph Hutchinson.
Clifford C. Hamilton.
INVENTOR

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

FLOYD NELSON IMHOFF, JOSEPH HUTCHINSON, AND CLIFFORD COATES HAMILTON, OF GULL LAKE, SASKATCHEWAN, CANADA.

ROTARY PUMP.

1,409,548. Specification of Letters Patent. Patented Mar. 14, 1922.

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To all whom it may concern:

Be it known that we, FLOYD N. IMHOFF, JOSEPH HUTCHINSON, and CLIFFORD C. HAMILTON, all subjects of the King of Great Britain, and residents of Gull Lake, in the Province of Saskatchewan and Dominion of Canada, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification.

Our invention is an improvement in pumps, and has for its object to provide a pump of the rotary type, comprising a rotor and a stator casing in which the rotor is mounted, the casing having inlet and discharge pipes for the fluid to be pumped.

In the drawings:

Figure 1 is a side view of the pump with parts in section,

Figure 2 is a top plan view,

Figures 3 and 4 are sections on the lines 3—3 and 4—4, respectively of Figure 1,

Figure 5 is a perspective view of a portion of the rotor showing one of the vanes or blades removed.

In the present embodiment of the invention, a pair of similar heads 1 is provided, each of which is provided at its center with a hub portion 2 in which is held a bushing 3, and a shaft 4 is journaled in the bushings of the two heads. A ring 5 is arranged between the heads, and the heads and rings are clamped together by bolts and nuts 6 which pass through radial lugs 7 extending from the heads.

An inlet pipe 8 is arranged co-axially with the shaft 4 at one side of the rotor casing constituted by the heads and rings, and an outlet or discharge pipe 9 is arranged at the opposite sides. These pipes 8 and 9 are approximately half circles, being arched to extend concentric with the shaft 4, and each pipe has at the top of the casing a connection 10 and 11 respectively for connection with a source of supply and a discharge pipe or reservoir, respectively.

Ports or passages 12, 13, 14 and 15 are provided near the ends of the pipes 8 and 9, the said ports or passages forming a communication between the pipes and the interior of the rotor casing, and it will be noticed that the ports or passages 12 and 13 which connect the pipe 8 with the rotor casing, are almost diametrically opposite. The same is true of the ports 14 and 15 which connect the pipe 9 with the interior of the rotor casing.

A rotor 16 is secured to the shaft 4 within the casing, the rotor being keyed to the shaft as indicated in Figures 1, 3 and 4, and this rotor has a series of radial slots 17, five in number in the present instance, in each of which there is arranged a blade or vane 18. A spring 19 is seated beneath each blade or vane, and acts normally to force the blade or vane outwardly as shown in Figures 1, 3 and 4, and the rotor is at the edges of its peripheral surface and on opposite sides of the blades or vanes expansion rings 20 which form a seal between the rotor and the rotor casing.

Referring to Figures 3 and 4, it will be seen that each of the heads 1 is annularly reamed or counter-bored on its inner face so that there is a marginal inwardly extending rib for each head, and it is this rib that abuts the ring 5, the rotor fitting within the counter-bores or reams of the head.

The operation of the improvement is as follows: Referring to Figure 1, when that blade which is just below the port 12 moves downwardly with the rotor, it tends to create a vacuum within that portion of the rotor casing which is directly above the blade, that is, behind the blade. Liquid will flow through the port 12 into this portion of the rotor casing, and as the said blade moves further and down toward the port 14, a succeeding blade will come into position past the port 12, acting to force this liquid onward.

When the first named blade passes the port 13 the water will be driven out of the port 14 into the pipe 9 from whence it will pass to the reservoir or place of discharge. At the right of Figure 1, the operation is the same, the liquid being drawn in through the port 13 and driven out through the port 15. Thus both sides of the pump will be acting simultaneously, two blades being always cooperating with one side of the pump, in active operation.

Referring to Figure 1, it will be seen that the rotor touches the rotor casing at diametrically opposite points, and that these points are between the ports 12—15 and 14—13. Thus two inlet chambers are formed, one at each side of the pump. The interior of the casing is so shaped that as

the blades or vanes pass the ports 14—15 they will be moved inward, while as they pass the ports 12—13 they may move outward.

It will be understood that while the device is a rotary pump, it is also a motor, working with equal efficiency in either direction, as a pump or as a motor. One utilization of the device will be as a transmission for motor cars.

I claim:—

1. A rotary pump comprising a stator including a pair of heads having hubs at their center and laterally extending annular ribs at their peripheries, a ring arranged between the ribs of the head and working chambers formed therein, means for securing the heads and the ring together, the ring being provided with diametrically opposite and inwardly extending enlargements, a shaft journaled in the hubs of said heads, a rotor keyed to said shaft and having its peripheral surface contacting with the enlargements of the head of the ring and having laterally extending annular flanges at its periphery engaging the annular ribs of the stator, packing rings carried by the flanges of the rotor and engaging the ribs and stator, said rotor having radial slots extending transversely thereof between the flanges, sliding pistons arranged within the slots, a spring for urging said sliding pistons outwardly into engagement with the ring, an arcuate inlet pipe coaxial with the stator and having connections therewith, one on one side of one of said enlargements and the other on the other side of the other of said enlargements, and an arcuate outlet pipe coacting with the stator and longitudinally spaced from the inlet pipe and having connections with the stator, the connections of the outlet pipe being spaced circumferentially from the annular pipe and one of said connections being disposed on one side of said enlargements and the other of said connections being disposed on the opposite side of the other of said enlargements.

2. A rotary pump comprising a stator including a pair of heads having ribs at their peripheries, a ring arranged between the ribs of the heads, means for securing the heads and the ring together, the ring being provided with diametrically opposed and inwardly extending enlargements and having working chambers formed between said enlargements, a rotor operating in the stator and contacting with the enlargements, spring pressed sliding pistons carried by the rotor and engageable with the ring, an arcuate inlet pipe having connections with the stator and an arcuate outlet pipe having connection with the stator.

3. A rotary pump comprising a stator including a pair of heads having hubs at their center and laterally extending annular ribs at their peripheries, a ring arranged between the ribs of the head and having working chambers formed therein, means for securing the heads and the ring together, the ring being provided with diametrically opposite and inwardly extending enlargements, a shaft journaled in the hubs of said heads, a rotor keyed to said shaft and having its peripheral surface contacting with the enlargements of the head of the ring and having laterally extending annular flanges at its periphery engaging the annular ribs of the stator, packing rings carried by the flanges of the rotor and engaging the ribs and stator, said rotor having radial slots extending transversely thereof between the flanges, sliding pistons arranged within the slots, and a spring for urging said sliding pistons outwardly into engagement with the ring.

FLOYD NELSON IMHOFF.
JOSEPH HUTCHINSON.
CLIFFORD COATES HAMILTON.

Witnesses:
HJOLMES E. LEAF,
FLORENCE V. DEWAR.