

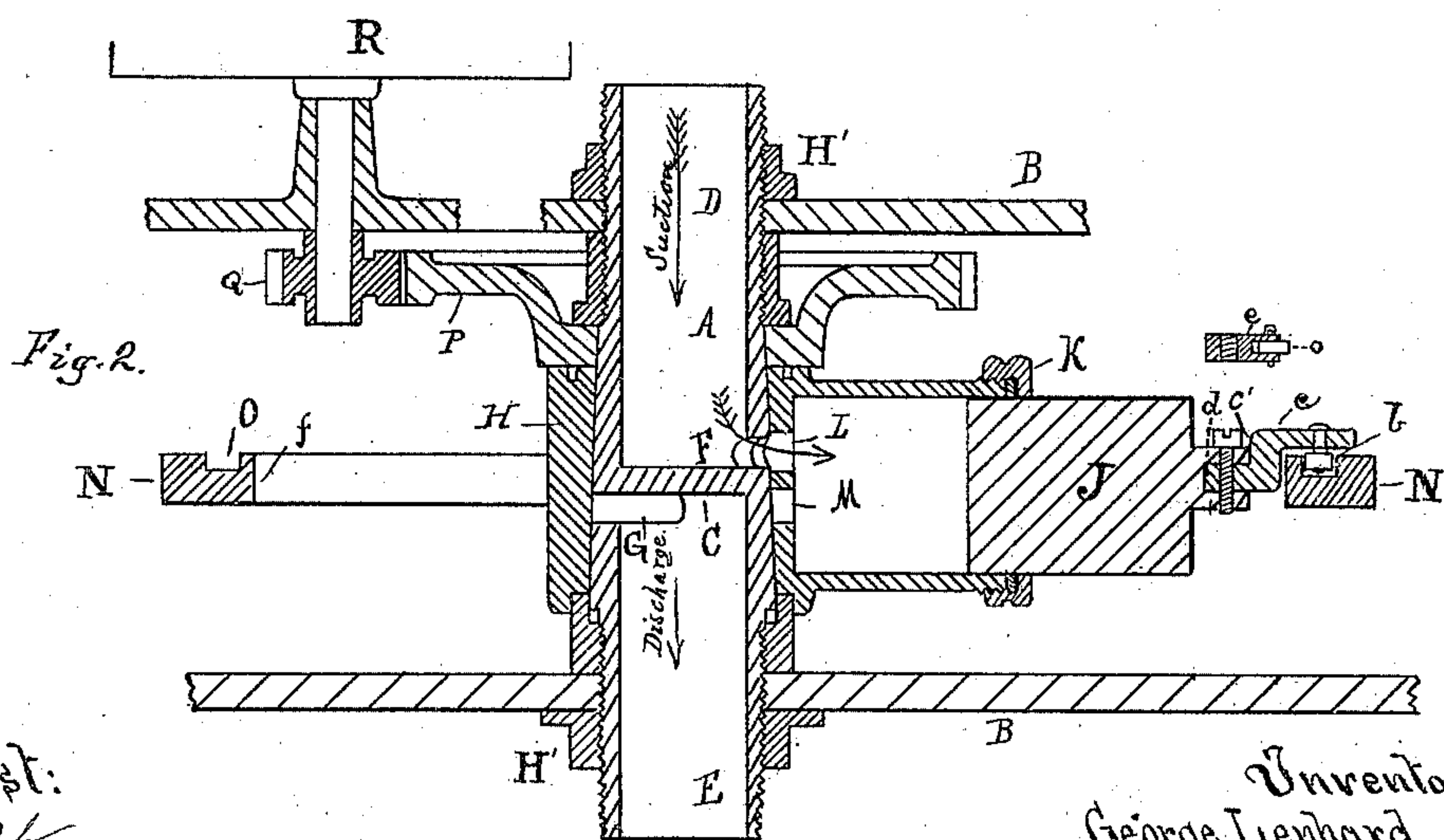
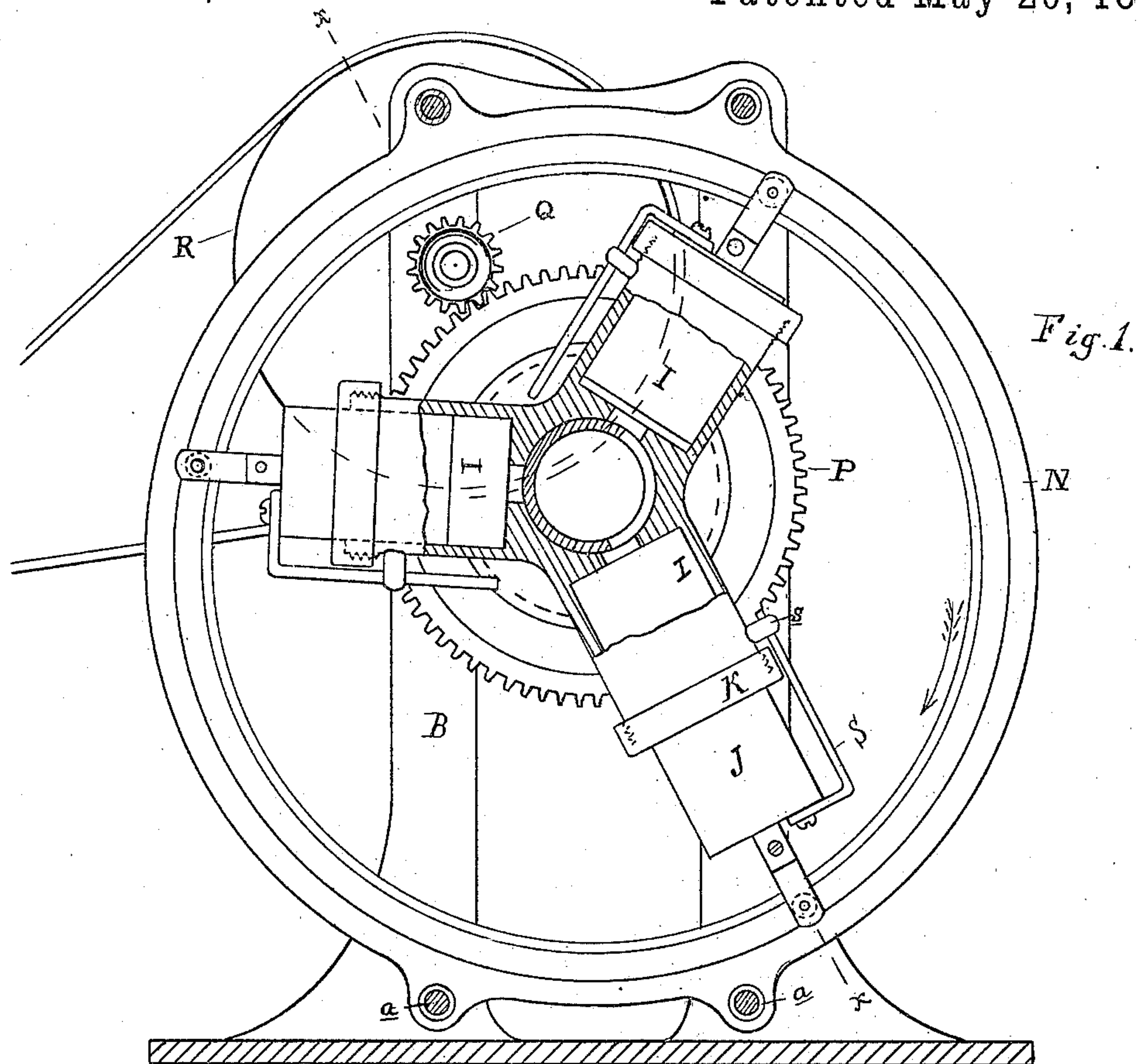
(No Model.)

G. LENHARD.

ROTARY PUMP.

No. 298,866.

Patented May 20, 1884.



Attest:
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UNITED STATES PATENT OFFICE.

GEORGE LENHARD, OF DETROIT, MICHIGAN.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 298,866, dated May 20, 1884.

Application filed June 27, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE LENHARD, of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Rotary Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to an improvement in rotary lift and force pumps; and the improvement consists in the construction and arrangement of the various parts, all as hereinafter described and shown.

Figure 1 is a sectional elevation of my pump. Fig. 2 is a cross-section on the line $x x$.

In the accompanying drawings, which form a part of this specification, A is a hollow conical spindle rigidly supported near its ends in the uprights or standards B B, which form the sides of a supporting-frame for the pump.

C is a diaphragm dividing the aperture through the spindle into two parts or passages, D and E.

F and G are two lateral openings or ports in the shaft A, on opposite sides of the diaphragm, and upon opposite sides of the spindle.

H is a hub sleeved upon the spindle, which is for a part of its length turned slightly conical, as shown, and collars H' are employed for holding the hub against lateral displacement.

I are cylinders radiating from the hub H, and formed integral therewith. These cylinders, of which there may be three or more, are placed symmetrically around the hub, and each is provided with a piston, J, a stuffing-box, K, two ports, L and M, which register with the ports F and G of the spindle, respectively.

N is a circular track rigidly secured to the plane of the axis of the cylinders by transverse stay-bolts a , or in any other suitable way. This track N is placed eccentrically to the spindle A, its center being vertically below the axis of said spindle.

O is a circular channel or groove in the track N.

b are friction-rollers engaging with the circular channel.

c are the piston-rods, provided with the offsets c' , and to which the friction-rollers are secured.

d are sockets upon the ends of the pistons, into which the piston-rods c are detachably secured.

P is a gear-wheel secured concentrically to one side of the hub H.

Q is a pinion meshing with the gear-wheel P, and R is a drive-pulley for applying power and transmitting the same through the pinion Q and geared wheel P to the hub H.

S are guides for preventing the pistons from turning upon their axis. They are connected to the pistons J, and pass through an eye in the projection s, cast integral with the cylinder I.

In practice, if power is applied to the drive-pulley R, the hub will rapidly revolve, and the eccentric-track will operate the pistons, exhausting air or fluid from the passage D through the ports F L and forcing it out again through the ports M G into the passage E, and therefore, if the passages D and E are properly connected with suction and discharge pipes, the device will operate as a lifting and force pump, and without the necessity of air-chambers, as the stream obtained is perfectly continuous, without the least pulsation. To prevent any vibrations arising from the eccentricity of the movable parts, the center of the track N is placed vertically below the center of the spindle A.

If the device is only required to act as a force-pump, or as a lifting and force pump at very high speeds, the piston-rods which connect the pistons with the track N may be taken off and replaced by other piston-rods, e , (shown detached at the right of Fig. 2,) which hold a friction-roller, o , adapted to travel on the inner face, f , of the track N. This arrangement will lessen the friction, as the operation of exhausting the cylinders will then be performed, if necessary, by the centrifugal force acquired by the pistons, and in this latter shape the device also gives its best results if used as a motor. When used as a motor, the water will be let into D or E, as the case may be, under pressure, and acting on the piston will force it outward; but as it is limited in its movement by the track N, it will ride the incline

of said track, and in its movement will cause the hub H to rotate and bring another piston in active operation, and as the pistons are so arranged that there will be no dead-center, 5 the device can be at all times used either as a pump or a motor, as desired.

What I claim as my invention is—

1. The combination of the revolving cylinder I, piston J, grooved track N, and rod c, 10 provided with an offset, c' , and a friction-roller traveling in the grooved track, whereby the pressure is exerted in a straight line, substantially as described.

2. In a combined rotary pump and motor 15 provided with reciprocating pistons J, and track N, having a grooved channel, O, the combination of the piston-rods detachably connected to said pistons J, and having a pin extending at right angles thereto, and carrying 20 an anti-friction roller, b , constructed to enter

said channel O, all combined, arranged, and operating as specified.

3. In a rotary pump, the combination, with the cylinder I, piston J, and suitable means for reciprocating said piston, of the guide S, 25 working in an eye in the projection s , whereby the piston J is guided in its movement, substantially as described.

4. In a combined rotary pump and motor provided with reciprocating pistons, as J, the 30 rigid track N, having a channel, O, and the piston-rods c , each having an offset, c' , and carrying a friction-roller adapted to travel in said channel, and constructed to be detachably connected with said pistons, substantially as 35 and for the purpose specified.

GEO. LENHARD.

Witnesses:

H. S. SPRAGUE,
E. SCULLY.