

R. RAINALTER.
OSCILLATORY MOTOR.
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1,001,684.

Patented Aug. 29, 1911.

Fig. 1.

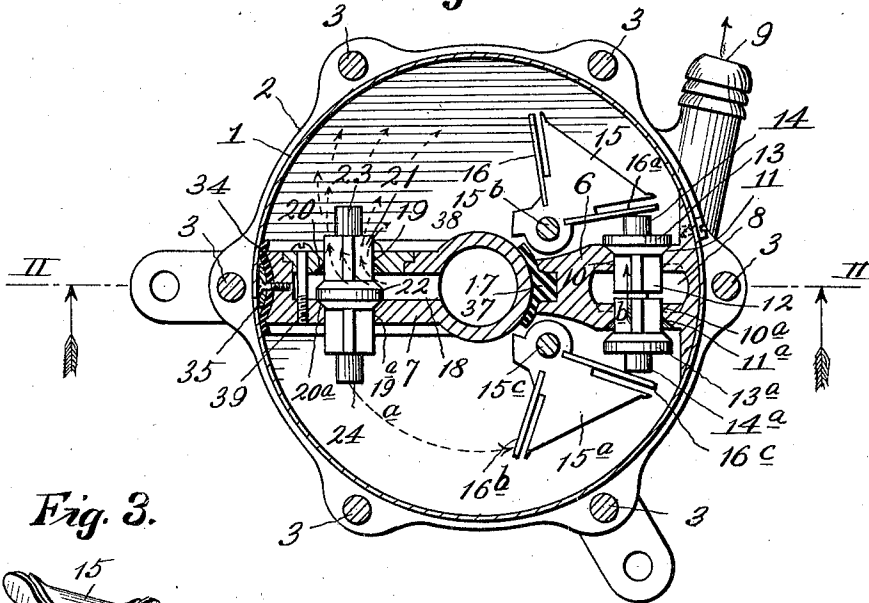


Fig. 3.

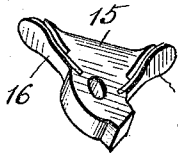
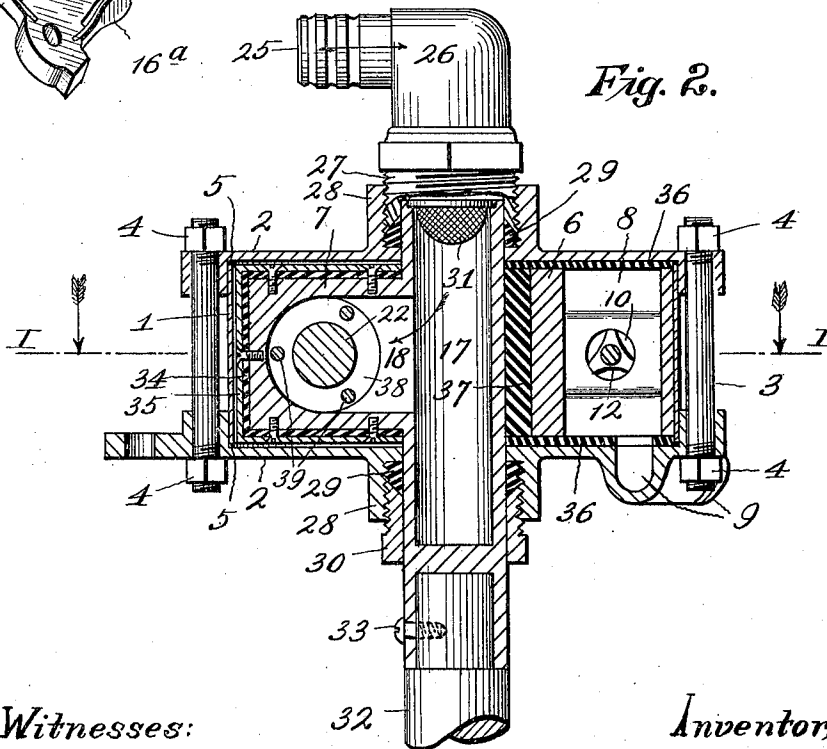


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

RUDOLPH RAINALTER, OF ST. JOSEPH, MISSOURI.

OSCILLATORY MOTOR.

1,001,684.

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To all whom it may concern:

Be it known that I, RUDOLPH RAINALTER, a citizen of the United States, residing at St. Joseph, in the county of Buchanan and State of Missouri, have invented certain new and useful Improvements in Oscillatory Motors, of which the following is a specification.

My invention relates to improvements in oscillatory motors, and my object is to produce a simple motor of this character for driving light machinery. The motor, owing to its oscillatory motion, is especially adapted for running the agitators of washing machines, which can be connected direct to the piston shaft of the motor and thus avoid the complication and loss of power where intervening gearing is employed.

In order that the invention may be fully understood, reference will now be made to the accompanying drawing, in which:

Figure 1 represents a horizontal section of a motor on line I—I of Fig. 2. Fig. 2 is a vertical section on line II—II of Fig. 1. Fig. 3 is a detail perspective of a lever employed in carrying out the invention.

In constructing my motor I employ a cylinder 1, which is closed at its ends by a pair of cylinder heads 2, which are firmly clamped in position by tie-rods 3 and nuts 4. Packing 5 is interposed between the ends of the cylinder and its heads to render the joints between the same fluid tight.

The interior of the cylinder is divided transversely into two parts by a stationary partition 6 and an oscillatory piston 7. Partition 6 has a central chamber 8 extending therethrough and communicating at its lower end with an exhaust port 9. Said partition also has centrally-disposed transverse outlet ports 10 and 10^a, extending therethrough and communicating with chamber 8, the outer ends of said ports being beveled as indicated at 11 and 11^a, respectively.

12 designates a valve slidably arranged in ports 10 and 10^a, and provided with enlarged beveled heads 13 and 13^a adapted to fit, respectively, in the beveled portions of the ports 10 and 10^a. Said valve also has reduced terminals 14 and 14^a, against which a pair of triangular-shaped levers 15 and 15^a, respectively, loosely bear, said levers being provided at their ends with springs or cushions 16 and 16^a, respectively. Levers 15 and 15^a are mounted upon a pair of pins 15^b and 15^c, respectively.

Piston 7 is provided with an integral tubular portion 17, rockingly-mounted in the cylinder heads and having communication with a chamber 18 in the body of the piston. Piston 7 also has two centrally-disposed ports 19 and 19^a communicating with opposite sides of chamber 18 and having beveled inner ends 20 and 20^a, respectively, for a purpose hereinafter described.

21 designates a valve slidably arranged in ports 19 and 19^a, and provided with an enlarged central head 22 having beveled sides adapted to snugly fit the beveled ends 20 and 20^a, respectively, of ports 19 and 19^a. Valve 21 has reduced terminals 23 and 24 adapted to, respectively, engage the levers 15 and 15^a, as hereinafter described. The tubular portion 17 of the valve communicates with an inlet port 25 in a fitting 26, provided with a gland 27 adapted to enter the internally-threaded stuffing-box 28 on the upper cylinder head. Stuffing-box 28 is provided with packing 29, whereby the joint between the same and the tubular portion of the piston is rendered fluid tight. The lower cylinder head is also provided with a stuffing-box 28, containing packing 29 and a gland 30.

31 designates a strainer, which strains the motive fluid before entering the piston, and thereby excludes all foreign matter which might interfere with the proper operation of the valves.

32 designates the drive-shaft whereby the motor operates the machinery to which it is connected, said drive shaft being secured in the lower terminal of the tubular member 17 by a set-screw 33. The edge of the piston is concave and provided with a U-shaped flexible cup 34, which is firmly held in position by a U-shaped clip 35, having a convex edge to force the cup into the concave edge of the piston and prevent leakage of the motive fluid between the exterior of the piston and the interior of the cylinder.

36 designates packing interposed between the ends of the stationary partition 6 and the cylinder heads, and 37 designates packing interposed between the inner edge of the partition and the tubular portion of the piston.

Access is had to chamber 18 for the insertion or removal of the valve 21 through an opening in one side of the piston, which is normally closed by a disk 38, removably held in position by screws 39.

When the valves are in the positions shown in Fig. 1, motive fluid entering the inlet 25 will pass through the tubular portion 17 into chamber 18 and flow from
5 thence through the open port 19 into the cylinder, as indicated by the dotted arrows, and as the motive fluid cannot escape through the closed port 11, it will force the piston in the direction of arrow *a* until the
10 reduced end 24 of valve 21 contacts with lever 15^a and thereby slides valve 12 in the direction of arrow *b*, causing it to open port 10, and close port 10^a. When valve 12 becomes seated in port 10^a, it will prevent further
15 movement of lever 15^a and valve 21, consequently as the piston continues to move in the direction of arrow *a*, it will carry port 20 against the adjacent bevel side of head 22 and open port 19^a. The motive
20 fluid will then flow into the cylinder through said port 19^a, and force the piston in the opposite direction until valve 21 contacts with lever 15 and causes it to restore valves 12 and 21 to their initial positions, so
25 that the motive fluid will again flow through port 19 and force the piston in the direction of arrow *a*. Thus it will be understood that the piston will continue to oscillate and alternately open and close the
30 valves, as long as the motive fluid enters the cylinder. As the valves and the piston are automatic in operation, they require no adjustment to start or stop the motor.

Having thus described my invention, what I claim is:—

1. A motor consisting of a cylinder, a chambered oscillatory piston having a tubular member mounted in the cylinder and communicating with motive fluid supply means, said piston also having oppositely-
40 disposed ports communicating with the cylinder, a valve carried by the piston to alternately close the oppositely-disposed ports, a chambered partition in the cylinder communicating with an exhaust port and hav-
45 ing oppositely-disposed ports communicating with the cylinder, a valve carried by the partition to alternately close the ports therein, levers interposed between the valves, and yielding means carried by said levers
50 against which the valves are adapted to contact.

2. A motor comprising a casing, a shaft journaled in said casing, a piston mounted in said casing and having one edge secured
55 to said shaft and its other edges concave and adapted to engage the sides of said casing, and packing secured within said concave edges.

In testimony whereof I affix my signature, 60 in the presence of two witnesses.

RUDOLPH RAINALTER.

Witnesses:

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M. Cox.