

C. E. BROWN.
MOTOR AND PUMP.

No. 522,102.

Patented June 26, 1894.

Fig: 1.

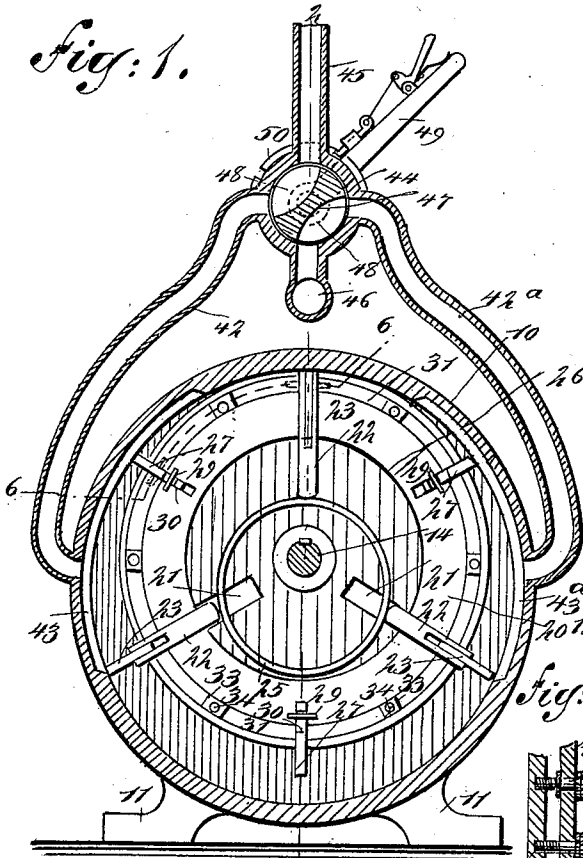


Fig: 2.

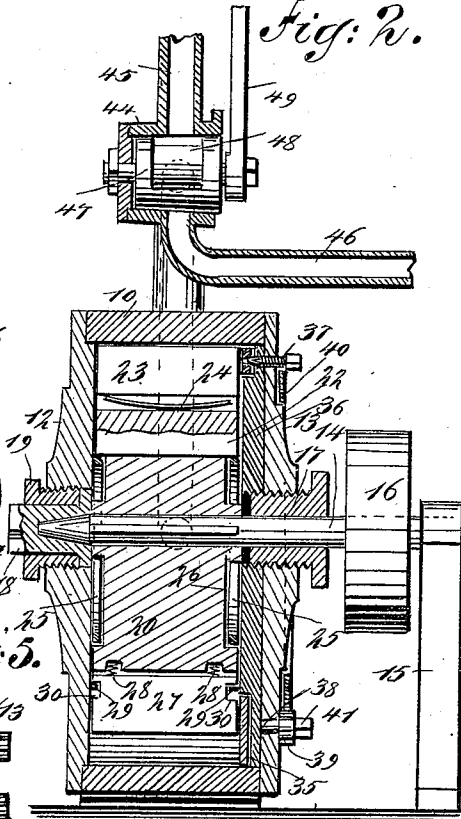


Fig: 5.

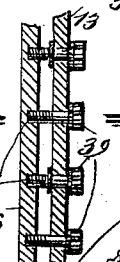


Fig: 3.

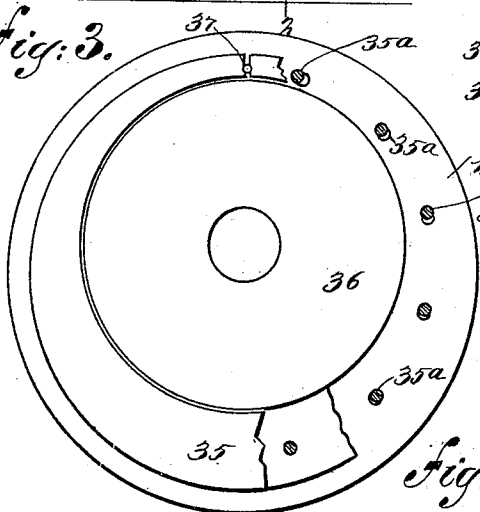


Fig: 4.

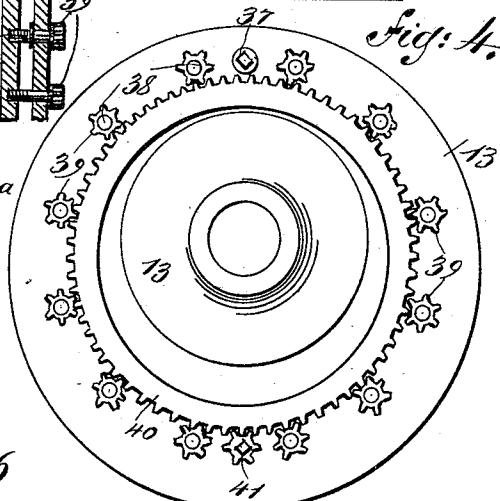
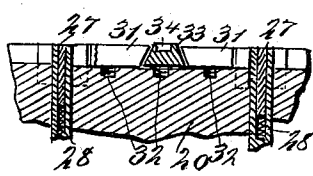


Fig: 6.



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Fig: 7.

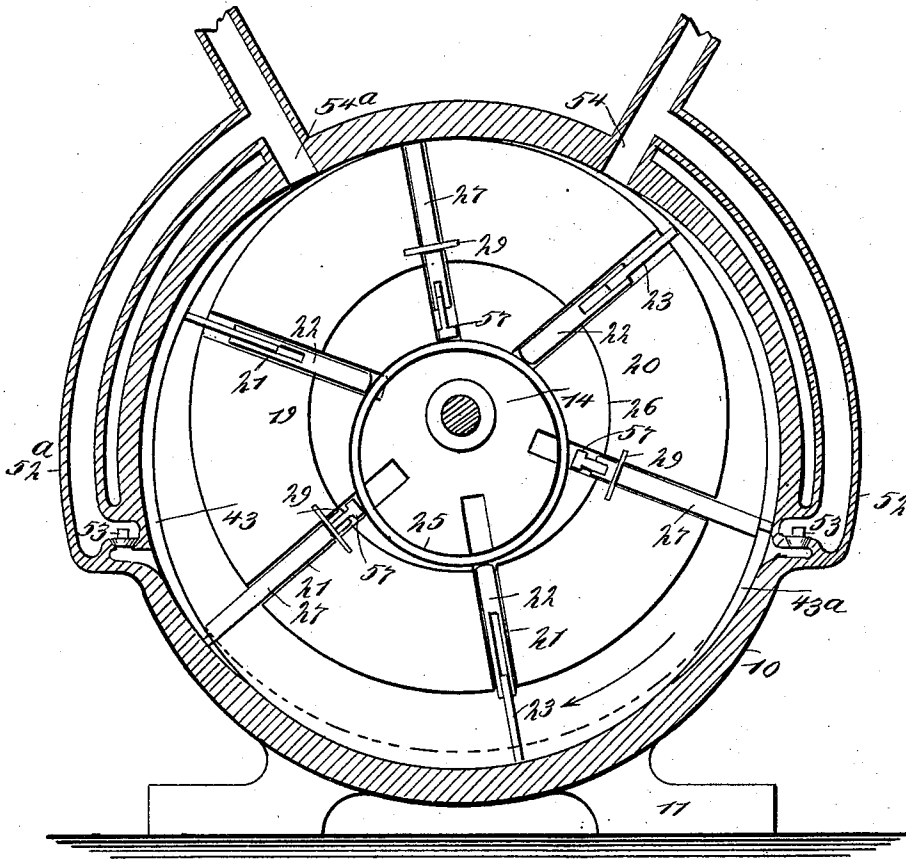


Fig: 10. Fig: 8.



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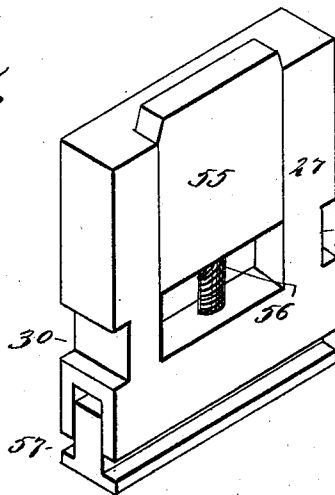
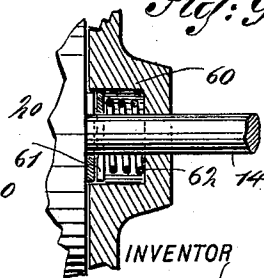


Fig: 9.



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UNITED STATES PATENT OFFICE.

CHARLIE E. BROWN, OF STAYTON, OREGON.

MOTOR OR PUMP.

SPECIFICATION forming part of Letters Patent No. 522,102, dated June 26, 1894.

Application filed October 2, 1893. Serial No. 486,982. (No model.)

To all whom it may concern:

Be it known that I, CHARLIE E. BROWN, of Stayton, in the county of Marion and State of Oregon, have invented a new and Improved Motor or Pump, of which the following is a full, clear, and exact description.

My invention relates to improvements in rotary motors, and the object of my invention is to produce a simple and effective motor which may be worked advantageously by either steam or water, and which may also be readily converted into a powerful pump.

To these ends my invention consists in certain features of construction and combinations of the same, as will be hereinafter described and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a sectional elevation of the motor and pump embodying my invention. Fig. 2 is a cross section on the line 2—2 of Fig. 1. Fig. 3 is a broken inside view of the adjustable head and ring used in connection with the motor. Fig. 4 is an outside elevation of the same parts. Fig. 5 is a detail sectional view showing the screw mechanism for adjusting the head ring. Fig. 6 is a detail sectional view on the line 6—6 of Fig. 1, and shows the adjustable packing ring for the piston. Fig. 7 is a sectional end elevation of the cylinder and its pipe connections, showing means for governing the speed of the engine. Fig. 8 is a detail view of one of the piston wings and the governor slide which is held in the wing. Fig. 9 is a broken detail sectional view of a form of stuffing box adapted to be used with my improved motor; and Fig. 10 is a detail view of the packing rings shown in Fig. 9.

The motor is provided with a cylinder 10 which rests upon feet 11, and has suitable heads 12 and 13, the former being secured in the usual way to the cylinder, and the latter having means of adjustment to take up wear and leakage, which will be hereinafter described.

The cylinder is pierced by a driving shaft 14 which is mounted in suitable supports 15 and provided with a fly wheel 16, from which power may be taken when the apparatus is

used as a motor and to which power is applied when the apparatus is used as a pump. The shaft 14 turns in a stuffing box 17 in the cylinder head 13 and the inner end of the shaft is mounted in a stuffing box comprising a socket 18 having a flange at its inner end and a ring 19 having a flange at its outer end, these two parts 18 and 19 being screwed in from opposite sides of the cylinder head, and a packing ring may be placed between them to make a steam-tight joint.

The piston 20 is secured to the shaft 14 and turns steam-tight within the cylinder 10, the piston being smaller than the cylinder and the shaft is placed above the center of the cylinder so that a chamber for steam or water is formed around the lower portion of the piston. The piston is provided with radial slots 21 in which are held the sliding supports 22 carrying wings 23 which are forced outward by springs 24 behind them, and which form abutments against which the steam or water strikes, so as to turn the piston.

On the ends of the piston and between the inner ends of the several supports 22 are rings 25 which lie in recesses 26 in the piston ends, so that the piston may lie flush against the cylinder heads, and it will be observed by reference to Fig. 1, that as the piston revolves, the upper support 22 will, by reason of its contact with the cylinder, be forced inward while the lower supports and their wings will be forced downward and outward, so as to project across the steam or water chamber of the cylinder. The piston is also provided with a plurality of short wings 27 which are adapted to extend only partially across the steam or water chamber, these wings being pressed outward by springs 28 (see Fig. 2), and their outward movement is limited by cross bars 29 which are secured to the piston head and which extend across recesses 30 in the ends of the wings 27. The object of these supplemental or small wings 27 is to form an increased abutting area for the steam and water to strike against, and also to prevent back pressure. This latter function is effected in a manner illustrated by Fig. 1. That is to say, when one of the larger wings 23 is at the lower end of the inlet groove in the cylinder, a small wing 27 will be at the opposite end of the groove and will permit the steam or water

to pass upward and fill that portion of the chamber which lies above the small wing, thus increasing the effective working area, and the wings 27 also permit the steam or water to exhaust while being forced on the other side into the narrowing space at the top of the motor.

In the ends of the piston 20 and near its outer periphery are packing rings made up of segmental sections 31, which lie in grooves in the piston and press against the piston heads so as to make a tight joint, these sections being pressed outward by springs 32. Between each pair of sections is a wedge-shaped block 33 which is pressed outward in a similar way and which practically forms a part of the packing ring, the block having a recess in its outer face, as shown at 34, in Fig. 6, and for this reason the block wears away faster than the sections 31, and the pressure of its spring upon it causes it to be continually pressed against the sections so as to spread them endwise and thus keep the ring tight.

The cylinder head 13 has an inwardly projecting portion 36, which forms practically a part of the head and which is provided with a split ring 35, this being secured to the head 36 which is countersunk around the edge so that the inner head 36 and ring 35 are flush with each other. The ring 35 serves as a calking ring and fits against the outer wall of the cylinder 10, next the piston head, and also fits against the ends of the wings in the piston. The ring 35 is secured to the head 36 by rivets 35^a which pass through elongated openings in the head 36, so as to permit the ring to be expanded. The ring is expanded by a screw 37, which projects through the head 13 and in the head 36, and this screw has a wedge shaped inner end which projects between the ends of the ring 35 so that by turning in the screw the ring may be expanded. The above arrangement enables a tight joint to be maintained between the head 13 and the cylinder 10; and the ring is pushed inward by screws 38 which are mounted circumferentially on the head 13 and the inner ends of which abut with the inner head 36, as shown in Fig. 5. On the outer ends of the screws 38 are pinions 39 which mesh with a circular rack or cog wheel 40 (see Fig. 4), and a stud 41 having a squared end to receive a crank and a pinion to engage the cog wheel is journaled on the head 13, so that by applying a crank to the said stud and turning the crank, the cog wheel may be turned and the several pinions 39 simultaneously revolved and in this way all portions of the inner head 36 and the ring 35 are forced evenly inward.

The cylinder 10 is provided on opposite sides with pipes 42 and 42^a, either of which may be used as a supply or exhaust pipe, and these pipes connect with grooves or ports 43 and 43^a in the inner sides of the cylinder. The pipes 42 and 42^a also connect with opposite sides of a valve casing 44 which is pro-

vided on one side with an inlet pipe 45 and on the other with an exhaust pipe 46. In the valve casing is a revoluble valve 47 having two similar ways 48 arranged on opposite sides, and the valve may be turned as shown in Fig. 1, so that only the pipe 45 connects with one of the pipes 42 or 42^a, and the exhaust pipe 46 connects with the other cylinder pipe. The stem of the valve is provided with a lever 49 by which the valve may be turned, and on the valve casing is the usual quadrant 50 adapted to engage the ordinary hand latch on the lever, by means of which the lever and valve may be locked in a fixed position.

I do not claim the valve as a part of this invention, but it affords a very convenient means of supplying steam or water to the cylinder and also of reversing the engine.

It will be observed by reference to Fig. 1, that the valve may be turned so as to admit water through the pipe 42, thus driving the piston in one direction or it may be turned in through the other pipe, so as to drive the piston in the opposite direction. If steam or water is admitted through the pipe 42 it enters the groove 43 in the chamber of the cylinder 10, strikes one of the wings 23 and thus sets the piston in motion, and the inflowing water strikes successively on the wings so that motion is constantly kept up. The object of the groove 43 is to enable the water to pass over the ends of the wings 23. It will be seen that each wing as it is pushed through the lower portion of the cylinder, will expel the water in front of it through the pipe 42^a, but if the said pipe serves as an inlet pipe, the water will, of course, be ejected from the pipe 42.

In Figs. 7 and 8 I have shown a self-governor for the device when used as a motor. As here shown, the cylinder is provided with pipes 52 and 52^a, which enter the cylinder on opposite sides and which are provided at the points where they enter the cylinder with check valves 53 which open under pressure from within the cylinder. The pipes also enter the cylinder near the top as shown at 54 and 54^a and they may be connected with a source of steam or water supply controlled by a valve like that already described.

When used in connection with the pipes just described, the wings 27 are used, and are provided with outwardly movable blades 55 which are held normally in the wings by springs 56. The wings are mounted on supports 57 which are held in three of the slots 21 and abut with the rings 25, the wings being recessed at their inner ends to receive and slide on the outer ends of the supports 57. When the engine is running at high speed, the centrifugal force of the piston causes these blades to be thrown out against the tension of their springs, so as to shut off the supply of steam from the largest part of the space where the most effective pressure would be exerted. When running in the di-

rection indicated by the arrow in Fig. 7, the steam or water is admitted through the pipe 52 and its check valve remains closed so that the supply enters at 54 only, while the opposite valve 53 opens under the pressure of steam or water in the cylinder and permits the latter to exhaust.

It will be understood that the sectional packing 31, and the split ring 35 may be, and preferably are employed in connection with the motor shown in Fig. 7, but they have been omitted from this figure for the sake of clearness.

When the apparatus is to be used for a pump, the pipes 42 and 42^a or 52 and 52^a may be used respectively for suction and discharge pipes and the valve 47 may be dispensed with. In this case the small or supplemental wings 27 may also be dispensed with.

In Fig. 9 I have shown a form of packing which I prefer to use around the shaft 14 of the motor where the shaft connects with the cylinder heads. As here shown the shaft 14 projects through the hub of the cylinder head, which is enlarged and chambered, as shown at 60, and in the chamber are split packing rings 61 which fit snugly around the shaft and are pressed against the piston 20 by a spring 62 which encircles the shaft.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with the cylinder having suitable inlet and exhaust ports, of the revoluble piston hung off the center in the cylinder, a plurality of yielding wings projecting from the face of the piston and adapted to be held in continuous contact with the cylinder, and a plurality of supplemental wings also projecting from the piston but striking the cylinder intermittently, substantially as shown and described.

2. The combination, with the piston and the cylinder, of the packing ring in the end of the piston, the ring comprising a plurality of

segmental sections having under-cut ends, a wedge-shaped block between each pair of sections, and separate springs interposed between the piston and each of the sections and wedges, the said springs being arranged essentially perpendicular to the end surface of the piston to force the packing ring away from the piston in a direction parallel to the axis thereof, substantially as described.

3. The combination, with the piston and the cylinder, of an inner head arranged parallel to the cylinder head, and means for adjusting it toward and from the cylinder head proper, a split calking ring held on the inner surface of the said inner head adjacent to the piston and to the walls of the cylinder, and means for expanding and contracting the said ring.

4. The combination, with the piston and the cylinder head, of an inner head arranged parallel to the cylinder head a calking ring held on the inner surface of the inner head adjacent to the piston, screws engaging with the said inner head and extending outward through the cylinder head, the screws being held against longitudinal movement pinions secured to the screws on the outside of the cylinder head, a circular rack engaging with the pinions, and means for turning the rack, substantially as described.

5. The combination of the cylinder, the revoluble piston within it, a cylinder head, the split packing ring mounted on the head opposite the end of the piston, rivets for securing the ring to the cylinder head, said rivets passing through elongated, essentially segmental openings in the cylinder head, to permit the ring to move in a plane parallel to the cylinder head, and means for expanding the ring, substantially as shown and described.

CHARLIE E. BROWN.

Witnesses:

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G. W. POWELL.