

S., D., & J. BARROW.
Rotary Engine and Pump.

No. 222,439.

Patented Dec. 9, 1879.

Fig: 1.

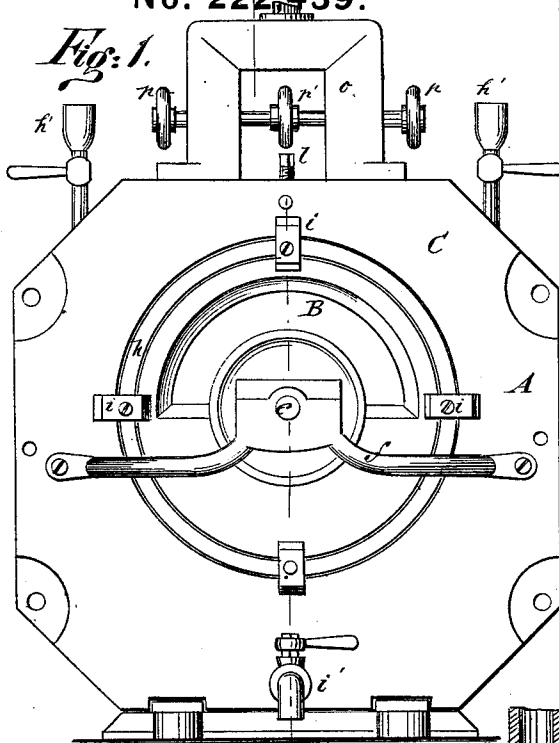


Fig: 2.

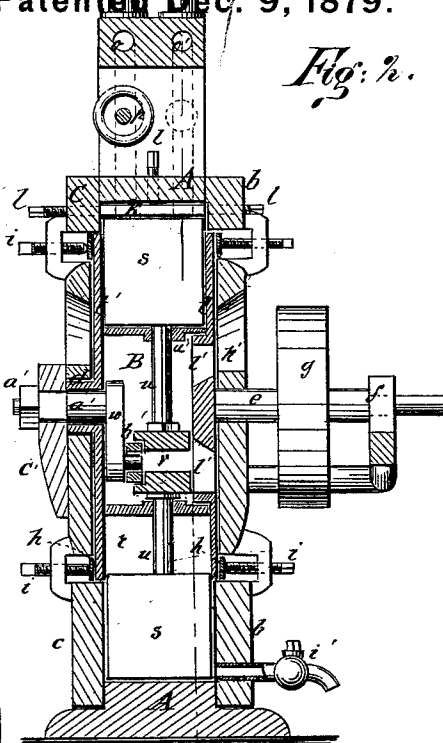
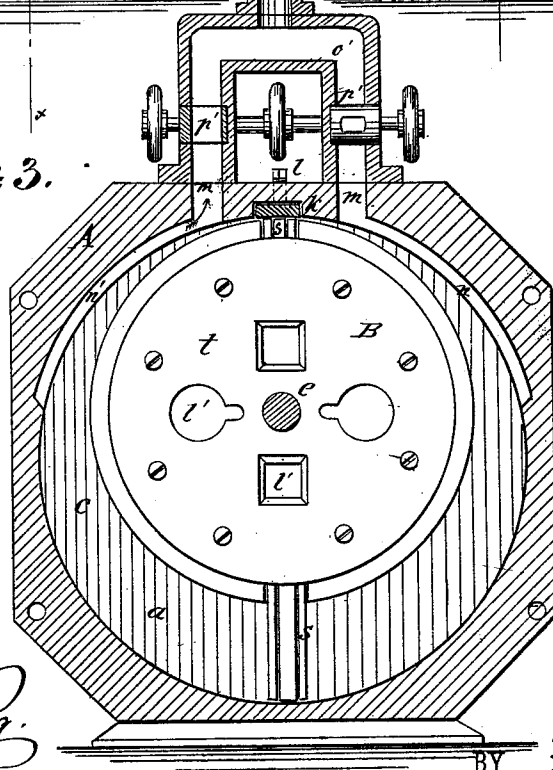


Fig: 3.



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Fig. 4.

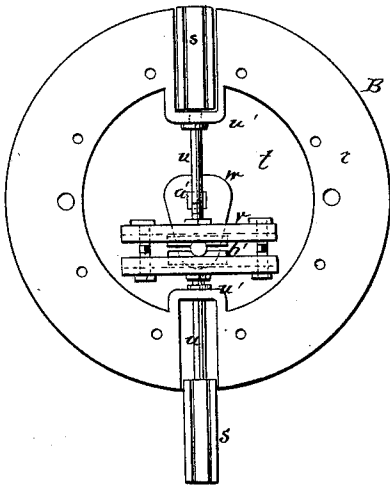


Fig. 5.

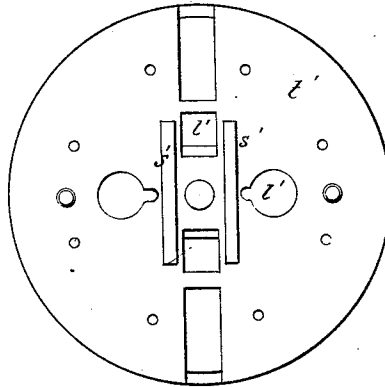


Fig. 6.

Fig. 10. Fig. 11.

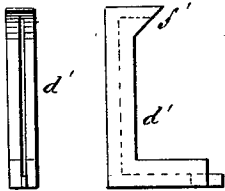
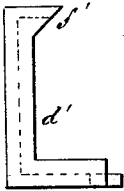
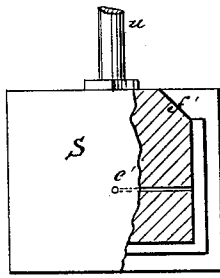


Fig. 9.

Fig. 10.

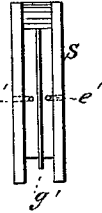
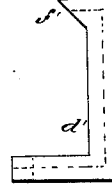


Fig. 7.

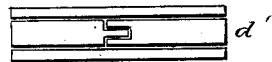
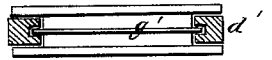


Fig. 8.



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UNITED STATES PATENT OFFICE.

SAMUEL BARROW, DAVID BARROW, AND JACOB BARROW, OF WINDFALL, INDIANA.

IMPROVEMENT IN ROTARY ENGINES AND PUMPS.

Specification forming part of Letters Patent No. 222,439, dated December 9, 1879; application filed May 22, 1879.

To all whom it may concern:

Be it known that we, SAMUEL BARROW, DAVID BARROW, and JACOB BARROW, of Windfall, in the county of Tipton and State of Indiana, have invented a new and Improved Rotary Engine and Pump, of which the following is a specification.

Our improvements relate to rotary engines, pumps, and blowers, wherein a wheel is fitted eccentrically in a circular chamber or steamway, and fitted with radially-acting gates; and the invention consists in certain novel details of construction and combination, which will be described in connection with the accompanying drawings and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of the engine. Fig. 2 is a vertical cross-section on line *x x* of Fig. 1. Fig. 3 is a side elevation, reverse of Fig. 1, and with the side plate of the case removed. Fig. 4 is a side view of the wheel detached, and with one side removed to show the operating mechanism of the pistons. Fig. 5 is an inside view of the plate removed in Fig. 4. Figs. 6 to 12 represent details of construction of the pistons and their packing.

Similar letters of reference indicate corresponding parts.

A is the case of the engine, having a circular aperture, *a*, and fitted with the side plates, *b c*, between which is fitted the wheel B, eccentric to the aperture *a*. The wheel B is sustained at one side by a hollow gudgeon, *d*, entering plate *c*, and at the opposite side by the shaft *e*, that is connected to the wheel and extends through plate *b* and through a box on the yoke *f*. This shaft *e* carries a pulley, *g*, for taking power from the engine, or for driving the wheel B by a separate motor when the apparatus is used as a pump. The side plates, *b c*, are each formed with an annular slot concentric with wheel B, but of smaller diameter, in which slots are metal packing-rings *h*, for holding packing, that is pressed in contact with the sides of the wheel by set-screws *i*. Within the circumference of these packing-grooves the inner surfaces of the plates *b c* are recessed to receive the sides of the wheel B, which is formed with a rabbet around its edges to correspond. This construction gives a tight pack-

ing, and permits renewal of the packing without removing the side plates, *b c*.

As shown in Fig. 3, the wheel B is in contact at one point in its circumference with the side of the aperture or steamway *a*, and at this point there is a metal packing, *k*, that is adjusted by a screw, *l*, from the outside of the case.

m m' are steam-ports at opposite sides of the packing *k*, and *n n'* are grooves in the side of the steamway, which permit the exhaust of steam and the change of pressure from one piston to the other, as hereinafter described.

The admission of steam is regulated by valves contained in the steamways *o o'*, both of which communicate with both ports *m m'*, and are cut off from either port by valves *p p'*, which are fitted to be operated from the outside by hand. The steamway *o* is the inlet for steam, and *o'* the exhaust, and the valves are changed according to the direction in which the engine is to run.

The wheel B consists of a ring portion, *r*, (see Figs. 4 and 5,) formed with two radial slots at opposite sides, which form boxes for the pistons *s*, and the sides of the ring are covered by the plates *t t'*, which inclose the operating mechanism of the pistons, and are also grooved at the inner sides for the pistons *s*. The pistons *s* are attached upon the outer ends of rods or arms *u*, that pass through tubular guides *w'*, which contain packing, and the said arms *u* are connected at their inner ends to a cross-head, *v*, that moves against the slideways *s'* on plate *f'*. The connections are made by right and left handed screw bolts and nuts, which permit adjustment to regulate the position and movement of the pistons. The pistons *s* are operated by a crank-arm, *w*, that is on the end of a shaft, *a'*, (see Figs. 2 and 4,) the crank-pin of which arm carries a slide-block, *b'*, that moves freely in a slide-way that is formed in the side of head *v*. The shaft *a'* passes through the hollow axis *d* of wheel B and through a plate, *c'*. The portion of shaft *a'* in plate *c'* is squared to fit the correspondingly-shaped aperture of plate *c'*, and at its outer end the shaft *a'* is fitted with a nut for retaining it in place. By this construction the shaft *a'* remains stationary, and

the revolution of the wheel B will cause radial movement of the pistons at the proper time, so that the end of each piston conforms to the circle of the steamway *a*.

The construction of pistons *s* and manner of packing them are shown in the figures from 6 to 12. Each piston is grooved at its outer edge and sides to receive the metal packing-strips *d'*, which are pressed outward in contact with the sides of the steamway by the pressure of steam, which has access behind the packing by an opening and passage, *e'*, at the side of the pistons, and this outward movement is limited by an inclined lug or flange, *f'*, that is formed on each packing-strip *d'*. The lugs *f'* serve also to prevent steam escaping at the back of the pistons.

As the engine is to be run in either direction, there is an opening and passage, *e'*, at each side of the pistons. To prevent steam passing through, a partition, *g'*, is fixed in the packing-groove, projecting into a groove in the packing, thereby separating one passage *e'* from the other.

At the top of case A are oil-cups *h'*, by which the interior parts are lubricated, and at the bottom is a cock, *i*, for permitting escape of water. The side plate *b* of case A is formed with an opening, *k'*, and the side plate *t* of wheel B with openings *l'*, through which openings access may be had to adjust the pistons *s*.

In operation, the steam enters by the passage *o* to either port *m* or *m'*, as the valves *p* are set, and the exhaust goes out by the other port *m* or *m'* to the passage *o'*.

The steam escapes over the end of the piston *s* that is under pressure as soon as the piston reaches the groove *n* or *n'*, and until

that point is reached the live steam passes over the top of the other piston *s* by the other groove *n* or *n'*. As soon as the exhaust commences the pressure is taken upon the piston nearest to the live-steam port.

In using the above apparatus as a pump, it is to be driven by a separate motor, and the passages *o o'* connected with suction and discharge pipes. Each piston will act to fill the space behind it by exhaustion of the air, and to force out the water in front.

This construction furnishes an engine and pump of durable construction that can be readily and tightly packed, and which may be taken apart with facility for repairs. The apparatus is also adapted for use as a blower, and will in that case be driven by a separate motor.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a rotary engine and pump, in combination with the case A, having slotted and recessed side plates, *b c*, the wheel B, formed with rabbeted edges, the packing-ring *h*, and set-screws *i*, substantially as described and shown, and for the purposes specified.

2. In a rotary engine, the combination of the pistons *s*, the slotted ring *r*, and the plates *t t'*, grooved on the inner sides, as shown and described.

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Witnesses:

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