2 Sheets—Sheet 1.

R. JOHNSON.

Machinery for Pumping, Forcing, and Blowing.

No. 212,944. Patented Mar. 4, 1879.

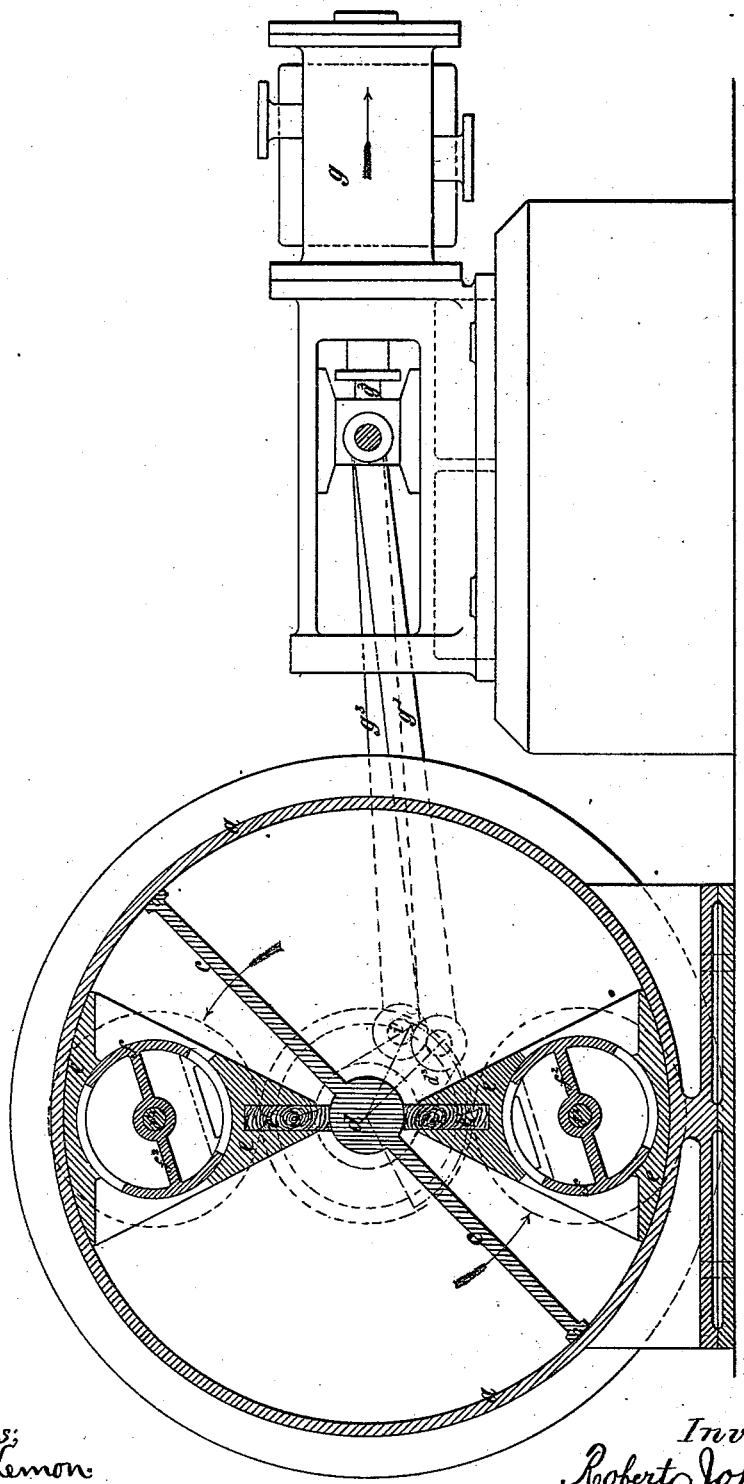

FIG. 1.

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2 Sheets—Sheet 2.

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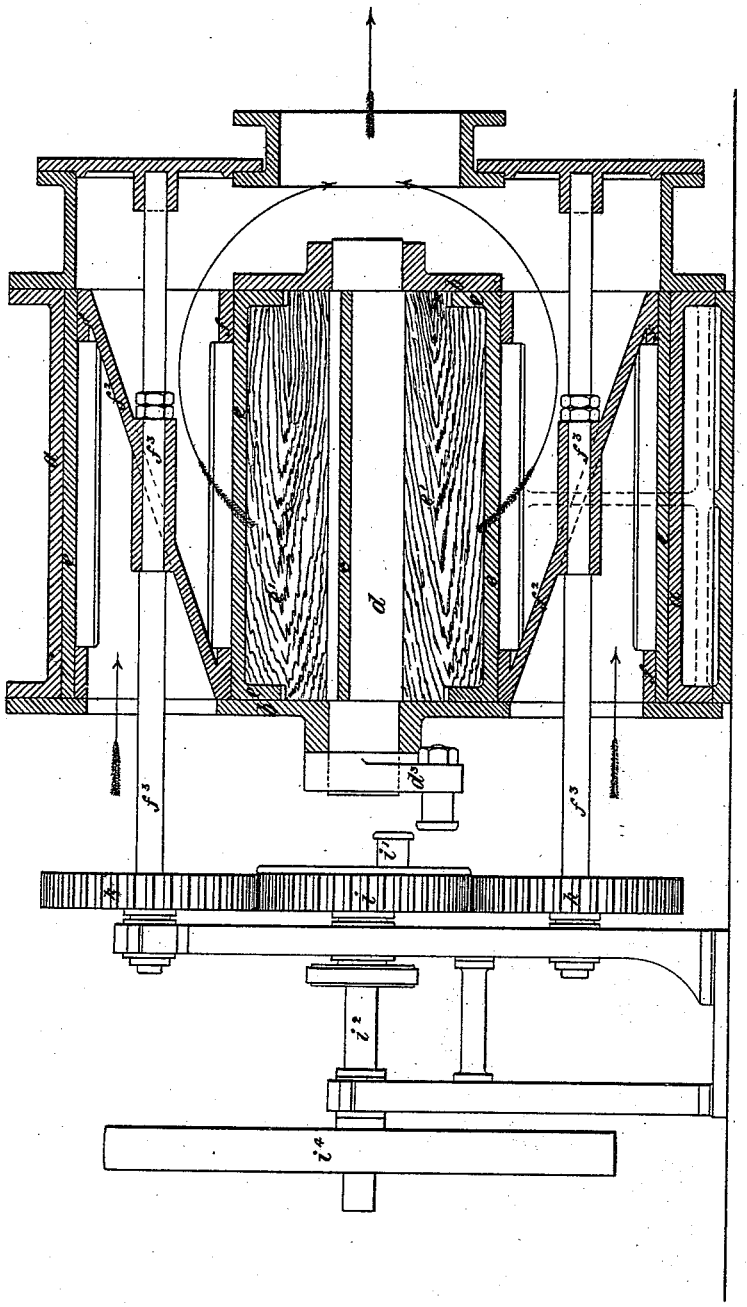
FIG. 2.



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UNITED STATES PATENT OFFICE.

ROBERT JOHNSON, OF SEEDLEY, NEAR MANCHESTER, ENGLAND.

IMPROVEMENT IN MACHINERY FOR PUMPING, FORCING, AND BLOWING.

Specification forming part of Letters Patent No. **212,944**, dated March 4, 1879; application filed December 10, 1878.

To all whom it may concern:

Be it known that I, ROBERT JOHNSON, of Seedley, near Manchester, in the county of Lancaster, in England, engineer, have invented certain new and useful Improvements in Machinery for Pumping, Forcing, Blowing, and Exhausting Air and other fluids, and for obtaining motive power; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of this specification.

My improved machinery consists of a cylinder, with covers at each end supporting a central axle. Within this cylinder are segmental divisions extending from the inside circumference to the axle, to which is fixed a double blade. At the outside of the axle is fixed a crank, which is connected to the piston-rod of a steam-cylinder or other motor by a connecting-rod; or when the machine is used as a motor, the axle is connected to the driving-gear. Openings are provided on each side of the segmental divisions for admitting and discharging the air or other fluid, such openings being regulated by means of circular valves placed within the said segmental divisions; consequently every to-and-fro motion of the steam-piston or other motor draws in and forces out a certain quantity of air, water, or other fluid; or when used as a motor, the fluid imparts motion to the double blade *c*, and from it to the driving-gear.

Figure 1 is a longitudinal section of my improved machinery for pumping, forcing, blowing, and exhausting air and other fluids. Fig. 2 is a transverse section of the same.

a is the cylinder; *b*, the covers for the ends of the cylinder *a*. In each cover is a bearing supporting the central axle *d*, to which is fixed a double blade, *c*. Within the cylinder *a* are segmental divisions or abutments *e*, extending from the inside circumference of the cylinder to near the axle *d*, and a wood or other packing, *e'*, is inserted in the divisions *e* to form the joint. In the divisions *e* are placed cylindrical valves *f*, open at each end, one for the outlet and the other for the inlet of the air or other fluid, which openings are separated by means of a diagonal division, f^2. The valves *f* are fixed on the spindles f^3, on the ends of which are spur-wheels *h*. On the axle *d* is fixed the crank d^3, which is connected with the piston-rod g^2 of the steam-cylinder *g*, or other motor, by the connecting-rod g^1. The connecting-rod g^3, also connected to the cross-head of the piston-rod g^2, is connected to the crank-pin i^1 on the spur-wheel *i*, which is fixed to the axle i^2, on which is the fly-wheel i^4. The spur-wheel *i* gears into both the wheels *h h*.

The drawings represent the parts in the positions they occupy when the piston in the steam-cylinder *g* or other motor is moving in the direction of the arrow in Fig. 1, and consequently when the double blade *c* is approaching the segmental division *e*. At this time the valves *f* are partly open to admit the fluid into the cylinder *a* at one side of the abutment, and discharge it at the other side. When the piston-in the steam-cylinder arrives at the end of the stroke the double blade *c* will be close to the division *e*. At this point the valves have closed the openings on each side of the abutments; but when the steam-piston commences its return stroke in the cylinder, the valves, in consequence of the rotary motion given them by the wheels *i* and *h*, again open to admit and discharge the air or other fluid.

By this means every to-and-fro motion of the steam-piston or other motor imparts an oscillating or reciprocating motion to the double blade *c* and a rotary motion to the valves *f*, and twice in each to-and-fro motion draws in and forces out a quantity of air, water, or other fluid equal in capacity to the space between the segmental divisions *e* minus the thickness of the double blade *c*.

When the machine is used as a motor, the air, water, or other fluid is admitted through the valves *f* onto the double blade *c*, and discharged from the cylinder when the double blade reverses its direction of motion.

Having thus stated the nature of my invention and described a convenient manner of performing the same, I do not claim, broadly, the combination of an oscillating blade with alternately opening and closing valves; but

What I claim is—

1. The combination of the blade *e* and the cylindrical valves *f f*, arranged within the cylinder parallel to its axis, and the abutments *e e*, in which said valves are located, the blade and valves having respectively oscillating and rotary motion by connecting gearing, substantially as specified.

2. An oscillating cylindrical valve, *f*, having the diagonal division f^2, in combination with a case, A, and apertured abutment *e*, substantially as specified.

3. The combination, with the blade *e* and valves *f* f^2, of the crank d^3, gears *h h i*, the connecting-rods g^1 g^3, and piston g^2, all as shown and described, whereby oscillating motion is imparted to the blade and rotary motion to the valves, as and for the purpose specified.

In testimony whereof I have hereto set my hand before two subscribing witnesses.

ROB. JOHNSON.

Witnesses:

CHARLES J. MORRIS,

TOM PITTS.