W. E. BARTRUM & H. C. POWELL.
Rotary-Engines, &c.

No. 208,559. Patented Oct. 1, 1878.

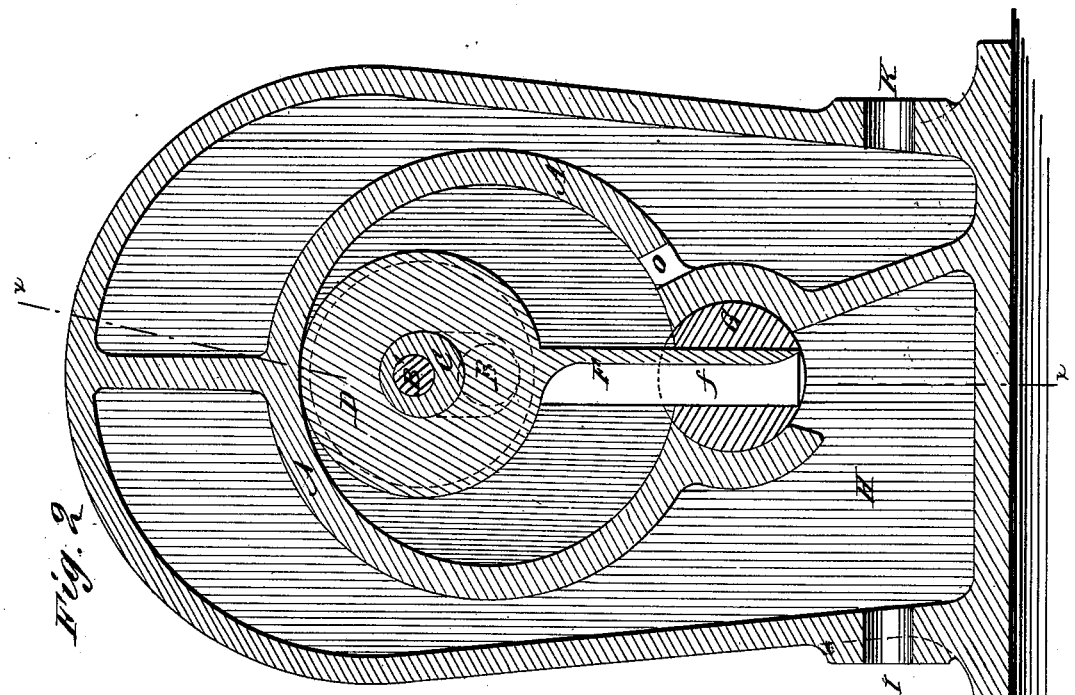

Fig. 2

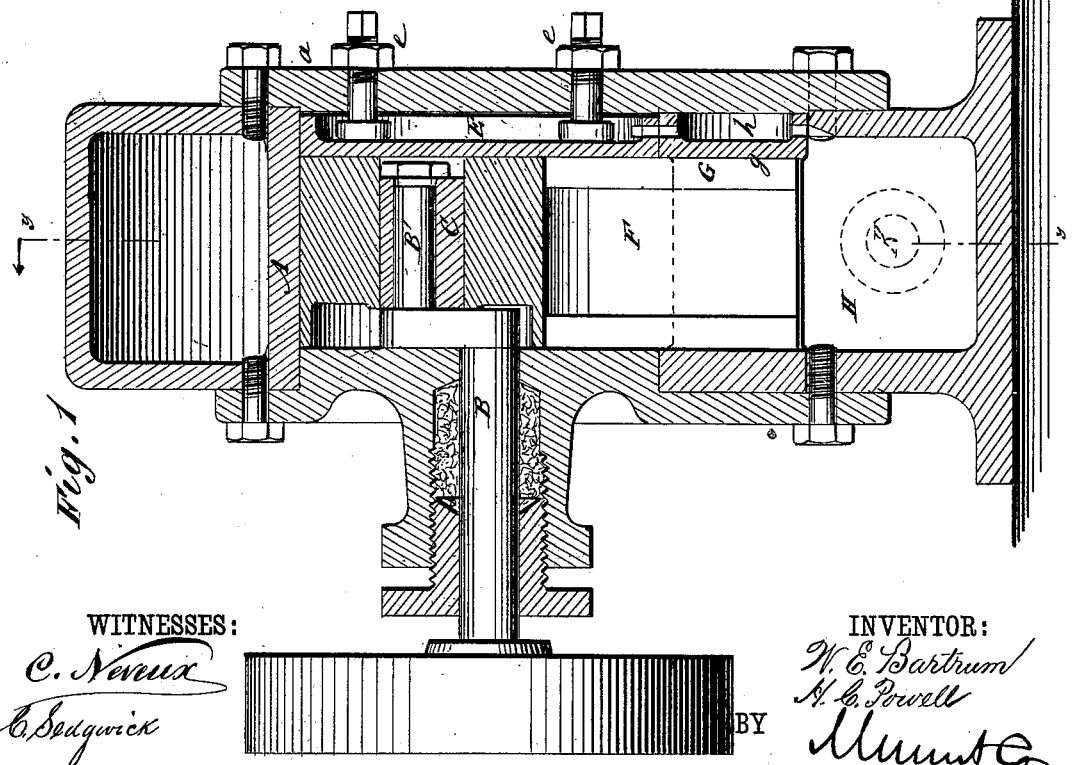

Fig. 1

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UNITED STATES PATENT OFFICE.

WALTER E. BARTRUM AND HENRY C. POWELL, OF LONDON, ENGLAND.

IMPROVEMENT IN ROTARY ENGINES, &c.

Specification forming part of Letters Patent No. **208,559**, dated October 1, 1878; application filed July 23, 1878.

To all whom it may concern:

Be it known that we, WALTER ECCLESTON BARTRUM and HENRY COKE POWELL, of London, England, have invented a new and useful Improvement in Rotary Engines, Pumps, Blowers, and Meters, of which the following is a specification:

This invention relates to rotary apparatus that may be employed as an engine worked by steam or other fluid under pressure, or as a pump for raising or forcing fluids, or as a liquid or fluid meter.

This apparatus consists of a cylinder, in the axis of which is mounted a shaft, having on it an eccentric or crank. On this eccentric or crank is fitted a strap of such thickness that its exterior is in contact with the interior surface of the cylinder. From one side of the said strap an arm or slab projects through bushes mounted in the side of the cylinder, through which bushes it can freely slide, while these bushes themselves can partly rotate. A port or passage is formed through the side of the cylinder, near the said bushes on the one side thereof, and another port is likewise provided on their other side, steam or other fluid under pressure being admitted by the one of these ports, while an escape is provided at the other port. The excess of pressure on the one side of the eccentric or crank causes it to revolve and the shaft to rotate therewith, the apparatus thus forming a rotary engine or fluid-meter; or if the shaft be caused to rotate by power applied thereto fluid will be drawn in at one of the ports, and will be forced out at the other, the apparatus thus constituting a rotary pump or instrument for raising or forcing fluids.

Either of the ports mentioned above, instead of being formed in the side of the cylinder, might be formed as a passage in the slab arm of the eccentric strap, opening at its outer end into a chamber connected with either the supply or the discharge, and at its inner end opening by a lateral aperture into the cylinder.

Figure 1 represents a vertical transverse section taken on line *x x*, Fig. 2; and Fig. 2 is a vertical section taken on line *y y* in Fig. 1.

Similar letters of reference indicate corresponding parts.

A is a cylinder, through the axis of which is mounted a shaft, B, that passes through a stuffing-box in one of the end covers of the cylinder, or it may pass through stuffing-boxes in both covers. On the shaft B is fixed a crank, B′, on which is placed the eccentric C. The eccentric C is embraced by the piston D, which extends the whole length of the cylinder A, and which is made of such thickness as to fit exactly between the outer circumference of the eccentric C and the inner surface of the cylinder A.

When slackness results from wear, a cap, *a*, on the side of the cylinder can be removed, and by turning the eccentric C the piston D may be adjusted to bear against the inner surface of the cylinder A; also, a sliding plate, E, is provided at one end of the cylinder A, which plate can be set up by screws *e* to take up any lateral movement and prevent leakage. From the piston D a slab or arm, F, extends, and is guided through a cylindrical rocking joint, G, arranged in a cavity at one side of the cylinder, the slab F being capable of sliding longitudinally through the joint, while the joint itself is capable of partially rotating in its seat.

In order to insure a good fit of the cylindrical joint to its seating and to the slab F, and to prevent leakage of fluid through it, one side of the joint is made to work against a sliding plate, *g*, pushed by a spring or by the pressure of fluid in the cavity *h*, at the mouth of which the joint G is fitted.

A port, *f*, is formed in the slab F, communicating at its end with the cavity H. The cavity H is supplied with steam or other fluid under pressure through the opening I, and at the side of the cylinder A, close to the joint G, is an outlet-passage, O, communicating with a discharge-pipe at K.

The apparatus operates as follows: The eccentric C being in the position shown in Fig. 2, the steam or working fluid flows from H by the passage *f* into the cylinder A, and pressing on the one side of the piston D causes the eccentric and shaft B to revolve toward the opening O. The rotation of the shaft and eccentric continues till the supply *f* has been cut off; but the movement is continued by the expansion of the fluid already supplied to the

one side of the cylinder A until the discharge-outlet O is exposed, whereupon the fluid escapes by the discharge-pipe at K after having done its work in the cylinder, and the like action is repeated in every revolution.

The shaft B may be provided with a fly-wheel to carry the eccentric and moving parts over the dead-center, which occurs when the eccentric stands in the position opposite to that shown in Fig. 1; or two engines, such as we have described, may be arranged to act on the same shaft, their eccentrics being set opposite to one another, or nearly so.

We have described the operation of the apparatus as an engine, by which the pressure of a fluid is made to give rotary motion to a shaft, either for the production of motive power or to act as a meter for the measurement of the fluid passing through a cylinder of known capacity.

It may be readily understood, however, that by giving from an extraneous source rotary motion to the shaft B the apparatus could be made to act as a pump for raising or forcing fluids, the pipes I and K serving either for inlet or for outlet, respectively, according to the direction in which the shaft B may be caused to revolve.

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

The combination of the cylinder A, crank-shaft B, having eccentric C, the piston D, extending the whole length of the cylinder and having slide-arm F, with port *f* and the joint G, as and for the purpose specified.

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Witnesses:
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