2 Sheets—Sheet 1.

F. PERNOT.

Rotary-Engine.

No. 219,365. **Patented Sept. 9, 1879.**

Fig. 1

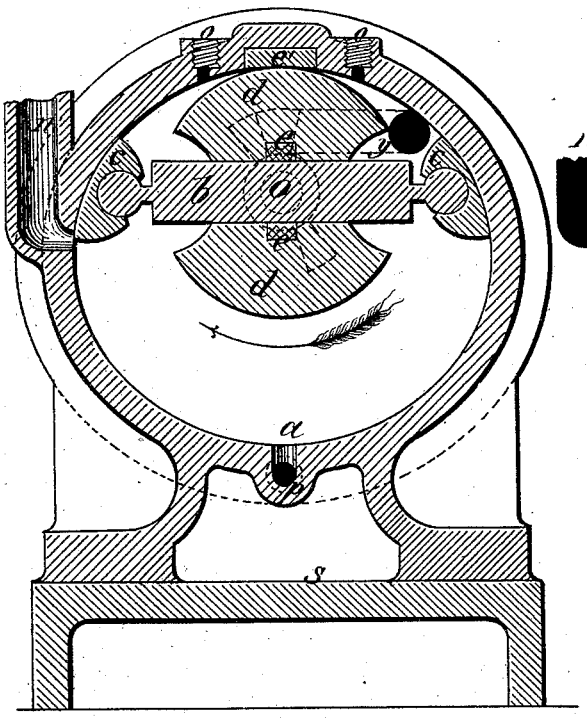

Fig. 3

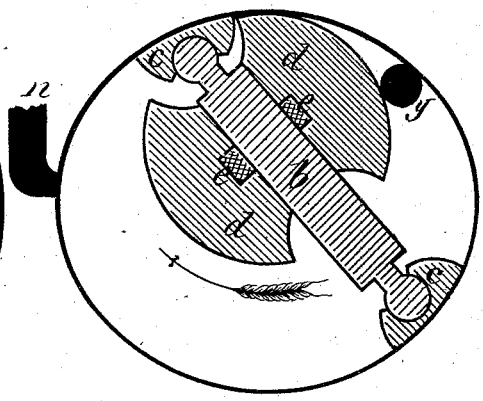

Fig. 4

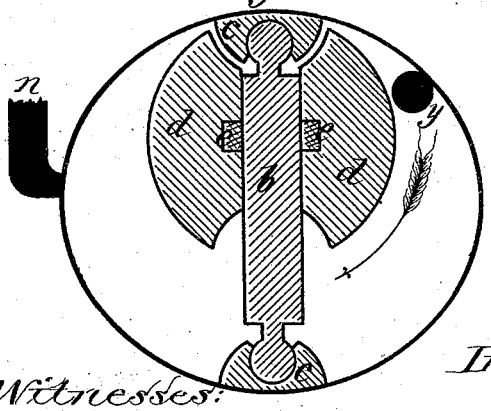

Fig. 5

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2 Sheets—Sheet 2.

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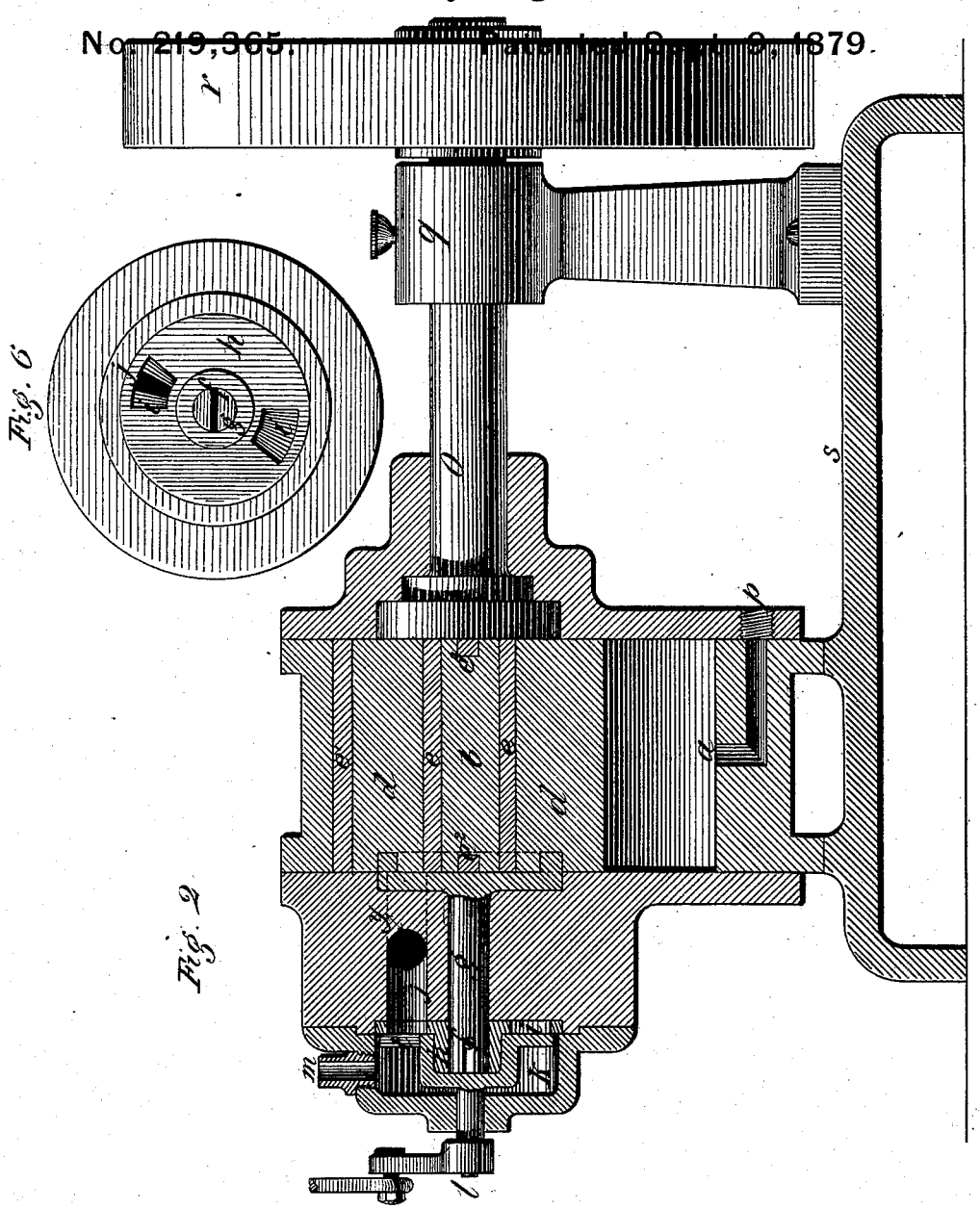
Rotary-Engine.

No. 219,365. Patented Sept. 2, 1879.



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UNITED STATES PATENT OFFICE

FRANÇOIS PERNOT, OF GRAY, FRANCE.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **219,365**, dated September 9, 1879; application filed July 14, 1879.

To all whom it may concern:

Be it known that I, FRANÇOIS PERNOT, of Gray, in the Department of the Haute-Saône, in the Republic of France, have invented certain new and useful Improvements in Rotary Engines and other Rotary Apparatus, of which the following is a true and exact description.

This invention has reference to rotary engines worked by steam, gas, or other fluids, to rotary pumps, fans, and blowing-machines; and its object is mainly to construct an engine which, while possessing the advantages of existing rotary devices, shall offer further advantages with regard to regularity and ease in working.

In a cylinder of symmetric elliptical section is placed a nave, preferably made solid, which turns upon an axis eccentrically placed in the shorter axis or diameter of the ellipse. Through this nave passes from side to side a sliding plate of constant length, and whose ends always touch the inner periphery of the cylinder. The contact is made hermetic by means of movable segments connected by knuckle-joints. The continuous rotation of the nave causes the sliding of the movable plate in the said nave without springs or other similar devices. The engine works by expansion, which may be made variable by hand or by a governor.

The invention consists in the construction and combination of parts, as hereinafter more particularly specified.

I will proceed to describe, with reference to the annexed drawings, a rotary steam-engine constructed in accordance therewith.

Figure 1 is a transverse section, and Fig. 2 a longitudinal section, of the engine.

The engine is composed of a cylinder, *a*, by preference of oval or elliptical form, perfectly regular and symmetrical. This form is adopted so that a sliding plate, *l*, which revolves, passing constantly a point, *o*, which is eccentric in relation to the cylinder, may touch the inner periphery of the said cylinder. The said point *o* is the axis of rotation of the piston of the engine.

The piston is composed of the nave *d*, through which the sliding plate *b* passes. This plate slides easily in the nave, and a hermetic joint is made between them by means of metallic or other packing, *e*. Each of the ends of the rotating sliding plate has a movable segment, *c*, jointed so as to pivot on the plate *b* and adopt the curved contour of the inner periphery of the cylinder. At the upper part a metallic packing, e^1, makes a hermetic joint along the line where the nave *d* touches the cylinder *a*. A hermetic joint is also made between the rotary piston and the ends of the cylinder by means of packing e^2, fitted in grooves formed in the nave *d* and sliding plate *b*.

The steam, supplied by a pipe, *m*, to the steam-chest *k*, is admitted at one end of the cylinder by a port, *y*, communicating, by a channel, *j*, with the steam-chest. The admission is regulated by a rotary valve, *h*, formed with two orifices, *i*, (see the view in front, Fig. 6,) which allow the steam to pass when they are opposite the said channel *j*. The rotary valve is carried on the end of the shaft *g*, and turns with the nave *d*, being acted on by the pin *f*. The steam, after having done its work, exhausts through a port, *n*, in the side of the cylinder.

When the sliding plate *b* occupies the position seen in Fig. 1 it is at the dead-point. The exhaust and the admission of steam commence. Fig. 3 shows the position the plate *b* occupies when the admission of steam ceases. The period of expansion then begins, and the exhaust continues on the opposite side of the plate *b*.

Figs. 4 and 5 show the successive positions of the plate *b* in the cylinder.

The period during which the steam is admitted is represented in the drawings as a third of the stroke—that is to say, a third of the half-revolution—because each of the parts of the sliding plate *b* acts as a piston, and during one entire revolution there are two periods of admission and of exhaust.

The length of the orifices *i* in the rotary valve *h* determines the duration of the admission.

In order to produce a variable expansion, a second valve or disk, *t*, Fig. 2, is fitted against the first valve, *h*, having orifices corresponding with those in the first valve. The second valve is carried by a rod, *l*, which passes out of the steam-chest through a stuffing-box. This rod *l* allows of shifting the second valve, *t*, as required, either by hand or by the gov-

ernor, so that the orifices *i* of the valve *h* are covered sooner or later. Thus the admission of steam, and consequently the expansion, are regulated.

The engine is provided with a grease-cock at *o* and with purge-cocks at *p*. It is supported by a foundation or bed plate, *s*, and the shaft *o*, which carries the fly-wheel *r*, is supported by a lubricated bearing, *q*.

An elliptical form of the cylinder answers well, the axis of rotation of the small piston being made eccentric on the small axis. The dimensions of the cylinder will vary according to the power of the engine.

It is well to limit the amount of eccentricity and to proportion it in a measure to the distance of the foci of the ellipse. It may vary from a half to once the distance between the two foci.

Part of the advantages of my invention may be secured if any other form than the elliptical is given to the section of the cylinder, provided that the sliding plate, which is of constant length, shall always touch by both ends the inner periphery of the cylinder.

I claim as improvements in rotary engines and other rotary apparatus—

1. The combination of a cylinder, a solid nave eccentrically arranged to touch the cylinder at one point, and a sliding plate having movable jointed segments at opposite ends, the said nave having formed upon opposite sides hollows of a shape and size to receive the segments aforesaid flush with its surface, and the said sliding plate being packed at the center of the nave, substantially as described.

2. The combination of the following elements: first, a cylinder with inlet and outlet ports; second, a nave eccentrically placed in said cylinder, and touching the cylinder at one point; third, a sliding plate working hermetically in said nave and cylinder; fourth, a shaft connected with said nave; fifth, a rotary valve connected directly with said shaft and controlling the inlet-port; and, sixth, an independent adjustable valve, substantially as described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

F. PERNOT.

Witnesses:
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CH. MILLOR.