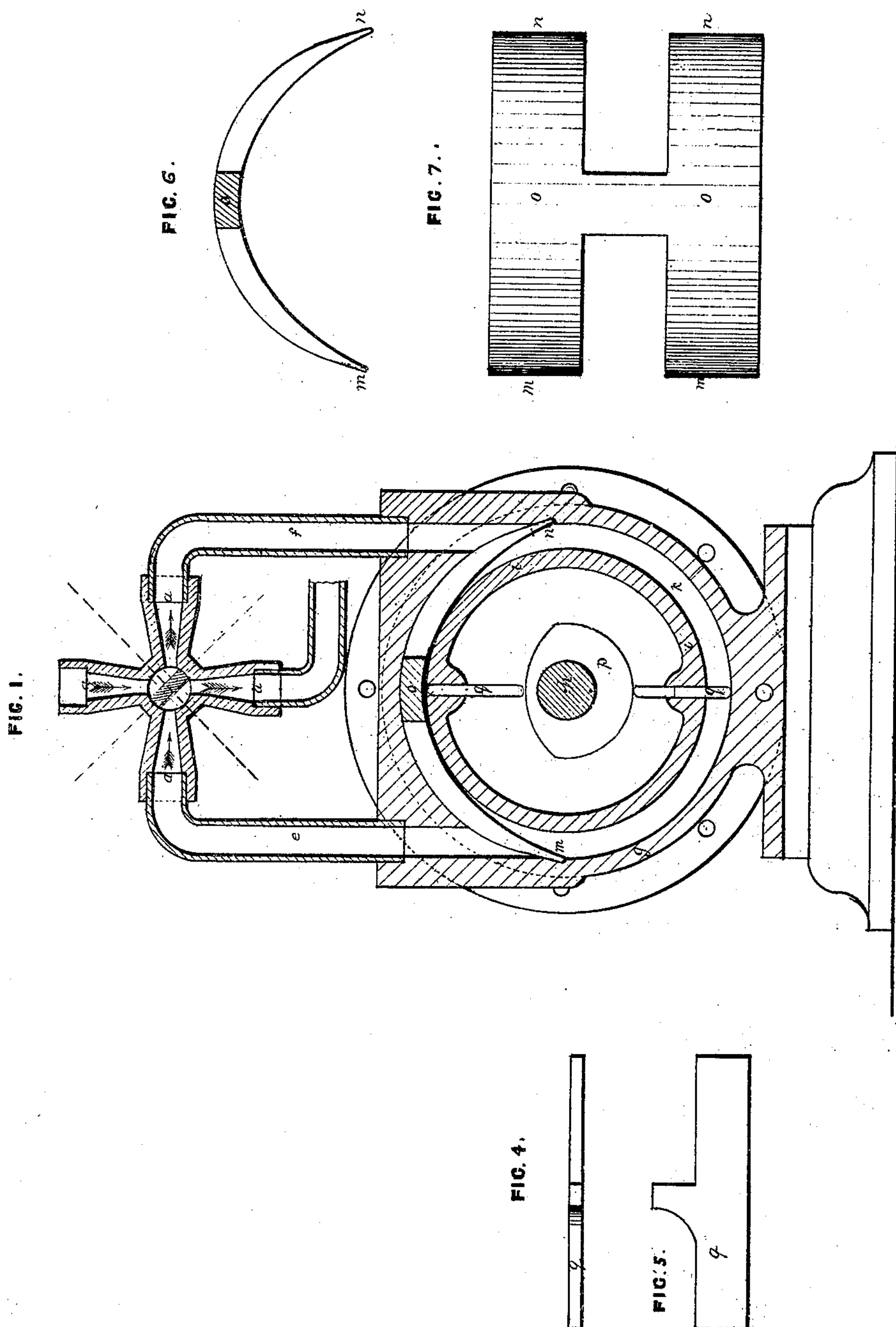


H. L. Bemison,
Rotary Engine.

2. Sheets, Sheet 1.

No. 113,839.

Patented Apr. 18. 1871.



Witnesses:

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John Austin

Inventor:

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Attys

H. L. Bemison, 2. Sheets. Sheet. 2.

Rotary Engine.

No. 113,839,

Patented Apr. 18. 1871.

FIG. 11.

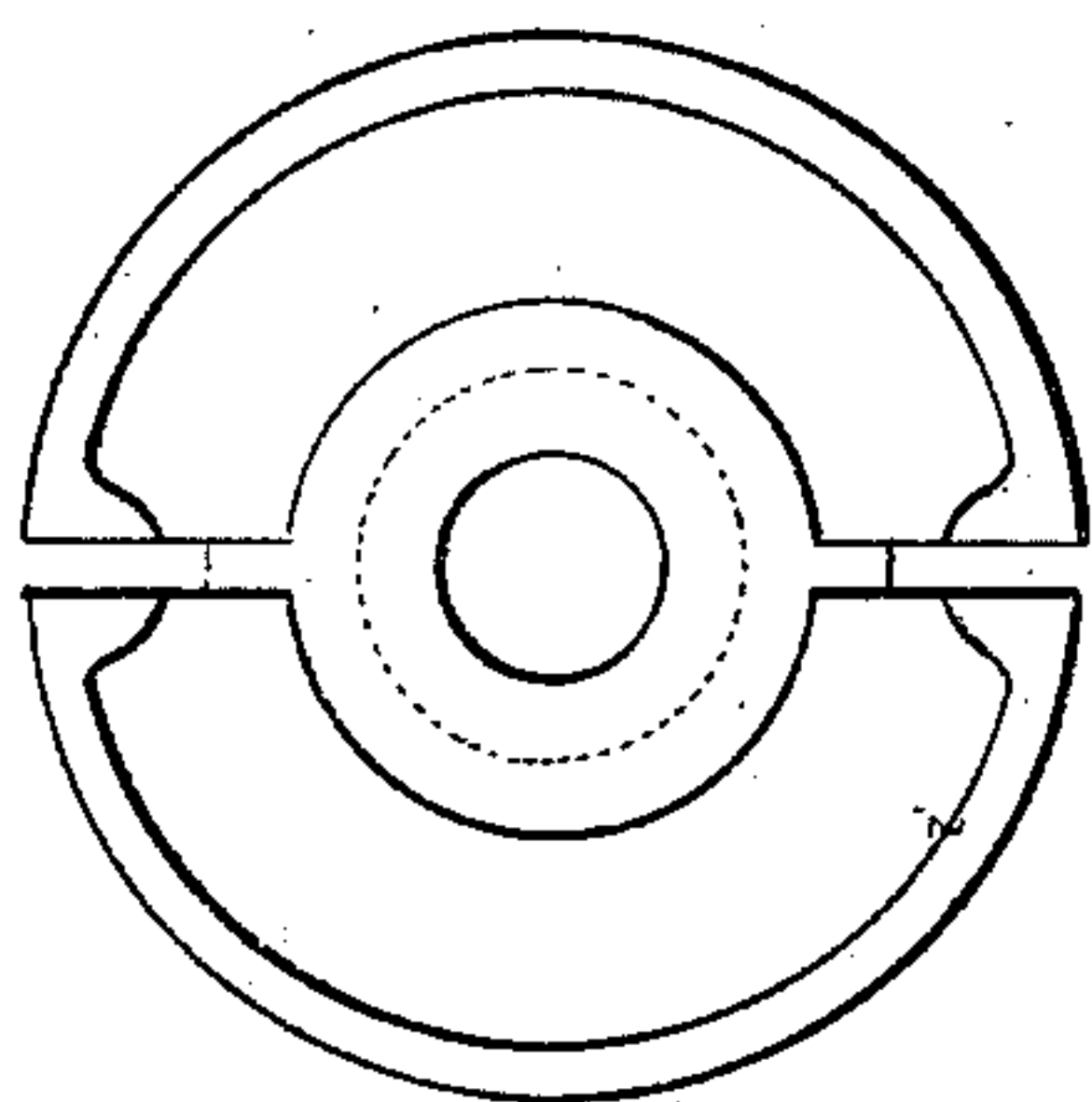


FIG. 10.

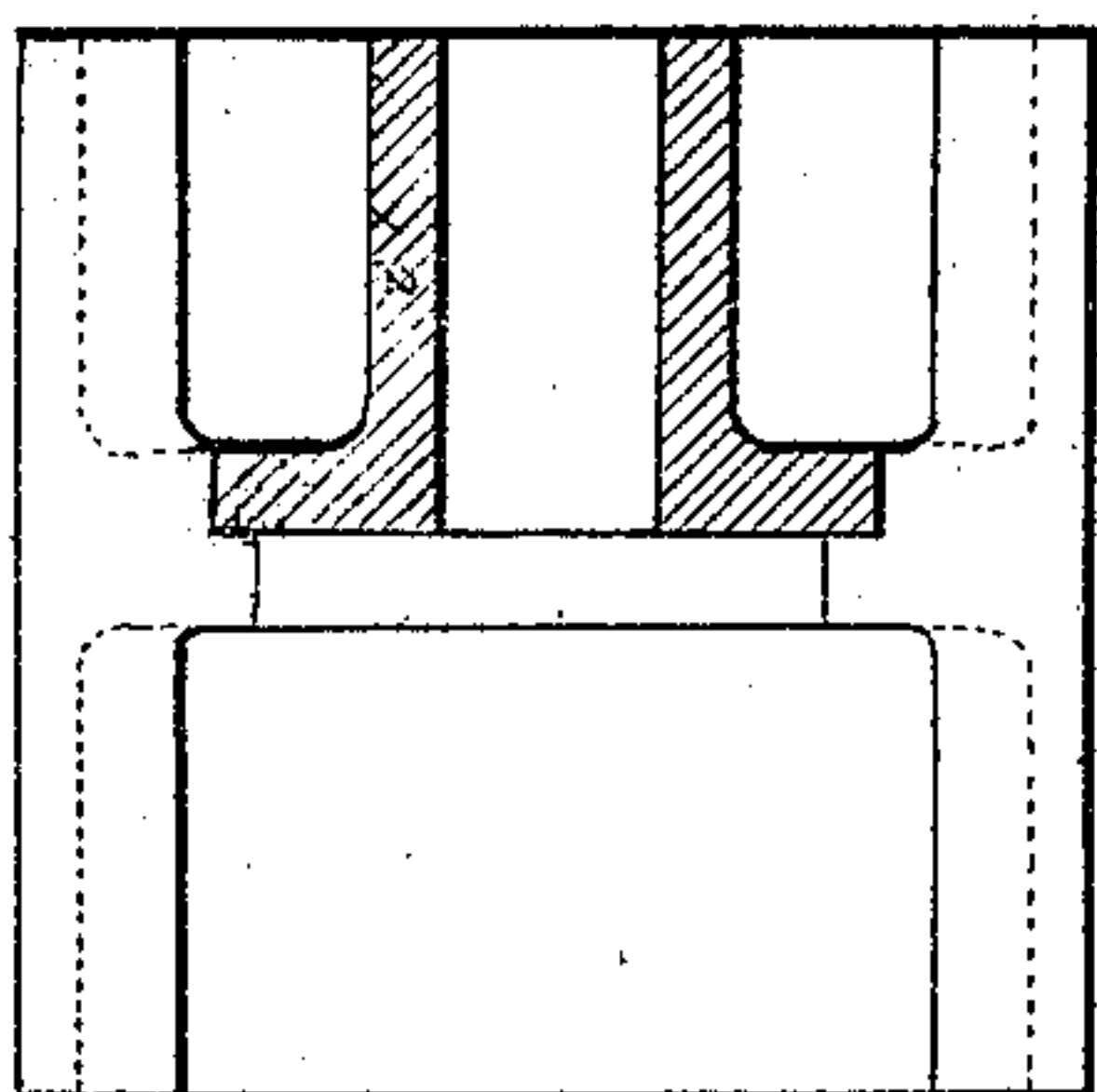


FIG. 9.

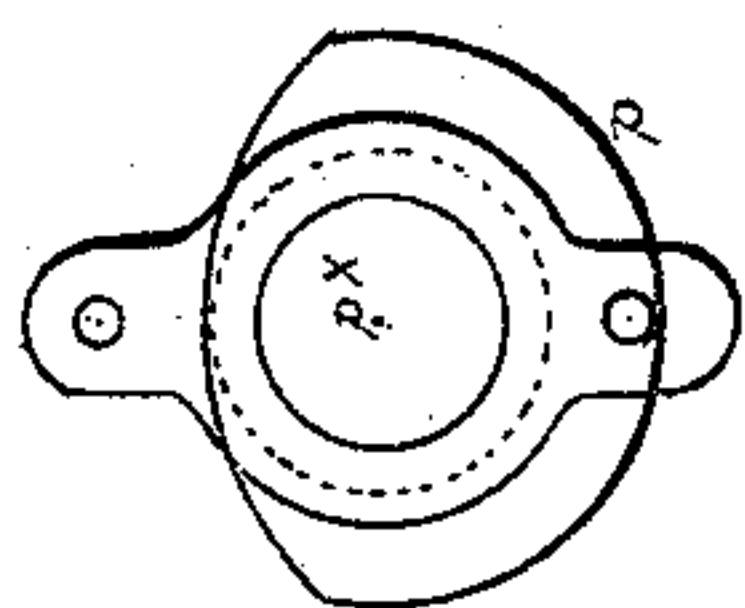


FIG. 8.

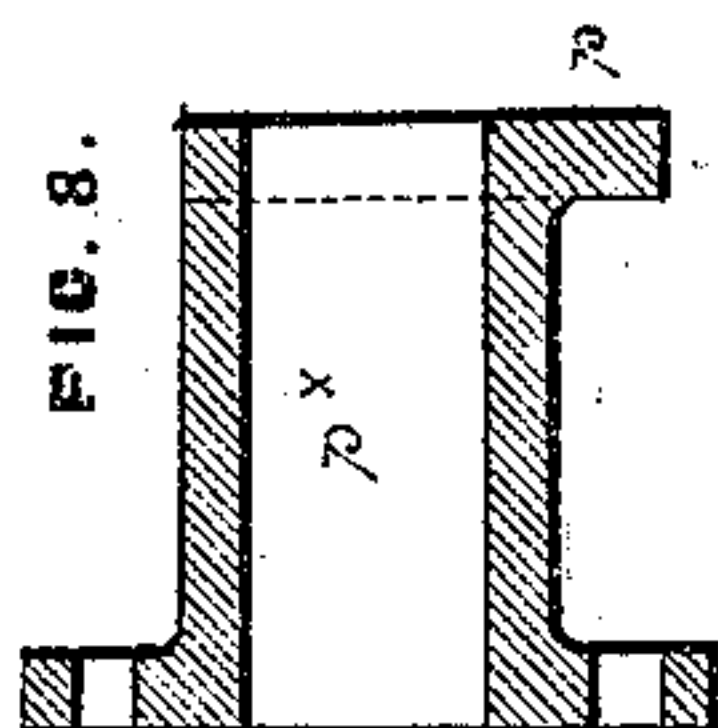
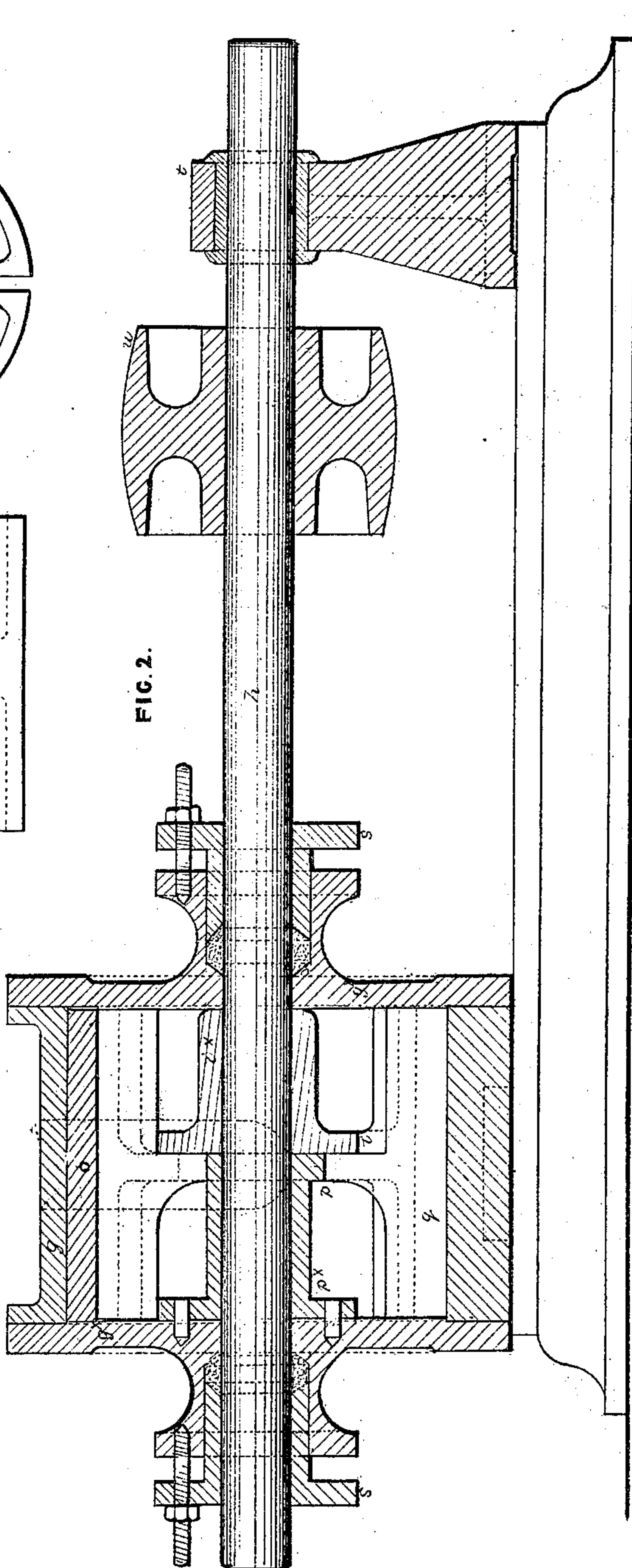


FIG. 2.



United States Patent Office.

HENRY LEONARD BENNISON, OF GREENWICH, ENGLAND.

Letters Patent No. 113,839, dated April 18, 1871.

IMPROVEMENT IN ROTARY ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

I, HENRY LEONARD BENNISON, of Greenwich, in the county of Kent, England, have invented certain new and useful Improvements in Rotary Engines and Pumps, to be driven by water, steam, or air-power; and I hereby declare that the following is an exact description thereof, reference being had to the drawing hereto annexed, in which—

Figure 1 is a transverse section.

Figure 2, a longitudinal section.

Figures 4 and 5, plan and elevation of sliding blade or piston.

Figures 6 and 7, plan and section of larger cam.

Figures 8 and 9, elevation and section of smaller cam.

Figures 10 and 11, longitudinal and transverse sections of inner cylinder.

My invention consists in the construction of an improved rotary engine, in combination with a four-way cock for supplying the exhaust; in the construction of the larger cam of the engine of H-shaped form, to afford a free passage of the steam (or water, if used as a pump) on each side of the sliding blades or pistons, and relieving said blades from the force of the steam or water while passing the cam; recessing the ends of the larger cam into the inner surface of the larger cylinder; and in the combination and arrangement of the above-named improvements in a rotary engine or pump.

As represented in the drawing—

My engine has an external cylinder, *g*, fig. 1, arranged for a shaft, *h*, figs. 1 and 2, to pass through its ends, and within it and on the shaft is an internal cylinder, *i*, figs. 1 and 2, thus leaving an annular cylindrical space, *k*, between the two cylinders, into which the steam, water, or air-ports *e f* open.

The ports *e* and *f* serve for supply and exhaust or waste, one for each, accordingly as the engine is rotated in one direction or the other.

One large cam, figs. 6 and 7, partly occupies the annular space, and a smaller cam, figs. 8 and 9, is arranged concentric with the shaft, the two being used, respectively, for forcing into and forcing out from the inner cylinder the sliding blades or pistons *q*, which form the necessary stops across the annular space.

One special feature in this invention is, that I make the larger cam H-shaped in plan, with ends cut away to clear the ports.

The ends of this cam are recessed or seated into the inner surface of the external cylinder, as shown in fig. 1.

The space cut away at each end of this cam permits the steam, water, or air to pass freely by the ends and act upon both sides of the sliding blades or pistons until they arrive at the point *m* or *n*, fig. 1, accordingly as the engine is rotated to the right or to the left, thus preventing friction on the sliding blades or pistons while they are being moved into

or out from the internal cylinder, and avoiding the wear which would be caused on their surfaces if they received the pressure of steam, water, or air upon one side only while moving out of or into the internal cylinders.

As will be seen by the drawing, the larger cam occupies a fixed position, with its ends seated in recesses in the outer cylinder, so that the pistons can pass by these ends without catching upon them.

The smaller cam *p*, fig. 2, is formed at the extremity of a flanged collar, *p**, fig. 2, by which it is held to one end, *g**, fig. 2, of the external cylinder, and also occupies a fixed position below the center of the pistons.

q q, fig. 1, are the sliding blades or pistons, which lie across the annular space when they are driven out of their recesses in the inner cylinder by the smaller cam *p*, (see lower piston, fig. 1,) and lie sheathed within the recesses formed for them in the internal cylinder when compelled to do so by the larger cam, (see upper piston, fig. 1.) This action of the cams ensues upon the revolution of the inner cylinder, which is rotated by the pressure of steam, water, or air upon the sliding blades or pistons.

The inner cylinder is so constructed that, in its rotary motion, its periphery forms, by its close contact with the larger cam and with the inner sides of the external cylinder-heads *g**, fig. 2, a perfectly steam-tight joint, or nearly so.

The internal cylinder is keyed onto the shaft *h*, as at *i**, fig. 2, and drives the shaft *h*.

As above described, the machine is heated as an engine for driving the shaft *h*; but when it is to be employed as a pump the shaft *h* is to be used as the driver, the other moving parts being driven by it, and the engine will pump water, air, or other liquid or fluid instead of employing the steam, water, or air as the motive-power.

Although I prefer the improved four-way cock constructed as shown in fig. 1 for the purpose of my invention, yet an ordinary four-way cock may be substituted; or the cock may be dispensed with altogether, in which case the engine or pump will not be reversing.

Having now described the nature of my invention, and the manner of its operation,

I claim as new and desire to secure by Letters Patent—

The H-shaped cam *o*, internal cylinder *i*, cam *p*, and pistons *q q*, combined and operating substantially as herein shown and described.

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