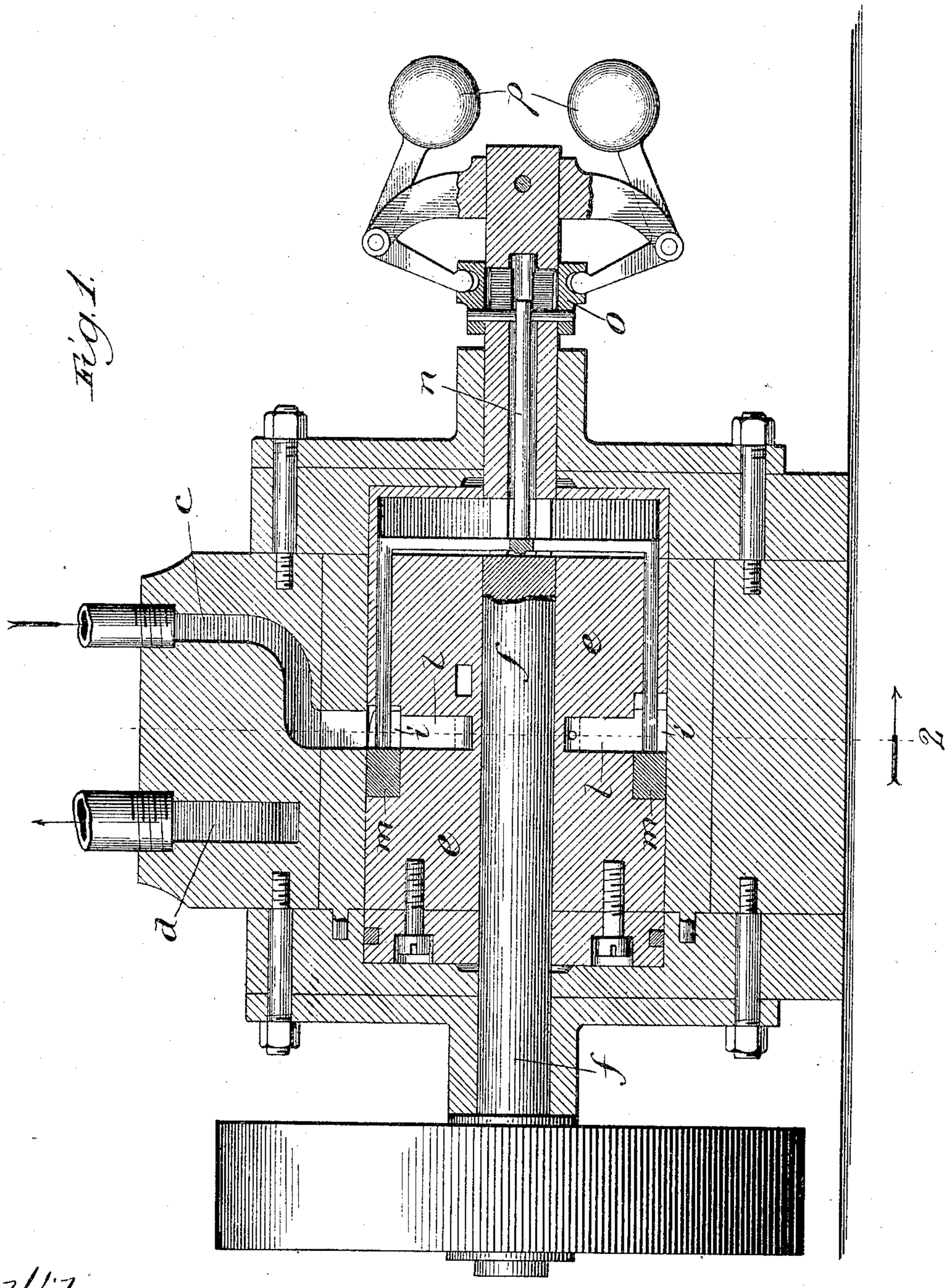
No. 682,256. Patented Sept. 10, 1901.

F. A. HEADSON.

ROTARY ENGINE.

(Application filed May 28, 1900.)

(No Model.) 3 Sheets—Sheet 1.



Witnesses:
Chas. E. Gaylord,
Lulu S. Alter.

Inventor:
Frank A. Headson,
By Thurman F. Sheridan
Atty.

No. 682,256. Patented Sept. 10, 1901.

F. A. HEADSON.

ROTARY ENGINE.

(Application filed May 28, 1900.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

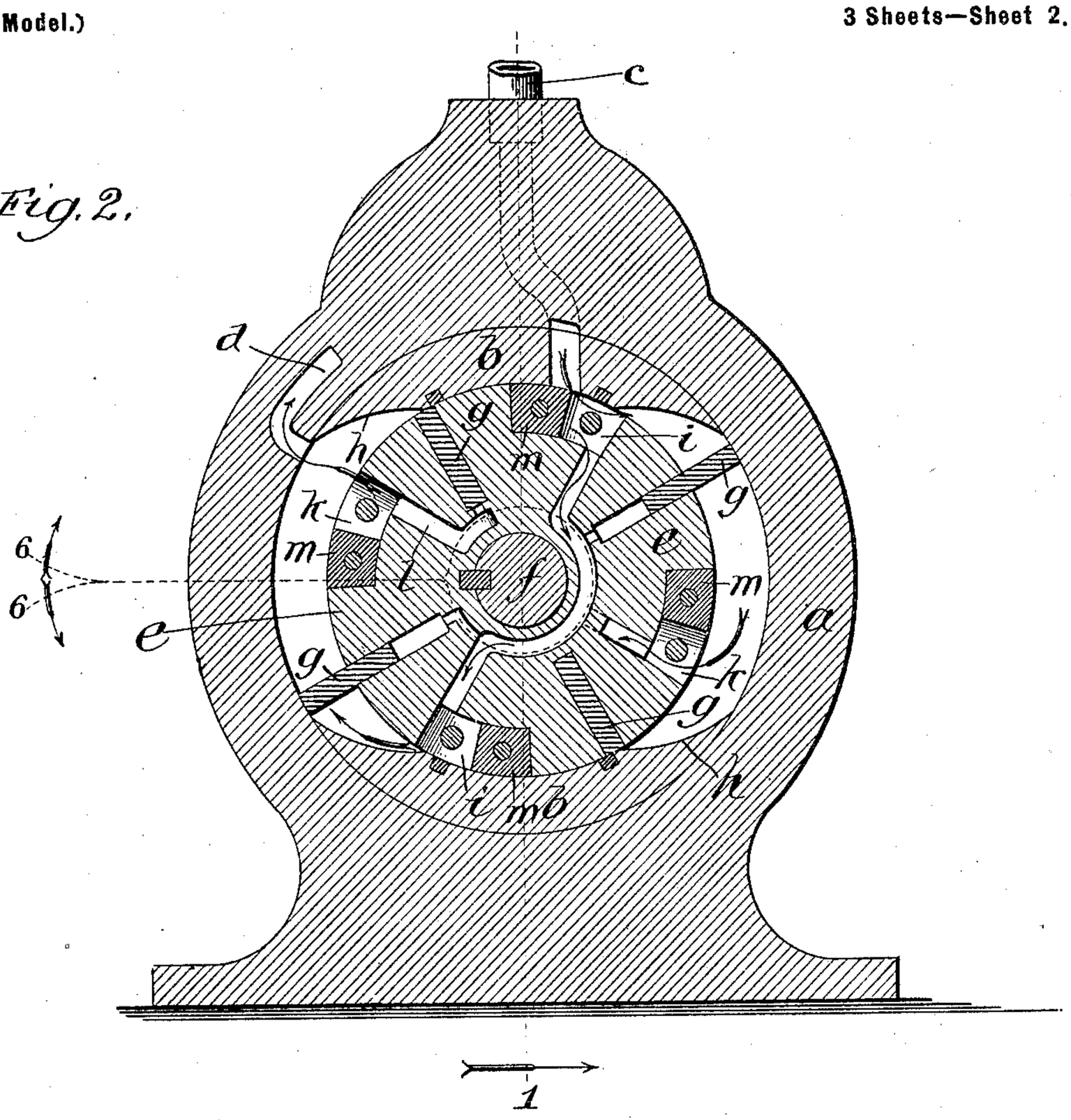
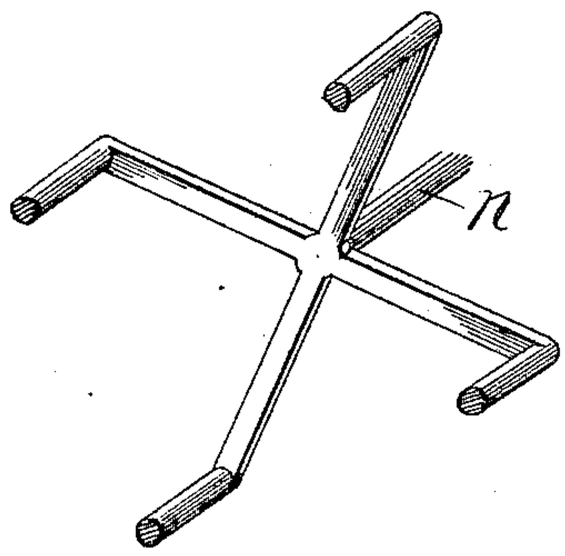


Fig. 3.



Witnesses:
Chas. E. Gaylord.
Luth. S. Allen

Inventor:
Frank A. Headson
By Thomas F. Sheridan
Atty

No. 682,256. Patented Sept. 10, 1901.

F. A. HEADSON.

ROTARY ENGINE.

(Application filed May 28, 1900.)

(No Model.) 3 Sheets—Sheet 3.

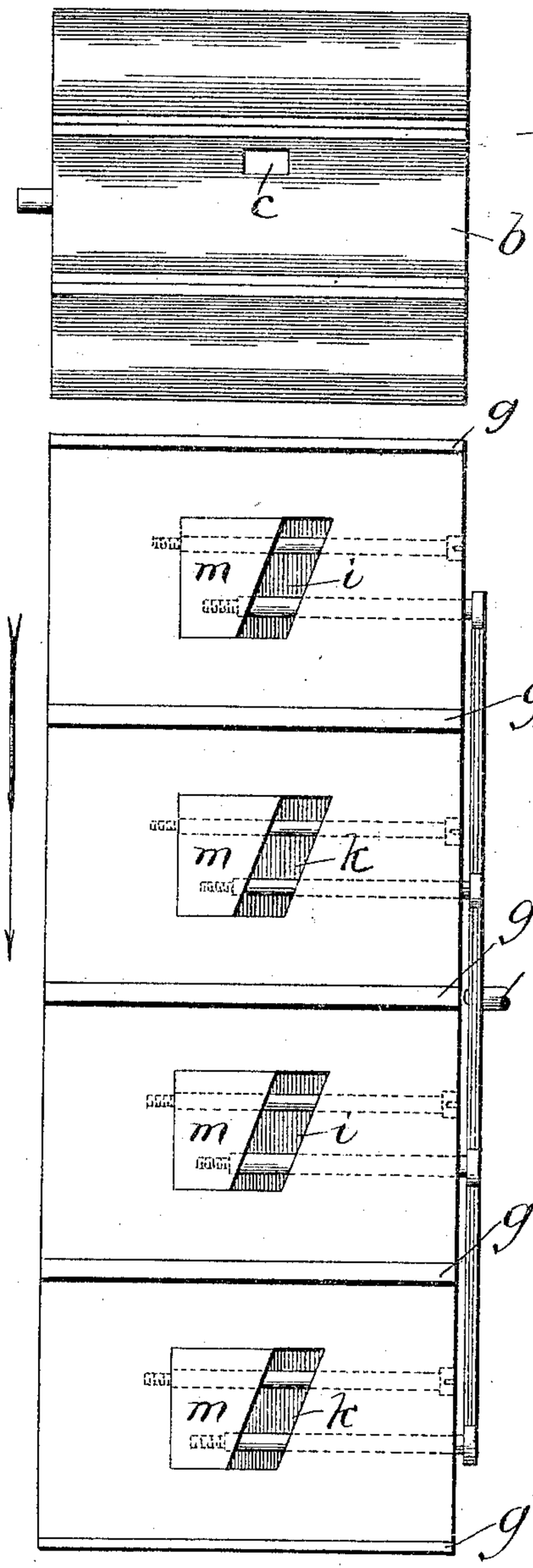
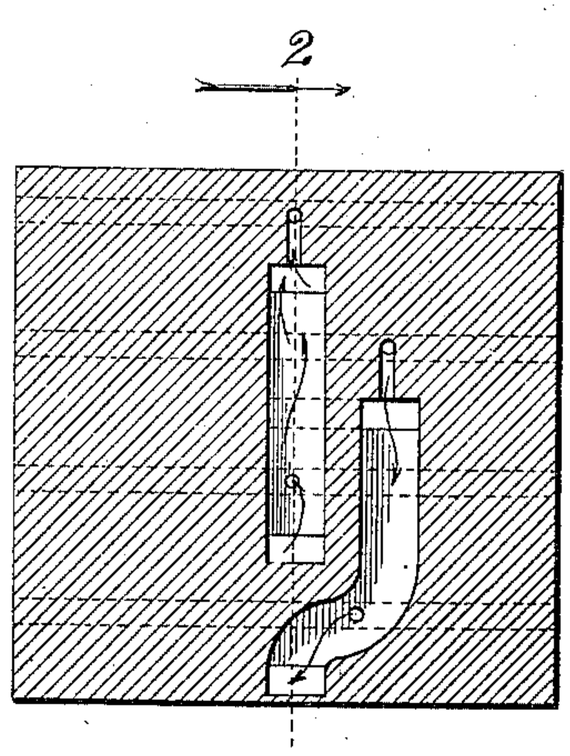


Fig. 4.

Fig. 5.

Fig. 6.



Witnesses:
Chas. E. Gaylord.
Lulu S. Otter.

Inventor:
Frank A. Headson
By Thurman T. Scribner
Atty.

UNITED STATES PATENT OFFICE.

FRANK A. HEADSON, OF LAFAYETTE, INDIANA, ASSIGNOR OF ONE-HALF TO LEO POTTLITZER, HERMAN POTTLITZER, MAX POTTLITZER, AND JULIUS POTTLITZER, OF SAME PLACE.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 682,256, dated September 10, 1901.

Application filed May 28, 1900. Serial No. 18,223. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. HEADSON, a citizen of the United States, residing at Lafayette, in the county of Tippecanoe and State of Indiana, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

The principal object of the invention is to provide a simple, economical, and efficient rotary engine; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of an engine constructed in accordance with my improvements and taken on line 1 of Fig. 2 looking in the direction of the arrow; Fig. 2, a cross-sectional view taken on line 2 of Fig. 1 looking in the direction of the arrow; Fig. 3, a perspective view of the valve-rod mechanism hereinafter described; Fig. 4, a plan view of the under side of the upper segmental bushing; Fig. 5, a developed plan view of the periphery of the piston; and Fig. 6, a developed plan sectional view of the piston, taken on line 6 6 of Fig. 2 looking in the direction of the arrows—that is, from the inside.

In constructing an engine in accordance with my improvements I make a main frame or cylinder portion *a* of the desired size, shape, and strength to hold and contain the operative and other parts in position for use. This frame is preferably rectangular in longitudinal section or side elevation, as shown particularly in Fig. 1, and substantially circular in contour when viewed in end or cross-sectional elevation, as shown in Fig. 2. The main frame is provided with two substantially crescent-shaped bushings or inward projections *b b*, one at the top and one at the bottom, with an inlet-passage *c* and an outlet-passage *d* so arranged that motive fluid, preferably steam, may enter into the operating-chamber and be exhausted therefrom at the desired time or times. The upper bushing or projection *b* is provided with a pocket or chamber, which forms a practical continuation of the inlet-passage *c*, as will be more fully hereinafter described. To convert the energy into work done, a piston *e* is secured to a main shaft *f*, so as to rotate therewith and be rotated thereby, which shaft has its journal portions in the cylinder-heads, as shown particularly in Fig. 1. This piston is arranged to rotate so that its peripheral surface contacts the inner surface of the inwardly-projecting bushings and to cover and uncover the inlet steam-pocket in the upper one and by the new mechanism hereinafter described to permit the motive fluid to be exhausted whenever necessary. During the rotations of the piston it is highly desirable that motive fluid be admitted to points substantially diametrically opposite on the piston mechanism, so as to balance or equalize the power and strains on the parts during their rotation. In order to accomplish this result, the two bushings above described are inserted in position, preferably independently, as shown in the drawings, though they may be integral portions of the cylinder-casting. The piston is provided with four radial wings *g*, arranged in pairs and ninety degrees apart, so that the wings in each pair are diametrically opposite each other and arranged in grooves that are parallel to or in line with the axis of the piston and main shaft. These wings are kept at their outer limit of motion when in the operating portion of the cylinder by means of steam-pressure, which is admitted behind the same through the steam-passages of the piston hereinafter described. During rotation, however, the wings contact the cam-surface *h* of the bushings and are pressed inwardly at a time when there is substantially no pressure behind them, or such pressure is permitted to exhaust. To admit the motive fluid into the operating-chamber of the cylinder, the piston is provided with four pockets arranged in pairs in the peripheral surface thereof, as shown in the developed view, Fig. 5 of the drawings, each pocket in each pair being diametrically opposite the other. One pair *i i* is connected together by the passage *j*, and the other pair *k k* is connected together by the passage *l*, so that when the parts are in the position shown in Fig. 2 steam enters through the inlet-passage into the pocket *i* at the upper part of the piston

and from thence passes out into the operating-chamber between the upper bushing and the wing *g*. Continuing, a portion of the fluid under pressure passes from the upper pocket *i* into the passage *j*, from which it passes into and through the lower pocket into the operating-chamber. As the piston continues to rotate the steam-pocket cuts off the motive fluid, and as it continues to rotate the wings are compressed by the upper and lower bushings or projections, as shown in Fig. 2, so that the steam or other motive fluid may exhaust from the right-hand side of the cylinder through the valve-pocket *k*, through the passage *l* and the opposite pocket *k*, into the left-hand portion of the operating-chamber, from whence it is permitted to pass out through the exhaust-passage *d*. It will thus be seen that the steam or other motive fluid is admitted to points of the cylinder diametrically opposite each other and exhausted therefrom at or during the same time or times.

Each and all of the steam-pockets *i* and *k* are provided with cut-off valves *m*, arranged to be moved longitudinally of the piston, and thus vary the size of the steam-pocket, so as to regulate the admission or cut off the steam under pressure at any desired point of the stroke or rotation of the piston. To operate these cut-off valves, a valve-stem *m* is provided, extending out through an axial opening in the main shaft and provided with arms or a multiplicity of end portions, each engaging with a desired cut-off valve, as shown particularly in Fig. 3. This valve-stem is connected with a sleeve *o*, loosely mounted on the main shaft at or near one end thereof and adapted to be operated by a centrifugal ball-governor *p*, which, however, is no part of this invention, so that during the rotations of the piston and main shaft such governor acts to operate the cut-off valves and vary the size of the steam-pockets, and thus to vary or regulate the supply or cut-off of motive fluid at the desired time or times.

I claim—

1. In a rotary engine, the combination of a cylinder portion provided with inlet and outlet passages, a piston rotatably mounted therein and provided with steam-pockets and steam-passages extending through the piston, connecting-pockets on opposite sides of the piston whereby steam or other motive fluid is admitted to substantially opposite points of the cylinder and exhausted therefrom, substantially as described.

2. In an engine of the class described, the combination of a cylinder portion provided with an exhaust-passage and two inwardly-projecting portions substantially diametrically opposite each other—one of which contains the inlet-passage, a piston rotatably mounted in the cylinder and provided with steam pockets and passages for covering and uncovering the inlet-passage and admitting steam to substantially opposite points or sides of the cylinder and exhausting it therefrom at or during the same time or times, substantially as described.

3. In an engine of the class described, the combination of a cylinder portion provided with a lower imperforate inwardly-projecting portion or bushing and an upper inwardly-projecting portion or bushing having an inlet-passage therefrom and an outlet-passage in the main frame, a rotatable piston provided with steam-pockets in the peripheral surface thereof arranged in pairs, each pocket in each pair diametrically opposed to each other and connected together by means of ports or passages so that during the rotation of the piston steam is admitted in the cylinder through the pockets at substantially opposite points of the cylinder and permits the exhaust to take place therefrom at substantially opposite points, substantially as described.

4. In an engine of the class described, the combination of a cylinder portion provided with upper and lower inwardly-projecting portions or bushings, an inlet-passage through the upper bushing and an outlet-passage through the main frame of the engine, four pockets arranged in the peripheral surface of the piston in pairs connected together by means of ports or passages so that during the rotation of the piston steam is permitted to enter and exhaust from the cylinder at substantially opposite points, wing mechanism arranged longitudinally of the piston between each pair of steam-pockets to receive the expansive force of the steam and permit the exhaust to take place at proper time or times, and valve mechanism arranged in the steam-pockets to vary the size thereof and control or regulate the "cut-off" of motive fluid at the proper time or times, substantially as described.

FRANK A. HEADSON.

Witnesses:
GEO. M. FORESMAN, Jr.,
HANNAH MEYER.