(No Model.) 2 Sheets—Sheet 1.

P. AINSWORTH.

ROTARY ENGINE.

No. 341,395. Patented May 4, 1886.

Fig. 1.

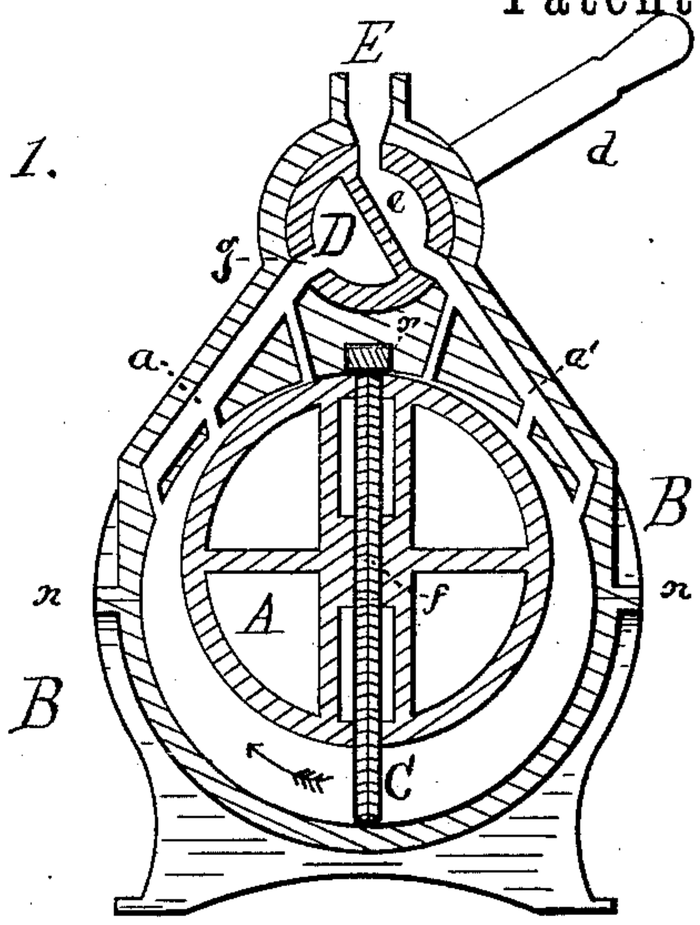


Fig. 2.

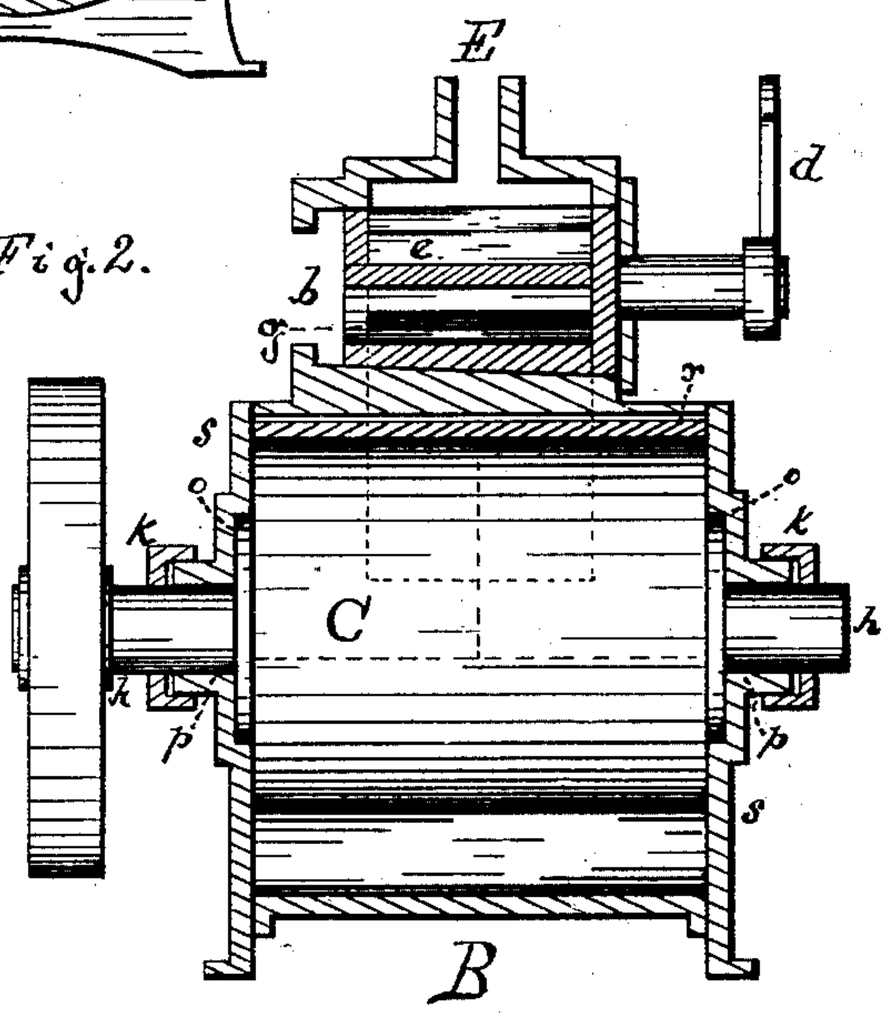
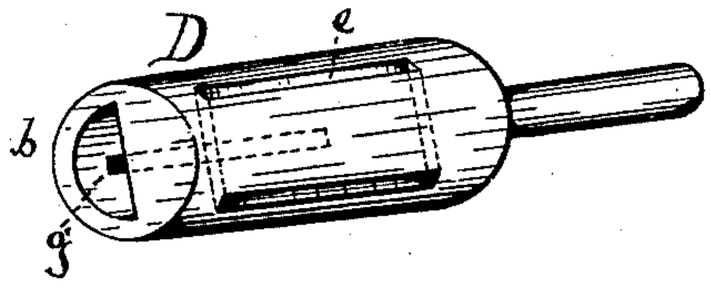


Fig. 3.



WITNESSES:

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(No Model.) 2 Sheets—Sheet 2.

P. AINSWORTH.

ROTARY ENGINE.

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Fig. 4.

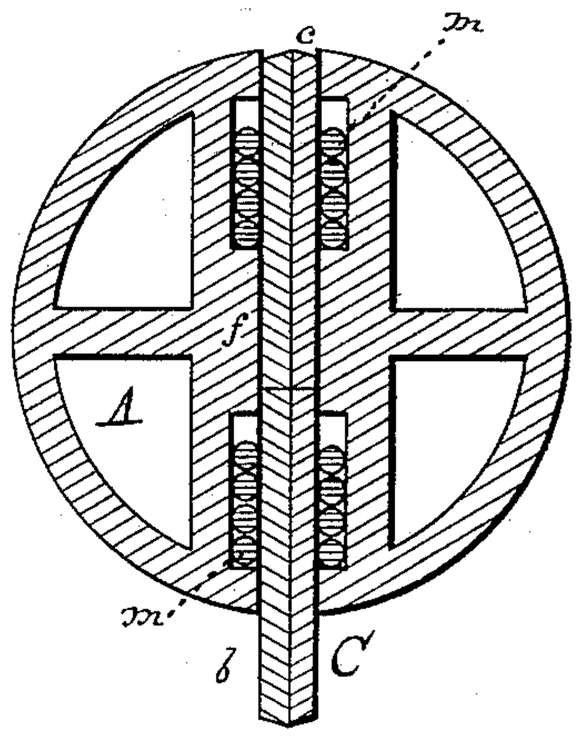


Fig. 5.

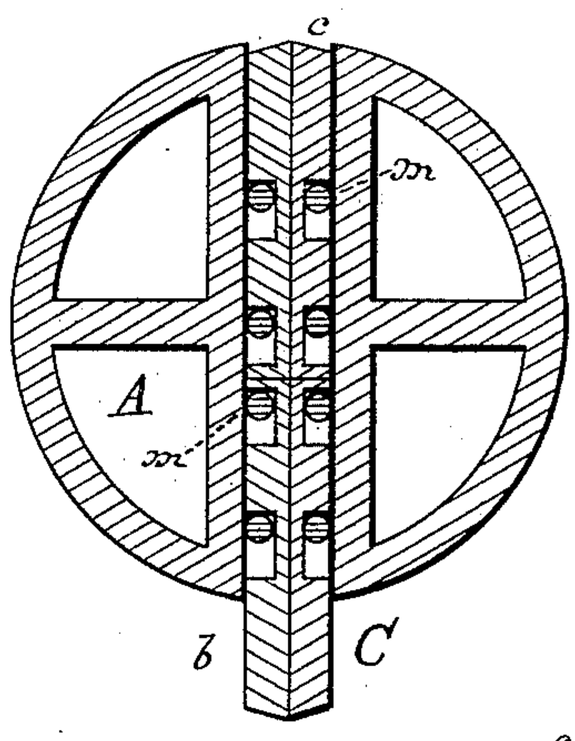


Fig. 6.

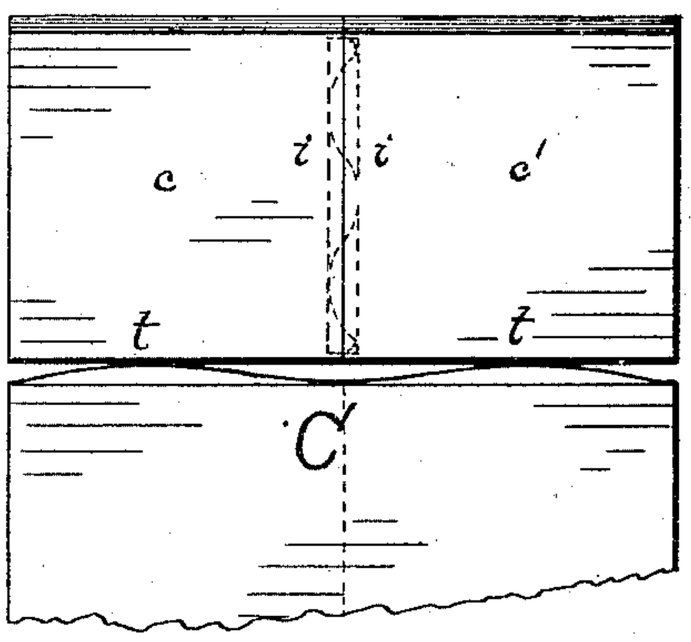
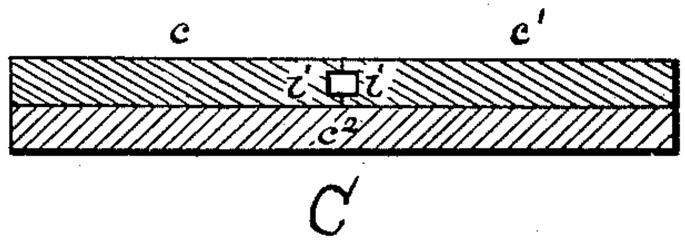


Fig. 7.



WITNESSES:

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UNITED STATES PATENT OFFICE.

PERLEY AINSWORTH, OF CHARLOTTE, NEW YORK.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 341,395, dated May 4, 1886.

Application filed February 15, 1886. Serial No. 191,922. (No model.)

To all whom it may concern:

Be it known that I, PERLEY AINSWORTH, a citizen of the United States, residing at Charlotte, in the county of Monroe and State of New York, have invented a new and useful Improvement in Rotary Engines, of which the following is a specification.

My invention relates to rotary engines, pumps, and meters, and particularly to that class of engines in which a single revolving cylinder is placed eccentrically in a stationary casing, and is provided with a diametric piston oscillating through it.

The principal objects of my invention are to provide means for automatically packing the piston at its sides and ends, and to construct a rotary engine in which the wear of the parts shall be uniform and regular, and therefore easily compensated for by the piston-packing hereinafter described.

In the accompanying drawings, Figure 1 is a transverse section of my improved engine; Fig. 2, a longitudinal section of the same; Fig. 3, a perspective view of the valve. Figs. 4 and 5 are transverse central sections of the cylinder and piston. Fig. 6 is a side elevation of a portion of the piston; and Fig. 7 is a cross-section of the same, showing its construction.

Similar letters refer to the same parts in all the figures.

B B indicate the casing, preferably made in two parts and bolted together at *n n*. This casing contains all the working parts of the engine. Suitable heads, *s s*, are bolted to it and contain the bearings *p p* for the shaft, and, extending down below the casing, furnish a suitable base for the engine to rest on.

A is the cylinder, which is provided with shaft *h h* and hubs *o o*, Fig. 2, and revolves in the bearings *p p* of the casing B, just meeting the same at the abutment *r*, and also meeting the heads *s s*. The abutment *r* extends the full length of the casing, and is kept in constant contact with the cylinder A by a spring, in the usual manner, and serves to prevent the steam or other motive fluid from passing the cylinder at its point of contact with the casing. The cylinder A is slotted through its entire length, as shown in Figs. 1, 4, and 5, to receive the piston C, which oscillates through it as it revolves. In the position shown in Fig. 1 steam enters at E, and passes into the valve D, and through the slot *e*, and enters the cylinder through the port *a'*; and revolves the cylinder and piston in the direction shown by the arrow. The exhaust-steam escapes through the port *a* into the slot *g* in the valve, and thence through the opening *b* in the end of the valve. The piston C is in constant contact with the casing B at both ends at all points of its revolution, for the diameter of the casing, measured through the center *f* of the cylinder A, is the same in all directions. This casing is of elliptical shape; but in an engine of the proportions shown in the drawings, which has been found to work well in practice, the casing departs but slightly from the true cylindrical form.

The piston C is preferably constructed of six pieces, as shown in Figs. 6 and 7. It is divided in the center, and a suitable spring, *t t*, inserted between the two halves, which spring presses the two parts of the piston apart and against the periphery of the casing, thus keeping the ends of the piston in constant contact with the casing. Each half of the piston is composed of three pieces, as shown in Fig. 7. The plates *c* and *c'* are each half the size of the plate c^2, and are provided with slots *i i* in their meeting edges, Fig. 7, in which slots are placed a spring, the office of which is to press them apart and against the heads *s s* of the casing, and make a steam-tight joint between the piston and the heads, and compensate for wear of both the piston and the casing. Each half of the piston, as divided by the spring *t t*, is like the other; but I prefer to place the two pairs of small plates *c* and *c'* on opposite sides of the piston from each other. The plates c^2 may be advantageously divided and the parts separated by springs, as are the plates *c* and *c'*, but not on the same line with them. The piston C also, instead of being divided into two equal parts by the spring *t t*, may be divided through each half of its thickness at different points.

A series of rollers or balls, *m m*, are inserted in recesses in the cylinder, as shown in Fig. 4, or in the piston, as shown in Fig. 5, in order to decrease the friction between the piston and cylinder. These rollers or balls have space enough to roll back and forth as the piston oscillates through the cylinder. Suitable pack-

ing-boxes, *k k*, are placed on the bearings *p p* of the casing.

The valve D is a three-way valve, and preferably made tapering, as shown in Figs. 2 and 3, and adapted to be fitted into the valve-seat in the casing, and requiring no bearings. It is operated by a lever, *d*, and constructed with three ports or ways, so as to admit the motive fluid into either of the ports *a* or *a'*, according as it may be desired to run the engine in either direction, and at the same time permit the exhaust-steam to escape through the slot *g* and opening *b* in the end of the valve. This construction permits a very free exhaust, as the opening *b* is four times the size of the steam-port *e*.

Having thus described my invention, what I claim is—

1. The piston C, composed of six or more plates, *c c' c²*, said plates being arranged in two series side by side with overlapping joints, with springs *t t*, whereby the piston is held in constant contact with the heads and periphery of the casing, substantially as shown and described.

2. The combination of the piston C, composed of six or more plates, *c c' c²*, and springs *t t*, series of rollers *m m*, and cylinder A, substantially as and for the purpose set forth.

3. The combination of the piston C, composed of six or more plates, *c c' c²*, being arranged in two series side by side with overlapping joints, and springs *t t*, the cylinder A, and the three-way valve D, substantially as shown and described.

4. In a rotary engine, the combination, with the casing B, cylinder A, and compound piston C, composed of plates arranged in two series side by side with overlapping joints, and the three-way tapering plug-valve G, having an opening, *d*, at one end, communicating with the slot *g*, for an exhaust, and having the longitudinal port *e*, through which steam is admitted to the engine to propel it in either direction by oscillating the valve.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

PERLEY AINSWORTH.

Witnesses:

JOHN E. DURAND,

GEORGE R. ZIMMER.