No. 807,830. PATENTED DEC. 19, 1905.

G. F. LEIGHTON.

ROTARY ENGINE.

APPLICATION FILED SEPT. 11, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

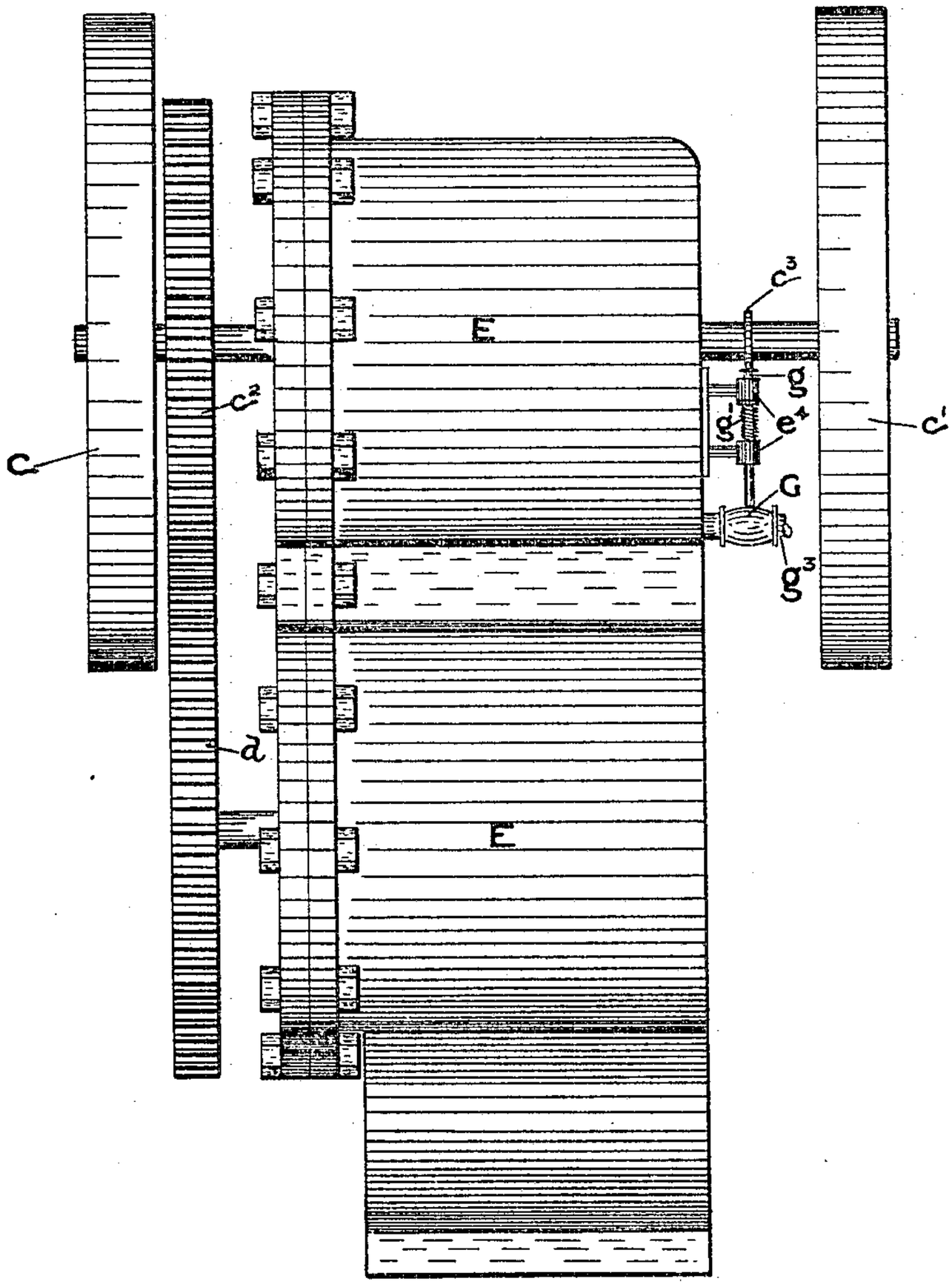
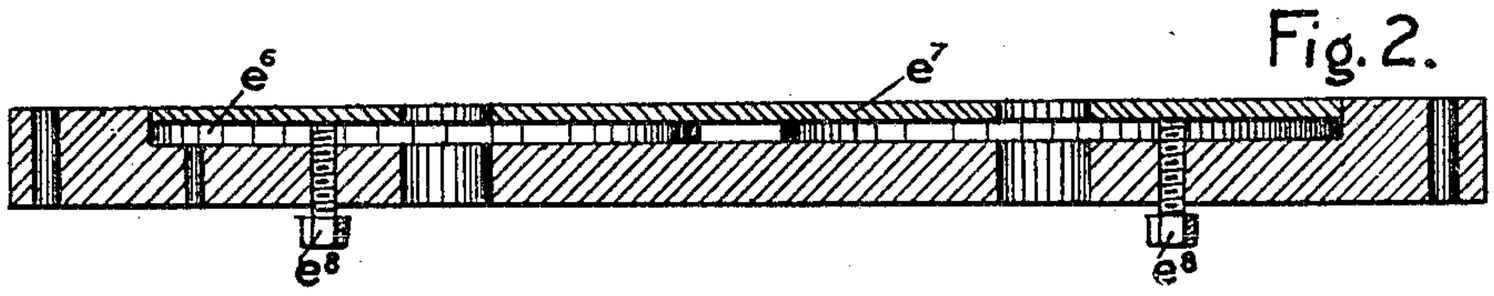


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

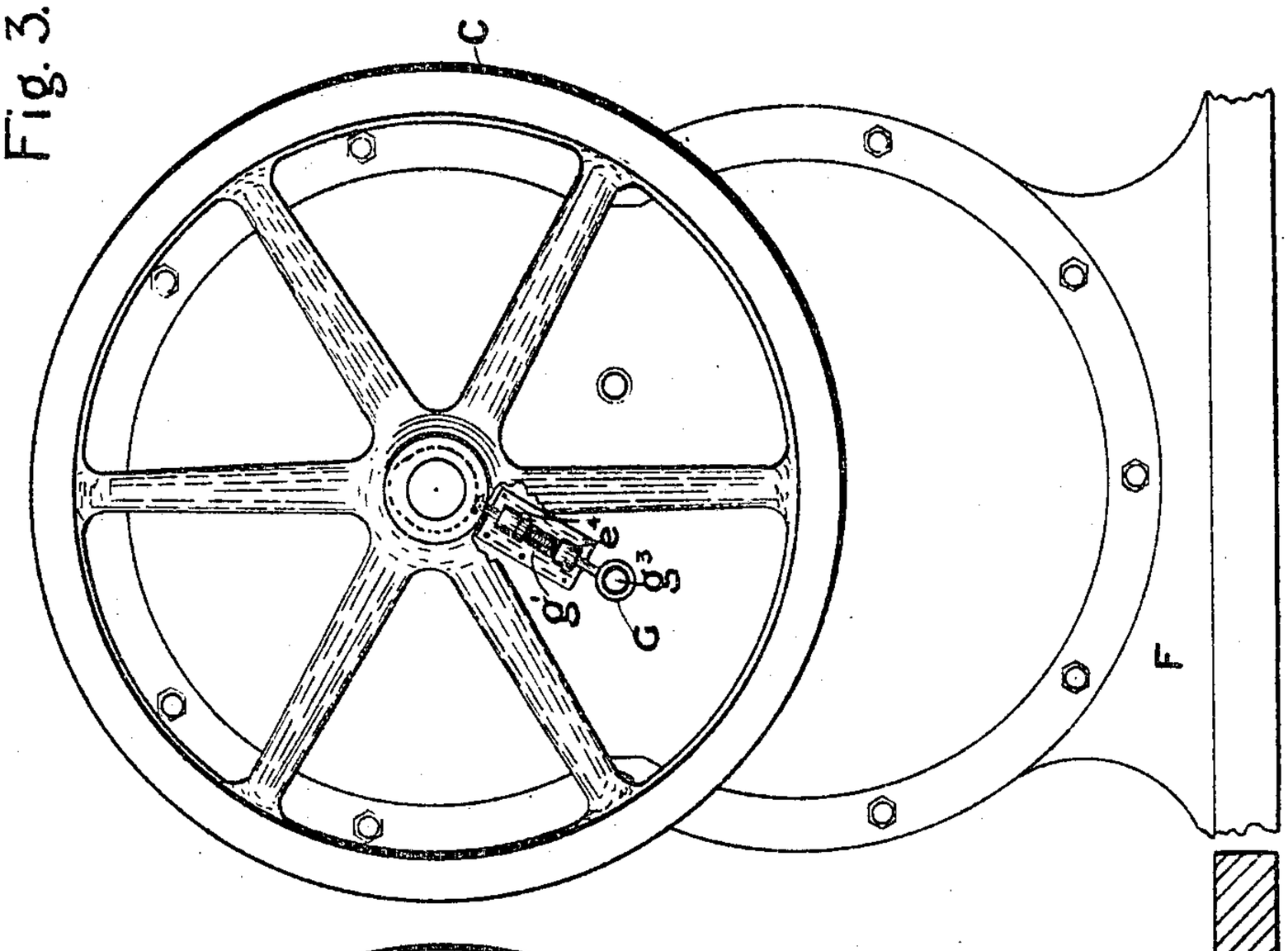

Fig. 4.

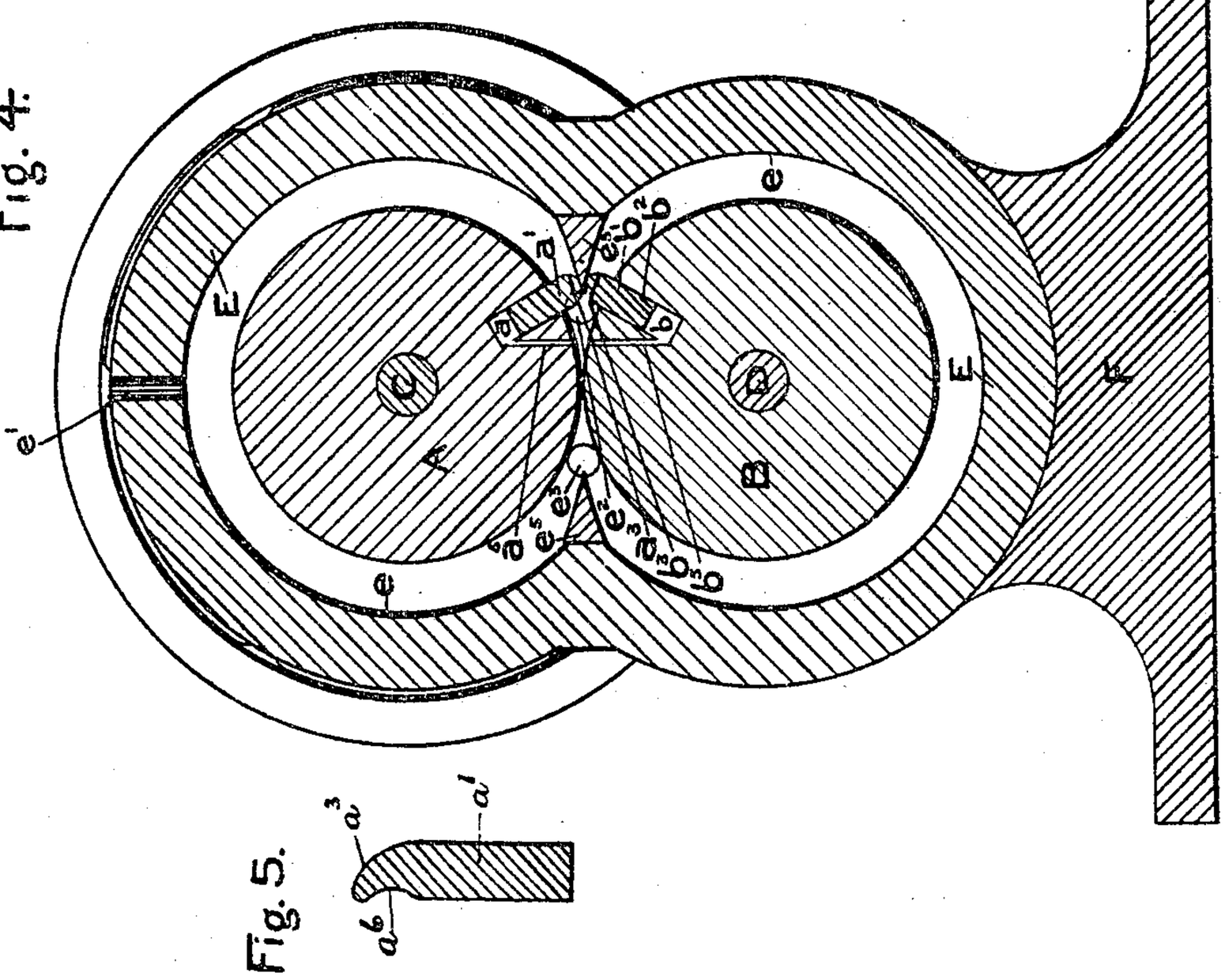

Fig. 5.

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GEORGE FREDERICK LEIGHTON, OF CINCINNATI, OHIO.

ROTARY ENGINE.

No. 807,830. Specification of Letters Patent. Patented Dec. 19, 1905.

Application filed September 11, 1905. Serial No. 277,857.

To all whom it may concern:

Be it known that I, GEORGE FREDERICK LEIGHTON, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to an improvement in fluid-pressure rotary engines consisting of two rotative cylinders in a steam-tight chamber and suitable means provided to generate motion in the two shafts to which the cylinders are rotatively attached.

Heretofore rotary fluid-pressure engines have never been carried to such a perfected state as to make them advantageous for the transmission of power. They are at this time of no commercial importance and practically unknown to the mechanical world.

The object of my invention is to perfect a rotary engine and to reduce the friction peculiar to an ordinary fluid-pressure engine. The means employed to reduce the friction is the simplification of the mechanism. Efficiency of this class of engine will be greater for the same expansion and pressure, as the power is transmitted directly to the shaft instead of being transferred by complex mechanism. The cost of construction is reduced by diminishing the amount of material used and the simplification of labor. Furthermore, the invention is so designed that a reverse drive can be transmitted without changing the direction of the engine's motion. Within limits the power of the engine can be increased without increasing the fluid-pressure—that is, by enlarging the diameter of the cylinder—thus giving more leverage and in turn more power.

If provided with a water-jacket and means for supplying the usual ignition-spark, my device may be used as a gas or gasolene engine.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my engine. Fig. 2 is a vertical axial section through one head with a false head fitted therein adapted to take up wear. Fig. 3 is an end elevation showing the cut-off. Fig. 4 is a vertical transverse section through the engine, showing cylinders with fins partly depressed just as pressure is again being applied. Fig. 5 is a detail showing a preferred form of fin in transverse section.

Referring to the drawings, A and B are cylinders tangent to one another and attached to shafts C and D, respectively. Said cylinders contain the longitudinal axial slots a and b, which afford suitable sockets for the fins a' and b'. The outer corner of each fin is curved on the outer side away from the pressure, (said curved corners indicated as a^3 b^3,) and the end of said fins fit against the inside curved wall e of chamber E. The end of fin on the side pressure is applied may be notched or curved in, as shown in Fig. 5 by a^6, to give a better surface against which pressure can be exerted. The cylinders may contain any number of passages a^5 b^5 to force the fins outward until centrifugal force presses said fins with sufficient tightness against the wall e. The aperture e' at the top of chamber E affords an opening for the oiling of the inside mechanism.

The shafts C and D are journaled in the sides of the chamber E by suitable fluid-tight journals. (Not shown). Fly-wheels c c' are attached to and rotate with said shaft C. Also a gear-wheel c^2 is attached to and rotates with shaft C and meshes with an equal and similar gear d, which is attached to and rotates with shaft D. These said gears c^2 and d when once properly set cause the fins a' and b' to contact correctly every revolution, as they will not allow one cylinder to rotate faster than the other. As these gears rotate in opposite directions, a reverse drive can be had by merely transferring the driving mechanism from one gear to the other. Also attached to shaft C is cam c^3, which is in constant contact with stem g of pop-valve G, which is along the pipe g^3, said pipe leading from the steam-supply (not shown) to the intake-port e^2. Stem g works through suitable ring-supports e^4, which are attached to the outside of chamber E. Spring g' holds the stem of said valve continually against the cam c^3.

The chamber E is so constructed as to afford equal and similar fluid-room around each of the tangent cylinders, whose tangency is fluid-tight. Hardened pieces e^5 of steel or other metal prolong the edges which they embrace farther than if the inside surfaces were continued until they came to an edge. These steel edges prevent the knocking and possible breaking of the fins as they come together by forcing said fins far down into apertures a and b before they come in contact with one another and to ease off in starting the next revolution.

A false head e^7 to take up the space caused by wear, may be placed in recesses in the inner side of head e^6, as shown in the drawings, said false head being held in desired position by set-screws e^8, springs, or in any other suitable manner. The mechanism and chamber are supported on suitable support F.

The operation is as follows: The fluid being allowed to enter the intake-port e^2, its pressure on the fins causes said fins to diverge and each to follow its circular path, the fluid-chamber's inside wall e. As the fins are suitably attached to the cylinders, said cylinders begin to revolve, causing the shafts C and D to revolve. The fins follow said circular path and are gradually forced down into the apertures a b by the wedge e^5 nearest the exhaust-port e^3. As soon as they break contact with said wedge they strike one another, and by the time they arrive at the line of tangency of the cylinders they are forced completely down into said apertures. Just before the fins crossed the exhaust-port e^3 the cam c^3 forced the pop-valve stem g down and in this manner shut off the fluid-pressure. From the time just before the fins arrive at the said exhaust-port till they are a suitable distance past the line of tangency of the cylinders the motion of the whole mechanism is carried on by its own momentum. As soon as the fins pass the line of tangency the centrifugal force causes said fins to fly out of their respective apertures and connect with one another, and when a suitable distance past the line of tangency of the cylinders the cam c^3 releases its pressure on the stem g of the pop-valve G, the said stem is forced up by spring g', the fluid is turned into the intake-port, creates pressure, and fills all the space between tangent cylinders and pressure side of fins, including the passages a^5 and b^5, and the cylinders start on another revolution. Further description of the operation of this machine would be a repetition of the foregoing description.

It is apparent that this device may be used as a pump as well as an engine.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. A rotary engine having in combination a fluid-tight chamber, cylinders rotatable within said chamber in opposite directions, said cylinders tangent and made steam-tight at the line of tangency, and having longitudinally-extending slots, fins slidable in said slots and arranged to so contact at each revolution as to depress each other simultaneously, said cylinders having fluid-passages connecting the fin-slots with the surface of the cylinders at points near the fins on the same side pressure is applied whereby the fins are simultaneously expanded after they pass each other.

2. In a rotary engine, the combination with tangent rotating cylinders, steam-tight at the line of tangency, of fins having limited radial motion in slots in said cylinders; said fins having their outer edges rounded on the side opposite that on which steam is applied, and said fins adapted to so contact at each revolution as to depress each other simultaneously.

3. A rotary fluid-pressure engine, consisting of a fluid-tight chamber, within which are two tangent cylinders whose tangency is fluid-tight, said cylinders containing fins suitably set in slots in the circumferential surface of the cylinders, passages connecting said fin-slots with the surface of said cylinders at points near said fins on the same side pressure is applied; and said cylinders rotatively attached to shafts, which are suitably journaled in the sides of said fluid-chamber; one or more fly-wheels outside the chamber on one of said cylinder-shafts, equal and similar meshing gears on said cylinder-shafts; a cut-off valve without said chamber; means for operating same and suitable inlet and exhaust ports.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GEORGE FREDERICK LEIGHTON.

Witnesses:
JOSEPH R. GARDNER,
FREDK. G. MOHR.