No. 625,328. Patented May 23, 1899.

C. T. FONDA.

ROTARY ENGINE.

(Application filed June 23, 1897.)

(No Model.)

Fig. 1.

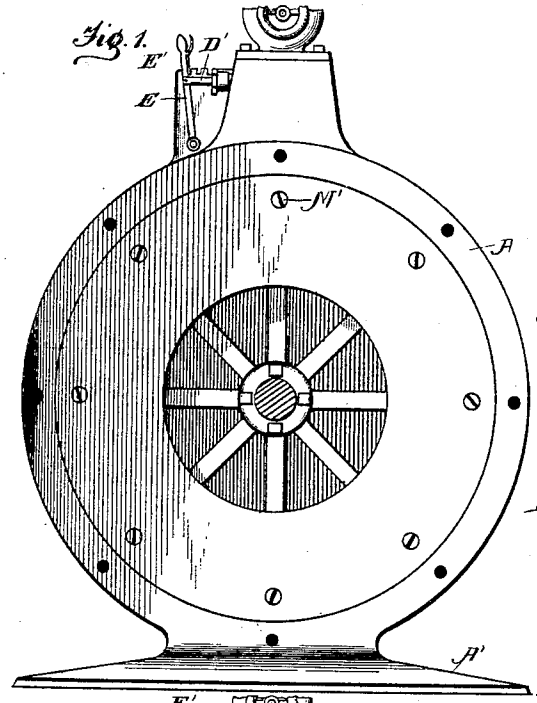


Fig. 2.

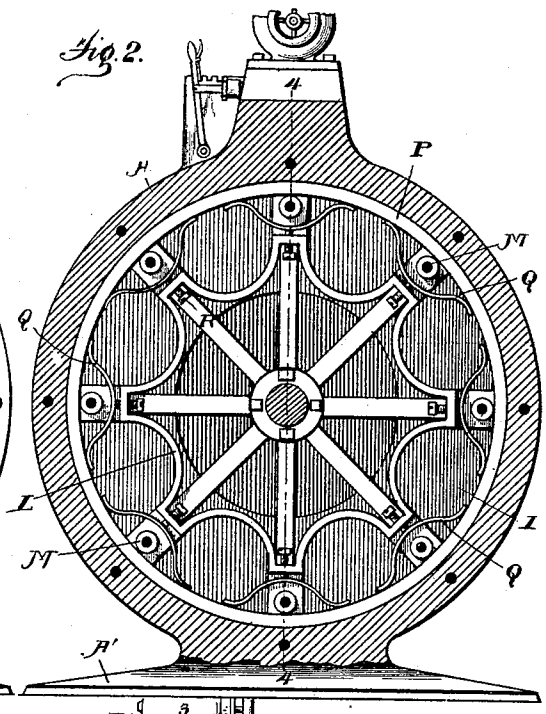


Fig. 3.

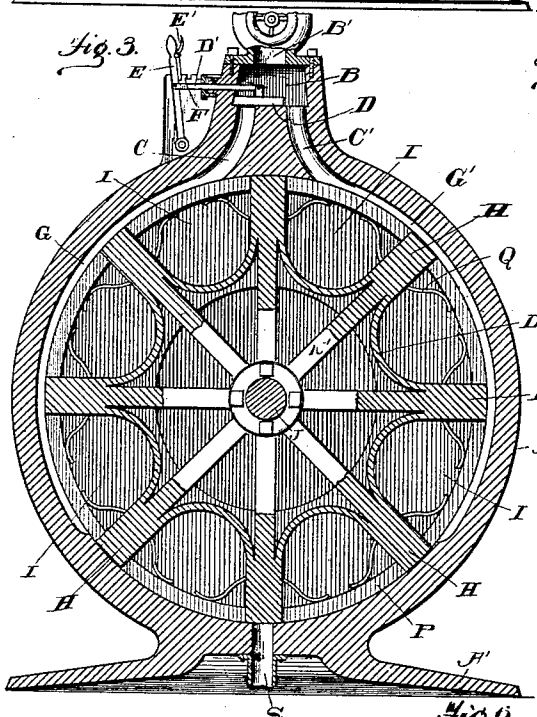


Fig. 4.

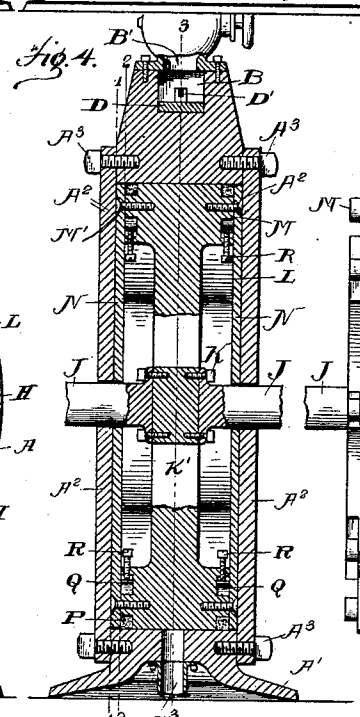


Fig. 5.

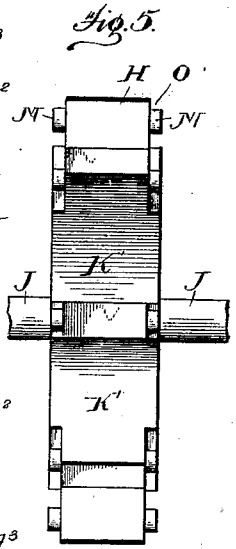
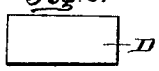


Fig. 6.



Witnesses

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ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 625,328, dated May 23, 1899.

Application filed June 23, 1897. Serial No. 641,892. (No model.)

To all whom it may concern:

Be it known that I, CHARLES T. FONDA, residing at Wheatland, in the county of Hickory and State of Missouri, have invented a new and useful Improvement in Rotary Engines, of which the following is a specification.

My invention is in the nature of a rotary engine which may be direct-acting or reverse, as desired, but slight change in the construction being needed.

The object of my invention is to produce a rotary engine which shall be simple, cheap, durable, and effective and which while very easy to manage and not at all liable to get out of repair will give a much larger percentage of power for the amount of steam consumed than any engine now in existence of which I have any knowledge.

My invention consists in the improved construction, arrangement, and combination of parts hereinafter fully described and afterward specifically pointed out in the claim.

In order to enable persons skilled in the art to which my invention most nearly appertains to make and use the same, I will now proceed to describe its construction and operation in connection with the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a sectional view of my invention on the line 1 1 of Fig. 4, showing the engine with the cylinder-head removed. Fig. 2 is a sectional view on the line 2 2 of Fig. 4, showing the piston-head in elevation. Fig. 3 is a central sectional view on the line 3 3 of Fig. 4. Fig. 4 is a sectional view at right angles to that of Figs. 1, 2, and 3 on the line 4 4 of Fig. 2. Fig. 5 is a view in elevation of the piston-head removed from the engine. Fig. 6 is an inverted plan view of the slide-valve.

Like letters of reference indicate the same parts wherever they occur in the different views of the drawings.

Referring to the drawings by letters, A is a cylinder which may be cast in one part with the base A′. This cylinder is provided with a steam-chest B at the top, into which the steam-pipe enters at B′. Leading from the steam-chest are two steam-passages C and C′, and mounted in the bottom of the steam-chest is a slide-valve D, whose operating-rod D′ is connected to a pivoted hand-lever E, having a spring-pawl E′ to engage with a toothed segment F. Two grooves G and G′, cut in the inner periphery of the cylinder, extend a sufficient distance around the cylinder to permit the steam let into said grooves to impinge upon three of the pistons H and enter three of the steam-pockets I. These pistons and steam-pockets are part of the skeleton piston-head or wheel, which is rigidly secured on a shaft J, extending entirely through the engine, whereby it may be provided at one or both ends with pulleys upon which to run belts for the purpose of transmitting power to the engine. This skeleton head consists of a hub K and spokes K′, said spokes extending longitudinally the whole length of the cylinder and radially a sufficient distance to slide on the inner periphery thereof. The piston-heads H are located at the ends of the spokes and are connected and braced by curved bars L. Projecting laterally from each piston-head H is a lug M, which forms the seat of screws M′ for securing follower-plates N on the sides of the spokes of the piston-head. In the angles formed between the outer sides of the pistons H and the lugs M, as at O in Fig. 5, is seated a ring P, which runs in contact with the inner periphery of the cylinder and is kept in bearing therewith by means of springs Q, seated in the space just inside of these lugs and kept extended upwardly by means of set-screws R. An exhaust-port S is provided at the bottom of the pistons, which will also serve as a drip for the cylinder.

A^2 are the cylinder-heads, secured to the cylinder by bolts A^3, the joints being made steam-tight by any suitable packing.

The operation of my invention may be described as follows: The sliding valve being in the position as shown in Fig. 3, steam is admitted into the steam-chest and from the steam-chest passes through the passage C and groove G′ of the inner periphery of the cylinder, entering the first three of the steam-pockets I and exerting its force against three pistons H in front of said pockets. This will cause the piston-head to rotate and carry the shaft and all its attachments with it. As soon as any one of the pistons H has passed the exhaust-port S the steam-pocket I, immediately adjacent and in rear thereof, will be exhausted; but in the meantime another piston has passed into position at the upper part

of the engine to receive the steam against it and into the pocket following it, so that a continuous motion in that direction will be kept up as long as the steam is admitted. The shaft will be turned with great power owing to the fact that the steam has a bearing at all times against at least three of the pistons, always exerting its power in at least three of the steam-pockets when the piston-head, as in this instance, is provided with eight piston-heads and eight steam-pockets. It will be understood, of course, that the number of steam-pockets and the consequent number of piston-heads may be varied to suit the kind of work to be performed and the style of engine; but in every instance the steam will be admitted to nearly one-half of the total number of pockets and against the same number of piston-heads. In order to stop the engine, the engineer will grasp the hand-lever E and, withdrawing the pawl E′ from the outer notch of the toothed crank, will push the lever in one notch and again engage the pawl, this time in the middle notch. This will cause the slide-valve D to rest partially over each of the passages C and C′, which will let steam in on both sides of the piston-heads at once, this quickly stopping the engine. In order to reverse the engine, the engineer will again grasp the lever E, release the pawl E′ from engagement with the rack and press the lever E to its extreme opposite position, and again drop the pawl into engagement with the rack at its opposite end. This will bring the slide-valve into position to let the steam into the other side of the engine and will cause the engine to be revolved with the same speed and power in the reverse direction as it moved in the forward direction, as hereinbefore described.

The foregoing description was that of an engine constructed in accordance with my invention intended to be used as a reversible rotary engine, and while by means of my invention a rotary engine of greatly-increased power and speed is produced a still more powerful direct-acting rotary engine in which the engine can work but in one direction will be the result of carrying out my ideas. In order to construct such an engine for running in one direction only, there need be but one steam-passage. The steam-chamber may be dispensed with and the steam admitted directly from the steam-pipe from the boiler. There will be but one groove, such as G or G′, in the inner periphery of the cylinder; but this groove will extend around almost the entire circumference, leaving only sufficient space to include slightly more than one complete steam-pocket. In this instance the exhaust S at the bottom will be dispensed with and an exhaust provided at the top. With such a construction the steam may be admitted simultaneously to all but one of the steam-pockets and exert its force at the same time upon all but one of the pistons, this obviously more than doubling the power of the engine with an expenditure of but very little, if any, more steam than in the construction illustrated.

As before stated, my engine is applicable to all kinds of work for which an engine can be used and is so simple and easy to manage that it can be run by any ordinary unskilled laborer, even a boy with just sufficient knowledge to operate the hand-lever and pawl.

While I have illustrated and described the best means now known to me for carrying out my invention, I wish it to be understood that I do not restrict myself to the exact details of construction shown, but hold that any slight changes or variations as would suggest themselves to the ordinary mechanic will clearly fall within the limit and scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

The combination with the cylinder and the hub with its spokes, of the piston-heads on the outer ends of the spokes, lugs projecting laterally from the said heads, follower-plates on the sides of the said spokes, means engaging the said lugs for securing said plates, a ring upon one side of said lugs and bearing against the inner periphery of the cylinder, and springs in the spaces formed between the inner sides of the piston-heads and the said lugs and bearing against said ring, and means as set-screws bearing on the springs to keep the same extended outward, substantially as shown and described.

CHARLES T. FONDA.

Witnesses:
JOHN W. ROBERTSON,
CHARLES M. BENTLEY.