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W. HAVEN.

ROTARY-ENGINE.

No. 170,365.

Patented Nov. 23, 1875.

Fig 1

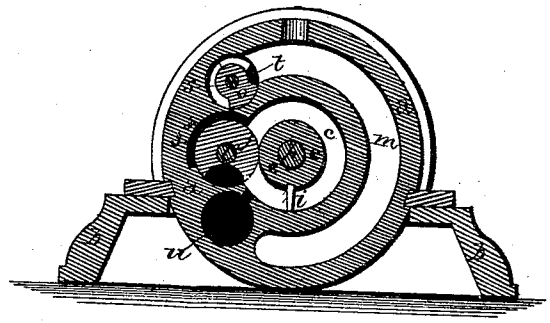


Fig 2

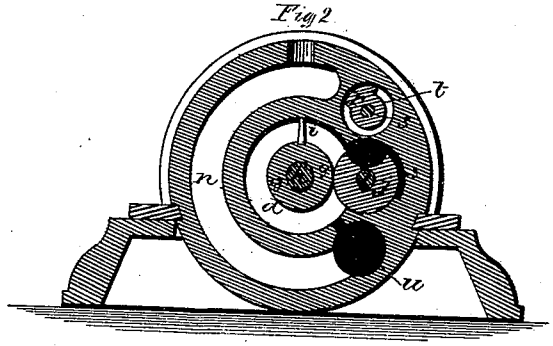
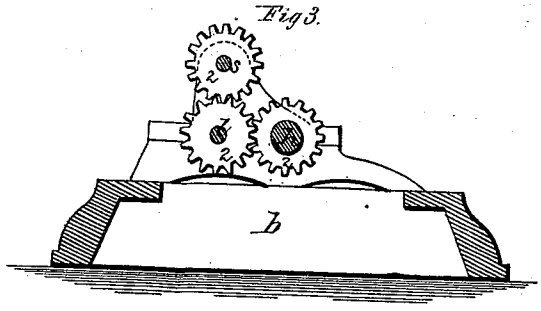


Fig 3.



WITNESSES.

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2 Sheets—Sheet 2.

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ROTARY-ENGINE.

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Fig. 4

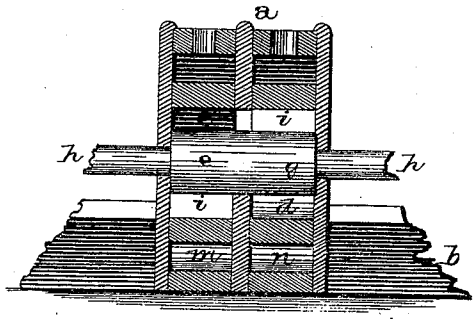


Fig. 5

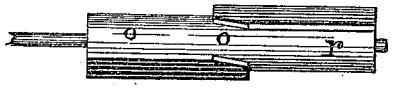
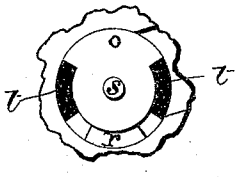


Fig. 6



WITNESSES—

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UNITED STATES PATENT OFFICE.

WILLIAM HAVEN, OF CLYMER, NEW YORK.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **170,365**, dated November 23, 1875; application filed March 24, 1875.

To all whom it may concern:

Be it known that I, WILLIAM HAVEN, of Clymer, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in rotary engines; and it consists in the arrangement and combination of parts that will be more fully described hereafter.

Figures 1 and 2 are cross-sections of my engine, taken through each of the cylinders. Fig. 3 is a view of gears by which the valves and abutments are operated. Fig. 4 is a vertical transverse section of my invention. Figs. 5 and 6 are detached views of the valve alone.

a represents the shell of the engine, which is secured to a suitable bed-plate or frame, *b*. This shell is divided by a central partition into two cylinders, *c d*, in which are placed the two pistons *e g*, secured to the central shaft *h*, each one of the pistons being provided with a single bucket, *i*. In the shell, just to one side of the cylinders, are recesses made, in which are placed the abutments *j*, which are secured to the shaft *l*. Running a little more than half-way around each of the cylinders there is formed a chamber, *m n*, one of which forms a reservoir for the live steam, so that when the valves *o r* are opened the cylinders will be instantly filled with steam without drawing upon the pipes. There is but one of these reservoirs; but, as the valves *o r* are secured to opposite sides of the shaft *s*, there is left an opening, *t*, through the partition, so that the steam can pass through from the reservoir, and thus supply both cylinders. The chamber *n*, in the opposite end of the shell, receives the exhaust direct from one cylinder, and through the hole *u* in the shell from the other. By thus having a large space, into which the steam is exhausted, instead of into the usual small pipes, the exhaust is very easy, and the engine runs with just so much more speed and power. Each one of the shafts upon which the pistons, abutments, and valves are secured is geared together by means of the wheels 2, all of which are equal size. It will be noticed in Figs. 1 and 2 that the piston, abutment, and valve of one cylinder are placed in just a reverse position from what they are in the other, so that there will be no dead-centers to overcome, and so that the engine will run easily and steadily even without a fly-wheel. In the shell, around the top and rear sides of the abutments *j*, there is left a space, 3, into which the live steam from the cylinders passes and presses the abutments up against the pistons, so as to form a tight joint at the point of contact, and prevent the steam from escaping between them without causing any unnecessary friction.

Having thus described my invention, I claim—

1. In a rotary engine having two cylinders and pistons, the combination of the two chambers *m n*, each of which communicates with both cylinders, substantially as shown and described.

2. The space 3 around the rear side of the abutments *j*, for the purpose of allowing the steam to press it against the piston, as described.

3. The opening *t* through the shell, whereby the reservoir *m* supplies both cylinders with steam, as specified.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of March, 1875.

WM. HAVEN.

Witnesses:

F. A. LEHMANN,

WM. B. UPPERMAN.