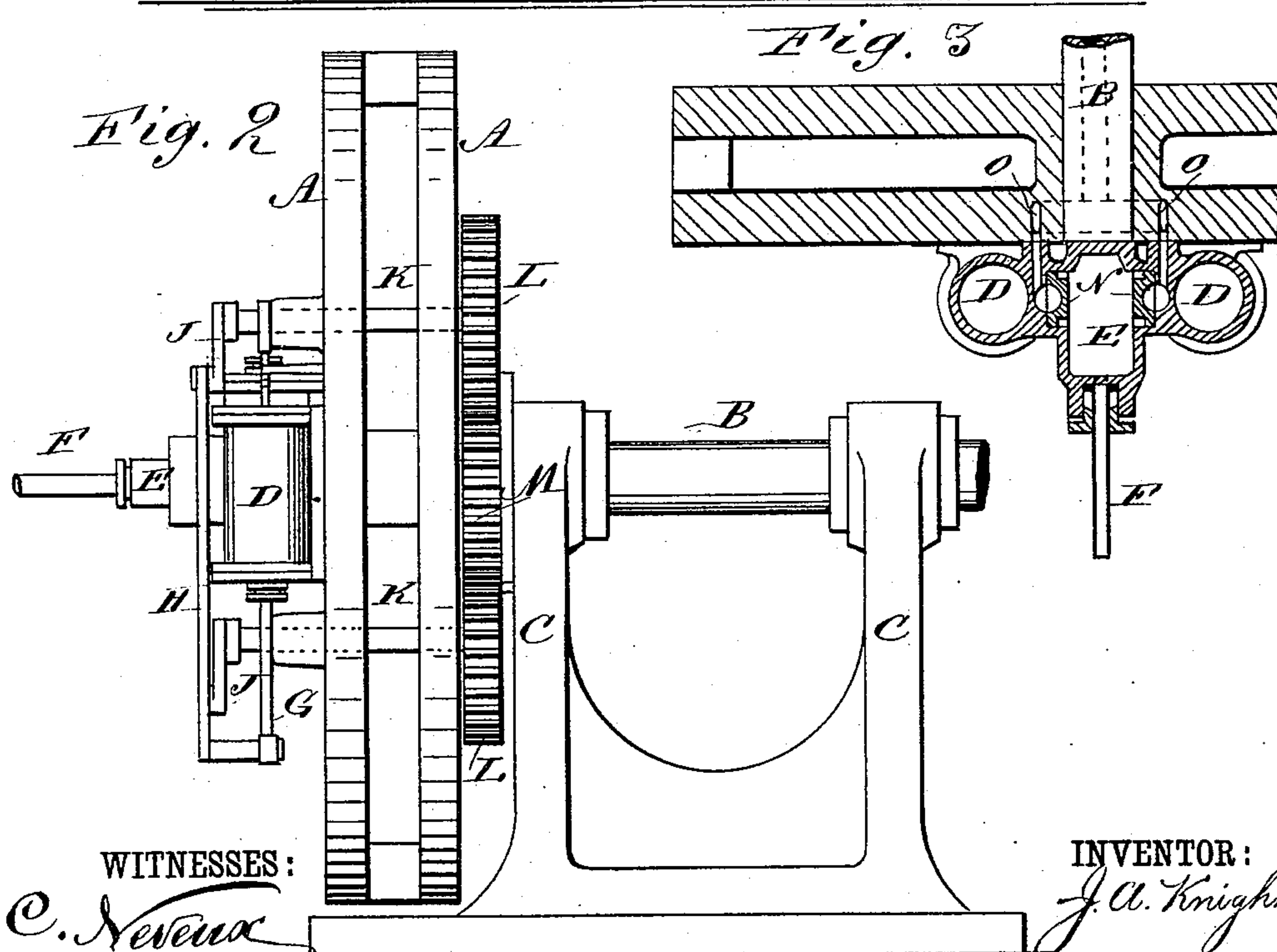
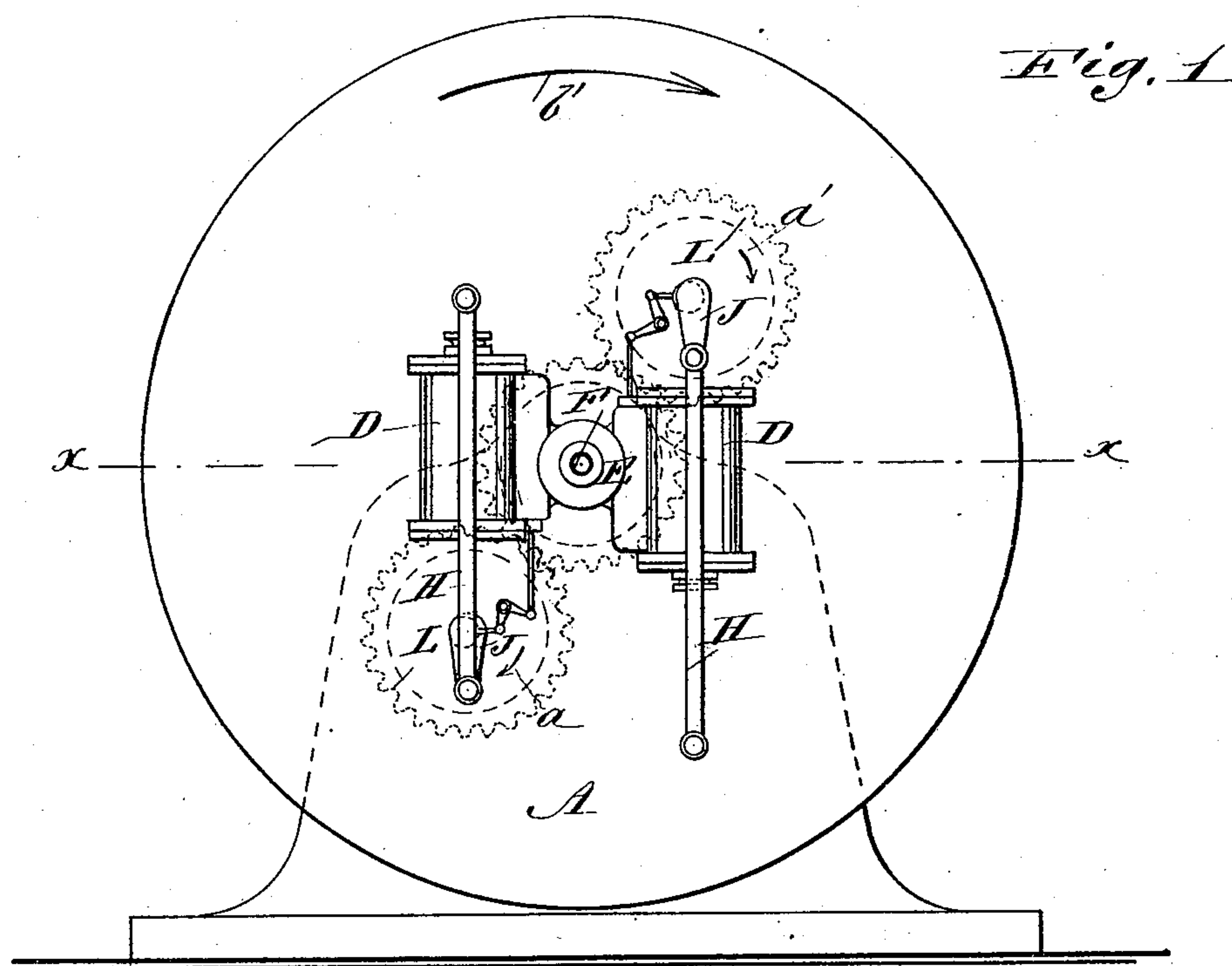


(Model.)

J. A. KNIGHT.  
ROTARY STEAM ENGINE.

No. 282,907.

Patented Aug. 7, 1883.



**WITNESSES :**

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**INVENTOR:**

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# UNITED STATES PATENT OFFICE.

JOHN ANDREW KNIGHT, OF MARLBOROUGH, N. H., ASSIGNOR TO HIMSELF,  
AND RICHARDSON H. MONTGOMERY, OF WEST PLAINS, MISSOURI.

## ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 282,907, dated August 7, 1883.

Application filed January 16, 1883. (Model.)

*To all whom it may concern:*

Be it known that I, JOHN ANDREW KNIGHT, of Marlborough, in the county of Cheshire and State of New Hampshire, have invented  
5 a new and Improved Rotary Steam-Engine, of which the following is a full, clear, and exact description.

The invention consists in a steam-engine constructed with a rotating wheel, carrying  
10 a series of steam-cylinders containing pistons and piston-rods for rotating crank-shafts journaled in the said wheel, which crank-shafts carry cog-wheels engaging with a fixed cog-wheel on the machine-frame, whereby if  
15 steam is admitted into the cylinders and their pistons are reciprocated the cog-wheels on the crank-shafts will be rotated, and, as they engage with the fixed cog-wheel, will necessarily rotate the wheel on which the cog-wheels  
20 are mounted.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

25 Figure 1 is a front elevation of my improved rotary steam-engine. Fig. 2 is a longitudinal elevation of the same. Fig. 3 is a sectional view on the line *x x*, Fig. 1, parts being omitted.

30 Two united disks, A, forming a fly-wheel, are rigidly mounted on a shaft, B, which is journaled in suitable standards, C C, secured on a base-plate. On the outer surface of the said wheel A two cylinders, D, are secured,  
35 which are connected by means of suitable ports with a steam-chest, E, to which steam is conducted by a pipe, F, suitably packed in the steam-chest to prevent the escape of steam. Each cylinder D contains a piston provided  
40 with a piston-rod, G, which piston-rods of the two cylinders project from opposite ends of the same, each piston-rod being connected, by means of a connecting-rod, H, with a crank, J, on a shaft, K, journaled transversely in the  
45 wheel A, the crank J being at the outer end, and a cog-wheel, L, being rigidly mounted on the end projecting from the inner surface of the wheel A, which cog-wheels L on both shafts K engage with a cog-wheel, M, fixed

on one of the standards C, the cog-wheels L 50 and M being of the same diameter. Each cylinder D is provided with a slide-valve, N, for admitting steam into the cylinders, which slide-valves are operated by means of suitable eccentrics and connecting-rods from the shafts 55 K. The exhaust-steam passes off through a channel in the shaft. If steam is admitted into the cylinders, the pistons will be reciprocated in the same and their rods will turn the cranks J, which turn the cog-wheels L, en- 60 gaging with the fixed cog-wheel M. The cog-wheels L rotate in the direction of the arrows *a'*, whereby the wheel A, which acts as a fly and balancing wheel, will be rotated in the direction of the arrow *b'*, as shown in Fig. 1. 65 Each crank makes one revolution for one revolution of the wheel A. By means of this construction of the machine I obtain double leverage, for the power of the steam is applied to the piston-rod and acts through the leverage of 70 the cranks J, from whence the power is transmitted to the wheels L, and then acts on the wheel A by the combined leverage of the radius of the wheel M and the wheels L; or, in other words, the leverage is doubled without 75 additional cost.

In my improved steam-engine all dead-centers are avoided, the friction is distributed, and a smooth and regular motion is obtained.

I have shown only two cylinders; but it is 80 natural that any number may be used without departing from the spirit of my invention, and I do not limit myself to the exact method of attaching the cylinders to the fly-wheel.

The wheel A acts as a fly-wheel, and also as 85 a bearing, support, or frame for all the machinery, thus making the machine very compact and strong.

Having thus fully described my invention, I claim as new and desire to secure by Letters 90 Patent—

1. In a rotary engine, the combination, with two disks, A A, united and rigidly mounted upon a rotary shaft, of the two cylinders D D, arranged on the outer face of said wheel and 95 on each side of a steam-chest, E, communicating therewith, as shown and described.

2. The combination, with the wheel A A and



the cylinders D D, of the pistons carrying rods G, projecting from the opposite ends of said cylinders, the rods H, shafts K, having the cranks J, and journaled transversely in  
5 said wheel at equal distance from its axis, and the cog-wheels L M L, of the same diameter, as and for the purpose specified.

3. In a rotary engine, the combination, with a rotating wheel A, of the cylinders D, the  
10 steam-chest E, the steam-supply pipe F, packed

in the end of the steam-chest, the piston-rods G, the connecting-rods H, the shafts K, provided with cranks J, the cog-wheels L on the shafts K, and the fixed cog-wheel M, substantially as herein shown and described, and for  
15 the purpose set forth.

JOHN ANDREW KNIGHT.

Witnesses:

HIRAM BLAKE,  
WALLACE L. MASON.