W. C. STILES.

Rotary Steam-Engines.

No. 137,109. Patented March 25, 1873.

Fig. 1.

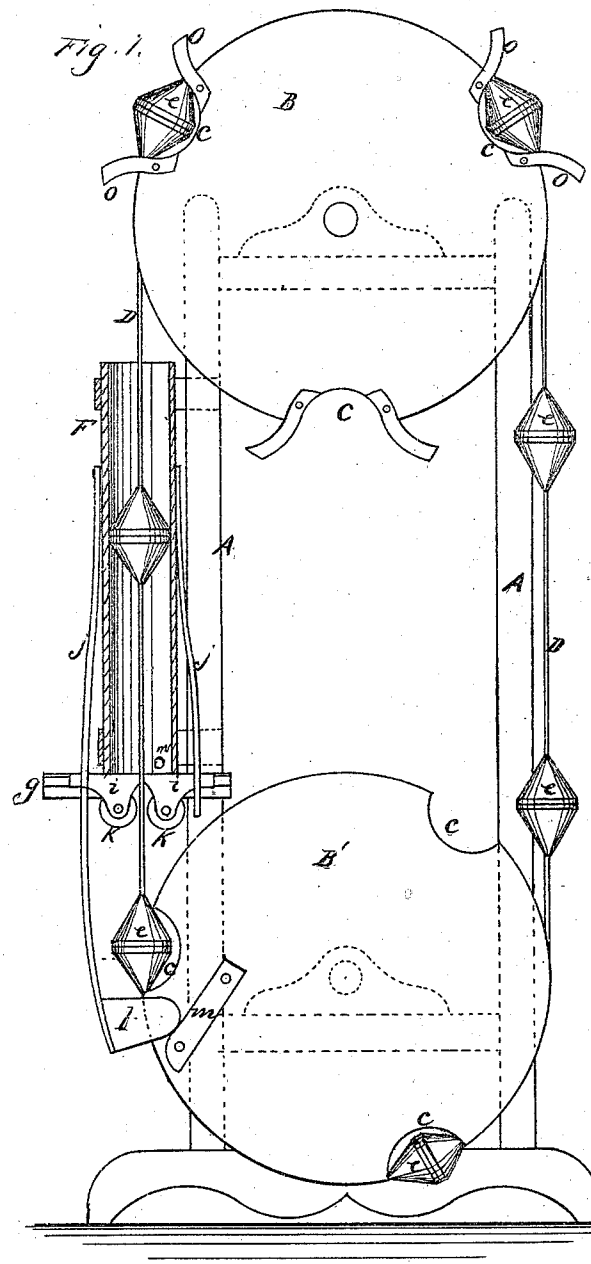
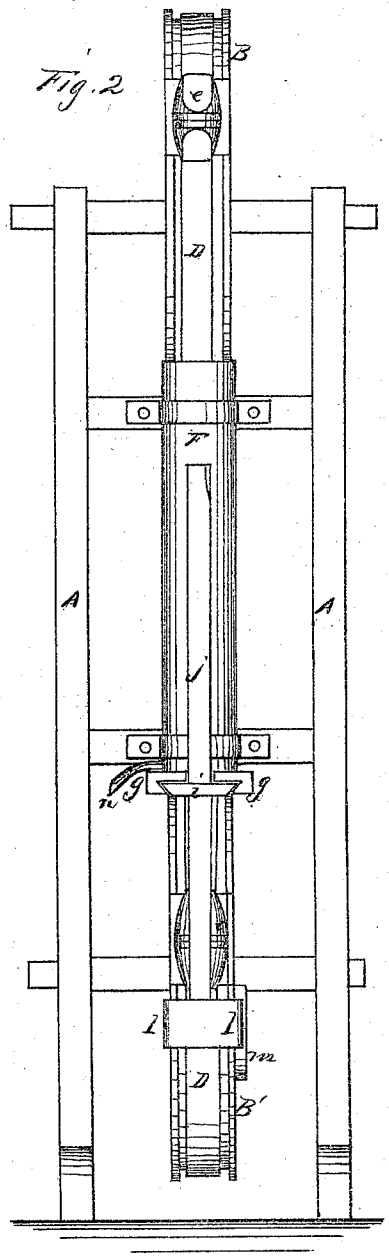
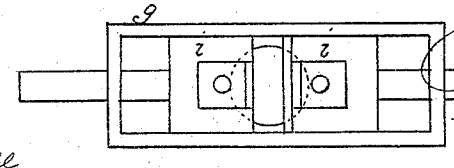


Fig. 2





Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM C. STILES, OF NEVADA CITY, CALIFORNIA.

IMPROVEMENT IN ROTARY STEAM-ENGINES.

Specification forming part of Letters Patent No. **137,109**, dated March 25, 1873.

To all whom it may concern:

Be it known that I, WILLIAM C. STILES, of Nevada City, Nevada county, State of California, have invented an Improved Rotary Engine; and I do hereby declare the following description and accompanying drawing are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvements without further invention or experiment.

My invention consists of an arrangement by which both the force and the expansive power of the steam can be exerted to drive an endless chain or belt, and thus produce a rotary motion of the pulleys over which the belt passes and from which power can be taken.

In order to more fully explain and illustrate my invention, reference is had to the accompanying drawing forming a part of this specification, in which—

Figure 1 is a side elevation of my engine. Fig. 2 is an end elevation.

A represents a strong frame-work, which can be constructed in size and strength according to the size and capacity of the engine. B B′ are two pulleys, which are suitably mounted in this frame in the same vertical plane, one near the bottom and the other near the top, as shown. These wheels are both provided with recesses *c c c* in their rims, equidistant from each other, and which serve the double purpose of providing a seat for the pistons on the endless belt while they are passing around the pulleys, and also for preventing the belt from slipping on the wheels. The endless belt D passes around the pulleys B B′ in the usual manner of an endless chain or belt, and has pistons *e e* secured to it at regular intervals between the recesses *c c c* in the rim of the wheels. The particular form or construction of these pistons is not material, the only requirement being that they shall be so constructed and packed that they will fit snugly in the cylinder. The cylinder F is secured vertically to the side of the frame A in such a position that the endless chain or belt will pass directly through it while passing from one pulley to the other. One cylinder can be employed upon each side of the frame, so that a double power can be exerted to drive the engine, in which case the action of the steam in one cylinder would be in the reverse direction from its action in the other. The cylinder consists of a simple tube, inside of which the pistons *e e e* fit snugly, being provided with proper packing to make them steam-tight while passing through it. Suitable means for the entrance of steam at *n* should be provided. To the lower end of the cylinder a small horizontal frame, *g*, is secured, inside of which two oppositely-moving abutments, *i i*, are arranged to slide transversely across the lower end of the cylinder and meet on a line drawn diametrically through it. A strong spring, *j*, is secured—one at each side of the cylinder—at some point between its upper and lower end, which extend downward and are attached to the outer ends of the abutments so as to keep them snugly together.

The pistons *e e* are represented herein as pointed or beveled toward both ends, so that they will force the abutments apart when entering the cylinder; and, generally, I shall employ a mounted friction-roller, K, on the under side of the meeting ends of each of the abutments, against which the pistons will strike in forcing the abutments open, and thus relieve the friction and consequent jar of the stroke. The outside spring *j* can also be extended below the lower end of the cylinder, as represented, and have a pair of arms, *l l*, attached to it, which extend upon each side of the lower pulley B′, and a lug or projection, *m*, can be secured to the side of the pulley in the proper relation to each recess, *c c*, to strike the arms *l l* at the proper instant to open the outer abutment, while the inner one can be operated by a similar arrangement operated from the upper pulley.

Steam will be admitted into the lower end of the cylinder just above the horizontal frame *g*, so as to strike the piston which is in the cylinder, and act by expansion between it and the abutments to force it upward, and before it reaches the upper end of the cylinder another piston has passed the lower abutments and is being acted upon, thus producing a continuous movement of the endless chain in one direction, which gives to the pulleys B B′ a rotary motion. The exit of each piston allows the steam to escape freely at the upper end of the cylinder.

For a belt or chain I prefer to use a thin

piece of band or hoop steel of the required width and strength.

The meeting edges of the abutments will be properly cushioned with India-rubber or other packing to cause them to fit tightly against it on both sides and prevent leakage of the steam.

In case the expansion of the steel endless band when heated should interfere with the proper seating of the pistons in the recesses in the wheels, I secure upon the side of the wheel at the four corners of each of the recesses an outwardly-curved horn or guard, *o*, which extends above the face of the wheels, so that the pistons will be carried to their seats in the recess by the incline of the guard upon which they strike, and to insure this action I shall insert friction-rollers in each end of the piston so as to render their automatic adjustment into the recesses more easily accomplished.

By this construction I provide a rotary steam-engine in which the full expansive force of the steam can be utilized, and I avoid the difficulties which have heretofore been encountered in the practical working of rotary engines.

Various modifications of this plan of an engine can readily be suggested; but the working principles, as required in an operative engine, are sufficiently explained and recited in the above description to enable any one familiar with steam-engines to make the modifications without further invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The pulleys B B′ and endless band D, with the pistons *e e e*, in combination with one or more cylinders, F, provided with suitable means for the ingress of steam, and sliding abutments, substantially as set forth.

2. The extended springs or levers with their arms *l l*, in combination with the projections *m* for automatically separating the abutments, substantially as described, for the purpose specified.

In witness whereof I hereunto set my hand and seal.

WILLIAM C. STILES. [L. S.]

Witnesses:

L. W. WILLIAMS,

J. B. JOHNSON.