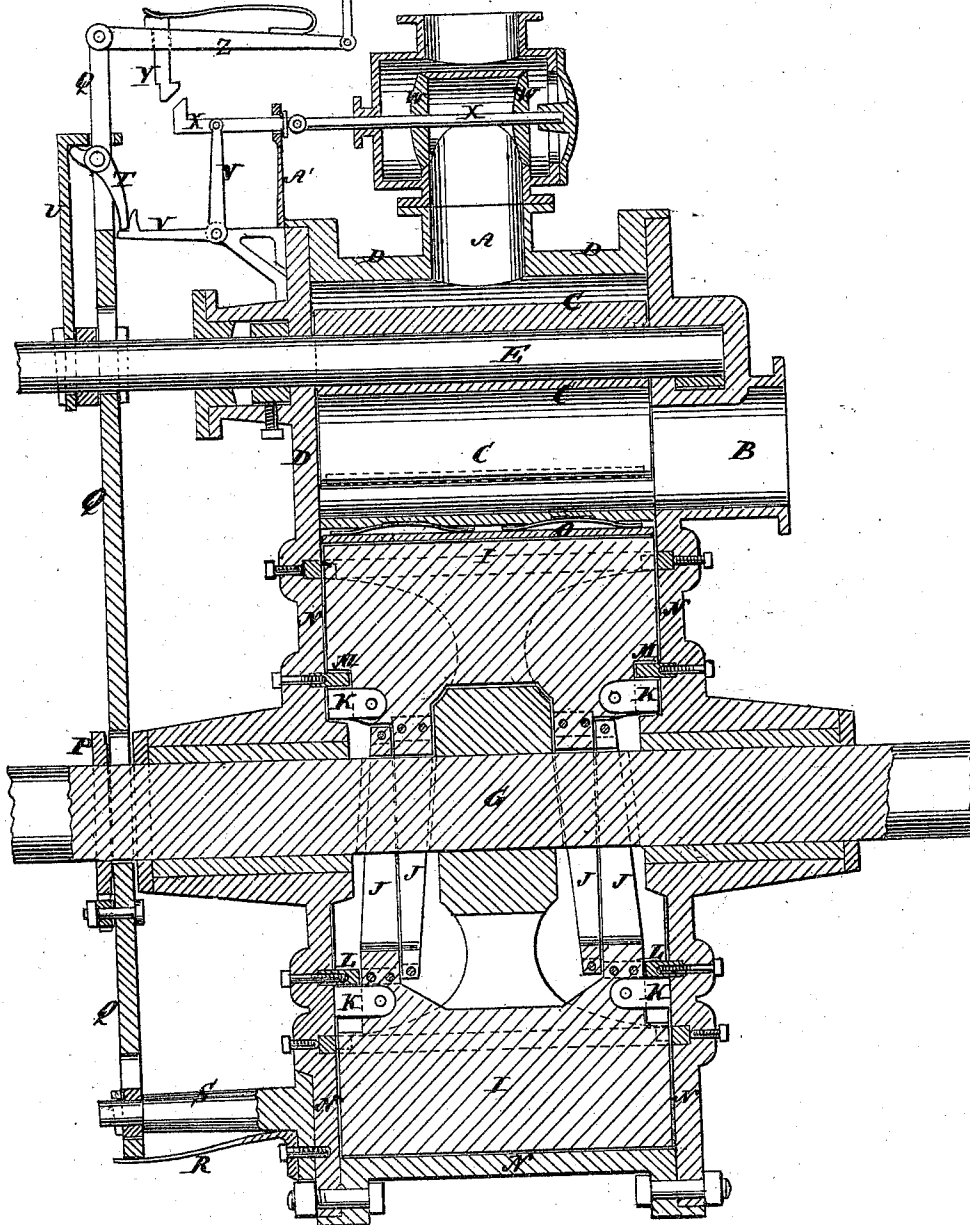


O. ADAMS.

Reversible Rotary Steam-Engines.

No. 141,909. *Fig. 1* B'

Patented August 19, 1873.



Witnesses:

E. Hoff
C. Sedgwick

Inventor:

O. Adams

PER

Munnell
Attorneys

O. ADAMS.

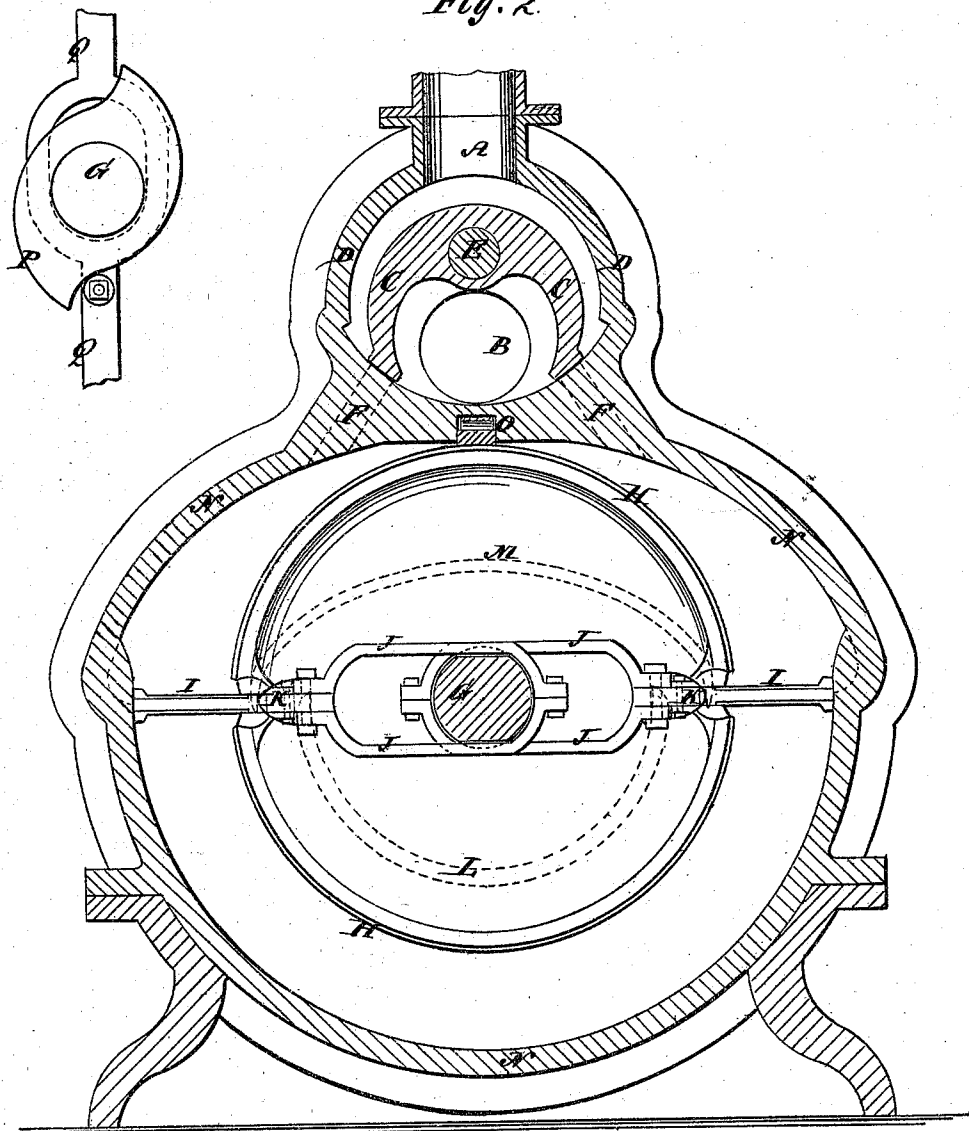
Reversible Rotary Steam-Engines.

No. 141,909.

Patented August 19, 1873.

Fig. 3.

Fig. 2.



Witnesses:

E. Wolff
Sedgwick

Inventor:

E. Adams

PER

Munnell
Attorneys.

UNITED STATES PATENT OFFICE.

ORWIN ADAMS, OF BLACK HAWK, COLORADO TERRITORY.

IMPROVEMENT IN REVERSIBLE ROTARY STEAM-ENGINES.

Specification forming part of Letters Patent No. **141,909**, dated August 19, 1873; application filed March 8, 1873.

To all whom it may concern:

Be it known that I, ORWIN ADAMS, of Black Hawk, in the county of Gilpin and Territory of Colorado, have invented a new and useful Improvement in Reversible Rotary Steam-Engine, of which the following is a specification:

Figure 1, Sheet I, is a detail vertical longitudinal section of my improved engine. Fig. 2, Sheet II, is a detail vertical cross-section of the same. Fig. 3, Sheet II, is a detail view of the cam.

Similar letters of reference indicate corresponding parts.

My invention has for its object to furnish an improved rotary steam-engine, simple in construction and effective in operation, working with little friction, and which may be readily reversed, and will enable the steam to be cut off at any desired point of the stroke. The invention consists in the combination of circular and elliptical guides with the pistons and shaft, and in the arrangement of mechanism for operating the cut-off valve.

A represents the induction-pipe, and B the exhaust. C is the throttle or reverse valve, which is placed in the valve-chest D, and is keyed to the shaft E. The shaft E works in bearings secured to the heads of the steam-chest D, with set-screws to relieve the pressure upon the valve-seats. F are the induction and exhaust ports. G is the main shaft, to which is keyed the drum H, through slots in the face of which the pistons I move in and out. The shaft G works in cast-steel bearings twice as long as the diameter of the said shaft, and made adjustable with keys and gibs. The pistons I are bolted to yokes J, which work upon the shaft G, the said shaft being slightly flattened to receive them. To the pistons I and yokes J, at or near their point of intersection, are secured slides K, which move along the outer or convex surface of the circular guide L to force and hold the pistons I out, and along the inner or concave surface of the elliptical guide M to force and hold the pistons I in. The steel circular rings working against the metallic packing in edge of the drum, are let into the heads of the cylinder or case N, and are adjusted by set-screws. The part of the cylinder N above the points of intersection of the guides L M is recessed, as shown

in Fig. 2, to allow the exhaust steam to escape freely around the edge of the pistons, as soon as they have completed their stroke. The steam is prevented from passing directly from one port, F, to the other by a packing, O, set in the cylinder N, and held against the drum by springs, as shown in Figs. 1 and 2. To the shaft G, at one end of the cylinder N, is secured a cam, P, which moves the bar Q downward by striking against a pin and friction-roller attached to the said bar Q. The bar Q is moved upward gradually, as allowed by the cam P, by a spring, R, which presses against its lower end. The bar Q is slotted to receive and slide upon the spindle S and the shafts G E, and to its upper part is attached a dog, T, which as the said bar Q moves upward gradually, strikes against a bar, U, looped around the shaft E, and sleeved around the bar Q, and is thrown out upon the toe of the bell-crank lever V, which operates the balanced valve W, so that as the bar Q is moved quickly downward by the cam P the dog T will operate the lever V, and open the valve W suddenly at the beginning of the stroke. As the valve W opens the valve-stem X is caught and locked by the tappet or catch Y attached to the lever Z. The lever Z is connected with the upper end of the bar Q, so that as the said bar again gradually rises the tappet Y will be raised from the valve-stem X at the end of the stroke, when the valve W will be instantly closed by the action of a stiff spring, A'. The long arm of the lever Z is attached to the governor-rod B', so that the valve W may be released at some point between the beginning and end of the stroke, depending upon the speed of the engine. By placing a cut-off in the ports F the steam may be cut off at one-fifteenth or any other desired point of the stroke.

To reverse the engine, the valve-works are thrown out of gear, and the cut-off is thrown open by a lever, not shown in the drawing. The engine, when reversed, works at full stroke, and is regulated by the throttle-valve. The cut-off may also be made reversible by an extra cam, friction-pulley, and lever arrangement.

In engines not requiring a governor the cut-off can be regulated by the engineer, and

in any case the governor-valve to regulate the engine is done away with, which is important where steam is used expansively.

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

1. The circular guide L and the elliptical guide M, in combination with the slides K, yokes J, pistons I, drum H, and cylinder or

case N, substantially as herein shown and described.

2. In combination with the valve-stem X, the spring A', bell-crank lever V, dog T, trip-bar U, and reciprocating rod Q, as specified.

ORWIN ADAMS.

Witnesses:

HAL. SAYR,
J. N. NICHOLS.