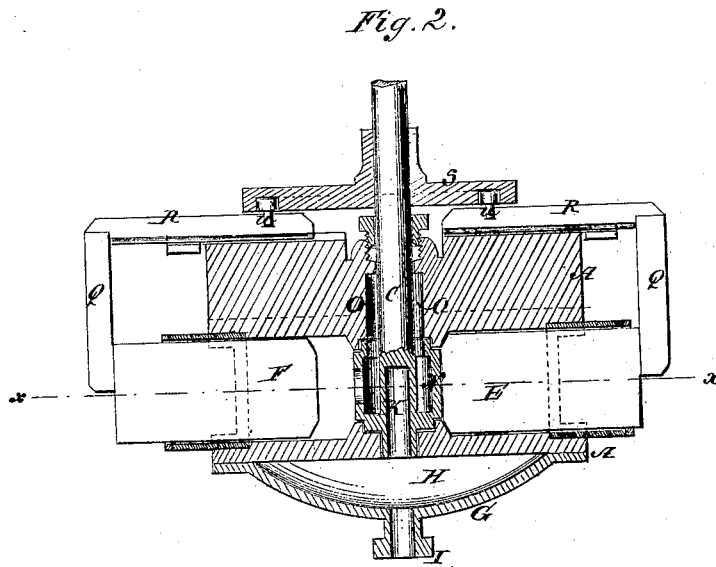
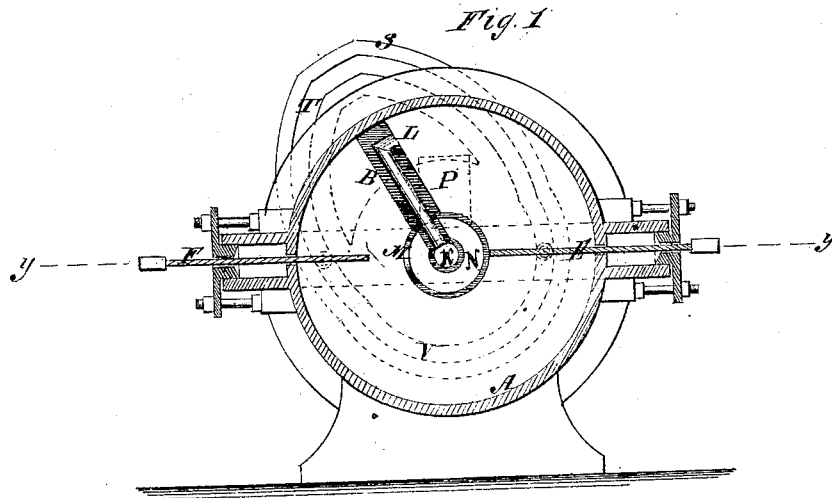


*J. Constantine,*

*Rotary Engine.*

*No. 109179.*

*Patented Nov. 15. 1870.*



Witnesses:  
*L. S. Mabee*  
*Alex. F. Roberts*

Inventor:  
*Jas. Constantine*  
PER *Mmm*  
Attorneys.

# United States Patent Office.

JAMES CONSTANTINE, OF MANSFIELD, LOUISIANA.

Letters Patent No. 109,179, dated November 15, 1870.

## IMPROVEMENT IN ROTARY ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern :*

Be it known that I, JAMES CONSTANTINE, of Mansfield, in the parish of De Soto and State of Louisiana, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

My invention relates to devices for exhausting the steam from rotary engines, and consists in diminishing the extra friction by exhausting through the hub, as hereinafter described.

I will now describe a machine with which my improvement is preferably combined.

Figure 1 is a sectional elevation, taken on the line  $x\ x$  of fig. 2, and

Figure 2 is a horizontal section on the line  $y\ y$  of fig. 1.

A is the cylinder;

B, the piston; and

C is the shaft.

E and F are the cut-off plates, working through opposite sides of the cylinder through stuffing-boxes.

G is a shell, attached to one end of the cylinder, forming a steam-chest, H, to which the steam is admitted through the pipe-connection I.

From this chest it passes into the end of the shaft, which is made hollow for a short distance at K, thence it passes into the cylinder through the piston at L, behind it.

The plates E and F are so operated as to open in advance of the piston and close behind it, each closing before the other begins to open.

M is the exhaust-passage leading from the front of the piston into a hollow boss, N, on the shaft opening into an annular space, O, in one of the side walls of the case leading to the exhaust-pipe P.

The exhaust-passage M being located in front of the piston and moving with it, will always remove the steam in advance.

The piston, as seen in fig. 1 of drawing, has passed over the quadrant of a circle and approaches the plate F, which commences to rise as soon as E has closed down. After passing the plate, and for a quarter of a revolution thereafter, the steam will continue to act against the plate E, when F will have again closed down, and E will begin to rise.

For operating these plates they are connected by bars Q to sliding bars R, arranged in radial ways in the side of the case, the said slides being worked by the cam-plate S on the shaft C, the said plate being provided with a groove, T, in which studs, projecting from the slides R into the said groove, work. Half of this groove is a semicircle, concentric with the shaft at V, and the other half is suitably formed to open and close the plates while the plate makes half a revolution.

Other means for operating these plates may be used. The said plates may also be arranged to work through one end of the cylinder in lines parallel with the shaft, but I prefer the arrangement which I have here shown.

Having thus described my invention,

I claim as new and desire to secure by Letters Patent—

The piston B L, and cut-off plates E F, combined with chambered boss N, annular space O, channel K, and chamber H, combined, constructed, and relatively arranged as and for the purpose described.

The above specification of my invention signed by me this 8th day of April, 1870.

JAMES CONSTANTINE.

Witnesses:

GEO. W. MABEE,

ALEX. F. ROBERTS.