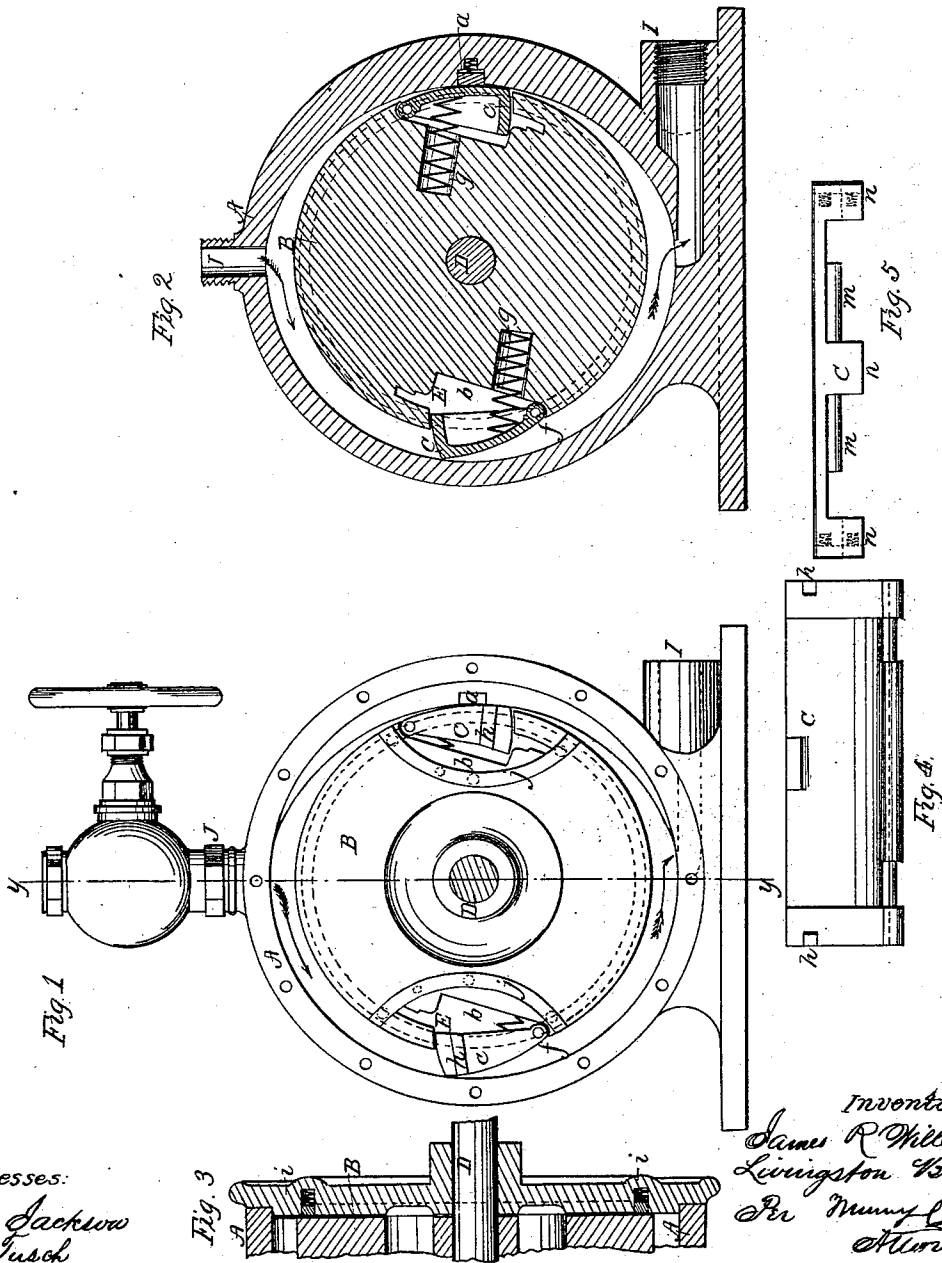


J. R. WILLETT & L. BRIEN.
 ROTARY STEAM ENGINE.

No. 61,695.

Patented Jan. 29, 1867.



Witnesses:
E. H. Jackson
The Tusch

Inventor:
James R. Willett
Livingston Brien
Per Munn & Co.

United States Patent Office.

JAMES R. WILLETT AND LIVINGSTON BRIEN, OF NASHVILLE, TENNESSEE.

Letters Patent No. 61,695, dated January 29, 1867.

IMPROVEMENT IN ROTARY STEAM 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 we, JAMES R. WILLETT and LIVINGSTON BRIEN, of Nashville, in the county of Davidson, and State of Tennessee, have invented a new and useful Improvement in Rotary Steam Engines; and we do hereby declare that the following is a full, clear, and exact description thereof.

The object of this invention is to more economically use steam in its direct action upon the driving-shaft of a rotary steam engine; and the invention consists in the arrangement of the buckets C upon the piston B, in such a manner that the piston shall receive and communicate to the driving-shaft the power of the steam in a more advantageous manner than heretofore. And to enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

Figure 1 represents an end elevation of our engine with the cover or cylinder-head off.

Figure 2 is a transverse section through the middle of the cylinder.

Figure 3 is a section of the cylinder-head, and showing a portion of the piston through the line *yy* of fig. 1.

Figure 4 is a view of the outside or movable portion of the bucket; and

Figure 5 is a view of the outer edge of the same.

Similar letters of reference indicate like parts in the drawings.

A represents the cylinder, B the piston, and C and E form the bucket. The inside of A does not form a perfect cylinder; it is cylindrical, and the sides are parallel, but the interior surface forms an eccentric, as seen in the drawing. This eccentric has a packing strip, *a*, running through it, which may be removed when required. The object of this piece is to keep the joint between the piston and this portion of the cylinder steam-tight at all times. It may be pressed out by spiral springs or otherwise. The driving-shaft D of the engine passes through the centre of the outside diameter of the cylinder, and through the centre of the piston. The outside surface or periphery of the piston forms a steam-tight joint on the eccentric portion of the cylinder at the point *a*. There are recesses, E, formed in the face of the piston, a portion of which, *b*, with the movable portion, *c*, forms a V-shaped bucket, upon which the steam acts in propelling the engine. The spring *g*, which presses out C, is located in the recess or in the bottom of this portion, E, of the bucket. This recess is surrounded at each end by a segment of a packing-ring, *j*, the ends of which are flush with the periphery of the piston. It is pressed outward by springs, and forms a steam joint around the recess or bucket. The other portion of the bucket C is hinged to one edge of E, as seen at *f*. The spiral spring *g* bears against the inner side, pressing against the inner surface of the cylinder, keeping it steam-tight therewith. The side of C, shown in fig. 4, forms an arc of a circle of the same diameter as the piston, and when it is passing the point *a* of the eccentric, its outer surface is uniform with the periphery of the piston. There are packing-pieces *h* at each end of C, which are pressed against the cylinder-heads by spiral springs. There are also packing-rings in each head of the cylinder, which are pressed against the ends of the piston by spiral springs. These pieces, with their springs, are seen at *i*, fig. 3. J represents the induction pipe, and I the eduction or exhaust pipe. *m m*, fig. 5, represent spaces in the edge of C, through which the steam passes before it presses on the bucket at *b*. The edge of C receives the pressure of the steam at *n n*, the steam acting at those points nearly at right angles with the shaft. These points, however, present but a small surface for the action of the steam, and we depend mainly upon the interior surface of the bucket, as here a large additional surface is presented, and the power of the engine is augmented accordingly.

In this description we have represented but two of these buckets in a piston, but any desired number may be employed, and other springs than spiral springs may be employed to press out the portion C of the bucket.

The operation of this engine is readily understood. The piston moves in the direction of the arrows, and takes steam as the bucket passes the induction pipe J, and exhausts it when it passes the eduction pipe I. The steam acts against the interior surface as well as on the edge of C, and against the bottom of the bucket or recess at *b*. The result is, the propelling shaft is driven with great power by a constant and steady application of steam.

We do not claim the parts the subject-matter of the patents of Perry B. Holmes, August 28, 1860, and John Collicott, April 3, 1866, cited in the official letter of November 15, 1866, but what we do claim, and desire to secure by Letters Patent, is—

The construction and arrangement of the bucket C, and the recess E, with the packing-pieces *h* and *j*, spring *g*, and piston B, as herein described and set forth.

Witnesses:

P. W. BRIEN,
E. R. GLASCOCK.

JAMES R. WILLETT,
LIVINGSTON BRIEN.