No. 5,142. PATENTED JUNE 5, 1847.

J. BLACK.

ROTARY STEAM ENGINE.

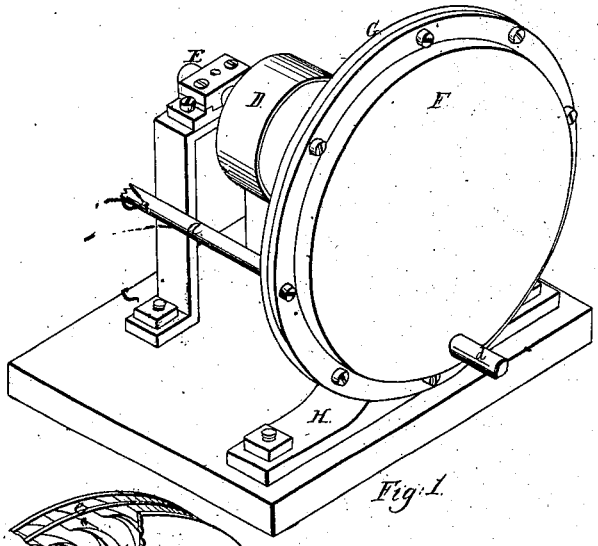


Fig. 1.

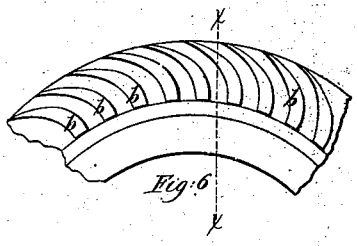


Fig. 6.

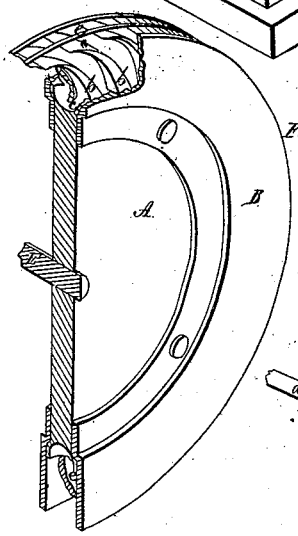


Fig. 3.

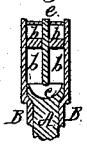


Fig. 4.


Fig. 5.

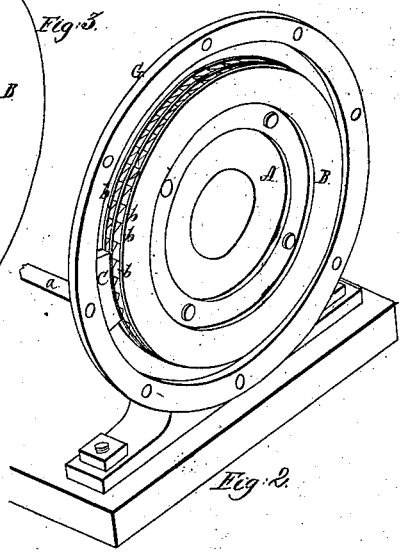


Fig. 2.

# UNITED STATES PATENT OFFICE.

JAMES BLACK, OF PHILADELPHIA, PENNSYLVANIA.

## ROTARY STEAM-ENGINE.

Specification of Letters Patent No. 5,142, dated June 5, 1847.

*To all whom it may concern:*

Be it known that I, JAMES BLACK, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and Improved Rotary Steam-Engine; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, is a perspective view; and Fig. 2, is also a perspective view of the same, with one of the inclosing side casings removed. Figs. 3, 4, 5, and 6, are sectional views showing parts of the engine in detail.

Similar letters refer to corresponding parts in all the figures.

The nature of my invention consists in the constructing a steam wheel with a double series of curved buckets secured to its periphery, closed at their sides and divided by a central division plate, with the spaces between the series of buckets on each side of the division plate connected by curved apertures; and the arranging the steam wheel within an inclosing casing in such a manner that steam admitted to the buckets on one side of the central division plate, will act directly upon the wheel by impinging upon the face of the buckets, and descending to the base of the same, will pass through the connecting apertures to the series of buckets on the opposite side of the division plate, and in escaping from between which, it will react upon the face of the buckets, and give additional impetus to the wheel.

The steam wheel is constructed as follows: A, is a central metallic disk with a thin division plate *e*, projecting from the center of its periphery; B, B, are metallic annular plates with a series of curved buckets *b*, *b* projecting from and cast solid upon one of their sides. The plates B, B, are accurately fitted and bolted to the sides of the periphery of the disk A, the buckets *b*, *b*, and the division plate *e*, being previously ground and fitted to each other so as to form steam tight joints between the same, when brought together. Curved apertures *c*, *c*, are formed in the periphery of the disk A, under the base of the division plate *e*, uniting the spaces between the series of buckets *b*, *b*, on opposite sides of the division plate. The series of buckets *b*, *b*, on each of the annular plates B, B, exactly correspond with each other in form, and are placed opposite to each other. The steam wheel when thus formed is inclosed between two side casings F, and G, secured to each other by projecting flanges and screw bolts in the usual manner. The disk A, may be secured to the end of the shaft E, and the shaft work in bearings attached to the casing G, or the shaft may pass through and work in bearings in both side casings. There is a space surrounding the steam wheel, between its periphery and the inclosing casing, and also at the sides of the steam wheel. C, is a metallic segment secured to the side casing G, inclosing a portion of the buckets on that side of the steam wheel, being ground and fitted to the peripheries of the division plate *e*, and to one of the annular plates B, as also to the extremities of the buckets *b*, *b*, with the most perfect accuracy.

Fig. 5 is a section of the segment C. The steam pipe *a*, passes through the side casing G, into the tangential passage *f*, in the segment, which conducts the steam between the buckets on that side of the steam wheel, giving propelling impetus to them as it impinges against the face of the same, descending to the base of the buckets, the steam passes through the apertures *c*, *c*, and escapes between the buckets on the opposite side of the division plate; in doing which it reacts upon the face of the buckets and gives additional impetus to the steam wheel. As many jets of steam may be admitted to the steam wheel as may be desired, by elongating the segment C, or by inserting others.

The buckets may be varied in depth or curvature as may be found expedient.

The waste steam is conducted freely from the inclosing casing by the escape pipe *d*.

It is evident that the expansion of the steam will increase the velocity with which it will escape from between the buckets, and consequently will add to its power of reaction upon the wheel.

Having thus fully described the construction and operation of my improved rotary engine, what I claim therein as new and desire to secure by Letters Patent, is—

The double series of curved buckets upon the steam wheel, with the spaces between the same united as herein described, combined with the steam pipe by means of the segment C, substantially in the manner and for the purpose herein set forth.

JAMES BLACK.

Witnesses:
Z. C. ROBBINS,
GUY C. HUMPHRIES.