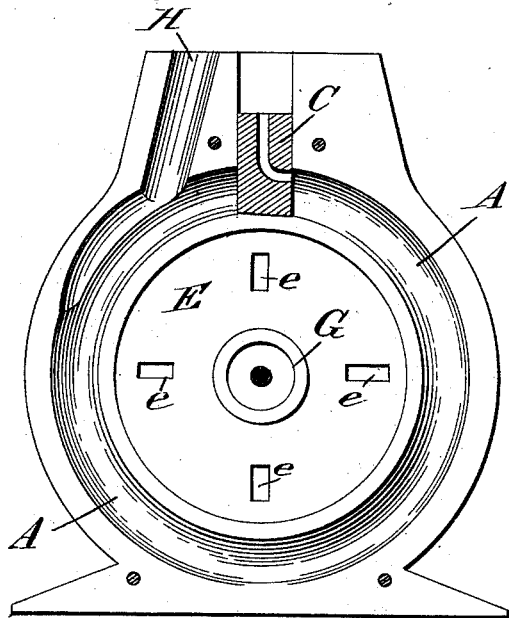


J. C. HOWARD.  
 ROTARY STEAM ENGINE.

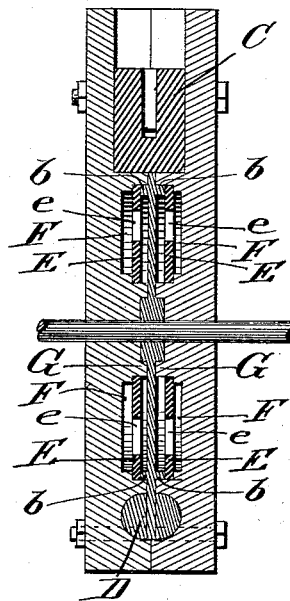
No. 6,251.

Patented Apr. 3, 1849.

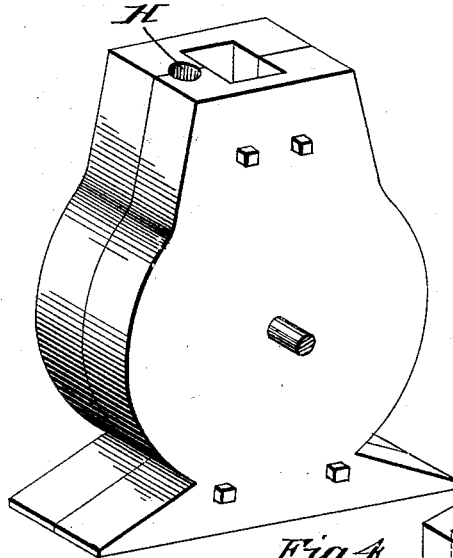
*Fig. 1.*



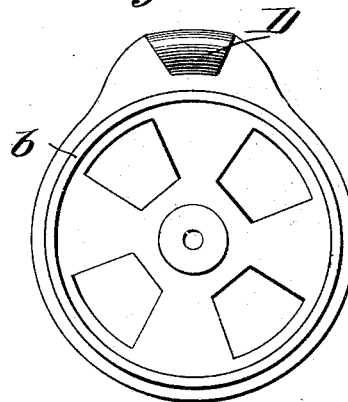
*Fig. 5.*



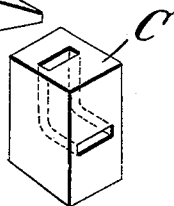
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



# UNITED STATES PATENT OFFICE.

J. C. HOWARD, OF WILLIAMSBURG, NEW YORK.

## ROTARY ENGINE.

Specification of Letters Patent No. 6,251, dated April 3, 1849.

*To all whom it may concern:*

Be it known that I, JOHN CHAPLIN HOWARD, of Williamsburg, in the county of Kings and State of New York, have invented certain new and useful Improvements in the Construction of Rotary Steam-Engines, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known, and of the usual manner of making, modifying, and using the same, reference being had to the accompanying drawing, which forms a part thereof, in which—

Figure 1, is a section of the case showing the expansion plate E. Fig. 2, general view of the machine. Fig. 3, the revolving wheel and piston. Fig. 4 sliding valve detached. Fig. 5 section of the engine in the plane of the axle.

The case is formed in two parts of cast iron, and in it is formed the steam channel or cylinder A, which is annular, the cross section through it being circular, as clearly indicated in the cross section; in this channel there is an opening on the inner side; and within it there is a chamber F, on each side of the wheel B, there is an expansion plate of iron, E, fitted with holes (e) in it, so as to admit any steam that may enter the chamber F, to pass freely on to both sides of the plate to cause it to expand for a purpose hereafter described; the shoulder against which the edge of this plate bears, is made to project far enough to cover a flanch (b,) on the revolving wheel B, the two surfaces being made to fit each other steam tight, or nearly so; the disk of the wheel has openings in it, as shown in Fig. 3, or it may be made with thin arms; beyond the flanch (b,) above named, the thin plate of the wheel projects sufficiently to fill the space left open in the steam channel A, and a portion of it at one point extends into the channel a distance equal to its diameter; to this projection the piston D, is affixed, and the projection is gradually tapered down from each end of it to the surface of the inside of the chamber A, this forms a cam for raising the valve (c) which is a sliding box with an opening in it that enters the steam way, and when down, as shown in Fig. 1, forms the head of the steam channel; this box valve C, slides freely upward as the piston comes around to permit it to pass, and then falls into place again. To cut off the steam I use a sliding throttle valve, not represented; the exhaust pipe H, is placed near

the valve C. It is obvious that instead of making the cross section circular, as shown in Fig. 5, it can be made of any other convenient form.

It will be seen by the above description, and an inspection of the drawing, that the friction is confined to the piston and the periphery of the flanch of the revolving wheel, by which means I am enabled to fit the parts steam tight; and as the whole expands by heat, the circular bearing against which the flanch on the wheel comes, will be enlarged as fast as the flanch; this is also aided by the plate E, in which there is more metal than in the revolving wheel, and to which the steam has free access on both sides, so that by its expansion it bears against the edge of the recess, and thus aids in relieving the friction on the revolving wheel. The importance of this in practice is found to be very great, and without it the friction would be sufficient to impede and render useless the machine. The bearing around the recess is designed for four purposes: first, to guide the stem around the wheel; second, to be wide enough to insert a band of spring packing, if required, to prevent the escape of steam; third, this bearing is also designed to hold up the gate C, when the same enters a groove made for the gate in the bearings to prevent steam from blowing under the gate; fourth, to receive a plate fitted to the circle, to expand by the heat; the design of this plate is to relieve the wheel from friction.

A ring G is formed near the center of the case; this ring is designed to hold packing around the shaft and touch on this edge of the wheel to receive a proportion of pressure from the expansion plate E; each of the halves of the side of the case bolted together form the case entire for one wheel.

Having thus fully described my improvement, what I claim therein as new, and for which I desire to secure Letters Patent, is—

The recess F, within the circle of the steam channel, in which is placed an expansion plate, on which the heat can act, in the manner and for the purpose herein set forth, and having the friction of the revolving wheel confined to that part of the stationary case which can be made to expand and contract with said wheel, all as above specified.

JOHN CHAPLIN HOWARD.

Witnesses:

J. J. GREENOUGH,  
H. DONN.