J. F. BROWN.

Rotary Steam-Engine.

No. 205,043. Patented June 18, 1878.

Fig. 1.

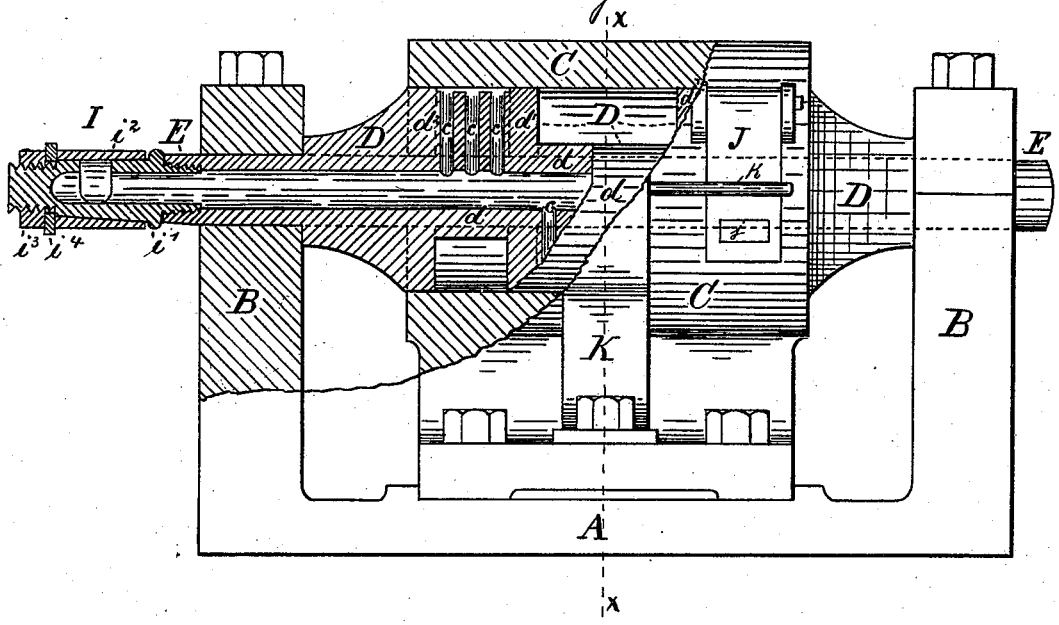


Fig. 2.

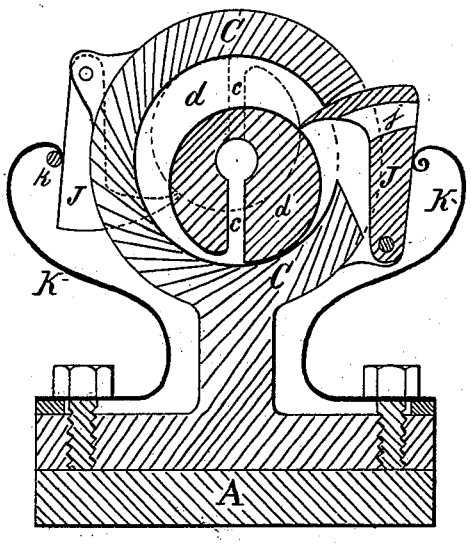
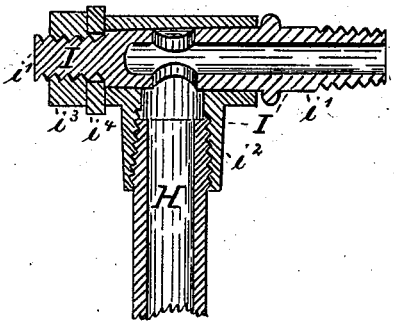


Fig. 3.



WITNESSES.

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JOHN F. BROWN, OF INDIANAPOLIS, INDIANA.

IMPROVEMENT IN ROTARY STEAM-ENGINES.

Specification forming part of Letters Patent No. **205,043**, dated June 18, 1878; application filed April 29, 1878.

To all whom it may concern:

Be it known that I, JOHN F. BROWN, of the city of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Improvements in Rotary Steam-Engines, of which the following is a specification:

Reference is had to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts.

Figure 1 is a side elevation, partly in section, of an engine in which my invention is embodied. Fig. 2 is a transverse vertical section thereof on the dotted line *x x;* and Fig. 3 is a horizontal or plan sectional view of the cut-off valve, by means of which the admission of steam into the hollow shaft is regulated.

In said drawings, the portion marked A is the bed-plate or lower frame-work to which the cylinder is attached. B B are the pillow-blocks, on which are the bearings for the piston-shaft E. C is the cylinder, which is primarily of a plain tubular form, and preferably open at both ends. D is the piston, which consists of two or more eccentrically-set cylinders, *d d d*, divided and inclosed by flanges d^1 d^1 and d^2 d^2, all of which are secured upon a common shaft, E, which runs through and projects beyond them and rests in suitable bearings on the pillow-blocks.

The pistons *d d d* are of a considerably less size than the internal diameter of the cylinder C, but are set upon the shaft E eccentrically, so that one side thereof shall be in constant contact with the inside of said cylinder as they rotate with the shaft. The flanges d^1 d^1, and also d^2, are of the same size as the internal diameter of the cylinder C, and are set concentrically upon the shaft, so that every part of their peripheral surfaces shall be in constant contact with the inside of said cylinder, and thus divide it into several inclosed chambers. The pistons, flanges, and shaft will usually all be formed from a single piece of metal, as shown in the drawing; but should so large a size be built as to render this impracticable the parts will be divided, as shown by the dotted lines. The flanges d^2 d^2 serve as the usual cylinder-heads, and render the taking apart of the engine exceedingly easy. However, if the usual heads are thought desirable, they can be applied, and the flanges in that case can either be retained or dispensed with at pleasure.

The shaft E is made hollow, thus forming the supply-pipe through which the steam reaches the ports in the pistons. Leading from this pipe out through the larger side of each of the pistons, and just to one side of where they come in contact with the cylinder, is one or more ports, *c c*, through which the steam enters the cylinder. I is a cut-off valve, through which the steam is admitted to the hollow shaft. This valve is composed of the hollow plug i^1 (which is firmly attached to the shaft E, of which it forms a continuation) and the T-shaped fitting i^2, attached to the pipe H, which approaches the valve at right angles with the line of the shaft. From one side of the hollow plug i^1 enough of its substance is cut away to form an opening to its center sufficient in size in one direction to admit steam the proper length of time and to the proper quantity, and in the other to match the opening in the pipe H. As the shaft revolves the remaining portion of the periphery of this plug acts as a cut-off. The outer end of this plug is threaded, and bears upon it the nut i^3 and the washer i^4, by which a tightly-fitting joint is secured.

As the steam passes into the cylinder through the ports *c c* it impinges against the abutments J J, and thus forces the pistons forward. These abutments are jointed to the outside of the cylinder through the sides of which they pass, and are held in contact with the pistons by the springs K K. They are made to fit closely against the steam sides of the openings in the cylinder, but are left loose on the other side, and are also provided with exhaust-ports *j j*, through which the dead steam escapes.

Instead of swinging abutments those that slide may be substituted, and instead of the springs K K other mechanical contrivances may be used.

No packing-rings or means of conveying away exhaust-steam are indicated in this specification or are shown in the accompanying drawings, for some form of such devices are common to all engines and are well known

to those skilled in the art. I therefore do not desire to confine myself to any particular form, but wish to leave such points, as well as many other details of construction, with the builders who may manufacture them.

My invention consists, first, in the construction of a rotary engine having two or more cylindrical pistons eccentrically set on a common shaft, in combination with abutments against which the steam shall impinge; secondly, in the dividing of the cylinder of such an engine into several pressure-chambers, the steam in each of which shall act on the diametrically-opposite side of the piston-shaft from that in the next, thus neutralizing the side friction of the pistons against the cylinder which would exist if the steam pressure was all on one side; thirdly, in the admitting steam into such an engine centrally by means of ports in the pistons, and discharging it circumferentially by means of ports in the sides of the cylinder; and, fourthly, in constructing a suitable cut-off valve for such an engine.

It will also be seen that in this engine each piston will take steam but once in an entire revolution.

In practice I divide the cylinder into three chambers by means of the flanges d^1 d^1, and construct a piston for each. I make the central piston equal in size to both of the others, and place it diametrically opposite to them on the shaft. By this means I get a more perfect balancing of the parts than in any other way and neutralize the side pressure more exactly.

My invention is simple in its parts and cheap in its construction, and the perfectly even balancing and equal pressure which I obtain make it even in its running and thoroughly practical.

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

1. The shaft E, concentrically-set flanges d^1 and d^2, and eccentrically-set pistons d d d, together forming the device D, in combination with the cylinder C, substantially as shown and specified.

2. The combination of the hollow shaft E, having steam-ports c c, the flanges d^1 d^1 and d^2 d^2 inclosing and dividing the pressure-chambers, the pistons d d d and the cylinder C, having suitable exhaust-ports, forming a rotary steam-engine, substantially as shown and specified.

In witness whereof I have hereunto set my hand and seal at Indianapolis, Indiana, this 24th day of April, A. D. 1878.

JOHN F. BROWN. [L. S.]

In presence of—
C. BRADFORD,
FRANK D. BORNHOLT.