(No Model.)

G. HOPKINS.

ROTARY STEAM ENGINE.

No. 265,082. Patented Sept. 26, 1882.

Fig. 1.

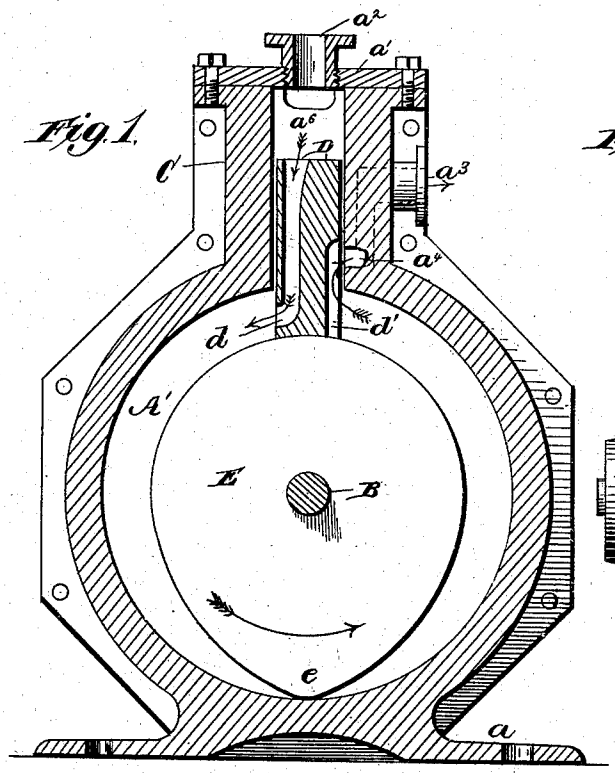


Fig. 2.

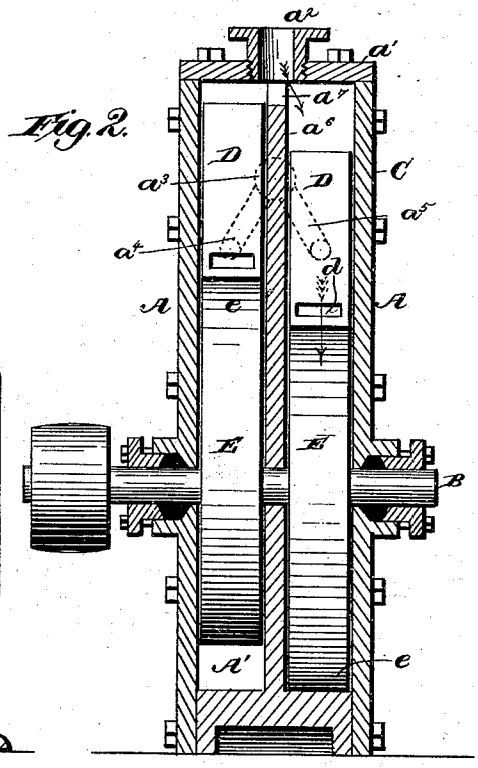


Fig. 3.

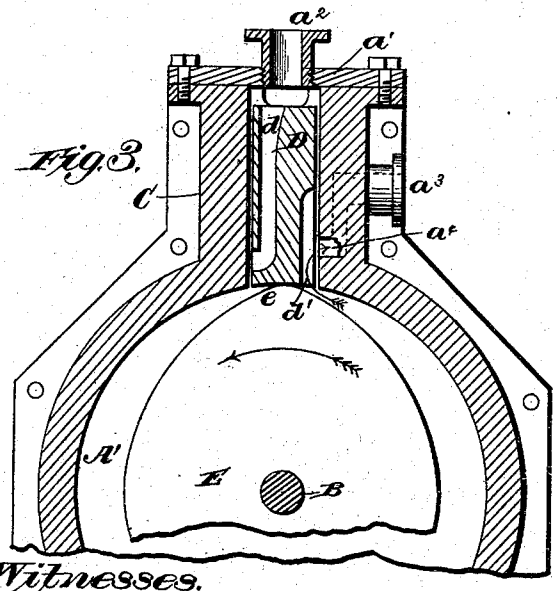
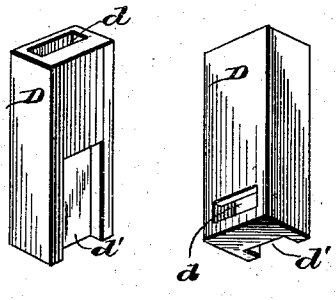


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE HOPKINS, OF GLEN ALLEN, VIRGINIA.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 265,082, dated September 26, 1882.

Application filed August 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HOPKINS, a citizen of the United States, residing at Glen Allen, in the county of Henrico and State of Virginia, have invented new and useful Improvements in Rotary Steam-Engines, of which the following is a specification.

My invention relates to that class of rotary engines which comprise a rotating drum or drums and a sliding valve or valves adapted to be reciprocated by riding the periphery of said drums and abutments formed thereon; and my invention consists in certain features hereinafter described, and specifically set forth in the claim.

Referring to the drawings, Figure 1 is a vertical section, Fig. 2 a vertical longitudinal section, Fig. 3 a partial and vertical transverse section, and Fig. 4 detail perspectives, of a rotary engine constructed in accordance with my invention.

Like letters of reference indicate like parts in all the figures.

The object of my invention is to provide such a construction, relative arrangement, and cooperation of the parts employed that the direct action of live steam, and, if desired, a partially expansive action of the same, may be secured throughout an extent of the revolution of the drum approaching practically and as nearly as possible to a complete revolution thereof. With this object in view I construct and arrange the elements as follows:

A designates the casing, which is provided with a suitable base, *a*, and a projecting edge flange at each end thereof, (the shaft B being considered as passing longitudinally through the casing,) said flanges being perforated for the reception of suitable tie-bolts, by which the separate parts of the casing are bound together. The main body of the casing is cylindrical and provided with a steam-chest, *c*, located exteriorly to and directly communicating with the cylindrical portion of the casing, which constitutes the steam chamber or cylinder A′ of the engine. A cap, *a*, is bolted upon the steam-chest and provided with a supply pipe or orifice, a^2. An exhaust pipe or orifice, a^3, is located at one side of the steam-chest, and communicating therewith and with said orifice is an exhaust port or ports, a^4 a^5, the latter and a central partition, a^6, having a port or passage, a^7, being added for the purpose of permitting the two drums E E to be employed, as hereinafter fully explained. Aside from the above mentioned features, the casing may be constructed of any usual contour adapted to the requirements of the operative parts, or to the special uses for which the engine may be intended.

Within the steam-chest is a valve, D, adapted to snugly fit the same and to reciprocate therein, and provided with a supply-port, *d*, and an exhaust-port, *d′*, arranged on opposite sides thereof, the former extending from the upper end to nearly the lower end and leading out through the side, and the latter entering at about the middle of said opposite side and extending to and leading out through the bottom, as clearly shown in Figs. 1, 3, and 4. In this instance I have illustrated the valve as square in cross-section; but it is evident that it and the steam-chest may be round or polygonal, and in the former case suitable longitudinal ribs upon the sides of the valve may be provided to ride in grooves formed in the walls of the chest, which would act to keep the exhaust-port of the valve in register or line with exhaust-port of the casing. The lower end of the valve is slightly concaved to fit the periphery of a drum, E, mounted rigidly on the shaft B, and of a general diameter less than the steam cylinder or chamber A′, but extended over a portion of its periphery to form an abutment, *e*, which renders the drum substantially cam-shaped, the approaches to the apex of the abutment being at each side gradual, in order that by any usual suitable means of reversal said drum may rotate in either direction at will and co-operate with the valve to govern the supply of steam. The two drums E E, secured to the shaft B, are separated by partitions a^6, and each is provided with an independent valve and separate exhaust-port, and each is set upon the shaft so that no two of the abutments are in line; and, if desired, each of the exhaust-ports may be continuous and independent, and not arranged to communicate with an eduction-pipe, as shown. If desired, suitable packing may be provided on the abutment to in-

sure a steam-tight joint between itself and the continuous circular wall of the chamber.

This being the construction, the operation of my invention is as follows: Steam being supplied through the pipe a^2, the pressure thereof forces the valve D firmly against the periphery of the drum E, and, passing through the port d, impinges the abutment e, which is supposed to be at the start at the left of and near the steam-chest. The direct pressure of the steam forces the abutment, drum, and shaft to revolve in the direction indicated by the arrow, and this direct pressure of the steam continues until the abutment has arrived at or near the right side of the steam-chest. During this revolution of the drum the valve has been pressed down into the chamber and prevents a complete circuit thereof by the incoming steam and directing it at one side against the abutment, while on a second and each subsequent revolution it directs on its opposite side the steam in advance of the abutment into the exhaust-port d', from which it is received by the ports a^4 and a^3 and conducted away. The exhaust-port d' in the valve extends such a distance that, whether it be at either the highest or lowest point of its movement, steam may readily pass therethrough, as clearly seen in Figs. 1 and 3.

It is apparent that by locating the inlet of the supply-port d through the side of the valve and the outlet of said port a greater distance from the bottom of the valve therein shown the live steam would be cut off as soon as the inclined approach to the abutment arrives at the valve, and hence by extending said incline over a greater portion of the drum the supply may be cut off at any desired point in the revolution thereof, and the remaining portion of the revolution would be produced by the expansion of the steam within the chamber and in rear of the abutment.

Fig. 2 clearly illustrates the operation of an engine constructed in accordance with my invention. The two drums are so arranged upon the shaft that as the first completes a revolution the second commences another; the live steam, being prevented from entering the first chamber by reason of the exit of the port d being closed by the wall of the steam-chest, passes through the opening a^7 in the partition a^6 and the port d of the second valve, and acts on the second drum and is exhausted through the port a^5, (shown in dotted lines, Fig. 2.)

Having thus described my invention, what I claim is—

The combination, in a rotary engine, of a steam-chest directly communicating with a steam-chamber having a continuous cylindrical wall, a partition having a passage, as a^7, two drums, each having a single abutment, and two valves having oppositely-arranged induction and eduction ports, substantially as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GEO. HOPKINS.

Witnesses:
ALBERT H. NORRIS,
J. A. RUTHERFORD.