

E. P. JONES.

Improvement in Rotary-Engines.

No. 129,830.

Patented July 23, 1872.

Fig. 1.

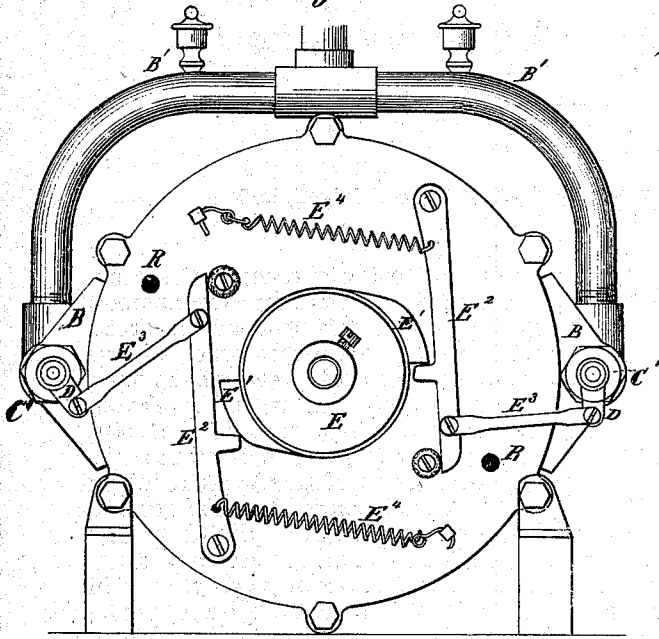


Fig. 3.

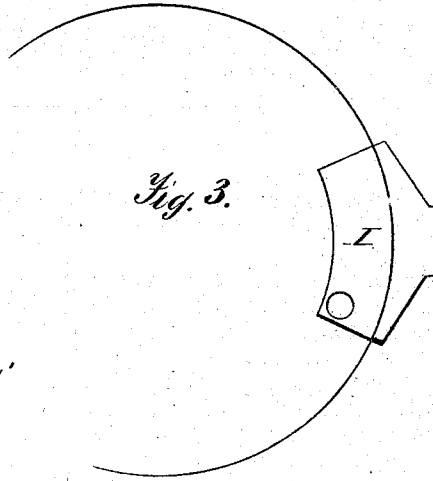


Fig. 2.

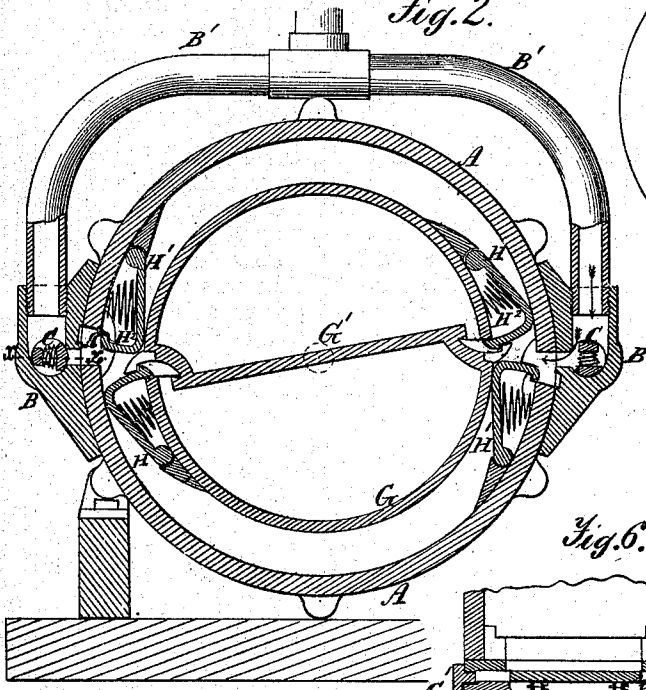


Fig. 4.

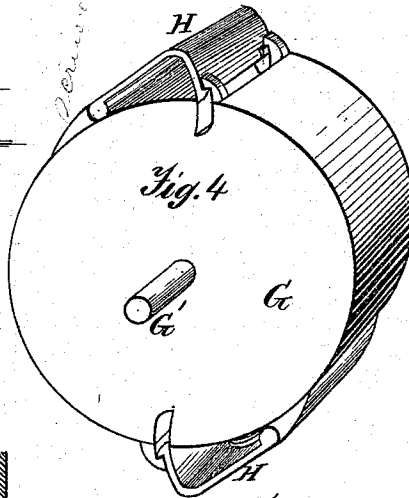


Fig. 5.

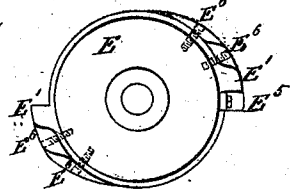
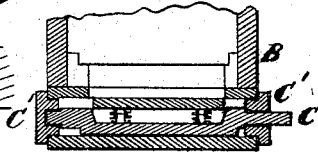


Fig. 7.



Fig. 6.



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IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. 129,830, dated July 23, 1872.

Specification describing certain Improvements in Rotary Engines, invented by EDWARD P. JONES, residing in the county of Leflore, in the State of Mississippi.

In the accompanying drawing, Figure 1 is a side elevation of my improved engine, showing one of the heads of the cylinder, the steam-induction pipe, the induction-valves, the levers, rods, and springs for opening the valves, and the cams for giving them motion. Fig. 2 is a sectional elevation, showing the concentric cylinder and the chambered revolving drum with its oscillating abutments, the abutments in the cylinder, the induction-passages for the steam, and the valves which control them. Fig. 3 is partial side elevation, showing a removable portion of the head of the cylinder or case. Fig. 4 is a perspective view of the revolving drum and its oscillating or swinging abutments. Fig. 5 is an elevation of the cam which operates the induction-valves. Fig. 6 is a transverse section on line *x x* of Fig. 2, showing the construction of the induction-valves. Fig. 7 is a perspective view of a block of metal, which is designed to be placed upon the cam which operates the induction-valves for the purpose of changing at pleasure the point at which the steam shall be admitted.

Corresponding letters refer to corresponding parts in the several figures.

This invention relates to that class of engines which are denominated rotary engines, and has for its object the production of an engine which shall be free from many of the objections which have heretofore existed in that class of engines, whether it be used as a steam or as an air engine; and to this end the invention consists in the construction, combination, and arrangement of some of the parts of which it is composed, they being designed to produce certain new and useful results, which will be more fully described hereinafter.

In constructing engines of this character I use a concentric cylinder or case, A, which may be made of any suitable metal and of any required dimensions, it being so constructed as to be conveniently attached to a bed-plate or platform. The internal surface of this case is to be bored out smoothly, and to be a perfect circle, and is to have steam-induction ports formed in it, as shown at A' in Fig. 2. There may be any required number of these

ports, according to the character of the engine; but I prefer to have an even number, and they should be so arranged as to be directly opposite to their fellows, in order that, as steam is admitted, it shall press equally upon all parts of the revolving drum, and thus avoid unequal wear upon the journals of the shaft, and consequently a large amount of the friction usual in engines of this type, reducing this friction to an actual minimum. The steam-induction ports used in this cylinder are enlarged beyond what would be necessary to permit them to admit steam to the cylinder in order that the outer portions of the abutments, soon to be described, may pass through them. To the outer surface of the case or cylinder A, at the points where steam is to be admitted, steam-chests B are secured, into which steam is to be conducted by any suitable steam pipe or pipes, B', as shown in Fig. 2. The induction-valves C are placed in the steam-chests B, they being of suitable construction to admit steam to the interior of the case A and to cut it off at proper intervals, those shown in the drawing consisting of two parts, the outer surfaces of which are in the form of a segment of a circle, in order that they may fit the concentric chamber formed in the chest for their reception. The two portions of this valve are forced apart by means of springs, as shown in Figs. 2 and 6, in order that their outer surfaces may be held in contact with the chamber in which they oscillate; one of them being furnished with journals, which rest in caps or covers C', screwed into or otherwise secured to the chest. One of these journals extends through the cap or cover, and is arranged to receive a crank, D, for imparting to the valve the required movements. Upon the outer end of the shaft which passes through the revolving drum and through the heads of the cylinder or case there is placed a cam, E, which may have upon it one, two, or more projections, E¹ E¹, which are to be so arranged as to come in contact, at the proper times, with suitable levers or sliding rods for giving motion to the valves, the devices used in the example shown consisting of a lever or levers, E² E², pivoted to the head of the cylinder, and having upon them projections, against which the cams, during a portion of their revolution, press, and thus cause their lower ends to oscillate and

give motion to connecting-rods E^3 , which are pivoted to them and to the lower ends of the cranks D , thus imparting to the induction-valves their closing movement, their opening movements being imparted, in the present case, by means of springs E^4 , one end of which is attached to a stud or bolt screwed to the head of the cylinder and the other end to the oscillating lever E^2 in such a manner that when the raised portion E^1 of the cam E has passed the projections on the lever E^2 they shall instantaneously open the valves to admit steam to the cylinder. In order that the springs may be allowed to act upon the valves at any desired point with reference to the revolutions of the drum within the cylinder, and thus admit the steam at any desired point during such revolution, or, in other words, in order that the points or times of admitting the steam may be properly controlled, blocks E^5 , such as are shown at Fig. 7, are provided, and are to be bolted to the cam E , as represented in Fig. 5, so as to form a prolongation of the curved portion thereof, and thus control the time of opening the valves; and, in order that the point at which the steam is to be cut off may be regulated at pleasure, blocks E^6 E^6 are placed upon the opposite edge of the raised portion of the cam E^1 , which are held in position by screws, as shown in Fig. 5, or in any other suitable manner.

When it is desirable to cut off the steam earlier with reference to the revolution of the drum, more of these blocks are added, and when a more continuous supply of steam is wanted some of them are removed, and thus the time or point of cutting off is regulated.

Instead of the devices here shown for imparting motion to the valves, it is evident that sliding bars may be connected to the crank D , the inner ends of which may be connected to the cams by means of friction-rollers, so that a sliding motion will be imparted to said rods, and thus the required movement imparted to the valves; their opening and closing movement in such a case being positive, because controlled by the cam, with which the roller would always be in contact.

The interior portion of my improved engine consists of a chambered drum, G , which is secured to a shaft, G' , said shaft passing through the center of the drum and forming its axis, and also the journals upon which it rotates, by having its ends extended through the heads of the case or cylinder, so that the cam E may be attached to one of its outer ends. This drum is to be of a length equal to that of the case, so that in revolving its ends may be in contact, or very nearly in contact, with the heads thereof, and thus prevent steam from passing that point. The interior of this drum is to be divided into two or more compartments, which are to communicate with the space between the outer surface or periphery thereof and the inner surface of the cylinder or case, so that when steam is admitted to such space by the induction-valves a portion of it

may pass into these compartments or chambers, and remain there until the steam has been exhausted from the space above alluded to, when, by the action of the swinging abutments, soon to be described, a portion of it will be allowed to pass out and fill the space between the two abutments the instant they shall have passed each other, which space is usually denominated the "clearance," so that when the induction-valves are opened a less quantity of steam is required to enter from the boiler or generator than would be the case if the space above alluded to were empty.

Another beneficial effect which will be produced by this steam is that, so soon as the abutments have passed each other far enough to allow them to return to their open or partially open position, it will enter between said abutments, and thus act expansively upon them during a portion of the time in which the induction-valve is closed, and will, as soon as said valve is opened, meet the inflowing current of steam from the generator, and a portion of it pass through into the drum, to be again shut in and used again at the next proper points.

It is believed that an additional advantage and actual increase of driving-power for the instant will be produced by the meeting in conflict of the two currents of steam, one from the chamber in the drum and the other from the generator, as a certain amount of reaction will take place, the force of which will be exerted upon the receding abutment. The abutments H H^1 , against which the steam presses to cause the revolution of the drum C , are placed in the space between its periphery and the inner surface of the case or cylinder, as shown in Fig. 2 of the drawing, they consisting of two or more pairs of swinging pieces of metal, one of each pair being hinged to or pivoted in projections screwed upon the revolving drum, and the other to a similar projection upon the interior of the case or cylinder. At their pivoted or hinged ends or bases these abutments are made nearly cylindrical in form, in order that they may fit into a socket formed in the said projections, respectively. From this rounded or cylindrical portion of each there extends a flattened portion, the length of which is sufficient, at a proper angle or incline, to fill and close the space between the case and the drum, while its width is such as to permit its front or loose end, which has been curved or bent for the purpose, to enter a slot formed in the case A , and likewise in the drum G , in order that when the abutments H H , which are pivoted to the revolving drum, come under those lettered H^1 H^1 , they may each move through one-half of the space which exists between the drum and the outer case, for which purpose these free ends must enter their respective slots, while they laterally or in width entirely and closely occupy that space. This arrangement of the abutments is calculated to prevent much of the injury usually resulting from the moving abutments in ro-

tary engines as they are now constructed, for the reason that in the present instance they only have to travel one-half the usual distance, and for the further reason that the inclination upon their outer surfaces is so slight as not to cause any jar to the machinery upon their coming in contact. Another peculiarity in the construction of these abutments consists in the fact that they are provided with hooks or projections upon that portion of their surfaces which enter the slots in the case or drum, which are so arranged that when the abutments have been forced outward by the springs H², which are placed under them, or by steam entering beneath them, sufficiently far to allow their surfaces to come in close contact with the drum and case, respectively, as shown in Fig. 2, they will then be held and prevented from being forced out to such an extent as to cause undue friction upon the parts thus brought in contact. These abutments are by size or packing to be in such close contact with the drum and case, respectively, that steam cannot pass by them, but yet they are to be so held from within their slots that they cannot impinge the drum or the case with any more severity, or cause more wear or friction at a high pressure of steam than at a low one. Another and a very important function which is performed by the abutments H H, or those which are pivoted to the revolving drum, is that they serve as valves for controlling the discharge of steam from the compartments or chambers of the drum G, they being so fitted to it that, as its chambers have been filled with steam and the drum has rotated far enough to bring the abutments H H under those which are pivoted to the case or cylinder, they will be closed, and thus the steam will be confined in its apartment until the drum has further rotated a sufficient distance to carry the abutments H H past those lettered H¹ H¹, when those lettered H H will instantaneously open and allow the steam which was confined in the drum to pass out and produce the effects previously described. For facilitating the removal of the above-described abutments for the purpose of repairing or repacking them, or for replacing them conveniently and quickly with new ones, I provide one head of the case or cylinder with "hand-hole plates" or removable portions, such as are represented at I in Fig. 3, being placed in such position in the head that when removed the abutments may be readily drawn out and replaced or removed, and again inserted when the hand-hole plate is replaced and repacked to prevent the escape of steam around it. K K represent the exhaust-passage, which may be placed in any desired position with reference to the swinging abutments, so that steam may be exhausted at any

desired point of the revolution of the drum G; but I prefer to place them in such a position that the steam shall not be exhausted until the abutments in the revolving drum have nearly reached the point at which they arrive when the abutments are to pass each other, and the induction-valves are to be opened, so that the full force of the steam will be maintained throughout nearly the entire revolution of the drum. These apertures, outlets, or exhausts may be provided with escape-pipes to conduct the steam in any desired direction.

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

1. In an engine to be propelled by steam, air, or any of the gases under pressure, a revolving chamber, arranged substantially as herein described, and in which a portion of the steam admitted to propel the engine is confined for a short period of time and then automatically liberated and allowed to come in contact with the current of steam which is entering the engine direct from the boiler, as and for the purpose set forth.
2. I claim the swinging abutments H H H¹ H¹, when constructed with projections, as described, whereby they are prevented from being forced out too hard against the surfaces with which they come in contact.
3. I claim the arrangement of the swinging abutments within the space between the revolving drum and the case, in such a manner that upon their coming in contact those on the revolving drum shall be made to recede through one-half of the space, and, at the same time, cause the others to recede through the other half of such space.
4. I claim the arrangement of the swinging abutments H¹ H¹ with reference to the revolving drum G, whereby the steam is confined in said drum, and is let out at the proper point of time, in order that it may act expansively to propel the engine, substantially in the manner described.
5. I claim the cam E for closing the induction-valves, when provided with the removable blocks for controlling the point or time of opening and closing the valve, substantially as set forth.
6. I claim the removable portion I of the cylinder-head, when arranged in relation to the swinging abutments substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWD. P. JONES.

Witnesses:

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A. RUPPERT.