G. G. WRIGHT.
Rotary-Engine.

No. 213,726. Patented Mar. 25, 1879.

Fig: 1.

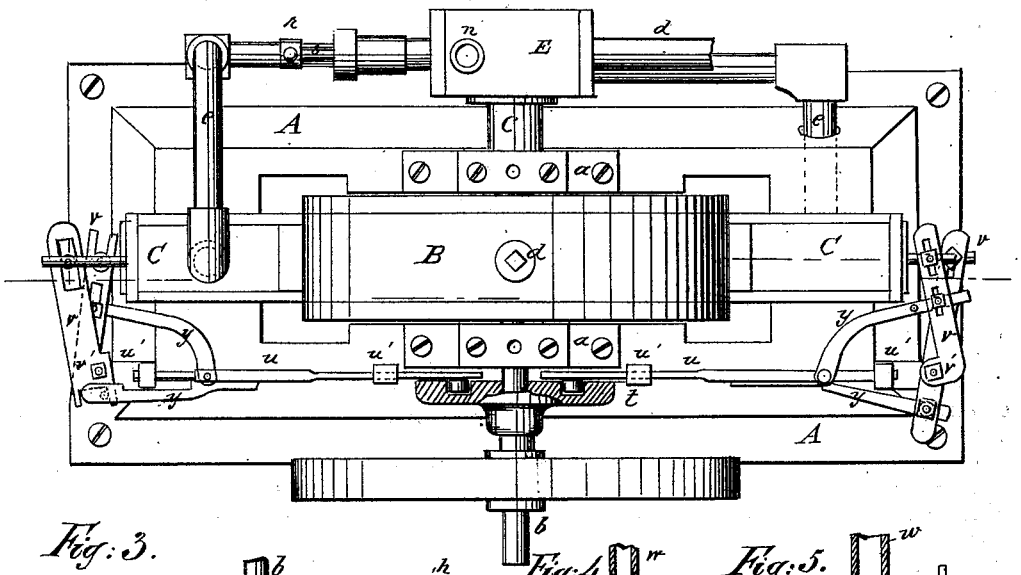


Fig: 3.

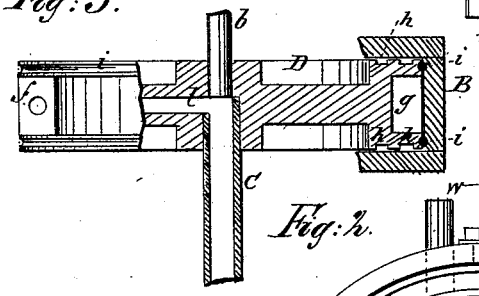


Fig: 4.

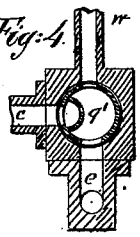


Fig: 5.

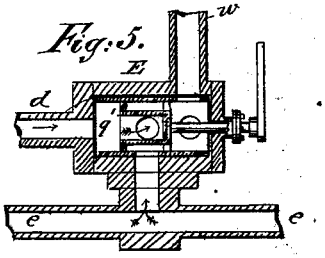


Fig: 2.

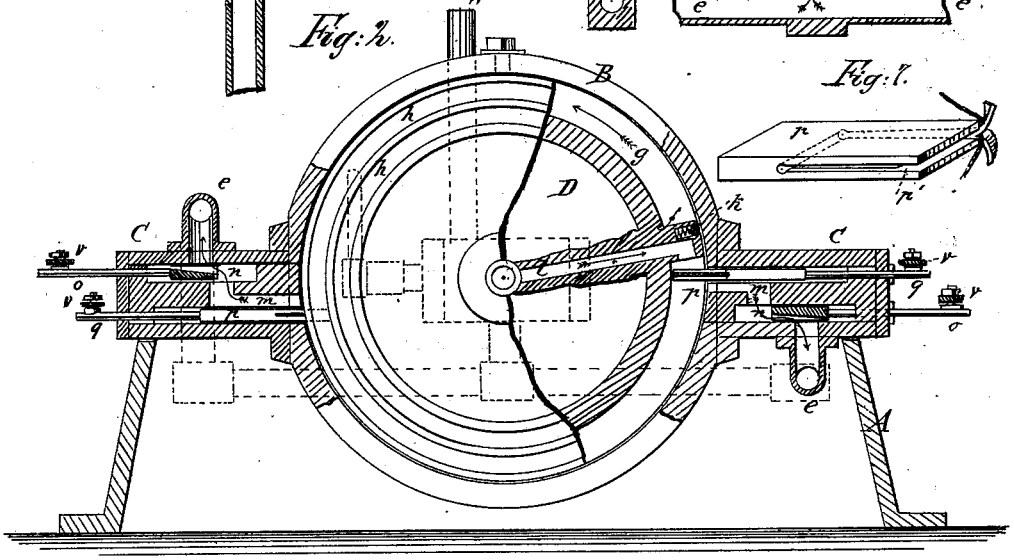
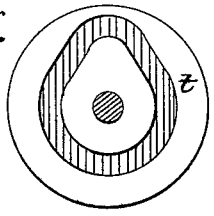


Fig: 7.

Fig: 6.



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UNITED STATES PATENT OFFICE.

GRANVILLE G. WRIGHT, OF WINCHESTER, CONNECTICUT, ASSIGNOR TO HIMSELF AND JAMES T. RENOUFF, OF SAME PLACE.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **213,726**, dated March 25, 1879; application filed December 7, 1878.

To all whom it may concern:

Be it known that I, GRANVILLE G. WRIGHT, of Winchester, in the county of Litchfield and State of Connecticut, have invented a new and useful Improvement in Rotary Engines, of which the following is a specification:

My improvements relate to the class of rotary engines in which a rotary piston is fitted in a circular case, the steam acting between the piston and movable valves or gates to give a continuous revolution to the piston.

The object of my invention is to remove the objections to rotary engines as heretofore made by rendering the parts durable, making the parts not easily accessible simple in construction, and packing the moving contact surfaces, so that the packing will last a long while and may be easily replaced.

Figure 1 is a plan view of my engine. Fig. 2 is a sectional side elevation. Fig. 3 is a sectional plan of the rotary piston. Fig. 4 is a cross-section of the steam-valves, and Fig. 5 is a longitudinal section of the same. Fig. 6 is an elevation of the cam which operates the gates and exhaust-valves.

Similar letters of reference indicate corresponding parts.

The operative parts are supported upon a suitable bed, A, the cylindrical case B being supported rigidly in a vertical position, and having valve-cases C connected at opposite sides.

D is the rotary piston contained within case B upon a shaft that extends at each end of case B, and is supported in bearings *a a* on bed A. At one side the shaft is solid, as at *b*, and at the other side the shaft *c* is hollow, forming a steam-pipe, that is connected at its outer end with the steam-chest E. *d* is the steam-supply pipe.

e e are exhaust-pipes passing from valve-cases C, and connected at the under side of steam-chest E, through which the exhaust-steam passes to pipe *w*.

The piston D is a solid disk fitting closely within case B. In its periphery a groove, *g*, is cut entirely around the piston, except at one point, *f*, which groove forms a steam-passage between piston D and case B, the passage being continuous, except at *f*. To prevent friction the sides of D are cut out, so that there is no contact except near the outer rim of D, and to reduce the friction at that place there are annular grooves *h h* cut in the piston D.

In the edge of the flanges that are formed by cutting out steamway *g* a semicircular groove is cut, as at *i*, and a corresponding groove made in the rim of case B. Wicking or other suitable packing material is secured in grooves *i*, and when the parts are together this packing projects within the groove in case B, thereby forming a simple and efficient packing at each side of the steamway.

The edge of projection *f* has a groove cut across it, in which is a steel roll, *k*, that is projected outward in contact with the rim of case B by a spiral or other spring beneath it, so that it acts as a packing and friction-roll.

A radial opening, *l*, extends from the center of piston D, where it communicates with hollow shaft *c*, to the projection *f*, where it opens into the steamway *g*, at one side of *f*.

The valve-cases C are similar in construction, and contain the valves that open and close the exhaust-way and the slide or gate against which the steam acts. The construction and operation of the parts in both cases C will be understood by a description of one.

m is the exhaust-port communicating with steamway *g*, and, through the under or upper side of case C, with the exhaust-pipe *e*. A horizontally-sliding valve, *n*, is fitted in connection with part *m*, to open and close the same, and is operated by connections to its rod *o*, as hereinafter described.

Above the valve *n* on one side and below it on the other is a gate or slide *p*, (shown separately, in Fig. 7,) which is fitted to be projected into the steamway *g*, as shown in Fig. 2, or withdrawn therefrom. *q* is the rod by which it is operated.

It is necessary that the gate *p* close the steamway *g* tightly, and for that purpose its edges are formed with a groove, *p'*, in which packing material is placed. I prefer to use felt, applied in the manner illustrated by Fig. 7, and held in place by a cord. By this means the gate *p* closes the way *g* steam-tight when it is projected forward.

The steam-valve is contained within chest

E, and consists of a tubular cylinder, q', provided with openings or ports that permit the steam to pass to the hollow shaft c. The valve remains in this position without movement while the engine is running forward, and is only shifted when the direction is to be reversed. In that case the valve q' will be turned axially to change the position of its parts by a lever, r, that is connected to the rod s, which extends from valve q through one end of chest E.

The valves n and gates p are operated simultaneously by a cam, t, that is fixed on shaft b, outside case B, through the medium of rods u u, that are connected by levers v v to valve-rods o and q. The cam t (shown separately in Fig. 6) has a groove in its face, in which friction-rollers connected with rods u u lie, and the groove is of such shape that the valves n are caused to open the exhaust-passages m at the same moment in both cases C, and at the same time the gates p are projected into and withdrawn from the steamway g.

The rods u are sustained by brackets w', that are attached to bed A and an outer bracket, w', also serving as a support for the fulcrum-pin v' of the levers v v. Arms y y, from the end of each rod u, connect the levers v at each valve-case, and the connections are made by screw-bolts that pass through slots in the levers, so that the extent of motion can be regulated.

The operation is as follows: Steam entering through hollow shaft c passes through the opening l, as indicated by the arrow, to the steamway g, and acting against the gate p, which is projected, forces piston D around in the direction of the arrow. There may be a cut-off arranged in connection with the steam-pipe to cut off the steam at any point. When the piston D has nearly completed a half-revolution, the cam t draws back the gates p and closes valves n, and then, as soon as the projection f has passed the gate p at that side, the gates are again projected, the valves n opened, and the steam forces the piston around.

The engine will operate with the steam exhausting but once during a complete revolution of piston D; but I prefer the construction shown, wherein the exhaust is made at each half-revolution.

To reverse the engine, the steam-valve is turned by its reversing-lever r a quarter revolution, which action will admit the live steam through the pipes e to valve-cases C, from whence its admission to steamway g, at the proper time will be regulated by valves n, and the passage l will become the exhaust. In this case the exhaust-steam escapes from chest E by the pipe w.

The reversing-lever r is also used to cut off the steam from the engine, which is done by turning lever r a quarter-revolution in the opposite direction to that which it is turned in reversing.

The rotary engine constructed as above described combines the following advantages: The steam has a leverage action continuously upon the shaft that carries the piston, and there are no dead-centers to be overcome; it may be run at very high speed to get the required power; it is free from backlash; the contact surfaces are packed so that there is but little friction, and the expansion of the parts by heat renders the packing more effective without increasing friction; it is simple in construction, has no complicated interior parts to get out of order, and by its use the steam is more economically applied than heretofore.

By forming the piston with the radial steam-passage the construction is simplified, and the motion of the piston can be reversed without the use of additional gates and valves.

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

1. A rotary engine in which are combined the rigid case B, having opposite cases C C, which contain the sliding abutments and exhaust-valves, the rotary piston D, having an axial and radial passage, and the steam-chest E, having a reversible valve, q', said chest being connected with said axial passage and said cases C, as and for the purpose specified.

2. In a rotary engine, the combination, with the case B and rotary piston, substantially as described, of the slides p and exhaust-valves n, both connected to rods u by levers v, and operated by cam t, substantially as and for the purposes specified.

GRANVILLE G. WRIGHT.

Witnesses:

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C. SEDGWICK.