G. VINING.

ROTARY ENGINE.

No. 44,901. Patented Nov. 1, 1864.

Fig: 1

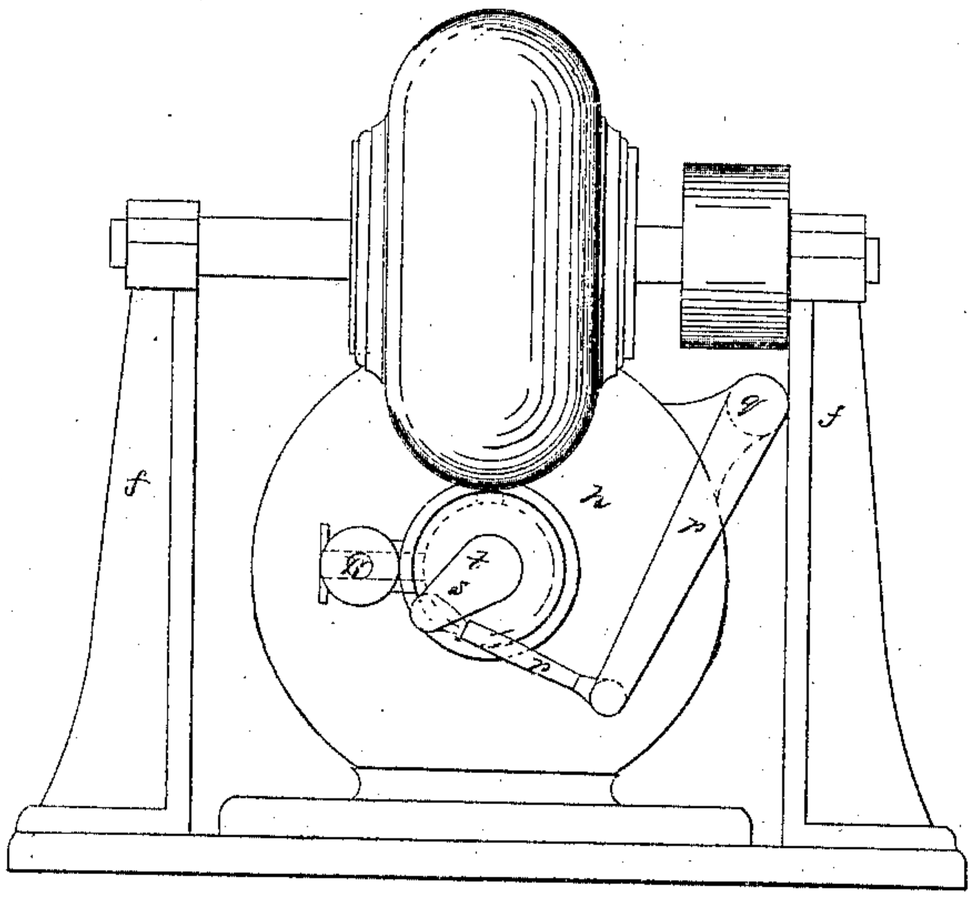


Fig: 3

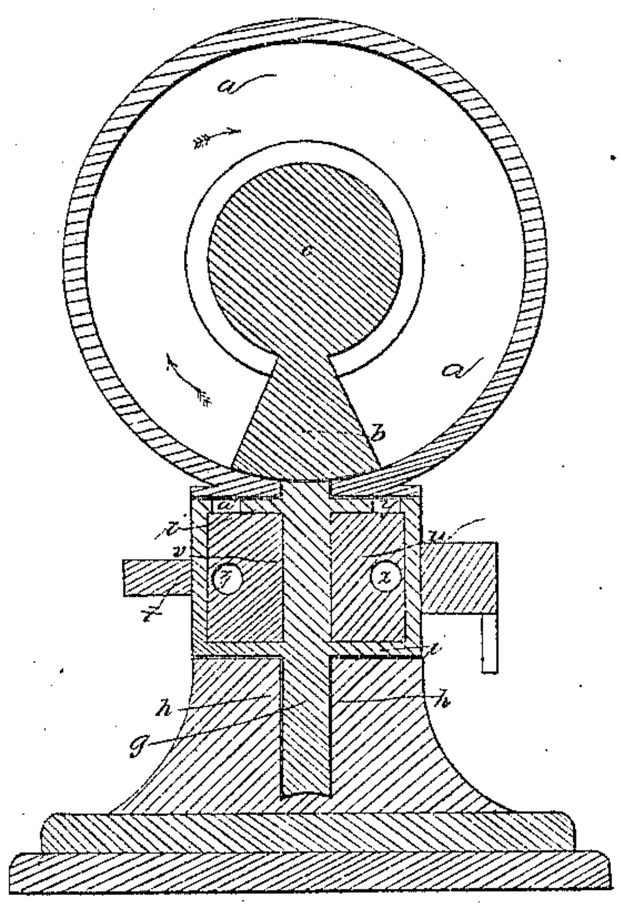
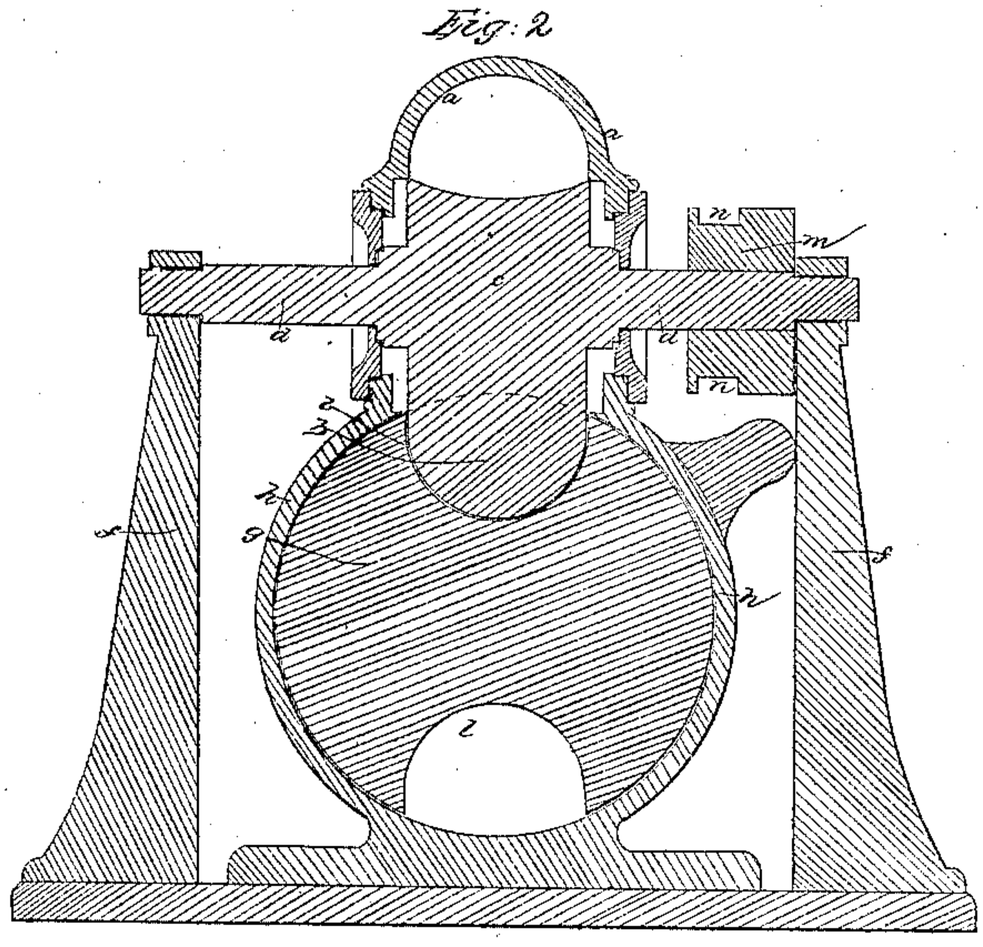


Fig: 2



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GEORGE VINING, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **44,901**, dated November 1, 1864.

To all whom it may concern:

Be it known that I, GEORGE VINING, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

For many purposes a rotary steam-engine possesses several advantages over a reciprocating engine, as has long been known; but heretofore the complication of parts necessary to produce working rotary engines has prevented their being brought into successful practical operation. Where, for instance, it has been necessary to give considerable play to the main parts of the engine—such as the valves, piston, &c.—in order that they should adapt themselves to the various requirements and peculiarities of motion differing essentially from those of an ordinary reciprocating engine, it has been found almost impossible to prevent leakage, owing to the great friction and wear of the parts.

The object of the present invention is to so construct a rotary steam-engine as to make every motion that is requisite to be given—such as those for the induction and eduction of steam, the travel of the piston, &c.—a positive one, requiring no play or self-adaptation of parts, thus rendering the packing of the various devices as feasible and as perfect as in a reciprocating engine.

My improvement consists, briefly, in the use of a rotating piston traveling in one and the same circular path in a suitable chamber, combined with a rotating disk moving in the said chamber at right angles to the plane of motion of the piston, and in such a manner and is so constructed as both to furnish a steam-abutment for the piston to act against and yet allow the passage of the piston through it at the proper intervals of time for the reception and delivery of steam. This rotating disk is inclosed in a steam tight casing, and, moreover, is attached to, or forms a part of, a rotating, cylinder, through ports of which the steam is permitted to enter into and escape from the main steam chamber. Furthermore, every movement necessary for the operation of my apparatus is so contrived and arranged as to be in a circular plane.

In the accompanying plate of drawings my improvements in rotary-engines are represented.

Figure 1 is a side elevation of the same; Fig. 2, a central longitudinal vertical section, and Fig. 3 a transverse vertical section.

a a in the accompanying drawings represent the main steam cylinder or chamber. Within this chamber *a a* plays a piston, *b*, attached to or forming a part of a drum, *c*, having its periphery concave, for a purpose to be hereinafter specified. The drum *c* is secured to a horizontal shaft, *d*, passing through the sides of said cylinder *a*, and having bearings in two standards, *f f*. When motion is communicated to the piston *b* by the pressure of the steam, it travels in a fixed path within the chamber *a*, without ever changing its line of motion, its adaptation to the inner periphery of the steam-chamber being the same as that of the piston in any ordinary reciprocating steam-engine, and consequently requiring no different packing.

g g is a circular disk placed within the steam-tight casing *h h*, and attached to or forming a part of a hollow steam-drum, *i i*, having bearings in the projections of the said casing *h*. This disk *g g* is placed at right angles to the plane of revolution of the piston *b*, and has two portions, *l l*, of its surface cut away at points diametrically opposite to each other, corresponding in shape to the piston, so as to allow it to pass through the same at the proper time as revolved. The unbroken parts of the edge of said disk fit and bear against the concave drum *c*, before referred to. The disk *g g* has an intermittent rotary motion imparted to it by means of any suitable arrangement of devices connecting it with the shaft *d* of the concave drum *c*.

In the drawings I have represented one mode of connection, consisting of a wheel, *m*, placed on the shaft *d* and revolving with the same, having a cam way or groove, *n*, in its periphery. In the groove *n* travels the upper end of an arm of the angular connecting-rod *p*, turning on a fixed bearing at *q*, the lower

end of said rod being attached to the rod *r*, secured to the crank *s* of steam-drum shaft *t*.

The steam-drum *i* is divided into two chambers, *u v*, to one of which, *u*, steam is admitted from the steam-pipe *w* through a port, *x*, and thence through a port, *y*, to act upon the piston *b*, and to the other, *u*, the exhaust-steam of the piston-cylinder is admitted through a port, *z*, escaping therefrom at *a'*.

Having thus described the manner in which the parts composing my improved rotary engine are arranged with regard to each other, I will now proceed to describe the manner in which the same operate together.

Steam is first admitted to the piston-cylinder *a* through the port *y* of the chamber *u*, and acting against the piston *b* impels it in the direction represented by the arrow in Fig. 3, and in a fixed path around the inner periphery of the steam chamber. During this movement of the piston the circular disk *g*, with its steam-drum *i*, is slowly and gradually revolved, bearing against the concave periphery of the piston-drum *d* by means of the connecting devices described, its unbroken surface then forming a steam abutment for the piston to act against, until the piston has reached it, or nearly so, when it is suddenly and quickly moved and one of its apertures *l* brought in apposition with said piston and kept there until the said piston has passed through the same to the other side of the disk, when it is as quickly moved again to close the opening and present its unbroken surface to the steam then admitted to the piston-chamber through the port *y*, above named. The exhaust-steam back of the piston in the chamber *a* then passes therefrom through the port *z* to the steam-drum *i* at the same time that the disk is moving forward by the revolution of the piston in the chamber, to which steam has been again admitted, until the piston reaches it, when like movements of both disk and piston take place, as above described, and so on until the engine is stopped. The induction and eduction ports of the steam-chamber are opened and closed at the proper times by the revolution of the steam-drum, the corresponding ports of said drum being arranged in the same in the proper position therefor.

Having thus described my improvements I shall state my claims, as follows:

1. The combination of the piston traveling in one and the same circular path in a suitable steam-chamber, and a disk moving at right angles thereto in such a manner and so constructed as both to furnish a steam-abutment to and permit the passage through it of the said piston, substantially as described.

2. The combination and arrangement of the disk and steam-drum, so operating together that the rotary movement given to the said drum and disk shall be such as to permit the ingress and egress of the steam to and from the steam-cylinder at the proper times, and also present a steam-abutment to the piston, as set forth.

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