J. B. GROOMES.

ROTARY STEAM ENGINE.

No. 19,697. Patented Mar. 23, 1858.

Fig: 1.

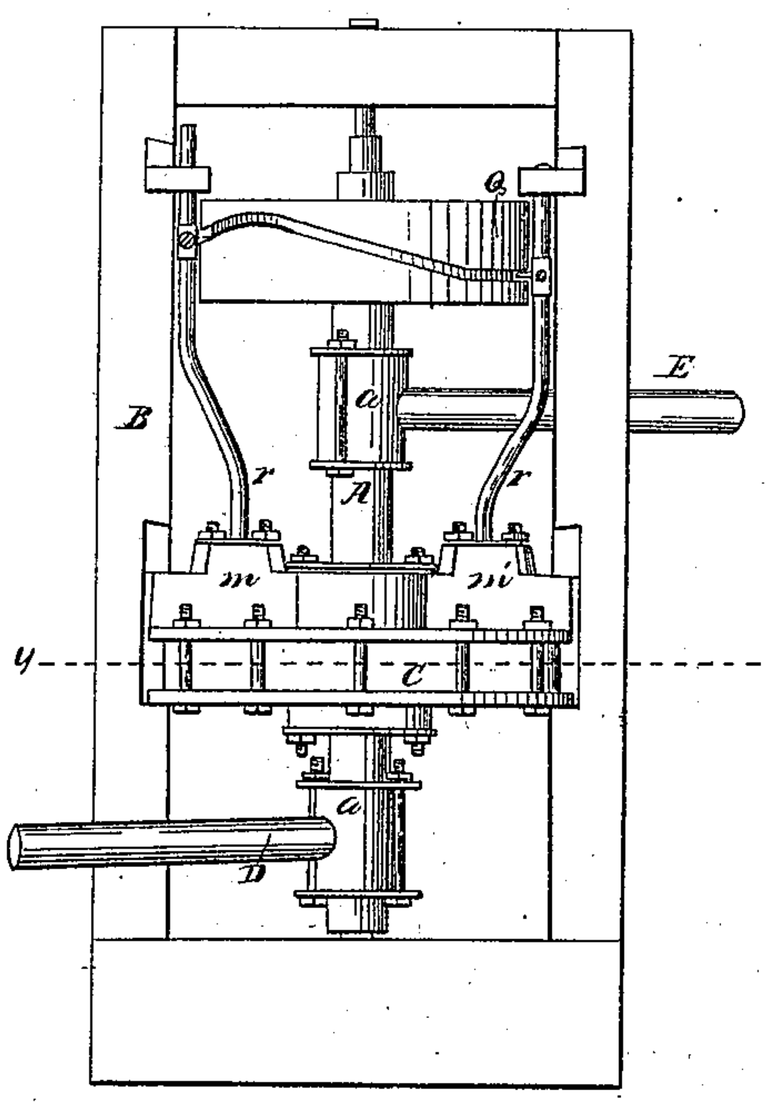


Fig: 2.

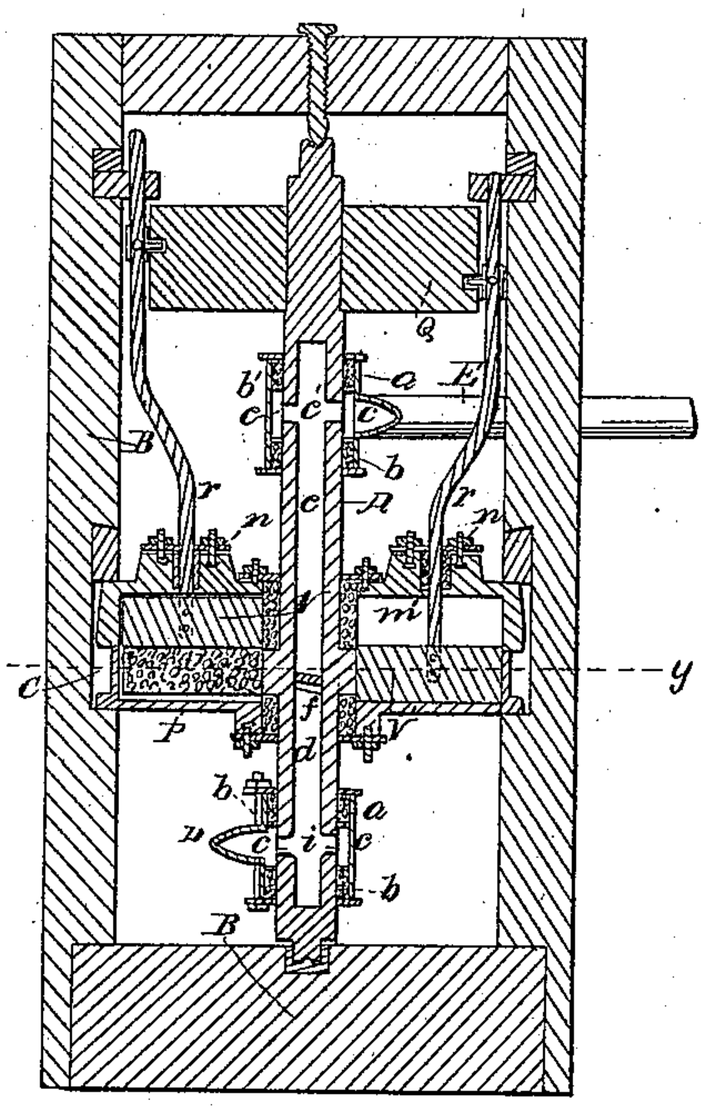
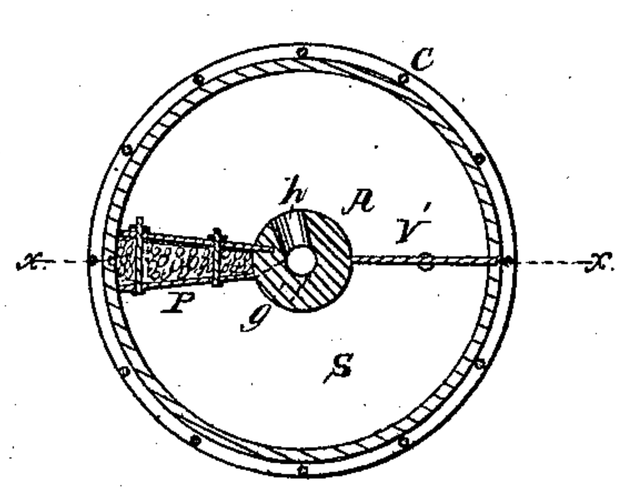


Fig: 3.



UNITED STATES PATENT OFFICE.

JAMES B. GROOMES, OF CARMICHAELS, PENNSYLVANIA.

ROTARY STEAM-ENGINE.

Specification of Letters Patent No. 19,697, dated March 23, 1858.

To all whom it may concern:

Be it known that I, JAMES B. GROOMES, of Carmichaels, in the county of Greene and State of Pennsylvania, have invented a new and useful Improvement in Rotary Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, forming part of this specification, in which—

Figure 1 is an elevation of the engine. Fig. 2 is a section through axis of shaft on line *x x* of Fig. 3; piston and valves being in position indicated in Fig. 3. Fig. 3 is a horizontal section of cylinder on line *y y*.

Similar letters of reference in the several figures denote the same part of the engine.

The character of rotary engine to which my invention refers, is that in which the steam enters the cylinder, and escapes therefrom, through the main shaft; which is rotated by pressure of steam on one side of an arm of said shaft, tightly packed to fit the cylinder, and constituting what I term the radial piston; the space in front of the piston being kept in a discharge condition by valves actuated by the rotation of the shaft through cams or other devices.

The nature of my invention consists in incasing the shaft, at its induction and eduction perforations by cylinders with interior flanges, between which and the cylinder heads is inserted packing, adjusted by the drawing of the heads together; the annular spaces formed around the shaft being in communication respectively with the pipes receiving and discharging the steam and the steam cavities of the shaft as and for the purpose hereinafter to be set forth.

In the drawing A is the main shaft, supported in frame B, which also supports cylinder C.

D is the induction, and E the eduction pipe, each communicating with a cylinder *a* surrounding the shaft, and tightly packed as shown at *b;* an annular space *c* being left between the upper and lower packing (as shown in Fig. 2). This annular space is bounded by two flanges in the interior of the cylinder *a*, reaching to the surface of the shaft, as shown in Fig. 2. The packing *b* lies between these flanges and the heads of the cylinder, adjustable by drawing the heads of the cylinder together by bolts, shown in Fig. 1. The shaft is hollow, and is divided into two channels *d* and *e* separated by partition *f;* the former having an opening *g* into the cylinder shown by dotted lines in Fig. 3, and the latter communicating with cylinder by passage *h*. The shaft is also perforated transversely in communication with channels *d* and *e* and annular spaces *c*, as seen at *i* and *i′* in Fig. 2.

P is the piston, fitting tightly in the cylinder C.

V V′ are the valves, lifted into chambers *m m′*, and dropped into cylinder by cam Q upon shaft A. The shaft is securely packed where it passes through the cylinder, and also the valve rods *r* at *n*.

The further details of construction not being essential to the invention, need not be minutely described here, as the drawing fully shows them.

The operation of the engine is as follows: Steam enters channel *d* by induction pipe D, without lateral pressure on the shaft, by reason of annular space *c*, and through transverse perforation *i*. The opening *g* admits it into the cylinder behind piston P; valves V V′ being in the positions shown in Figs. 2 and 3. The space S (Fig. 3) being filled with steam, the piston and shaft are carried forward. When the passage *g* comes in front of valve V, said valve drops into its position into cylinder, and valve V′ is lifted into chambers *m′*, by action of cam Q. This permits the steam of space S, now in front of piston, to pass through passage *h* and escape at eduction pipe E. In this manner by the alternate lifting and dropping of the valves V V′ the steam acts regularly on the rear of the piston and the rotation is kept up.

By the construction above set forth, the shaft is effectually protected from lateral pressure, at both ingress and egress passages, as the steam can not press unequally upon the shaft by reason of the annular space and through transverse perforation, and a simple and easily regulated communication with the cylinder, given the induction and eduction pipes.

I make no claim to the radial piston attached to the shaft, as equivalent devices are well known. Neither do I claim the introduction and exit of the steam through the shaft; but

What I do claim as my invention and desire to secure by Letters Patent, is—

The flanged cylinders *a a* incasing the shaft at its transverse perforations *i i′*, and

packed as described between the flanges and the cylinder heads, in combination with the steam channels *e* and *d* of the shaft, and the induction and eduction pipes D and E communicating with the annular spaces between the flanges of the cylinders; the whole operating as hereinbefore set forth.

In testimony whereof, I have hereunto signed my name before two subscribing witnesses.

JAMES B. GROOMES.

Witnesses:

GEO. PATTEN,

W. CROSSFIELD.