

(No Model.)

3 Sheets—Sheet 1.

S. G. BROSIUS.
ROTARY ENGINE.

No. 465,519.

Patented Dec. 22, 1891.

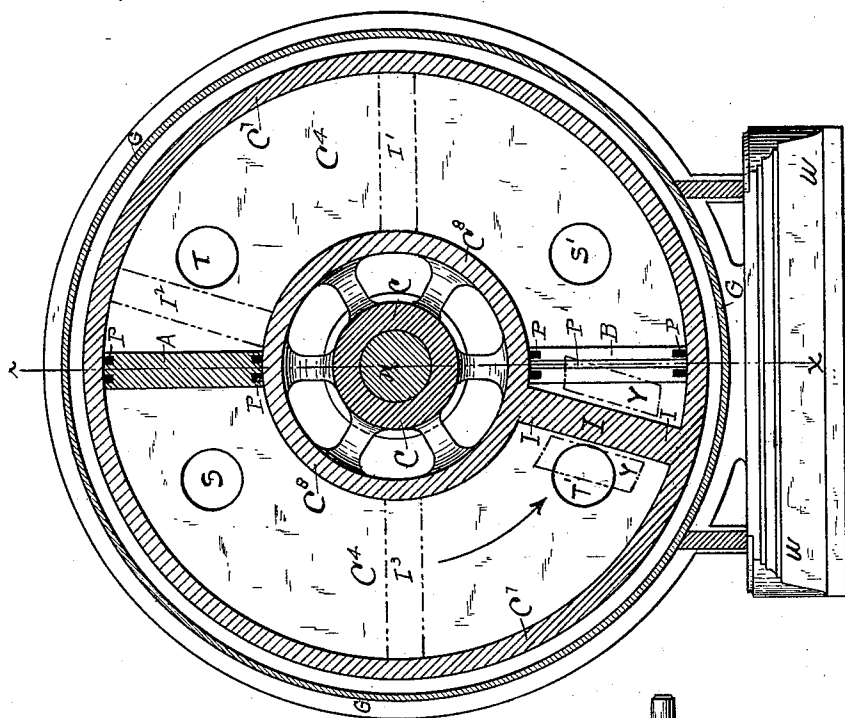


Fig. 1.

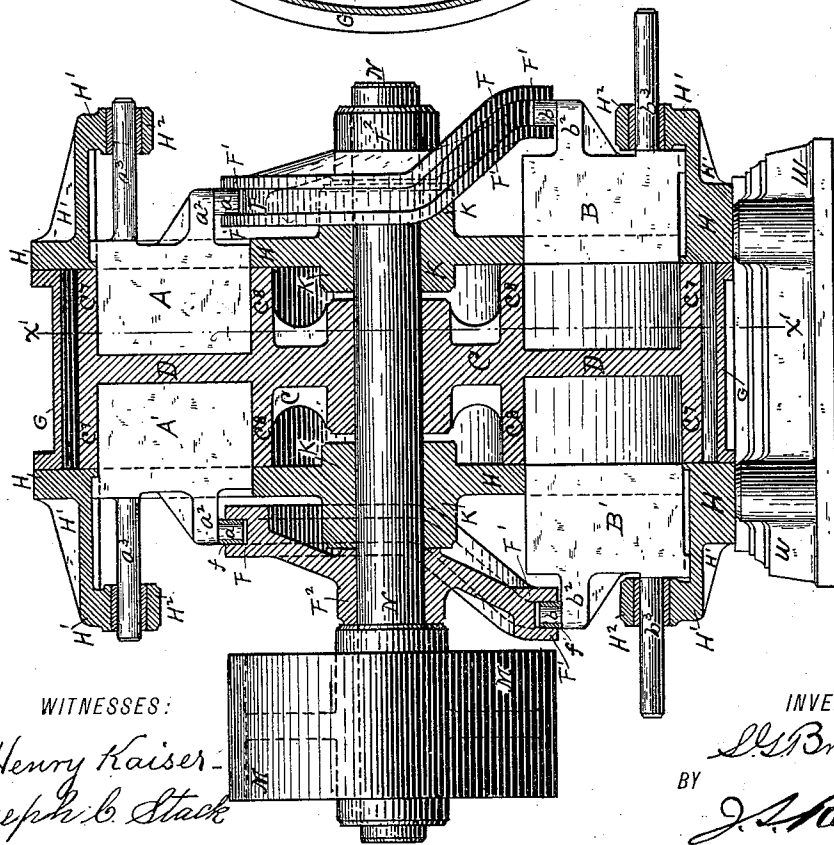


Fig. 2.

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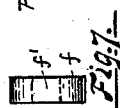
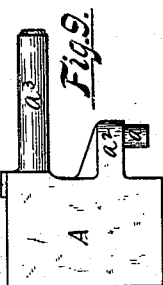
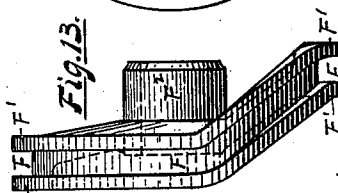
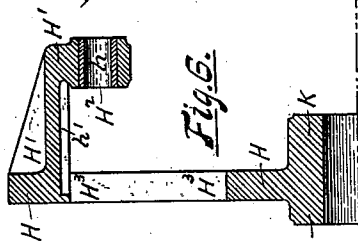
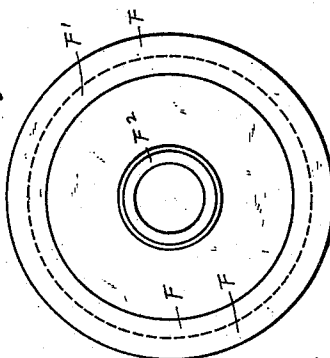
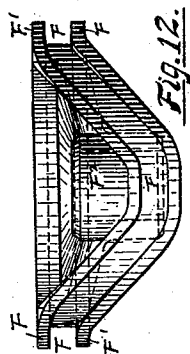
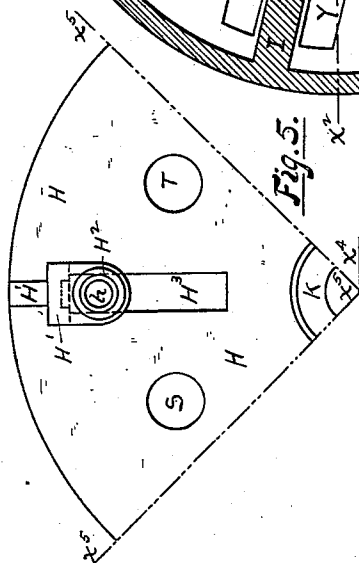
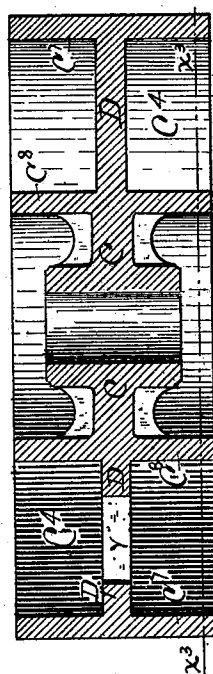
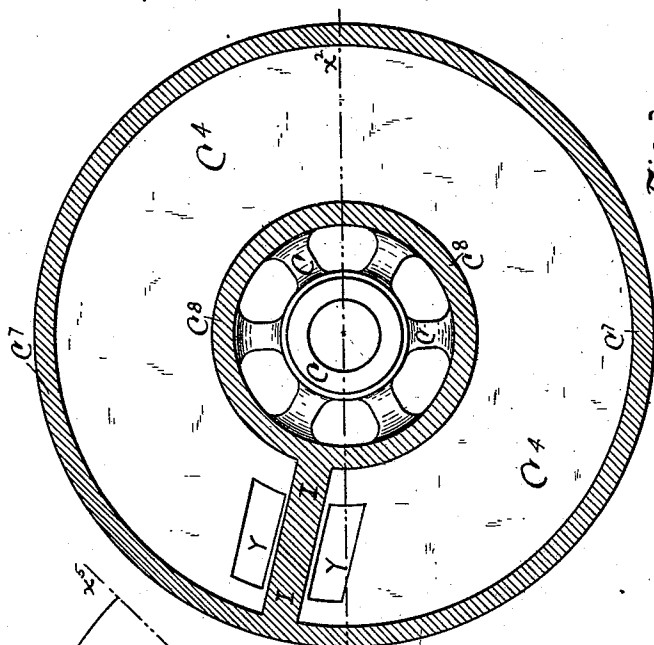
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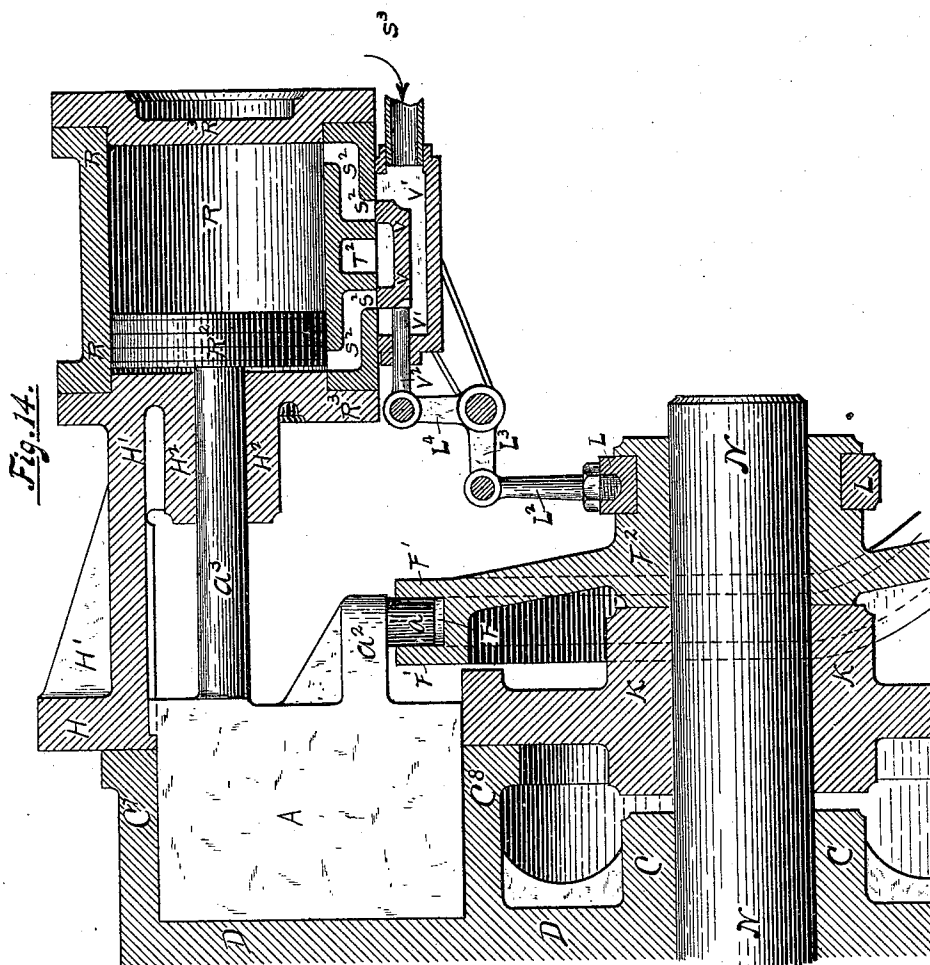
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ROTARY ENGINE.

No. 465,519.

Patented Dec. 22, 1891.



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UNITED STATES PATENT OFFICE.

SAMUEL GLENVILLE BROSIUS, OF SAVANNAH, GEORGIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 465,519, dated December 22, 1891.

Application filed April 17, 1891. Serial No. 389,309. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL GLENVILLE BROSIUS, of Savannah, in the county of Chatham and State of Georgia, have invented a new and useful Improvement in Rotary Engines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention has for its objects to produce a rotary engine of the least possible friction and having steam-tight packing; to construct an engine in such a manner so that no part shall bind or cramp, and so that the pistons will be at rest when under pressure, and to admit steam so as to avoid binding the cylinders or pistons in any position; to avoid all centrifugal and centripetal friction in packing or any packing causing undue friction; to admit steam simultaneously to the cylinders so as to avoid all binding or cramping; to operate the abutments substantially parallel to the axis of rotation of the rotating cylinder, thereby overcoming all centrifugal friction which would otherwise be encountered; to operate the abutments when the same are not under pressure; to construct the cam or cams which control the movements of the abutments with the least possible throw, thereby avoiding jar, and also constructing said cam or cams with periods of rest and periods of throw; to construct an engine in such a manner that the abutments, after the piston has passed, close the cylinders and act as cylinder-heads; to seat the abutments so that the periods of rest and periods of throw may be controlled by a cam or some mechanical equivalent; to overcome the jar incident to the use of cams in operating the reciprocating abutments in passing the stationary pistons in a rotary engine; to reciprocate or control the reciprocating pistons in a rotary engine as the abutment passes said pistons; to reciprocate or control the reciprocating pistons in a rotary engine as the abutment passes the pistons by means of a steam-cylinder acting as a dash-pot; to reciprocate or control the reciprocating piston in a rotary engine as the abutment passes said piston by means of a steam-cylinder acting as a dash-pot in conjunction with a cam, which governs the reciprocations of the pistons; to admit and cut off steam to the dash-pot cylinder by a compound lever operated

by an eccentric, and to admit and cut off steam to the dash-pot cylinder, so as to operate the pistons when the abutment passes said pistons. These and other objects are accomplished by the mechanism hereinafter described.

This invention consists of certain novel features hereinafter described, and pointed out in the claims.

Like letters of reference refer to like parts throughout the several views.

Figure 1 is a view in cross-section on line $x'x'$ of Fig. 2. Fig. 2 is an elevation in cross-section on line xx of Fig. 1. Fig. 3 is a cross-section of the rotating cylinder on line x^3x^3 of Fig. 4. Fig. 4 is a cross-section on line x^2x^2 of Fig. 3. Fig. 5 is an elevation showing a portion of the head containing one piston-seat and one steam and one exhaust port. Fig. 6 is a central cross-section of Fig. 5. Figs. 7 and 8 are respectively end and side elevations of the cam-blocks. Figs. 9 and 10 are respectively side elevation and plan of the abutments. Fig. 11 is a side elevation of the cam. Fig. 12 is a plan of the cam. Fig. 13 is a front elevation of the cam. Fig. 14 is a cross-section on the line xx of Fig. 1, showing dash-pot cylinder with its cut-off in position.

Within an outer casing G, to which are attached heads H H, secured to base-plate W, there is arranged a rotating cylinder C, with its pistons A, A', B, and B'. Said cylinder is attached to a shaft N, which is mounted in journal-boxes K K. The rotating cylinder C is mounted on shaft N, and is constructed so as to have the annular cavities C¹, formed by the rings C⁷ and C⁸ and disk D, and is provided with abutments I, which are firmly fixed in said cavities and act as pistons of said rotating cylinder, as shown in Fig. 1. The stationary heads H are constructed so as to form the packing-disks against which the rotating cylinder is packed, and are provided with the seats H³ and the bracket H', provided with the guideway h' and the guide H², bearing h , said seats and guides receiving the abutments A, A', B, and B', which act as abutments, and are packed within the annular cavities of said rotating cylinders. The abutment A is provided with guide-bar a^3 , guide h^2 , packing P, and with the cam-block f , which is secured to the journal a and journal-lug a^2 . The said

abutment is controlled through its cam-block by cam F. Said cam is mounted by hub F² on rotating shaft N, and has the flanges F' F', forming the groove in which the cam-block *f* operates. Said piston by its cam is operated substantially parallel to the axis of rotation of the rotating cylinder. Said stationary heads H contain the steam-ports S and S' and the exhaust-ports T and T', which admit and exhaust pressure into the rotating cylinders by means of passages Y Y in the disk D, which forms the partition between the cylinders, said passages making the admission and exhaust to the cylinders simultaneous and eliminating friction caused by end pressure.

As shown in Fig. 14, the guide-bar *a*³ is provided with the piston-head R², which operates in dash-pot cylinder R. Said cylinder is connected to the stationary head H by the bracket H' and guide H². Steam is admitted to said cylinder through steam-ports S², and is controlled by valve V in the steam-chest V', into which it is admitted by steam-pipe S³. The valve V is operated and controlled by valve-rod V², which is connected by the compound lever L³ L⁴, operated by eccentric L through its rod L².

The steam is admitted to dash-pot cylinder R, and operates the piston-head R², which governs the reciprocations of the piston and allows the piston I to pass said abutments, which are operated substantially parallel to the axis of rotation of said rotating cylinder. Said cylinder may be used in connection with cam F, reducing any jar which may be incident to the use of said cam, in which case the cam governs the motions of the abutments, which are operated by the piston through the guide-bar *a*³, which has been formed into the piston-rod and is provided with the piston-head. If found advisable, the cam F may be dispensed with and the abutment operated and controlled by the piston.

The operation is as follows: The abutment operates substantially parallel to the axis of rotation of the rotating cylinder and moves in seat H³ and is held in line by its guide-bar or piston-rod *a*³ and its guide *h*², which operates in the guide H² and in the guideway *h*¹ respectively. Said abutment is controlled through its cam-block *f*, journaled on the cam-block lug *a*² by the journal *a*, and is operated by the piston-rod R², which is securely attached to the guide-bar *a*³. As shown in Figs. 1 and 2 abutment B has taken a position to allow the piston I to pass, and abutment A is packed in the annular cavity of said rotating cylinder. The steam having entered at port S is confined between said abutment A and piston I, which is driven in the direction indicated by the arrow until it takes the position as shown at I'. The abutment B is moved inward after the passage of piston I, the exhausted steam escaping at port T. Continuing the revolution, abutment A takes a position to allow the piston I to pass,

the steam having entered at port S'. After passing abutment A piston I is acted on by steam from port S until said abutment A has taken its original position, as indicated, the exhaust-steam escaping at port T' until piston I passes it. Piston I takes its original position, as does the abutment B. This constitutes a full revolution. The inlet and exhaust ports may be provided with any ordinary cut-offs. The abutments are controlled by the cylinders governed by the cams.

The abutments A', B, and B', with their respective co-operating parts, are identical in construction to abutment A and its co-operating parts.

While four abutments and two pistons have been shown, I do not confine myself to this, as any number, one or more, may be used; and, furthermore, I do not confine myself to the construction shown, as the same may be varied without departing from the spirit of my invention.

Having thus ascertained the nature and set forth the construction of the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A rotary engine having rotating cylinders, reciprocating abutments operating substantially parallel to the axis of rotation of said cylinders, rotating cams, and a disk forming a partition between said cylinders, substantially as set forth.

2. A rotary engine having rotating cylinders, reciprocating abutments operating substantially parallel to the axis of rotation of said rotating cylinders, and rotating cams for controlling the reciprocations of the abutments, substantially as set forth.

3. In a rotary engine, a rotating cylinder and reciprocating abutments operating substantially parallel to the axis of rotation of said rotating cylinder and controlled by a steam-cylinder, and rotatory cams for controlling the movements of said abutments.

4. In a rotary engine, a rotating cylinder, reciprocating abutments operating in stationary heads, substantially parallel to the axis of rotation of said rotating cylinder, a steam-cylinder, and a bar forming the piston-rod of the steam-piston head and forming the guide-bar of the reciprocating abutments, for the purpose set forth.

5. In a rotary engine, a rotating cylinder, reciprocating abutments operating substantially parallel to the axis of rotation of said rotating cylinder, a cylinder, a rotating cam, a bar forming the piston-rod of the piston-head and forming the guide-bar of the reciprocating abutments, and a cam-block lug having a cam-block operating in said cam, for the purpose set forth.

6. In a rotary engine, a rotating cylinder, reciprocating abutments operating substantially parallel to the axis of rotation of said rotating cylinder, a rotating cam, a steam-cylinder having steam inlet and exhaust ports controlled by levers, for the purpose set forth.

7. In a rotary engine, a rotating cylinder, reciprocating abutments operating substantially parallel to the axis of rotation of said rotating cylinder, a steam-cylinder with one of its heads provided with a guide for the guide-bar of the reciprocating abutment, which guide-bar also forms the piston-rod of the dash-pot piston-head, for the purpose set forth.

8. In a rotary engine, a rotating cylinder, reciprocating abutments operating substantially parallel to the axis of rotation of said cylinder, a rotating cam for controlling the movements of said abutments, and a steam-cylinder having steam inlet and exhaust ports controlled by levers operated by an eccentric and an eccentric-rod, for the purpose set forth.

9. In a rotary engine, a rotating cylinder, reciprocating abutments operating substantially parallel to the axis of rotation of said cylinder, a steam-cylinder, a bar forming the guide-bar of the piston and the piston-rod of the piston-head, and a cam-block lug on the piston having a cam-block operating in said cam, for the purpose set forth.

10. In a rotary engine, a rotating cylinder, reciprocating abutments operating substantially parallel to the axis of rotation of said cylinder, a rotating cam, a cam-block lug having a cam-block operating in said cam, a steam-cylinder, a bar forming the piston-rod of the piston-head, and guide-bar of the reciprocating abutments, said cylinder having steam inlet and exhaust ports controlled by levers operated by an eccentric, for the purpose set forth.

11. In a rotary engine, a rotating cylinder, reciprocating abutments operating substantially parallel to the axis of rotation of the ro-

tating cylinder, stationary heads with guides thereon, and guide-bars operating in said guides and forming the piston-rod for operating the abutments, for the purpose set forth.

12. In a rotary engine, a rotating cylinder, reciprocating abutments operating substantially parallel to the axis of rotation of said cylinder, stationary heads, guides formed in brackets attached to said stationary heads, and guide-bars attached to the abutments and operating in said guides and forming the piston-rod for operating the abutments, for the purpose set forth.

13. In a rotary engine, a rotating cylinder, abutments, rotating cams, stationary heads having guides and guideways, said abutments having guide-bars and guides sliding in the guides and guideways of the head, and cam-block lugs having cam-blocks operating in said cam, for the purpose set forth.

14. In a rotary engine, a rotating cylinder, reciprocating abutments operating substantially parallel to the axis of rotation of said rotating cylinder, rotating cams, stationary heads having guides, guide-bars on said abutments operating in said guides and controlling the reciprocations of the abutments, and cam-block lugs on said abutments, having cam-blocks operating in said rotating cams, for the purpose set forth.

In testimony whereof I, SAMUEL G. BROSIUS, have signed my name to this specification, in the presence of two subscribing witnesses, on this 15th day of April, A. D. 1891.

SAMUEL GLENVILLE BROSIUS.

Witnesses:

J. HENRY KAISER,
JOSEPH C. STACK.