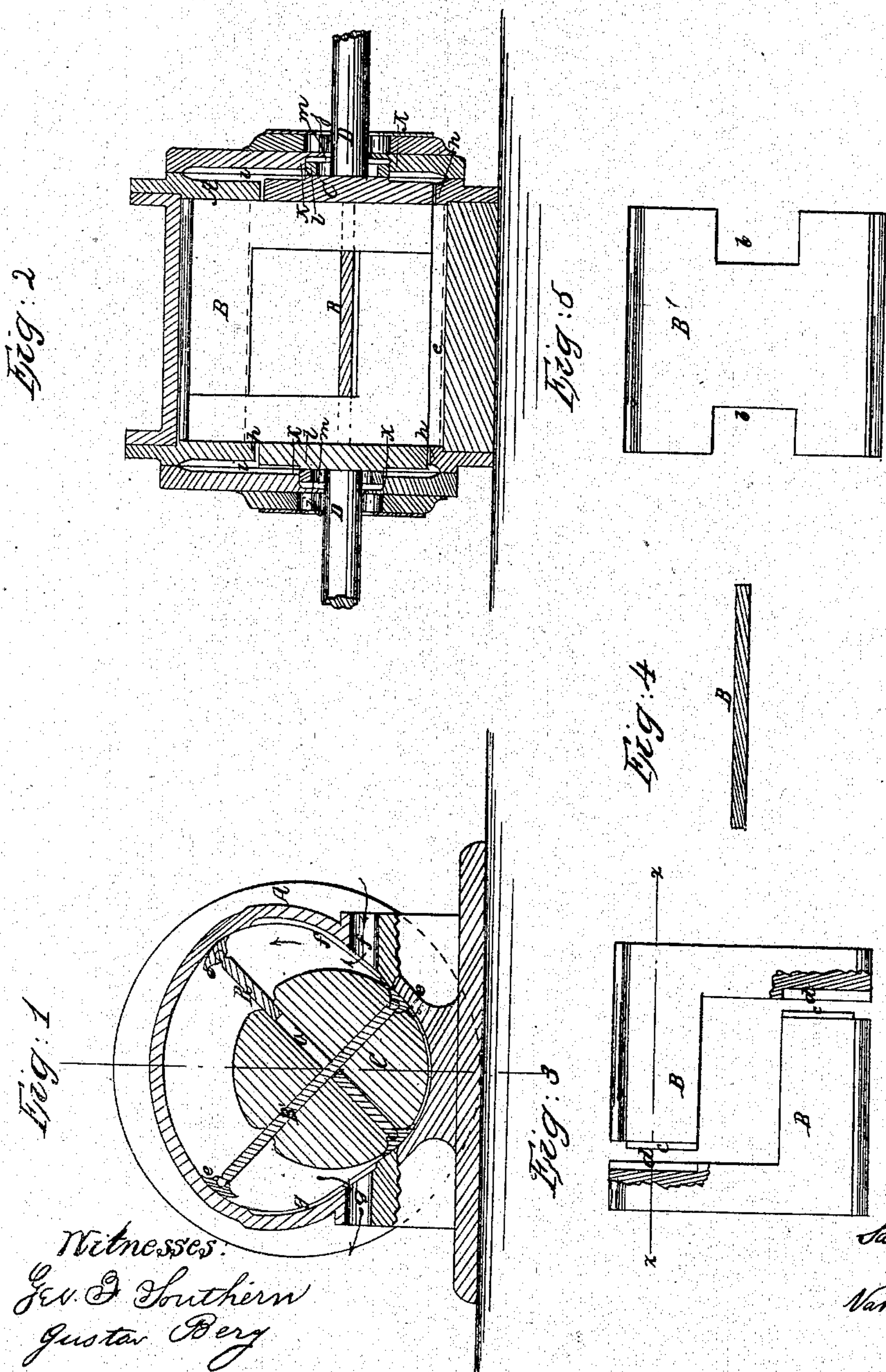


S. G. HALL.
ROTARY STEAM ENGINE.

No. 68,186.

Patented Aug. 27, 1867.



Inventor:

Samud G. Hall
per
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Attys

United States Patent Office.

SAMUEL G. HALL, OF NORWICH, CONNECTICUT.

Letters Patent No. 68,186, dated August 27, 1867.

IMPROVEMENT IN ROTARY STEAM ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, SAMUEL G. HALL, of Norwich, in the county of New London, in the State of Connecticut, have invented a new and useful Improvement in Rotary Engines; and I do hereby declare that the following is a full, and clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which drawing—

Figure 1 represents a transverse vertical section of this invention.

Figure 2 is a longitudinal section of the same.

Figure 3 is a detached elevation of one of the pistons.

Figure 4 is a transverse section thereof, taken in the plane indicated by the line *x x*, fig. 3.

Figure 5 is a detached elevation of the other piston.

Similar letters indicate corresponding parts.

This invention relates to an improvement in that class of rotary engines, the cylinder of which is bored out to form an irregular curve, so that two pistons, sliding in a piston-wheel which revolves eccentrically in said cylinder, are enabled to remain in contact with the inner surface of the cylinder at both their ends during the entire revolution.

The invention consists, first, in the construction of one of the pistons of two L-shaped pieces, which fit together by tongues and grooves, while the other piston is provided with recesses in its edges in such a manner that the operation of introducing the pistons in and removing the same from the piston-wheel is rendered easy, and that when the pistons are in position no additional fastening is required to retain them there. It consists, secondly, in the arrangement of rocking-heads in combination with the pistons in such a manner that the edges of said heads are pressed up tight against the inner circumference of the cylinder by the action of the steam itself, allowing the same to accommodate themselves to the formation of said circumference, and rendering the use of packing superfluous. It consists, thirdly, in the arrangement of a steam-space in each head of the cylinder, in such a manner that the pressure of the steam on said heads is balanced, and the leakage of steam is prevented which is caused by the dishing out of the heads when the same are exposed to the pressure of the steam from one side. It consists, fourthly, in the arrangement of a metallic ring between each end of the piston-wheel, and between an elastic or soft packing-ring, placed into each roller-box in such a manner that said metallic rings are held in close contact with the ends of the piston-wheel by the action of the packing-ring, and the escape or leakage of steam at the ends of the piston-wheel is effectually prevented with comparatively little friction.

A represents the cylinder of my rotary engine, which is made of cast iron or any other suitable material, and which is bored out so that its cross-section forms an irregular curve, and that the ends of the pistons B B' are capable of remaining in contact with the inner surface of said cylinder during their entire revolution. These pistons are carried by the piston-wheel C, which is mounted on the shaft D, and which is placed eccentrically into the cylinder, as clearly shown in fig. 1 of the drawing; and said pistons fit into slots *a* extending diagonally and at right angles through the piston-wheel, so that as the piston-wheel revolves, each piston is free to slide back and forth. The piston B' is made solid, and it is provided with two recesses *b*, which serve to give room to the piston B, and to allow the piston B' to move back and forth as the piston-wheel revolves. The piston B is composed of two L-shaped pieces, which are fitted together by tongues *c* and grooves *d*, as indicated in fig. 3. The grooves *d* extend clear out to the ends of the L-shaped pieces which compose the piston, so that after the piston B' has been inserted into the piston-wheel, the two parts of the piston B can be slipped in and locked by the tongues and grooves, and that after the piston-wheel, together with the pistons, is inserted into the cylinder, both pistons are securely held in position, the two parts of the piston B being prevented by the cylinder itself from sliding out in opposite directions, and from getting disengaged. The ends of the pistons are rounded off, and they form the bearings for the rocking-heads *e*, which are applied in such a manner that their edges are kept in close contact with the inner circumference of the cylinder by the action of the steam itself, as indicated in fig. 1 of the drawing, where the steam is supposed to act in the direction of the arrows. Said rocking-heads are thus enabled to accommodate themselves to the formation of the interior surface of the cylinder, no packing being required to produce tight joints, and as the working surfaces wear off, the heads *e* will place themselves automatically in such a position as to be self-compensating, and no attention is required

to keep the joints tight. The steam enters through the pipe *f*, and exhausts through the pipe *g*, or *vice versa*, and from the steam and exhaust-ports extend recesses *f' g'*, which facilitate the entrance and the discharge of the steam. These recesses may be protected by a screen or gridiron, with oblique or longitudinal bars, so that the rocking-heads *e* are prevented from catching in the same. The edges of the pistons work steam-tight against the inner surfaces of the cylinder-heads, and these heads are provided with recesses *h* to admit the solid ends of the piston-wheel, and they are cast hollow or provided with steam-spaces *i*, so that the pressure of the steam on said heads is balanced, and the dishing out of the heads is prevented. Without the steam-spaces the cylinder-heads are liable to dish out by the internal steam-pressure, and it is impossible to prevent leakage between the edges of the pistons. The shaft *D* has its bearings in roller-boxes *j* in the cylinder-heads, and inside these roller-boxes are recesses *k*, to receive a metallic ring, *l*, and packing-ring *m*. The metallic rings are faced perfectly true, and a ground joint is made between their inner surfaces and the ends of the piston-wheel. The packing-rings *m* are made of India rubber or other elastic material, and by their action the metallic rings are pressed up against the ends of the piston-wheel, and the escape of steam is prevented. This mode of packing is very simple and effective, and it creates but very little friction, when compared with the friction created by an ordinary stuffing-box. To prevent the packing-ring *m* being blown out by the steam, the metallic surfaces between which it is held are provided with a series of V-grooves, which clamp the packing-ring and hold it in position. By these means a rotary engine is obtained which works with great economy, and with comparatively little friction,

What I claim as new, and desire to secure by Letters Patent, is—

The L-shaped pieces of the piston *B*, provided with grooves *d* and tongues *e*, operating in combination with the piston *B'*, provided with recesses *b*, when applied to the piston-wheel *C* and irregular cylinder *A*, all constructed as and for the purpose described.

Witnesses:

W. HAUFF,
G. BERG.

SAM. G. HALL.