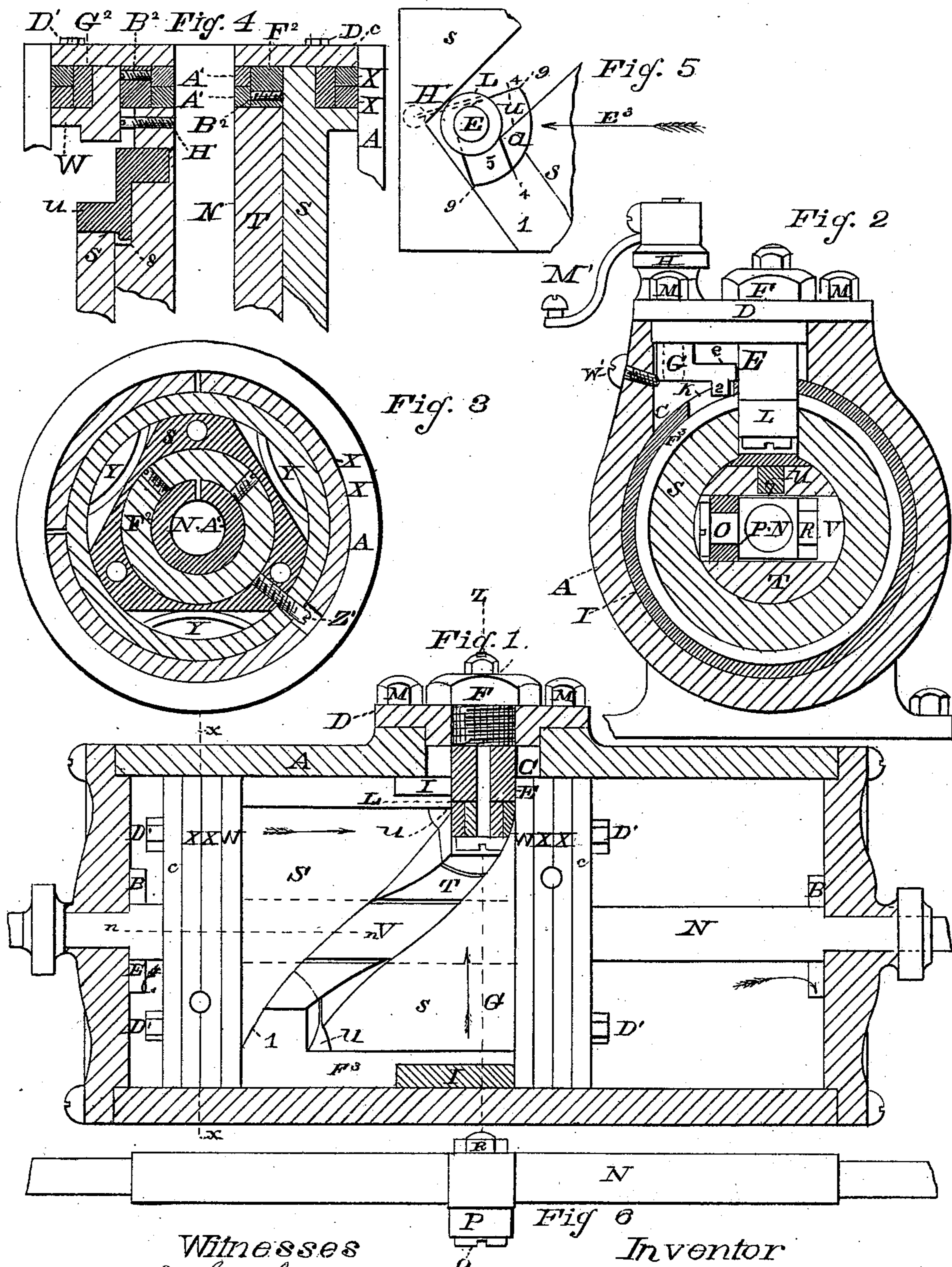


R. C. BARRIE, Jr.  
Steam-Engine.

No. 226,591.

Patented April 20, 1880.



Witnesses  
John Stearns  
Perennial Burton

Inventor  
Robert C. Barrie Jr.

R. C. BARRIE, Jr.  
Steam-Engine.

No. 226,591.

Patented April 20, 1880.

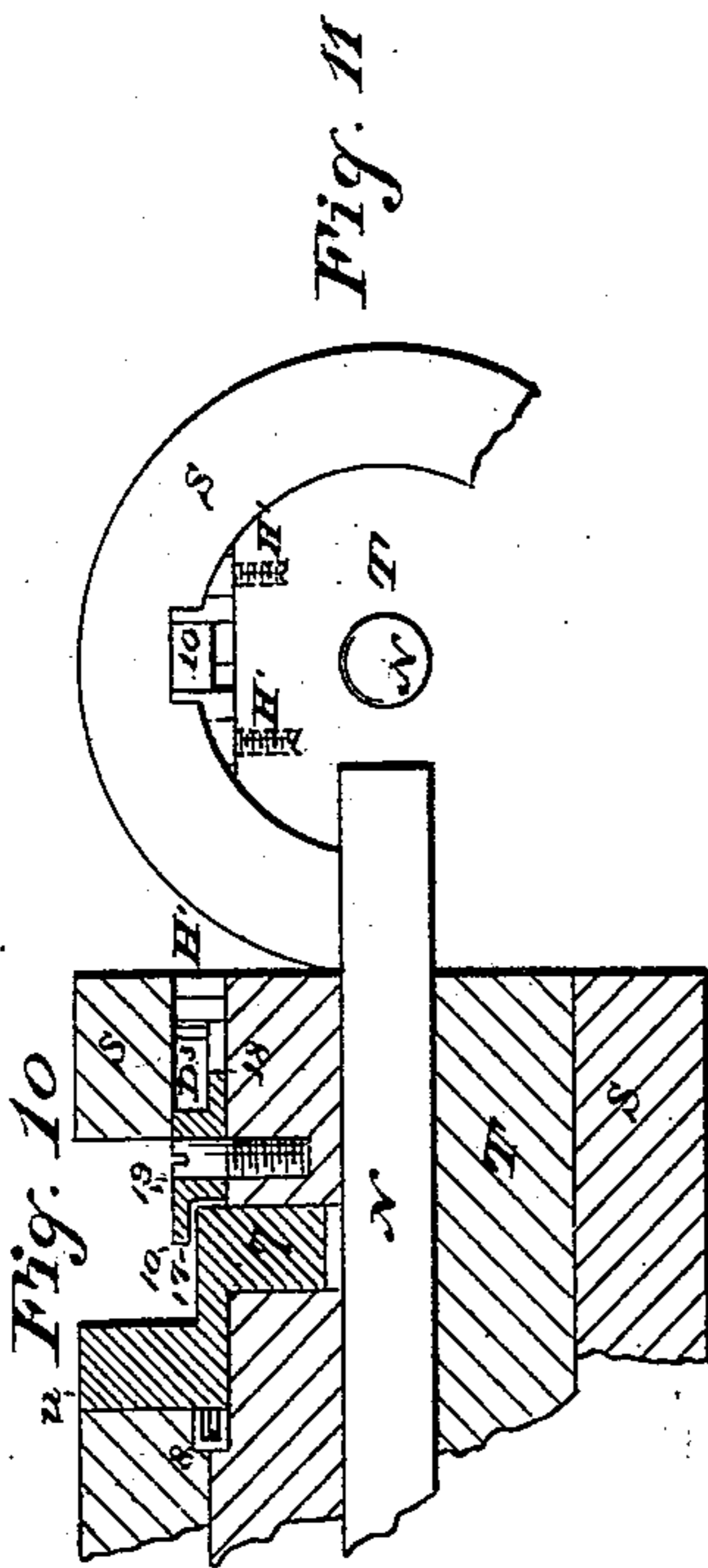
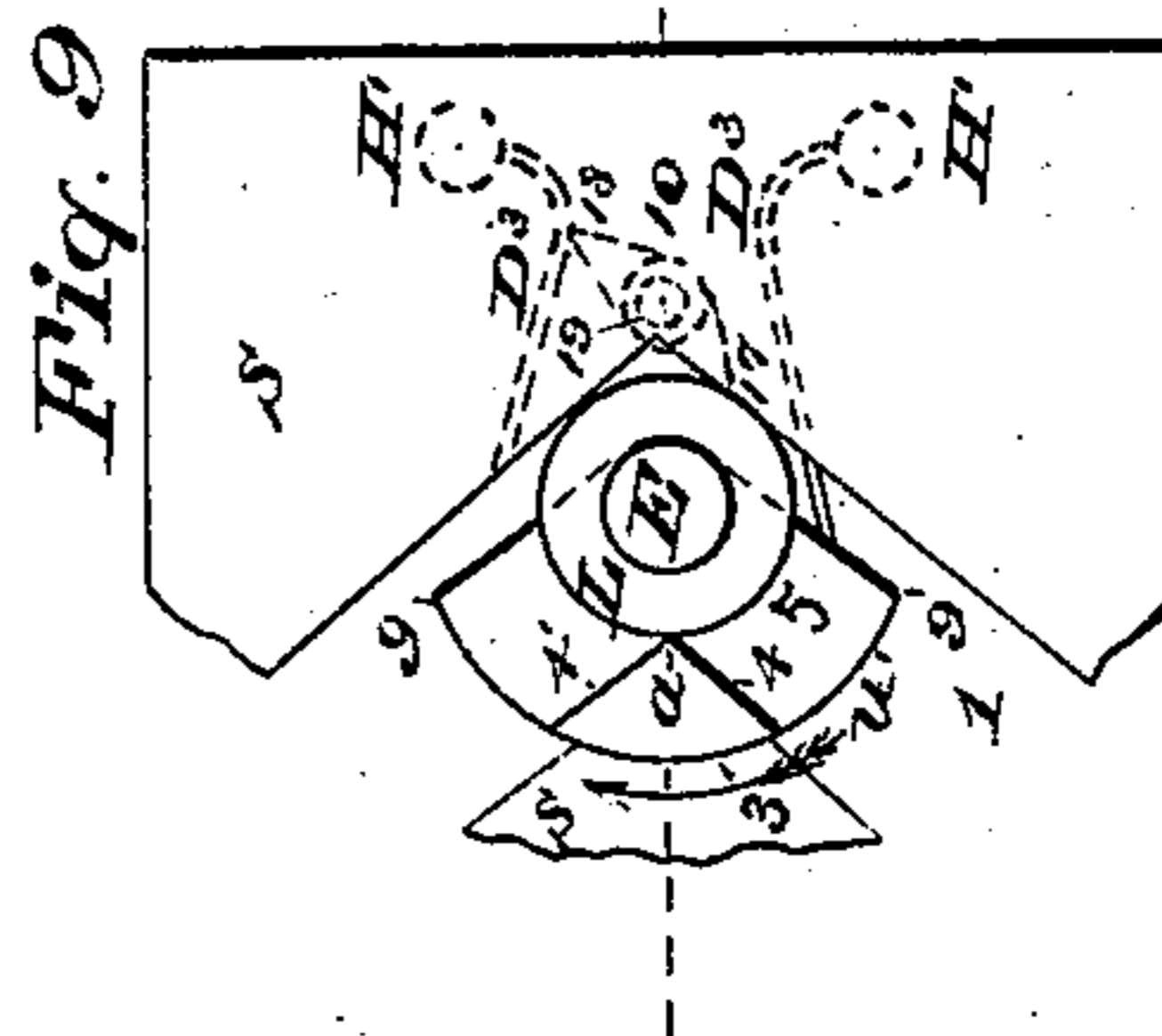
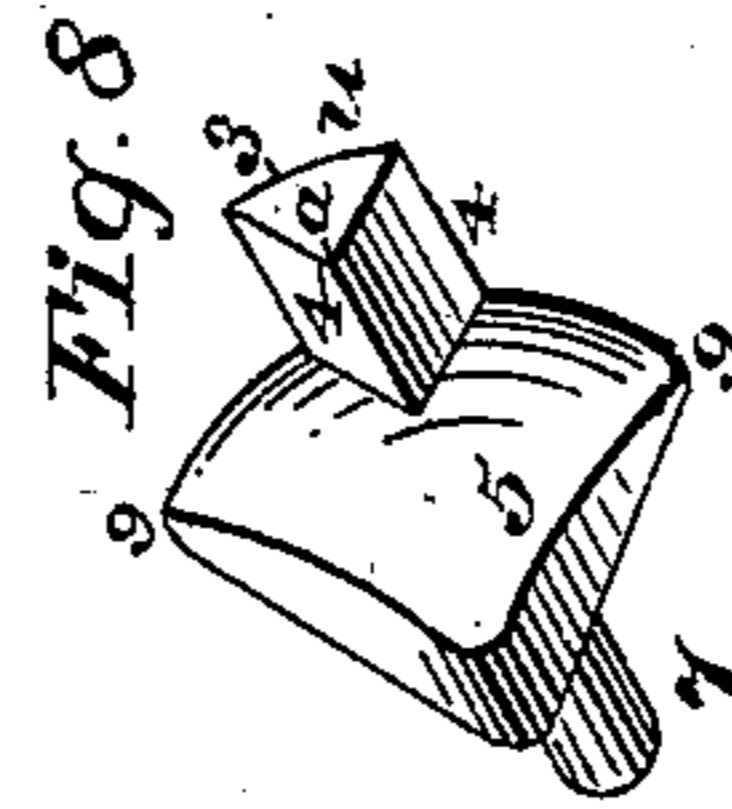
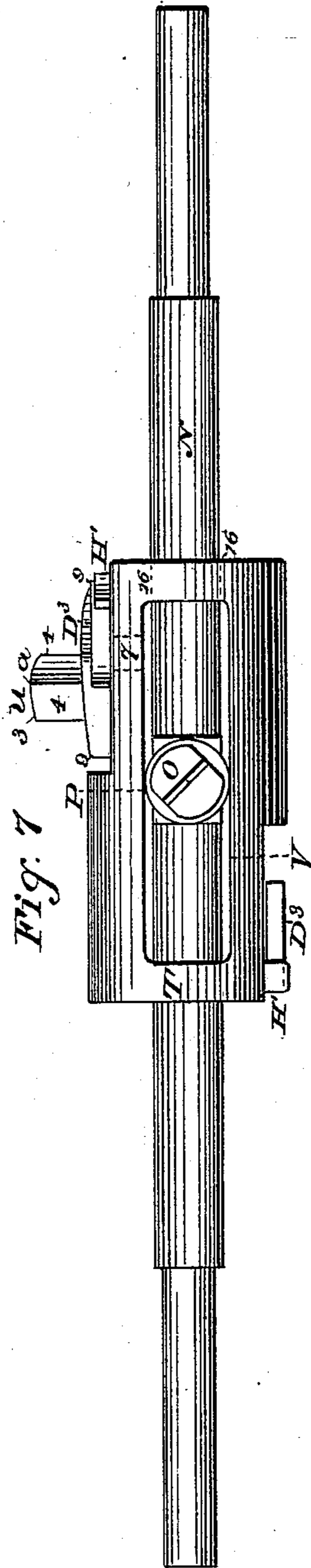


Fig. 11



Witnesses

F. S. Eastman

Charles D. Freeman

Inventor

Robert C. Barrie, Jr.

# UNITED STATES PATENT OFFICE.

ROBERT C. BARRIE, JR., OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO JOHN H. W. CHESTNUT, OF SAME PLACE.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 226,591, dated April 20, 1880.

Application filed January 27, 1880.

*To all whom it may concern:*

Be it known that I, ROBERT C. BARRIE, Jr., of the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engines by which a reciprocating movement is converted into a rotary motion, of which the following is a specification.

This invention relates to direct-acting and reciprocating engines, and the purpose of the said invention is to convert longitudinal rectilinear motion into rotary motion.

It consists of certain devices arranged within a steam-cylinder.

It also consists of other devices by which the engine is prevented from stopping on what is termed the "dead-center."

It further consists of a valve-operating mechanism.

An application has been filed, bearing even date herewith, in which are set forth and described certain features resembling, in a measure, some of the elements embodied in this application, but largely differing in their construction, operation, and results.

Figure 1 is a vertical longitudinal section of the cylinder A, showing the side elevation of the piston-heads *c* W, shaft N, and groove 1. Fig. 2 is a vertical transverse sectional view on the line Z in Fig. 1, and shows a side elevation of the stud E, roller L, cover D, rock-shaft G, and, in section, the sleeve I and slot K. Fig. 3 is a vertical transverse section on the line *x*, and shows the packing-ring case F<sup>2</sup>, adjusting-screws B<sup>2</sup>, packing-rings A', and screw Z. Fig. 4 represents a longitudinal section of the pistons *c* W at *n n*, and shows the arrangement of the rings A', case F<sup>2</sup>, screws B<sup>2</sup>, and the ordinary packing-rings X X. Fig. 5 is a plan view of the oscillating plate 5, and shows the convex face 3 and the corresponding concave face in the cylinder S. Fig. 6 is a plan view of the shaft N, roller P, and stud O. Fig. 7 is a view of the cylinder T, shaft N, slot V, stud O, roller P, springs D<sup>3</sup>, and their fastenings H. Fig. 8 shows, in perspective, what I term an "oscillating plate," 5, provided with the pivot 7 and angular surfaces 9 9, and a projecting sector or lug, *u*, having the bearing-surfaces 4 4, which meet at the edge *a*, the

sector or lug *u* forming at its arc 3 a convex face. Fig. 9 is a plan view of the oscillating plate 5, showing by the dotted lines the spring D<sup>3</sup>, cam 10, and stud 19. Fig. 10 is a longitudinal section on the dotted line seen in Fig. 9. It shows the stud 19 and, in section, the cam 10 and the plate 5 and the projection 8. Fig. 11 is a part of an end view, showing the cam 10 and fastenings H.

The cylinder A is constructed in the usual manner, and is provided with cylinder-heads, alike at each end, in which the shaft N is fitted, said shaft being constructed as shown in Fig. 6. On the shaft N is fitted a cylinder, T, having an elongated slot, V, and flattened surfaces at each end on opposite sides. On the said surfaces are pivoted the plates 5, constructed as shown in Fig. 8. In Fig. 7 is seen the construction of the springs D<sup>3</sup>.

Upon the cylinder T are set and secured the peculiarly-constructed piston-heads which form the groove 1, and are provided with metallic packing-rings around the shaft N, and also with the ordinary packing-rings *xx*. The stud E is fitted in the groove 1, and is made rigid with the cylinder A. Fig. 2 shows the rock-shaft G and the parts necessary thereto.

If steam be admitted through the steam-ports B or E it will act in the same manner upon the pistons *c* W, as in an ordinary engine. The stud E in the groove 1 will cause the pistons to rotate at the same time the shaft N is rotated by means of the stud O, working in the slot V of the cylinder T. When the edge of the face 4 which extends into the groove 1 strikes the stud E it will oscillate against the spring D<sup>3</sup> until the plate 5 is directly under the stud E, when the spring D<sup>3</sup>, reacting on the angular surface of the plate 5, returns the abutting point 9 against the surface of the groove 1, as shown in Fig. 5.

The operation of the valve mechanism is as follows: The piston-heads, upon reaching the sleeve I, impart a longitudinal motion to said sleeve, which, in turn, imparts a rocking motion to the shaft G. Fig. 9 represents the positions of the groove 1, plate 5, stud E, cam 10, and springs D<sup>3</sup>, when at the end of the longitudinal stroke of the pistons *c* W. It will be seen that the end of the cam 10 that projects

over the plate 5 (see Fig. 10) has been carried to the position shown by coming in contact with the stud E, and the opposite end of said cam is thereby made to overcome the resistance of the spring D<sup>3</sup>, thus allowing the opposite spring to actuate the plate 5 for the purpose of removing the edge *a* from the line of resistance. The said spring also retains the abutting point 9 against the face of the groove 1 until the plate 5 has passed from under the stud E in an opposite longitudinal direction, the operation being the same when the shaft turns in the other direction.

I am aware that converting longitudinal into rotary motion is not new. Therefore I do not claim such broadly; nor do I wish to confine myself to the exact construction as shown, as many devices or equivalents may be substituted therefor without departing from the spirit of my invention.

What I do claim, and wish to secure by Letters Patent, is—

1. In a steam-engine, the two piston-heads

adapted to reciprocate and rotate within a cylinder, as shown, in combination with suitable operating mechanism, by which longitudinal is converted into rotary motion, as and for the purpose set forth.

2. In a steam-engine, the rock-shaft G, sleeve or ring I, in combination with the pistons *c* W, the ring being located between the pistons and actuated by the same, substantially as shown, and for the purpose set forth.

3. In a steam-engine, the combination of the pistons *c* W, cylinders S S, groove 1, oscillating plate 5, cylinder T, having slot V, stud O, stud E, and shaft N, operating together in the manner set forth and described.

4. In a steam-engine, the packing-ring F<sup>2</sup>, adjusting-screws B<sup>2</sup>, and packing-rings A', in combination with the piston-heads *c* W, as and for the purpose set forth.

ROBERT C. BARRIE, JR.

Witnesses:

JOSEPH MERCER,

J. H. W. CHESTNUT.