Sheet 1, 2 Sheets.

H. E. Long.

Rotary Steam Engine.

No. 103,212. Patented May 17, 1870.

Fig. 1.

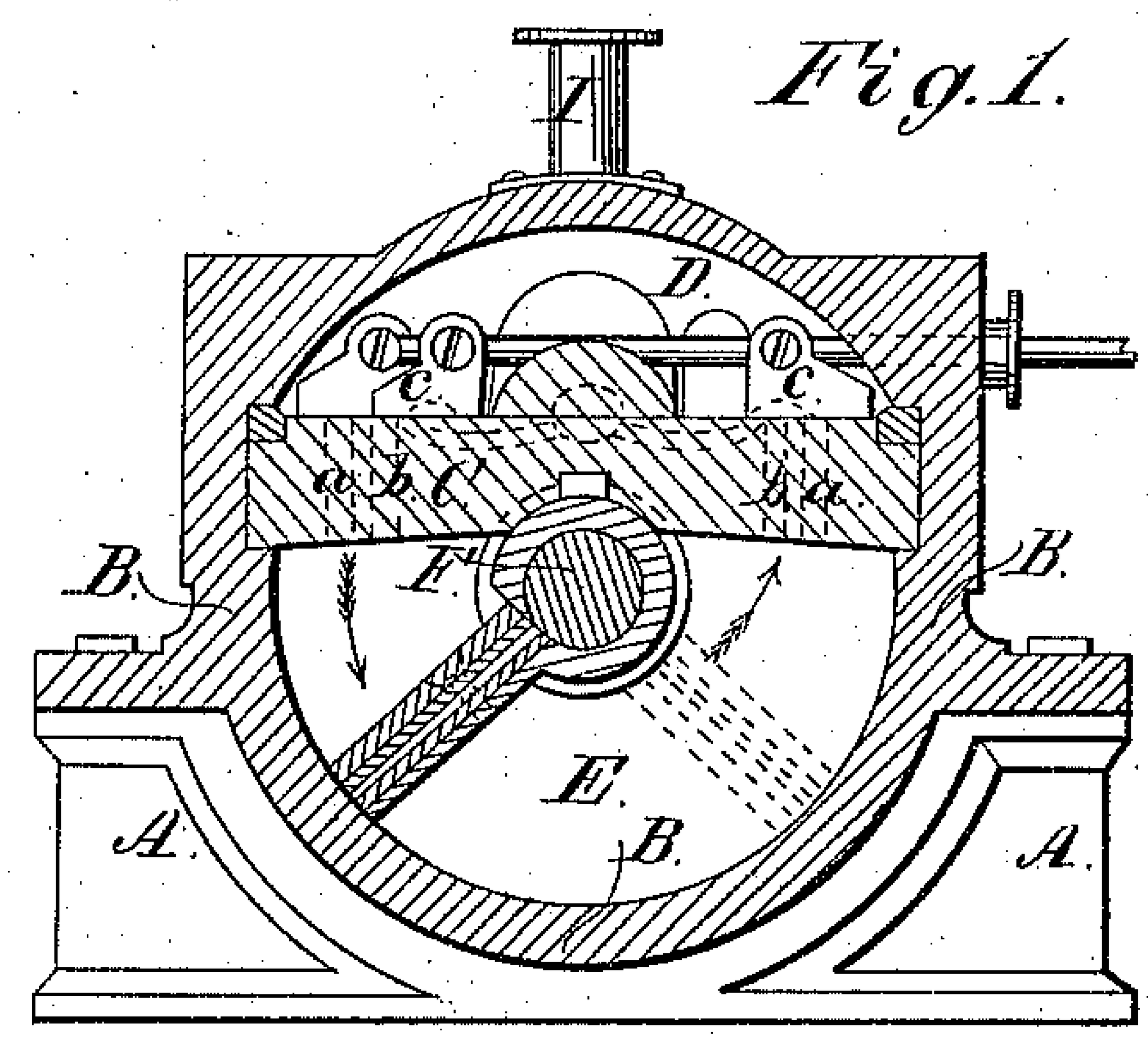
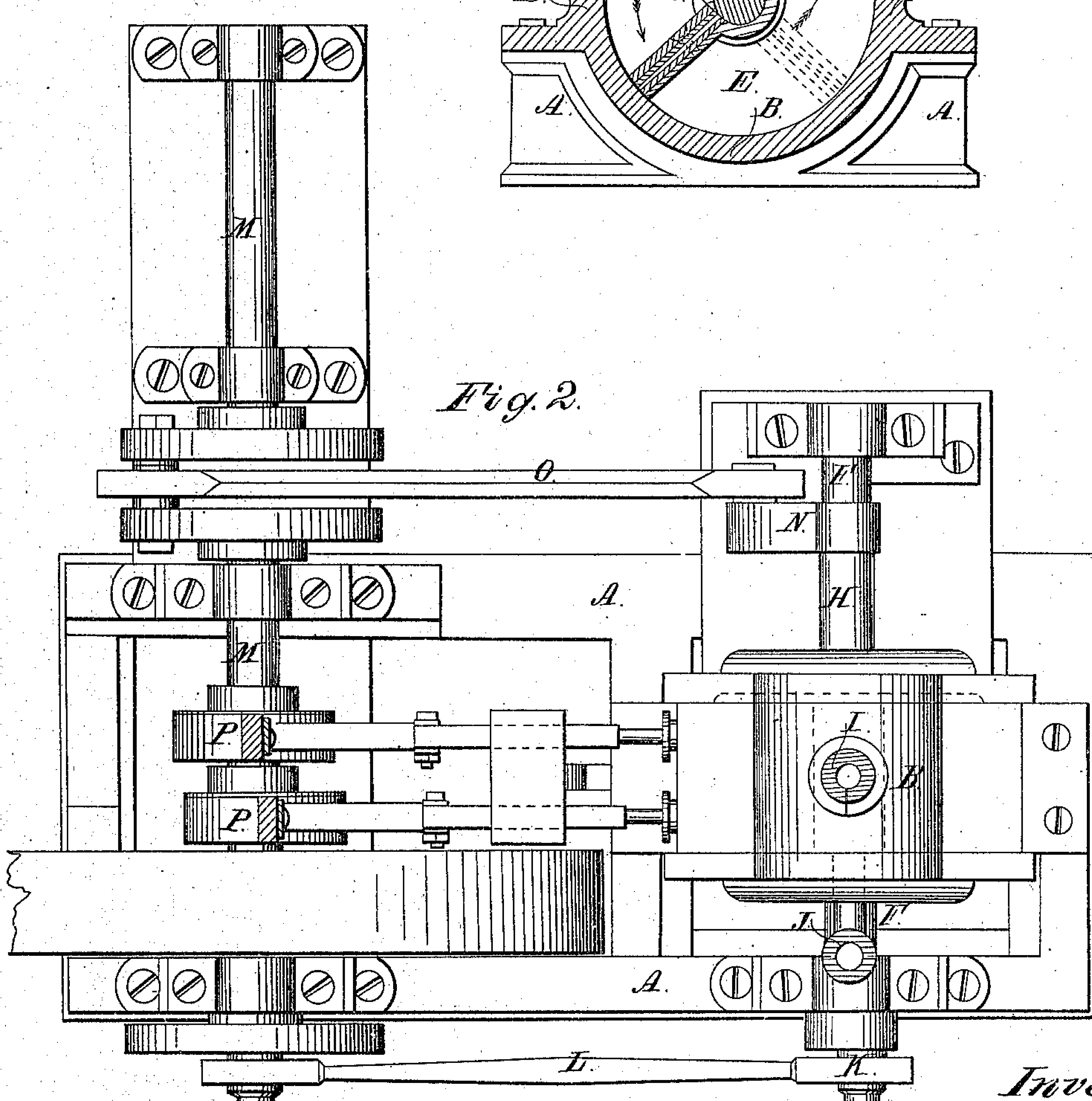


Fig. 2.



Witnesses.
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Inventor.
H. E. Long,
per Alexander & Mason
Attys

Sheet 2, 2 Sheets.

H. E. Long.

Rotary Steam Engine.

No. 103,212. Patented May 17, 1870.

Fig. 3.

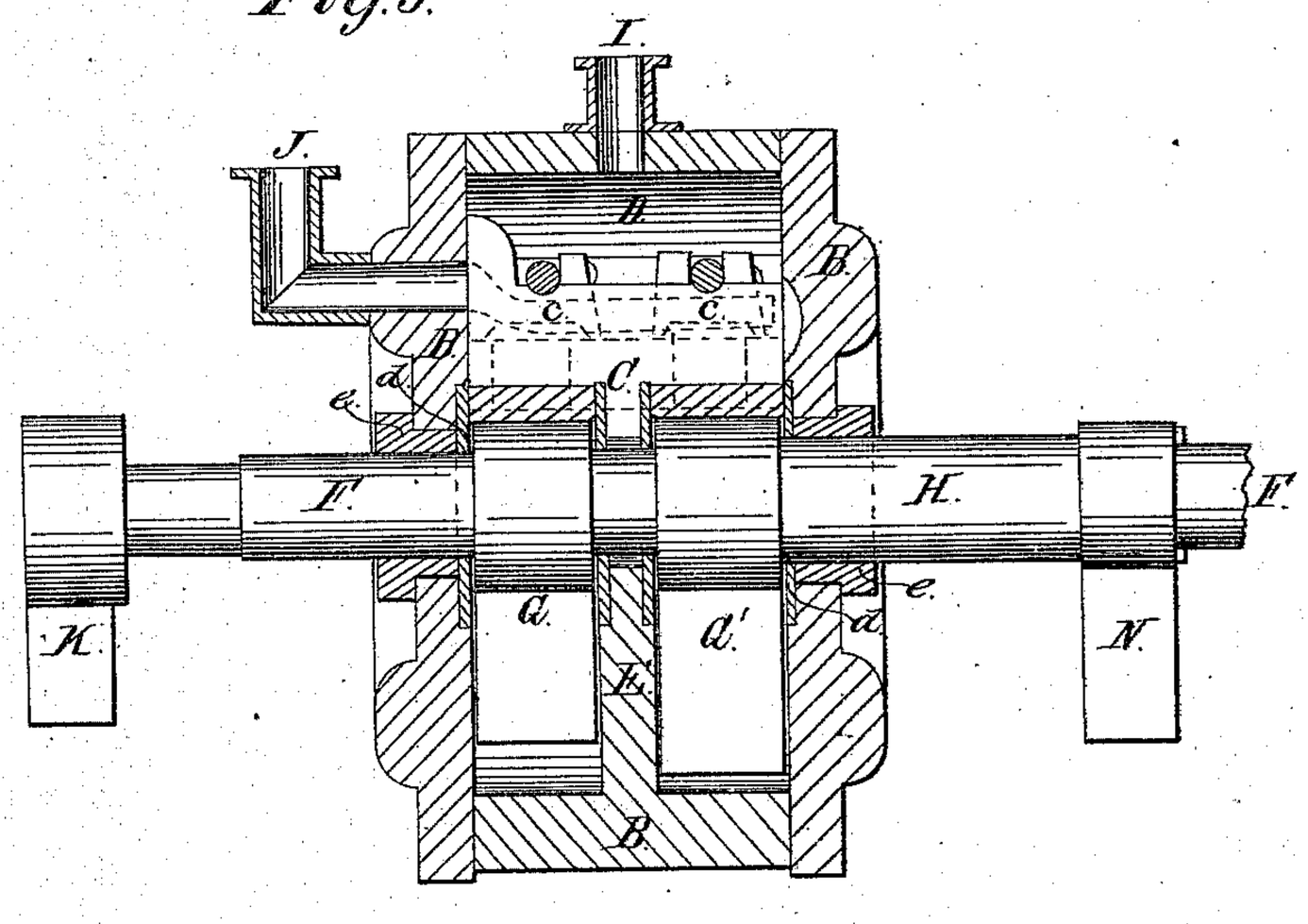


Fig. 4.

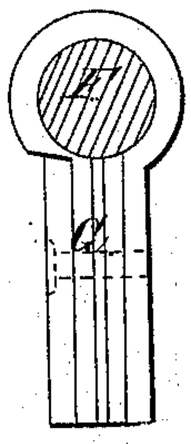
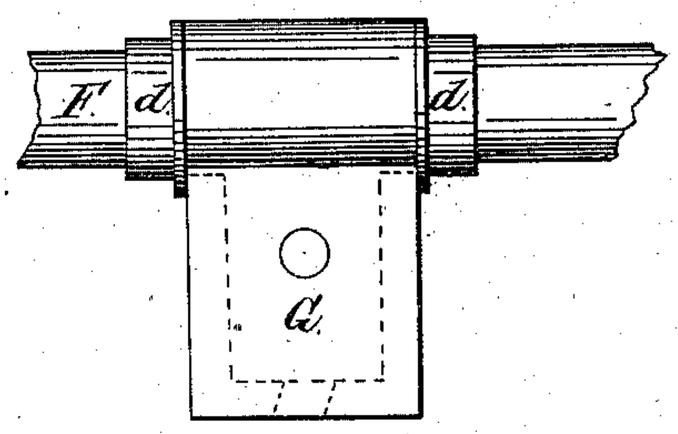


Fig. 5.



Witnesses.

Leopold Everts

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United States Patent Office.

H. E. LONG, OF DECATUR, ILLINOIS.

Letters Patent No. 103,212, *dated May* 17, 1870.

IMPROVEMENT IN STEAM-ENGINE.

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, H. E. LONG, of Decatur, in the county of Macon and in the State of Illinois, have invented certain new and useful Improvements in Steam-Engines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of a double engine, as will be hereinafter fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a longitudinal vertical section of the steam-cylinder, showing its interior arrangement;

Figure 2 is a plan view of the whole engine;

Figure 3 is a transverse vertical section of the cylinder;

Figure 4 is an enlarged end view of the piston or shoving-head; and

Figure 5 is an enlarged side view of the same.

A represents the bed of the engine, and

B, the cylinder, secured to the same in any suitable manner.

The cylinder B is, above its center, provided with a horizontal partition, C, set into the sides of the cylinder forming the valve-seat, the chamber D above the same being the steam-chest.

The part of the cylinder below the valve-seat C is, by a perpendicular partition, E, divided into two chambers of equal size, in each of which a piston operates.

Through the center of the cylinder B, just below the valve-seat C, passes the main shaft or mandrel F, said shaft having its bearings in suitable journal-boxes on the bed A, or in standards placed on the same.

On the main shaft F, inside of one of the chambers under the valve-seat C, is secured a piston, G, and in the other chamber is a similar piston, G′, attached to a hollow shell or sleeve, H, passed around that end of the shaft F.

The valve-seat C is provided with two sets of valve-openings to each of the chambers,

a a being the steam-inlets, and

b b, the outlets.

The valve-slides *c c* are so arranged as to alternately open and close the steam inlets and outlets.

The steam enters into the steam-chest D through the pipe or inlet I; thence through the valve *a*, (shown open in fig. 1,) and forces the piston G around a certain distance, when the change in the valves closes the inlet previously open and opens the other, when the steam forces the head G back again, the steam first admitted passing out through the other opening or outlet *b*, into a recess in the under side of the valve-slide; thence through a steam-channel, and out through the exhaust-pipe J.

It will be observed that each valve-slide closes the outlet, when the inlet is open, and *vice versa*.

The pistons G G′ are provided with packing-rings *d d*, at the ends of the hub-part, which rings are set up by the pressure of the follower of the outside stuffing-boxes *e e*.

Their edges are also provided with packing composed of metal strips, as seen in figs. 4 and 5, and which may be adjusted by steam or springs.

The piston and the steam-valves are so arranged in the cylinders that the heads will move in opposite directions.

One end of the shaft F is provided with a crank, K, connected by a pitman, L, to a crank on the fly-wheel shaft M, and the sleeve H is also provided with a crank, N, connected by a pitman, O, to another crank on the same shaft.

Now, it is clear that, by setting the cranks on the fly-wheel shaft at quarter angles, one will carry the other over the dead-points, each alternately, and thus cause the machinery to move uniform or even.

On the fly-wheel shaft M are eccentrics P P, which are suitably connected with the valve-slides *c c*, and operate the same.

Having thus fully described my invention,

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

1. The combination of the shaft F, hollow shell or sleeve H, and pistons G G′, all constructed and arranged as described and herein set forth.

2. The arrangement within the cylinder B of the valve-seat C, rings *d d*, and pistons G G′, substantially as shown and described.

In testimony that I claim the foregoing, I have hereunto set my hand this 5th day of May, 1869.

H. E. LONG.

Witnesses:

J. B. SHATZER,

A. B. LONG.