

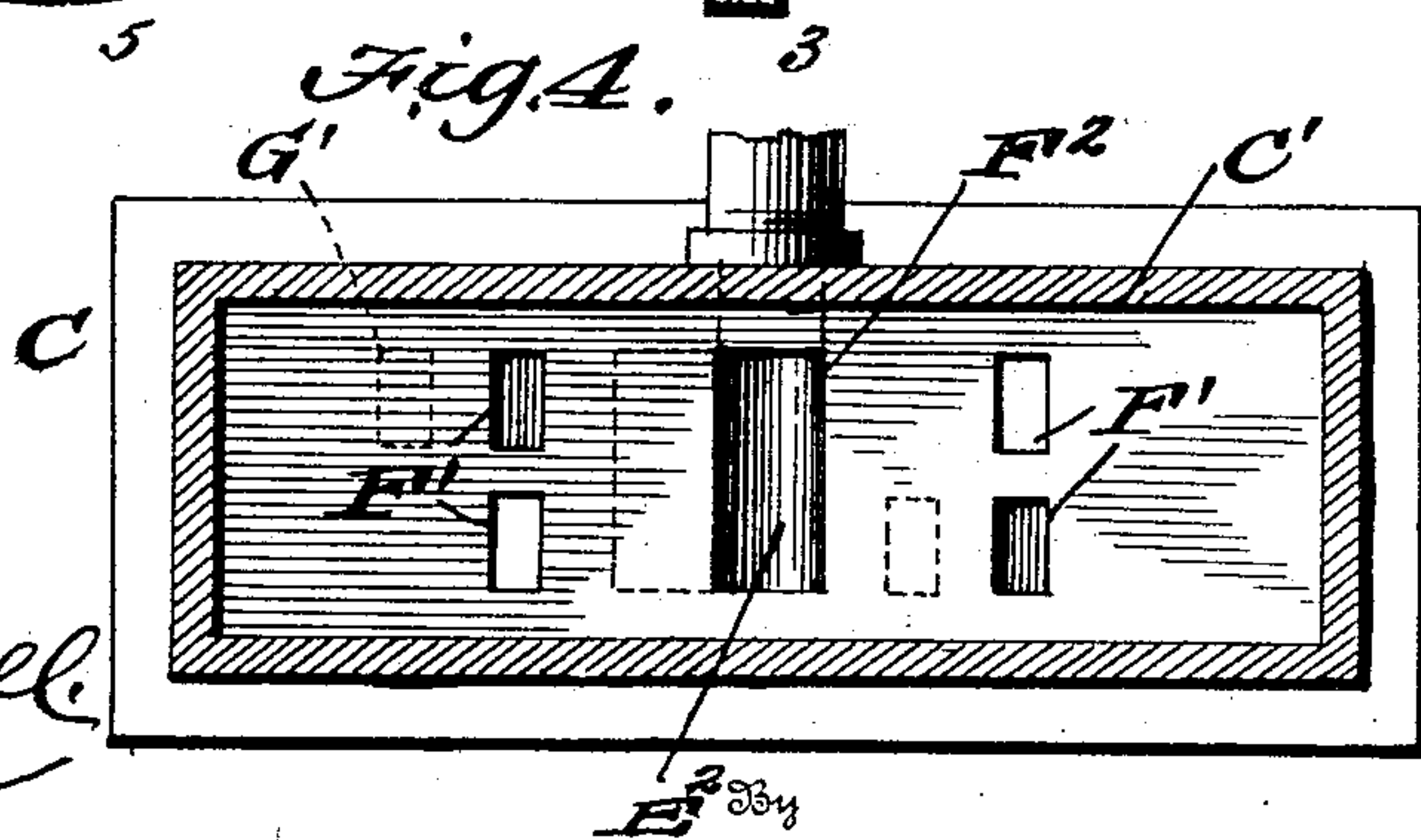
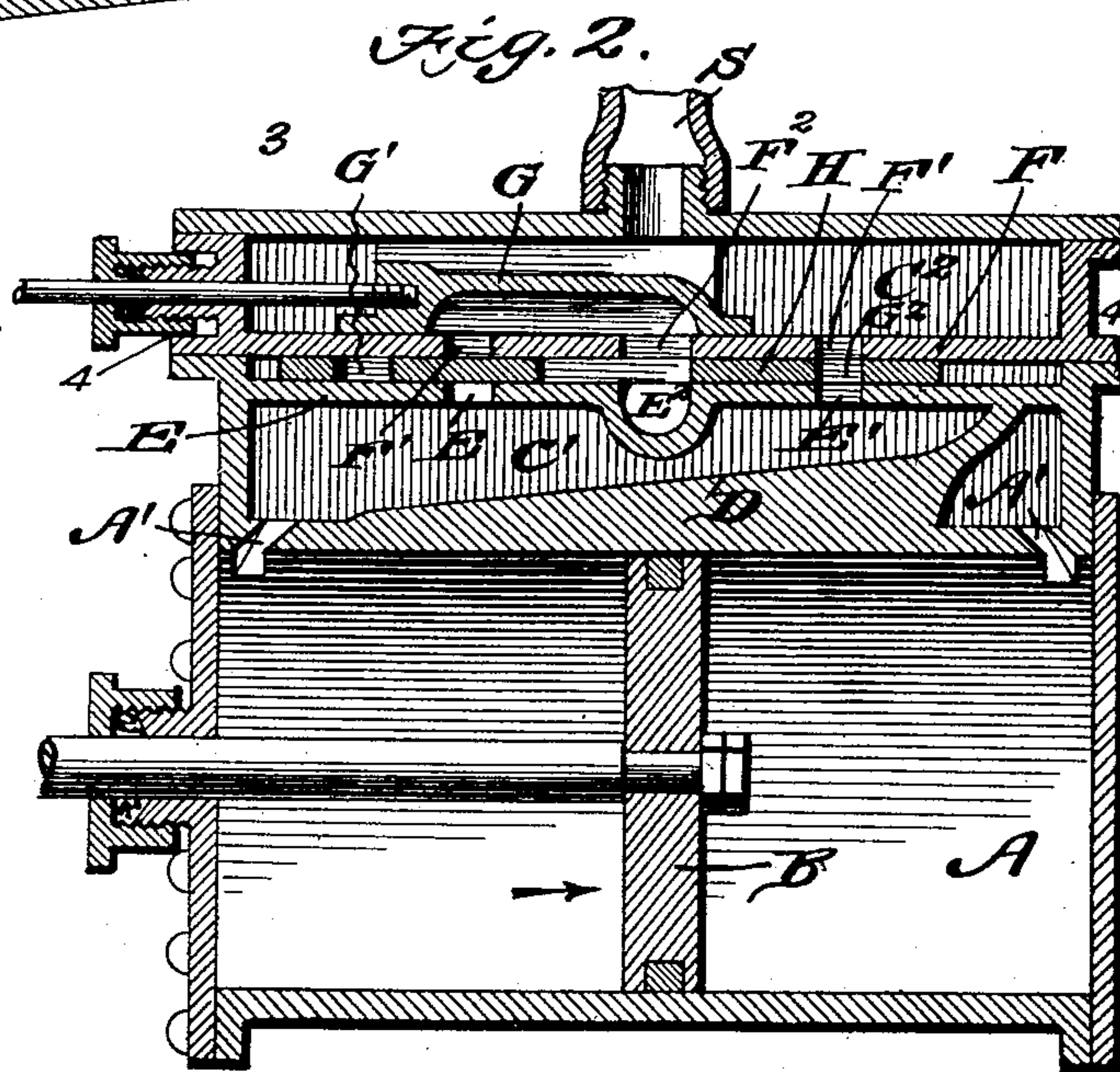
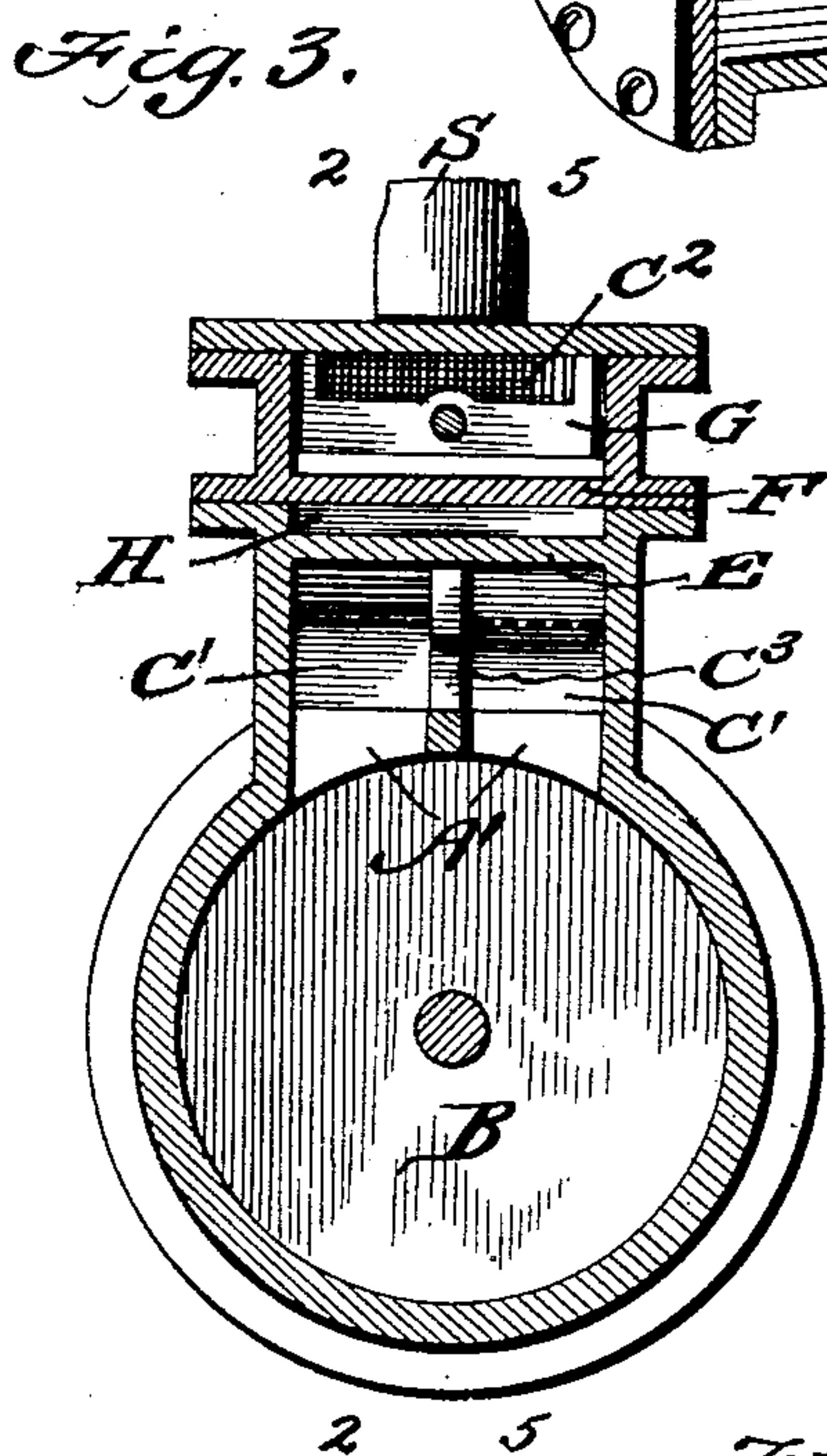
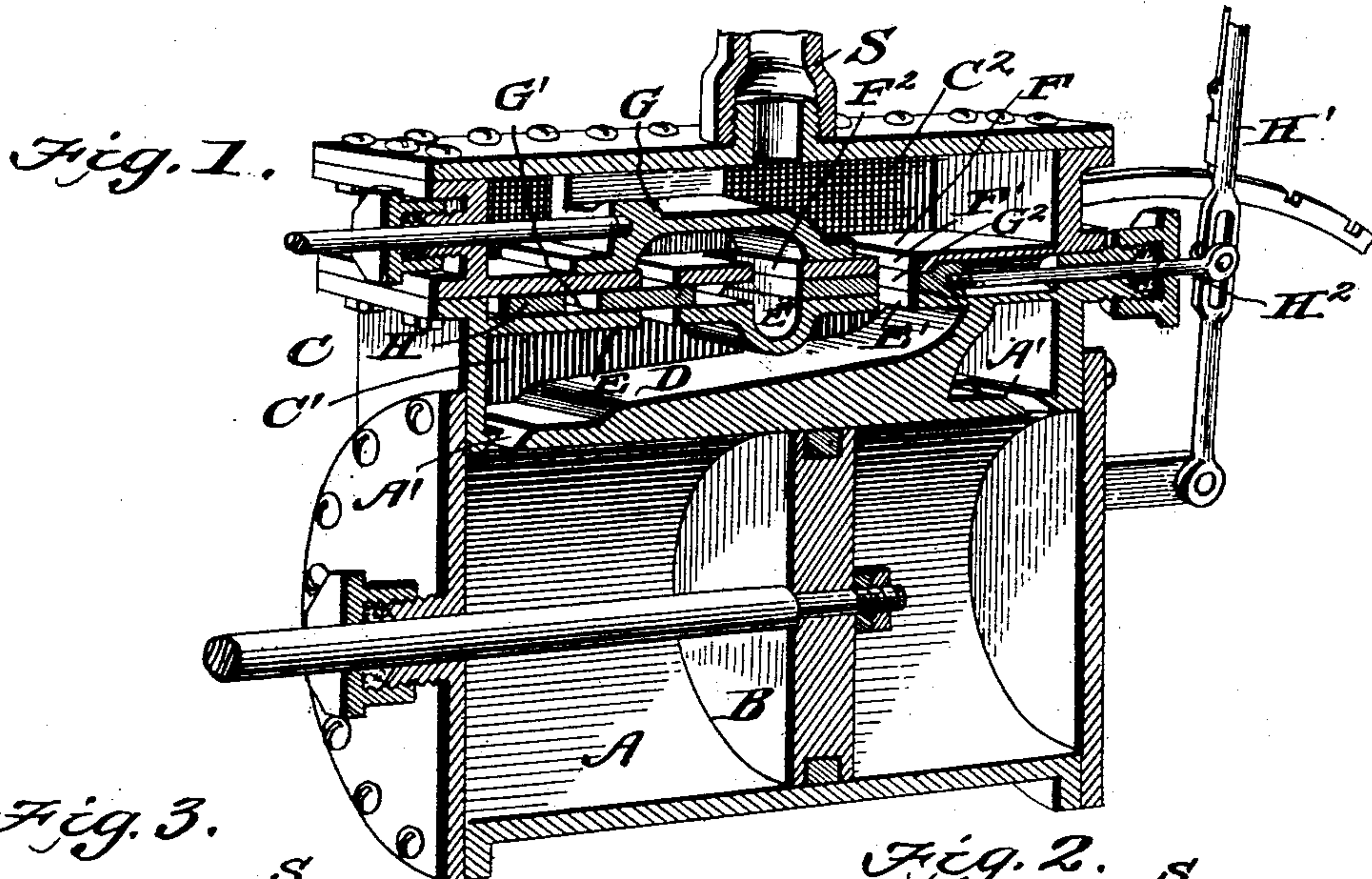
A. H. KOONS.

VALVE FOR REVERSIBLE STEAM ENGINES.

(Application filed May 16, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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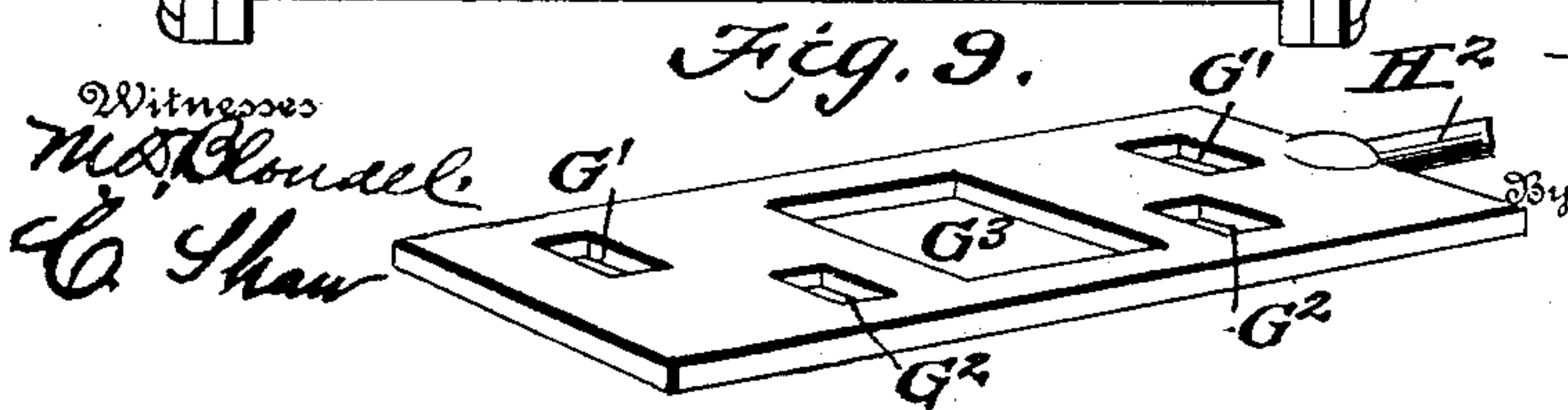
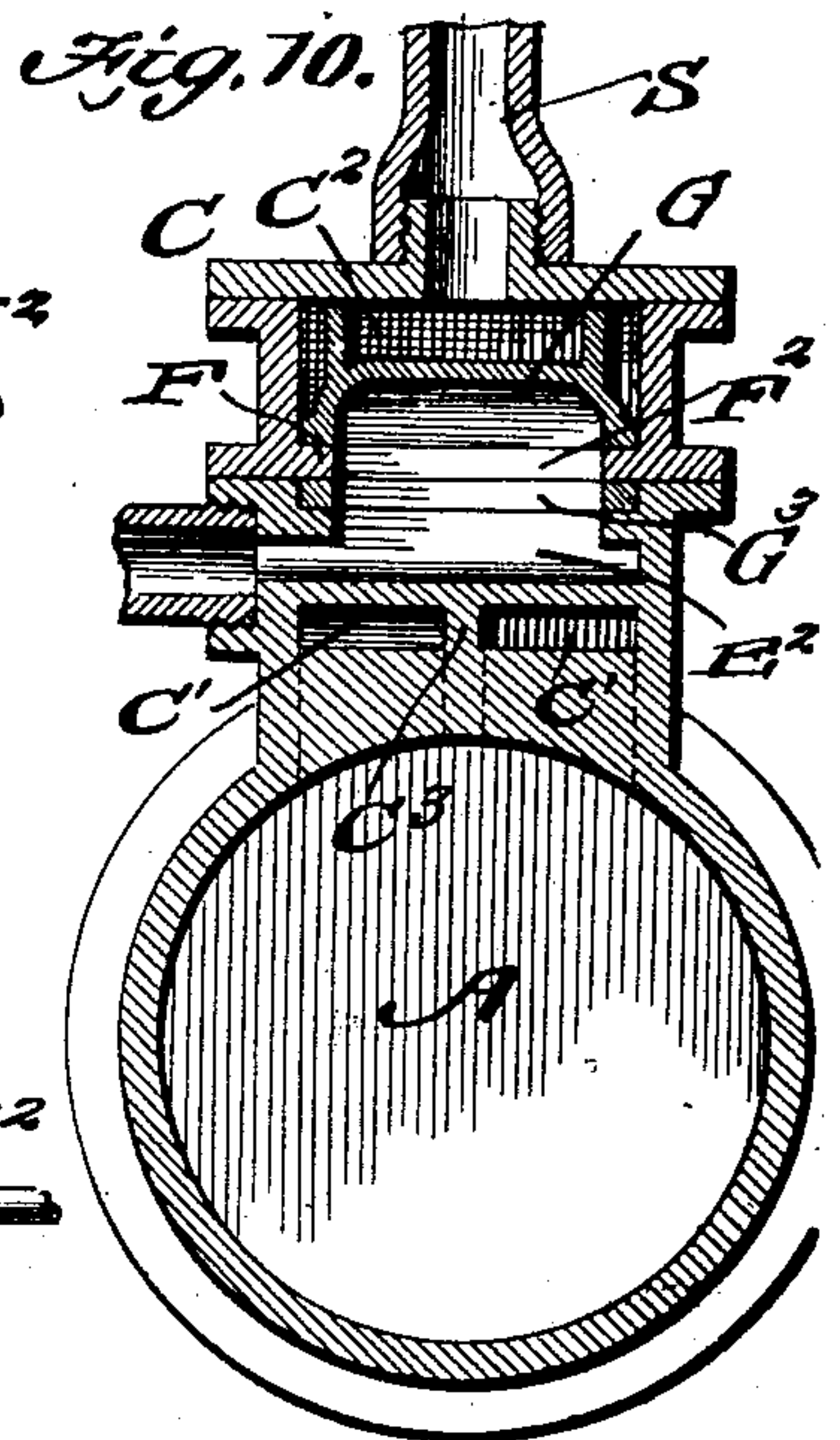
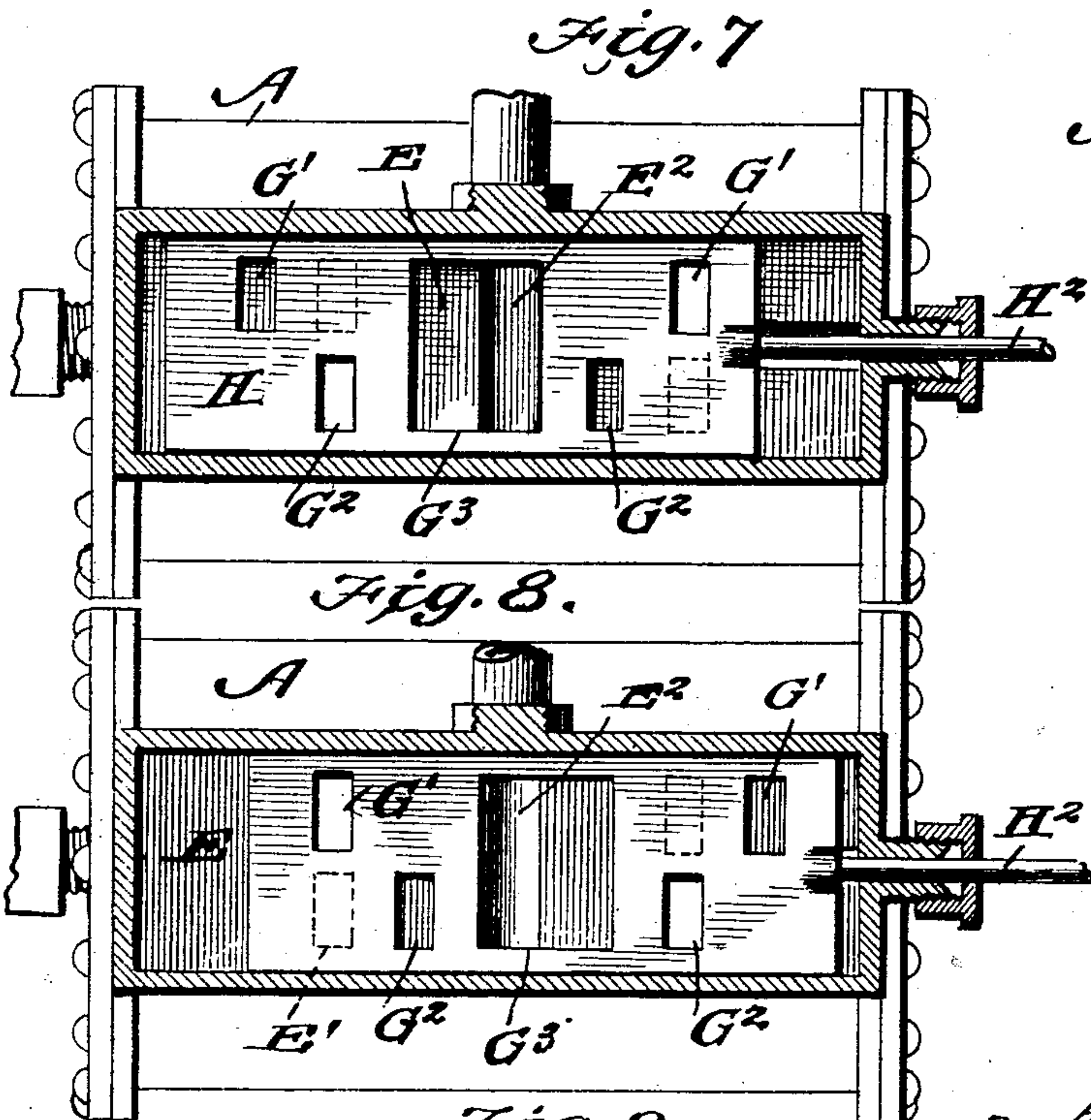
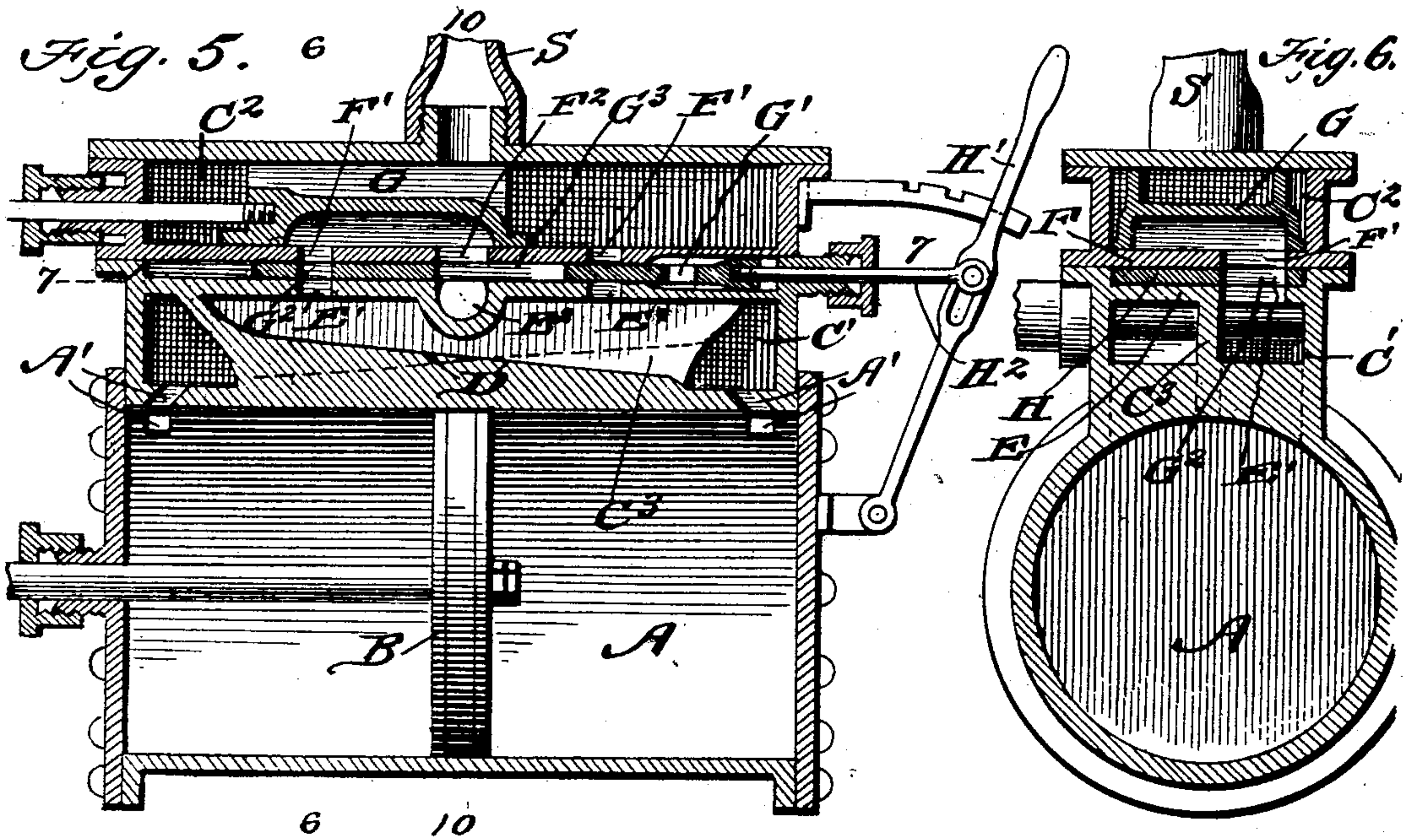
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2 Sheets—Sheet 2.



Inventor

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# UNITED STATES PATENT OFFICE.

AMOS H. KOONS, OF MARTINSVILLE, INDIANA.

## VALVE FOR REVERSIBLE STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 702,860, dated June 17, 1902.

Application filed May 16, 1901. Serial No. 60,544. (No model.)

*To all whom it may concern:*

Be it known that I, AMOS H. KOONS, a citizen of the United States, residing at Martinsville, in the county of Morgan and State of Indiana, have invented a new and useful Valve for Reversible Steam-Engines, of which the following is a specification.

This invention relates generally to steam-engines, and more particularly to an improved reversing mechanism whereby the use of the ordinary link-motion is avoided.

Another object of the invention is to provide an improved mechanism by means of which the motion is not only reversed, but the steam-pressure regulated, thereby accomplishing all of the operations of the link-motion.

Other objects and advantages of the invention will appear hereinafter; and the invention consists in the peculiar construction of the various parts and in their novel combination or arrangement, all of which will be fully described hereinafter and pointed out in the claims.

In the drawings forming a part of this specification, Figure 1 is a sectional perspective illustrating my invention. Fig. 2 is a longitudinal section on the line 2 2 of Fig. 3. Fig. 3 is a section taken on the line 3 3 of Fig. 2. Fig. 4 is a section on the line 4 4 of Fig. 2. Fig. 5 is a longitudinal section on the line 5 5 of Fig. 3. Fig. 6 is a transverse section on the line 6 6 of Fig. 5. Fig. 7 is a horizontal section on the line 7 7 of Fig. 5. Fig. 8 is a similar view, the reversing plate being shifted. Fig. 9 is a detail perspective of the reversing plate, and Fig. 10 is a transverse vertical section on the line 10 10 of Fig. 5.

In carrying out my invention I employ a cylinder A, in which works the piston B. The steam-chest C, which is arranged upon the cylinder A, is of peculiar formation and comprises the lower section C' and the upper section C<sup>2</sup>, the lower section C' being divided longitudinally by means of a vertical partition C<sup>3</sup>.

A' indicates steam-ports arranged at each end of the cylinder, and the lower section of the steam-chest is provided with oppositely-inclined partitions D for the purpose of separating the ports upon the opposite sides of the central partition C<sup>3</sup>.

E, which forms the top of the lower section C', is a bearing-plate, and F, which constitutes the bottom of the upper section C<sup>2</sup>, is a valve-seat for the valve G, and working between the bearing-plate E and the valve-seat F is the reversing plate H, connected to a lever H' by means of a pitman H<sup>2</sup>, said lever being pivoted at the rear end of the cylinder, as most clearly shown at Figs. 1 and 5. The valve G is of the usual construction, and the bearing-plate E and the valve-seat F have registering port-openings E' and F', respectively, and the ordinary exhaust-openings E<sup>2</sup> and F<sup>2</sup> are also arranged in connection with the said bearing-plate and valve-seat. As before stated, the bearing-plate and valve-seat have registering openings E' and F', and these openings are arranged in alinement, as most clearly shown in Fig. 4, it being understood that four openings are produced in the plate and four openings in the valve-seat and at each end, such construction being made necessary on account of the subdividing-partition C<sup>3</sup>. The reversing plate H also has four openings produced therein, as indicated at G' and G<sup>2</sup>, and the central exhaust-opening G<sup>3</sup> is also provided, and it will be noted that this exhaust-opening is twice the length of the exhaust-opening F<sup>2</sup> in the valve-seat F. It will also be noted that the openings G' and G<sup>2</sup> are not in alinement, but are arranged in stepped order, as most clearly shown in Figs. 7, 8, and 9, so that by shifting the position of the plate between the bearing-plate and valve-seat alternate series of openings are brought into register with the port-openings of the plate and valve-seat, and thereby control the motion of the piston.

In operation steam is admitted to the chest through the steam-pipe S and passes through the ports F', G<sup>2</sup>, and E' and through the port A' at the left-hand or forward end of the cylinder into the said cylinder, forcing the piston in the direction indicated by the arrow in Fig. 2. At the same time steam is exhausting from the opposite end through the ports A', E', G<sup>2</sup>, F', F<sup>2</sup>, and E<sup>2</sup>, and these operations will continue as long as the reversing plate remains in that position, it being understood that the steam enters through the port G' upon one side of the central partition and exhausts through the port G<sup>2</sup> upon the



opposite side of the partition. The lever for operating the shifting plate can be adjusted to cut off or regulate the steam to any desired extent, and by completely shifting or  
 5 reversing the position of the plate, as most clearly shown in Fig. 5, it will be noted that the steam will enter through the port G' at the opposite end and exhaust through the  
 10 port G<sup>2</sup>, which is oppositely disposed to the port G<sup>2</sup> previously referred to in the first operation. The exhaust-opening G<sup>3</sup> being double the size of the exhaust-openings F<sup>2</sup> and G<sup>2</sup>, will always be in register with the  
 15 said exhaust-openings, irrespective of the position of the reversing plate.

The operation and advantages of my invention will thus be clearly understood, and it will be readily seen that I provide an exceedingly simple and efficient reversing mechanism, which will avoid the use of link-motion and at the same time accomplish all of its advantageous results.

Having thus fully described my invention, what I claim as new, and desire to secure by  
 25 Letters Patent of the United States, is—

1. In a reversing-gear for steam-engines, the combination with the bearing-plate and valve-seat having alining ports or openings upon opposite sides of a central longitudinal  
 30 line, of a reversing plate arranged between the bearing-plate and valve-seat and having non-alining openings or ports upon opposite sides of a central longitudinal line, said plate being movable horizontally for the purpose  
 35 of bringing certain of its ports into register with the ports or openings in the bearing-plate and valve-seat, substantially as shown and described.

2. In a reversing-gear for steam-engines,  
 40 the combination with a bearing-plate and valve-seat having alining ports or openings and arranged above a central partition in the steam-chest, of a reversing plate arranged between the bearing-plate and valve-seat and  
 45 having ports or openings adapted to be alter-

nately brought into register with the ports or openings of the valve-seat and bearing-plate, substantially as shown and described.

3. The combination with a cylinder, of a steam-chest said chest having a longitudinal  
 50 partition provided with oppositely-inclined partitions upon its opposite sides, a bearing-plate having openings or ports therein, a valve-seat having openings or ports arranged in alinement with the openings or ports of  
 55 the bearing-plate, and a reversing plate arranged to work between the bearing-plate and valve-seat and provided with non-alining openings or ports, substantially as shown and described. 60

4. In a reversing-gear for steam-engines, the combination with the bearing-plate having steam inlet and exhaust ports or openings, of a valve-seat having inlet and exhaust  
 65 openings upon opposite sides of a central longitudinal line adapted for alinement with the openings or ports of the bearing-plate, and the reversing plate having non-alining inlet openings or ports, and an exhaust-port of a size to be continually in register with the ex-  
 70 haust ports or openings in the valve-seat and bearing-plate, substantially as shown and described.

5. The combination with the cylinder and steam-chest of a longitudinal partition arranged in the said steam-chest, the oppositely-inclined partitions arranged upon opposite sides of the longitudinal partition, the bearing-plate and valve-seat having alining  
 75 ports or openings, the reversing plate sliding between the bearing-plate and valve-seat and having non-alining inlet openings or ports and a continuously-alining exhaust-port, and means for shifting or reversing the said plate, substantially as described. 80

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