

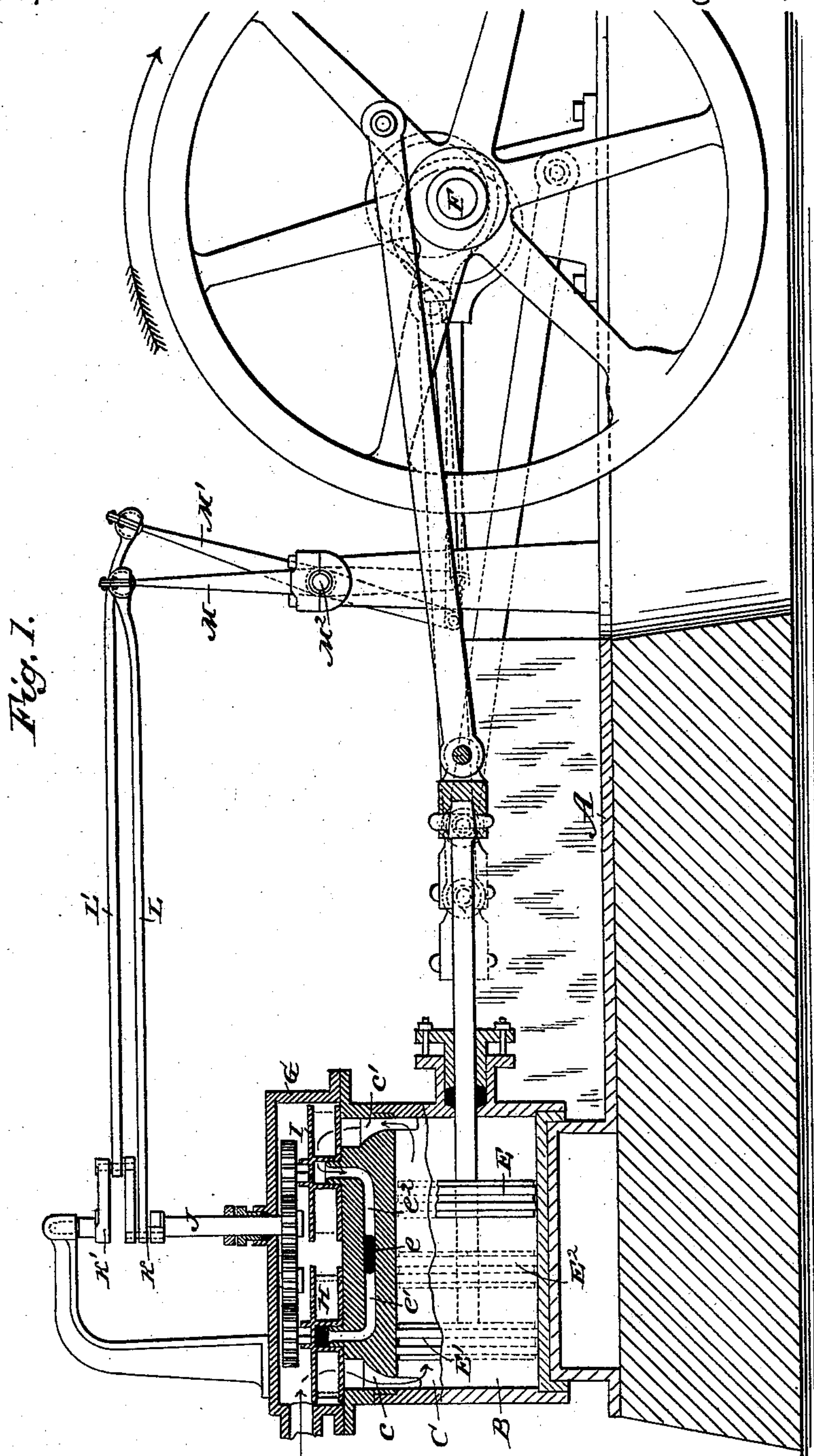
(No Model.)

3 Sheets—Sheet 1.

P. S. RUSH.  
STEAM ENGINE.

No. 368,974.

Patented Aug. 30, 1887.



WITNESSES:  
*Motzger*  
*C. Sedgwick*

INVENTOR:  
*P. S. Rush*  
BY *Munn & Co*  
ATTORNEYS.

(No Model.)

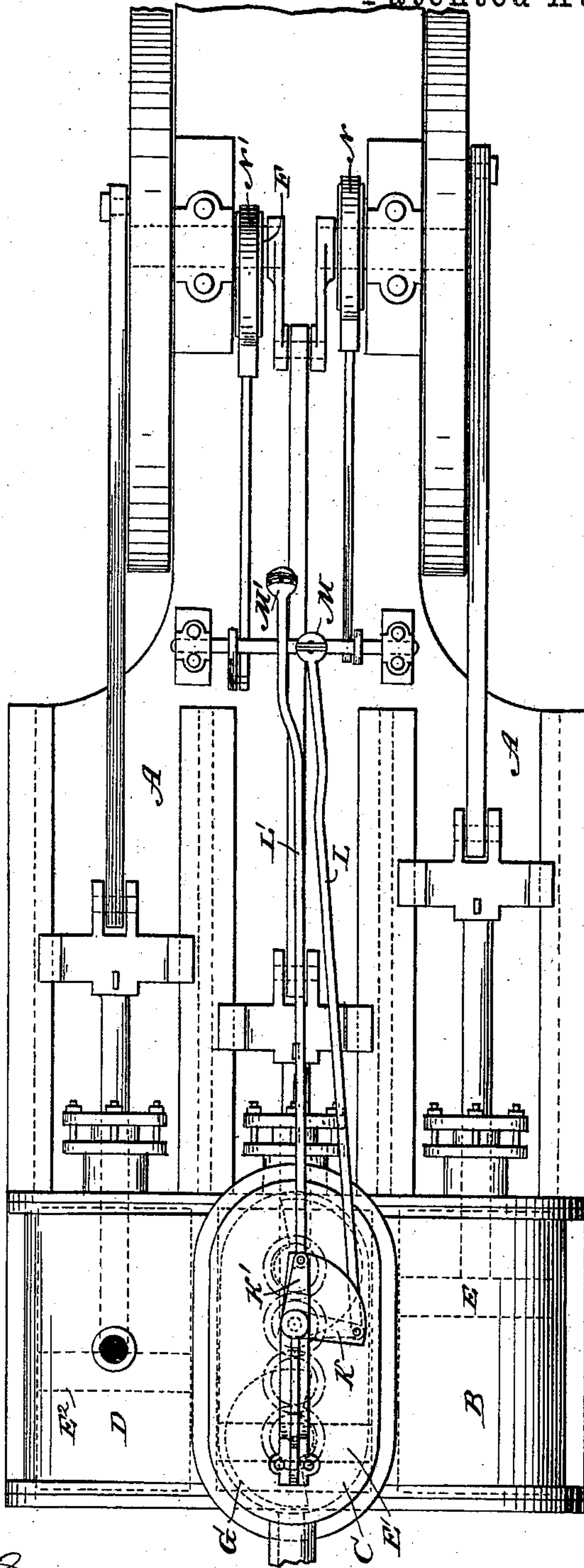
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Fig. 2.



WITNESSES:

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(No Model.)

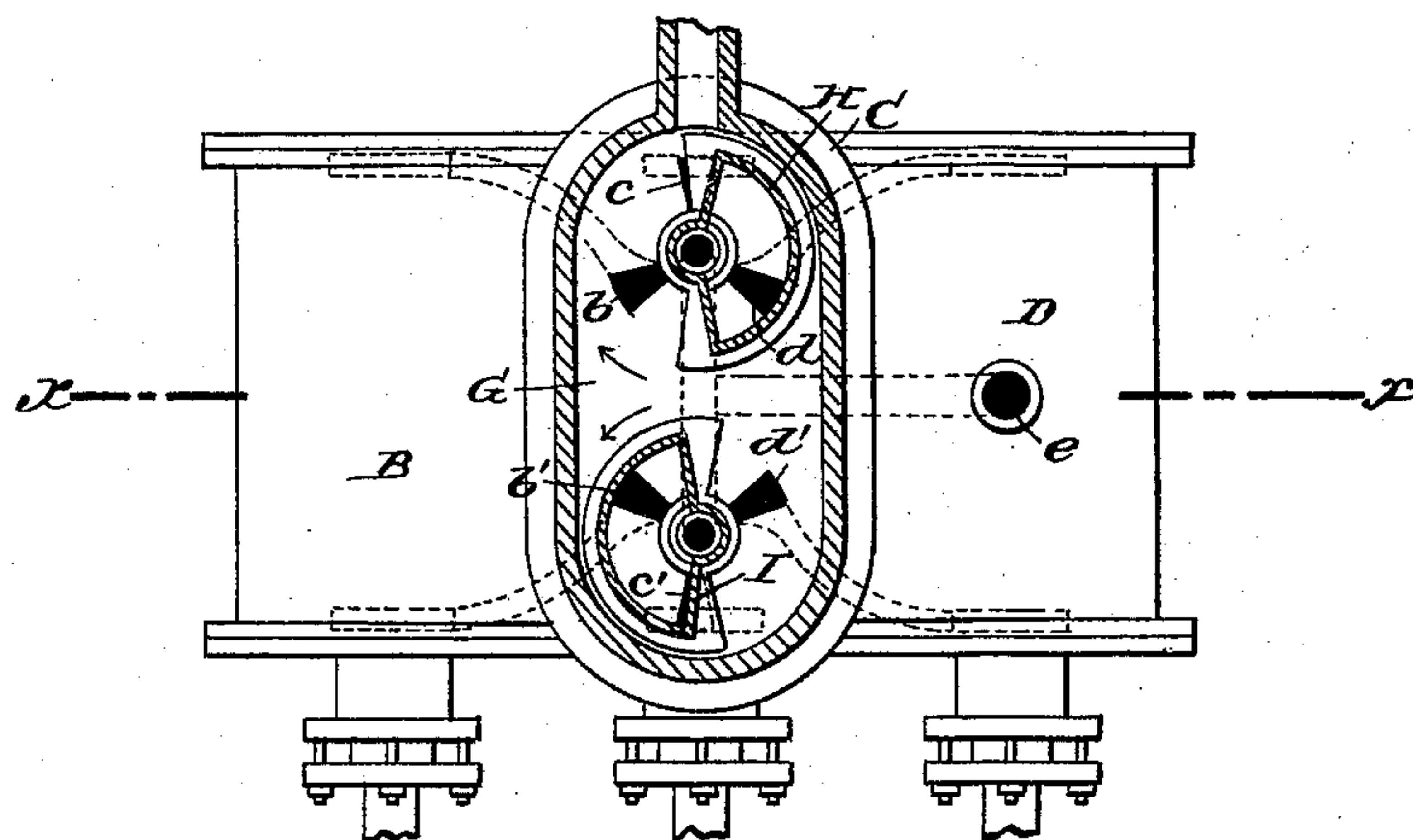
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P. S. RUSH.  
STEAM ENGINE.

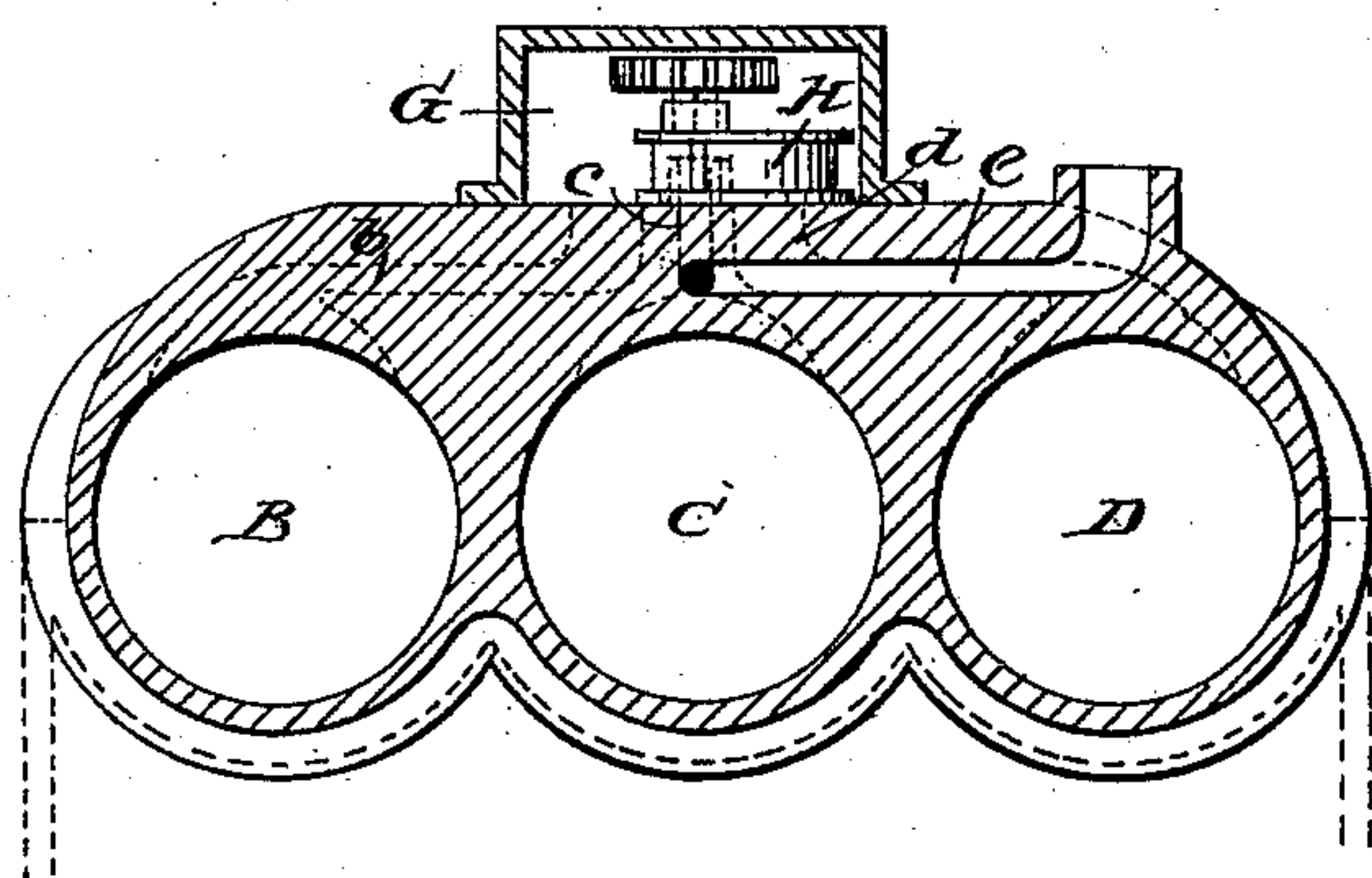
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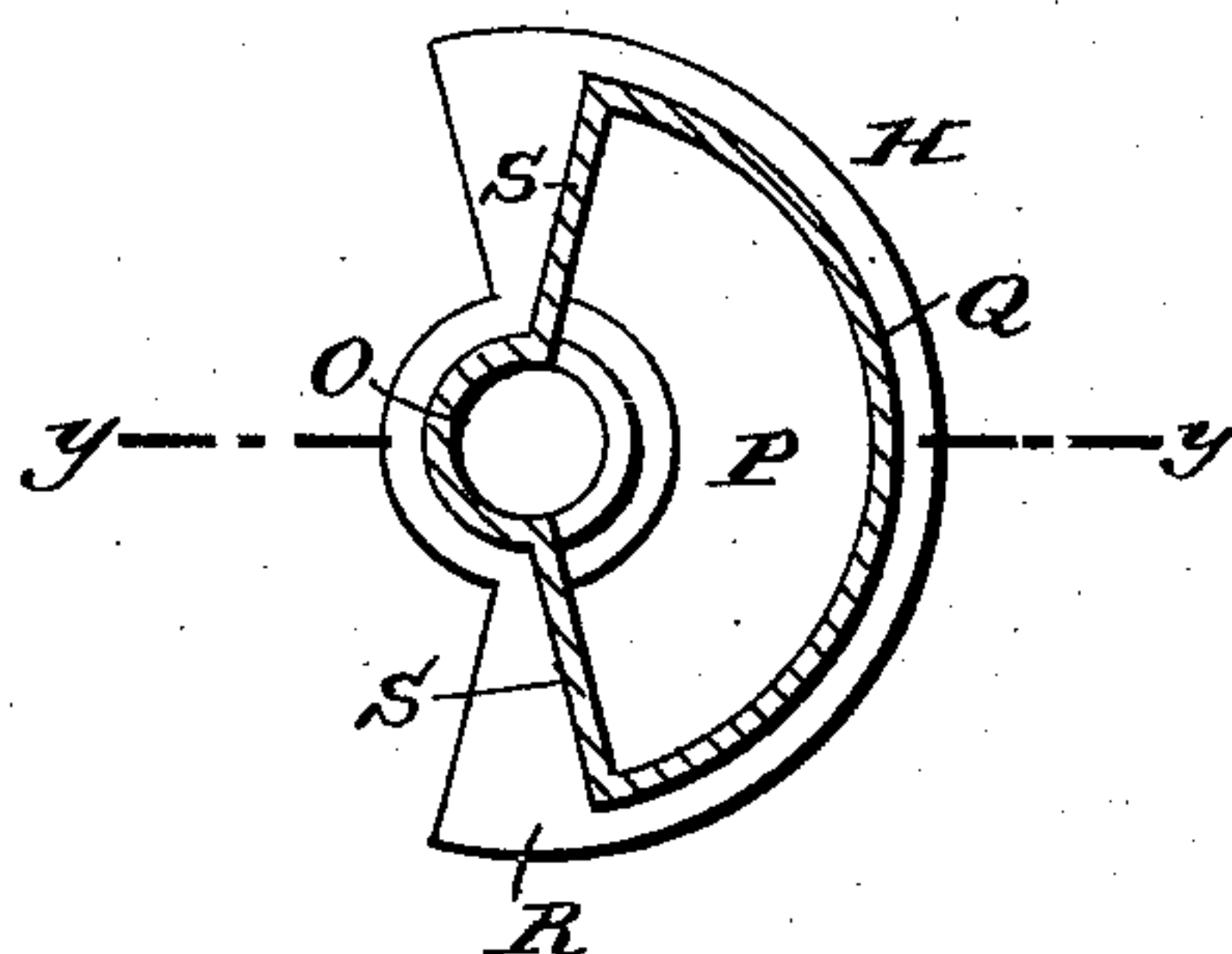
*Fig. 3.*



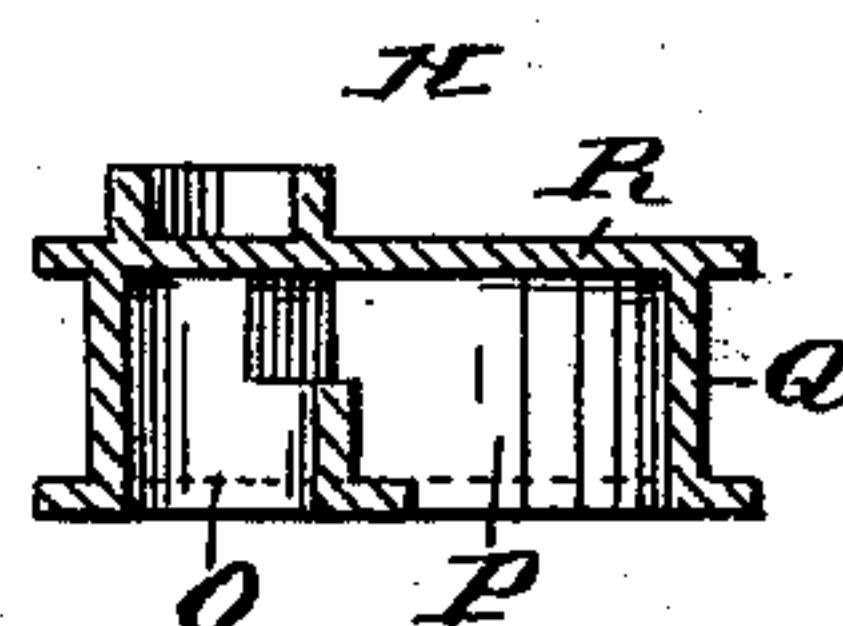
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



WITNESSES:

*Wm. Beyer*  
*C. Sedgwick*

INVENTOR:

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# UNITED STATES PATENT OFFICE.

PETER S. RUSH, OF ATLANTA, TEXAS.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 368,974, dated August 30, 1887.

Application filed November 2, 1886. Serial No. 217,789. (No model.)

*To all whom it may concern:*

Be it known that I, PETER S. RUSH, of Atlanta, in the county of Cass and State of Texas, have invented a new and Improved Steam-Engine, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved steam-engine in which a dead-center position is obviated and the pressure of the live steam is completely and very advantageously utilized.

The invention consists in the construction and arrangement of various parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section of my improvement. Fig. 2 is a plan view of the same. Fig. 3 is a plan view of the cylinders with the steam-chest in section. Fig. 4 is a vertical cross-section of the same on the line  $xx$  of Fig. 3. Fig. 5 is a sectional bottom view of one of the valves, and Fig. 6 is a vertical cross-section of the same on the line  $yy$  of Fig. 5.

On the frame A, of suitable construction, are mounted, at its rear end, the three cylinders B, C, and D, placed alongside of each other and each provided with a piston, E, E', and E'', respectively. These pistons E, E', and E'' are connected by the usual means with the main shaft F of the engine.

Above the middle cylinder, C, is located a steam-chest, G, which supplies the three cylinders with live steam by means of the two rotary valves H and I, which are alike in construction and operate together by means of a train of gear-wheels which is set in motion by the revolving shaft J, having two crank-arms, K and K', connected by the rods L and L', respectively, with the rocking beams M and M', each independently mounted on the shaft M'', held in standards held on the main frame A. The said rocking beams M and M' are connected by the usual eccentric-rods with the eccentrics N and N', secured to the main shaft F.

The rotary valve H operates over the ports  $b$ ,  $c$ , and  $d$ , leading from the steam-chest G to

the outer ends of the respective cylinders B, C, and D, and the rotary valve I operates over the ports  $b'$ ,  $c'$ , and  $d'$ , leading from the steam-chest G to the inner ends of the respective cylinders B, C, and D. The exhaust-port  $e$  is connected by means of the branch pipes  $e'$  and  $e''$  with the central openings in the hubs of the valves H and I.

Each of the rotary valves H and I is fitted so that its hub O will rotate on a projection on the steam-chest G, and is provided with a chamber, P, formed between the semicircular flanged rim Q, the top plate, R, and the flanged side walls, S S. The exhaust branch pipes  $e'$  and  $e''$  are always in communication with the said chamber P. A part of the hub O of the respective valves H and I, cut away on the inside of said chamber, is shown in Fig. 3.

The valves H and I operate simultaneously, but rotate in opposite directions at the same speed, so that when the ports  $b$ ,  $c$ , and  $d$  are alternately closed and exhaust, then the ports  $b'$ ,  $c'$ , and  $d'$  are alternately opened, and when the piston E in the cylinder B travels forward, as shown in Figs. 1 and 2, then the piston E' in the cylinder D is on its return-stroke, while the piston E' in the central cylinder, C, is in the middle position between the two pistons of the outer cylinders, B and D, so that at no time can a dead-center position of the three pistons take place simultaneously in relation to the main shaft F.

The crank-arms K and K' stand at right angles to each other, so that the rocking motion imparted to the rocking beams M and M' from their respective eccentrics N and N' on the main shaft causes the shaft J to rotate continuously.

The respective ends of the three cylinders take steam whenever the respective port is uncovered by the said valves H and I, and the exhaust takes place when one of the ports is in communication with the chamber P of the valve, so that the steam from the said port passes to the hub O and into the respective branch pipe leading into the exhaust-port  $e$ .

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent--

1. In a steam-engine, three cylinders arranged alongside of each other, and a piston



for each of the said cylinders, said pistons being connected with the main shaft in the usual manner, in combination with the steam-chest into which open the ports leading to the ends of the said cylinders, two rotary valves operating over the said ports in the said steam-chest, and means for rotating the said valves from the main shaft, substantially as shown and described.

2. In a steam-engine, three cylinders arranged alongside of each other, and a piston for each of said cylinders, said pistons being connected with the main shaft in the usual manner, in combination with the steam-chest, into which open the ports leading to the ends of said cylinders, and two rotary valves, each having a chamber connected at all times with the exhaust-port, and the said valves operating over the said ports in the steam-chest, substantially as shown and described.

3. In a steam-engine, the cylinders B, C, and D, the pistons E, E', and E'', operating in the said cylinders and connected in the usual manner with the main shaft F, and the steam-chest G, arranged above the said cylinders and connected by the ports *b b'*, *c c'*, and *d d'* with the ends of the said cylinders B, C, and D, in combination with the two rotary valves H and I, each provided with a chamber, P, into which open alternately the said ports leading to the front or inner ends of the cylinders, the said chamber being also connected continuously

with the exhaust *e*, and means for revolving the said valves H and I over the said ports in the steam-chest, substantially as shown and described. 35

4. In a steam-engine, the steam-chest G, into which open the ports *b*, *c*, and *d*, leading to the rear ends of the cylinders B, C, and D, and the ports *b'*, *c'*, and *d'*, leading to the inner ends of said cylinders, in combination with the two valves H and I, of which the valve H operates over the ports *b*, *c*, and *d*, and the valve I operates over the ports *b'*, *c'*, and *d'*, each of the valves being provided with a chamber into which open the respective ports, and which is continuously connected with the exhaust *e*, substantially as shown and described. 40 45

5. In a steam-engine, the valves H and I, rotating in the steam-chest G over the ports leading to the ends of the cylinders B, C, and D, the shaft J imparting by suitable means motion to the said valves H and I, and the crank-arms K and K' on the said shaft, in combination with the rocking levers M and M', connected by means of the rods L and L' with the said crank-arms K and K', and the eccentrics N and N', connected with the said rocking levers M and M', substantially as shown and described. 50 55

PETER S. RUSH.

Witnesses:

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I. L. WALTER.