(No Model.) 2 Sheets—Sheet 1

J. P. SIMMONS.

CUT-OFF VALVE.

No. 305,718. Patented Sept. 23, 1884.

FIG. 1.

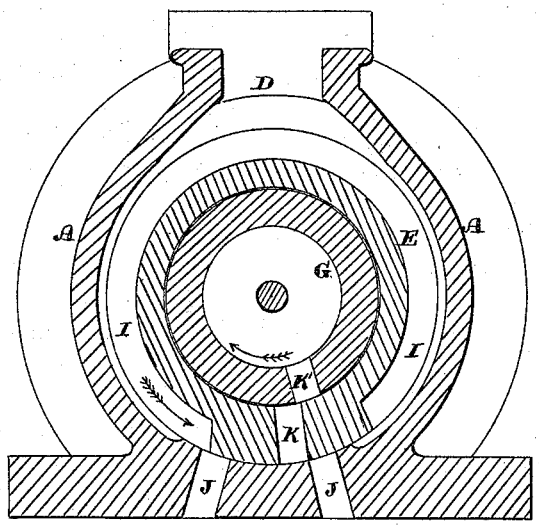


FIG. 2

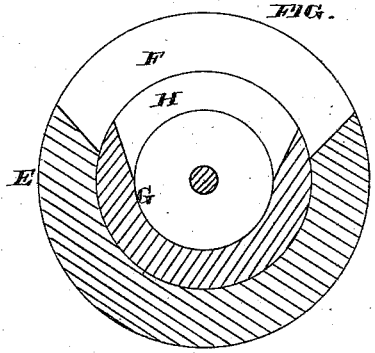
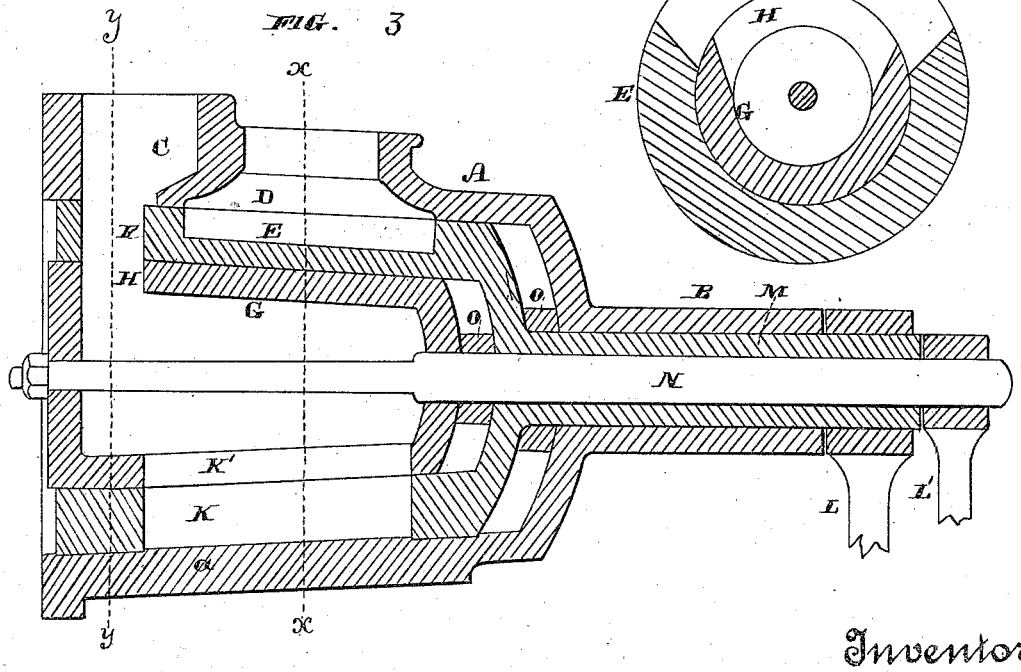


FIG. 3



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(No Model.) 2 Sheets—Sheet 2.

J. P. SIMMONS.

CUT-OFF VALVE.

No. 305,718. Patented Sept. 23, 1884.

FIG. 4

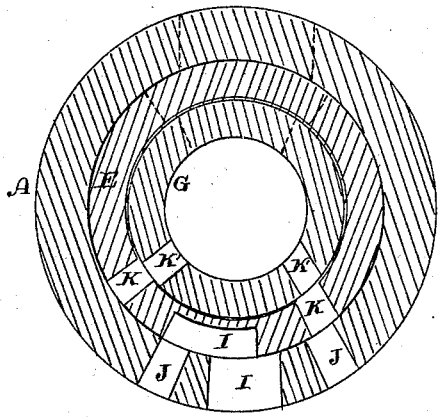
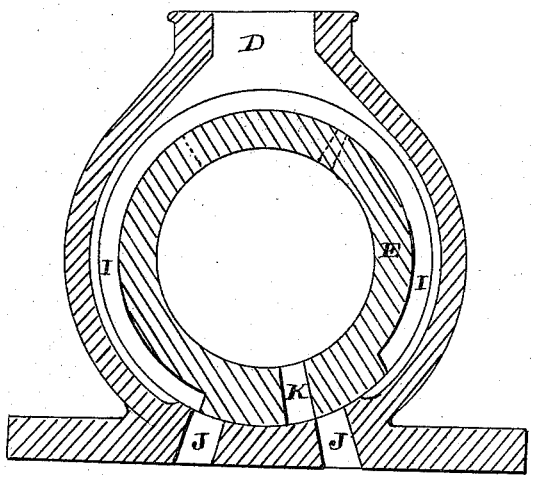


FIG. 5



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UNITED STATES PATENT OFFICE.

JOHN P. SIMMONS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO WILLIAM H. OHMEN, OF SAME PLACE.

CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 305,718, dated September 23, 1884.

Application filed October 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. SIMMONS, of the city and county of San Francisco, and State of California, have invented an Improvement in Cut-Off Valves; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in valves for engines; and it consists of a novel combination of a conically-shaped valve oscillating or partially rotating within a similarly-shaped valve-chamber and steam-chest, and an interior concentrically-placed cut-off valve, also rotating, so as to limit the admission of steam.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a transverse section of the steam-chest and valves taken through *x x*, Fig. 3. Fig. 2 is a section taken through *y y*, Fig. 3. Fig. 3 is a longitudinal vertical section taken through the steam-chest and valves. Fig. 4 shows the steam-port outside and the exhaust-port in the center. Fig. 5 shows the cut-off valve omitted.

A is the steam-chest, its interior being of the shape of a frustum of a cone of considerable length, having an extension or sleeve, B, through which the stems pass to move the main and cut-off valves.

C is a passage or port through which steam is admitted into the steam-chest; and D is the exhaust-passage through which the steam escapes when released from the cylinder. The main valve E fits the interior tapering form of the steam-chest, forming a steam-tight working-surface between the two, and it has a passage, F, communicating with the steam-passage C in the chest, so that steam may be admitted into its interior. Within the main valve is fitted the cut-off valve G, its exterior surface fitting within the tapering interior of the main valve, in the same manner that the main valve fits into the steam-chest, and the surfaces work together steam-tight.

H is a passage through the cut-off-valve shell, communicating with the passage C and F in the steam-chest and main valve, so that steam may be admitted through them into the interior of the cut-off valve.

I is a space or passage around the outside of the main valve through which exhaust-steam from the engine escapes, and is discharged through the passage D in the steam-chest.

J J are steam-ports leading to opposite ends of the engine-cylinder and communicating with the interior of the steam-chest.

K is a port through the main valve, and K′ is a port through the cut-off valve, through which steam passes from the interior of the latter valve to the engine-cylinder through the ports J J alternately when the ports K and K′ are brought to coincide with them. Each of the valves E and G are given a rotary oscillation by means of eccentrics, which are connected by rods with rocker-arms L L′. The main valve E has a hollow stem or sleeve, M, which extends out through the extension B of the steam-chest, and the rocker-arm L is secured to it. The stem N of the cut-off valve extends out through the hollow sleeve M, and has the arm L′ keyed to it. Collars O O are fitted around the stems M and N, and between the ends of the valves and the inner ends of the chambers within which they oscillate, to prevent their being forced too far in. The opposite or outer end of the steam chest or case may have a cover which closes it. The operation will then be as follows: The eccentrics are set so that when the engine moves the main valve is turned until its port K coincides with one of the cylinder-ports J. The cut-off valve is moved simultaneously, so that its port K′ is in advance of the port K of the main valve, and does not allow any steam from the interior of the cut-off valve (which is supplied from the port C) to enter the cylinder. When the port K opens into the port J, the cut-off valve begins to move in an opposite direction, and admits steam through the ports K′, K, and J as long as the three coincide. The backward movement of the cut-off valve, however, soon cuts off the steam from the port K in the main valve, and the two valves then continue to traverse the remainder of their arc until the port K of the main valve coincides with the port J for the opposite end of the cylinder. The return movement of the cut-off valve admits steam to the cylinder while the ports coincide, as above described.

It will be manifest that the cut-off valve can

be removed or omitted, and the engine will then take steam and run like an ordinary single main-valve engine, as in Fig. 7. The passages I around the exterior of the main valve are alternately brought opposite the ports J, so that steam exhausts through them while the opposite end of the cylinder is receiving steam.

In order to make my cut-off adjustable and automatic, the eccentric by which it is actuated is shifted by a governor, which forms the subject-matter of another application, filed May 23, 1884, Serial No. 132,573. If the engine runs more slowly, the eccentric is moved in an opposite direction upon the shaft, and thus regulates the position of the cut-off valve.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a rotary main valve and a cut-off valve, both closed at one end and fitting concentrically within one another, with a steam-chest having inlet and outlet ports arranged on the same side, substantially as specified.

2. The combination of a rotary main valve and cut-off valve, both closed at one end and provided with inlet and outlet ports, as shown, with a steam-chest, substantially as set forth.

3. The combination of a rotary main valve and cut-off valve, both closed at the reduced end and provided with inlet and outlet ports, as shown, said main valve having an elongation through which the valve-stem of the cut-off valve passes, with a steam-chest, all arranged for operation substantially as specified.

4. The combination of a rotary valve and a cut-off valve constructed as shown, and said main valve provided with an elongation, through which the valve-stem of the cut-off passes, and both fitting concentrically into each other and into a steam-chest, with the collars O O, as and for the purpose set forth.

5. A rotary main valve and a cut-off valve fitting concentrically into each other and into a steam-chest, and said valves having ports K K′ and F H, and a passage, I, in combination with a steam-chest having inlet-passage C and exhaust-passage D, both arranged on the same side, and said valves provided with means for operating them, substantially as specified.

6. The combination of a rotary cut-off valve, G, and a main valve, E, both closed at the reduced end and fitting concentrically into each other and into a steam-chest, all provided with ports and passages, as shown, and having an extension, B, through which a sleeve, M, passes for the valve-stem N, and arranged for operation as and for the purpose specified.

In witness whereof I have hereunto set my hand.

JOHN P. SIMMONS.

Witnesses:
S. H. NOURSE,
H. C. LEE.