

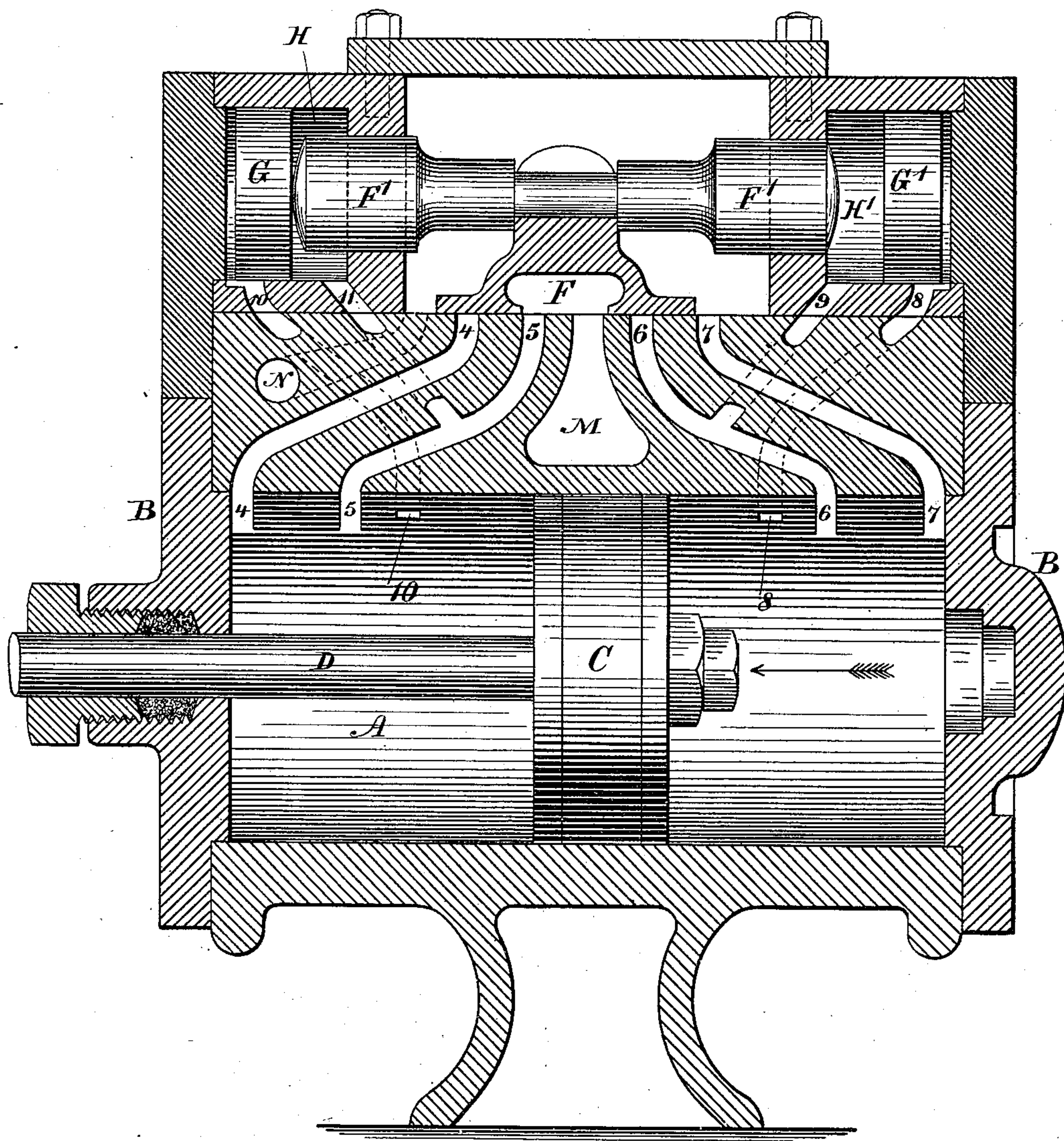
(No Model.)

L. B. CARRICABURU.

STEAM ACTUATED VALVE.

No. 336,211.

Patented Feb. 16, 1886.



Witnesses

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LEON B. CARRICABURU, OF NEW YORK, N. Y.

STEAM-ACTUATED VALVE.

SPECIFICATION forming part of Letters Patent No. 336,211, dated February 16, 1886.

Application filed November 16, 1885. Serial No. 182,963. (No model.)

To all whom it may concern:

Be it known that I, LEON B. CARRICABURU, of the city and State of New York, have invented an Improvement in Steam-Actuated Valves, of which the following is a specification.

This invention is an improvement upon the engine represented in my Patent No. 303,704, August 19, 1884, and a reference is hereby made to the said patent for a description of the construction and operation of the parts, so far as the two engines are alike.

The object of the present invention is to disconnect the valve-moving pistons from the rods, and to connect one rod with the valve in such a manner as to move with the same, in order that the steam acting upon one of the valve-moving pistons may communicate to the valve the desired motion; but should the valve not complete its movement the steam will act upon the end of the valve-rod and complete the motion.

In the drawing I have represented my improvement by a vertical section through the steam-cylinder and valve-chest.

The cylinder A, piston C, piston-rod D, heads B, and steam-chest correspond generally to those shown in my aforesaid patent, and the ports 4, 5, 6, 7, 8, 9, 10, and 11 are similar to those in said patent, and the valve-moving pistons G G' within the cylinders H H' also correspond; but, if desired, the pistons G G' may be made thicker.

The valve F is of ordinary character, adapted to the ports 4 5 6 7, and the valve-rod F', instead of being in two parts and attached to the respective pistons G G', is in one piece, separate from the said pistons and attached to the valve F. Usually this will be accomplished by the smaller portion or neck of the rod F' receiving the forked upper part of the valve F. The ends of the valve-rod F' should be rounded.

The operation of the parts is as follows: The piston C is presumed to be moving in the direction of the arrow and the steam passing through the port 7, and the exhaust is open through the port 5, and there is minus pressure at this end of the cylinder A, and in the valve-moving cylinder H, ports 4 5 10 11. As soon as the piston C passes the port 10, the live steam from the

cylinder A rushes through the same and moves the piston G, rod F', and valve F to the right, closing the ports 5 and 7, and opening the ports 4 and 6. This movement results from the steam-pressure acting upon the piston G, the area of which is larger than that of the end of the valve-rod in the cylinder H' against which the steam-pressure is acting at the same time. The steam now passes through this port 4, and the piston C commences to move in the opposite direction, and the steam rushing off through the port 6 to the exhaust M makes a minus pressure at this end of the cylinder A, and also in the port 10, and behind the valve-moving piston G. The port 10 is now covered by the piston C as it moves along, and the port 5 is uncovered and the live steam rushes into the same and through the port 11 into the cylinder H, moving the piston G away from the rod F', and the pressure upon the end of the rod F' is sufficient to complete the motion of the valve F should it not have made its full stroke, and the other end of the valve-rod F' comes into contact with the piston G' and stops the motion of the valve and its rod. It will be understood that at this time there is a minus pressure in the valve-moving cylinder H', ports 6, 7, 8, and 9. When the piston C completes the motion in the other direction—that is to say, to the right in the drawing—it passes across the ports 8 and 6, and the piston is cushioned by the vapors that are confined in the end of the cylinder, the port 7 being closed by the valve F, and the port 8 is uncovered for the admission of live steam to act in the cylinder H' behind the valve-moving piston G', to move the same and the valve-rod F' and valve F back again to the position shown in the drawing, so that the live steam will re-enter by the port 7 and move the piston C in the direction of the arrow, and the exhaust-steam will rush off by the port 5, so that there will be a minus pressure at this end of the cylinder and in the ports 4, 5, 10, and 11, and in the cylinder H, and there will also be a minus pressure in the port 8 and cylinder H', behind the piston G'. As the piston C moves, it first covers the port 8, confining the vapors, and as it uncovers the port 6 the live steam rushes through the same and through the port 9 into the cylinder H', moving the piston

G' away from the valve-rod F', and it is cushioned against the confined vapors in the cylinder H' and port 8, and should the valve not have moved its entire stroke the pressure of the steam upon the end of the rod F' will complete the motion, because there is a minus pressure at the end of the rod F'—that is, in the cylinder H.

There will be little or no concussion, because the steam-piston C is cushioned, and so also are the respective valve-moving pistons G G', and should there be a blow of the end of the rod F' against the valve-moving piston H or H', it will be very slight, because the distance existing from any incomplete motion of the valve is very small, and the valve-moving piston with which the rod comes into contact is itself cushioned in its cylinder.

The ends of the rod F' are by preference segments of spheres, so as to come in contact with the valve-moving piston at a point only to allow the steam to act between the valve-rod and valve-moving piston.

To effectually prevent the valve covering both the steam-ports 4 and 7, and thereby allowing the engine to stop, I make the valve slightly shorter than the distance between the outer edges of the ports 4 and 7, and the steam will then act upon one of the valve-moving pistons G or G', through the ports 8 or 10, to cover one steam-port and more fully open the other, because there will be a minus pressure in the cylinder H or H' in consequence of the exhaust having been open by the ports 11 and 5, or 9 and 6.

The valve may be shorter than the measure-

ment of the ports, as shown in my Patent No. 303,703, or it may be notched at the ends, or made with holes coinciding with holes to the steam-cylinder, as in my Patent No. 303,704.

I claim as my invention—

1. The combination, with the cylinder A, valve-chest and valve-moving cylinders, and ports 4, 5, 6, 7, 8, 9, 10, and 11, of the valve F, pistons G G', and valve-rod, that is connected with the valves and passes at its ends into the valve-moving cylinders, but is not connected to the pistons, substantially as specified.

2. The combination, with the ports, valve, and valve-moving pistons, of a valve-rod connected to the valve and separate from the valve-moving pistons, and passing at its ends into the cylinders of the valve-moving pistons, substantially as set forth.

3. The combination, with the steam-engine cylinder, piston, valve, and ports, substantially as set forth, of cylinders into which the steam is admitted to move the valve-pistons within such cylinders, a valve-rod connected to the valve and having its ends within such valve-moving cylinders, whereby the steam that moves the valve acts upon the valve-moving pistons and afterward upon the end of the valve-rod, substantially as set forth.

Signed by me this 12th day of November, A. D. 1885.

L. B. CARRICABURU.

Witnesses:

GEO. T. PINCKNEY,
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