

C. ROGERS.

Steam-Engine Valve-Gears.

No. 149,067.

Patented March 31, 1874.

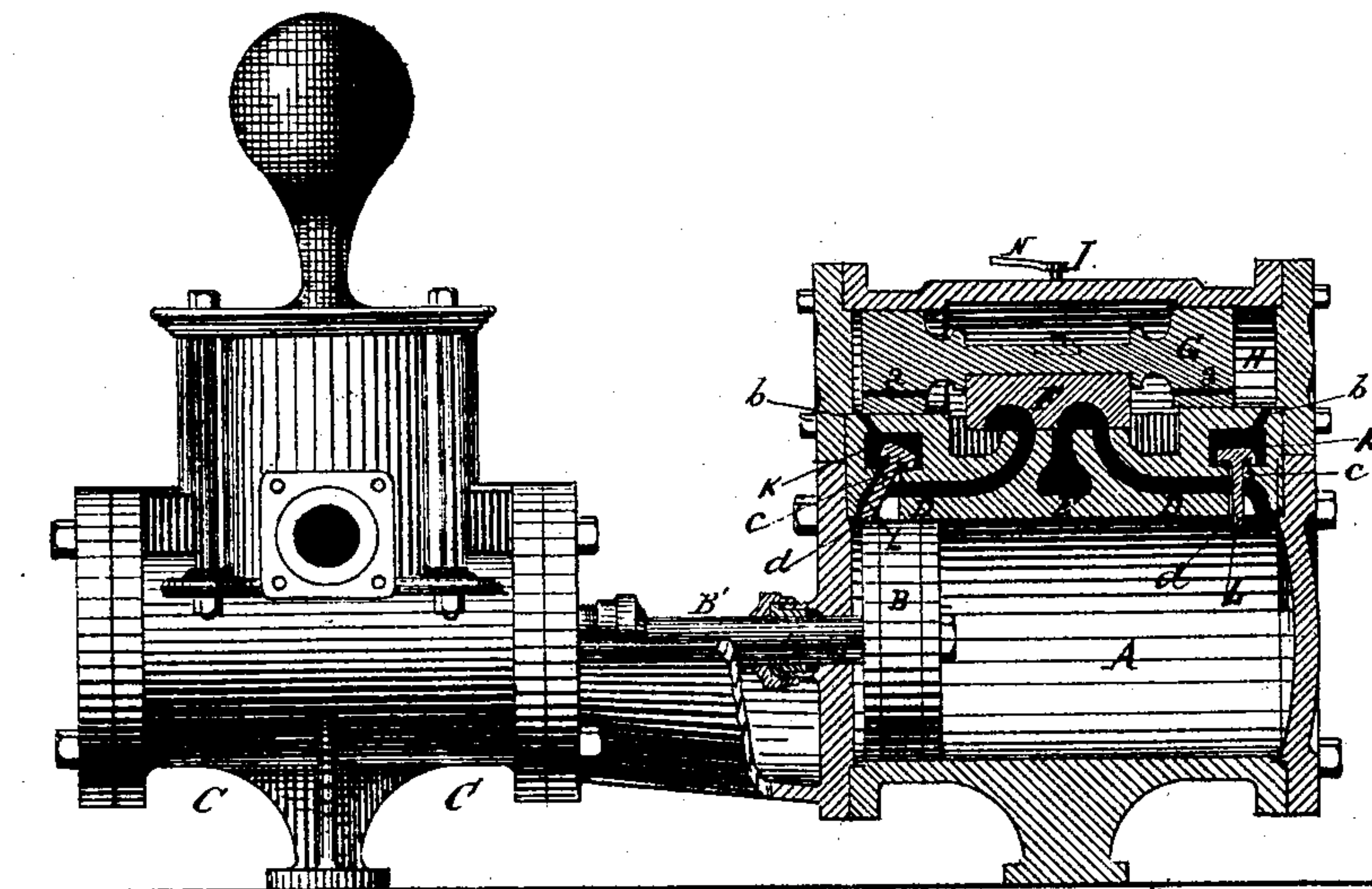


Fig. 1

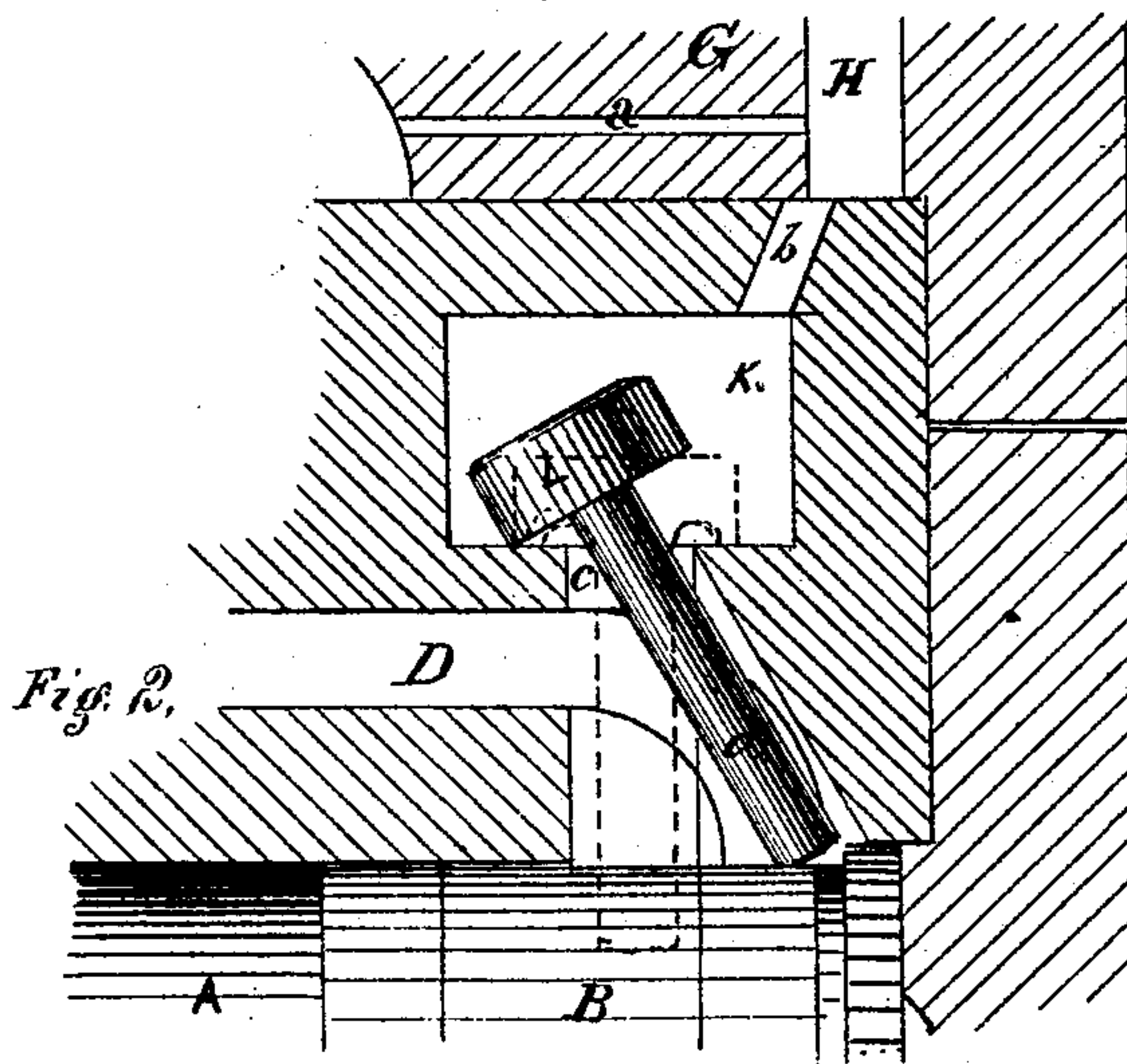


Fig. 2.

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CHARLES ROGERS, OF ALLEGHENY, ASSIGNOR TO JAMES A. HUTCHISON,
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IMPROVEMENT IN STEAM-ENGINE VALVE-GEARS.

Specification forming part of Letters Patent No. **149,067**, dated March 31, 1874; application filed
January 29, 1874.

CASE A.

To all whom it may concern:

Be it known that I, CHARLES ROGERS, of the city of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Steam-Engine Valve-Gear; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a side view of an engine and pump, showing a vertical central section of the steam-cylinder; Fig. 2, a detail section, on an enlarged scale, showing the construction and operation of the auxiliary valve.

My invention relates to the mechanism for operating the slide-valve in direct-acting engines—i e., engines dispensing with the fly-wheel and crank.

To enable others skilled in the art to make and use my improvement, I will proceed to describe its construction and mode of operation.

In the drawing, A is the steam-cylinder; B, the piston; B', the piston-rod, which connects with a pumping-piston in the pump C, or connection may be made with any other device or machine for communicating power; D D, steam-ports; E, exhaust-port; F, slide-valve, operated by the double headed piston G, to which it is secured. This piston fits in the small cylinder H, which forms the upper part of the steam-chest I. The live steam is admitted to both ends of the piston G through the small steam-ports *a a*, giving a uniform pressure on all sides of the piston, which is, therefore, perfectly balanced. *b b* are steam-ports, communicating from the cylinder H to the auxiliary valve-chambers K K, from which other ports, *c c*, open into the steam-ports D D. The ports *c c* are closed by the auxiliary valves L L, which are ground to their seats in the chambers K K. The valve L has a stem, *d*, which projects through the steam-port, which is slotted to receive it, into the cylinder A, in the path of the piston-head, which, when near the end of its stroke, comes in contact with the end of the valve-stem and trips the valve,

as shown in the drawing, allowing the steam back of the piston G to escape into the exhaust-port, thereby destroying the balance of the piston G, which moves forward and shifts the valve, admitting the steam to the front of the piston and opening the exhaust-port on the opposite side. The drawing shows the slide-valve after it has been shifted, and at the instant the piston B has commenced to move back. As soon as the valve L is relieved from contact with the piston B it seats itself by its own weight, closing the port *c* and restoring the balance of the piston G. The operation of both of the valves L L is the same.

It will be seen that the live steam is at all times admitted equally to both ends of the piston G, which is moved by the opening of the valve L, and the escape of the steam into the exhaust-port.

N is a lever, operated by a wrench on the outside of the steam-chest, for handling the valve when starting the engine.

In Fig. 2 the valve-chamber is shown on an enlarged scale, and the position of the valve shown as open, or, when tipped, by full lines, and by dotted lines when closed.

I am aware that the double-headed piston for operating the slide-valve, in connection with auxiliary valves is not new, but such auxiliary valves have heretofore rested on their sides, their movement being in the same direction as the piston. Such valves, by reason of their construction, do not wear equally and seat themselves, but wear altogether on the lower side, and therefore need constant attention, refitting, and renewing, while the valves above described seat themselves.

There is further advantage in the operation of the valves above described, in that they take no power from the engine for the purpose of operating them, and afterward they drop to their seat by their own weight. The use of horizontal valves with stems working through stuffing-boxes, which valves have to be returned to their seats by the aid of a spring, is liable to this, among other serious disadvantages, viz., that to open the valves it is required to force a rod through the tight

stuffing-box against the pressure of a spring sufficiently stiff or strong to return the rod, and the spring, if only of sufficient strength to move the rod when it is working smoothly in the stuffing-boxes, would be too weak when the movement of the rod would be impeded by rust, as would naturally occur after short disuse, while, if the spring be stronger than was necessary to overcome the hard friction in the stuffing-box, it would carry the valve so heavily against its seat as in a short time to batter the one or the other and cause leakage.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The auxiliary valves L L, having stems *d d* projecting into the steam cylinder in the

path of the piston and at right angles to its motion, whereby the valve shall be canted and opened by the contact of the piston B with the stem *d*, in combination with direct-acting steam-engines, as and for the purpose specified.

2. The combination of the cylinder, the slotted posts *c c*, auxiliary valves L L, the stems of which project into the cylinder at right angles to the movement of the piston, with chambers K K, perforated piston G, and lever N, when arranged and operating as and for the purpose set forth.

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Witnesses:

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