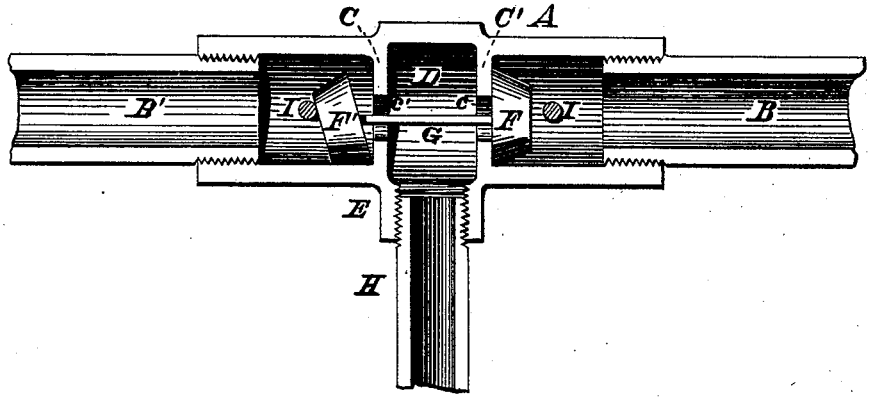
H. W. DOPP.

AUTOMATIC-CYLINDER COCKS.

No. 195,108. Patented Sept. 11, 1877.



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IMPROVEMENT IN AUTOMATIC CYLINDER-COCKS.

Specification forming part of Letters Patent No. **195,108**, dated September 11, 1877; application filed July 6, 1877.

To all whom it may concern:

Be it known that I, H. WILLIAM DOPP, of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Automatic Cylinder-Cocks; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

My present invention has special reference to automatically-acting cylinder-cocks, for continually draining engine-cylinders, &c., from the water of condensation; and it consists in the peculiar arrangement, with a cylindrical or otherwise shaped shell having two valve-seats, of two valves operating alternately to open and close communication between the exhaust side of said cylinder and the atmosphere, said valves being so arranged as to be automatically opened when not under pressure, substantially in the manner as hereinafter more fully described, and subsequently pointed out in the claims.

The drawing heretofore mentioned, to which reference is had in the following description, represents my improved cylinder-cock in a longitudinal sectional view.

A is a pipe, of any desired diameter and length, having its extremities either internally or externally screw-threaded, for attachment of the pipes B B′, leading to the cylinder-heads of an engine. This pipe has, near its center, two centrally-perforated valve-seats, C C′, forming between them a chamber, D, from which leads a discharge-branch, E.

Upon the seats C C′ are alternately bearing two valves, F F′, placed on the outer side of the seats C C′.

G is a flat bar, placed centrally into the apertures *c c′*, and made of a length slightly in excess of the distance between the seats C C′.

The branch E is either internally or externally screw-threaded, for attachment of the discharge-pipe H.

The operation of this device is as follows: The pipes B B′ being connected with the respective cylinder-heads, the live steam, acting upon one side of the piston—say, that to which pipe B is attached to the respective head—enters the pipe A and forces the valve F against the seat C′, and thus closes communication between the steam side of the cylinder and the atmosphere, and opens communication with the exhausting side by the rod G pushing the valve F′ from its seat, so that any condensed water will escape by being ejected through the pipe B′ and discharge-pipe H. The valve F′ remains open as long as the valve F is under pressure; but as soon as the piston commences its back stroke and live steam enters the pipe B′, the valve F′ will be forced upon its seat and push F to open communication on the then exhausting side, exactly as hereinbefore described with reference to the valve F.

In cylinder drain-cocks, as heretofore made, several serious objections exist, which have, so far as I am aware, rendered them useless in a short space of time; and these objections are, first, that when no pressure is acting upon any one of their valves—as, for instance, during temporary stoppage of the engine—that one of them having been last under the influence of live steam or pressure will remain closed, so that the water of condensation accumulating on the respective side of the cylinder cannot be all discharged when the engine starts again, and thus causes frequent and serious damages to the engine; second, that all the valves employed in such cocks are provided with guide-stems, to properly seat them, which stems, no matter how strongly they may have been made, will be fractured or severed from the disks in a very short time, owing to the momentum of the valves when seating, and thus be suddenly arrested in their motion, which momentum or inertia in the case of an engine operating under a pressure of, say, from one hundred to two hundred pounds per square inch, is actually enormous.

These two principal objections I have overcome by the peculiar construction of my valves, which consist of plain disks whose diameter is considerably less on one side than on the other, they being, in fact, a frustum of a cone whose base forms the seat. These valves bearing upon, or rather against, a vertical seat, rest upon the edge of the base, and their center of gravity being outside of the base

causes them to fall over, and thereby to remain open until a current of sufficient velocity, passing through either one of the pipes B B′, causes the respective one to close.

By this arrangement both valves will open automatically as soon as released from pressure tending to close them, so that both sides of the cylinder to which my device is attached will be drained during stoppage, and the first of the above-mentioned objections avoided, while, there being no stems on my valves, they are not open to the second criticism referred to.

It will be readily observed that the principal feature of my cylinder-cock consists in the introduction of stemless valves, which are opened automatically by gravitation and closed by pressure. Such valves can be constructed in various manners, such as balls rolling down inclines when receding from their seat and forced up by pressure, or flap-valves pivoted within bearings, and having their center of gravity so located that they will travel from the seat under the influence of gravity. All such and many similar arrangements will be mechanical equivalents of my device, and answer the purpose more or less satisfactory.

To prevent my valves from falling entirely over, I place stops I a suitable distance from them, against which the valves drop.

Having thus fully described my invention, I desire to secure by Letters Patent of the United States—

1. A cylinder-cock having two valve-seats and two alternately-acting stemless valves, and the separate bar interposed between said valves, as and for the purpose stated.

2. A valve arranged to bear against a vertical seat, consisting of a frustum of a cone whose base forms the valve-seat, and whose base edge is the point of support of said valve, substantially as described, in virtue of which arrangement said valve, when not under pressure, is caused to open by gravitation, as specified.

3. As an improved article of manufacture, a cylinder-cock consisting of a suitable casing having two valve-seats, provided with valves arranged to open and close under the influence of pressure acting alternately upon them in virtue of their arrangement, and an intermediate mechanism, substantially as described, interposed between said valves, and to open automatically when pressure ceases, as and for the purpose specified.

4. As an improved article of manufacture, a cylinder-cock consisting of a suitable casing having two valve-seats, provided with valves arranged to open and close under the influence of pressure acting alternately upon them in virtue of their arrangement, and an intermediate mechanism, substantially as described, interposed between said valves, and to open automatically by gravitation when pressure ceases, as and for the purpose specified.

5. As an improved article of manufacture, a cylinder-cock consisting of a suitable casing having two valve-seats, provided with valves arranged to open and close under the influence of pressure acting alternately upon them in virtue of their arrangement, and an intermediate mechanism, substantially as described, interposed between said valves, said valves having their center of gravity located outside of their point of support, in virtue whereof said valves will open automatically when pressure ceases, substantially as and for the purpose specified.

6. The cylinder-cock hereinbefore described, consisting, essentially, of the pipe A, having the two seats C C′, valves F F′, arranged to open automatically, when not under pressure, by their own gravity, and the discharge-pipe E, as stated, as and for the purpose mentioned.

7. A cylinder-cock, substantially as heretofore described, consisting, essentially, of the pipe A, having the seats C C′ and the valves F F′, arranged to open automatically when not under pressure, as and for the purpose stated.

8. The combination, with the pipe A, having the double valve-seats C C′ and the branch E, of the valves F F′ and the pins I, said valves being arranged with capability of automatically opening when not under pressure, as and for the purpose stated.

9. The combination, with the two vertical valves F F′, of the separate bar G, as stated.

In testimony that I claim the foregoing as my invention I have hereto set my hand and affixed my seal in the presence of two subscribing witnesses.

H. WM. DOPP. [L. S.]

Attest:
MICHAEL J. STARK,
FRANK HIRSCH.