

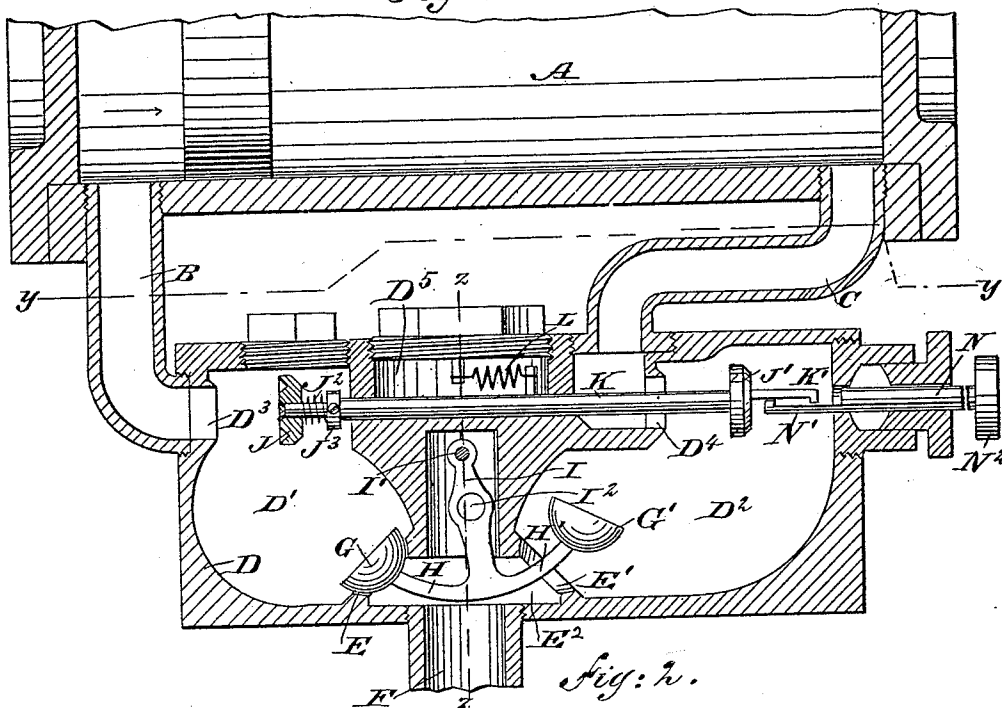
(No Model.)

R. P. CAPWELL.
CYLINDER DRAIN COCK.

No. 472,855.

Patented Apr. 12, 1892.

Fig: 1.



1236
X1233

X2329

Fig: 2.

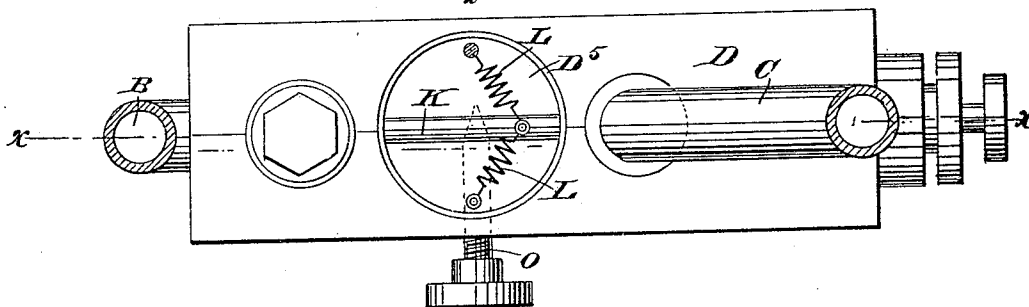
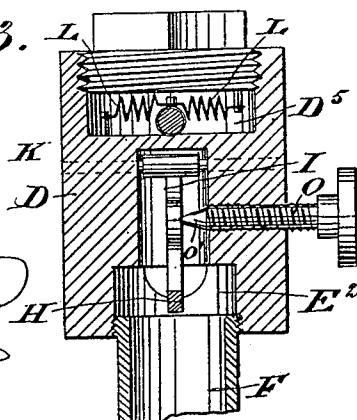


Fig: 3.



WITNESSES:

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ROY PETER CAPWELL, OF LINDEN, NEW YORK.

CYLINDER DRAIN-COCK.

SPECIFICATION forming part of Letters Patent No. 472,855, dated April 12, 1892.

Application filed August 8, 1891. Serial No. 402,131. (No model.)

To all whom it may concern:

Be it known that I, ROY PETER CAPWELL, of Linden, in the county of Genesee and State of New York, have invented a new and Improved Drain-Cock for Steam-Cylinders, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved drain-cock which is simple and durable in construction and designed for automatically draining the water of condensation from the ends of the steam-engine cylinder without waste of steam and consequent loss of power.

The invention consists of a valve-body connected with the ends of the cylinder and containing two valve-seats adapted to be alternately engaged by two valves held on stems projecting from a lever pivoted between the valve-seats.

The invention also consists of certain parts and details and combinations of the same, as will be hereinafter fully described, 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 views.

Figure 1 is a sectional side elevation of the improvement as applied on the line $x x$ in Fig. 2. Fig. 2 is a sectional plan view of the same on the line $y y$ in Fig. 1, and Fig. 3 is a transverse section of the same on the line $z z$ of Fig. 1.

The steam-engine cylinder A, on which the improvement is applied, is connected at its bottom at the ends with the pipes B and C, connected with a valve-body D, containing the chambers D' and D², into which open the said pipes B and C through valve-seats D³ and D⁴, respectively. In the chambers D' and D² are formed the valve-seats E and E', respectively opening into a compartment E², formed in the valve-body D and leading to a discharge-pipe F for carrying off the water of condensation. The valve-seats E and E' are adapted to be alternately engaged by valves G and G', respectively secured on the valve-stems H and H', respectively projecting from opposite sides of a lever I, fulcrumed at I' in the valve-body D in an extension of the compartment E². The lever I hangs vertically,

so that the slightest pressure on either of the said valves G or G' forces it to its seat, while the opposite valve G' or G is thrown off its seat. Now when the device is in the position as shown in Fig. 1 the piston in the cylinder A is on the return stroke in the direction of the arrow a' , so that steam is forced through the pipe C into the chamber D², in which the steam presses onto the valve G', so that the latter is forced onto its seat E', the lever I swinging from right to left. This movement of the lever I throws the valve G off the seat E, so that the water accumulated in the chamber D' can drain through the seat E into the compartment E² and from the latter, through the pipe F, to the outside.

During the time the piston is on its return stroke the valve G' remains seated, so that no steam is wasted to the outside through the drain-cock. At the same time the water of condensation in the right-hand end of the cylinder A can pass through the pipe C into the chamber D² to accumulate therein. Now when the piston is at the outward stroke a similar operation takes place in the chamber D'—that is, the steam forced into the said chamber closes the valve G to prevent escape of steam and permit the accumulation of water of condensation. At the same time the other valve G' is unseated and the water of condensation in the chamber D³ will flow to the compartment E² and through the drain-pipe F. It is understood that the respective valve G or G' readily opens whenever the stroke of the piston changes, as the pressure is then relieved from one valve and pressure is exerted on the other valve.

In order to cut off the chambers D' and D² from the cylinder A, valves J and J' are provided, adapted to engage simultaneously the seats D³ and D⁴, leading to the pipes B and C, respectively. The valves J and J' are held on a valve-stem K, mounted to slide longitudinally in the valve-body D and passing through a recess D⁵, containing springs L, arranged as shown in the drawings and serving to hold valve-stem K in either a right or left hand position.

When in the position shown in Fig. 1, the valves J and J' are off the seats D³ and D⁴ and the drain-cock operates, as above described. Now in order to close the valves J

and J', one end of the valve-stem K is formed with a hook K', adapted to be engaged by a corresponding hook N', also arranged to press on the end of the valve J'. The hook N' is formed on the inner end of a rod N, fitted to slide in a suitable stuffing-box held on the valve-body D and leading to the chamber D². The outer end of the rod N is provided with a knob N² for conveniently shifting the said rod, so as to engage the hook end N' with either the hook K' or the valve J'. Now when the operator desires to close or seat the valves J and J' he pushes on the knob N², so that the hook N' presses on the valve J', and the latter, as well as the stem K and valve J, moves to the left. As soon as the springs L have passed a central position they exert their power in an opposite direction and force the valve-stem K to its left position to seat the valves J and J' firmly on their seats. The valve J is preferably fitted to slide on the valve-stem K and is pressed on by one end of a spring J², resting at its other end on a collar J³, secured to the stem K. This means insures a firm seating of the valves J and J' on their seats.

The valves J and J' are closed in case the engine is run with very dry steam, so that draining the cylinder of water is not necessary. In case of a more than normal pressure on the cylinder the valves J and J' are automatically opened and closed by the excess of pressure on each stroke of the piston, it being understood that the force of the springs L only hold the valves closed under normal pressure.

When it is desired to again set the drain-cock in operation, the operator pulls on the knob N², so that the hook N' engages the hook K', and the further pull on the knob causes the valve-stem K to slide to the right to unseat the valves J and J'. Steam from the cylinder can then again pass into the chambers D' and D² to act on the valves G and G', respectively, as above described.

If it is desired, the lever I may be locked in an intermediate position, so that both valves G and G' are open. For this purpose a set-screw O is provided, screwing in the valve-body D and having its inner end O' adapted to pass into a transverse opening I², formed in the lever I. Thus when the set-screw O is screwed inward the point O' enters the opening I², thereby forcing the lever I into a vertical position and locking it therein. Thus it will be seen that the device operates automatically for draining both ends of the cylinder of water of condensation without loss of power of the motive agent working in the cylinder. It will further be seen that the operator has full control of the drain-cock—that is, can set it out of operation or put it into operation whenever desired.

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

1. The combination, with the valve-body D, having inlets B C at its ends, leading from the steam-cylinder, chambers D' D², and the intermediate outlet-chamber E², having valve-seats E E', of the lever I, pivoted at its upper end in the chamber E² and having stems at its lower end projecting through the valve-seats and provided at their ends in the chambers D' D² with valves G G', substantially as set forth.

2. In a drain-cock for steam-engine cylinders, the combination, with pipes leading from the ends of the cylinder, of a valve-body provided with chambers, into which open the said pipes, valve-seats formed in the bottom of the said chambers and opening into a discharge or outlet compartment, valves adapted to be seated on the said valve-seats and arranged to open inwardly into the said chambers, a lever pivoted in the said valve-body and provided at opposite sides with stems carrying the said valves, and a set-screw screwing in the said valve-body and adapted to engage the said lever to lock the same in an intermediate position to hold both valves off their seats, substantially as shown and described.

3. In a drain-cock for steam-engine cylinders, the combination, with a valve-body formed with two separate and independent chambers provided at their upper ends with a set of valve-seats and another set of valve-seats in the bottom thereof, of pipes leading from the upper set of valve-seats to the ends of the cylinder, valves adapted to be alternately seated at the same time on the lower valve-seats, and a set of valves adapted to be seated on the upper set of valve-seats, substantially as shown and described.

4. In a drain-cock for steam-engine cylinders, the combination, with a valve-body formed with two separate and independent chambers provided at their upper ends with a set of valve-seats and another set of valve-seats in the bottom thereof, of pipes leading from the upper set of valve-seats to the ends of the cylinder, valves adapted to be alternately seated at the same time on the lower valve-seats, a set of valves adapted to be seated on the upper set of valve-seats, and means, substantially as described, for opening and closing the said second set of valves, as set forth.

5. The combination, with the valve-body D, having two chambers D' D² to receive the water of condensation, and the inlet-valve seats D³ D⁴, of the sliding rod, having two valves, one in each chamber, seating simultaneously on said seats, and means for operating the rod from the outside of the valve-body, substantially as set forth.

6. The combination, with the valve-body D, its separate chambers D' D², and the inlet-valves D³ D⁴ in said chambers, of the sliding rod provided with a spring-pressed valve J at its inner end, seating on the valve-seat D³, a valve-seat J', seating on the seat D⁴, and the

sliding rod N, adapted at its inner end to engage the valve J and the valve-rod, substantially as set forth.

7. The combination, with the valve-body
5 having end chambers D', provided with alternately opening and closing outlet-valves, aligned inlet-valve seats, and a chamber D⁵ between said seats, of the sliding rod extending through the chamber D⁵ into chambers
10 D' D² and having a valve in both of the lat-

ter chambers to close over said seats, springs in the chamber D⁵, connected to the said valve-rod, and the sliding rod N, having a hooked inner end engaging the similarly-formed end of the valve-rod, substantially as set forth.

ROY PETER CAPWELL.

Witnesses:

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