

J. COCHRANE.

Valve-Lubricators.

No. 136,136.

Patented Feb. 25, 1873.

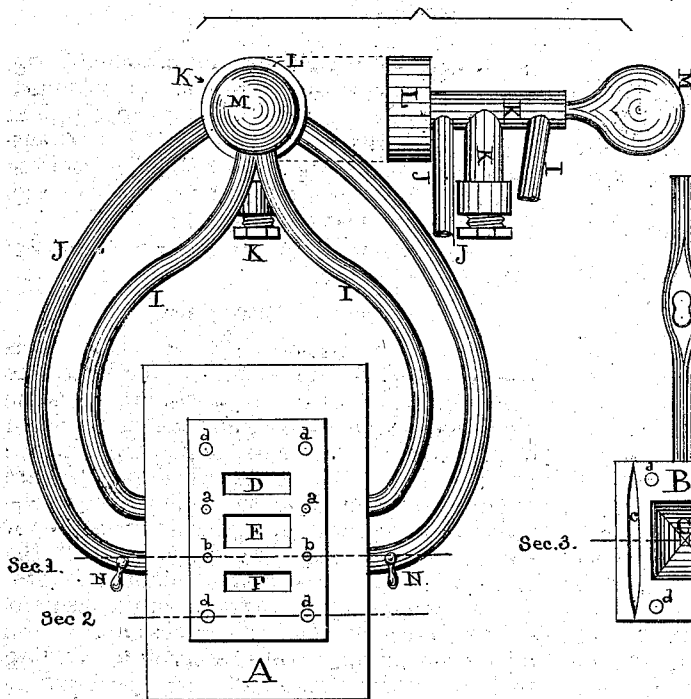


Fig. 1.

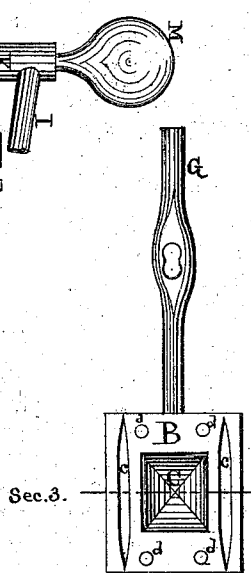


Fig. 2.



Fig. 3.



Section 1.



Section 2.



Section 3.

WITNESSES

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IMPROVEMENT IN VALVE-LUBRICATORS.

Specification forming part of Letters Patent No. 136,136, dated February 25, 1873.

To all whom it may concern:

Be it known that I, JAMES COCHRANE, of the city, county, and State of New York, have invented certain Improvements in Devices for Valve-Lubrication, of which the following is a specification:

Nature and Objects of the Invention.

The object of my invention is to lessen the amount of friction of slide-valves, (flat or curved,) and thereby save a large percentage of the power, considerably diminish the present wear of the surfaces of the valve and valve-seat, and, as a consequence, save the time, labor, and expense of refacing and repairing them so frequently as is at present found necessary. It is estimated that a result will be realized from the use of this device equivalent to five per cent. over the most advantageous results formerly attainable. The means by which my invention proposes to secure this object is by injecting through suitable conduits and perforations a lubricating fluid between the surface of the valve and valve-seat, by means of any ordinary injector or pump operated by any suitable and convenient power, the valve and valve-seat having cavities, channels, or grooves, &c., at suitable intervals for the purpose of spreading, retaining, and forming a passage for the lubricating material. The lubricating fluid may thus be placed under hydraulic pressure, and, by a device hereinafter described, the degree of pressure may be regulated to balance the valve; also, as will be described further on, the fluid may be merely injected between the surfaces of the valve and valve-seat or caused to circulate, as desirable; and the perforations, grooves, &c., may be cleansed of all extraneous matter at pleasure, even with the valve in operation.

In the following description and the accompanying drawing I have used the common three-port steam-valve for the purpose of illustrating the application of my invention. I do not mean, however, to confine my invention to that particular kind of valve, but extend it to slide-valves generally.

Description of the Accompanying Drawing.

Figure 1 is a plan, showing the injector or pump, conduits, and valve-seat, the valve and steam or valve chest being removed. Fig. 2

is a plan of valve-face with rod attached. Fig. 3 is a side view of the valve with rod attached.

Section 1 is a transverse section of Fig. 1 at the point marked "Sec. 1." Sec. 2 is a transverse section of Fig. 1 at the point marked "Sec. 2." Sec. 3 is a transverse section of Fig. 2 at the point marked "Sec. 3."

Like letters indicate like parts in all the figures and sections.

General Description.

A is the valve-seat. B is the valve. C is the concavity of the valve. D and F are the steam-ports. E is the exhaust-port. G is the valve-rod, and in this case also the pump-piston or plunger. I I are conduits passing from the pump K to the side of the valve-seat. J J are conduits passing from the side of the valve-seat to the reservoir L. M is an air-globe for the purpose of equalizing the pressure of the lubricating fluid, and may be dispensed with. N N are common stop-cocks or valves, as hereinafter described. K K K are chambers of the injector or pump. L is a reservoir for holding the lubricating fluid. *a a* are perforations through the valve-seat receiving the lubricating fluid from the conduits I I and discharging it between the faces of the valve and valve-seat. *b b* are also perforations through the valve-seat, running from its face to its side. *c c* are grooves or channels in the face of the valve. *d d d d*, &c., are cavities in the faces of the valve and valve-seat.

The reservoir L having been supplied with lubricating fluid, the pump-piston or plunger G, (in this case represented also as the valve-rod,) by its vibratory motion, alternately draws the fluid from the reservoir and forces it through the conduits I I into the perforations *a a* of the valve-seat, the ordinary pump check-valves, located above and below the piston-chamber acting to prevent the return of the fluid through their respective passages at the next stroke of the piston. The globe M equalizes the pressure by permitting the fluid to play upon a body of air within it.

This part of the device may be varied or supplied by any other form of injector or pump that convenience and advantage may suggest; also the power to operate the pump may be received, as shown above, from the motion of the engine or from any other convenient source, as, for ex-

ample, it might be found advantageous to inject the lubricating material by means of a hand-pump. Moreover, the pumping may be made continuous or at intervals, as desirable.

The lubricating fluid having been injected through the perforations *a a*, is received into the grooves or channels *c c*, and thence, by the movement of the valve, spread over the faces of the valve and valve-seat and into the various cavities and perforations. Sufficient pressure may be made to cause the valve to rise from its seat and ride upon a film of the lubricating material. Where it is found to be more advantageous and practical the perforations *a a* receiving the fluid may be multiplied and made to pass to various points on the face of the valve-seat, provided their orifices be not uncovered by the movement of the valve, as in that case there would be a loss of the lubricating material. Care should also be taken that the cavities *d d d d*, &c., be so located that at no time will there be a communication between the conduits and steam chest or ports. The cocks *N N* being open, the lubricating fluid will pass from the grooves or channels through the perforations *b b* and be discharged by the conduits *J J* into the reservoir *L* and again be circulated over the same course. At the same time any extraneous matter will be carried from the perforations and grooves and deposited in the bottom of the reservoir *L*; or cocks opening externally may be inserted between *N N* and the valve-seat. Then by turning shut *N N* and opening the other cocks the pressure will cause the extraneous matter to be ejected.

By varying the size of the passages of the cocks *N N*, by turning their handles toward shut or open, the hydraulic pressure of the lubricating fluid between the valve and valve-seat may be increased or diminished. By substituting valves similar to the safety-valves of a steam-boiler in the place of the cocks *N N* and weighting their lever-arms to the desired pressure, the degree of pressure may be regulated and the surplus of pressure will be relieved by discharging a quantity of the lubricating fluid beyond the valves, this passing to the reservoir *L*, as before. As it may be desirable to connect or disconnect the circulating conduits *J J* at pleasure, this may be done by turning on or off the cocks *N N*. It is proposed also to dispense entirely with the conduits *J J* and merely terminate the perforations *b b* with

plugs or cocks. Then, by removing the plug or opening the cock the extraneous matter may be ejected as before.

One of the main features of this invention is the provision for cleaning the passages, &c., of the valve and valve-seat of all extraneous matter, and doing this, if required, when the valve is in operation. However, to secure this, the length of the channels or grooves *c c* and the distance between the perforations *a* and *b* should be so regulated as to admit of communication between the perforations *a* and *b* at all points in the movement of the valve. Another novel feature of my invention is the combination of the pump or injector with the perforations in the valve-seat, thus admitting of forming a hydraulic pressure of the lubricating fluid and thereby balancing and lubricating the valve. A third novel feature is a combination of the two previous features with the circulating conduits *J J*, thereby admitting of circulating the lubricating fluid under the valve. A fourth novel feature is the combination of the cocks or safety-valves *N N* with the foregoing features for the purpose of regulating the pressure of the lubricating fluid.

Claims.

I claim and desire to secure by Letters Patent—

1. The combination of an injector or pump with the perforations *a a*, substantially as and for the purposes as hereinbefore set forth.
2. The combination of an injector or pump and perforations *a a* with the grooves or channels *c c* and the perforations *b b* terminating in a plug or stop-cock, substantially as and for the purposes as hereinbefore set forth.
3. The combination of an injector or pump and perforations, *a a*, and grooves or channels *c c* and perforations *b b* with the conduits *J J*, substantially as and for the purposes as hereinbefore set forth.
4. The combination of an injector or pump and perforations, *a a*, and grooves or channels *c c* and perforations *b b* and conduits *J J* with the cocks or safety-valves *N N*, substantially as and for the purposes as hereinbefore set forth.

JAMES COCHRANE.

Witnesses:

JONES COCHRANE,
A. SPRINGSTEEN.