WILLIAM A. CLARK.

Improvement in Lubricators for Steam Engines.

No. 125,022. Patented March 26, 1872.

Fig. 1.

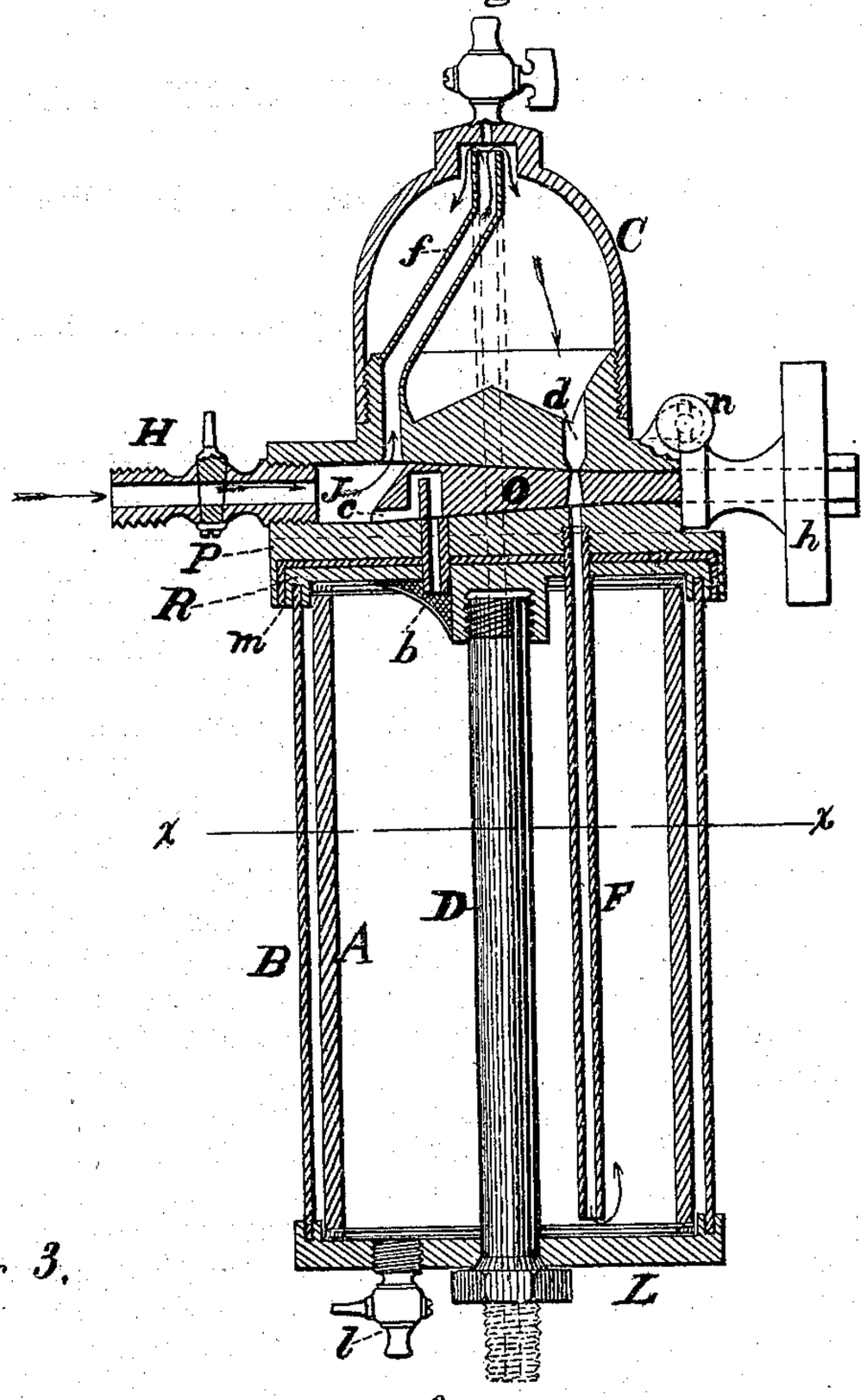


Fig 3.

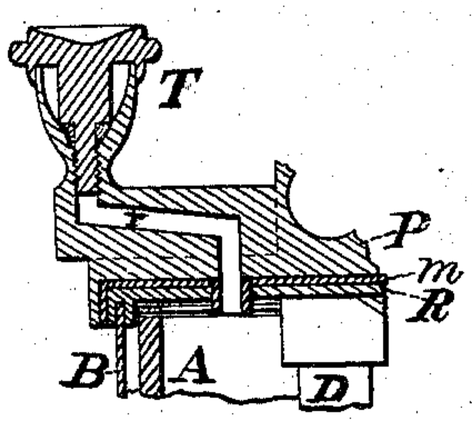


Fig 2.

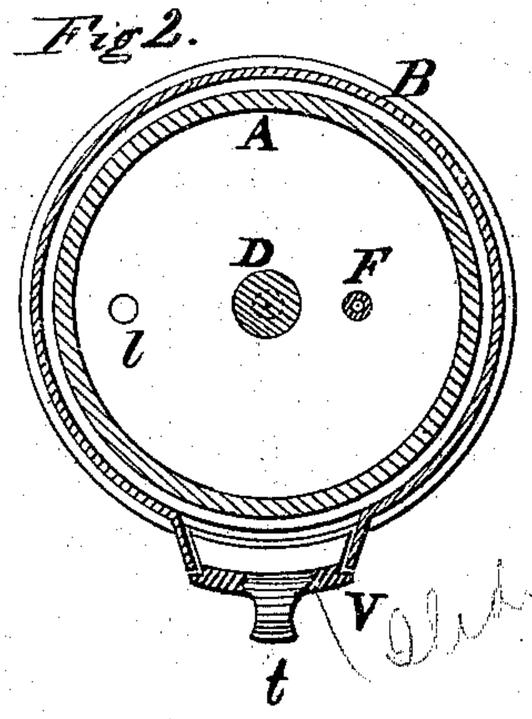
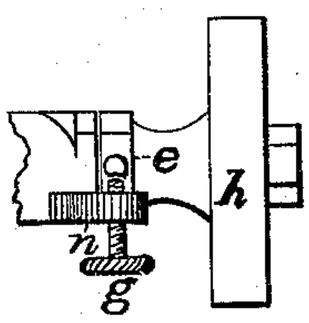


Fig 4



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM A. CLARK, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN LUBRICATORS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 125,022, dated March 26, 1872

SPECIFICATION.

To all whom it may concern:

Be it known that I, WILLIAM A. CLARK, of New Haven, in the county of New Haven and State of Connecticut, have invented certain Improvements in Lubricators for Steam-Engines, of which the following is a specification, reference being had to the accompanying drawing.

My invention consists of certain improvements upon the lubricator patented to me January 2, 1872, by which the apparatus is rendered more perfect and simpler in its construction, as hereinafter more fully explained.

Figure 1 is a transverse vertical section. Fig. 2 is a horizontal section on the line *x x* of Fig. 1; and Figs. 3 and 4 are views of portions shown more in detail.

In constructing my improved lubricator I provide a metal head-piece or disk, P, having a raised portion extending transversely across its upper face to form a seat for the valve O. The center of this raised portion is made circular in form, and has a screw-thread cut on it, by which an inverted cup or dome, C, is secured to it, as shown in Fig. 1, this dome forming a chamber in which steam is condensed, as as in my former one. The head-plate P I make recessed on its under face, though this is not essential, except to make a better finish; and to the under side of this I fit another plate or disk, R, interposing between the two a layer, *n*, of any suitable non-conducting material to prevent the transmission of heat from the upper part to the parts below, so as to obviate an undue expansion, which would tend to loosen the glass reservoir A at its ends, and thereby cause it to leak, the metal parts expanding much more than the glass when heated, as they will be by the steam. The reservoir consists of a glass tube, A, held between the plate R at the top and a similar metal plate, L, at the bottom, there being a packing of cork or other suitable material between the ends of the glass and the plates in order to prevent leakage. Instead of holding these parts together by a series of bolts or rods placed outside of the glass, as before, I now secure them by a single bolt, D, extending up through the center, as shown in Fig. 1. To protect the glass body A I surround it with a thin metal shell, B, which is held in place by having its ends secured in grooves cut for it in the end plates R and L. In order to enable a person to see the interior of the reservoir A I make an opening on one side of the shell or jacket B, and fit therein a sliding door, V, represented in Fig. 2, so that by raising this slide, which has a thumb-piece or hook, *t*, for the purpose, the condition of the reservoir can be examined at pleasure. It is obvious that this door may be hinged to open like an ordinary door, if desired. By this arrangement of the case with a door it will be seen that the glass, which will become heated when the lubricator is applied to the steam-chests of locomotives, will be prevented from being broken by the sudden contraction, due to the contact with it of cold air, sleet, or snow, which would come directly upon it if the case were simply provided with slots or openings, as has heretofore been done. The steam enters through a pipe, H, and passes thence through an opening in the bottom of the condenser C, into and through a small tube, *f*, which has its upper open end terminating near the top of the condenser C, as shown in Fig. 1. An opening, *d*, extends from the bottom of the condenser C downward into the reservoir, and through a tube, F, to near the bottom thereof, as shown also in Fig. 1. A valve, O, is seated transversely in the upper or raised portion of plate P, and has a small passage or hole made through it to correspond with the passage *d*, so that by turning this valve the size of the passage *d* may be regulated at will. In order that the valve may be set to keep this opening exactly as desired, to readily bring it back to the same position again after it has been turned to shut off the flow, I now provide it with a pin, *e*, or stop *e*, shown in Fig. 4, so arranged that it will strike against the end of a thumb or set screw, *g*, which is fitted in a lug, *n*, made on the top plate P. By adjusting this screw *g* the valve may be set with the utmost accuracy, and turned as often as desired, and still be always brought back to the same position. In the opposite end of the valve I form a passage, *c*, of the form shown in Fig. 1, the inner opening of which corresponds with a hole or passage extending from the reservoir up through the plates R and P to the under side of the valve O, there being a small tube screwed into this hole to prevent the oil from entering between the plates and saturating the

non-conducting layer *l*. The object of giving to the passage *c* the curved form is to form a trap, so as to prevent any water which may be formed by the condensation of steam in the space J from entering the reservoir, it escaping through the pipe H before it rises high enough to pass over through the trap *c*. Directly under the point where this passage *c* enters the reservoir I solder or otherwise secure a strainer of fine wire-gauze, *b*, which prevents any particles that may be floating in the oil in the reservoir from entering and stopping up the passage, and thereby enabling me to use a poorer quality of oil than could otherwise be done. The reservoir is provided with a cock, *l*, at the bottom for drawing off the water, and the condenser C is provided with a similar cock at the top to permit the escape of the air when first started, as in my former case.

The operation of the lubricator is similar to the former one, with this difference—in that, whenever the steam was shut off, it would cease to operate, because, even if there was any water left in the condenser C, it would be free to flow back into the space J and so out through pipe H, the opening leading from the space J into the condenser terminating at its upper end on a level with the bottom of the condenser. Hence, if that lubricator were applied to a locomotive it would not operate on a down grade, as the steam at such times is usually shut off. Now, by extending the tube *f* up into the condenser, as shown in Fig. 1, it will be seen that if the steam is shut off at any time the water which is in the condenser can escape only through the passage *d*, and, as the water is above the reservoir, it will natually flow down into it, thereby displacing the oil, and thus keeping up the action so long as any water remains in the condenser; and there will always be more or less. Thus this lubricator will continue to act for a considerable time after the steam is shut off.

Another result of this arrangement is that the apparatus is rendered self-regulating in its condensation. As the condenser becomes filled more and more with water the steam area is rendered smaller and smaller, and, consequently, there is much less quantity of steam in it to condense, and a much less amount of surface containing steam exposed to the action of the air outside. As the water in the condenser lowers the steam area is increased, and so, too, is the area of surface exposed. Hence the condensation becomes more rapid. It follows that, when the valve is opened to admit more water from the condenser to the reservoir, as it must be when more oil is required for lubrication, as the water lowers in the condenser the condensation will be increased, and vice versa.

It is intended to have the oil pass off through the same pipe H that brings the steam, though it may flow off through a separate pipe, if preferred. In like manner, if desired, the steam may enter the condenser through a pipe leading into it direct; or it may enter through bolt D, which may be made hollow for that purpose, as indicated by dotted lines in Fig. 1. It is obvious that the bolt or tubes D, in that case, may extend down far enough to be screwed directly into the steam-chest, and the lubricator be thus attached, if desired.

By these improvements I am enabled to produce a lubricator that will operate in a most efficient manner, and that is specially adapted for use on locomotives and in similar positions.

Having thus described my invention, what I claim is—

1. A lubricator having the reservoir made of glass, surrounded by a metallic case, arranged to be opened and closed at will, substantially as described.

2. The condenser C, having the steam delivered through a tube or passage, *f*, which opens above the bottom of the condenser, substantially as and for the purpose set forth.

3. The trap formed in the oil-passage *c* to prevent the back flow of water into the oil-reservoir, as described.

4. The non-conducting layer *m*, interposed between the body and the parts which receive the steam, substantially as described.

5. The combination of the valve O, provided with the stop *e*, with the adjustable screw *g*, arranged to operate as set forth.

WILLIAM A. CLARK.

Witnesses:

W. C. DODGE,

W. W. DODGE.