W. A. CLARK.
Lubricator.

No. 202,235. Patented April 9, 1878.

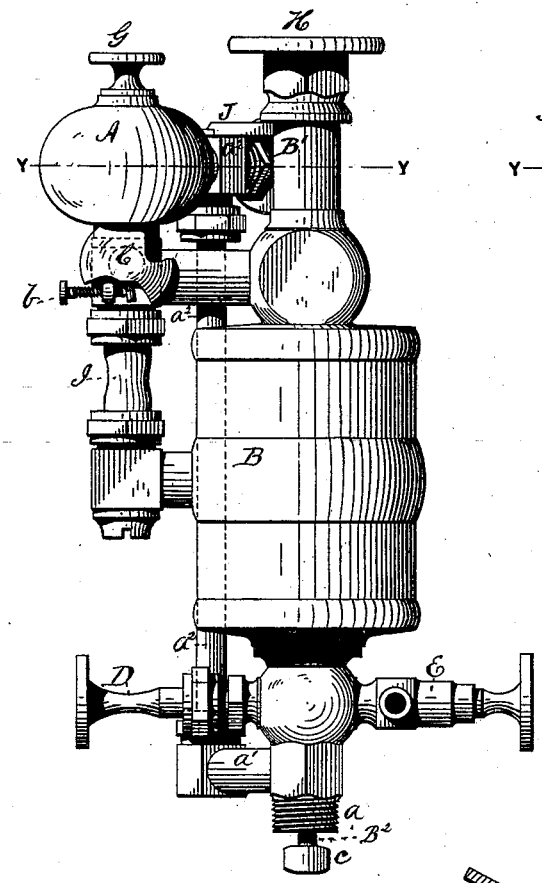

FIG. 1.

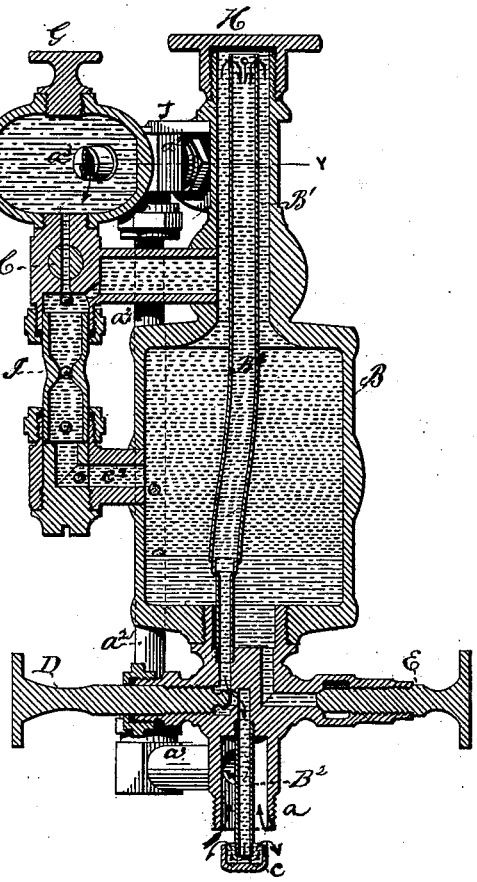

FIG. 2.

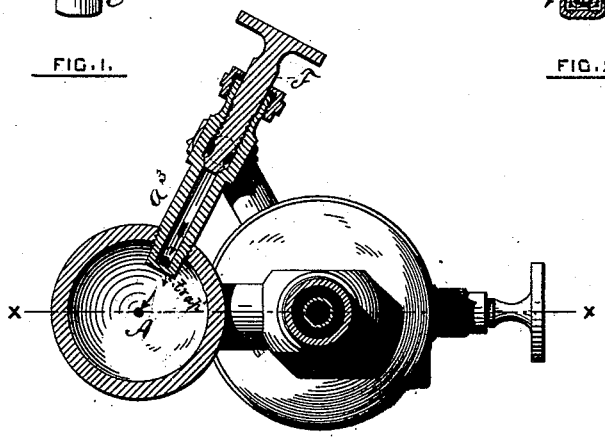

FIG. 3.

ATTEST,

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WILLIAM A. CLARK, OF WESTVILLE, CONNECTICUT.

IMPROVEMENT IN LUBRICATORS.

Specification forming part of Letters Patent No. **202,235**, dated April 9, 1878; application filed January 24, 1878.

To all whom it may concern:

Be it known that I, WILLIAM A. CLARK, of Westville, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Lubricators; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1 is an elevation. Fig. 2 is a vertical section on the line *x x* of Fig. 3. Fig. 3 is a horizontal section through the line *y y* of Figs. 1 and 2.

My invention relates to that class of lubricators for steam-engines by which the oil is automatically supplied drop by drop, or in such regulated quantity as may be required, the oil as fast as discharged having its place in the oil-reservoir supplied by an equivalent in bulk of water.

Before my invention various devices have been employed for this purpose, the essential principle of which is that the oil is expelled from the chamber of supply as the result of the pressure of a water-column extending above the body of the oil.

My invention differs from all such previous structures from the fact that I do not employ hydrostatic pressure as the means for expelling the oil from the supply-chamber; but, on the contrary, the top of my water-column or surface of the water in the water-chamber stands at a lower elevation than the top of the pipe through which the oil is discharged, and I make available the principle of the siphon as a means for discharging the contents of the oil-chamber.

Various improvements in the construction of my apparatus are also peculiar to it, which will be specifically described.

Referring to the drawings, it is to be understood that A is the chamber containing water or condensed steam from the engine, and B is the oil-chamber. The water is represented by lines of dots and dashes and the oil by simply dotted lines. The apparatus is to be supposed as attached, for instance, to the steam-chest of an engine by the screw-threaded pipe *a*, and both oil and water in their respective chambers are under an equilibrium of pressure of steam. This is effected by tapping the pipe *a* with a branch, a^1, Fig. 1, which connects with a vertical side pipe, a^2, and this latter pipe leads to another branch, a^3, the end of which is seen entering the condenser or water-chamber A in the sectional view, Fig. 2.

The necessary valves or cocks are provided for regulating the flow of the oil and water, and for other purposes, thus: C, Fig. 1, regulates the quantity of water which shall be allowed to pass into the oil-chamber, and, for convenience, the stem of the valve is furnished with a check-pin, which comes into contact, sooner or later, with the end of a check-screw, *b*, whereby the extent of the valve-opening can be limited at pleasure. D, Figs. 1 and 2, regulates the quantity of oil which is to be discharged. E is a draw-off valve for emptying the chamber B when it has become filled with water, and F, Fig. 3, regulates the flow of the steam into the condenser or water-chamber A. G is a screw-plug, and H a screw-cap, which closes, respectively, the tops of the chambers A and B, and which can be removed at will for charging the apparatus.

We will suppose now that the apparatus is ready for operation and completely filled with oil and with water, as indicated in Fig. 2. Oil occupies the greater part of the chamber B, including the vertical extension of the same, B^1. Within this vertical extension is a pipe, B^2, which extends downward through the oil-chamber, and constitutes the duct or supply-pipe for the engine. It is contracted in dimensions, as shown, toward the bottom, and is supposed to be filled with oil. The gravity of the column of oil in the supply-pipe B^2 causes it to flow into the cylinder over the trap *c* (hereinafter to be referred to) as fast as it is permitted to do by the valve D. The top of the pipe B^2 is above the water-level in the chamber A; but the pipe is nevertheless kept constantly full of oil, for the reason that it and the surrounding concentric extension B^1 of the oil-chamber constitute, in effect, a siphon.

The operation of the apparatus is plain from the inspection of the sectional view, Fig. 2. The water, which has been condensed from steam entering the chamber A, passes through the valve C and into the glass pipe

I, which has a constricted passage, (the purpose of which will be presently referred to,) and the water, (indicated in the drawing by globules,) being of greater specific gravity than the oil which fills such glass pipe, descends through the glass pipe into the passage c^2 connected therewith, and thence into the oil-cylinder, and precipitates itself to the bottom. The oil in the chamber B is in consequence kept always as high in the extension-pipe B^1 as the water-level in the chamber A; but it would not be able to pass into the pipe B^2 were it not that upon starting the apparatus it is charged with oil, by means of the removable screw-cap H, to the very top of the extension-pipe B^1. After the cap has been tightly closed, so that air cannot enter, the oil, so long as any is in the apparatus, will cover the openings into the pipe B^2 and flow into it as fast as oil is discharged by gravity from the pipe B^2.

The glass pipe I, which is for the purpose of observing the quantity of water, is made contracted near its middle section, as shown in Fig. 2. The advantage which results from thus contracting the tube is that it is rendered much easier thereby to observe the quantity of water which is passing into the apparatus. In case the tube be not so contracted, and the oil be of a dark color, it is not easy always to tell how much water is passing through it; but if the construction shown be employed, the water will displace the small quantity of oil which occupies the contracted passage, and the rate of the water-flow can be easily observed.

Another feature of my apparatus is that a trap of any preferred form is placed upon the end of the pipe a^3 when it enters the water-chamber or condenser A. When the apparatus is first put ready for operation the water-chamber is filled with water through the opening at the top, which is then closed by the screw-plug G. The trapped inlet-pipe prevents the water which stands at a higher level than the pipe from flowing back into the steam-chest.

Another feature of my invention is that the pipe for conveying the oil to the steam chest or cylinder to be supplied with oil is not only concentric with the pipe which connects the apparatus with the steam-chest, but it extends below the end of such pipe, (see Fig. 2,) and the bottom of the oil-pipe is furnished with a trap, *c*. The trap prevents air or steam from working into the oil-pipe, and thereby emptying the pipe, while the arrangement of the entrance for the steam into the apparatus above the trap-protected end of the oil-pipe diminishes the liability of the oil being driven back in the pipe by the steam.

Another feature of my apparatus is the employment of a metallic conducting-bar, J, which connects the extension-pipe B^1 of the oil-chamber with the vertical steam side pipe a^2, Fig. 2. This bar performs the double office of a supporting or connecting bar to support the side pipe and a conductor of the heat from the side pipe to the extension of the oil-chamber, whereby the oil, which is near the top of the discharge-pipe, and which otherwise might become cooled, is kept constantly warm, so as to flow readily.

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

1. In a lubricator for automatically feeding oil in regulated quantity, a chamber or vessel containing oil, constructed with a siphon discharge-pipe, the said oil-chamber being in combination with a water-chamber for maintaining by the inflow of water into the oil-chamber the surface of the oil at a given height, substantially as described.

2. In a lubricator for automatically feeding oil in regulated quantity, the combination, with the water-chamber and with the oil-chamber, of a glass tube for observing the quantity of water which is flowing into the oil-chamber when a portion of such tube is contracted to facilitate the observation of the water, substantially as described.

3. The combination, with the condenser or water-chamber in a lubricator, of an inlet steam-pipe, a^3, whose end is trapped, as described, to prevent the condensed water which stands above the opening of such pipe from flowing back into the steam chest or cylinder, as specified.

4. The arrangement of the oil-delivery pipe B^2 and the neck *a*, which connects the apparatus with the steam-chest or portion of the engine to be supplied with oil, so that the former shall be concentric with or within the latter, be extended below the opening, and afford an annular steam-passage, substantially as described.

5. The combination, with the oil-delivery pipe in a lubricator, of a trap, *c*, to prevent the entrance of air or steam into such delivery-pipe, substantially as described.

6. The combination of the steam-pipe a^2, the vertical extension B^1 of the oil-chamber, and a conducting-bar, J, which connects said extension and pipe, and which bar performs the double office of a brace or support to the steam-pipe and a conductor of heat to the oil-chamber, substantially as described.

WILLIAM A. CLARK.

Witnesses:
J. C. B. WOODS,
GEORGE FULLER.