

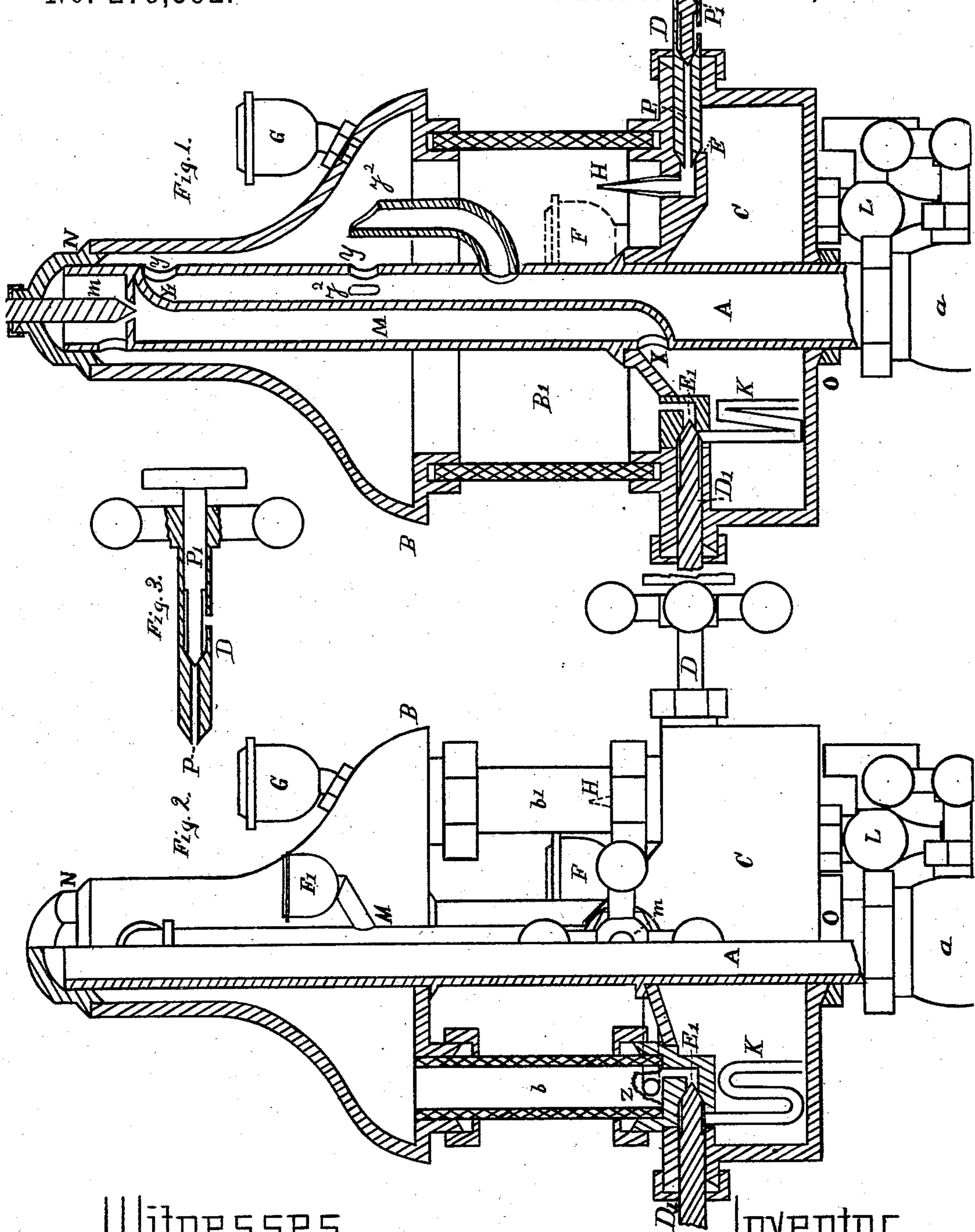
(No Model.)

W. L. PARKER.

LUBRICATOR.

No. 279,592.

Patented June 19, 1883.



Witnesses.
Richard Kennedy
Jas T. Hoyle

Inventor.
W. L. Parker.

UNITED STATES PATENT OFFICE.

WASHINGTON L. PARKER, OF CHICAGO, ILLINOIS.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 279,592, dated June 19, 1883.

Application filed January 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, WASHINGTON L. PARKER, a citizen of the United States, and residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lubricators for Steam-Cylinders, which are fully explained in the annexed specification and drawings.

The purpose of my invention is to provide a lubricator of the class known as "oil-drop sight-feed" lubricators, in which the feed of oil shall be effected solely by virtue of the difference in the specific gravity of oil and water—that is, without the aid of hydrostatic or steam pressure. A further purpose is to provide a compact form of lubricator of the class named, and one in which the passage of oil from its reservoir to the steam pipe or cylinder shall be as short and direct as possible, thereby avoiding, or at least diminishing, the danger of clogging the passage with impurities from the oil. A further purpose is to furnish a lubricator with a visible feed, in which, without special additional parts or devices for that purpose, the oil may be kept so hot that it may be used in the most exposed positions—as on locomotives or other outdoor engines—in the most severe weather without permitting the oil to become too cold to flow freely in drops. A further purpose is to prevent the vibration and consequent breaking of the oil-drop, which is due to the varying pressure of steam upon the contents of the cup at the different stages of the piston-stroke. A further purpose is to provide means for cleaning out the oil-nozzle by blowing steam through it without emptying or disturbing the contents of the oil-reservoir. These purposes are accomplished by the form of structure described herein, as follows: I place the condenser surrounding the upper end of a vertical branch of steam-pipe which forms the stem of the lubricator, such pipe penetrating the bottom of the condenser, and having its steam-discharge openings (one or more) at any point or points within the condenser, the lowest of them, if more than one, or the sole opening, if but one, serving also as the oil-educt and also as the water-overflow opening. The oil-reservoir I place surrounding the steam-induct pipe or stem below the condenser, into which it communicates by two openings, through one

of which the water of condensation passes down to the oil-reservoir, a suitable trap preventing the upward passage of the oil through this passage-way, and thereby compelling the oil to pass up through the other passage-way, which is provided with a suitable nozzle protruding upward into the water which fills the lower portion of the condensing-chamber, and delivers the oil in drops into the water, through which it then rises and floats off from the surface through the overflow-opening in the steam-induct pipe constituting the stem, and passes to the cylinder. The lower portion of the condensing-chamber is made wholly or partly transparent, being transparent at least at that part opposite the nozzle, so that the oil-drop may be observable through it and the feed regulated accordingly. This lower part of the condensing-chamber may be diminished so as to consist only of two tubes or branches, constituting passage-ways from the upper part of the condensing-chamber to the oil-reservoir below, one of the branches being the path of the water of condensation down from the steam-filled portion of the condensing-chamber to the oil-reservoir, and the other branch being the path of the oil-drop upward from the oil-reservoir to the water-surface in the condensing-chamber, from whence it flows off to the steam pipes and cylinder. Only the latter-named passage need be transparent. Both modifications of structure are shown in the drawings.

Figure 1 is a view showing a vertical section of a form of my lubricator, in which the lower part of the condensing-chamber is made continuous of full size, as first above described. Fig. 2 is an elevation of a form in which the lower-part of the condensing-chamber is diminished, as last above described, to two branches, constituting the passage-ways, performing the function stated. In order to show features of construction, the front left-hand quarter of the lubricator in this figure is shown cut out, leaving a sectional view of the left-hand portion of the lubricator as cut by the plane in the same position as that upon which the sectional view of Fig. 1 is made. Fig. 3 shows in sectional view details of construction of a valve attachment employed as hereinafter described.

A is the stem, constituting the steam-in-

duct, water-overflow, and oil-educt in one passage. It is controlled by the valve *a*, and has the steam-discharge openings *Y* and *Y'*, the lower of which serves also as water-overflow and oil-educt opening; or the oil-educt may be by a separate opening, either in the stem *A*, as shown by the dotted outline *Y*², or elsewhere, and provided with a separate passage back to the steam-pipe, as shown by the dotted outline *Y*³; but in either or any case it should be on the same level as the water-overflow opening. The number of the steam-openings may be several, and distributed along the stem *A* within the condenser; but even one, the lower, *Y*, will in most cases suffice.

B is the condenser, having the lower transparent part, *B'*, Fig. 1, which in Fig. 2 is divided and diminished to the two branches *b* and *b'*, of which only *b'* need be transparent.

E and *E'* are passages communicating between the condenser *B* and the oil-reservoir *C*. The former passage, *E*, is the oil-passage, and the latter, *E'*, is the water-passage. One, and preferably both, of these passages are controlled by valves *D* and *D'*, respectively. If only one is so controlled, I prefer that it should be the oil-passage *E*.

H is a nozzle, covering above, and, except as to its own aperture, closing the oil-passage *E*. *K* is a trap, covering below, except as to its own aperture, closing the water-passage *E'*. It is preferably made in the form shown; but it may be in any form such as to trap the oil against upward passage through it. Any mechanic familiar with this class of devices will be able without further instructions to fix upon a suitable form.

I provide a suitable plug in either of the positions *F* or *F'* for filling the oil-reservoir; also, a drain-cock, *L*, for emptying. I prefer to have also a plug, *G*, for filling the condenser with water at starting. This plug is preferably located, as shown, at a point directly above the nozzle *H*, so that it may also serve to admit a swab to clean the glass and the nozzle, so as to permit the unobstructed observation of the oil-drop in its upward passage from the nozzle to the water-surface.

M is a passage, termed a "vent," leading the highest interior point of the oil-reservoir *C* into the condenser or steam-pipe, into which it opens at a point which must be higher than a column of oil would be sustained by the balancing-weight of the column of water in the condensing-chamber *B*. It may be as high as desired, and in practice I prefer to have it considerably higher than the overflow-opening *Y* of the steam pipe or stem *A*. This vent is preferably controlled by a valve, *m*, located at any convenient point. The oil-reservoir *C* is preferably made interiorly concave above, so that there shall be a point, *X*, higher than any other point of its interior surface, at which the vent *M* may communicate. This vent I prefer to locate so that the greater part of its length shall be outside of both the oil-reser-

voir and the condensing-chamber, as in Fig. 2, where it is placed at a point ninety degrees from each of the branches *b* and *b'*; but it may be elsewhere, provided it forms a communication from the upper—and preferably the very highest—part of the oil-reservoir to the upper steam-filled portion of the condenser or its connections, for the purpose hereinafter stated. In Fig. 1 it is shown as a separate passage in the stem *A*, alongside of but not communicating directly with the steam-passage. The position is rather a matter of convenience in construction than substantial importance as respects its function; but I have found that it is usually more effective for its purpose when it is so placed that it is not overheated by the contiguity of the steam-pipe, and for this reason I prefer to place it as in Fig. 2.

The precise mechanical structure of this lubricator is not strictly material to its purposes, except so far as it secures compactness; but I prefer to make it substantially as shown, the parts being bound together about the stem *A* by means of the threaded nuts *N* above and *O* below the condenser and oil-reservoir, respectively, the stem *A* making steam-tight junctions through both condenser and reservoir. The transparent part of the condensing-chamber—*B'* in Fig. 1 and *b* and *b'* in Fig. 2—make steam-tight junctions below with the top of the oil-reservoir, and above with the upper portion of the condenser, by means of stuffing-boxes or other packed joints, in a manner familiar to mechanics, and which needs no further explanation.

The operation of the above-described lubricator is as follows: The oil-reservoir being filled with oil through the filling-plug *F*, and the condensing-chamber being also filled with water, preferably by pouring through the plug *G*, though it may be allowed to fill by condensation, the steam is admitted through the cock *d*, and the valves *D* and *D'* and *m* being opened, the water will pass down through the passage *E'* and the trap *K* into the oil-reservoir, displacing the oil therein, which will pass up through the passage *E* and nozzle *H* into and through to the surface of the water in the lower part of the condenser or its branch *b'*, and thence will float off through the opening *Y* into the steam pipe and cylinder. The flow of oil may be observed through the glass portion of the condenser, and may be regulated as desired by either valve *D* or *D'*, the other being left open.

The purpose served by the vent-passage *M* is to permit any steam or oil vapor which may form in the oil-reservoir *C* to escape. The necessity for this arises from the fact that if it remains in the oil-reservoir it forms an elastic cushion on the top of the oil therein, and the pulsation due to the stroke of the piston being communicated through the stem *A* to the condensing-chamber *B*, and thence to the oil-reservoir *C*, through the passage-ways *E* and *E'*, and, acting in the oil-reservoir against

the elastic cushion or vapor therein, causes the entire contents of the reservoir to throb with the stroke of the piston, thereby soon churning the oil and water therein together into a foam; or, if the pulsation is not sufficiently violent to produce that effect, it at least causes such agitation as to interfere with the steady and uniform formation of the oil-drop on the tip of the nozzle, and sometimes causing it to break and pass up in fine specks, the quantity of which it is impossible to estimate, so defeating the purpose of rendering the feed visible. When, however, the vent M is employed, the oil-reservoir is kept substantially free from vapor or gas, and full of a continuous body of inelastic liquid, which, being incompressible, remains steady under the varying pressure attendant upon the piston-stroke; or, to state the effect differently, the steam-pressure being transmitted through the vent-passage M counterbalances the same pressure transmitted through the passages E and E', and however that pressure may vary and fluctuate it can produce no motion of the liquid body in the oil-reservoir, because, being applied at the same instant and with the same force at the two extremes in the direction of which only motion could otherwise take place, it is expended in a tendency to compress a liquid substantially incompressible, and therefore produces no sensible result. A similar but not identical function of this vent may be thus stated: When this lubricator is acting under high pressure of steam, especially if it is connected at or near the engine-cylinder, so that the pressure in it varies substantially as in the cylinder, from boiler-pressure to atmospheric pressure, or nearly so, at the different points of the piston-stroke, even if no steam is actually formed in the oil-reservoir, yet, being at a temperature at which it would vaporize if the interval of minimum pressure were sufficiently prolonged, the liquid in the reservoir is constantly on the point of vaporizing, and is thereby rendered practically elastic; and in the absence of the vent M, or an equivalent device, the high tension of the liquid in the reservoir, reacting in the interval of low pressure in the condenser, will drive the oil by main force either out through the nozzle in an irregular and uncomputable quantity, or back through the trap into the condenser, in either case tending to defeat the purpose of the visible feed; but with the vent M there is afforded ample space for this expansion and contraction to take place without materially varying the pressure on the nozzle or the trap, and thereby a steady action of the forces—viz., the difference in the specific gravity of the oil and the water—is permitted, and a correspondingly steady and regular feed is the result.

To blow through either of the passages E, E', or M, close both the others and open the drain-cock L. To drain the oil-reservoir only, close the valves D and D' and open the drain-cock L. To drain also the condensing-cham-

ber, open the valves D and D' and the drain-cock L. To drain the condenser alone, I provide the passage P through the stem of the valve D, and, to close such passage, the screw-plug or an equivalent device, P'. This passage being opened, the entire condenser may be drained through it. It also serves the more important purpose of blowing the nozzle clear of any impurities which may have accumulated in it from the oil, or to allow any air or steam bubbles which may lodge under it and cause vibration of the oil-drop to escape.

When the form of the lubricator is that shown in Fig. 2, I consider it desirable to connect the two branches *b* and *b'* by the passage Z, opening into the branch *b'* at its base, outside the nozzle H, and into the branch *b* at its base, above the trap K. The purpose of this passage is to permit complete drainage of both branches through the passage P, and also to allow a circulation of water, which would result from difference of temperature at different points between the two branches and the main part of the condenser above, thereby rendering the two forms, Figs. 1 and 2, complete equivalents in all respects. Manifestly, if the branch *b* be closed above the opening of the passage Z, the entire interchange of water and oil will take place through the branch *b'*, the oil rising in drops through it, and the water of condensation passing down through it and through the passage Z and the trap K. This suggested form would manifestly be identical with the form Fig. 1, the transparent portion B' of the condenser being simply reduced in size, so taking the form of the branch *b'*.

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

1. In a visible feed-lubricator, the combination of an oil-chamber, a condenser, and a tube which serves as the sole passage for the steam to the condenser, and for the oil from the surface of the water of condensation in the condenser to the parts to be lubricated.

2. In a visible feed-lubricator, the method of feeding oil to the parts to be lubricated, which consists in passing it, solely by reason of its inferior specific gravity, from the oil-reservoir to the surface of the water in the condenser, and thence carrying it by and with the surplus water of condensation into and through the steam-induct pipe to the parts to be lubricated.

3. In a visible oil-drop-feed lubricator, a condensing-chamber which affords water for displacement and feed of oil, of which the condensing-surface is higher than the steam-induct connection, and of which the lower part, in which water of condensation is accumulated, is wholly or partly transparent, and through the water in which the oil passes from the oil-reservoir to the steam-pipe.

4. In a visible oil-drop-feed lubricator, the visible feed tube or chamber, communicating below and downward with the top of the oil-reservoir, and forming a part of or communi-

cating above directly with the condensing-chamber, which affords water for the displacement and feed of oil, and of which the condensing-surface is higher than the steam-induct connection.

5 5. A visible oil-drop-feed lubricator having a condenser whose condensing-surface is higher than the steam-induct connection and an oil-educt which opens at the surface of the water
10 of condensation in the condenser, whereby the oil flows off with the surplus water of condensation into and through the steam-pipe.

6. In a visible oil-drop-feed lubricator for the purpose of keeping the oil at a high temperature, the combination, with an oil-reservoir and a condenser communicating with it, of
15 a steam-pipe passing vertically through but not opening into the oil-chamber, and serving also as the steam-induct into the condenser,
20 substantially as set forth.

7. A visible oil-drop-feed lubricator having a condensing-chamber superimposed upon an oil-reservoir and communicating therewith by
25 two passage-ways, one for the downward passage of the water of condensation, guarded by a trap against the upward passage of the oil, and the other for the upward passage of the oil, either or both of said passage-ways being
30 controlled by suitable valve or valves, substantially as and for the purpose set forth.

8. In combination with the transparent tube or chamber B' or b' and the nozzle H, the valve D, having the passage P, and suitable devices for closing and opening said passage at will,
35 substantially as set forth.

9. The combination of the filling-plug F', opening into vent-passage M, in combination with such passage and with the oil-reservoir C, substantially as set forth.

40 10. A lubricator in which the oil-chamber and superimposed condensing-chamber are connected by three passages, one for the downward passage of the water and controlled by suitable trap, another for the upward passage for the oil, and provided with a suitable

nozzle, and the third for the direct communication of steam-pressure to the oil-chamber, and to relieve said chamber of pressure originating therein, and leading from said chamber, at or near its highest interior point, to the upper
50 steam-filled portion of the condenser, substantially as and for the purpose set forth.

11. In a lubricator in which oil is displaced from its reservoir by water derived from a condenser and is delivered upward in visible drops
55 through water in a transparent chamber separate from but communicating with the oil-reservoir for the purpose of effecting such delivery uniformly, notwithstanding any agitation or varying pressure in the oil-reservoir, the combination, with such oil-reservoir, condenser,
60 and communicating passages, of a vent-passage leading from the oil-reservoir, at or near its highest interior point, to an opening exposed to the steam-pressure at a point higher
65 than any liquid column which exerts pressure on the liquid in the oil-reservoir, substantially as set forth.

12. An oil-drop-sight-feed lubricator having its condenser superimposed upon the oil-reservoir, the two chambers being secured together by a tubular vertical stem which passes through them both, and which serves as the steam-induct to the condenser, substantially as
70 set forth.

13. A visible-feed lubricator having a condensing-surface which is higher than the steam-induct connection, and whose openings for the emission of oil and the discharge of the surplus water of condensation are on the same
75 level.

In testimony that I claim the foregoing as my invention I have hereunto set my hand, this 19th day of January, A. D. 1883, in the presence of two witnesses.

WASHINGTON LEROY PARKER.

Witnesses:

CHAS. S. BURTON,
LE GRAND BURTON.