(No Model.)

J. V. CLARK.

LUBRICATOR.

No. 485,454. Patented Nov. 1, 1892.

Fig. 1.

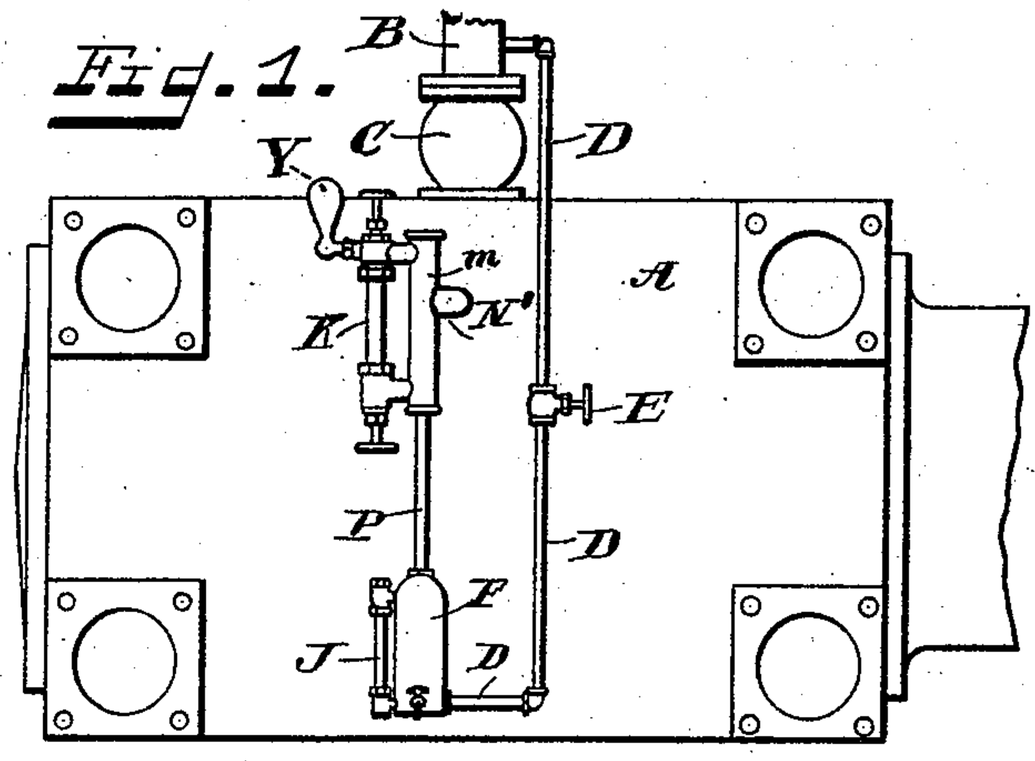


Fig. 4.

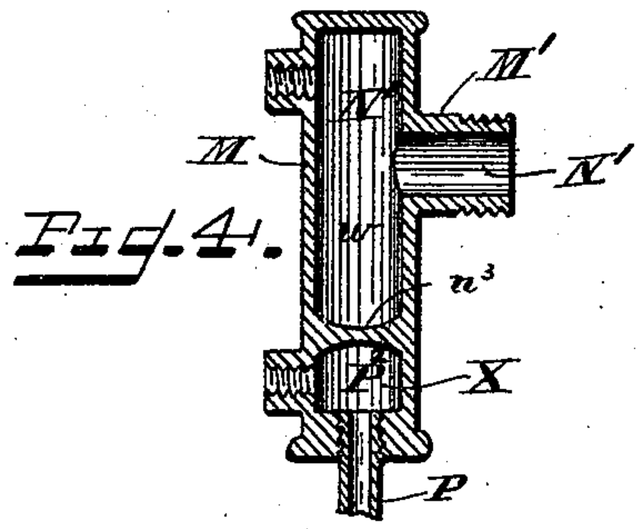


Fig. 2.

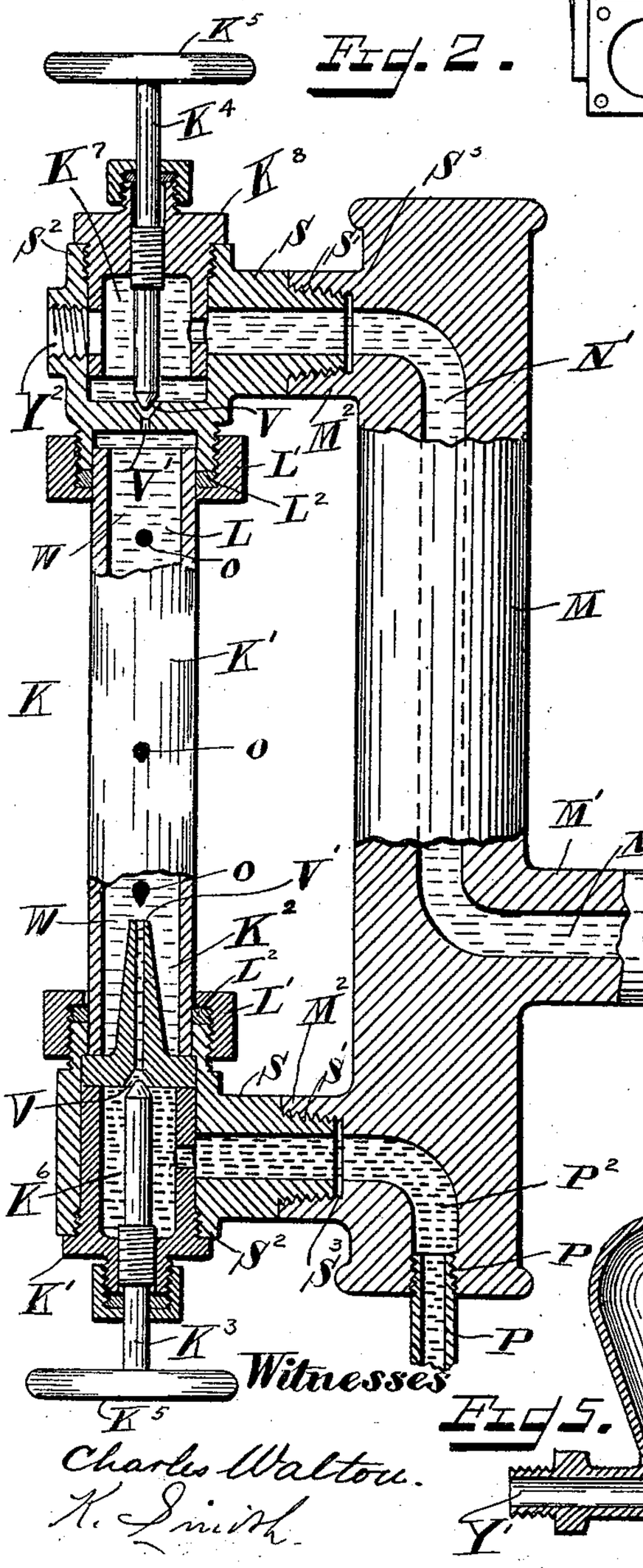


Fig. 3.

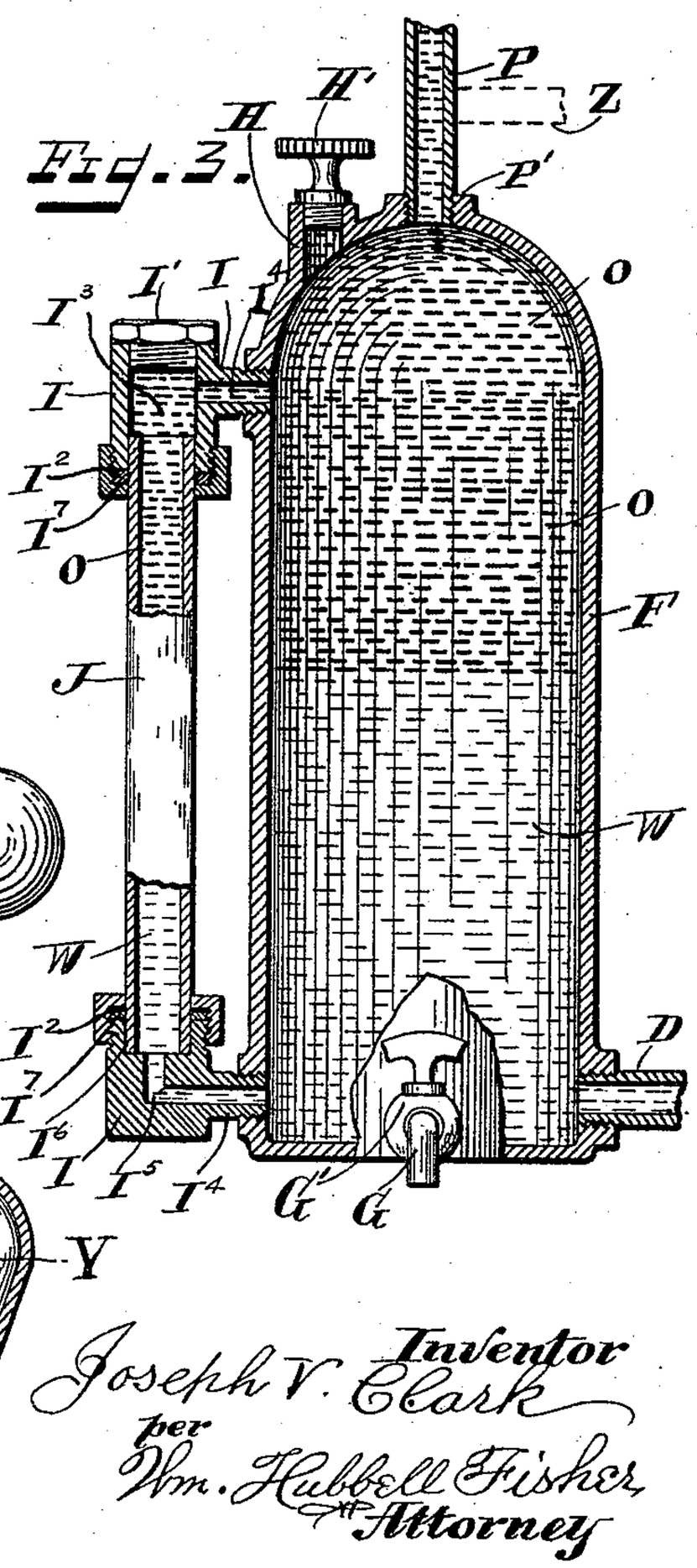
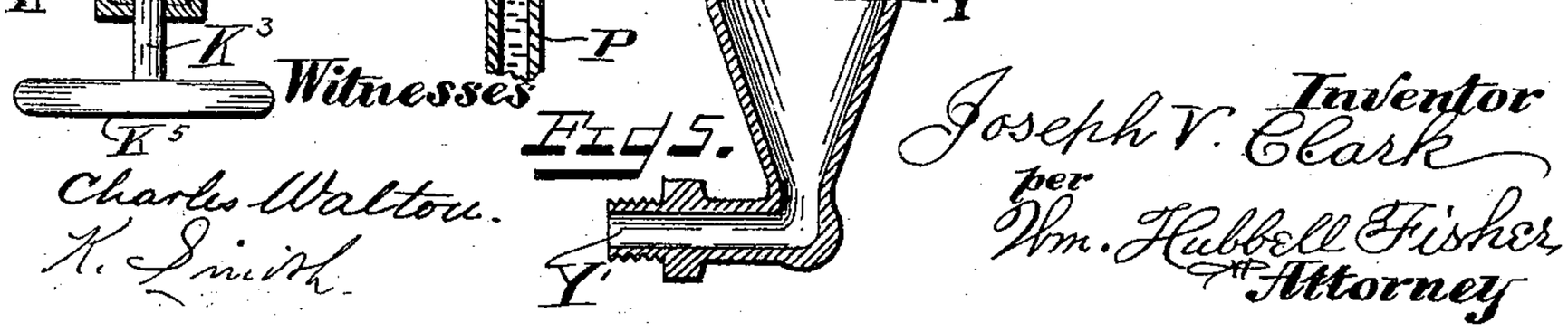


Fig. 5.



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LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 485,454, dated November 1, 1892.

Application filed February 26, 1891. Serial No. 382,957. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH V. CLARK, a citizen of the United States, and a resident of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Sight-Feed Lubricators, of which the following is a specification.

The several features of my invention and the various advantages resulting from their use, conjointly or otherwise, will be apparent from the following description and claims.

In the accompanying drawings, making a part of this specification, and to which reference is hereby made, Figure 1 is a side elevation of the cylinder and steam-chest of a Corliss engine and the inlet or feed pipe thereof and of the sight-feed lubricator and its supply-reservoir as applied to and connected to the said steam-chest, cylinder, and inlet feed-pipe. Fig. 2 is a vertical central section taken through the sight-feed lubricator proper, showing in elevation the plugs for regulating the flow of oil through the sight-feed glass. Portions of the sight-feed glass and also portions of the accompanying vertical bracket containing the passages connected with the sight-feed glass are shown in elevation. Fig. 3 is a vertical transverse section of the supply-reservoir and indicator-glass made according to my invention, part of the said indicating-glass being shown in elevation. A portion of the lower end of the supply-reservoir is shown in elevation, together with the outlet or discharge faucet connected thereto. Fig. 4 is a vertical central section of the column, on a reduced scale and showing the preferred kind of chambers therein. Fig. 5 is a vertical central section of the condensing-chamber, which is combined with the sight-feed and constitutes one of the features of my invention.

My lubricator is applicable to various descriptions of engines. For the purpose of illustrating my invention I have shown it as applied to the cylinder of a Corliss engine, it being understood that the application of my invention to the Corliss engines does not essentially differ from the mode in which it is applied to other engines.

A indicates that side of the steam chest or cylinder of a Corliss engine which is opposite to where the valves are located.

B indicates the steam-inlet pipe, whereby the steam is admitted into the steam-chest of the engine.

C indicates that portion of the pipe wherein the throttle-valve is located.

D indicates a steam-pipe or passage-way, at its upper end connected to the steam-inlet pipe B above the throttle-valve C and at its lower end connected to the lower part of the interior space of the oil-supply reservoir F. The flow of steam down through the pipe D is regulated by the valve or stop-cock E.

The oil-reservoir F may be located at any desired point, either on the engine or at a distance therefrom, it being one of the features of my invention that the oil-supply reservoir is so constructed as to be located at any desired point and also to be of any desired size. For these reasons the oil-supply reservoir as constructed by me and as combined by me with the sight-feed lubricator may be very large and contain sufficient oil to supply the lubricating-oil for the engine for a long space of time. At the lower end of this oil-reservoir F is an outlet-pipe G, the passage-way of which is controlled by the faucet G′. The oil-reservoir is provided at its upper end with an inlet-orifice H, capable of being closed by suitable devices. In the drawings one form of such device is shown and consists of a screw-stopple H′, whose screw-thread engages the screw-thread on the inner side of the orifice H.

Connected to the oil-reservoir is an indicating-glass J. The longitudinal axis of this glass is vertical or substantially so. As the indicating-glass is liable to be broken, and also at times needs to be cleaned inwardly, it is connected to the supply-reservoir by devices which enable it to be removed therefrom and replaced. A preferred construction of such device is as follows: Into the upper portion of the wall of the reservoir F is screwed or otherwise secured a piece I, which contains a passage-way I^3, extending through it from top to bottom, and also a passage-way I^4, connected to the passage I^3. This last-named passage connects the large passage-way I^3 with the interior space of the reservoir F. The upper end of the passage-way I^3 is closed by a

screw-stopple or equivalent device I′. Into the lower portion of the wall of the reservoir F is screwed or otherwise secured a piece I, provided with a vertical passage-way I^5, and therefrom a horizontal passage-way I^4, in turn connected with the interior space of the reservoir F. The vertical passage-way I^5 of this piece I need not be of as large a diameter as that of the upper piece I, for the reason that the passage-way I^3 is allsufficient for enabling the glass tube J to be withdrawn from its holding device I I, and hence there is no need of so constructing the lower piece I as to enable the glass to be slipped down through it, and thence removed therefrom. On the lower end of the upper piece I is screwed a nut I^2, and between the said nut and the lower end of the piece I a packing-ring, preferably of rubber, is located. A similar nut I^2 is similarly connected to the lower piece I, and a similar packing-ring I^7, located between the nut I^2 and its piece I, is present. The lower end of the glass J sets in a recess I^6 in the upper side of the lower piece I, the recess being connected with the passage-way I^5, while the upper end of the glass extends up in the passage-way of the upper piece I, substantially as shown. The glass indicator-tube J passes through a central opening in each of the nuts I^2. As the nuts I^2 are screwed upon their respective pieces I, the rubber packing will be thereby compressed vertically and will expand laterally and press against the indicator-glass J, thus making a tight joint, thereby preventing any liquid or gas within the indicator-glass or the passages I^3 I^5 from escaping into the outer air at the junction between the pieces I I and the indicator-tube. When it is desired to remove the glass J, the screw-stopple I′ is turned and unscrewed through the upper piece I. The nuts I^2 I^2 are loosened and the grip of the packing-rings I^7 I^7 upon the glass is thereby released. The indicator-glass is now passed up through the opening or passage I^3 of the upper piece I and removed. It may then be cleaned, or, in case it is cracked or otherwise marred in such a manner as to be no longer fit to be used as an indicator-glass, a new indicator-glass may be substituted for it. The indicator-glass to be used is now replaced by being introduced through the passage I^3 and passed down until the lower end of the glass has been received into the recess I^6 of the lower piece I. The screw-stopple I′ is now replaced in position and the nuts I^2 are tightened.

The oil-reservoir F is connected to a sight-feed. One description of such sight-feed is shown in Fig. 2 at the left-hand side of said figure. Inasmuch as this sight-feed is one in use and well known and not of my invention, a detailed description of this lubricator will not be needed here.

The construction of the supporting-column M and the arrangement of passage-ways therein and the combination of said column and its passages with the feed is of my invention. In the lower end of the column M is secured a pipe or conduit P. The preferred means for securing the pipe to the column is by means of the ordinary well-known screw-thread P′; but it can be attached to the column by a union or otherwise. In the lower portion of the column is the conduit or passage-way P^2. This conduit connects at its lower end with the pipe or conduit P, and turning sharply to the left it is connected at its other end with the space K^6 of the sight-feed. This latter space is connected to the chamber K^2 within the glass K of this sight-feed by the narrow aperture V′. At the lower end of the aperture V′ is the aperture V of a triangular or cone shape, and a plug or needle K^3, having a tapered point and screwed into the frame K′ of the lubricator by means of a hand-wheel K^5, is advanced into or retracted from the aperture or recess V. In this way the amount of oil passing from the chamber K^6 is regulated. The other end of the space inclosed by the glass sight-feed tube K is connected to the chamber K^7 by an orifice V′, whose upper end has a recess V, receiving the end of the plug or needle K^4, similar to that already described in connection with the lower recess V′ of chamber K^6. In this way the oil as it passes up from the sight-feed tube is retarded at will and the amount of oil that passes from the sight-feed tube into the chamber K^7 is regulated. The chamber K^7 is connected with the conduit N′, and this conduit extends into the upper end of the column M and thence through the column the greater part of its length, and then, turning to the right, extends outwardly from the column through the arm or elbow M′ of the column. This conduit N′ is then connected with the steam-space of the steam-chest at a suitable point, so that the oil introduced through this conduit shall be most easily distributed to the working devices within the steam-chest and the cylinder.

In order to prevent misapprehension, it should be here remarked that the arm or elbow on the column is not absolutely necessary; but it does, in fact, furnish a very useful means for connecting the column to the interior of the steam-chest or other space for receiving the oil on its way to the machinery to be lubricated.

For purposes of securing in a novel and convenient and very desirable manner the sight-feed to the column M aforementioned the column M is provided with the laterally-extending arms M^2 M^2, one of which is located at the upper end of the column and the other at the lower end of the latter. The laterally-extending arm or portion S of the sight-feed at its upper end is screwed into or otherwise suitably secured to the upper arm M^2 of the column, and the lower arm S of the sight-feed is screwed into or suitably secured to the lower arm M^2 of the column. A suitable packing S^3 is present in the connection between the upper arm S of the lubricator and the up-

per arm M^2 of the column, and in like manner a suitable packing S^3 is present between the lower arm S of the lubricator and the upper arm M^2 of the column. In this way both of these joints or unions are made fluid-tight.

I will now proceed to describe the operation of my invention.

The stop-cock or valve E is closed. The oil-reservoir F is then filled with oil. It may be here remarked that in the oil-reservoir and sight-feed and connecting-pipes, as shown in Figs. 2 and 3, the oil is shown by the heavy black horizontal lines or dashes, while the water is indicated by the light horizontal lines or dashes. After the reservoir is filled with oil the inlet orifice H is closed, the valve E is opened, and steam is thus allowed to pass through the pipe D to the oil-reservoir F. The pressure of this steam presses the oil upward and through the pipe P and conduit P^2 into the chamber K^6. Here for the first time the oil meets with a barrier, consisting of a narrow opening V′, recess V, and plug K^3. The oil very slowly oozes past the end of the plug K^3 into the narrow opening V′ and forms at the upper end of the opening V′ in the shape of a drop O. This drop O by its bouyancy floats upward through the water already within the sight-feed tube K until it reaches the upper conduit V′. Through this latter conduit it slowly oozes past the adjacent end of the point of the plug K^4 and enters the chamber K^7. Thence it is carried on through and with the liquid in the conduit or passage-way N′ through the column, and thence out through the elbow M′ of the steam-space within the steam-chest, where it is duly delivered and immediately utilized in lubricating the working parts within the steam-chest and the steam-cylinder to which the steam-chest is connected. The rate at which the oil passes through the sight-feed is, as aforementioned, determined by the adjustment of the plugs K^3 and K^4 in connection with the respective recesses V V, in which they are respectively received. In a large engine the delivery of six drops a minute would be sufficient for lubricating the working portions within the steam-chest and cylinder of the said engine. In a smaller engine the number of drops delivered per minute will be correspondingly reduced. As the oil in the reservoir F is consumed, the water of condensation W will be formed in the lower portion of the cylinder and take the place of the oil exhausted therefrom. Thus the reservoir will be continually filled, the upper portion of it with oil, and whatever part of it which is not occupied with oil will be filled with water below the oil. In this way the oil will be continually raised and kept up close to the pipe P and in position for being forced or delivered through the sight-feed pipe E to the sight-feed lubricator proper. The reservoir F need not be replenished with oil until the lower or bottom part of the oil therein has risen nearly to the upper conduit or passage-way I of the indicator J. At this time the reservoir F should be refilled with oil. The refilling of the reservoir is readily accomplished in a few moments by closing the valve E and opening the faucet G′. The water W in the reservoir F will continue as soon as sufficient water has run out so that the bottom of the oil in the reservoir has reached nearly to the lower conduit I^4 of the indicator J. The stop-cock G′ is closed and the reservoir is then refilled with oil through the inlet H in the manner aforementioned. The screw-stopple or equivalent device H′ having been reinserted in the inlet-orifice H, the steam from the supply-pipe is then allowed by opening the valve E to pass through the reservoir F, and the operation of supplying the lubricating-oil to the cylinder and engine is continued. The column M performs very efficient functions in relation to the apparatus. It holds the opposite ends of the sight-feed in position and prevents any expansion of any part of the latter from breaking the glass tube K thereof. It well supports the sight-feed and also performs a very efficient mode of connecting the same to the steam-chest of the engine. The elbow M′ of the column M securely supports the latter and the sight-feed. This elbow being in its preferred form integral with the column saves an extra junction of the elbow and the column. The column also forms a very efficient conduit or passage-way for the conduit N′ on the one hand and the conduit P^2 on the other. The arms M^2 M^2 of the conduit afford a very efficient means for securing the upper and lower projecting ends or arms of the sight-feed. In Fig. 4 the preferred kind of chambers or passage-ways which the column M is to contain are shown. Here the conduit N′ is of a greatly-enlarged diameter and does not stop at the arm M′, but extends downward a considerable distance below the elbow, as shown. In this figure the arm M′ is located higher up on the column than in Fig. 2. The advantage arising from this construction is that the enlarged and extended conduit, which is indicated by the letter *w*, will be filled with water and the latter will keep the column cool and cause the steam entering therein from the sight-feed between the drops of oil to condense much faster than if it (the water) were not there. The larger portion of this chamber *w* lies below the outlet N′ and forms a well wherein the water of condensation is retained. In Fig. 4 the lower conduit P^2 is also greatly enlarged, forming the chamber X. The advantage of this enlarged oil cavity or chamber is that, it being much larger than the pipe or conduit P, which carries the oil to it, the regularity with which the drops will leave the lower orifice V′ of the sight-feed and be fed through the same and into the machinery where they are to be utilized will be uniform.

An improvement which I have made in the sight-feed is the combination therewith of a condensing-chamber, as Y. This chamber is

suitably connected to some part of the upper portion of the said chamber, so that intercommunication shall exist between this chamber and the chamber K^7 and conduit N′, and so that the water of condensation from this chamber shall on its way out through conduit N′ pass over and near the upper opening V′ of the sight-feed. In the present illustrative instance the open end Y′ of the chamber Y is connected with the opening Y^2 to the chamber K^7 of the sight-feed, the connection being securely made by interengaging screw-threads, as shown. The part which this chamber takes in the operation aforementioned is as follows: The steam entering this chamber condenses therein and causes a continual flow of water to pass over the upper end of sight-feed glass, substantially as shown, and prevents the sight-feed from clogging up in using heavy oil.

I desire at this juncture to call attention to the upper end of the reservoir. The roof of the interior space of the reservoir F, I make of a concave or a cone shape, and I find this very valuable, inasmuch as this shape greatly aids in the proper discharge of the oil from the reservoir into the conduit-pipe P.

Inasmuch as the advantage of my invention is that it allows the oil-supply reservoir F to be made of a large size, the reservoir can be utilized in feeding two or more sight-feed lubricators. In such event the conduit P may be tapped at Z and the supply-pipe for another feed be there introduced, as indicated by the dotted lines in Fig. 3, or be otherwise connected to the reservoir.

It will be recollected that slide-valve engines are not constructed as are the Corliss, and in the case of slide-valve engines it will be necessary to place the sight-feed on the feed-steam pipe instead of on the steam-chest. Such a location of the sight-feed can also be made where the engine belongs to the Corliss class.

While the various features of my invention are preferably employed together, one or more of the said features may be employed without the remainder, and in so far as applicable one or more of the said features may be employed in connection with lubricating apparatus other than the one herein specifically set forth.

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

1. In a lubricator, the combination of the reservoir F, the sight-feed lubricator independent of the reservoir, and the column M, intervening between the reservoir F and the sight-feed K and containing in its lower part the conduit P^2, whereby the pipe P is connected to the lower chamber of the sight-feed and the conduit N′ connected to the upper chamber of the sight-feed and the said conduit extending into the column and down into the same and provided with outlet at the side of the column, substantially as and for the purposes specified.

2. In a lubricator, in connection with an oil-reservoir, a sight-feed and column M, having arms S′ S′, to which are respectively secured the upper and lower portions S S of the sight-feed, the conduit through the upper chamber K^7 of the sight-feed being connected to the conduit N′ of the arm M^2, the said conduit N′ being also continued in the column and extending down in said column and having its point of exit located below the said exit-way of the upper chamber K^7, the said passage-way and the lower arm or portion S of the sight-feed connecting the pipe P with the passage-way P^2, located in the column M and connected to the oil-supply reservoir, substantially as and for the purposes specified.

3. In a lubricator, the combination of a steam-supply pipe B, steam-pipe D, connected thereto, regulating-valve E, located in pipe D, oil-reservoir F, having pipe D connected to its interior space at the lower portion of the latter, provided with exit-orifice G, indicator-glass J, oil-exit pipe P for supplying oil to the sight-feed, the reservoir having an inlet filling-orifice H, column M, having elbow M′, provided with the passage-way N′, extending into and through the elbow M′ and conduit P^2 in its lower portion, the sight-feed, the interior space of whose lower end is connected to the conduit P^2 and the interior space of its upper end connected to the conduit N′ aforementioned, the elbow M′ being connected to the steam-chest or other machinery to be lubricated, substantially as and for the purposes specified.

4. In a lubricator, the column M, provided at the upper end with the arm M^2 and at its lower end with a similar arm M^2, provided with the conduit N′ and conduit P^2, separated from one another, the sight-feed having upper arm S, provided with the screw-threaded portion S′, and the lower arm S, provided with the screw-threaded portion S′, each of the arms M^2 of the column having screw-threaded recesses, each recess receiving its respective adjacent screw-threaded portion S′ of the adjacent arm S of the sight-feed, the exit-conduit N′ being connected to the chamber or interior space of the sight-feed and extending downward and having its exit at the bottom of it, the said passage-way, and also at a point below the exit passage-way of the upper chamber, and conduit P^2, connected with the oil-supply pipe from the oil-reservoir and at the other end with the chamber or oil-space in the lower end of the sight-feed, substantially as and for the purposes specified.

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