2 Sheets—Sheet 1.

C. D. LYNCH.

Lubricator.

No. 202,736. Patented April 23, 1878.

Fig. 1.

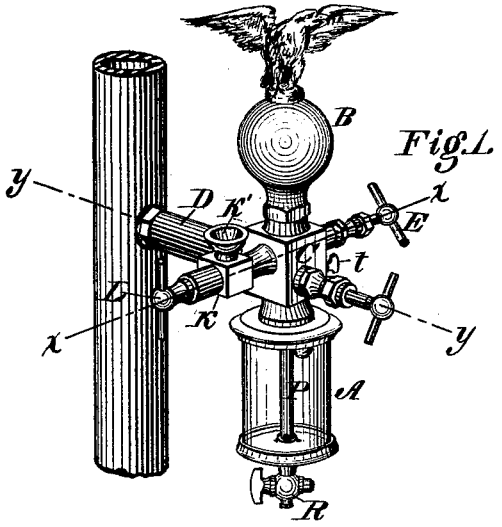
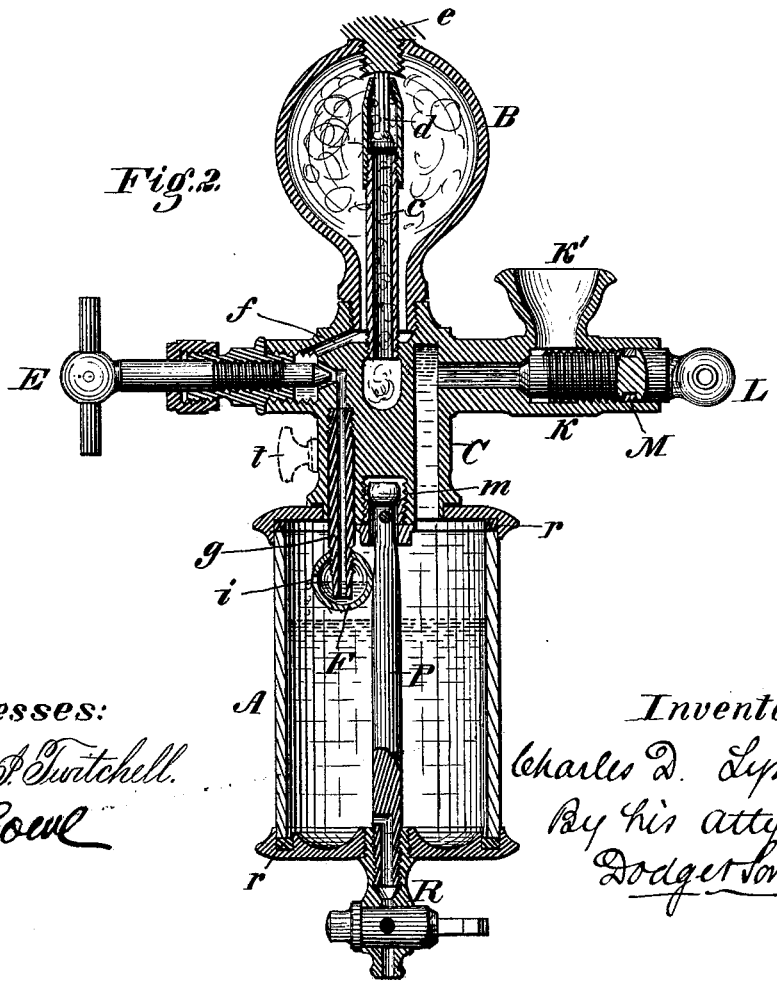


Fig. 2.



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2 Sheets—Sheet 2.

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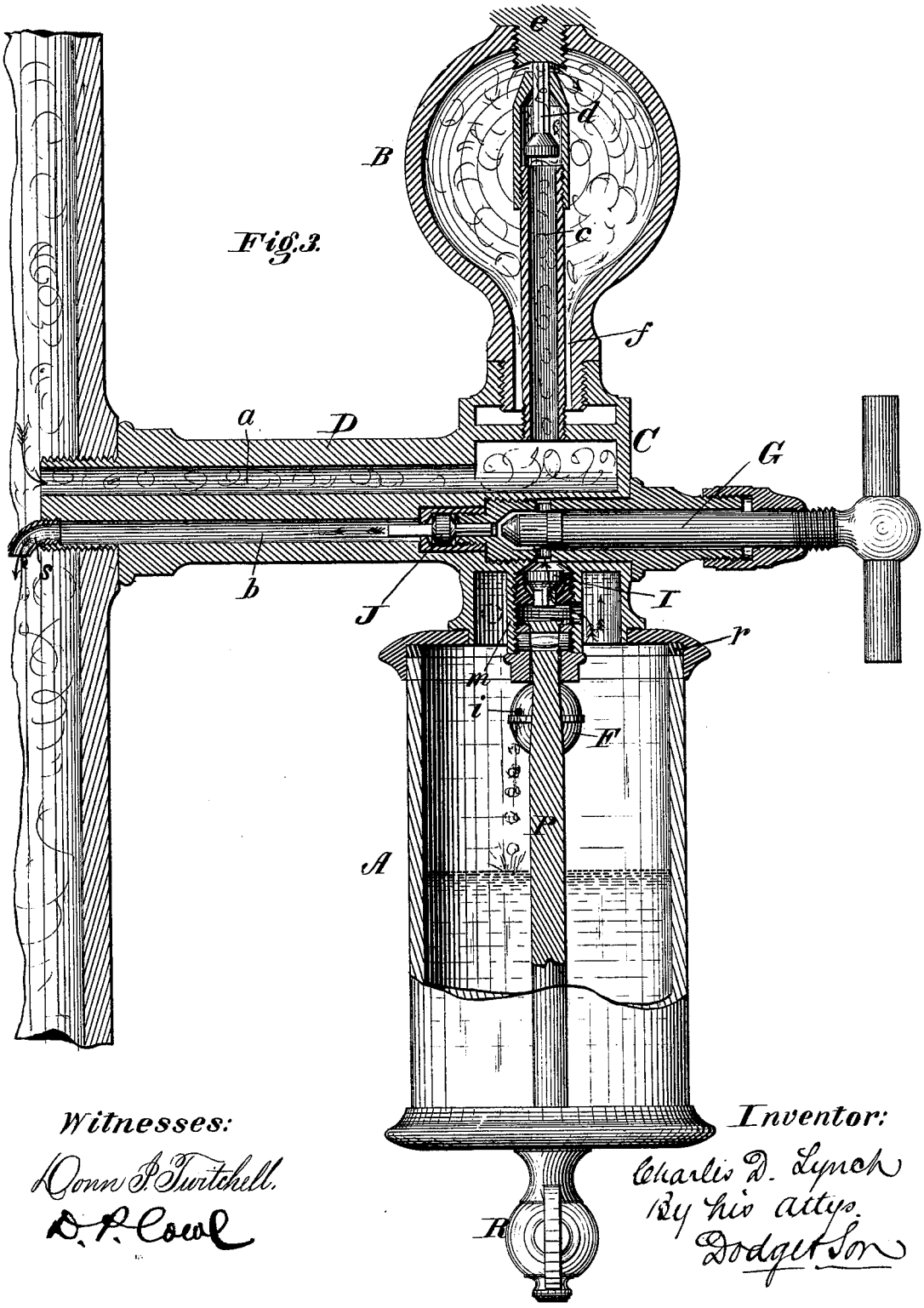
Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES D. LYNCH, OF DETROIT, MICHIGAN.

IMPROVEMENT IN LUBRICATORS.

Specification forming part of Letters Patent No. **202,736**, dated April 23, 1878; application filed February 14, 1878.

To all whom it may concern:

Be it known that I, CHARLES D. LYNCH, of Detroit, in the county of Wayne and State of Michigan, have invented certain Improvements in Lubricators, of which the following is a specification:

This invention relates to that class of lubricators in which water, formed by the condensation of steam in a special chamber, is permitted to descend into a separate oil chamber or reservoir, whereby the oil is displaced and caused to ascend from its chamber through a suitable outlet.

The improvement consists mainly in an improved manner of constructing a close oil chamber or reservoir, whereby the close fit of its heads is secured without danger of fracturing the glass, and without the necessity of accurately adjusting the parts; in a valve-stem constructed and arranged to serve also as a pump, for the purpose of feeding the oil by hand with a positive action, when required; in a trap or seal of peculiar construction to prevent the bodies of water and oil from changing places when the lubricator is not in use; in a check-valve arranged in the oil line or passage, in such manner as to be opened by the oil-regulating valve when the latter is closed, in order that the check-valve may start off at once when the regulating-valve is opened, and that there may be no danger of the check-valve adhering to its seat in such manner as to become inoperative; and in other details of minor importance, which will be hereinafter described.

Figure 1 represents a perspective view of the improved lubricator applied in position for use; Fig. 2, a vertical central cross-section of the same on a line, *x x*, of Fig. 1; Fig. 3, a similar cross-section on the line *y y* of Fig. 1.

A represents the close cylinder or reservoir to contain the oil; B, the condenser or water-chamber; and C a metallic body connecting the water and oil chambers, and containing the various passages and valves.

As shown in Figs. 1 and 3, the body C is provided with the horizontal stem D, serving as a means of attaching and supporting the lubricator to the steam-pipe, steam-chest, or other part of the engine, and containing two longitudinal passages, *a* and *b*, the former to admit the steam from the pipe or engine to the lubricator, and the latter to deliver the oil from the lubricator into the steam pipe or chest.

From the passage *a* a pipe, *c*, extends upward into and nearly to the top of the condensing-chamber B, this pipe containing at its upward end an upwardly-closing check-valve, *d*, the stem of which protrudes from the upper end of the pipe, as shown in Figs. 2 and 3. The plug E, screwed into the top of the condensing-chamber, bears upon the stem of the valve *d*, and holds the same open while the lubricator is in operation, as represented in the drawing.

As shown in Figs. 2 and 3, an annular space in the lower part of the condensing-chamber extends downward around the pipe *c*, and communicates, as shown in Fig. 2, through an irregular passage, *f*, with a pipe, *g*, extending downward into the oil-reservoir, this passage serving to permit the descent of the water from the condenser into the oil-reservoir. A valve-stem, E, screwing into one side of the body C, as shown in Figs. 1 and 2, serves as a means of closing the passage *g*, and of stopping or regulating the descent of the water. The lower end of the water-pipe *g* is screwed into and extends nearly to the bottom of a hollow sphere, F, which latter is provided near its top with one or more small outlet-openings, *i*. This sphere, remaining constantly filled with water to the level of the outlet-opening and above the lower end of the pipe *g*, serves as an effectual trap or seal to prevent the water and oil from changing their positions on account of the difference in gravity, as there is naturally a tendency to.

The trap, constructed in the peculiar manner shown, is cheap and simple, and is entirely free from liability to be rendered inoperative by the collection of sediment therein, and in these respects is superior to the different traps or seals hitherto devised for the same purpose. The oil-reservoir communicates with an outlet pipe or passage, *b*, by means of an irregular or circuitous passage, such as represented in Fig. 3, wherein the course followed by the oil is indicated by the arrows. This oil-passage passes first into a central hub or body, *m*, at the top of the oil-reservoir, past a down

wardly-closing check-valve, I, located therein, thence past a valve stem or spindle, G, thence past a second and horizontal check-valve, J, to the passage *b*.

During the ordinary operation of the device the valves I, G, and J remain open, and the oil, as rapidly as it is displaced by the water, flows past them and downward through the passage *b*. The valve J, opening outward, serves to prevent the steam from blowing inward to the oil-reservoir, and insures the circulation in the proper direction through the apparatus. The valve stem or spindle G serves as a means of closing or regulating the size of the oil-passage, in order to shut off or regulate the delivery of oil, as required.

As represented in Fig. 3, the check-valve J is arranged in line with the valve G, and provided with a stem, against which the valve G acts when it is closed, in such manner that the closing of the valve G serves to raise the valve J from its seat. This action of the valve stem or spindle upon the check-valve insures the prompt action of the latter when the oil-valve is open, and also serves, by its occasional movement of the check-valve, to prevent the danger of the latter adhering or becoming stuck fast in its seat or bearing in such manner as to be inoperative.

It will be observed that the spindle G consists of a smooth, round body of considerable length, fitting closely within a corresponding socket or bearing, its upper end being provided with a short screw-thread, working in a fixed nut or sleeve, by which the stem is moved endwise when rotated, in order to open and close the oil-passage, as explained. Upon screwing the valve stem or spindle outward beyond the position which it ordinarily occupies when open its screw-thread becomes disengaged, and the stem is left free to slide freely inward and outward, after the manner of a pump plunger or piston.

The arrangement of the check-valves I and J is such that when the stem or spindle G is drawn outward the valve J closes, while the valve I, remaining open, permits the oil to ascend through the passage into the socket or chamber of the spindle, and then, as the spindle is forced inward, the valve I is closed and oil driven by the spindle past the valve J and through the passage *b*.

It will thus be seen that the arrangement of parts admits of the stem or spindle G being used as a pump, by means of which the oil may be driven rapidly and with a positive action through the outlet-opening, when required.

It is manifest that the arrangement of the valves and spindle in the connecting oil-passage may be modified, as desired, provided the above-described mode of operation is retained, without departing from the limits of my invention, which consists essentially in the introduction of the feeding-pump between the oil-cylinder and the delivery.

The pump may be used without the inlet or suction valve, in which case the front opening in the pump-chamber will be located as shown in the drawing, and the hole in the piston-chamber located directly opposite the end of the plunger. The end of the piston or plunger will stand outside of the inlet-opening when not in operation, so that the oil will ascend, and keep the piston or pump-chamber filled. When the piston is forced inward it passes over and closes the inlet-opening, and drives the oil through the delivery-valve. Owing to the fact that the oil is forced upward by the water and caused to fill the pump-chamber constantly, there can be no accumulation or retention of air in the pump or passage in such manner as to impede the flow of the oil.

As a means of readily filling the oil-chamber, when required, I provide the body C on one side with a neck or extension, K, having on its top a flaring or funnel-shaped mouth, K′, which communicates by a suitable passage with the top of the oil-chamber, as shown in Fig. 2. The valve-stem or plug L, screwed into the outer end of the neck K, serves to shut off communication between the mouth K′ and the reservoir after the introduction of the oil. A valve-stem, L, has its inner end threaded, and seated in corresponding threads in the neck K, while its outer portion is made of a smooth cylindrical form, closely fitted in the outer end of the neck K, and provided with circumferential groove, containing a packing-ring, M, as shown in Fig. 2. By thus arranging the outer end of the valve-stem to fit closely within a smooth bore of the neck, and providing it with a packing in the manner shown, a tight joint is secured at a trifling expense, the necessity for the ordinary packing-glands being avoided.

The oil-reservoir consists, as usual, of a glass cylinder, provided with two metal caps, with packing-rings *r* seated between the ends of the glass and the inner faces of the caps, as shown in Figs. 2 and 3.

Hitherto much difficulty has been experienced in securing tight joints between the caps and the glass body, on account of the danger of fracturing the glass, and of the difficulty of fitting the parts accurately to each other.

In order to overcome these difficulties, I seat the upper cap upon the lower end of the body C, and secure the lower cap in place by means of the central rod or stem P, the upper end of which is connected to the body C by means of a universal joint, while its lower end is provided with a nut, bearing against the under face of the lower cap. The rod or stem P, being thus arranged, is free to swing in all directions, and consequently permits the caps to adjust themselves freely and firmly to the ends of the cylinder, notwithstanding any irregularity or unevenness that may exist in the fitting of the parts.

The joint at the upper end of the stem or rod P may be of any suitable character—either a pin passing through a hole therein, or a spherical head seated in a suitable bearing. In Fig. 2 the spherical head and the pin are both represented, while in Fig. 3 the pin

alone is shown. The essential point to be observed is, that the rod or stem shall have a free universal movement, and so long as this is secured the details may be modified as desired.

For the purpose of securing a better action of the parts, preventing the steam from condensing in the oil-delivery passage *b*, a short downwardly-curved tube, *s*, is screwed into the end of said passage, as shown in Fig. 3.

In order to provide for the discharge of the oil from the reservoir A at will, the rod or tube D has its lower end made of a tubular form, with an opening from its interior into the reservoir.

A cock, R, screwed upon the lower outer end of the rod P, serves the double purpose of regulating the passage, and of a nut to hold the lower cap in place.

A vent cock or plug, *t*, (shown in all the figures) may be arranged on one side of the body, in such manner as to communicate with an interior space or passage opening into the top of the oil-chamber A. This vent serves to permit the escape of air when the oil-chamber is to be filled.

Having thus described my invention, what I claim is—

1. In a lubricator having connected oil and water chambers, substantially as shown, a check-valve arranged in the oil-delivery passage, in combination with a hand-valve arranged to close the oil-delivery, and at the same time raise the check-valve from its seat, substantially as shown.

2. In a hydraulic displacement-lubricator, the combination of an oil-chamber, a condenser water-chamber connected therewith, a passage through which the oil may escape as it is displaced by the water, and an oil-delivery pump, substantially as shown, whereby the lubricator is adapted to feed either by the condensation or by hand, at will.

3. In a hydraulic displacement-lubricator, one or more check-valves located in the oil-delivery passage, and an intermediate stem or spindle, arranged substantially as shown, so that it may be used at will as a stop-valve or as a delivery-pump.

4. In a displacement-lubricator, a water trap or seal, consisting of a hollow globe or body provided with one or more outlets, and a tube extending downward therein, substantially as shown.

5. In combination with the glass cylinder and its two heads or caps, the rod or tube *p*, having its upper end jointed loosely to the lubricator, whereby a free adjustment of the cylinder and caps is permitted.

6. In a displacement-lubricator, an oil-delivery pump or piston, arranged to receive the oil from the top of the oil chamber or reservoir.

7. A hydraulic displacement-lubricator, embracing water and oil-chambers and an oil-delivery pump or piston, arranged so that the water causes the oil to flow into and constantly fill the pump, substantially as shown and described.

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Witnesses:

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