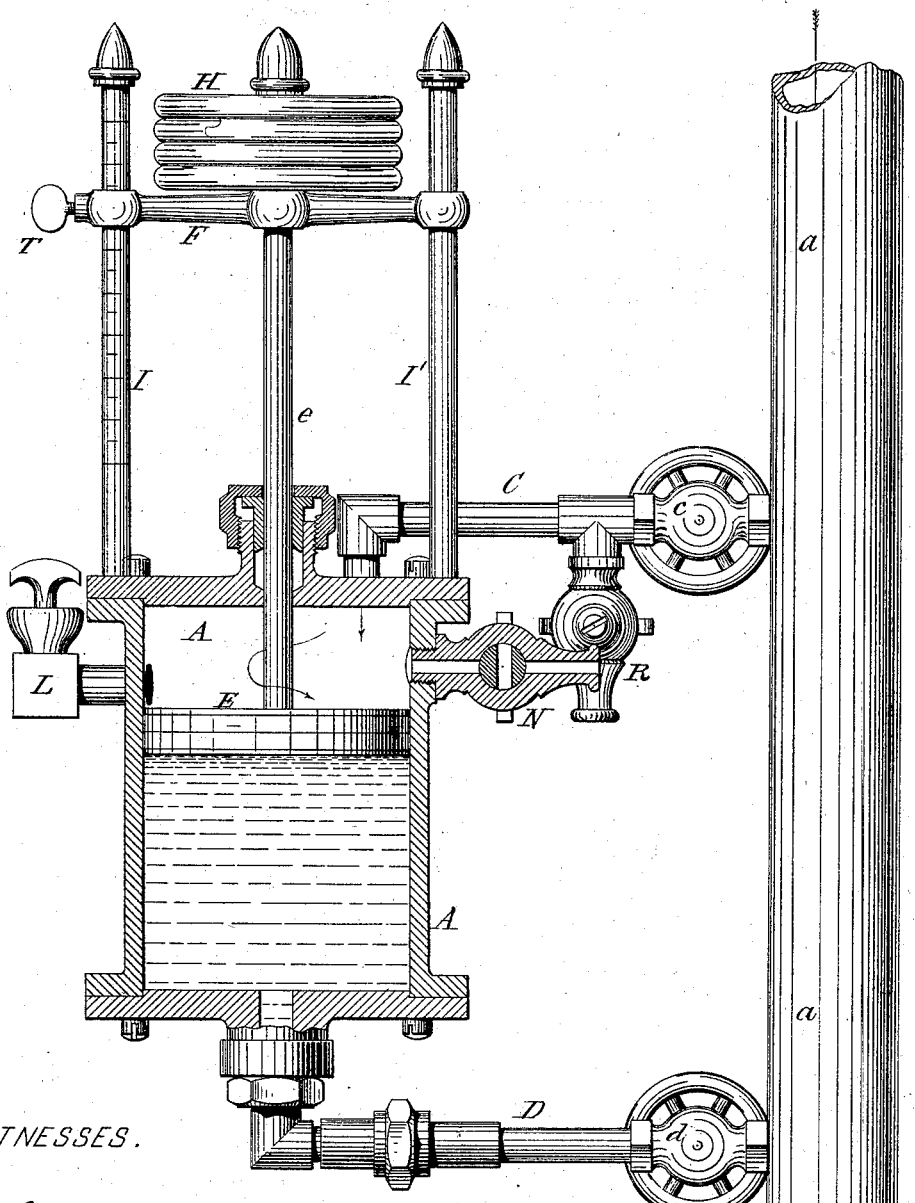
P. HOFFMAN.
Lubricator.

No. 207,355. Patented Aug. 27, 1878.

Fig. 1.



WITNESSES.

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UNITED STATES PATENT OFFICE.

PHILLIP HOFFMAN, OF HOBOKEN, NEW JERSEY.

IMPROVEMENT IN LUBRICATORS.

Specification forming part of Letters Patent No. **207,355**, dated August 27, 1878; application filed July 12, 1878.

To all whom it may concern:

Be it known that I, PHILLIP HOFFMAN, of Hoboken, Hudson county, New Jersey, have invented an Improved Steam-Engine Lubricator, of which the following is a specification:

My invention relates to that class of lubricators which connect with the steam-pipe of the engine and deliver the oil therein to mingle with the steam in its passage to the engine; and the object of my invention is to provide a simple and effective lubricator constructed and operating on the principle most familiar to engineers in general.

With this in view I have adopted the well-understood combination of steam cylinder and piston to form the oil-cup of the lubricator, and the features which embody my invention will be hereinafter fully set forth, and distinctly specified in the concluding clauses.

The drawing annexed presents a vertical section of my improved lubricator, the connecting-pipes, &c., being shown in elevation.

a indicates the steam-pipe of the engine, in which the steam is supposed to be passing downward, and to the side of which the lubricator is directly attached, as shown. The cylinder A, which forms the oil-cup of the lubricator, is connected with the steam-pipe at the top by the steam-vent pipe C and at the bottom by the oil-feed pipe D, each pipe being controlled by a suitable valve, *c d*.

The cylinder is fitted with a tight piston, E, the rod *e* of which rises through a stuffing-box in the upper head of the cylinder, and is guided at its upper end by a cross-head, F, which slides on upright guide-rods I I′. The cross-head sustains a series of weights, H, as shown, which tend to depress the piston, and thus expel the oil from beneath it through the oil-feed pipe D, according as its valve *d* is opened to admit its escape into the steam-pipe *a*, which leads to the engine. A vent of hot live steam is admitted at the same time above the piston, through the pipe C and valve *c*, to equalize the pressure on the cylinder and keep its contents warm.

It will thus be seen that the feed of the oil is effected by the gradual fall of the piston, which, being effected by weights, is positive and uniform during the entire stroke, thus expelling the oil with uniformity and certainty, which is not the case where springs are employed to effect the movement of the expelling piston as heretofore used in piston-lubricators.

The feed of the oil does not therefore depend on the displacing effect of the condensation of the steam-vent, as is usual in this class of lubricators; and my object is to avoid condensation in the cup, so as to preserve its contents always warm, as this gives a better and more rapid lubricating effect, the oil being in this case instantly diffused through the steam on its entrance into the steam-pipe. Hence the cup is attached close to the steam-pipe *a*, and the steam-vent pipe D connects directly with the top of the cylinder, so as to admit the live steam directly thereto.

One of the guide-rods I of the cross-head is graduated, as shown, to form an index, which is traversed by one end of the cross-head, and thus serves to indicate the amount of contents of the cylinder and the rate of feed of the oil in a simple and very efficient manner, thus dispensing with the more troublesome and expensive gage-glasses. The cross-head is also provided with a small clamp or set-screw, T, which may be tightened against the guide-rod I to hold the piston stationary when required to fill the cup. The top of the oil-cylinder is provided, preferably on its opposite sides, with a filling-cock, L, and vent-cock N, arranged about on a level with each other and below the point of the piston's highest travel. An additional vent-cock, R, is also provided above the lower cock or opening into the extreme top of the cylinder, being preferably attached on the steam-vent pipe, so as to give an outward vent to the cylinder when the piston rises past the lower vent, N.

The functions of these last-named features are to enable the cup to be refilled, which is accomplished as follows: When all the oil is exhausted and the piston has reached the bottom of the cylinder the cup is refilled with oil and its action renewed by first closing the steam and oil valves *c d*, the vent-cocks N R being afterward opened to admit the escape of air, steam, or water from above the piston, when the live steam is then admitted below the piston by opening the valve *d* of the oil-pipe, the pressure of which immediately raises the weighted piston to the top of its stroke,

which will be indicated by the blowing of steam from the vent N, the air or water above the piston being expelled through the vents on the rise of the piston. The piston being now held at the top of the cylinder by tightening the set-screw T, and the steam being shut off from the cup, the oil is then poured into the cylinder under the piston through the filling-cock L, the contained air finding escape by the vent N as the oil rises. When the cylinder has received its full charge of oil it will be indicated by its appearance at the vent N, at which the filling and vent cocks are closed, the clamp-screw loosened to release the piston, and the steam-valve *c* opened to admit a vent of live steam above the piston. The oil may then be fed from the cup at the requisite rate to the steam-pipe by opening the oil-cock *d* more or less, its rate of feed being clearly indicated by the descent of the cross-head on the index I.

It will thus be observed that the construction and operation of my improved lubricator are both quite simple and effective, and are designed on such principles as are most familiar to engineers, while the feed of the oil is under full control, and, moreover, the refilling of the cup may be accomplished with great ease and readiness, which is an important advantage of the invention. It is quite desirable when the oil is exhausted to be able to immediately refill the cup and continue the oil-feed to the engine without any appreciable delay. In my invention this can be effected instantly, as the direct-acting nature of the oil-feed obviates the delay required for condensation in the connecting pipes or chambers of the oil-cup to render the feed operative, as is the case in cups having a condensation-feed.

What I claim as my invention is—

1. A steam-lubricator formed of the combination of the oil-cylinder A, arranged with its axis vertical, pipes C D, connecting the cylinder at top and bottom with the steam-pipe *a*, piston E, which acts to expel the oil from beneath while it receives a steam-vent from above, and a weighted piston-rod, H *e*, which depresses the piston at a positive and uniform pressure to effect the feed of the oil, substantially as herein shown and described.

2. In a steam-engine lubricator, the combination, with a cylinder, A, connected at top and bottom with the steam-space, of the piston E *e*, cross-head F, and graduated guides I I′, substantially as shown and described.

3. In a lubricator, the combination, with the cylinder A and piston E, of the filling and vent nozzles L N, arranged on the oil-cylinder on a level with each other and below the point of the piston's highest travel, substantially as and for the purpose set forth.

4. The combination, in a steam-lubricator, of a vertical cylinder, A, steam and oil feed pipes C D, piston E *e*, guides I I′, and weighted cross-head F H, provided with a clamp, T, to bear against the said guides, substantially as and for the purposes set forth.

P. HOFFMAN.

Witnesses:
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