(No Model.)

W. H. CRAIG.

LUBRICATOR.

No. 398,583. Patented Feb. 26, 1889.

Fig. 1.

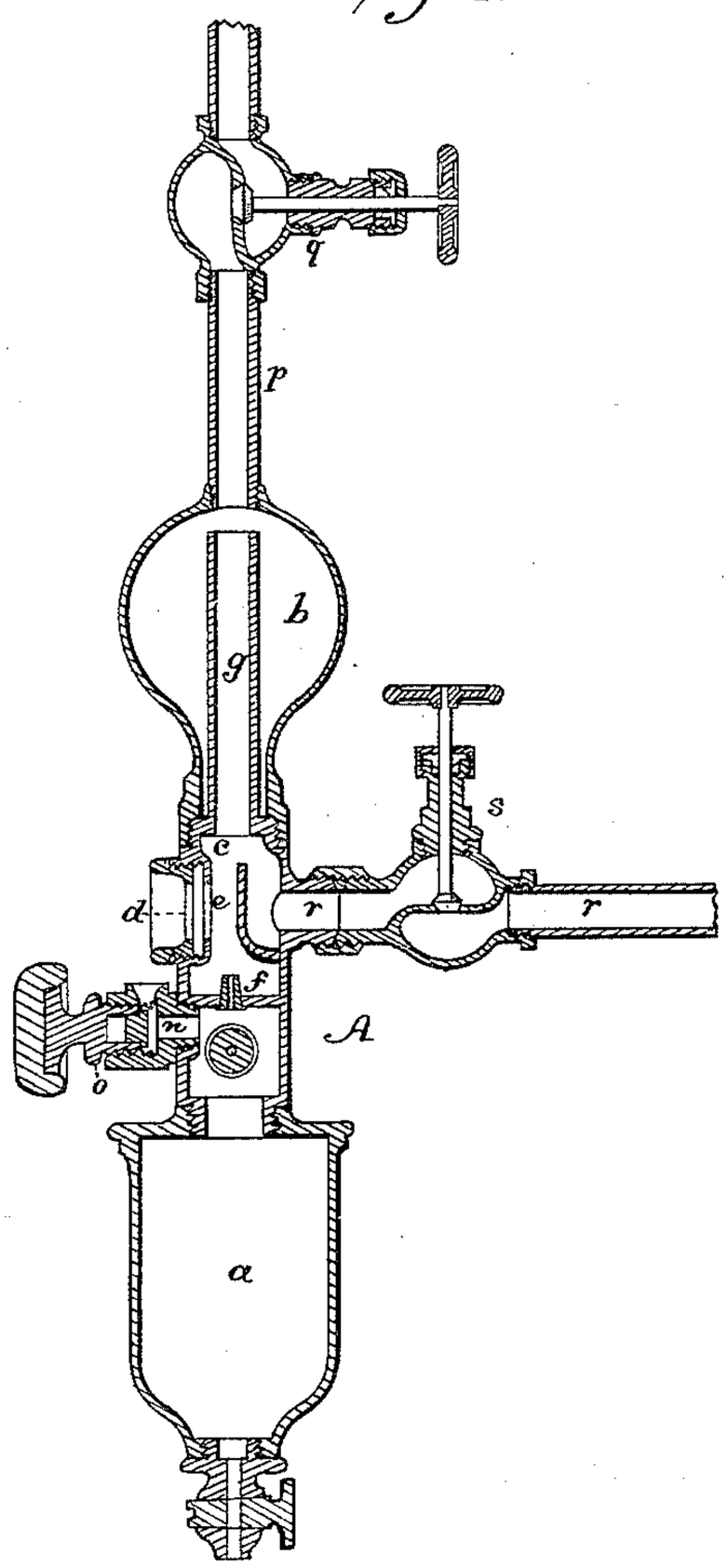
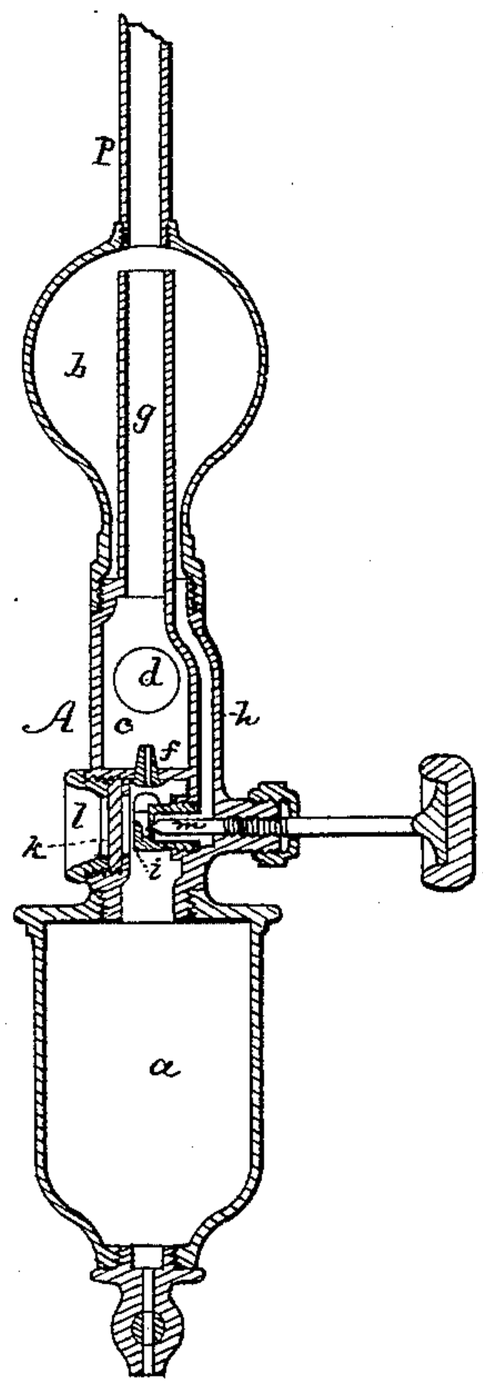


Fig. 2.



Witnesses:
Thos. Houghton.
H. A. Kilmer.

Inventor:
Warren H. Craig.
per W. H. Singleton.
atty.

UNITED STATES PATENT OFFICE.

WARREN HILLIARD CRAIG, OF LAWRENCE, MASSACHUSETTS.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 398,583, dated February 26, 1889.

Application filed June 1, 1885. Serial No. 167,173. (No model.)

To all whom it may concern:

Be it known that I, WARREN HILLIARD CRAIG, of Lawrence, in the county of Essex, of the Commonwealth of Massachusetts, have invented a new and useful Improvement in Steam-Engine Lubricators; and I do hereby declare the same to be described in the following specification, and represented in the accompanying drawings, of which—

Figures 1 and 2 are vertical and axial sections, in planes at right angles to each other, of a lubricator provided with my invention, the nature of which is defined in the claims hereinafter presented.

The object of my invention is to provide a means of equalizing the steam-pressure in a lubricator provided with a sight-feed or an observation chamber, in which the drops of oil may be seen in or on their way to the part or parts of the engine to be lubricated in cases where the oil-discharge conduit leading from such lubricator is subject to a variation therein of pressure not incident at the time to the boiler from which steam is conducted into the lubricator.

In the said drawings, A is a steam-engine lubricator; *b*, the condenser; *c*, the sight-feed or observation chamber, provided with the glass pane *d* and the reflecting-partition *e*, and with the nipple or small pipe *f*, the said pipe *f* being to lead oil from the reservoir into the observation-chamber when the latter is charged with water that may have escaped from the condenser down through the educt pipe or conduit *g*, leading from the observation-chamber up into the condenser to near the top thereof, such pipe *g* being to receive live steam from the condenser steam-induct pipe or conduit.

From the condenser at its lower part a passage, *h*, (see Fig. 2,) extends and opens into a narrow space between a reflector, *i*, and the glass pane *k* of another sight-feed, *l*, such space opening into the oil-reservoir. A screw-plug, *m*, arranged as shown in Fig. 2, serves to interrupt the flow of water from the condenser to the said narrow space.

The oil-reservoir is furnished with means for supplying it with oil, such being an induct, *n*, (see Fig. 1,) provided with a screw-plug, *o*. Furthermore, there is in rear of the partition *e* an oil exit or discharge pipe, *r*, to lead the oil to the part or parts of the engine to be lubricated.

The above-described lubricator is essentially like that exhibited in Letters Patent No. 277,464, dated May 15, 1883, and granted to me. I have made additions to it for the object or purpose hereinbefore mentioned—that is to say, I have provided the condenser with a pipe or conduit, *p*, to lead from it to the boiler in order to conduct steam from the boiler into the condenser, such pipe having in it a stop-cock, *q*.

The steam-educt pipe or conduit *g* has its upper end in close juxtaposition with the steam-induct pipe or conduit *p*, and its other end is connected with the top of a steam-equalizing chamber near the point where the oil-discharging conduit connects. Thus live steam passes direct from the induct pipe or conduit *p* through the educt-conduit *g* to the top of the observation-chamber. This produces a compact device. The pipe *g* is wholly within the lines of the lubricator, being a part thereof, and requiring no fitting or adjusting when the device is placed on a boiler. This educt or steam pipe *g* leads into a steam-space or duct connected to the observation-chamber. This space forms a steam-chamber, which enhances materially the value of the lubricator.

When the lubricator is being used, live steam passes down the induct *p* into the condenser *b*, a portion of it being condensed and passing down the passage *h* into the oil-cup *a*, as usual. A modicum of the live steam from induct *p* passes as live steam down the educt *g* into the steam-chamber, and with the oil which rises through the sight-feed chamber passes off through the exit *r* into the oil-pipe, such outflow being regulated, as desired, by the stop-cock *s*. I have also provided the oil-exit pipe or conduit *r* with a stop-cock, *s*, arranged on it as represented.

From the above it will be seen that in this my improved steam-engine lubricator the steam enters directly into the condenser without first passing upward through the pipe therein. The water of condensation from such steam flows from the condenser down

through a conduit to the oil-reservoir, and the live steam passes down the pipe *g*. The oil-observation chamber being charged with water, the oil in drops passes through such water and over the partition *e* into the oil-exit passage, and thence through such to the part or parts of the engine to be lubricated. The stop-cock *s* being slightly open, the oil discharged in consequence thereof is met by the steam passing from the condenser downward through the pipe *g* therein into and through the exit-pipe, such oil by such steam being carried to the part or parts of the engine to be lubricated.

The object of the stop-cock *s* in the exit-pipe *r* when used with the above-described lubricator A, provided with the steam-pipe leading into the upper part of its condenser, is to throttle or regulate or wholly interrupt the discharge of the oil and steam in case of the steam for supplying the valve-chest of the engine being wholly or partially shut off, such steam being supplied to such valve-chest by a conduit separate from the oil-exit pipe of the lubricator. Therefore, with the cock *s* to the oil-lubricator exit-pipe, and with the steam let into the upper part of the condenser, and also from the condenser into the exit-pipe, it will be seen that I can maintain a constant or nearly constant or uniform pressure of steam within the lubricator, even when the steam from the boiler to the valve-chest of the engine may be cut off, such enabling me to maintain a uniform or practically uniform feed of oil through its sight-feed or observation chamber when the steam to the valve-chest of the engine may be shut off.

The steam-chamber above referred to possesses very material advantages. It furnishes at this point a body of hot live steam that communicates with the sight-feed chamber. It keeps the lubricator sufficiently hot in cold weather, so as to have the oil in a good fluid condition without boiling it. The condense-water passing by this chamber is kept warm, and, as warm water enters the oil-chamber, softens the oil. This steam-chamber also has a most valuable function as an equalizer, and forms in the lubricator an equalizing-chamber, the exit of which is controlled by the valve *s*. By means of this valve the exit is so controlled as to diminish the flow of steam through the steam-chamber when desired, so that the steam-pressure in the lubricator is regulated or equalized, which permits the oil under all circumstances only to be fed by the action of the pressure of the condense-water.

I do not claim a lubricator constructed as represented in the United States Patent No. 262,774, in which oil passes in the sight-feed or observation tube downward through steam and not through water, as in my lubricator.

What I claim is—

1. The combination of a lubricator provided with a sight-feed or observation chamber in which oil rises through water in its passage to the discharging-conduit for leading such oil to the part or parts of the engine to be lubricated, with a conduit to lead steam from the boiler into the condenser of such lubricator, and with another conduit within and to lead steam from such condenser into the said oil-discharging conduit, as set forth.

2. A lubricator combining these elements: a condenser, a reservoir for oil, an observation-chamber in which oil rises through water, an oil-discharging conduit leading from the top of the observation-chamber, a conduit for conveying steam from the boiler into the condenser, and another conduit wholly within the lines of the lubricator and for conveying live steam from the induct-conduit of the condenser to the top of the observation-chamber, as set forth.

3. In a sight-feed lubricator through water in which the oil rises, the combination of the oil-reservoir, the sight-feed chamber, the oil-discharging conduit, the condenser having a pipe communicating with the boiler, and an internal tube leading from within the condenser and communicating with the sight-feed chamber and oil-discharging conduit, said latter conduit having in it a stop-cock, through which conduit the oil and steam may be discharged from said lubricator to the parts of the engine to be lubricated, as set forth.

4. In a sight-feed lubricator through water in which oil rises, the combination of the oil-reservoir, a steam-chamber at the top thereof, the oil-discharge conduit, and the condenser having a pipe to lead steam thereto, and also a pipe to lead steam into the said steam-chamber and oil-discharging conduit.

5. In a sight-feed lubricator of the character described, a steam-chamber located near the top of the oil-reservoir and communicating with the sight-feed chamber through which oil rises through water, and also having a pipe to lead steam into such chamber and also communicate with the steam-condenser of such lubricator, and another pipe to lead steam to the condenser and communicate with the steam-chamber or pipe leading thereto, whereby an equalizing pressure is obtained, as set forth.

6. A steam-chamber located at the top of the oil-reservoir and having a pipe to lead steam into such chamber and also to communicate with the condenser, and a pipe to lead steam to such condenser, such steam-chamber also communicating with a sight-feed chamber through which oil rises through water, and also having an oil-discharge passage to communicate with a pipe to convey the oil or oil and steam to the part or parts of the engine to be lubricated, all being substantially as set forth.

7. In a sight-feed lubricator in which oil rises through water and having a steam-chamber at the top part of the oil-reservoir

of such a lubricator, the combination of the following: the steam-chamber referred to, a condenser, a pipe to lead steam thereto and another pipe to lead steam into the said steam-chamber, a conduit communicating with the sight-feed and steam chambers, a choked oil-discharge conduit communicating with the two last named chambers, the oil-reservoir, and feed-regulating valve, all being combined to operate substantially as set forth.

WARREN HILLIARD CRAIG.

Witnesses:
R. H. EDDY,
ERNEST B. PRATT.