

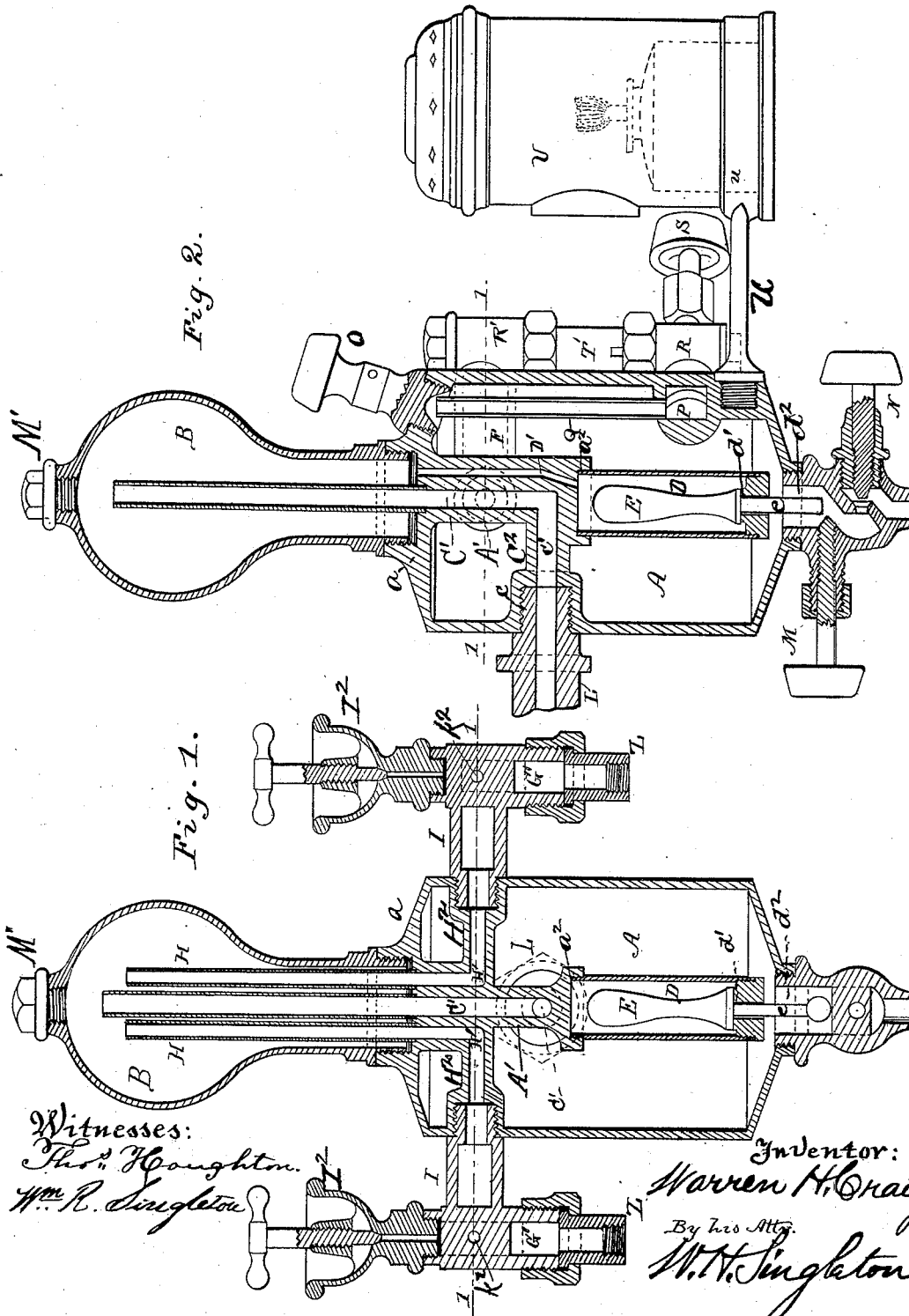
(No Model.)

3 Sheets—Sheet 1.

W. H. CRAIG.  
SIGHT FEED LUBRICATOR.

No. 421,389.

Patented Feb. 18, 1890.



Witnesses:  
Thos. Houghton.  
Wm. R. Singleton

Inventor:  
Warren H. Craig.  
By his Att'y.  
W. H. Singleton.

(No Model.)

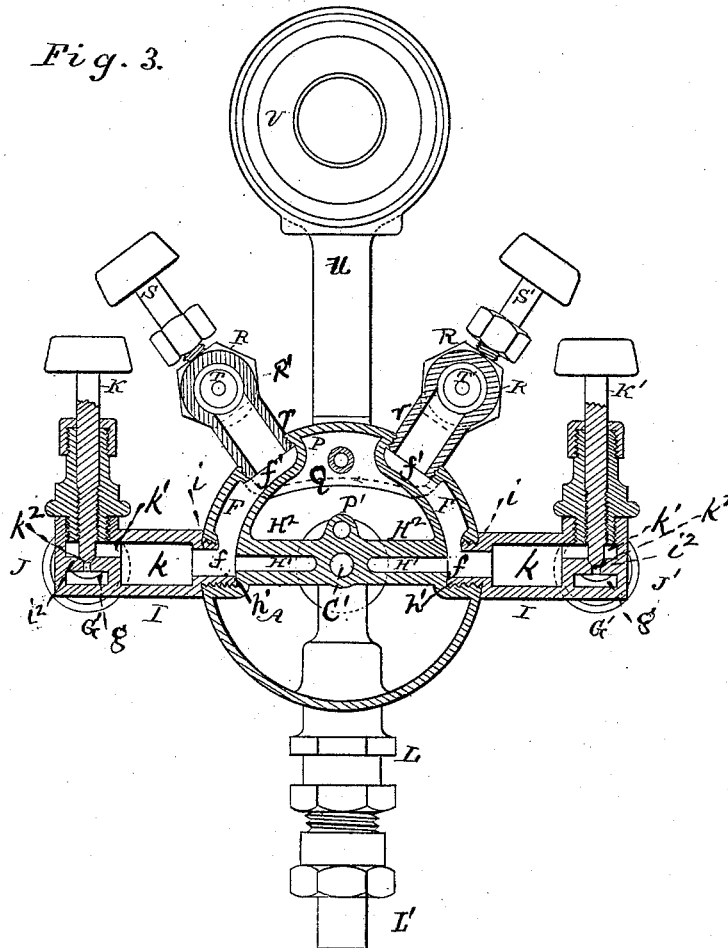
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Fig. 3.



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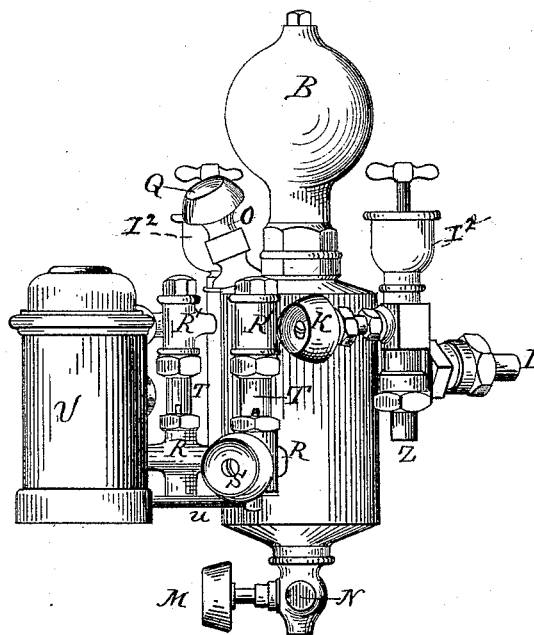
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*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

WARREN HILLIARD CRAIG, OF LAWRENCE, MASSACHUSETTS.

## SIGHT-FEED LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 421,389, dated February 18, 1890.

Application filed July 7, 1887. Serial No. 243,707. (No model.)

*To all whom it may concern:*

Be it known that I, WARREN HILLIARD CRAIG, of Lawrence, county of Essex, and State of Massachusetts, have invented new and useful Improvements in Lubricators for Locomotive-Engines; and I do hereby declare the same to be described in the following specifications and represented in accompanying drawings, of which—

10 Figures 1 and 2 are vertical sections at right angles to each other of a lubricator containing my invention. Fig. 3 is a transverse section taken through lines 1 1, Figs. 1 and 2. Fig. 4 is a perspective view of the device.

15 This invention relates to improvements in sight-feed lubricators; and it consists in the construction hereinafter pointed out.

In the annexed drawings, the letter A indicates the oil-reservoir, secured to the top of which is the condenser B. Passing centrally down from the top *a* of the oil-reservoir is a stem *A'*. Passing radially from this stem and diametrically in opposite directions are the arms  $H^2 H^2$ , which extend from the stem to the wall of the oil-reservoir. The stem extends below these arms, and another arm  $C^2$  at a right angle to the arms  $H^2 H^2$  extends radially from the stem to the wall of the oil-reservoir. At the bottom the stem *A'* has a threaded recess *a*<sup>2</sup>. In this stem *A'* are formed two passages  $H' H'$ , which extend from the top of the stem downward and through the arms  $H^2 H^2$ . Another passage *C'* extends from the top of the stem *A'* downwardly and through the arm  $C^2$ . Still another passage *D'* extends from the top of the stem *A'* downwardly and ends in the recess *a*<sup>2</sup>. Secured to the stem *A'* at the tops of the passages  $H' H'$  are tubes *H H*, which extend upwardly into the condenser and to the top of the passage *C'*. A tube *C* also extends up into the condenser. Secured within the recess *a*<sup>2</sup> is the upper end of the pipe *D*, at the lower end of which is a valve-opening *d'*, governed by a dancing valve *E* within the pipe *D*. The lower end *e* of the valve projects down through the opening *d'* and into the drain-passage *d*<sup>2</sup> at the bottom of the oil-reservoir. This valve *E* is regulated by the screw-plug *M*, which engages with the bottom of the end *e*, and a valve *N* controls the passage *d*<sup>2</sup>.

The oil-reservoir *A* is provided near its top

with the two segmental chambers *F F*. These chambers are made with the oil-reservoir, the construction being such that they are within the lines of the lubricator. As shown in Fig. 3, these chambers are inside of the oil-reservoir, the outer walls of the chambers being parts of the outside of the oil-reservoir. However, these chambers might be made on the outside, the inner walls of the chambers being part of the outside of the oil-reservoir. In either or any case the construction is such that the inner walls of the chambers form part of the body of the oil-reservoir. At their ends *f f* these chambers are connected to the outer ends of the arms  $H^2 H^2$ , there being a free way from the passages *H'* into these chambers. At the point of connection between these arms and passages there are threaded openings *h'*, into which are screwed the nipples *i i* of the brackets *I I*. These brackets have the depending arms *G' G'* for the union couplings of the tallow-pipes, which are connected at *Z Z*. To the top of these brackets are secured hand-oilers *I*<sup>2</sup>. Through these brackets extend the passages *k*, reduced at *k'*. In these brackets are the diaphragms *i*<sup>2</sup>, having the valve-openings *k*<sup>2</sup>, controlled by the screw-plugs *K K'*. These diaphragms *i*<sup>2</sup> are between the reduced portions *k'* of the passages *k* and the vertical passages *g*, the opening *k*<sup>2</sup> forming a way from one to the others. The hand-oilers *I*<sup>2</sup> *I*<sup>2</sup> connect with the tops of the passages *g g*.

The chambers *F F* at their ends *f' f'* have threaded openings in which are screwed the nipples *r* of the top brackets *R R* of the sight-feed glasses *T T*. The bottom brackets *R' R'* of these sight-feed glasses are screwed into the oil-reservoir, and form a connection between the sight-feed glasses and a chamber *P*, formed within the oil-reservoir near the bottom. From this chamber *P* rises a tube *Q*, which terminates near the top of the oil-reservoir. Just above this pipe the oil-reservoir has the usual filling-plug *O*. At the end of the arm  $C^2$  is a threaded opening *c*, into which is connected the supporting-shank *L*, having a free way with the passage *C'*. Projecting from the outside of the oil-reservoir is an arm *U*, to the outer end *u* of which is secured a lantern. This arm, with the lantern, is arranged between the two sight-feed glasses.

When this lubricator is connected up and in use, steam from the engine enters through the passage C' and tube C into the condenser, these passages and tube thus forming an induct steam-conduit. After entering the condenser portion of the steam is condensed, and as condense water passes down the passage D' and pipe D, these two forming a condense-water conduit. The rest of the steam passes as live steam down the pipes H through the passages H', each pipe and a passage forming an educt-steam conduit into the chambers F F. At the same time the oil passes down the tube Q into the chamber P, and through the brackets R R, sight-feed glasses T T, and brackets R' R' into the chambers F F. The steam and oil thus commingled pass through the brackets I I and off through the tallow-pipes Z Z. The chambers F F, into which steam and oil thus enter, form steam-chambers within the oil-reservoir, the steam from the educt-conduit expanding within such chambers filling them with steam, and only passing off little by little with the oil, the said chambers always being supplied with steam. This body of steam within these chambers F F operates to keep in a limpid condition the oil within the reservoir. They also form equalizers, whereby the steam-pressure is equalized over the tops of the sight-feed chambers and oil-discharging conduits. The openings  $k^2$  being much smaller than the cross-sections of the passages  $k k$ , the steam-pressure through these passages is diminished and the pressure exerted through the chambers F F upon the top of the sight-feed glasses. Thus the pressure within the lubricator is equalized and the condense water cannot unduly force the oil out faster than it is needed. This result is accomplished by the use of these chambers F F, which are thus equalizers.

The flow of condense water through the opening  $d'$  is regulated by the height of the valve E. By the use of the lantern V the sight-feed can be as readily seen by night as by day. As now constructed, at night the engineer cannot tell whether the lubricator works or not, as the dim light of the lantern in the cab is of no avail; but with this part of my invention relating to the lantern all difficulty vanishes, and there is no trouble in seeing the feed. In using the hand-oilers I<sup>2</sup> the openings  $k^2 k^2$  are closed, the throttle shut off, and the oil is sucked down the passages and off to the steam-chests, the locomotive being in motion at the time. The object of this is to give a rapid feed if the lubricator is not working fast enough or is in any way disarranged.

Various modifications of my invention may be made without departing from its spirit.

In using the equalizing-chambers F F, I do not propose to limit myself to the precise way of making them, nor to the precise way in which they are connected to the conduit for bringing steam into them, nor do I limit myself to the precise way of bringing steam into the condenser, as it may be brought in at the top where the plug M' is now inserted, in which I would dispense with the steam-tube C. Having described my invention, what I claim is—

1. A lubricator consisting of these parts: a condenser, an induct-pipe to lead steam thereto, an oil-reservoir, a water-passage from the condenser to the oil-reservoir, educt-pipes to lead steam from the condenser, an oil-discharging conduit leading from the oil-reservoir to the sight-feed glasses, two sight-feed glasses, into which the oil passes from the reservoir, and two equalizing or mixing chambers communicating with the top of the sight-feed glasses and also with the educt-pipes from the condenser, and the pipes for leading the oil from the sight-feed glasses to the parts of the engine to be lubricated, as set forth.

2. A lubricating apparatus consisting of a condenser provided with a pipe to lead steam thereto, an oil-reservoir having a passage communicating with the condenser and also having steam-chambers in the top thereof and extending along the sides, such chambers being provided with steam pipes or passages to lead steam thereto, sight-feed chambers communicating with the said steam-chambers and the brackets and hand-oilers attached thereto, said brackets having means of connection with the tallow-pipes, as set forth.

3. In a sight-feed lubricator having two sight-feed chambers arranged on the front thereof, the combination of the two steam-chambers, arranged one on each side of the oil-reservoir and extending toward the front of the oil-reservoir and communicating each with the top of one of the sight-feed chambers and having conduits leading outwardly from said steam-chambers, also having a pipe to lead live steam into said chambers and communicate with the conduit leading outwardly from the steam-chambers for conveying the oil to the parts of the engine to be lubricated, and also another pipe to lead steam to the condenser, substantially as shown and described.

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Witnesses:

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