No. 611,759. Patented Oct. 4, 1898.

E. McCOY.

LUBRICATOR.

(Application filed Mar. 2, 1898.)

(No Model.) 2 Sheets—Sheet 1.

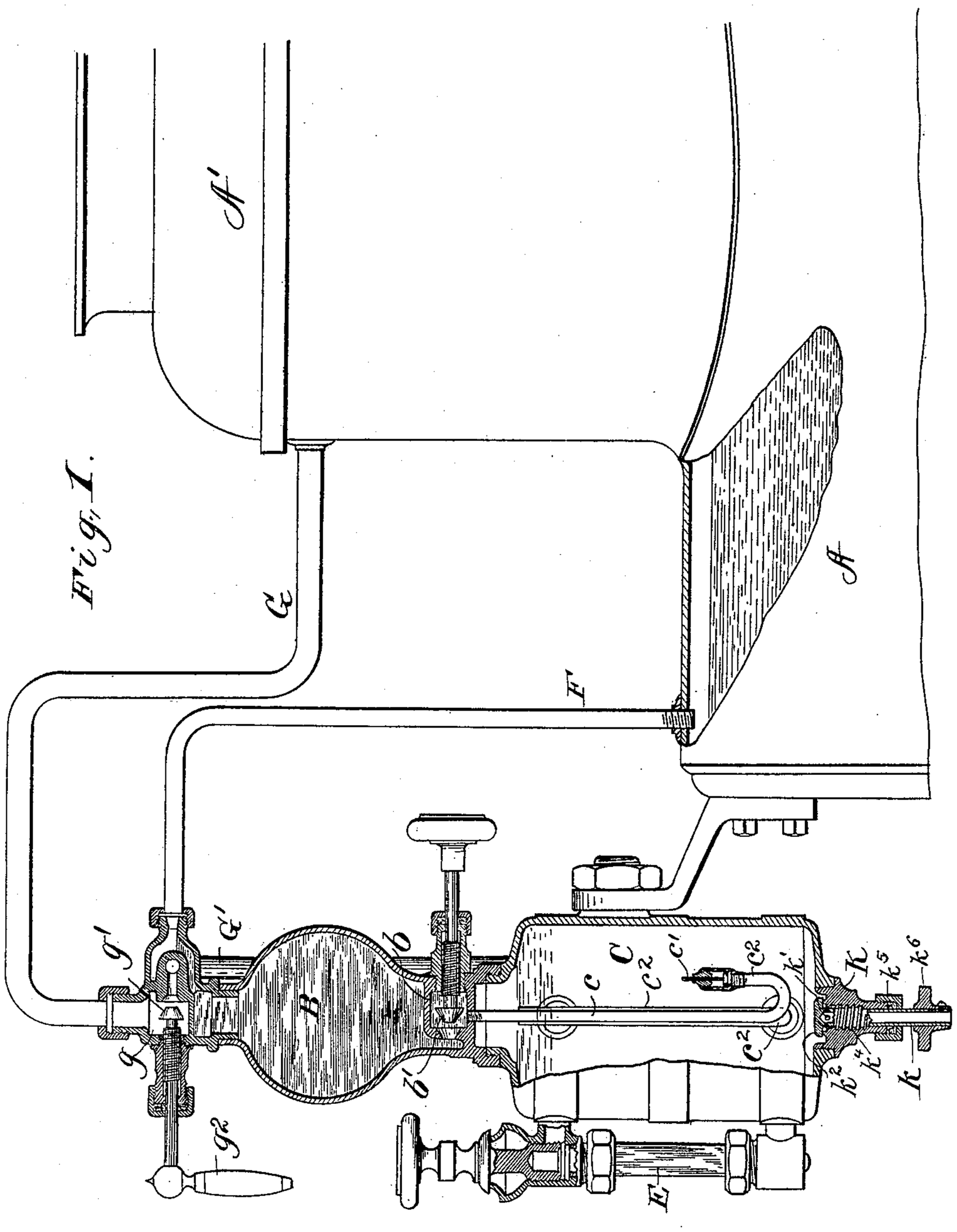

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Fig 4

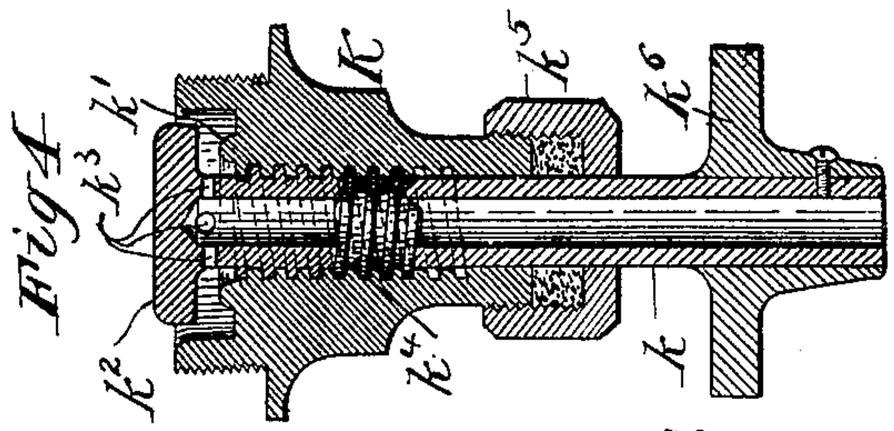


Fig. 3.

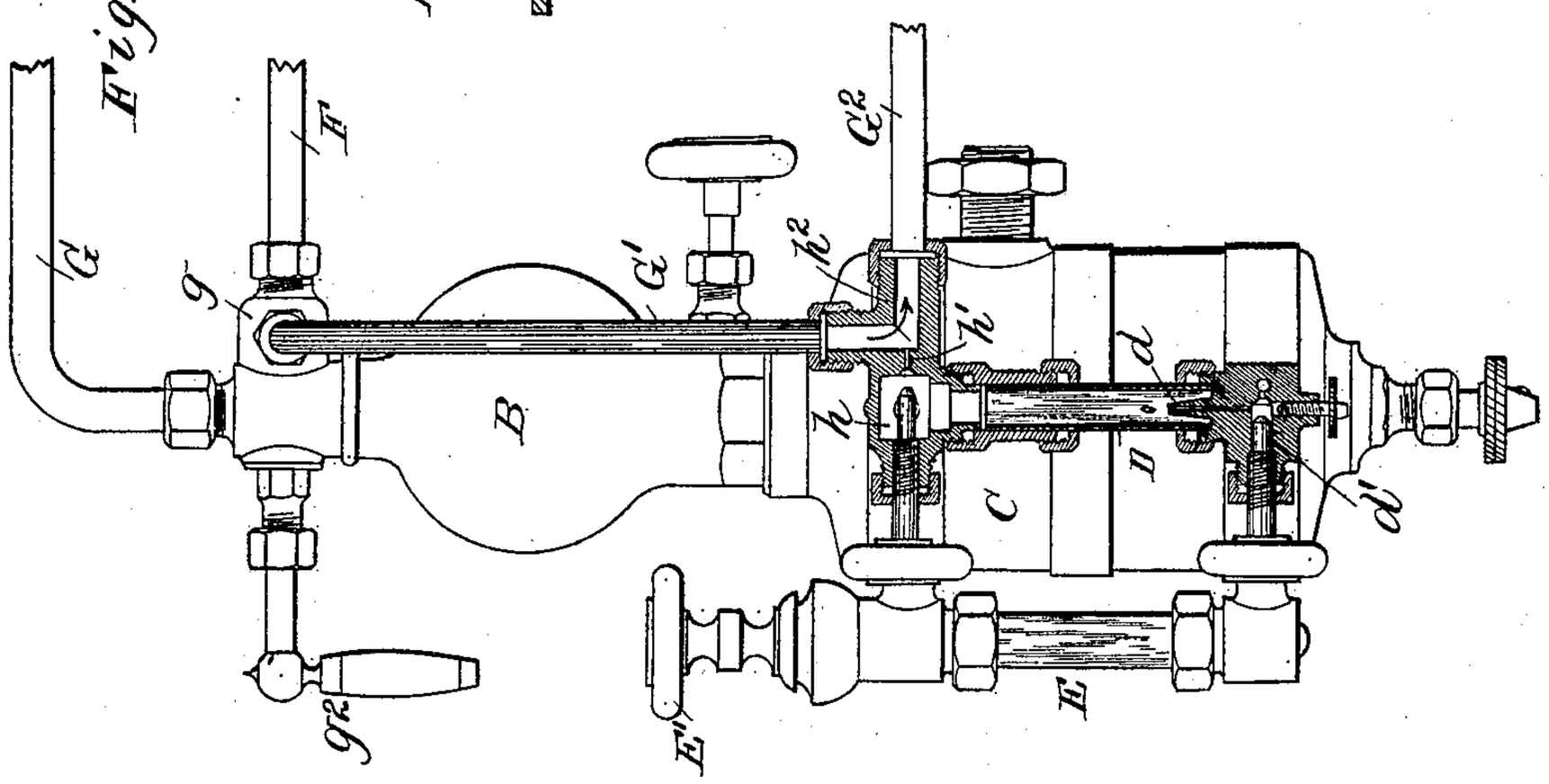
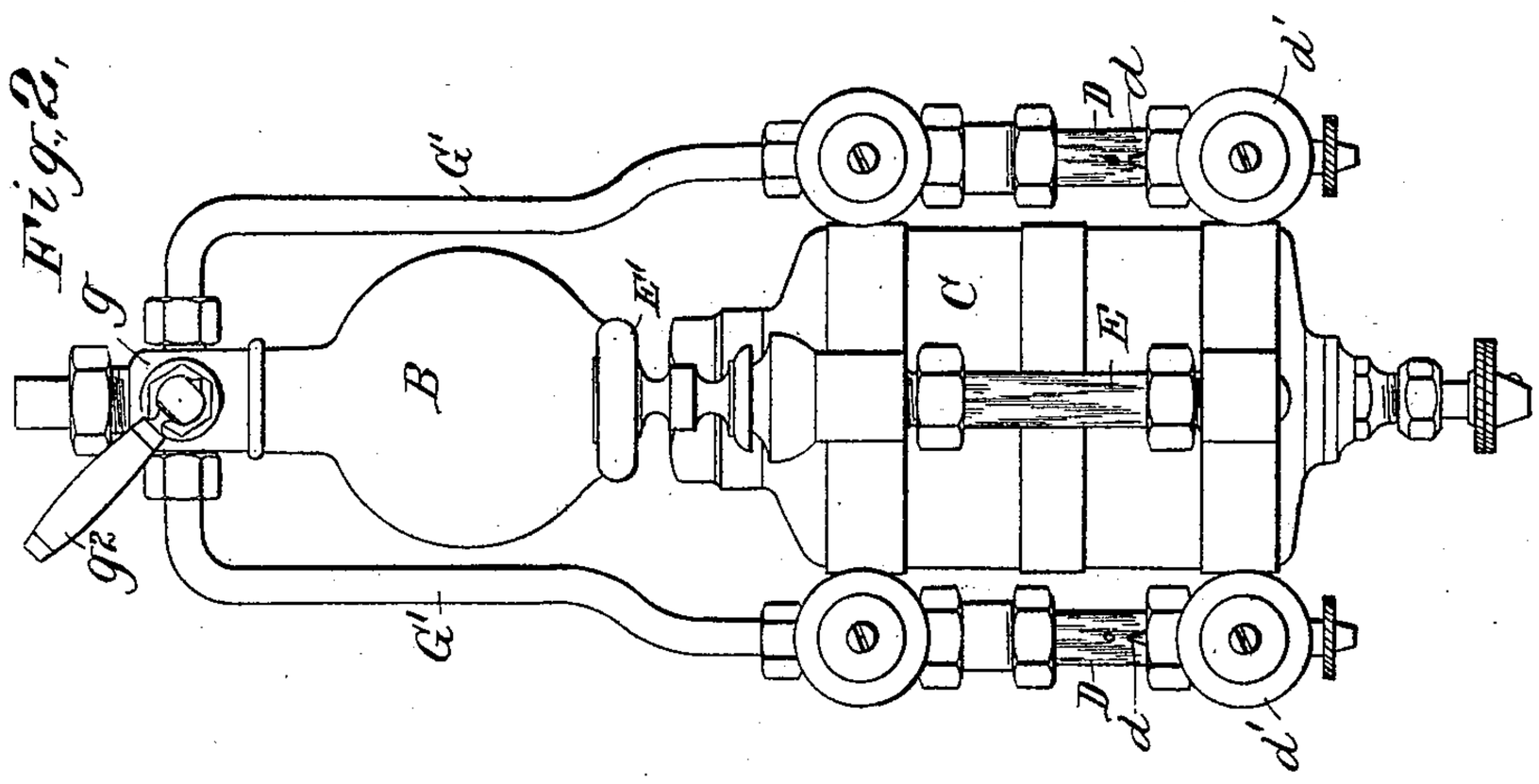


Fig. 2.



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UNITED STATES PATENT OFFICE.

ELIJAH McCOY, OF DETROIT, MICHIGAN, ASSIGNOR TO THE DETROIT SHEET METAL AND BRASS WORKS, OF SAME PLACE.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 611,759, dated October 4, 1898.

Application filed March 2, 1898. Serial No. 672,275. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH McCOY, of Detroit, Michigan, have invented a new and useful Improvement in Lubricators, which is fully set forth in the following specification.

This invention has reference to the construction of lubricators for use more particularly on locomotive-engines; and its general object is to remedy certain objections and defects in operation that have been experienced with lubricators of this character as generally constructed.

Lubricators of the class to which this invention most nearly relates are commonly known as "sight-feed" lubricators. As generally constructed the oil contained in a suitable reservoir is fed by displacement due to the pressure of a hydrostatic column, the oil being thus forced through a nozzle drop by drop in regulated quantity. After passing this nozzle, whose operation is under the observation of the engineer through the sight-feed glass, the oil is caught up by a current of steam and by it carried to the cylinder or other parts which require lubrication. In the operation of the lubricator steam is taken from the boiler and led to a condenser located above the oil-reservoir. The water of condensation furnishes the pressure whereby the feed of the oil is effected, while part of the steam is led through "equalizing-tubes" from the upper part of the condenser to a point in the feed-pipe in advance of the feed-nozzle, this current of steam serving as the vehicle for carrying the oil in a finely-divided state to the parts requiring lubrication. The most serious objection to the use of these lubricators that has been encountered in practice is the uncertainty and irregularity of the feed. The irregularity or cessation of the feed is caused at times by the retarding effect of the steam-pressure at the steam-chest, which pressure is frequently great enough to overcome the force of the current of steam which serves as the vehicle of the oil. Since this opposing pressure is variable, being at a maximum when the throttle is opened, the feed of oil is necessarily irregular. Moreover, the force of the current of steam which carries the oil is diminished by the contracted neck or orifice through which the steam and oil are forced for the purpose of atomization. Clogging sometimes occurs at this point, and in case of material resistance in the tallow-pipe the current is practically throttled. With a view to meeting these objections I have made two departures from the ordinary construction. First, I disconnect entirely the supply of steam for the condenser from the supply for atomizing and propelling the oil and dispense with the usual "equalizer-pipes." Steam for the condenser—that is to say, for the water-feed—is led from the boiler by a pipe which serves also as the overflow or return pipe, and may do so without inconvenience or difficulty, because according to this invention the steam for the overpressure or steam-feed has an independent source. The overpressure-steam is led (preferably from the steam-dome) by an independent pipe which has no connection at all with the condenser or water-feed, so that an ample and continuous current of live steam is available for propulsion of the oil to the steam-chest; second, the overpressure-pipe does not connect, as do the equalizer-pipes in ordinary construction, with an atomizing-chamber communicating with the tallow-pipe by the contracted atomizing-nozzle heretofore referred to, but connects directly with the tallow-pipe. In other words, the overpressure-steam to act as a carrier for the oil joins the latter in front of instead of behind the nozzle, through which it passes from the sight-feed pipe into the tallow-pipe. Another common difficulty with this class of lubricators is loss of oil. This may occur either through siphonage, when for any reason a partial vacuum forms in the boiler, or through the mere floating off of the oil to the boiler through the water-feed pipe, condenser, and pipe connecting the latter with the boiler, when this entire system (as sometimes occurs) becomes filled with water.

The present invention embraces means whereby backflow from the oil-reservoir to the condenser is prevented at all times.

The invention further embraces improve-

ments in details of construction of various parts, which, with the advantages thereof, can best be explained in connection with the accompanying drawings, in which—

Figure 1 is a vertical section, partly in elevation, of the improved lubricator. Fig. 2 is a side elevation thereof. Fig. 3 is a sectional elevation, the section being in a vertical plane through one of the sight-feed tubes. Fig. 4 is an enlarged detail of the main valve for the oil-reservoir.

A represents the locomotive-boiler, and A′ the steam-dome thereof.

B represents the condenser, C the oil-reservoir, D the sight-feed tubes, E the gage-glass, and E′ the filler-plug, these parts being of the usual or of any suitable construction.

Steam is conveyed from the boiler to supply-condenser C by means of a pipe F, which also serves as the overflow-pipe from the condenser to the boiler, the inconveniences heretofore resulting from the employment of a single pipe as both supply and return pipe being obviated by the means hereinafter described.

Instead of using pipe F as the source of supply for the overpressure or steam-feed an independent source of supply is provided, as represented in the drawings, by the pipe G. This pipe is, as shown, preferably connected to the steam-dome, thereby avoiding all possibility of the mouth of the pipe being submerged and closed by the water in the boiler.

The pipe G leads to a valve-chamber g, supported in the construction shown on top of the condenser B, this chamber containing a plug-valve g', operated by a handle g^2 for shutting off the overpressure-steam. The handle g^2 when down indicates that the valve is opened and when up that it is closed. The passage for the live steam continues from chamber g by pipes G′, herein termed the "overpressure-pipes." Two pipes G′ are shown, the lubricator illustrated being of the type which employs two sight-feeds. Pipe G′ communicates with pipe G², usually called the "tallow-pipe," which conveys the steam and finely-divided oil to the steam chest or cylinder.

It will be observed that the overpressure or steam-feed is wholly independent of the condenser and its supply and absolutely under control of the engineer by means of valve g'. It will be further observed that the steam in this system passes through no contracted channel and therefore is not subjected to retardation or choking whereby the force of the feed is diminished. Usually the equalizer-pipes pass through the condenser and through or in close proximity to the oil-reservoir, resulting frequently in overheating of the oil. This objection is obviated by the construction herein described.

The water of condensation in condenser B, whereby the displacement of the oil is effected, passes through a valve-chamber b, provided with a plug-valve b', and thence by pipe c into the oil-reservoir C. This pipe c is upturned at its lower end and provided with a puppet-valve c', properly weighted, so as to be opened by the pressure of the hydrostatic column, but to close automatically against any back pressure. This construction effectually prevents a drain of oil to the boiler either by siphonage through pipe F or by floating off of the oil through the passages forming the water-feed system. The valve c' is never open at a time when oil can pass from the reservoir into pipe c, and the bend c^2 of said pipe forms a trap which is always filled with water. After blowing out the reservoir so soon as the steam is shut off the steam in the condenser and pipe c condenses and fills the trap.

The oil as it is displaced passes from the oil-reservoir by oil-pipe c^2, whose mouth, as usual, is near the top of the reservoir, and is conducted by the usual lateral passages to the nozzles d, Fig. 3, in the lower part of the sight-feed tubes D. The feed of oil is regulated by the usual regulating-valves d'. The oil, rising drop by drop through the sight-feed tube, enters the sight-feed chamber h, at the upper end thereof, communicating by the small orifice h' with the passage of the overpressure-steam in the upper sight-feed arm h^2. The sweep of the current of steam in this passage assists in drawing the oil through orifice h', and in order to make the suction more effective the orifice is located just at the elbow of the arm h^2. The mixed oil and steam thence proceed through the tallow-pipe G² to the parts to be lubricated.

I have found that it is not necessary to force the oil and steam together through a contracted orifice in order to produce a sufficiently fine division of the former for effective lubrication. The energy of the current of high-pressure steam meeting the oil at the elbow of the sight-feed arm sufficiently subdivides or atomizes the oil, rendering the use of an atomizing-nozzle unnecessary.

The drain-valve of the oil-reservoir as usually constructed is liable to work loose by reason of the jar and vibration of the lubricator, this tendency being assisted by the internal pressure of the reservoir upon the valve. The presence of oil on the surfaces of the screw-threads further facilitates the unscrewing of the valve.

The drain-valve illustrated in Figs. 1 and 4 is designed to obviate this difficulty. The valve-body K is of the same dimensions as in ordinary standard lubricators, so that the improved drain-valve can be substituted for the old style in lubricators already in use. This body has a central passage for the valve-stem k, and around this passage is the raised annular valve-seat k'. The valve k^2, in the form of a disk, closes down upon this seat, the valve being raised to open it and lowered to close it, which is the reverse of the usual

operation. The obvious result is that the pressure on the valve tends to tighten instead of to loosen it. The valve-stem has a central discharge extending to the disk and communicating with the exterior of the stem by a series of lateral passages k^3.

It is the universal practice to turn a valve to the right to close it and to the left to open it, and if the valve-stem k had the ordinary right-hand screw-thread it would be necessary to reverse this practice and require of the engineer to bear this peculiarity constantly in mind. To obviate this, the thread k^4 of the valve-stem and the internal thread of the valve-body are, as shown, left-hand threads, so that, notwithstanding that the valve closes downwardly, it is nevertheless closed by a turn to the right. As thus constructed when the engagement of the threads becomes loosened by vibration, under which condition the ordinary valve would open, the pressure on disk k^2 tends to turn the stem in the direction to close the disk more tightly against its seat. Therefore in this construction dependence for keeping the valve tightly closed is not placed upon the frictional engagement of the screw-threads.

In assembling the valve the stem is inserted into the valve-body from the inside. The packing-box k^5 is then screwed into place, and the milled turning wheel k^6 is finally attached to the stem k. The body can now be attached to the reservoir. The valve is therefore easy to construct and to assemble. Furthermore, it is impossible to detach this valve from the lubricator and lose it.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lubricator, the combination with the condenser, oil-reservoir, a pipe leading from the condenser into the reservoir, a pipe supplying steam to said condenser, a sight-feed tube and nozzle therein, a sight-feed chamber at the top of said tube, a tallow-pipe communicating with said chamber, and an overpressure-steam pipe having a source independent of the steam-supply to said condenser, connected with the tallow-pipe at its junction with the sight-feed chamber, substantially as described.

2. In a lubricator, the combination with the condenser, oil-reservoir, a pipe leading from the condenser into the reservoir, a pipe supplying steam to said condenser, a sight-feed tube and nozzle therein, a sight-feed chamber at the top of said tube, an overpressure-steam pipe independent of the supply to the condenser leading from the boiler to the part to be lubricated, the wall of the sight-feed chamber having a narrow passage connecting said chamber directly with said pipe, substantially as described.

3. The combination with the condenser, oil-reservoir, and sight-feed tube and nozzle, of a casing or hollow arm at the top of said tube inclosing a chamber into which the oil is discharged from said tube, and inclosing also an elbow or angular chamber one end of which is connected with a steam-supply pipe independent of the condenser, and the other end with a pipe leading to the part to be lubricated, a contracted passage being formed between the sight-feed chamber and angular chamber, substantially as described.

4. The combination with the condenser, the oil-reservoir, the sight-feed tube, a chamber at the upper end thereof, a pipe connecting the condenser and oil-reservoir and provided with means for preventing backflow, a tallow-pipe leading from the sight-feed chamber, a pipe carrying steam from the boiler to the condenser and serving also as an overflow-pipe from the condenser to the boiler, said pipe and condenser having no communication with the oil-feed system, and a separate steam-pipe communicating with the tallow-pipe beyond the sight-feed chamber, said pipe having no communication with the condensing-chamber or the steam-pipe leading thereto, substantially as described.

5. The combination with the condenser, oil-reservoir, and sight-feed tube, of a valve-chamber above the condenser, a valve therein, and overpressure-pipes independent of said condenser leading from said chamber to a point in the oil-passage beyond the sight-feed tube, substantially as described.

6. The combination with the condenser, oil-reservoir and sight-feed, of a casing at the top of said condenser and inclosing two separate compartments, one communicating with said condenser and with the boiler by a steam-supply and overflow pipe, the other communicating with the boiler by a separate pipe, and with the oil-feed system, substantially as described.

7. The combination with the oil-reservoir, sight-feed tube and sight-feed chamber, and means for feeding the oil from said reservoir, of an overpressure-pipe carrying live steam, and a narrow passage leading through the wall of said chamber into said overpressure-pipe so that the oil enters the latter in the direction of the current of steam therein, substantially as described.

8. A drain-valve comprising in combination with the body having a valve-seat, a hollow valve-stem passing through said body, and engaging by screw-threads therewith, and a valve closing downwardly upon said seat, substantially as described.

9. A drain-valve comprising a body having a valve-seat, a stem having the drain-passage extending therethrough and provided with a left-handed thread engaging an internal thread in the body, and a valve carried by said stem and closing downwardly on said seat, substantially as described.

10. The combination with the valve-body having a central passage and a valve-seat, of a valve-stem passing through said passage

and engaging by screw-threads with said body, said stem having through it a discharge-passage, and a disk valve on one end of said stem, and a turning wheel or handle on the other, whereby disconnection of said valve from said body is prevented, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ELIJAH McCOY.

Witnesses:
J. G. EDWARDS,
M. H. WILLIAMS.