(No Model.)

3 Sheets—Sheet 1.

E. McCOY.

LUBRICATOR.

No. 472,066. Patented Apr. 5, 1892.

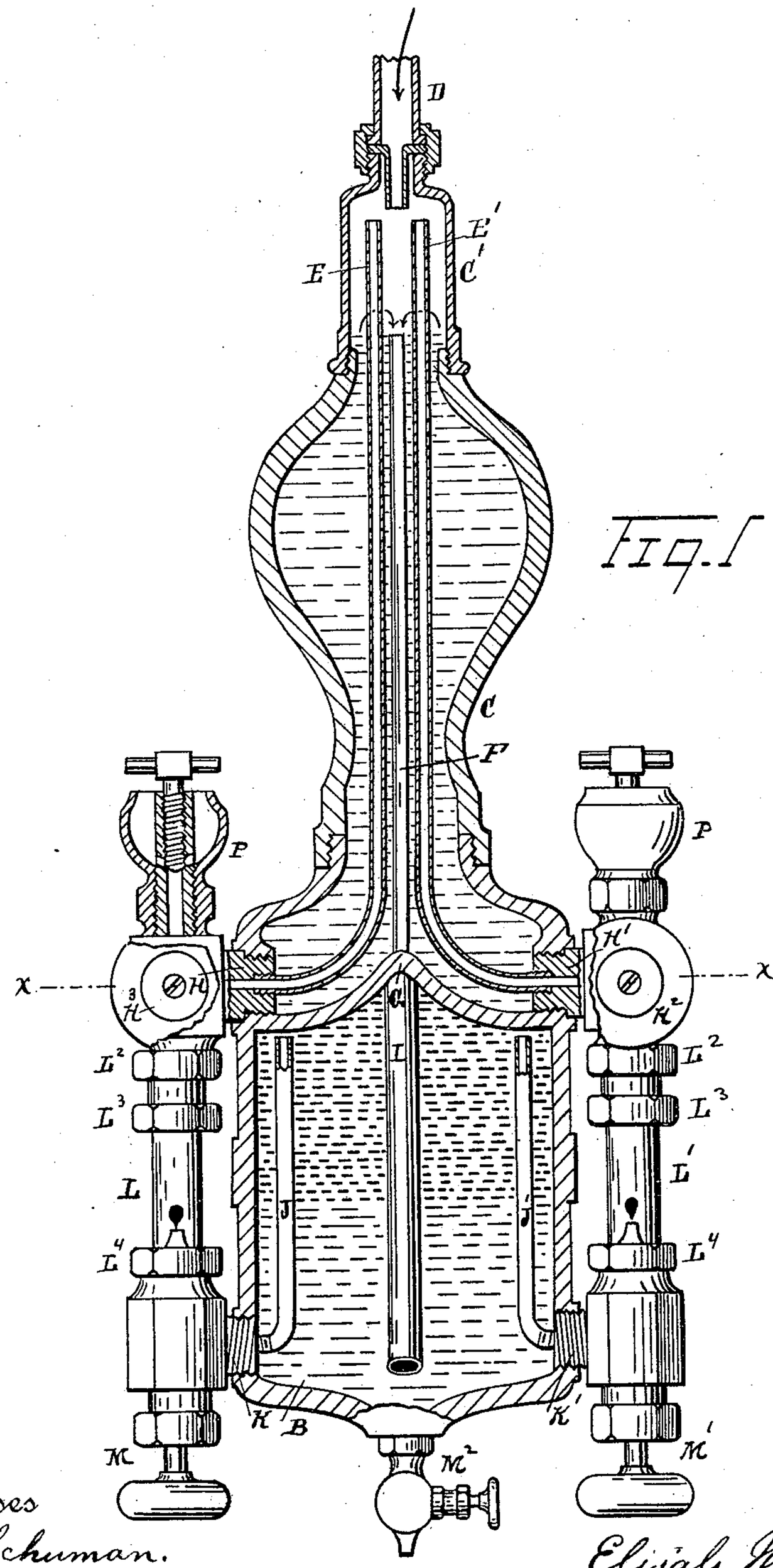

FIG. 1

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(No Model.) 3 Sheets—Sheet 2.

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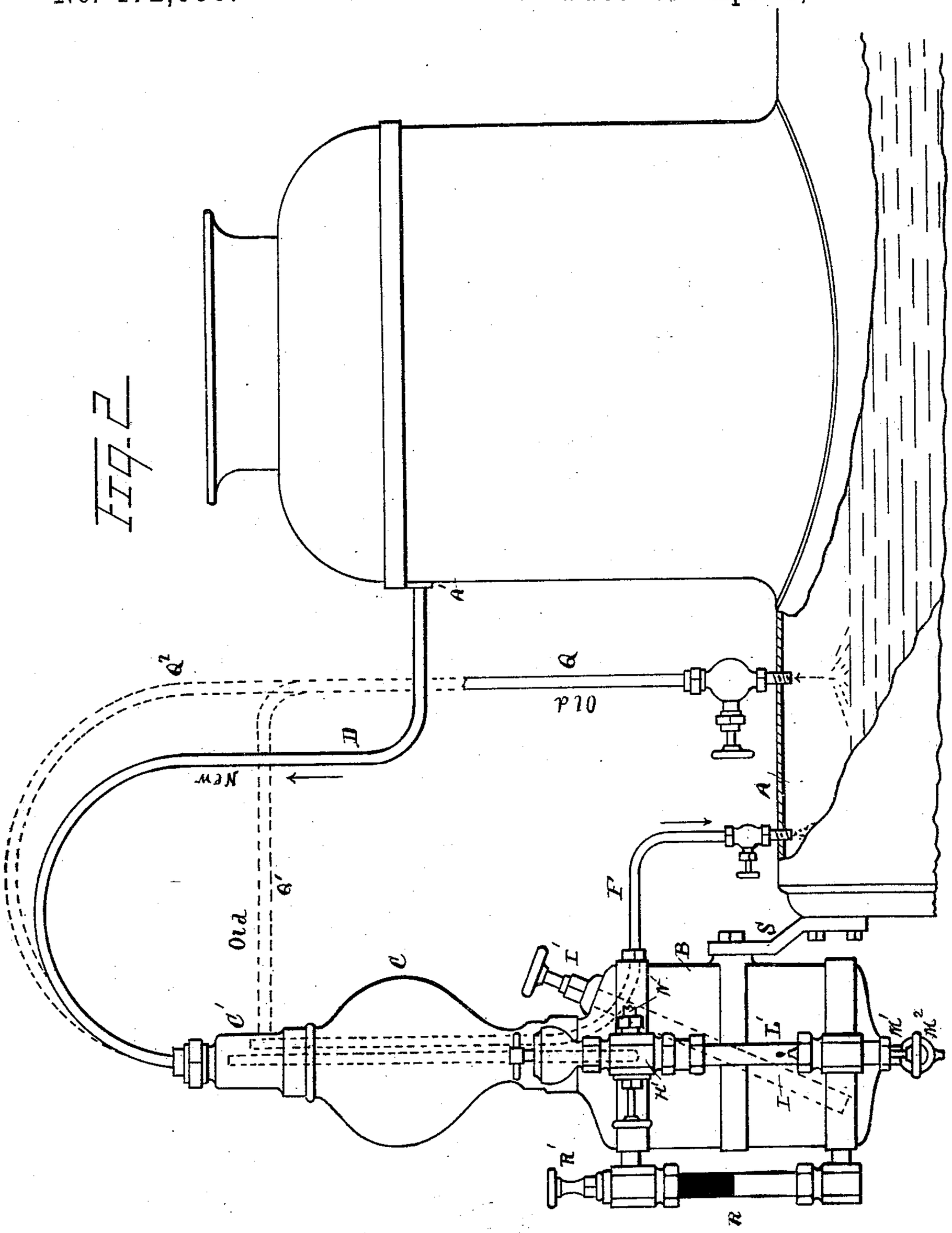
Fig. 2.



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3 Sheets—Sheet 3.

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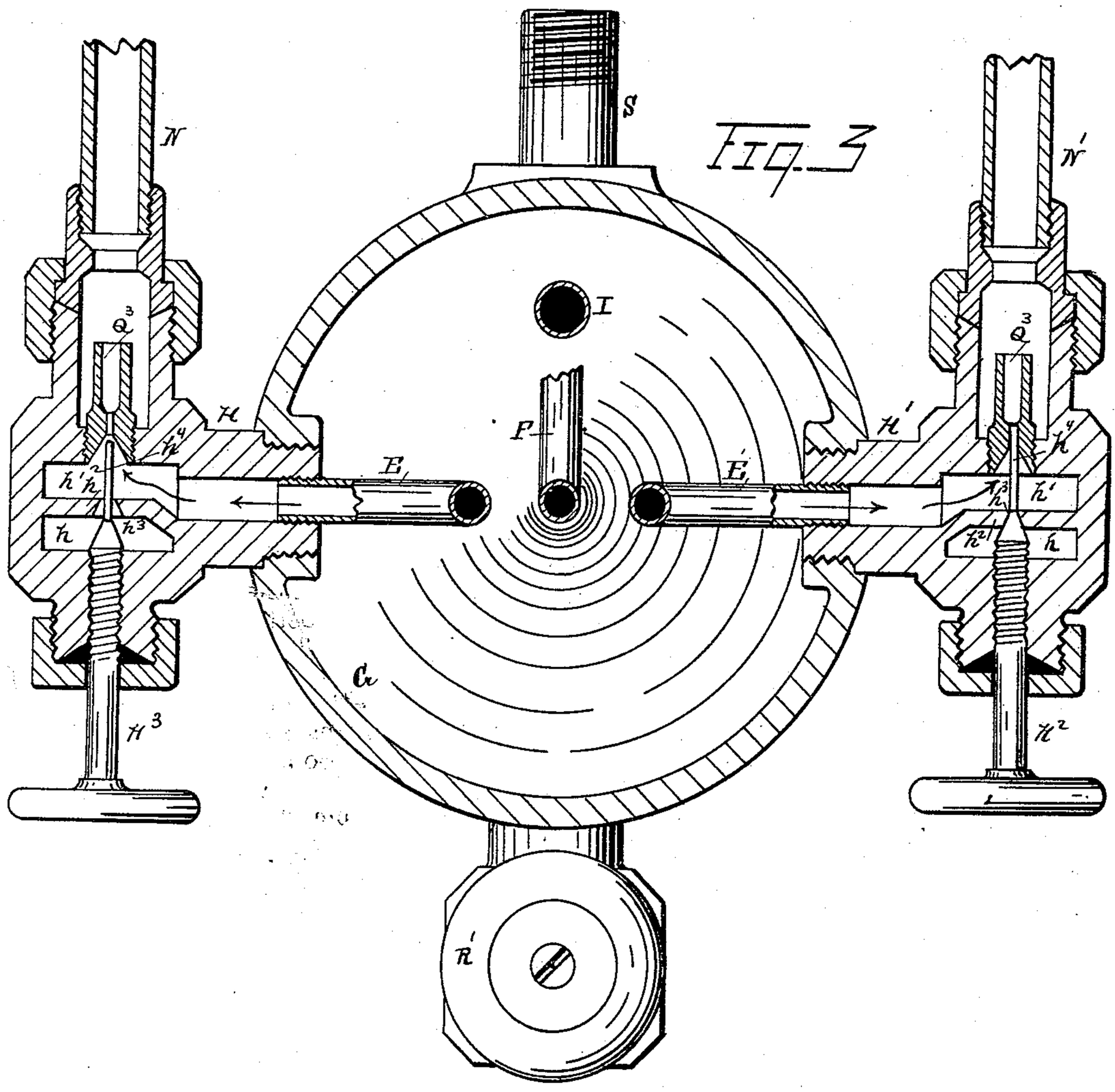

FIG. 3

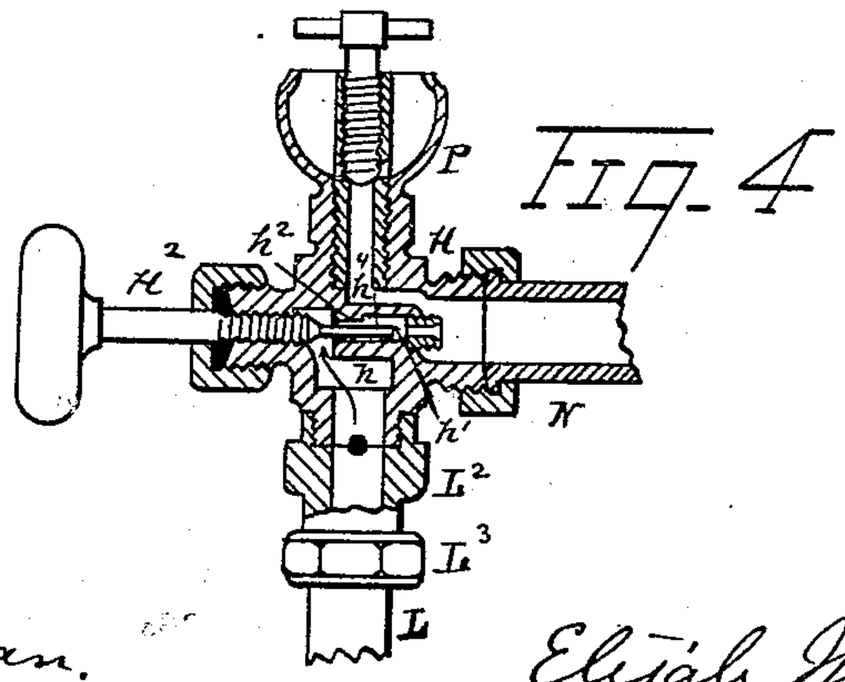

FIG. 4

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UNITED STATES PATENT OFFICE.

ELIJAH MCCOY, OF DETROIT, MICHIGAN.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 472,066, dated April 5, 1892.

Application filed July 31, 1890. Serial No. 360,539. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH MCCOY, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Lubricators; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain new and useful improvements in lubricators, and more particularly in locomotive-lubricators; and it consists of the combinations of parts hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of a device embodying my invention. Fig. 2 is a side elevation showing my improved lubricator attached to the head of a locomotive-boiler. Fig. 3 is a horizontal section on the line *x x*, Fig. 1. Fig. 4 is a detail view in vertical section of one of the upper sight-feed arms and connecting devices.

One of the main features of my invention has for its object to secure a more perfect equalization of the steam-pressure.

In a long experience with locomotive-lubricators great difficulty has been found in producing a perfect equalizing-lubricator having a positive and constant overpressure under all circumstances and variations in the operation of the locomotive-throttle necessary to properly atomize the lubricant and propel it to parts to be lubricated.

Heretofore as lubricators have commonly been constructed steam has been required to enter the condensing-chamber and surplus water of condensation to be discharged from the condenser through the same channel leading from the boiler to the condenser. It is obviously impossible, attention being definitely called to the fact, for steam to enter and surplus water to overflow through the same channel at the same time. So, also, when the lower end of said channel becomes submerged in consequence of the neglect of the engineer in allowing his boiler to get too full of water or in consequence of the foaming of the water in the boiler steam could not enter the pipe. The result is under these circumstances that at intervals an equilibrium is produced in the equalizing-pipes, destroying the overpressure necessary to atomize and propel the oil, as above stated, for want of proper circulation of steam through said channel. For these reasons a perfect and steady feed of the oil in visible drops through the sight-feed chamber has not heretofore been obtained, owing to said variations and circumstances. This difficulty has been experienced, for example, in the lubricator embodied in United States Letters Patent granted to me June 16, 1885, No. 320,379, where the steam-pipe led from the top of the horizontal shell of the boiler into the side of the condenser-neck, said pipe being also required to act as an overflow-pipe. So, also, the same difficulty has been experienced in lubricators where the steam-pipe led from the horizontal shell of the boiler into the top of the condenser, the equalizing-pipe located below the entrance of the steam-pipe being also required to act as an overflow-pipe by the way of the atomizing-chamber and sight-feed chamber, causing, also, a cloudy appearance within the sight-feed chamber, preventing the attendant from properly observing the passage of oil therethrough. In Fig. 2 of the drawings this old difficulty is illustrated, wherein the pipe Q is shown leading from the horizontal shell of the boiler A by way of the horizontal arm Q′ (shown in dotted lines) into the side of the condenser, the same being required, also, to act as an overflow-pipe to lead water of condensation back into the boiler. So, also, a common difficulty is thereby illustrated when steam is required to pass through the pipe Q and arm Q^2 (shown in dotted lines) into the top of the condenser. Evidently the submergence of the lower end of the pipe Q or the occupancy of the same with water of condensation returning to the boiler would meanwhile prevent the passage of steam therethrough.

It is one object of my invention to effectually overcome these difficulties by leading an independent steam-pipe, preferably from the dome of the boiler, into the top of the condenser between the upper extremities of two equalizing-pipes extended upward in the condensing-chamber above the water-level, and by providing, also, an independent overflow-

pipe, preferably directed downward through the condenser and leading into the boiler. Accordingly, as shown in the drawings, B denotes the oil-reservoir, and C the condenser, the same being elongated and provided with a removable condenser-top C′

D is an independent steam-inlet pipe leading from the dome A′ of the boiler into the top of the condenser.

E and E′ are two equalizing-pipes extending upward toward the top of the condenser and above the water-level therein. The steam-pipe D enters the top of the condenser over and between the upper extremities of said equalizing-pipes to prevent any sediment which might come from the dome from entering said pipes.

F is an independent overflow-pipe, its upper extremities located below the upper extremities of the equalizing-pipes, said overflow-pipe leading, preferably, downward in the condensing-chamber and through the base thereof into the shell of the boiler to conduct the surplus water of condensation back thereinto. It is clear that the steam-pipe D, leading from the dome of the boiler, and the overflow-pipe, being independent of each other, each has but a single office to perform, and consequently under no circumstance can there be any variation in the feed for lack of the proper amount of overpressure through the equalizing-pipes to atomize and propel the oil to the parts to be lubricated.

Another serious difficulty heretofore experienced in lubricators of this class as commonly constructed has been the liability of the breakage of the sight-feed glasses, owing to expansion and contraction. So, also, as lubricators have heretofore been made there has been great liability of overheating the oil in the oil-reservoir on account of the steam in the equalizing-pipes having contact with the body of the oil-reservoir in various ways. My object in this present invention aims, also, to effectually overcome these difficulties. To this end, as shown, the equalizing-pipes E and E′ are constructed separate and independent from the body of the oil-reservoir and extend downward through the condensing-chamber toward the base thereof and are connected into the upper sight-feed arms, a diaphragm G separating the oil-reservoir from the condensing-chamber. It is perfectly clear that by constructing the equalizing-pipes separate and independent from said diaphragm and leading them through the lower end of the condensing-chamber above and clear from said diaphragm the said pipes are surrounded with condensed water at their base to the very point of their connection with the upper sight-feed arms at all times.

H and H′ represent the upper sight-feed arms. These arms are engaged in the lower portion of the case of the condensing-chamber. It will be observed that said chamber, as shown, has an expanded base above the diaphragm G, the base of said chamber being extended to the inner ends of the upper sight-feed arms, so that the equalizing-tubes E E′ may be led through the expanded portion of said chamber above the diaphragm G to form direct engagement with the upper sight-feed arms, as shown, the lower ends of said tubes being thus submerged in water to the very point of their engagement with the sight-feed arms altogether independent and separate from the diaphragm dividing the condenser from the oil-reservoir. By this construction, it is obvious that the bottom of the condensing-chamber extends below the line of inlet into the upper sight-feed arms, thereby allowing the separate tubes E E′ to be screwed into the sight-feed arms and overcoming the liability of overheating the casing of the lubricator and consequent expansion and contraction thereof. The upper portion of the condensing-chamber is preferably formed into a bulb below the neck, always insuring a condenser full of water up to the top of the overflow-pipe extended into the base of the neck. The importance of thus leading the equalizing-pipes through the lower end of the condensing-chamber into the upper sight-feed arms will readily be seen by referring to various ordinary constructions now in use where the equalizing-pipes lead into cored passages in the body of the lubricator, thereby heating said body, producing expansion and contraction, resulting in the breakage of the sight-feed glasses and overheating the oil; but it will be understood that my invention effectually prevents such heating of said body and the expansion and contraction inevitably resulting therefrom, and thereby protects and saves the sight-feed glasses.

I is a pipe leading water from the condensing-chamber to the base of the oil-reservoir in the usual manner. I′ is the cock controlling the flow of water of condensation to the oil-reservoir for displacing the oil in said reservoir.

J J′ are the usual oil-conducting pipes, located in the oil-reservoir and connecting in the usual manner with the lower sight-feed arms K K′.

L L′ denote the usual sight-feed glasses.

M M′ denote the valves controlling the communication of said oil-conducting pipes through the sight-feed glasses.

M^2 denotes the customary drain-valve.

N N′ represent the tallow-pipes, connecting with the upper sight-feed arms. In the upper sight-feed arms I form a sight-feed chamber *h* and an atomizing-chamber *h′*, separated by a perforated diaphragm h^2, forming a valve-seat, as shown at h^3.

H^2 and H^3 denote the valves controlling the passage of oil from the sight-feed chamber to the atomizing-chamber seating on said valve-seat. A nozzle Q^3 is engaged in each upper sight-feed arm, opening into the tallow-pipe and into the atomizing-chamber. The valves H^2 and H^3 are each constructed with an elongated needle-point h^4, adapted to penetrate

the opening in said nozzle when the valve is seated. It will be seen that the penetration of the needle-point into said nozzle will effectually remove from the opening thereof any sediment which may accumulate therein. The valves H^2 and H^3 therefore each constitute a shut-off valve and sediment-remover.

As heretofore constructed should the communication from the sight-feed arm to the tallow-pipe be stopped up by sediment lodged therein it has been found necessary to close the throttle, reduce the speed, and resort to the use of the hand-oiler P, as the sediment could only be removed when the engine was at rest. This difficulty I effectually overcome by the provision of my improved valve and sediment-remover, whereby any obstruction from sediment may quickly and readily be removed by simply seating the valves H^2 H^5, which may be done without diminishing the speed of the locomotive and without being deprived of the use of the sight-feed.

Another very important advantage secured by my improved construction lies in the fact that should either of the sight-feed glasses break it can be replaced without losing any of the lubricant and without diminishing the speed. This may be done by closing the valves in the lower and upper sight-feed arms, shutting off the passage of oil and steam to the broken glass. The sight-feed glasses I engage in place by means of a removable connection L^2, having a screw-threaded engagement with the upper sight-feed arm, a packing-nut L^3 engaging the glass with said connection L^2.

L^4 is the lower packing-nut, engaging the glass upon the lower sight-feed arm. By loosening the said upper and lower packing-nuts the broken glass can be removed and a new one put in.

R denotes the usual indicator-tube, and R′ the filler.

S is the supporting-bracket.

The atomizing-chamber h', constructed and arranged as herein shown, obviously is a matter of much importance. The atomizing-chamber being separated by the perforated partition h^2, the oil is not atomized until it has passed from the sight-feed chamber into the atomizing-chamber, whereby the separation and deposit of sediment from the oil in atomizing is effected in the atomizing-chamber, leaving the sight-feed chamber clear.

In Fig. 4 the perforated partition is shown with a horizontal arm extending over the upper end of the sight-feed tube, the perforation forming the valve-seat in said partition being in a perpendicular arm, the oil being compelled to pass around the edge of the horizontal arm through the perforated partition. This horizontal and perpendicular partition prevents the action of sediment from wearing away the upper end of the sight-feed glass. The horizontal arm of said partition forms the base of the atomizing-chamber.

I would have it understood that my invention contemplates the use of one or more overflow pipes.

Instead of leading the inlet-steam pipe from the dome of a boiler, it may lead from any other portion or attachment to the boiler where its extremity will not be submerged in the water in the boiler.

What I claim as my invention is—

1. In a lubricator for locomotives, an oil-reservoir, a condenser, a separating-diaphragm, upper sight-feed arms engaged with said chamber above said diaphragm, equalizing-pipes located in said chamber, engaged with said sight-feed arms above and independent of said diaphragm, a pipe leading from said chamber into said reservoir, a steam-pipe leading from the steam dome of the locomotive into the top of the condensing-chamber, and an independent overflow-pipe leading from the condensing-chamber into the boiler of the locomotive, substantially as described.

2. In a lubricator, an oil-reservor, a communicating condensing-chamber, an upper sight-feed arm, a tallow-pipe communicating with said arm, said arm provided with a sight-feed chamber h, an atomizing-chamber h', separated from the chamber h by a perforated diaphragm h^2, forming a valve-seat, an equalizing-pipe communicating with said atomizing-chamber, a passage from said atomizing-chamber into the tallow-pipe, and a shut-off and sediment-removing valve constructed to seat in said valve-seat and with a needle-point to penetrate and control said passage, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

ELIJAH McCOY.

Witnesses:

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CHAS. F. SALOW.