(No Model.) 2 Sheets—Sheet 1.

# E. McCOY.

## LUBRICATOR.

No. 470,163. Patented Mar. 1, 1892.

Fig. 5

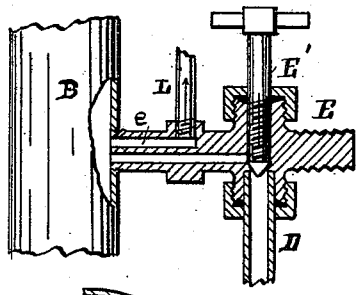


Fig. 4

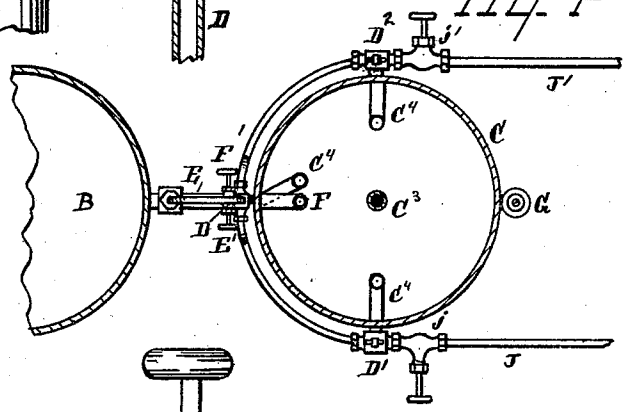


Fig. 6

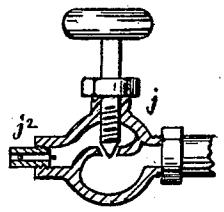


Fig. 1




Witnesses
John Schuman
Charles F. Salow.

Inventor
Elijah McCoy
By his Attorney
Newell S. Wright.

(No Model.)

2 Sheets—Sheet 2.

# E. McCOY.

## LUBRICATOR.

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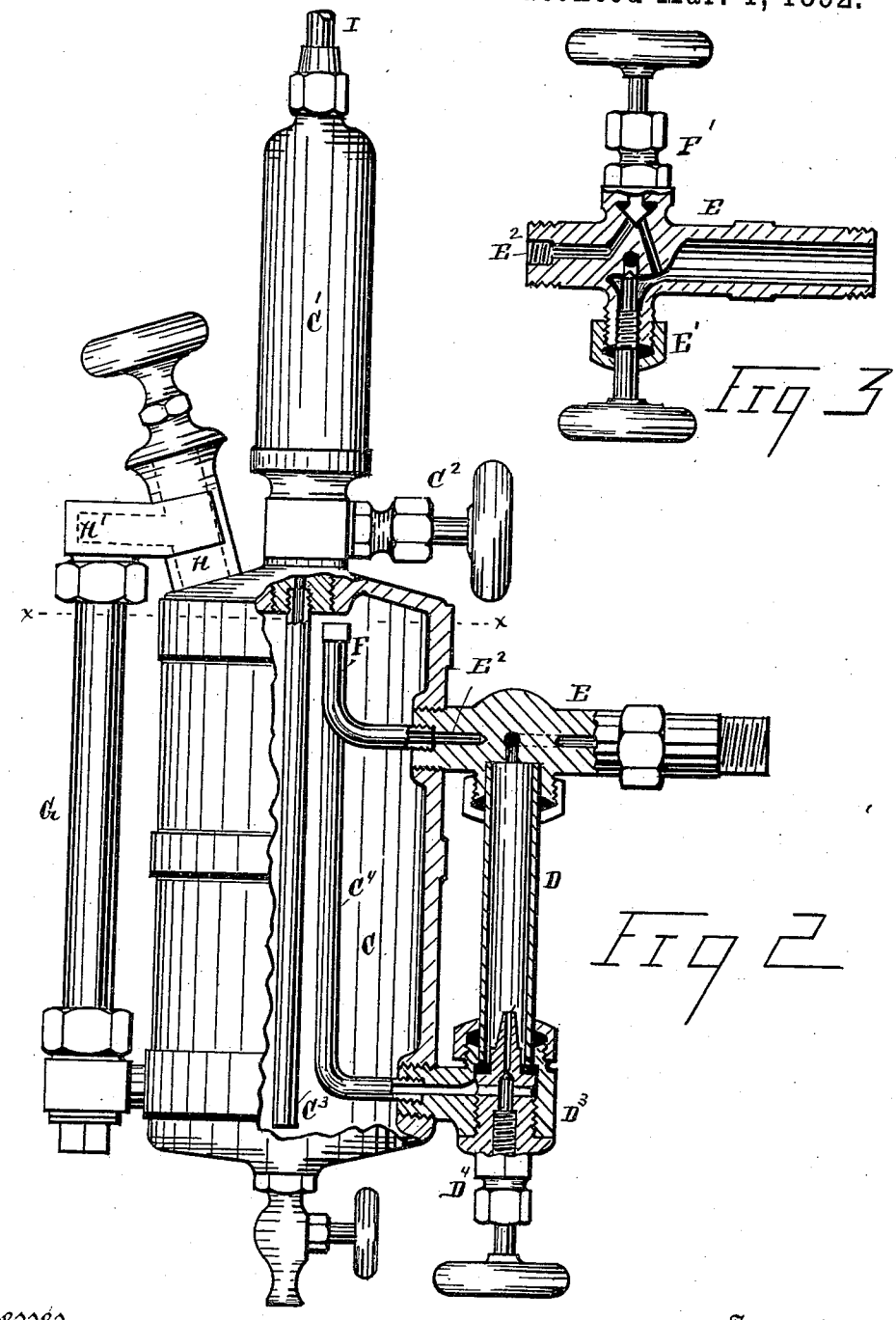


Fig 3

Fig 2

Witnesses

Jos H Baeon

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Elijah McCoy

By his Attorney

Newell S. Wright.

# UNITED STATES PATENT OFFICE.

ELIJAH McCOY, OF DETROIT, MICHIGAN, ASSIGNOR TO HENRY C. HODGES AND CHARLES C. HODGES.

## LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 470,163, dated March 1, 1892.

Application filed August 15, 1890. Serial No. 362,064. (No model.)

*To all whom it may concern:*

Be it known that I, ELIJAH McCOY, a citizen of the United States, residing at Detroit, 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 invention, 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 has for its object certain new and useful improvements in lubricators, and is more particularly designed to provide a lubricator adapted to more efficiently feed heavy oils and for lubricating double and triple expansion engines.

It consists of the combinations of devices and appliances hereinafter specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation illustrating my invention. Fig. 2 is a view of the lubricator, partly in elevation and partly in section. Fig. 3 is a detail view of the supporting-arm in horizontal section. Fig. 4 is a view, partly in plan and partly in section, showing the arrangement of the oil-pipes and their connections with the lubricator. Fig. 5 is a vertical section of the supporting-arm, showing its engagement with the steam-pipe. Fig. 6 is a detail view in section of one of the valves in the oil-discharge pipes.

I carry out my invention as follows:

A represents the high-pressure cylinder of a triple-expansion engine.

A′ is the intermediate cylinder, and $A^2$ is the low-pressure cylinder.

B is the steam-pipe communicating with the high-pressure cylinder. B′ is the throttle-valve therein.

C is the oil-reservoir of my improved lubricator.

C′ is the condensing-chamber, provided with a shut-off valve $C^2$. I prefer to construct the shell of the condensing-chamber and the case of said valve of an integral casting having a screw-threaded engagement in the body of the oil-reservoir, as shown in Fig. 2.

$C^3$ is an ordinary pipe to lead condense-water from the condensing-chamber to the base of the oil-reservoir to float the oil therein.

$C^4$ is an oil-overflow pipe leading the oil in the usual manner from the top of the oil-reservoir to the lower arm of a sight-feed chamber.

D D′ $D^2$ denote sight-feed chambers; $D^3$, the customary lower arm, by which a sight-feed chamber is connected to the body of the oil-reservoir.

$D^4$ is the governing-valve therein.

E denotes an upper supporting-arm, whereby the upper end of a sight-feed chamber is connected to the body of the oil-reservoir and whereby the lubricator is attached to the steam-pipe in the usual manner.

E′ is the valve governing the discharge of oil from the sight-feed chamber to the supporting-arm.

F is a heater extended into the oil-reservoir, preferably adjacent to the top of the oil-overflow pipe $C^4$. As shown, the heater consists of a steam-pipe closed at its extremity within the oil-reservoir and communicating through a steam-channel $E^2$ in the supporting-arm, with the oil-discharge pipe communicating with the steam-pipe. F′ is a valve controlling the said steam-channel. It will be observed that the heater is separate from the body of the oil-reservoir and independent of any cored passages in said body, and also of any equalizing-pipe, but consists of a distinct steam-chamber introduced into the oil-reservoir itself, and in such a position as to heat the oil therein, particularly adjacent to the upper end of the overflow pipe $C^4$, so that it can readily discharge therethrough. It is obvious that by means of the valve F′ the entrance of steam into the heater is under perfect control, so that its action can be regulated as required at all seasons of the year and for all fire tests of oil. By bending the heater-tube to form an upwardly-extended arm, as shown in Fig. 2, condense-water will readily free itself therefrom. Heavy oils can by this means be readily fed to the parts to be lubricated.

I would have it understood that I do not limit myself to the introduction of the heater through the supporting-arms.

G is the gage-glass. H is a filler entering

into the top of the body of the oil-reservoir, and H′ is the upper gage-arm united to the filler. By this construction, it will be seen I am enabled to carry the upper end of the gage-glass above the top of the overflow-pipe $C^4$, so as to readily observe when the oil-reservoir has been sufficiently filled.

The dotted line *x x*, Fig. 2, clearly shows the extension of the gage-glass above the top of the overflow-pipe. By this construction, also, it will be understood, the filler, the gage-arm communicating with the filler, and the upper end of the gage-glass constitute an expansion-chamber. The filler communicating directly into the oil-reservoir, it is obvious that no air-vent is required.

The letter I denotes the steam-induct pipe leading into the condenser. This pipe is preferably elongated, as in other analogous devices, so as to afford the desired pressure-column, and communicates at its upper extremity with the steam-pipe B. To better provide for expansion and contraction, I prefer to bend the pipe I intermediate its extremities, as shown in Fig. 1. This construction gives added length to said pipe and permits of contraction and expansion without leakage.

I′ is a valve governing the admission of steam through the pipe I.

J J′ denote oil-discharge pipes, leading respectively from the sight-feed chambers D′ and D, the one to the intermediate cylinder $A^2$ and the other to the low-pressure cylinder $A^2$. These oil-discharge pipes may communicate with said cylinders, if desired, through ordinary hand-pumps K K′, or said pumps may be dispensed with. By connecting said oil-discharge pipes therewith, however, the pumps can be used in case of any accident to the lubricator, as the breakage of a sight-feed glass.

L denotes an equalizing steam-pipe, communicating with said oil-discharge pipes J J′, preferably through the upper extremities of the sight-feed chambers D′ and $D^2$.

The letters *j j′* denote valves located in the said oil-discharge pipes. The equalizing-pipe preferably leads from the supporting-arm E, said arm being provided with an additional steam-inlet channel *e*, communicating with the equalizing-pipe. I prefer that the valves *j j′* should be provided with a nozzle $j^2$, engaged with the case, as shown in Fig. 6. This nozzle should be diminished in size so as to be essentially of the same size as that commonly located in the sight-feed chamber. As so provided it is evident that the valve need not be regulated to control the amount of oil discharged therethrough, as the size of the nozzle will accomplish that result. Consequently the valve need only be used when it is desired for any reason to shut off the passage of oil therethrough to the parts to be lubricated.

It will be observed that the equalizing-pipe in no wise interferes with the induct-pressure column or duct I, whereby the construction is especially adapted for a stationary engine, thus always insuring a proper water column pressure under all circumstances.

In Fig. 2 the communication of the gage-arm with the filler and the expansion-chamber formed thereby is outlined in dotted lines.

It will be observed that oil is discharged from the lubricator into the steam-pipe B and thence to the high-pressure cylinder in equilibrium—that is, without being effected by the equalizing-pipes herein described—no additional equalization of pressure being required to properly feed the oil through the steam-pipe B.

What I claim as my invention is—

1. A lubricator for lubricating double and triple expansion engines, having in combination an oil-reservoir, a supporting-arm for connecting the lubricator to a steam-pipe provided with a steam-equalizing channel *e* and with an oil-channel for feeding oil therethrough to the high-pressure cylinder of the engine, a heater consisting of a steam-pipe closed at its extremity within the oil-reservoir and in communication with the said supporting-arm, additional oil-pipes leading from the lubricator to the low-pressure cylinders of the engine, and an equalizing-pipe leading from said steam-equalizing channel of the supporting-arm to said additional oil-pipes.

2. A lubricator for lubricating double and triple expansion engines, having in combination an oil-reservoir, a supporting-arm for connecting the lubricator to a steam-pipe provided with a steam-equalizing channel *e* and with an oil-channel for feeding oil therethrough to the high-pressure cylinder of the engine, additional oil-pipes leading from the lubricator to the low-pressure cylinders of the engine, and an equalizing-pipe leading from said steam-equalizing channel of the supporting-arm to said additional oil-pipes, substantially as described.

3. A lubricator for lubricating double and triple expansion engines, having in combination an oil-reservoir, a condensing-chamber communicating therewith, multiple sight-feed chambers, a supporting-arm for connecting the lubricator to a steam-pipe provided with a steam-equalizing channel *e* and with an oil-channel communicating with one of said sight-feed chambers for feeding oil therethrough to the high-pressure cylinder of the engine, additional oil-pipes leading from the remaining sight-feed chambers to the low-pressure cylinders of the engine, and an equalizing-pipe leading from said steam-equalizing channel of the supporting-arm to said additional oil-pipes through the tops of the sight-feed chambers connected therewith, substantially as described.

4. A lubricator for lubricating multiple-cylinder engines having a high-pressure and a low-pressure cylinder, having in combination an oil-reservoir, a condensing-chamber communicating therewith, sight-feed chambers through which oil is fed to said cylin-

ders, a supporting-arm communicating with one of said sight-feed chambers for connecting the lubricator to a steam-pipe provided with a steam-equalizing channel and with an oil-channel for feeding oil to the high-pressure cylinder therethrough, an oil-pipe leading from the remaining sight-feed chamber to the low-pressure cylinder, and an equalizing-pipe leading from the steam-equalizing channel of the supporting-arm to said oil-pipe through its connected sight-feed chamber, substantially as described.

5. A lubricator for lubricating multiple-expansion engines, having in combination an oil-reservoir, a condensing-chamber, multiple sight-feed chambers, a supporting-arm communicating with one of said sight-feed chambers and provided with a steam-equalizing channel and with an oil-passage for feeding oil to the high-pressure cylinder therethrough, an oil-pipe leading from each of the remaining sight-feed chambers, and an equalizing-pipe leading from the steam-channel of the supporting-arm about the body of the lubricator and horizontally through the top of the respective sight-feed chambers to the oil-pipe in connection therewith, substantially as described.

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

ELIJAH McCOY.

Witnesses:
N. S. WRIGHT.
CHAS. F. SALOW.