

No. 610,634.

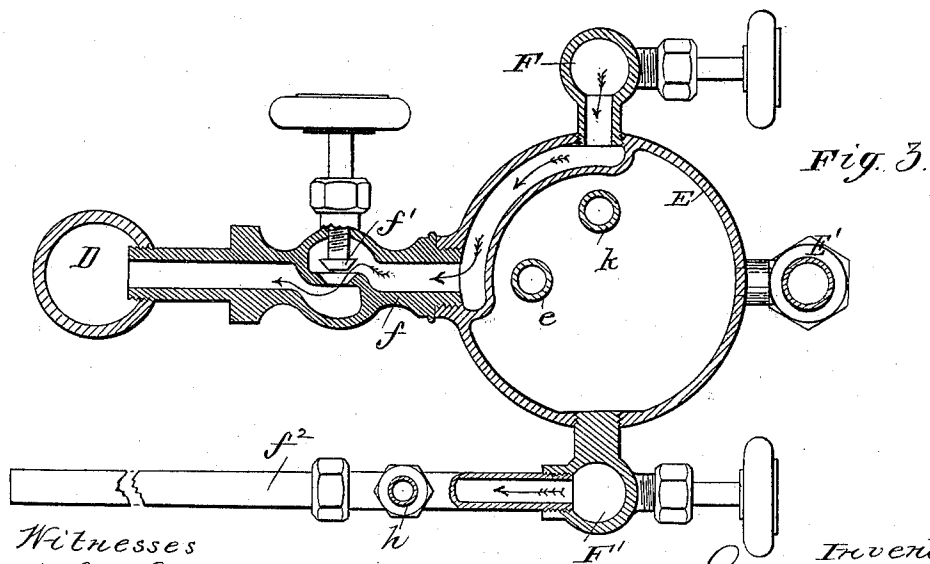
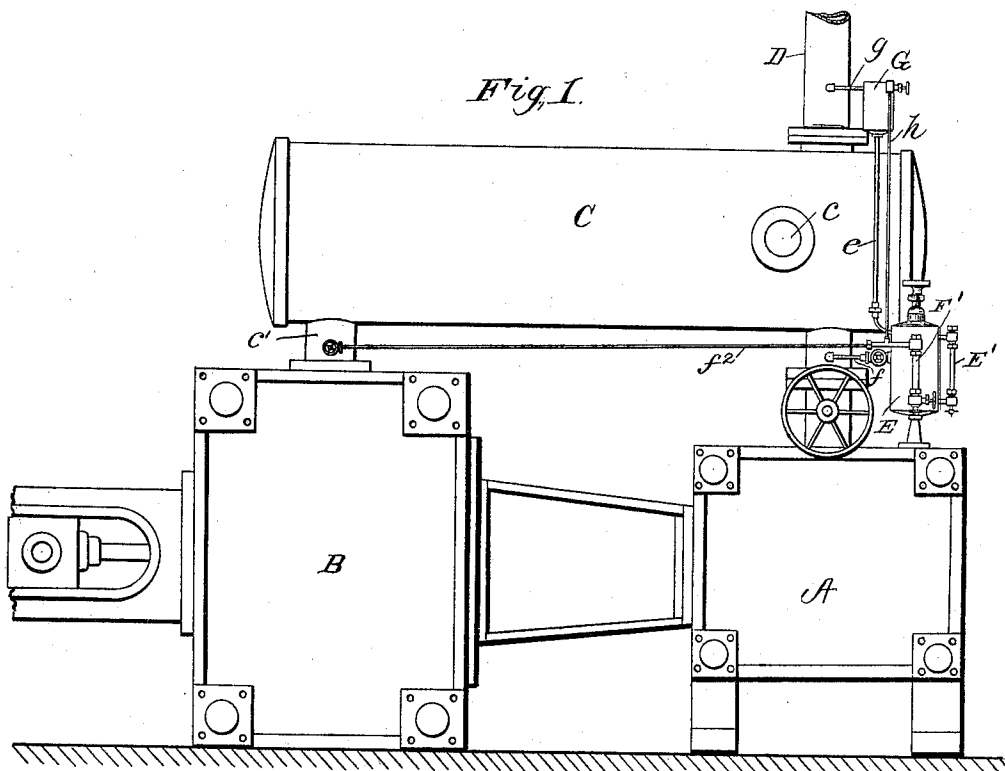
Patented Sept. 13, 1898.

E. McCOY.
LUBRICATOR.

(Application filed Mar. 2, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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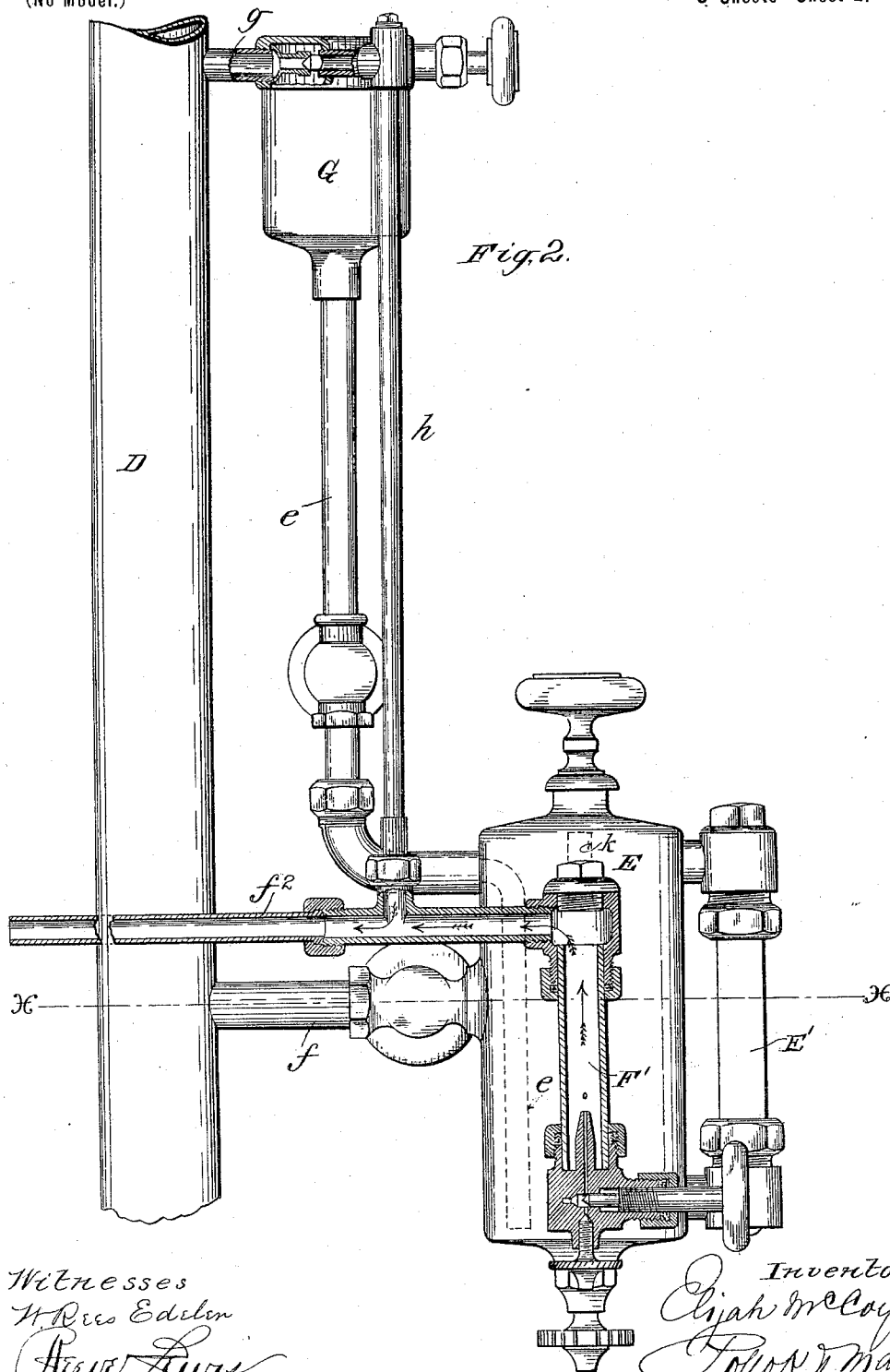
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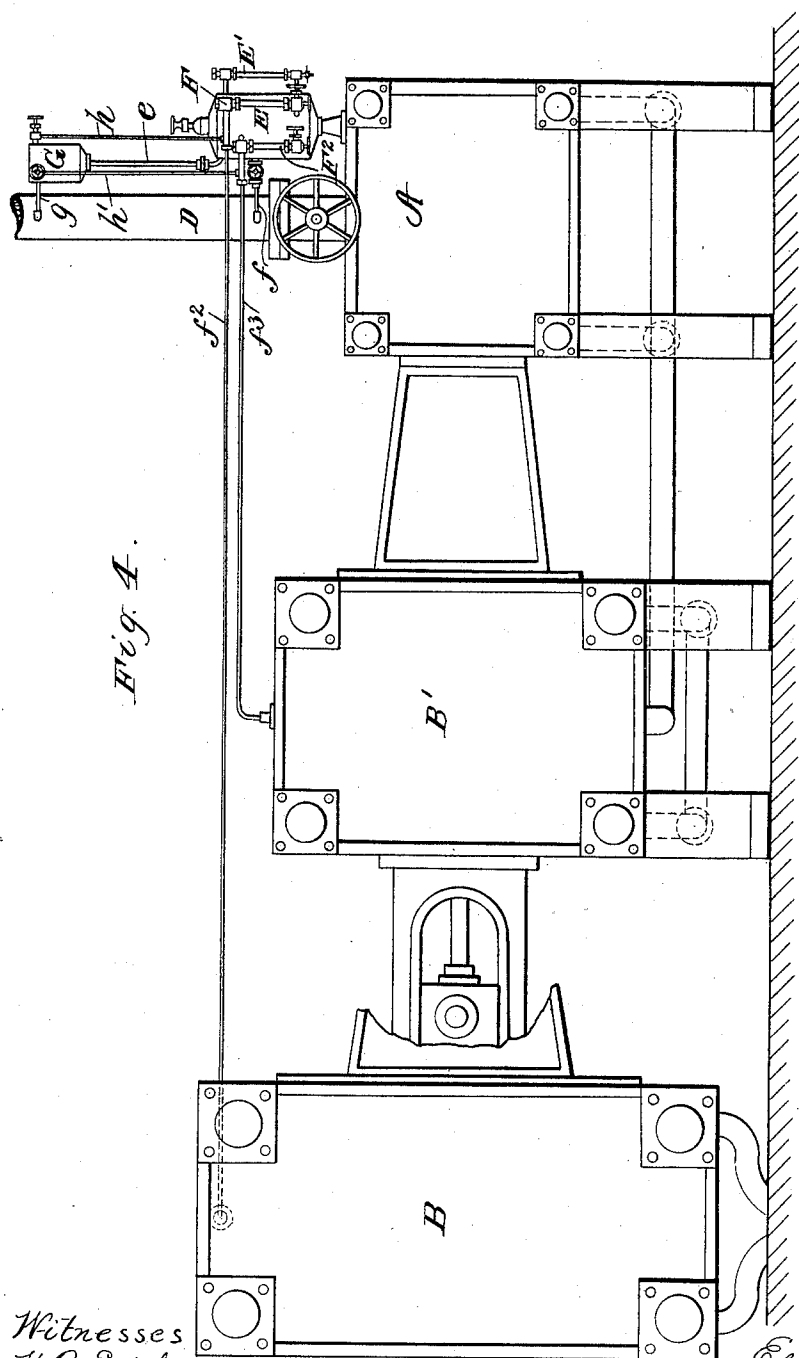
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3 Sheets—Sheet 3.



Witnesses

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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. 610,634, dated September 13, 1898.

Application filed March 2, 1898. Serial No. 672,277. (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 improvement is fully set forth in the following specification.

My present invention has reference to lubricators, and particularly to lubricators operating upon the principle of condensation displacement for feeding oil to the several cylinders of a multiple-expansion steam-engine through pipes leading thereto. In such lubricators it is necessary to provide means for propelling the oil through the pipe or pipes leading into the intermediate or low pressure cylinder or cylinders, into which pipe or pipes the oil passes from the sight-feeds. Such means is, however, not necessary in connection with the pipe or passage from the sight-feed for the high-pressure cylinder into the main steam-pipe, as the suction created by the passage of steam through the latter is sufficient to draw the oil through said pipe or passage into the main steam-pipe, whereby it passes into the high-pressure cylinder.

With the above-indicated object in view it has been customary to utilize a jet of steam taken from the main steam-pipe through a tube or passage which branches to the several pipes for conveying oil to the respective cylinders. In practical use, however, it has been found that this arrangement does not operate, as intended, to feed oil in proper proportion (regulated by the valves at the lower ends of the sight-feeds) to the several cylinders, but that a very serious difficulty and defect exists in that the lubricant instead of passing in said proper proportion to the respective cylinders practically all passes to the low-pressure cylinder, leaving the high and intermediate pressure cylinders unlubricated and necessitating the use of ordinary hand-pumps for supplying the requisite quantity of lubricant to the latter or entailing the expense of a separate sight-feed lubricator for each cylinder. This heretofore-unexplained defect in the operation of such devices I have found to be due to the fact that the steam passing through the tube which communicates with the main steam-pipe in-

stead of dividing into the branches leading to the high and intermediate pressure cylinders (in the case of a triple-expansion engine, for example) will all pass through the pipe leading to the low-pressure cylinder, as this pipe offers the path of least resistance. The result is that the oil in the pipes extending to the high and intermediate pressure cylinders is all drawn into the pipe leading to the low-pressure cylinder. The object of my present invention is to overcome this defect and to provide means whereby the proper quantity of oil will be fed to each cylinder irrespective of the difference in pressure between the several cylinders. This is accomplished by providing independent steam-supply passages for the pipes conveying oil from the sight-feeds of the low and intermediate pressure cylinders, communicating with the main steam-pipe at any suitable point or points a sufficient distance above the entrance thereto of the passage conducting oil for the high-pressure cylinder so that such oil in atomized form could not possibly be drawn upwardly in the main steam-pipe and pass into the auxiliary steam-pipe and thence to the low-pressure cylinder. By the arrangement above indicated it will be observed that branches from a common auxiliary steam-pipe to the pipes leading, respectively, to the low and intermediate pressure cylinders are avoided, and hence such defective operation as hereinbefore described is rendered impossible.

I have found it convenient and advantageous in practice to arrange the independent auxiliary steam pipe or pipes vertically, connecting them at their lower ends to the oil-supply pipe or pipes, respectively, for conducting the oil from the top of the sight-feed or sight-feeds to the intermediate or low pressure cylinders and at their upper ends leading them into the upper end of the condensing-chamber, the latter being arranged at the upper extremity of the hydrostatic column, as herein shown, (and as more fully described and claimed in my application filed December 4, 1896, Serial No. 614,443,) from which the water is fed to displace the oil in the reservoir; but any other suitable arrange-

ment may be employed. For example, the independent auxiliary steam-pipes may each be separately tapped into the main steam-pipe at suitable elevation above the inlet to the latter for the oil which passes to the high-pressure cylinder.

My invention will be more fully understood by reference to the accompanying drawings, wherein—

Figure 1 is a side elevation of a horizontal compound engine having my invention applied thereto. Fig. 2 is an enlarged side elevation of the lubricator and main steam-pipe, parts being in section. Fig. 3 is a horizontal section on line *xx*, Fig. 2; and Fig. 4 is a view similar to Fig. 1 of a triple-expansion engine.

Referring to Figs. 1 to 3 of the drawings, A represents the high-pressure cylinder, and B the low-pressure cylinder.

C is the steam-chamber, into which steam passes by an opening *c* from the high-pressure cylinder through a pipe. (Not shown.) D is the main steam-pipe from the boiler, passing downwardly through said steam-chamber, where it acts as a superheater for steam passing through the latter into the high-pressure cylinder.

c' is the steam-exit from the chamber C into the low-pressure cylinder.

E is the oil-reservoir of a double-connection condensation-displacement lubricator, which may be of any suitable well-known construction, provided with a gage-glass E' and sight-feeds F F' for the high and low pressure cylinders, respectively, said sight-feeds connecting with oil-exit pipe *k* in the reservoir.

e is the condenser-tube, leading into the oil-reservoir from the bottom of the condenser G, located at the upper end of said tube and communicating with the main steam-pipe through a support-arm *g*.

The parts of the apparatus as thus far described may be of any suitable well-known construction and constitute no part of my present invention.

From the upper end of the sight-feed F the oil fed through the latter is conveyed through support-arm *f* to the main steam-pipe, down which it is carried to the high-pressure cylinder, the passage through pipe *f* being controlled by a valve *f'*. *f*² is another pipe by which oil fed through the sight-feed F' is conveyed to the low-pressure cylinder through passage *c'*, into which said pipe *f*² leads.

h is an independent auxiliary steam-pipe leading into pipe *f*² at its lower end at a point near the sight-feed and at its upper end connected into the upper part of condenser G above the level of support-arm *g*, so that any overflow of water of condensation will pass through said arm and down the main steam-pipe and not down pipe *h*.

An important advantage gained by tapping the auxiliary steam-pipes *h* into the upper part of the condensing-chamber is that the

latter affords an area of surface which will readily accommodate a large number of such pipes when the lubricator is used in connection with engines having many expansion-cylinders, at the same time dispensing with many joints and connections which would be necessary in case such auxiliary pipes were separately tapped into the main steam-pipe or into the pipe leading into the top of the condenser from said main steam-pipe. It also affords a construction which can be readily applied to lubricators of this general character now in use by a mere substitution of parts and at comparatively slight expense.

The operation of my improved lubricator is as follows: The water admitted beneath the oil from the hydrostatic column formed in the condenser-pipe *e* and condenser G displaces oil in the reservoir E, causing the same to be fed in drops upwardly through the sight-feed glasses F F' (the rapidity of such feed being controlled by adjustment of the valves admitting oil to the sight-feeds) and into the pipes *f* and *f*², where it immediately becomes atomized or vaporized by the steam in said pipes. From the support-arm *f* the vaporized oil is drawn into the main steam-pipe by reason of a slight suction due to the passage of steam therethrough into the high-pressure cylinder. In the pipe *f*² the vaporized oil is propelled along to the low-pressure cylinder by the jet of steam passing into and through said pipe from independent steam-pipe *h*. There being no possible way in which the vaporized oil in the pipe *f* could pass into the pipe *f*² and to the low-pressure cylinder, the high-pressure cylinder receives its proper proportion of the lubricant.

When applied to triple-expansion engines, as shown in Fig. 4, a second independent steam-pipe *h'* will connect from the upper part of the condenser G into the oil-feed pipe *f*³, leading from the sight-feed F² (corresponding to the intermediate cylinder) to the intermediate-pressure cylinder B', the possibility of all the oil feeding to the low-pressure cylinder (as occurs in the lubricators of this type now ordinarily employed) being avoided by the arrangement of the auxiliary steam-pipes above described.

Among the features of construction which are particularly to be observed are, first, that the hydrostatic column is not tapped, as in many old constructions, and which diminishes the effectiveness of the column, and, second, that the low and high or intermediate pressure oil-supply pipes do not go through the same support-arm, as in old constructions, the effect of which is, as already pointed out, to establish a communication between these two pipes, with the result that all or far the greater part of the lubricant goes to the low-pressure cylinder.

While for purpose of economy and convenience of construction it is desirable to connect the independent auxiliary steam-pipe (or pipes) at its upper end to the condensing-

chamber, said pipe could with equally as good operative results be tapped into the main steam-pipe at any convenient point above the pipe *f*. Such and many other deviations from the precise construction illustrated and described will be understood to be fully within the scope and principle of my invention.

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

1. In a condensation-displacement lubricator for multiple-expansion engines, the combination with the sight-feed tubes, of pipes or passages leading therefrom to the high and low pressure cylinders, respectively, and an auxiliary steam-pipe leading at its lower end into the pipe or passage from the sight-feed to the lower-pressure cylinder, and independent of the pipe leading to the high-pressure cylinder and at its upper end communicating with the main steam-pipe at a suitable point, substantially as described.

2. In a condensation-displacement lubricator for multiple-expansion engines, the combination with the sight-feed tubes each having an independent connection with the oil-reservoir, of pipes leading therefrom to the high and low pressure cylinders, respectively, and an auxiliary steam-pipe leading at its lower end into the pipe from the sight-feed to the lower-pressure cylinder, and independent of the pipe leading to the high-pressure cylinder and at its upper end communicating with the main steam-pipe at a suitable point, substantially as described.

3. In a condensation-displacement lubricator for multiple-expansion engines, the combination with the sight-feed tubes, of independent pipes leading therefrom to the main steam-pipe and to the intermediate and low pressure cylinders, respectively, and independent auxiliary steam-pipes, one for each of the pipes leading to the intermediate and low pressure cylinders, connecting with said pipes at their lower ends and at their upper ends communicating with the main steam-pipe at any suitable point above the point of

introduction thereof into the oil for the high-pressure cylinder, substantially as described.

4. In a lubricator for multiple-expansion engines, the combination with the oil-feed passage into the main steam-pipe for the lubricant for the high-pressure cylinder, and an oil-feed pipe leading to each of the other cylinders, of an independent auxiliary steam pipe or pipes, one for each of said last-named feed-pipes, which auxiliary pipes communicate at the upper end with the main steam-pipe at a suitable point, and at their lower ends lead into the respective feed-pipes, substantially as described.

5. In a condensation-displacement lubricator for multiple-expansion engines, the combination with the sight-feed tubes, of feed-pipes, one for conveying oil into the main steam-pipe for the high-pressure cylinder, and another for conveying oil from the other sight-feed to the low-pressure cylinder, and a pipe for the water of condensation leading upwardly from the oil-reservoir into the bottom of a condensing-chamber connected with the main steam-pipe, and an auxiliary steam-pipe connecting at its upper end into the upper part of the condensing-chamber and at its lower end into the oil-feed pipe to the low-pressure cylinder and independent of the oil-feed pipe to the high-pressure cylinder, substantially as described.

6. In a condensation-displacement lubricator for multiple-expansion engines, the combination with two cylinders of different pressures, of an oil-reservoir, two independent oil-feed pipes for conducting oil from the reservoir to said cylinders respectively, and two independent auxiliary steam-pipes communicating with said oil-feed pipes, respectively, 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.