

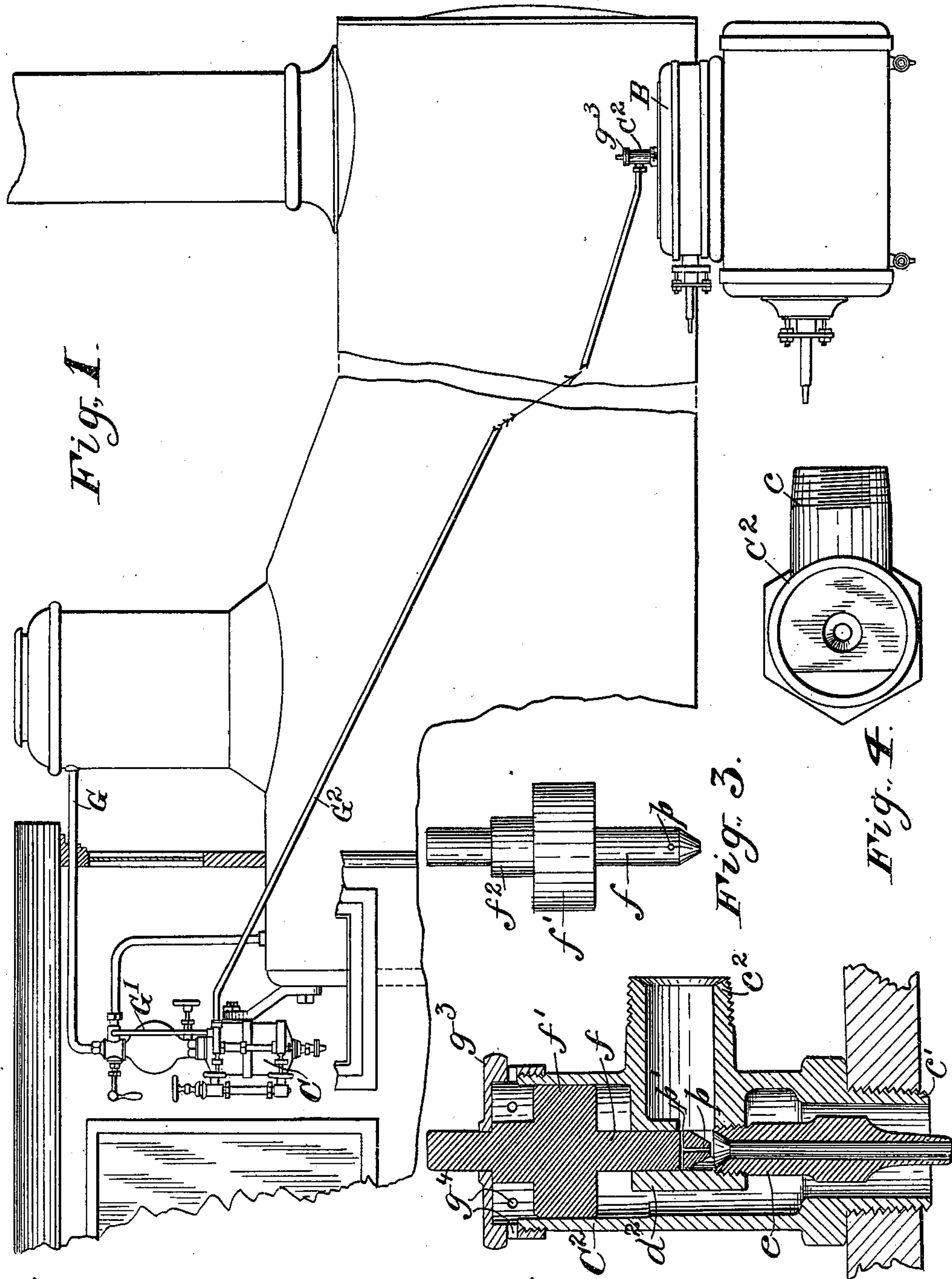
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Patented June 27, 1899.

E. McCOY.
LUBRICATOR.

(Application filed Nov. 19, 1898.)

(No Model.)



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. 627,623, dated June 27, 1899.

Application filed November 19, 1898. Serial No. 696,853. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH MCCOY, a citizen of the United States of America, and a resident of the city of Detroit, State of Michigan, have invented a new and useful Improvement in Lubricators, which invention is fully set forth in the following specification.

The present invention relates to automatic displacement-lubricators, and more particularly to locomotive-lubricators; and its objects are to insure the regular delivery of lubricant to the working parts within the cylinder in quantity varying proportionately with the speed of the engine and to secure other advantageous results, as will be hereinafter explained.

The operation of the ordinary displacement-lubricator is such that without a special controlling device the amount of lubricant delivered through the tallow-pipe is as great or greater when the locomotive is standing as when running and is the same at all speeds, which results in a lack of economy in the use of the lubricant. Furthermore, should the engineer forget (as sometimes occurs) to shut off the lubricator when the locomotive is stopped the pressure of the steam coming from the boiler through the equalizer and tallow pipes may be sufficient to move the piston and start the engine.

The present invention comprises what will be termed an "automatic choke-plug," which is connected with the tallow-pipe and controls or regulates the delivery of the lubricant to the parts to be lubricated. The choke-plug is directly in the oil-passage and is adapted to pulsate in unison with the movements of the main slide-valve in the cylinder, being moved in one direction by the pulsations of pressure in the steam-chest due to the opening and closing of the ports to the main cylinder as the slide-valve passes over the same and in the other by atmospheric pressure assisted, if need be, by gravity. The pulsation of the choke-plug continues while the engine is drifting or working a vacuum, but ceases when the engine is at rest, during which time the plug remains closed. When at rest, however, a small circulating-passage remains by way of a restricted opening through the plug, this passage being just

sufficient to drain the pipe and prevent accumulation of water of condensation.

The choke-plug operates most effectively at the discharge end of the tallow-pipe—that is, on top of the steam-chest—and this arrangement is specially claimed.

Other specific advantages of the present invention can be best explained in connection with the accompanying drawings, which form part of this specification, and in which—

Figure 1 is an elevation of part of a locomotive, showing the improved choke-plug attached thereto. Fig. 2 is a vertical sectional view through the automatic choke-plug. Fig. 3 is an elevation of the valve stem or plug and its piston; and Fig. 4 is a top view of Fig. 2, the cap being removed from the casing.

The lubricator C illustrated in the drawings is like that shown in my Patent No. 611,759, dated October 4, 1898, having over-pressure-pipes G^1 , only one of which is shown in Fig. 1 of the drawings, and tallow-pipes G^2 , one of which is shown leading to the top of one of the steam-chests B.

C^2 represents the casing of the improved automatic choke-plug, having thereon two screw-threaded connections, one, c , for the tallow-pipe G^2 , and the other, c' , for engagement with a screw-threaded opening through the top of the steam-chest. The opening through connection c is closed at its inner end by wall d^2 , cast integral with the casing C^2 and having an opening through the bottom thereof, in which the upper end of a small tube or neck e is screw-threaded, said tube extending downwardly into the steam-chest through the casing C^2 .

f is the choke-plug, having a conically-shaped lower extremity which is adapted to fit a corresponding seat in the upper end of nozzle or tube e , said stem being adapted to reciprocate in bearings through the top of wall d^2 and through cap g^3 , which is screw-threaded onto the upper end of casing c^2 . On stem f , between the wall d^2 and cap g^3 , is a piston f , preferably cast integral with said plug and of considerable weight. Above the piston is a shoulder f^2 , adapted to make contact with the underside of cap g^3 to limit the upward stroke of the choke-plug and piston. Opening g^4 through the cap g^3 puts the upper

side of the piston in communication with the atmosphere. Through its lower conical end plug f has a central vertical perforation p , intersected by lateral perforations p' . The motion of the plug is so limited that these perforations are always in communication with the tallow-pipe. When the piston is raised, the circulation tends to clear these perforations of any sediment that may collect therein.

The operation of the device is as follows: The steam and oil in a vaporized condition pass freely into and through the tallow-pipe G^2 until they come to the choke-plug. The tallow-pipe G^2 being of comparatively large cross-sectional area and there being no contraction or restriction thereof between the inlet for the jet of overpressure-steam and the choke-plug, there is secured at the latter not only the full pressure of the steam, but in addition the pressure due to the displacement in the lubricator. When the locomotive is at rest and the throttle-valve closed, the supply of steam to the steam-chest B being cut off, the weight of piston f , assisted by the atmospheric pressure against the upper side thereof through openings g^4 of cap g^3 , closes the choke-plug f against its seat in the upper end of nozzle e . There is still, however, a small circulation through the tallow-pipe G^2 by way of perforations p p' , nozzle e , steam-chest B, to the atmosphere, said circulation being sufficient to carry off the water of condensation that would otherwise accumulate in the tallow-pipe. Such accumulated water would freeze in cold weather, and under any condition would interfere with the operation of the parts in starting the engine. It also tends to hold the plug to its seat by reason of the pressure in the openings p p' . Moreover, when the plug is thus closed it is impossible for an amount of overpressure to pass into the steam-chest and cylinder sufficient to move the piston and start the engine. When the throttle-valve is open and the locomotive running, the pulsations or fluctuations of the pressure in the steam-chest B with every stroke of the main piston and slide-valve produce corresponding pulsations of pressure in the casing C^2 under the piston f' , causing the latter to rise and fall with every stroke of the valve in the steam-chest. When piston f' rises, it lifts choke-plug f from its seat and the overpressure in the tallow-pipe G^2 and connection c , both of large sectional area, being concentrated at the upper end of the smaller opening through nozzle e , the oil in a vaporized condition will be delivered into the steam-chest against any back pressure therein that may be exerted at the delivery end of nozzle e . It will also be seen that the back pressure coming from the steam-chest concentrates under and exerts its pressure to lift the piston f' , and with it plug f , from its seat rather than to impede the delivery of oil through the tube or nozzle e . As the locomotive runs faster and the reciprocations of the piston become more rapid there is a cor-

responding increase of rapidity in the pulsations of the piston f' , and plug f causes an increased feed of lubricant. When the throttle-valve is closed and the locomotive "drifting," in which case the piston acts as an air-pump, the choke-plug is reciprocated and the proper quantity of lubricant delivered to the parts, as when steam is used.

The location of the device on the steam-chest when used with a locomotive-lubricator is important for the reason that the delivery of the oil from the tallow-pipe thus takes place directly at the point where it is to be consumed rather than at a point in the tallow-pipe in close proximity to the lubricator, in which case the lubricant has to be fed against the back pressure from the cylinder extending up into the tallow-pipe for practically the entire length thereof, which is the case with most devices that have heretofore been made for this purpose.

Another important feature of the invention is that by observing the projecting end of plug the engineer can see whether the same is reciprocating during the running of the locomotive, and thereby ascertain whether the device is working properly. Also when the engine is standing still and the engineer is oiling up or looking over his charge he can by catching hold of the projecting end of the plug lift the same and assure himself that it is not stuck to its seat and so in operative condition. By removing the cap the plug and piston may be readily removed and access had to the interior of the device.

It will be observed that there is at all times by way of pipes G , G' , and G^2 a free and unobstructed passage for steam from the boiler to the connection and (when plug f is lifted) from said connection to delivery-nozzle e . The automatic choke-plug being located directly in this passage serves to control effectually the feed of lubricant.

It will be understood that the use of this device is not limited to locomotives, or even to steam-engines generally. It may, for example, be advantageously applied to air-pumps, wherein the same pulsating action occurs as in the cylinder of the engine.

What I claim is—

1. The combination with a steam-chest and a tallow-pipe for conducting lubricant thereto, a choke-plug or valve controlling the delivery of lubricant from the latter pipe into the steam-chest, and means for operating said plug, said means being exposed to the pressure in the steam-chest through a passage independent of or separate from the oil-feed passage and adapted to be actuated by pulsations of said pressure due to the opening and closing of the ports leading from the steam-chest to the main cylinder by the reciprocation of the slide-valve thereover, substantially as described.

2. An automatic choke-plug or valve for a tallow-pipe comprising an oil-passage having a valve-seat at its upper end, a reciprocatory

plug for closing and opening said passage, a piston for operating said plug exposed to back pressure from the cylinder through a passage independent of or separate from the oil-passage, and a passage for connection with the tallow-pipe, said passage entering the plug-casing at the side of said plug, substantially as described.

3. The combination with the steam-chest of a locomotive, of a tallow-pipe for conducting lubricant to be delivered thereto, a nozzle through which the tallow-pipe communicates with the steam-chest, a choke-plug for the nozzle having a perforation through which a circulation is established from the tallow-pipe, through the nozzle and steam-chest when the locomotive is stopped, and a piston connected to the choke-plug and exposed to back pressure in the steam-chest, whereby the pulsations of pressure in the latter reciprocate the choke-plug to open and close the nozzle for feeding oil to the parts when the locomotive is running, substantially as described.

4. The combination with the steam-chest of a locomotive, of a tallow-pipe for conducting lubricant to the point of delivery, a nozzle through which the tallow-pipe communicates with the steam-chest, having an opening of smaller sectional area than that through the tallow-pipe, a choke-plug controlling the passage through the delivery-nozzle, and a piston exposed to the back pressure in the steam-chest through an opening of larger sectional area than that of the delivery-nozzle, substantially as described.

5. A choke-plug or valve consisting of a vertically-reciprocatory stem, seated at its

lower end in the oil-delivery passage, and having a perforation through which a circulation may be established when the parts are at rest, such circulation tending to hold the plug to its seat, and a piston for reciprocating the plug to lift it from its seat to deliver the lubricant when the parts are in operation, as set forth.

6. A choke-plug or valve for delivering oil from the tallow-pipe of a locomotive to the steam-chest thereof, consisting of a vertically-reciprocating stem seated at its lower end in the oil-delivery passage, and at its upper end projecting from its inclosing casing, and a piston for reciprocating said stem to lift it from its seat, said piston being exposed to the back pressure in the steam-chest, substantially as described.

7. The combination with the tallow-pipe and the lubricator adapted to feed oil in regulated quantity into one end of the tallow-pipe, of the steam-supply pipes forming with said tallow-pipe an unobstructed passage from the boiler to the steam-chest for conducting to the latter oil and steam in an atomized condition, and an automatic delivery-controlling device for delivering oil from the tallow-pipe into the steam-chest operated by pressure from the steam-chest through connections independent of said tallow-pipe.

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

ELIJAH MCCOY.

Witnesses:

REEVE LEWIS,
W. R. EDELEN.