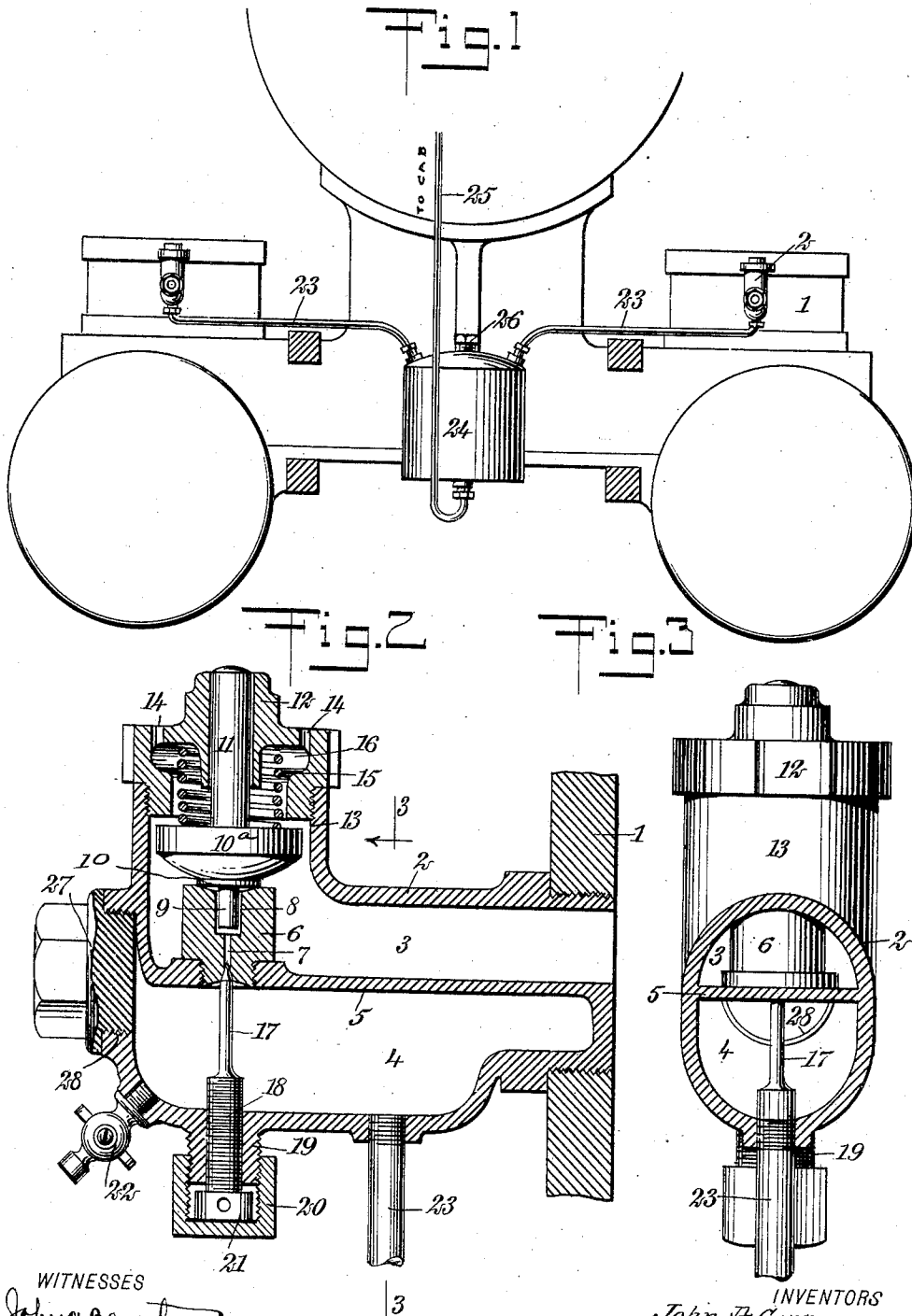


J. A. COPPERS & E. E. BOOTH.
LUBRICATOR.
APPLICATION FILED NOV. 27, 1908.

976,637.

Patented Nov. 22, 1910.



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JOHN ANDREW COPPERS AND ELDREDGE EARLY BOOTH, OF DENISON, TEXAS.

LUBRICATOR.

976,637.

Specification of Letters Patent. **Patented Nov. 22, 1910.**

Application filed November 27, 1908. Serial No. 464,761.

To all whom it may concern:

Be it known that we, JOHN A. COPPERS and ELDREDGE E. BOOTH, citizens of the United States, and residents of Denison, in the county of Grayson and State of Texas, have invented new and useful Improvements in Lubricators, of which the following is a full, clear, and exact description.

Our invention relates to lubricators and it has for its object to provide a lubricator for locomotives and for steam engines, which may be attached to the steam chest of the engine, with a communication between the steam chest and a chamber of the lubricator, and a communication between the said chamber and a second chamber disposed thereunder, there being means to command the communication between the two chambers.

Another object of the invention is to provide a communication between the upper chamber and the atmosphere, with means to command the said communication, the said means being adapted to close the said communication at the same time the communication between the two chambers is opened.

Still another object of the invention is to provide a storage tank having communication with the lower chamber of the lubricator, the communication at the storage tank being below the communication at the lower chamber, there being another communication leading to the storage tank by which steam may be admitted thereto.

Still other objects of the invention will appear in the following complete description.

In this specification, we will describe the preferred form of our invention, but we do not limit ourselves thereto, as we consider ourselves entitled to all forms and embodiments of the invention which may be held to fall within the scope of the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, in which—

Figure 1 is a front elevation of parts of a locomotive showing my lubricator applied thereto; Fig. 2 is an enlarged sectional side elevation of the lubricator; and Fig. 3 is a sectional view of the lubricator on the line 3—3 of Fig. 2.

By referring to the drawings, it will be

seen that our lubricator is attached to a steam-chest 1 of a locomotive, and, as shown in the drawings, the lubricator 2 is attached to the forward end of the locomotive, but it will be understood that if desired the lubricator may be secured to other parts of the steam chest. The lubricator 2 is divided horizontally into an upper steam chamber 3 and a chamber 4 for the lubricant. The chamber 3 is open at one end, so that it will have communication with the steam chest 1. A wall 5, between the chambers 3 and 4, has an opening therein and in this opening there is screwed or otherwise secured a valve member 6, having a vertical orifice 7 therein, affording communication between the chambers 3 and 4, the orifice 7 being of a greater diameter from the middle of the valve member upwardly than downwardly. In the portion 8 of the orifice which is of the greater diameter, is disposed a stud 9, which is secured to a valve 10, mounted on a valve stem 11. The valve stem 11 projects upwardly through an opening in a nut 12, which is adapted to be screwed down into an upwardly extending portion 13 of the lubricator 2. The nut 12 has orifices 14, by means of which communication is afforded between the chamber 3 and the atmosphere. The lower portion of the nut 12 forms a seat for the collar 10^a which serves as a valve, so that when the collar 10^a is resting against the lower portion of the nut 12, the communication between the chamber 3 and the atmosphere is cut off. The valve 10 has a lower surface which is adapted to close communication between the chambers 3 and 4. A spring 15 is disposed in a hollow portion 16 of the nut, the spring being adapted to press down on the collar 10^a to keep the communication between the chamber 3 and the atmosphere open, and the communication between the chambers 3 and 4 closed. Extending upwardly into the orifice 7 is a needle feed 17 having a point at its upper end. The needle feed has a screw portion 18 which screws in a threaded orifice in a neck 19 in the bottom of the lubricator 2, a cap 20 being provided, which has screw connection with the neck 19, by means of which the needle feed may be protected and be prevented from getting out of adjustment. When it is desired to regulate the feed the cap 20 is removed and the needle feed is screwed upwardly or downwardly as may be desired. A drain-cock 22 is connected

with the lower chamber 4 of the lubricator, and there is connected to this lower chamber 4, preferably at its bottom, a pipe 23, which if desired may communicate with a storage tank 24. This storage tank 24 should preferably be disposed below the plane of the bottom of the lubricator and the pipe 23 should connect with the storage tank 24 at its top. A pipe 25 is provided, said pipe connecting with the storage tank 24 near its base and being provided to supply water of condensation to the storage tank. An opening with a plug 26 is provided to permit of the filling of the storage tank 24 with grease. A plug 27 is also provided to screw in an orifice 28 in the lubricator, this orifice 28 being provided to permit of the filling of the chamber 4 with grease. Should the storage tank not be filled with grease, the steam from the pipe 25 will pass through the storage tank and through the pipe 23 to the lower chamber 4.

In the operation of our invention, the lubricator 2 is secured to a steam chest 1 with the chamber 3 in communication with the interior of the steam chest and the pipe 23 communicating with the storage tank 24. The pipe 25 leads from the steam supply to the storage tank 24 and it is commanded by a valve in the cab of the locomotive. It will therefore be understood that when grease is not deposited in the storage tank 24, the steam from the pipe 25 will pass through the storage tank 24 and on through the pipe 23 to the lower chamber 4, while when grease is deposited in the storage tank 24, steam will melt the grease and cause it to flow upwardly in the pipe 23 into the chamber 4.

When the engineer in the cab of the locomotive, opens the throttle, the steam enters the steam chest 1 in the customary manner and it passes into the chamber 3, when the steam pressure will raise the valve 10 from the valve member 6, by means of upward pressure against the collar 10^a around the valve 10, opening the communication between the chamber 3 and the chamber 4. As the collar is pressed upwardly by the steam pressure, it rests against the lower surface of the nut 12, thereby cutting off communication between the chamber 3 and the atmosphere through the orifices 14, and the steam will pass down around the stud 9 and down on to the needle feed 17, condensing and passing into the chamber 4. As the collar 10^a is forced upwardly by the steam pressure in the chamber 3, it will compress the spring 15, the function of which is to hold the valve 10 yieldingly against the valve member 6 and away from the lower surface of the nut 12. As the condensed steam enters the chamber 4, it will melt the grease in the said chamber, which grease will float on the condensed steam, and as the con-

densed steam continues to pass through the orifice 7, it will take the place of the grease in the chamber 4, which will flow upwardly and pass through the orifice 7 in the valve member 6, out through the top of the valve member and into the chamber 3, which, as has been stated, is in communication with the steam chest 1 of the engine, the lubricant becoming mixed with the steam and passing into the valves in the steam chest. The harder the engine is driven, the faster will the steam descend in the orifice 7 in the valve member 6, and the faster will the grease melt in the chamber 4 and pass upwardly into the chamber 3. Should it be desired to increase temporarily the feed of the lubricant to the valves in the steam chest, steam may be admitted into the pipe 23, which will more rapidly melt the grease in the said chamber and will force it upwardly through the orifice 7 into the chamber 3. When the storage tank 24 is used and when it is desired to increase the amount of lubricant fed to the valves, steam is admitted in the pipe 25, which melts the grease in the storage tank 24 and which causes it to flow upwardly through the pipe 23 into the chamber 4, accomplishing the purpose desired. By means of the construction of the valve 10, and the collar 10^a with the spring 15 connected therewith, the chamber 3 is in communication with the atmosphere when the throttle is closed and no steam is being admitted to the steam chest. This permits the engine to run freely after the throttle has been closed, and it also prevents the starting of the engine because of a leaky throttle valve, inasmuch as the steam which passes through an ordinarily leaky throttle valve would not be sufficient to raise the valve 10 and cut off the communication between the chamber 3 and the atmosphere. Our lubricator is designed to be put in the front of the steam chest in place of the ordinary relief valve, and as has been shown, our lubricator as it is constructed dispenses with the need of a relief valve.

Our lubricator is designed to use rod grease, or any other kind of hard grease, but if desired, it may be operated with the usual kind of valve oil. It is, however, preferable to use rod grease, inasmuch as it is very much cheaper than valve oil and as one pound of rod grease will do as much work as a quart of valve oil. Our lubricator has no glasses, or parts to become broken or to get out of order, and inasmuch as it works automatically it is necessary to give it little or no attention, provided the chamber 4 is kept filled with lubricant and the necessary communications are kept in condition.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. A lubricator having a chamber with an

opening, which is adapted to have communication with the steam chest of a steam engine, there being a second chamber in the lubricator, disposed below the plane of the first-mentioned chamber, adapted to contain a lubricant, there being a vertical communicating means connecting the two chambers, a valve commanding the vertical communicating means, and a member secured to the valve and disposed in the first-mentioned chamber, the member being disposed above the horizontal plane of the said opening, so that it is adapted to be raised by the inrush of steam into the first-mentioned chamber to raise the valve.

2. A lubricator having a chamber, a steam chest, there being a communication between the chamber and the steam chest, there being a second chamber in the lubricator, there being a communicating means between the two chambers, there being also a communicating means between the first-mentioned chamber and the atmosphere, valves commanding the two communicating means, the said valves being adapted to open the first communicating means as the second communicating means is closed and to open the second communicating means as the first communicating means is closed, one of the said communicating means being normally open, and means to hold one of the said valves yielding to the pressure of steam in the first-mentioned chamber by which its position is altered by the increase or decrease of steam pressure beyond a certain degree.

3. A lubricator having an upwardly-extending portion, there being two chambers in the lubricator, one disposed over the other, the upper chamber extending into the upwardly-disposed portion of the lubricator and being adapted to have communication with the steam chest of a steam engine, there being a communicating means between the two chambers, there being also a communicating means between the upper chamber and the atmosphere through the upwardly-extending portion of the lubricator, two valves secured together, one commanding each of the two communicating means, adapted to open the first communicating means as the second communicating means is closed and to open the second communicating means as the first communicating means is closed, the valve commanding the second-mentioned communicating means having its under surface exposed to the steam pressure in the upper chamber, adapting the said valve to be raised by the rush of steam into the upwardly-extending portion of the lubricator and out of the second-mentioned communicating means.

4. A lubricator having two chambers, one of the two chambers being adapted to have

communication with the steam chest of a steam engine and there being a communication between the two chambers, there being a communication independent of the other communications between one of the chambers and the atmosphere, two valve members adapted one to command the communication with the atmosphere, the other to command the communication between the two chambers, means connecting the two valve members, by which they are adapted to be operated together, a needle feed which projects into the communication between the two chambers, and means by which the position of the needle feed may be regulated.

5. A lubricator having a chamber, a steam chest, there being a communication between the chamber and the steam chest which is normally open, there being a second chamber in the lubricator, there being a communicating means between the two chambers, there being also a communicating means between the first-mentioned chamber and the atmosphere, automatic means for commanding the two communicating means, the said automatic means being adapted to open one communicating means as the other is closed, and means to hold yielding to the automatic means with the communicating means between the first-mentioned chamber and the atmosphere open.

6. A lubricator having a chamber, a steam chest, there being a communication between the chamber and the steam chest, there being a second chamber in the lubricator, there being a communicating means between the two chambers, there being a communicating means between the first-mentioned chamber and the atmosphere, means for commanding the two communicating means, which is adapted to open one communicating means as the other is closed, and a needle feed disposed in the communicating means between the two chambers.

7. A lubricator having a chamber, a steam chest, there being a communication between the chamber and the steam chest, there being a second chamber in the lubricator, there being a communicating means between the two chambers, there being a communicating means between the first-mentioned chamber and the atmosphere, valves for commanding the two communicating means, the said valves being adapted to open one communicating means as the other is closed, a member connected with the valves having a surface exposed to the pressure of the steam by which its position is altered by an increase or decrease of the steam pressure beyond a certain degree, and a needle feed disposed in the communicating means between the two chambers.

8. A lubricator having a chamber, a steam chest, there being a communication between the chamber and the steam chest, there be-

ing a second chamber in the lubricator, there being a communicating means between the two chambers, there being also a communicating means between the first-mentioned chamber and the atmosphere, valves for commanding the two communicating means, the said valves being adapted to open one communicating means as the other is closed, means to hold yieldingly the valves in a position to keep open the communicating means between the first-mentioned chamber and the atmosphere, and a needle feed disposed in the communicating means between the two chambers.

9. A lubricator having a chamber which is adapted to have communication with the steam chest of a steam engine, there being a second chamber in the lubricator, disposed below the plane of the first-mentioned chamber there being a communicating means between the two chambers, a valve commanding the communicating means, the valve having a stud which projects into the communicating means at one end, means by which the valve may be operated, and a needle feed which projects into the other end of the communicating means between the said chambers.

10. A lubricator having a chamber which is adapted to have communication with the steam chest of a steam engine, there being a second chamber in the lubricator, there being a communicating means between the two chambers, a valve commanding the communicating means, means for holding the valve yieldingly in one position, means which are adapted to be operated by steam in the first-mentioned chamber to move the valve, a storage tank, a communicating means between the second-mentioned chamber and the storage tank, and means adapted for supplying the storage tank with steam.

11. A lubricator having a chamber, a steam chest, there being a communication between the chamber and the steam chest, there being a second chamber in the lubricator, there being a communicating means between the two chambers, a valve commanding the communicating means between the two chambers, a collar on the valve stem of the valve by which the valve may be lifted from its seat by the pressure of the steam in the first-mentioned chamber, a storage tank, which is disposed below the plane of the second-mentioned chamber, a communicating means between the second-mentioned chamber and the storage tank, and means for supplying the storage tank with steam.

12. A lubricator having a chamber which is adapted to have communication with the steam chest of a steam engine, there being a second chamber in the lubricator disposed below the plane of the first-mentioned chamber, there being a communicating means be-

tween the two chambers, means for automatically commanding the said communicating means, and means independent of the communicating means between the two chambers for supplying the second-mentioned chamber with a fluid.

13. A lubricator having a chamber, a steam chest, there being a communication between the chamber and the steam chest, there being a second chamber in the lubricator, there being a communicating means between the two chambers, a valve commanding the communicating means between the two chambers, a collar on the valve stem of the valve by which the valve may be moved from its seat by means of the pressure of the steam in the first-mentioned chamber, and a communicating means independent of the communicating means between the two chambers adapted for supplying the second-mentioned chamber with steam.

14. A lubricator having a chamber which is adapted to have communication with a steam chest, there being a second chamber in the lubricator, there being a communicating means between the two chambers, there being a communicating means between the first-mentioned chamber and the atmosphere, means for commanding the two communicating means, which is adapted to open one communicating means as the other is closed, and a communicating means independent of the communicating means between the two chambers adapted for supplying the second-mentioned chamber with steam.

15. A lubricator having a chamber, a steam chest, there being a communication between the chamber and the steam chest, there being a second chamber in the lubricator disposed below the first-mentioned chamber and adapted to contain a lubricant, there being a communicating means between the two chambers, there being also a communicating means between the first-mentioned chamber and the atmosphere, valves for commanding the two communicating means, the said valves being adapted to open one communicating means as the other is closed, and means to hold one of the said valves yieldingly extended in the first chamber, the said valve having a surface exposed to the pressure of steam in the first-mentioned chamber by which its position is altered by an increase or decrease of steam pressure.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN ANDREW COPPERS.
ELDREDGE EARLY BOOTH.

Witnesses:

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THOMAS E. REARDON.