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F. W. & R. J. GRATIOT.

LUBRICATOR.

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Fig. I.

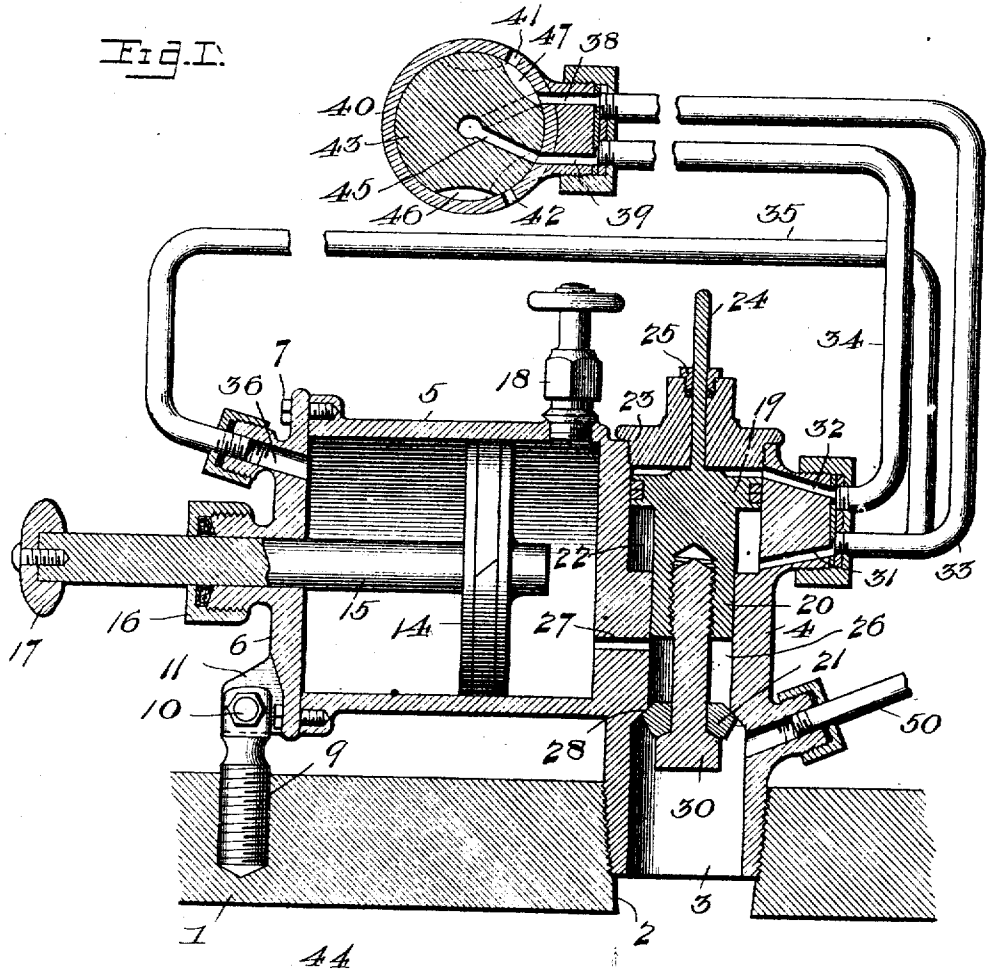
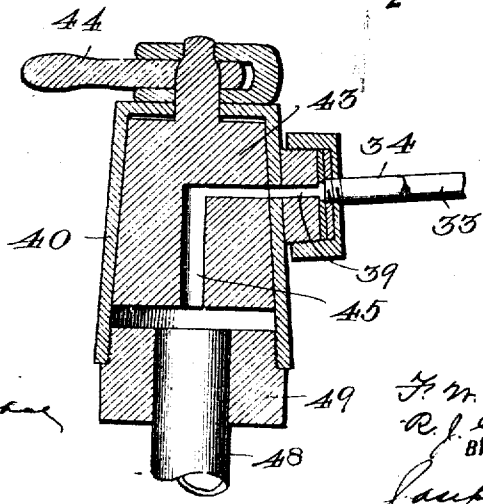


Fig. II.



WITNESSES:

J. L. Morgan

Frank J. Kerr

INVENTORS:

F. W. Gratiot

R. J. Gratiot

BY

Jasper E. Hopkins,

ATTORNEY.

UNITED STATES PATENT OFFICE.

FRED WILKINSON GRATIOT AND RENE JAMES GRATIOT, OF ARGENTA, ARKANSAS.

LUBRICATOR.

No. 829,866 Specification of Letters Patent. Patented Aug. 28, 1906.

Application filed May 12, 1904. Serial No. 207,619.

To all whom it may concern:

Be it known that we, FRED WILKINSON GRATIOT and RENE JAMES GRATIOT, of Argenta, in the county of Pulaski, State of Arkansas, have invented certain new and useful Improvements in Lubricators, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of our invention is to produce reliable and economical apparatus convenient of application and of manipulation for feeding a suitable lubricant, preferably graphite, to the working parts of a machine, and more particularly a steam-engine, the invention being regarded as especially useful in locomotive service.

In the accompanying drawings, Figure I is a central vertical longitudinal section of our apparatus, partly in elevation, also illustrating diagrammatically its operative connection with the valve mechanism by which its operation is subjected to manipulative control. Fig. II is a central vertical longitudinal section of the valve mechanism shown in horizontal section in Fig. I.

Referring to the numerals on the drawings, 1 indicates, by way of example of the wall of a chamber designed to contain live steam, the top of a locomotive steam-chest. 2 indicates an aperture therein, into which is tapped or otherwise secured the nose 3 of a valve-shell 4, with which communicates, and by preference is incorporated, a feed-cylinder 5, whose head 6 is detachably secured in place, as by a crown of bolts 7. As a convenient means of securing the shell and its appurtenances rigidly in position a screw-stud 9, bolted, as indicated at 10, to a lug 11 upon the cylinder-head 6 may be employed. Within the cylinder 5 is fitted a piston-head 14 of suitably-packed periphery, whose stem 15 projects through a stuffing-box 16 in the cylinder-head 6 and preferably terminates in a knob or handle 17, designed to afford means of manipulation through the stem 15 of the piston-head 14 as for the purpose of refilling the cylinder. The stem 15 also constitutes, as a means of determining whether the apparatus is working properly, an indicator. The cylinder is designed to contain a supply of suitable lubricant in a plastic state, a graphite paste being the material preferentially employed. 18 indicates a filling-plug that is threaded to an internally-threaded aperture in the cylinder 5, through which a supply of lubricant may be introduced from time to time as often as required. The shell 4 is suitably bored or constructed to operatively accommodate within it a valve-piston head 19, a feed cut-off or plunger 20, and a valve 21. The members 19, 20, and 21 constitute, in effect, an operative unit, which is, however, preferably divisible in order to facilitate the assembling of it within the bore of the shell 4. The valve-piston head 19, preferably made integral with the cut-off 20, is of larger diameter than the cut-off 20 in order to accommodate it to its function and fits within a chamber 22, provided for it, whose upper end is preferably closed by a screw-cap 23, through which a stem indicator 24 extends, a stuffing-box 25 being provided in the cap 23 about the stem 24.

The cut-off 20, fitting snugly within the barrel or middle portion 26 of the bore of the shell, works squarely across a duct or passage 27, which establishes communication between the interior of the cylinder 5 and the barrel 26 of the bore of the shell 4. The valve 21 is preferably a button-valve, whose seat 28 is defined in the bore of the shell 4 below the barrel 26 thereof. It is preferably, for the purposes of adjustment, secured to the end of the cut-off 20, as by a screw-bolt 30. The screw-bolt affords the means of dividing the valve 21 from the cut-off 20, whereby the valve may be introduced into the bore of the shell at one end of its barrel 26, and the cut-off, with its piston-head 19, may be introduced from the other end thereof, the two parts being united into an operative unit, as specified, after they have been introduced into place in the manner just set forth.

Our invention is designed to be subject to manipulative control through the employment of suitable fluid-pressure operating upon the respective piston-heads 14 and 19. The energy preferably employed is that of compressed air, although in practice steam may be substituted for compressed air, particularly as emergency means of actuation—as, for example, when a customary source of air-supply is temporarily cut off.

In order to adapt the apparatus above specified to the performance of the several functions required of it through the agency of compressed air, for example, we provide

in the shell 4 ports 31 and 32, with which communicate, respectively, pipes 33 and 34. From the pipe 33 proceeds a branch 35, which, as through a port 36 in the cylinder-head 6, communicates with the interior of the cylinder 5 upon the side of the piston 14 that is remote from the duct 27. It is not necessary that the pipes 33 and 35 should bear the relations to each other of a main and branch, but simply that their relative functions are such as that they may be so united. The pipe 33 communicates with the port 38, and the pipe 34 communicates with the port 39, of a suitable valve-shell 40, penetrated by vents 41 and 42, with which either of the ports 38 or 39 may be thrown, as required, into communication.

43 indicates a plug which, fitting within the shell 40, is provided with a suitable handle 44, by which it may be manually turned into one of two fixed positions. The plug is provided (compare Figs. I and II) with an air-supply passage 45 and with lateral vent-passages 46 and 47.

48 indicates a pipe communicating with a source of compressed-air supply or other source of energy. (Not illustrated.) For convenience of assembling it may be provided with a nut-head 49, to which is fitted and threaded the shell 40.

50 indicates a pipe leading from the interior of the steam-chest, as by direct communication with the shell 4 below the valve 21, to locomotive-lubricator. (Not illustrated.) The pipe 50 is merely intended to indicate means by which lubricant-laden steam may be conveyed for use from one point to another.

The operation of our apparatus may be described as follows: The normal position of the valve 21 is the closed position illustrated in Fig. I of the drawings. In that position the plug 43 occupies the position shown in dotted lines in Fig. I of the drawings, wherein compressed air or other fluid pressure is kept supplied to the pipe 33 and its branch 35. The pressure from the pipe 33 entering the chamber 22 through the port 31 forces the piston-head 19 toward the top of the chamber 22, thereby effectually forcing the valve 21 against its seat 28. At the same time pressure from the pipe 35 entering the interior of the cylinder 5 against the piston-head 14 drives it toward the end of its cylinder, through which the duct 27 establishes communication between it and the barrel 26 of the bore of the shell 4. In consequence of the correlations of the valve 21, piston-head 14, their shell and cylinder, respectively, the effect of air-pressure communicated in the manner we have last described is to keep the barrel 26 filled with a constant supply of plastic lubricant or graphite paste. A determinate quantity of lubricant is positively isolated and kept packed within the barrel by the force applied against the piston-head 14, its escape therefrom being prevented through engagement of the valve 21 with its seat 28 and its discharge, as required, being effected through movement of the cut-off 20. The lubricant isolated within the shell constitutes a charge of determinate quantity which after it is isolated by the filling of the space provided for it within the barrel is thereafter neither increased nor diminished in the process of delivering it for service, but when once isolated is kept isolated until its final discharge from the lubricator. The necessity for maintaining pressure at the same time within the pipes 33 and 35 will therefore be understood. The necessity for simultaneous relief of pressure in those pipes also exists in order that when the valve 21 is first opened there may be no spurt of lubricant from the interior of the cylinder 5 into the barrel 26, but only the discharge made of the determinate quantity of it contained within the barrel 26.

In the position of the plug 43 illustrated in full lines in Fig. I the plug is shown as set in the position for the opening of the valve 21 and the discharge of the contents of the barrel 26—that is to say, for the ejectment of a charge of lubricant—into the interior of the steam-chest. In that position of the plug the pipe 48 is shown in position to deliver pressure through the passage 45 to the interior of the pipe 34, which discharges through the port 32 above the piston-head 19. At the same time the vent-passage 38 makes communication between the port 47 and the vent 41, thereby relieving the pressure from in front of the piston-head 19 and from behind the piston-head 14. The piston-head 19 in consequence descends under pressure from above derived through the pipe 34, as specified, while the piston-head 14 simply remain stationary, thereby affording cut-off of the lubricant-feed supply during the discharge movement of the plunger 20.

It may be understood from the foregoing description that if the handle 44 be located in the cab of a locomotive, for example, the engineer by manipulation thereof may as often as required contribute a charge of lubricant to all the working parts of his engine which are in operative communication with the shell 4. The indicators 15 and 24 afford at all times means of ascertaining whether the apparatus is in operative condition, the latter by reason of its double reciprocation with each complete operation of the plunger 20 affording complete indication of its operation.

What we claim is—

1. In a lubricator, the combination with a lubricant-inclosing receptacle, of fluid-actuated means for isolating a determinate quantity of said lubricant, and a fluid-actuated member for discharging said isolated quantity.

2. In a lubricator, the combination with a lubricant-inclosing receptacle and a shell, of fluid-actuated means for driving lubricant from the receptacle into the shell, fluid-actuated means for confining the same within the shell, and a fluid-actuated member for discharging the lubricant from said shell.

3. In a lubricator, the combination with a lubricant-inclosing receptacle and a shell, of means for driving lubricant from the receptacle into the shell, and means for confining the same within the shell, each of said means being simultaneously fluid-actuated and fluid-actuated means for discharging the lubricant from said shell.

4. In a lubricator, the combination with a lubricant-inclosing receptacle and a shell, of fluid-actuated means for driving lubricant from the receptacle into the shell, and fluid-actuated means for discharging the lubricant from the shell and for simultaneously cutting off lubricant from the receptacle.

5. In a lubricator, the combination with a lubricant-inclosing receptacle and a shell, of means for driving lubricant from the receptacle into the shell, and means for confining the same within the shell, each of said means being simultaneously fluid-actuated, and fluid-actuated means for discharging the lubricant from the shell and for simultaneously cutting off lubricant from the receptacle.

6. The combination with a shell and a cylinder provided with means of intercommunication, of a piston-head in the cylinder, a piston-head in the shell, a valve working to and from a seat in the bore of the shell and connected with the piston-head within the shell, and means of fluid-pressure supply to the respective piston-heads.

7. The combination with a shell and a cylinder provided with means of intercommunication, of a piston-head in the cylinder, a piston-head in the shell, a valve working to and from a seat in the bore of the shell and connected with the piston-head within the shell, and intercorrelated means of fluid-pressure supply to the respective piston-heads.

8. The combination with a shell and a lubricant-inclosing cylinder communicating therewith, of a coöperative valve and piston-head within the shell upon opposite sides of the means of communication between the bore of the shell and the source of lubricant-supply, separate means of fluid-pressure supply to the interior of the shell above and below the piston-head, and means of controlling said fluid-pressure supply for the purpose of actuating the piston-head and its valve.

9. The combination with a shell and a lubricant-inclosing cylinder communicating therewith, of a coöperative valve and piston-head within the shell upon opposite sides of the means of communication between the bore of the shell and the source of lubricant-supply, separate means of fluid-pressure supply to the interior of the shell above and below the piston-head, and remotely-disposed means of controlling said fluid-pressure supply for the purpose of actuating the piston-head and its valve.

10. The combination with a shell provided internally with a barrel, a valve-seat at one end of the barrel, a chamber at the other end, and a source of lubricant-supply communicating with the interior of the barrel, of a piston-head in the chamber, a valve connected therewith working to and from the valve-seat with the reciprocation of the piston-head, and means of operatively supplying fluid-pressure above and below the piston-head within its chamber, as required.

11. The combination with a shell provided internally with a barrel, a valve-seat at one end of the barrel, a chamber at the other end, and source of lubricant-supply communicating with the interior of the barrel, of a piston-head in the chamber, a valve connected therewith, working to and from the valve-seat with the reciprocation of the piston-head, an intermediate cut-off and means of operatively supplying fluid-pressure above and below the piston-head within the chamber, as required.

12. The combination with a shell provided internally with a barrel, a valve-seat at one end of the barrel, a chamber at the other end, and a source of lubricant-supply communicating with the interior of the barrel, of a piston-head in the chamber, a valve adjustably connected thereto and working to and from the valve-seat with the reciprocation of the piston-head, and means of operatively supplying fluid-pressure above and below the piston-head within its chamber, as required.

13. The combination with a shell and cylinder provided with means of intercommunication, of a piston-head valve in the shell and a piston-head in the cylinder, a source of fluid-pressure supply to the interior of the cylinder and the shell, respectively, and means of control of said supply.

14. The combination with a shell and cylinder provided with means of intercommunication, of a piston-head valve in the shell and a piston-head in the cylinder, a source of fluid-pressure supply to the interior of the cylinder and the shell, respectively, and means of control of said supply, said means of control being located at a point remote from the shell and cylinder.

15. The combination with a shell provided with a threaded nose for securing it in place and a cylinder connected with the shell, the bores of the cylinder and shell being intercommunicating, a cylinder-head, and means of securing the cylinder-head to the part to which the nose of the shell is secured, of pis-

ton-heads in the cylinder and bore of the shell, respectively, a valve operatively carried by the piston-head in the shell and adapted to control the means of communication between the bores of the cylinder and shell, and means for actuating said piston-heads.

In testimony of all which we have hereunto subscribed our names.

FRED WILKINSON GRATIOT.
RENE JAMES GRATIOT.

Witnesses:
E. KEMPE,
W. B. MALLICOAT.