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F. GIELOW, Sr.

GRAPHITE LUBRICATOR.

(Application filed Feb. 4, 1901.)

(No Model.)

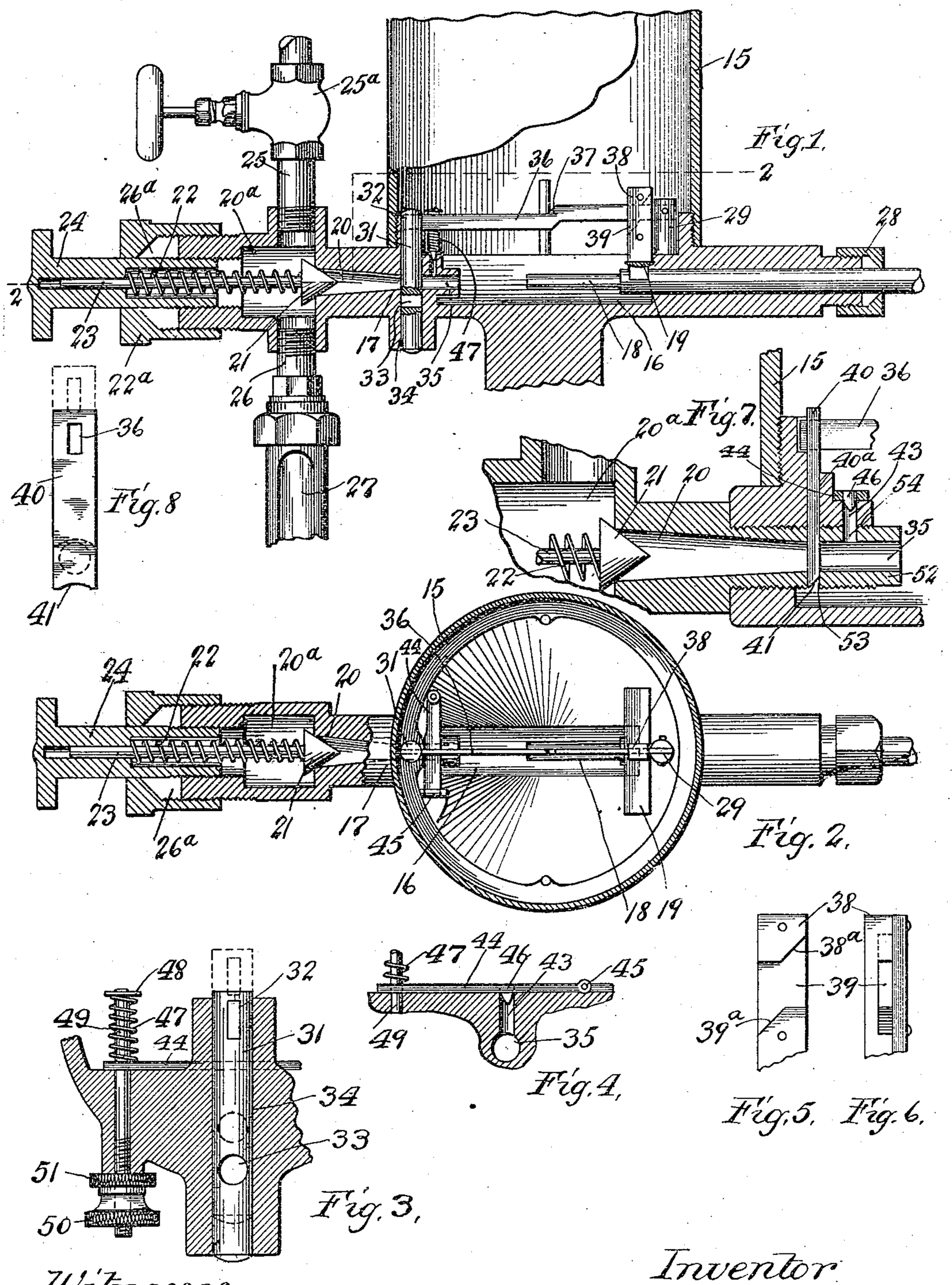

Fig. 1.

Fig. 8

Fig. 7.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5. Fig. 6.

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GRAPHITE-LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 688,632, dated December 10, 1901.

Application filed February 4, 1901. Serial No. 45,934. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK GIELOW, Sr., a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Graphite-Lubricators, of which the following is a specification and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to improvements in graphite-lubricators for steam-engines, &c., in which the lubricant is conveyed or forced from a reservoir into a discharge-pipe and thence carried by fluid under pressure in small particles to the part of an engine or machine to be lubricated.

The invention has particular reference to the graphite-lubricator shown and described in an application for patent filed by me December 3, 1900, Serial No. 38,441, for graphite-lubricator, although it will be obvious that it may be adapted to any lubricator operating on the same principle and where the same results attained by my invention are sought.

The invention comprises a suitable reservoir having a discharge-pipe leading from the bottom thereof and opening into a chambered casing, from which the lubricant is conveyed through a feed-pipe by a fluid under pressure, a spring-closed conical check-valve being located at the mouth of the outer end of the discharge-pipe to prevent the admission of steam or water of condensation into the reservoir and also to separate the emerging rod of lubricant into small masses. In addition to the conical valve a slide or reciprocating valve is located in the discharge-pipe between the check-valve and the mouth of the inner end of the discharge-pipe. A plunger reciprocating in a trough in the bottom of the reservoir forces the lubricant into the discharge-pipe and carries a post, through the aperture of which passes a cam-lever having loose connection with the slide-valve, the lever operating to open and close the valve in the discharge-pipe and being pivoted to a suitable support within the reservoir. A relief-duct, closed by a spring-controlled valve, leads from the discharge-pipe between the slide-valve and the reservoir to permit of the escape or overflow of graphite should the same become packed within the pipe and tend to prevent the entrance of the plunger within the mouth of the same.

The invention consists in the construction hereinafter described, and which is illustrated in the accompanying drawings, in which—

Figure 1 is a view, partly in elevation and partly in vertical section, showing the several parts of the invention. Fig. 2 is a detail plan section on the line 2 2 of Fig. 1. Figs. 3 and 4 are details showing the relief-valve and the mechanism for holding the same to its seat. Figs. 5 and 6 are details of the apertured post carried by the reciprocating plunger for opening and closing the slide-valve in the discharge-pipe. Fig. 7 is a vertical section showing a modification of the slide-valve and construction of the discharge-pipe, and Fig. 8 is a detail view of the form of slide-valve shown in Fig. 7.

15 designates the reservoir or lubricant-receptacle, having a discharge-pipe 17, forming a continuation of a trough 16 across the bottom of the reservoir. Reciprocating within the trough 16 and into and out of the pipe 17 and driven by any suitable means providing, preferably, an intermittent or step-by-step action is a plunger 18, its forward end at the limit of its backward movement being drawn partially across the bottom of the reservoir in order that graphite may fall in the trough 16 in the path of the plunger and upon its advance be forced into the discharge-pipe 17.

The plunger 18 extends through the bottom of the reservoir, a stuffing-box 28 being provided at that point where it is connected up with the operating mechanism. (Not shown.) A cross-arm 19 is carried by the plunger for disintegrating the graphite within the reservoir 15 and insuring its feed to the discharge-pipe 17 as the plunger is withdrawn therefrom.

The discharge-pipe 17 is provided at the outer or discharge end with a flaring mouth 20, which communicates with a chambered casing 20^a, the mouth 20 being closed by a conical check-valve 21, normally held to its seat by a spring 22, encircling the valve-stem 23 and interposed between the base of the valve and an adjustable guide-stem 24, which has a longitudinal counterbored guide-socket to

receive the valve-stem, and is externally screw-threaded to provide adjustable connection with the casing 20^a in order to regulate the tension of the spring 22.

A stuffing-box 26^a, located around the threaded connection of the casing 20^a and the stem 24, prevents leakage thereat. A pipe 25 for conveying fluid under pressure to feed the graphite enters the casing 20^a, having a suitable valve 25^a therein for shutting off the fluid, and a conveying-pipe 26 leads from the casing. Both of the pipes 25 and 26, or either, may be provided with sight feed-tubes 27.

The parts constituting the lubricator thus far described are shown and more fully described in my application for patent filed December 3, 1900, Serial No. 38,441.

I shall now describe in detail the improvements herein sought to be secured and their adaptation and use in connection with the lubricator shown.

Pivotally connected to a stud 29, located at the bottom of the reservoir 15, is a cam lever or arm 36, consisting of two straight sections connected by an inclined or beveled section 37, the free end of which lever enters a slot 32 at the upper end of a valve 31, adapted to slide or reciprocate in a passage 34, crossing the path of the plunger 18 in the discharge-pipe 17. The slide-valve 31 has an aperture 33, through which passes the end of the plunger 18 when the former has moved to open the passage in the discharge-pipe 17.

Fixed to the plunger 18 is a post 38, having an aperture 39, the upper and lower walls of which are beveled at diagonally opposite points, as indicated by 38^a and 39^a, respectively, the aperture serving as a guide for the cam-lever 36, which passes therethrough. It will be seen that as the plunger reciprocates, carrying with it the post 38, the cam-lever will be moved on its pivot whenever the cam or inclined section 37 of the lever 36 engages the beveled upper or lower walls of the aperture in passing therethrough, and the sliding valve will be opened or closed, according to the direction in which the plunger is traveling.

It is to be observed that the cam or inclined section 37 of the lever 36 is so positioned with reference to the length of the lever that it is not engaged by the beveled walls of the aperture of the post 38 until the end of the plunger 18 has entered the mouth 35 in the reservoir 15 of the discharge-pipe 17, in order that the aperture 33 of the slide-valve 31 may not open communication between the flaring mouth 20 and the interior of the reservoir and permit any steam that might by accident leak past the valve 21 and through the mass of graphite in the flaring mouth 20 to enter the reservoir.

In Figs. 7 and 8 is shown a modification of the slide or reciprocating valve. In this case the spindle-valve 31, having a passage therethrough for the end of the plunger 18, is dispensed with and a flat slide-valve 40 substituted, the seat therefor, 40^a, being formed correspondingly to receive the same. Preferably the lower edge of the slide-valve 40 is beveled and concaved, as shown at 41.

In operation the modified form of valve is raised out of the path of the plunger 18 just after the latter enters the mouth 35 of the discharge-pipe 17 and reseats itself before the plunger is entirely withdrawn from the discharge-pipe. The beveled or sharpened edge enables the valve to cut a way for itself through the compact mass of graphite without difficulty, and by shaping the edge as shown the valve need be raised only until its concave edge is in alinement with the inner wall of the passage.

In the construction illustrated in Fig. 7 the casing 20^a instead of being made integral with the bottom of the reservoir, as shown in Fig. 1, is provided with a threaded nipple 52, which screws into the side wall of the bottom of the reservoir. This nipple has a slot 53 cut through the walls thereof, designed to aline with the valve-seat 40^a for the passage of the valve, and another aperture 54 opens into the valve-closed relief-duct 43.

To avoid undue packing of graphite in the discharge-pipe between the valve 31 and the mouth at the inner end of the discharge-pipe, which might occur by accident or through tampering with the plunger-operating mechanism and probably result in a breakage of the mechanism, as the plunger would be prevented from reciprocating to the limit of its movement, a relief-duct 43, leading from the discharge-passage back into the reservoir, is provided. This duct is closed by a valve 46, hinged at 45. The valve is normally kept to its seat by a spring 47, which encircles a stem 49 and reacts between the head 48 of the stem and the free end of the hinged rod. One end of the stem 49 passes through the bottom of the reservoir and is screw-threaded to receive a nut 51 for regulating the tension of the spring, and a nut 50 is provided to lock the nut 51 against movement.

In operation a step-by-step or intermittent movement is given to the plunger 18 by suitable operating mechanism, and the plunger 18 reciprocates in the trough in the bottom of the reservoir 15, the end entering the mouth 35 of the barrel 17 and forcing the graphite, which has been disintegrated by the cross-bar 19, into the discharge-pipe 17 and through the flaring mouth 20 past the conical valve 21, which separates the graphite into small masses or particles. The graphite in this condition enters the casing 20^a, where it is caught by the steam or other fluid under pressure entering the said casing by the pipe 25. The lubricant then passes through the pipe 27 and is conveyed to the working parts to be lubricated. The conical valve 21 closes the flaring mouth 20 of the discharge-pipe when the pressure on the graphite is withdrawn by the recession of the plunger 18 and is held to its seat by the spring 22 to prevent steam or water of condensation from enter-

ing the reservoir through the mouth 20. As the plunger 18 reciprocates it carries with it the guide-post 38, through the aperture 39 of which the cam-lever 36 passes, and when the beveled bottom wall 39ª of the aperture comes in contact with the lower beveled edge of the cam-lever the said lever, moving on its pivot in the post 29, lifts the valve 31 in its seat until the passage 33 registers with the passage in the discharge-pipe 17, the cam being so positioned with relation to the length of the lever 36 that the alinement does not take place until the forward end of the plunger 18 has entered the mouth 35. When the plunger 18 is receded in its reciprocation, the upper beveled wall 38ª of the aperture 39 in the post 38 bears against the cam-face on the upper edge of the lever 36, whereby the free end of the lever is forced downwardly, and moving the valve 31 closes the opening in the passage in the discharge-pipe 17, the final closing of the said passage taking place before the end of the plunger 18 has left the mouth at the inner end of the discharge-passage.

If by accident that portion of the barrel between the slide-valve 31 and the mouth 35 becomes packed or filled to excess with graphite when the plunger 18 is moved into the mouth 35, the graphite will be forced out of the discharge-pipe by way of the duct 43 and past the valve 46, the plate 44 opening against the resistance of the spring 49 and being closed thereby when the pressure of the graphite is removed.

In carrying out my invention various changes may be made without departing from the spirit of the invention, and I do not limit myself to mechanical details. For example, while I have shown a slide-valve operated by the plunger, it will be obvious that another form of valve might be employed and the same results attained.

I claim as my invention—

1. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe therefor, a plunger reciprocating in the discharge-pipe and including in its range of travel the opening between the reservoir and the discharge-pipe, and a valve located in the discharge-pipe and operated by the plunger.

2. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating into and out of the mouth of the discharge-pipe, a valve adapted to close the passage in the discharge-pipe, and means governed by the movement of the plunger for operating the valve.

3. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a valve adapted to close the passage in the discharge-pipe, a plunger reciprocating in the discharge-pipe and past the valve, and means governed by the movement of the plunger for operating the valve.

4. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe therefor, a plunger reciprocating into and out of the discharge-pipe, a valve adapted to close the passage in the discharge-pipe, and means governed by the movement of the plunger for closing the valve before the withdrawal of the plunger from the discharge-pipe.

5. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating into and out of the mouth of the discharge-pipe, a valve located in the discharge-pipe, and means governed by the plunger for operating the valve, the movement of the latter being so timed that it does not open until the end of the plunger has entered the mouth of the discharge-pipe nor close before the plunger leaves the discharge-pipe.

6. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating in the reservoir and into and out of the discharge-pipe, a valve adapted to close the passage in the discharge-pipe, and means actuated by the plunger for operating the valve.

7. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating into and out of the mouth of the discharge-pipe, a slide-valve located in the discharge-pipe and having a passage therethrough, a lever pivoted within the reservoir carrying the slide-valve, and means carried by the plunger for operating the lever.

8. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating in the discharge-pipe, a slide-valve adapted to close the passage in the discharge-pipe, a lever pivoted within the reservoir and carrying the slide-valve, and means for operating the lever.

9. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating into and out of the mouth of the discharge-pipe, a slide-valve adapted to close the passage in the discharge-pipe, a cam-lever pivoted within the reservoir and having connection with the slide-valve, a post supported by the plunger and having an aperture, the upper and lower walls of which are beveled and adapted to coöperate with the cam-lever to open and close the valve.

10. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating into and out of the mouth of the discharge-pipe, a slide-valve adapted to close the passage in the discharge-pipe, a lever pivoted within the reservoir and having a loose connection with the slide-valve and being provided with an intermediate cam-section, a post supported by the plunger and having an aperture, the upper and lower walls of which are beveled at diagonally opposite points and adapted to coöperate with the cam-section of the lever to operate the slide-valve.

11. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating in the discharge-pipe, a valve adapted to close the passage in the discharge-pipe, means governed by the plunger for operating the valve, the discharge-pipe having

a relief-duct located therein between its inner end and the valve.

12. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating into and out of the discharge-pipe, a valve adapted to close the passage in the discharge-pipe, means governed by the plunger for operating the valve, the discharge-pipe having a relief-duct located therein between its inner end and the valve, and a spring-controlled pivoted valve adapted to close the relief-duct.

13. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating into and out of the discharge-pipe, a check-valve seated in the outer end of the discharge-pipe, a valve adapted to close the passage in the discharge-pipe, and mechanism for opening the latter valve on the advance of the plunger.

14. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe, a plunger reciprocating in the discharge-pipe, a slide-valve adapted to close the passage in the discharge-pipe, a lever pivoted within the reservoir and carrying the slide-valve, and a post supported by the plunger and having an aperture through which the lever passes and adapted to coact with the same to operate the valve.

15. In a graphite-lubricator, in combination, a reservoir, a discharge-pipe therefor, a plunger reciprocating in the discharge-pipe and including in its range of travel the opening between the reservoir and the discharge-pipe, a valve for the discharge-pipe, and means governed by the movement of the plunger for closing the valve before the withdrawal of the plunger beyond the opening between the reservoir and the discharge-pipe.

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