

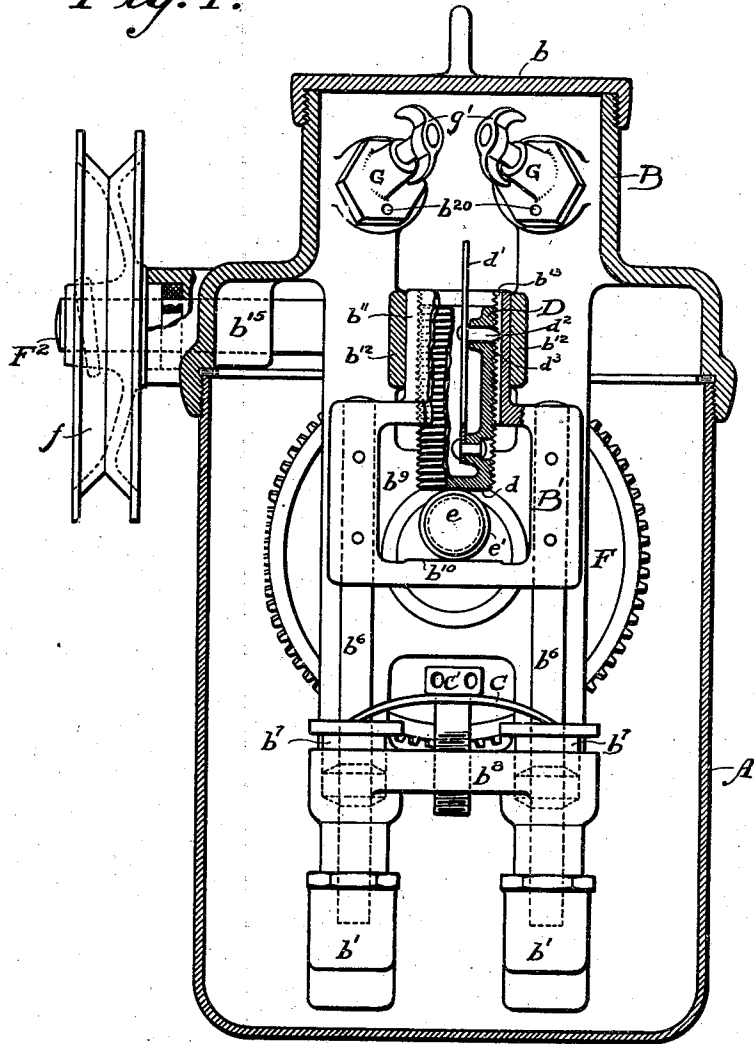
W. L. MORRIS.
LUBRICATING MECHANISM.
APPLICATION FILED NOV. 16, 1903.

947,449.

Patented Jan. 25, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

M. Israel
Jno. F. Oberlin

INVENTOR

Wm. L. Morris

BY

J. B. Fay
ATTORNEY

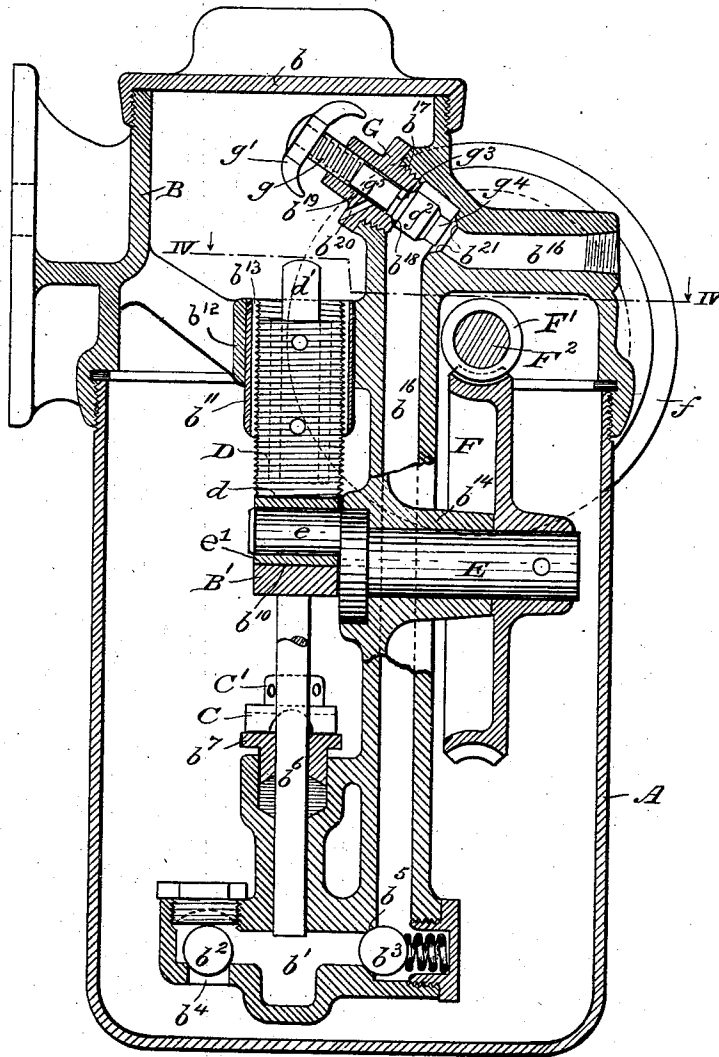
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3 SHEETS—SHEET 2.

Fig. 2.



WITNESSES:

Wm. A. Skinkle
S. I. Davis

INVENTOR:

Wm. L. Morris
by his attorney
J. O. Ray

UNITED STATES PATENT OFFICE.

WILLIAM L. MORRIS, OF BATAVIA, ILLINOIS.

LUBRICATING MECHANISM.

947,449.

Specification of Letters Patent. Patented Jan. 25, 1910.

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To all whom it may concern:

Be it known that I, WILLIAM L. MORRIS, a citizen of the United States, resident of Batavia, county of Kane, and State of Illinois, have invented a new and useful Improvement in Lubricating Mechanisms, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention relates to lubricating devices and particularly to that class of such devices in which a pump is utilized for forcing the lubricant to the desired points.

The object of my said invention is to provide means for the above-named purpose which shall be economical of operation and construction.

Said invention consists of means hereinafter fully described and particularly set forth in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings—Figure 1 represents a vertical axial section of a device embodying my invention, showing the interior mechanism principally in elevation. Fig. 2 represents a vertical axial section taken upon a plane at right angles to that of the section shown in Fig. 1. Fig. 3 represents a plan view of such device with the cover removed, and Fig. 4 a horizontal detail section taken upon the plane indicated by line IV—IV, Fig. 2.

A bowl or casing A constitutes the reservoir for containing the lubricant, which will usually be a more or less freely flowing oil. Such oil reservoir or tank has its upper portion threaded, as shown, and upon such threaded portion is screwed or otherwise detachably secured a cover or plate B provided at its top with an opening and a removable cap *b*. The cover B has secured to or formed integral therewith, preferably the latter, a depending structure forming chambers, ducts, guides, etc., which will be hereinafter fully described. Means for the exterior attachment and support of the lubricator are, in the form of the device illus-

trated in the drawings, provided by an arm 55 integral with such cover member B and designed to be secured to a wall or other firm support, as is most convenient. The lower portion of the structure depending from member B forms two chambers *b'* *b'*, each 60 of which is provided with an inlet valve *b*² and valve opening *b*⁴, and an outlet valve *b*³, and opening *b*⁵, as shown in Fig. 2. These valves are arranged in the manner of ordinary pump valves whereby fluid may be 65 pumped from the reservoir or tank A, into the chambers *b'* *b'*, and out through valve openings *b*⁵ as will be readily understood. Into each such chamber extends a vertical 70 plunger, *b*⁶ *b*⁶, the upper end of which is secured to a yoke or cross-head B'. These plungers are packed by means of glands *b*⁷ *b*⁷ and suitable packing in the gland chambers, as will be understood. Having its extremities bearing upon the two glands respectively, is a spring-bar, or plate, C held in 75 place by means of an adjusting screw C' whose lower end is threaded into a cross-bar *b*⁸ that forms an integral part of the cover structure. The ends of such spring-bar are 80 bifurcated, as shown in Fig. 2, so as to permit the same to bear upon the middle of the glands and so hold them firmly in place. It will be seen that by means of screw C', the glands may be held in place with varying degrees of intensity, as a result of the 85 varying force which may be imparted by such spring bar. The interior open space *b*⁹ formed in the cross-head B' is formed with a flat bearing surface *b*¹⁰ transversely located, 90 as shown, relatively to the head's direction of travel. The upper part of the head is formed with a tubular extension *b*¹¹, which slides in a guide *b*¹² forming an integral part of the structure as shown. Into this extension 95 is threaded a tubular adjusting member D, whose lower end is closed and formed with a flat bearing surface *d* disposed opposite surface *b*¹⁰ and extending similarly in a transverse direction. These surfaces *b*¹⁰ 100 and *d* are located centrally of the head as shown. Upon the lower portion of the interior of member D is secured the lower end of a spring-rod *d'*, upon which is secured a pin *d*², which passes through an aperture *d*³ 105 formed in the member D, the outer end of such pin projecting a short distance beyond the outside of said member, and being adapt-

ed to engage any one of a series of vertical grooves b^{13} formed upon the interior of the extension b^{11} , as shown in Figs. 1 and 4. By these means, the member D may be locked in various positions. The depending structure is furthermore formed with a horizontal bearing b^{14} in which is journaled an arbor E whose inner end is provided with an eccentric, or crank wrist-pin, e which extends into space b^9 between surfaces b^{10} and d . Upon the pin is journaled an anti-friction roller e' , suitably secured against displacement. The adjusting member D is made of a length to permit it to be lowered sufficiently to cause surface d to bear upon roller e' while the latter is in engagement with surface b^{10} as shown in Fig. 1. It will thus be seen that the length of stroke of the cross-head, and hence of the plungers, may be varied between zero as a minimum and the throw of the pin e as a maximum. To the outer end of arbor E, thus seen to constitute a pump-operating shaft, is secured a worm-wheel F which is rotated by means of a worm F' secured upon the inner end of a shaft F² journaled in a bearing b^{15} formed in the cover B. This shaft projects externally of the cover through said bearing, and upon its outer end is secured a driving sheave, f . Suitable packing is provided for making the bearing b^{15} dust-proof, as shown in Fig. 1.

Leading from each of the valve openings b^5 upwardly is a discharge duct b^{16} branching horizontally at its upper portion and intersecting the outer surface of the cover, Fig. 2, at which point a tube may be attached for conducting the lubricant to any desired point. Opposite the elbow of such duct is formed a threaded opening b^{17} in which is screwed a plug G provided with an inner valve seat b^{18} , a central bore b^{19} and a passage-way b^{20} intersecting the outside of the plug and the bore b^{19} , as shown in said figure. Opposite valve seat b^{18} , and co-axial therewith, is formed a second similar valve-seat b^{21} at the inner end of the horizontal branch of duct b^{16} . Threaded into the end of bore b^{19} is a valve stem g , the outer end of which is provided with a thumb-piece g' by means of which the stem may be turned. The inner end of said stem is provided with a double valve g^2 and with two piston portions g^3 and g^4 at each side of the latter. These piston portions are adapted to enter and close the bore b^{19} and duct b^{16} , respectively and are of a length such that both said duct and bore are not left open simultaneously but are always opened and closed consecutively. Stem g is formed with a reduced portion g^5 whereby lubricant may pass around it and through the passage-way b^{20} when the valve is off seat b^{18} . It will thus be seen that each chamber b' may be placed in communication with the interior or the exterior of the tank through the me-

dium of valve g^2 . Immediately above the valve-stem g is the cap b , by the removal of which the thumb-pieces g' are rendered conveniently accessible for purposes of adjustment.

In operating the above-described mechanism, valves g^2 are caused to close the valve openings b^{21} and so open ducts b^{16} to communication with the bowl A through passage-ways b^{20} , such tank or reservoir being supplied with the requisite amount of lubricant. The mechanism now being started, or being already in operation, lubricant is pumped up through ducts b^{16} and discharged through ways b^{20} . The cap b having been removed, the quantity of lubricant being pumped may be observed. If it be desired to change such amount, the adjusting-member D is turned so as to alter the throw of the plungers so as to obtain the amount of discharge required. When such amount has been obtained, valves g^2 are caused to open openings b^{21} and close openings b^{16} thereby diverting the discharge into the branches of ducts b^{16} . The cover is now replaced and the discharge continued as required.

Aside from the novel features involved in the construction and discharge connections of the pump of my improved lubricator, I desire to call particular attention to the fact that the oil receptacle A is removably secured to the fixed pump-supporting member B thereby permitting ready access at all times to the pump mechanism for purposes of inspection or repair. Obviously it is immaterial which of these two members, the pump-supporting member or the oil-containing member, be thus fixed and which detachable. In some cases, indeed, it may be more convenient to have the latter externally supported and the former removable. By applying the term "cover" to member B, it should be finally explained, I do not mean necessarily to imply that such member effects, in itself, a complete closure of the reservoir, or lubricant-containing casing A. In its general aspects member B is the support for the various operative parts of the device, and the term in question is intended to connote this function, as well as its function as a cover for the reservoir which it serves in conjunction with the cap b .

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim, as my invention—

1. In a device of the class described, the combination with a pump; of a pump-supporting member; and a liquid-containing member inclosing said pump, one of said

members having fixed external connections, the other of said members being detachably secured to said externally connected member.

2. In a device of the class described, the combination of a pump; a pump-supporting member; and a liquid-containing member, one of said members being fixed and provided with means for attaching an external discharge duct thereto, the other of said members being removably secured to said fixed member.

3. In a lubricating device, the combination of a pump; a pump-supporting member; an oil-containing member, one of said members being fixed and provided with external discharge connections for said pump, the other of said members being detachably secured to said fixed member, and actuating means for said pump mounted in said fixed member.

4. In a lubricator provided with fixed feed connections, the combination of a liquid-containing member, a pump-member located therein, and an externally connected actuating element for driving said pump-member, the one of said two members being externally supported and the other being detachably secured to such externally supported member, the feed connections of the lubricator being connected with, and said actuating element being mounted in such externally supported member.

5. In a device of the class described, a reservoir, a pump located therein, and pump operating mechanism, the said reservoir being detachable from the pump without disassembling the operating mechanism, and one only of said members having fixed external connections.

6. In a device of the class described, a reservoir, a cover, a pump located in the reservoir, operating mechanism consisting of a shaft for reciprocating the pump plunger and means for driving the shaft, the said operating mechanism being carried entirely by the cover and the reservoir being detachable from the latter without disassembling the operating mechanism.

7. In a device of the class described, a reservoir, a closure plate therefor, and a pump and its operating mechanism carried by the plate and located within the reservoir, the latter being detachable from the plate.

8. In a device of the class described, a reservoir and a closure plate therefor, one of the same being externally supported, and a pump and its operating mechanism carried by the plate and located within the reservoir, the latter being detachable from the plate.

9. In a device of the class described, a reservoir, an externally supported closure plate for said reservoir, and a pump and its operating mechanism carried by the plate

and located within the reservoir, the latter being detachable from the plate.

10. In a device of the class described, an externally supported member, a pump supported by said member, mechanism for operating said pump carried by said member, and a reservoir in which the pump is located and which is secured to and may be detached from said member without disassembling the operating mechanism.

11. In a device of the class described, an externally supported pump-supporting member, externally connected mechanism for operating the pump carried by said member, and a reservoir in which the pump is located and which is secured to and may be detached from the supporting member without disassembling the operating mechanism.

12. In a device of the class described, a reservoir, a stationary cover member, a pump and pump operating mechanism therefor entirely supported by the cover member and located in the reservoir, said reservoir secured to the cover member and detachable therefrom without disassembling the pump or operating mechanism.

13. In a device of the class described, a reservoir, an externally supported cover member, a pump and operating mechanism therefor supported by the cover member and located in the reservoir, said reservoir being secured to the cover member and detachable therefrom without disassembling the pump or operating mechanism.

14. In a device of the class described, a reservoir, an externally supported cover, a pump secured to and depending from the cover and having its outlet passing through the latter, and mechanism for operating the pump entirely supported by the cover, the said reservoir being secured to the cover and detachable therefrom without disassembling the pump or operating mechanism.

15. In a device of the class described, the combination of a support; a reservoir detachably secured to said support; a pump mounted on said support and having its inlet opening located in said reservoir; and an externally connected actuating element for driving said pump likewise mounted in said support.

16. In a device of the class described, the combination of a support; a reservoir detachably secured to said support; a pump with fixed feed connections mounted on said support and having an inlet opening located in said reservoir; and an externally connected actuating element for driving said pump likewise mounted in said support.

17. In a lubricating device, the combination of a support; a pump with fixed feed connections mounted on said support and depending therefrom; an externally connected actuating element for driving said

pump likewise mounted on said support; and an oil receptacle detachably secured to said support and inclosing said pump.

18. In a lubricating device, the combination of an externally supported member; pumping mechanism attached thereto; and an oil receptacle removably secured to said supporting member and inclosing but independent of said pumping mechanism.

19. In a lubricating device, the combination of an externally supported member; pumping mechanism attached thereto and comprising a pump cylinder, a plunger, and means adapted to operate said plunger; and an oil receptacle removably secured to said supporting member and independent of said pumping mechanism.

20. In a lubricating device, the combination of an externally supported member; pumping mechanism secured thereto and comprising a pump cylinder, a plunger, and means adapted to operate said plunger; and an oil receptacle removably secured to said supporting member and independent of said pumping mechanism, whereby it may be attached to or removed from said member while the pump is in operation.

21. In a lubricating device, the combination of an externally supported member; pumping mechanism depending therefrom and having a discharge duct; an oil receptacle removably secured to said supporting member and inclosing but independent of said pumping mechanism; and valves controlling communication between the part to be lubricated and said discharge duct between the latter and said oil receptacle.

22. In a lubricating device, the combination of an oil receptacle; pumping mechanism inclosed thereby, and including a reciprocatory plunger, a gland chamber and gland surrounding said plunger, a spring-member bearing upon said gland, and means for varying the tension of said member, such pumping mechanism being provided with a discharge duct leading to the exterior of said oil receptacle and with a passage-way connecting such duct with the interior of said receptacle; and a valve adapted to control the passage of liquid through such duct and passage-way.

23. In a lubricating device, the combination of an oil receptacle and cover, separable one from the other, said cover being formed with a pendent portion extending into said receptacle and inclosing a chamber having an inlet opening into said oil receptacle and a discharge duct provided with an interior and an exterior outlet; suitable valves respectively controlling said inlet opening and said discharge duct; a reciprocatory plunger adapted to operate in said chamber and means for reciprocating said plunger, said means being inclosed by said receptacle.

24. In a lubricating device, the combination of an oil receptacle and a cover, separable one from the other, said cover being formed with a pendent portion extending into said receptacle and inclosing a chamber having an inlet opening and a discharge duct provided with an interior and exterior outlet; a reciprocatory plunger adapted to operate in said chamber; means for reciprocating said plunger, said means being inclosed by said receptacle; suitable valves respectively controlling said inlet opening and said discharge duct; and a valve adapted to close one of the outlets of said discharge duct and open the other, and vice versa.

25. In a lubricating device, the combination of an oil receptacle and cover therefor, separable one from the other, said cover being formed with a pendent portion extending into said receptacle and inclosing a chamber having an inlet opening and a discharge duct provided with an interior and an exterior outlet; a reciprocatory plunger adapted to operate in said chamber; means for reciprocating said plunger, said means being inclosed by said receptacle; suitable valves respectively controlling said inlet opening and said discharge duct; and a valve adapted to close one of the outlets of said discharge duct and simultaneously open the other.

26. In a lubricating device, the combination of an oil receptacle and a cover, the one being externally supported and the other separable therefrom, said cover being formed with a pendent portion extending into said receptacle and inclosing a chamber having an inlet opening into said oil receptacle and a discharge duct provided with an interior and an exterior outlet; suitable valves respectively controlling said inlet opening and said discharge duct; and a reciprocatory plunger adapted to operate in said chamber.

27. In a lubricating device, the combination of an oil receptacle and a cover, the one being externally supported and the other separable therefrom, said cover being formed with a pendent portion extending into said receptacle and inclosing a chamber having an inlet opening and a discharge duct provided with an interior and exterior outlet; a reciprocatory plunger adapted to operate in said chamber; suitable valves respectively controlling said inlet opening and said discharge duct; and a valve adapted to close one of the outlets of said discharge duct and open the other, and vice versa.

28. In a lubricating device, the combination of an oil receptacle and cover therefor, the one being externally supported and the other separable therefrom, said cover being formed with a pendent portion extending into said receptacle and inclosing a chamber having an inlet opening and a discharge duct

provided with an interior and an exterior outlet; a reciprocatory plunger adapted to operate in said chamber; suitable valves respectively controlling said inlet opening and said discharge duct; and a valve adapted to close one of the outlets of said discharge duct and simultaneously open the other.

29. In a lubricating device, pumping mechanism having a bifurcated discharge duct, opposing coaxial valve seats at the mouths of such branches, and a double faced valve adapted to close one branch of said duct and simultaneously open the other.

30. In a lubricating device, pumping mechanism having a bifurcated discharge duct, opposing coaxial valve seats at the mouths of such branches, and a double-faced valve having a projecting piston portion on each face adapted to fit in said branches respectively, the distance between the outer ends of said piston portions being less than that between said valve seats.

31. In a device of the class described, pumping mechanism embodying a reciprocatory plunger provided with a cross-head, such cross-head having an open space intermediate of its ends formed at one end with an interior bearing surface, an adjustable member mounted in the other end of said cross-head and formed with a bearing surface and means adapted to lock said adjustable member against movement.

32. In a device of the class described, pumping mechanism embodying a reciprocatory plunger provided with a cross-head, such cross-head having an open space intermediate of its ends and being formed at one end of said open space with an interior bearing surface, a member screw-threaded in said cross-head so as to project into the other end of said open space and formed with a bearing surface disposed oppositely to such interior bearing surface, and means adapted to lock said screw-threaded member against rotation.

33. In a device of the class described, pumping mechanism embodying a reciprocatory plunger provided with a cross-head, such cross-head having an open space intermediate of its ends and being formed at one end of said open space with an interior bearing surface, and at the other end with an interiorly longitudinally grooved tubular extension, an adjusting member screw-threaded in such extension and formed with a bearing surface disposed oppositely to the aforesaid interior bearing surface, and a pin resiliently mounted on said adjusting member and adapted to engage a groove in such extension to hold said member against rotation.

34. In mechanism of the class described, the combination with a cross-head formed with an interiorly longitudinally grooved tubular extension, of an adjusting member

screw-threaded in such extension, and a pin resiliently mounted on said adjusting member and adapted to engage a groove in such extension to hold said member against rotation.

35. In a lubricating device, pumping mechanism including a reciprocatory plunger provided with a cross-head, such cross-head having an open space intermediate of its ends, and formed at one end with an interior bearing surface located transversely of the head's direction of travel and at the other end with an integral tubular extension, a member screw-threaded in said extension and formed with a lower exterior bearing surface disposed oppositely to the interior bearing surface of said head, and means for locking said screw-threaded member in said extension.

36. In a lubricating device, the combination with an oil receptacle and cover therefor, separable one from the other; of pumping mechanism mounted upon said cover and depending into said receptacle, such pumping mechanism including a cross-head having an open space intermediate of its ends, formed at one end with an interior bearing surface located transversely of the head's direction of travel and at the other end with an integral tubular extension, a member screw-threaded in said extension and formed with a lower exterior bearing surface disposed oppositely to the interior bearing surface of said cross-head, means for locking said screw-threaded member in said extension, a reciprocatory plunger, an oil chamber, such oil chamber having an inlet opening into said oil receptacle and a discharge duct, and suitable valves respectively controlling communication through said opening and said discharge duct.

37. In a lubricating device, the combination with an oil receptacle and cover therefor, separable one from the other; of pumping mechanism mounted upon said cover and depending into said receptacle, such pumping mechanism including a cross-head having an open space intermediate of its ends, formed at one end with an interior bearing surface located transversely of the head's direction of travel and at the other end with an integral tubular extension, a member screw-threaded in said extension and formed with a lower exterior bearing surface disposed oppositely to the interior bearing surface of said cross-head, means for locking said screw-threaded member in said extension, a reciprocatory plunger, an oil chamber, such oil chamber having an inlet opening into said oil receptacle and a discharge duct having an interior and an exterior outlet, valves respectively controlling said inlet opening and discharge duct, and a valve adapted to open either outlet of said discharge duct and close the other.

38. In a lubricator, the combination with a main lubricant-containing casing and a cover therefor, one of said members being externally fixed and the other detachably secured thereto; of pumping mechanism hung from said cover; and driving mechanism for said pumping mechanism, said driving mechanism being supported in the one of said members that is fixed.
39. In a lubricator, the combination with a main lubricant-containing casing and a cover therefor, one of said members being externally fixed and the other detachably secured thereto; of pumping mechanism hung from said cover and including an operating shaft; and driving mechanism for said pumping mechanism, said driving mechanism including a driven element mounted on said shaft and a driving element supported in the one of said members that is fixed.
40. In a lubricator, the combination with a main lubricant-containing casing and a cover therefor, one of said members being externally fixed and the other detachably secured thereto; of pumping mechanism hung from said cover mechanism and including an operating shaft; and driving mechanism for such pumping mechanism, said driving mechanism including a worm wheel mounted on said shaft and a worm supported in the one of said members that is fixed.
41. In a device of the character described, a reservoir and cover therefor, separable one from the other, and pumping mechanism, including a drive-wheel, hung in the reservoir from the cover, whereby said pumping mechanism, together with the drive-wheel, may be separated from the reservoir.
42. In a device of the character described, a reservoir and cover therefor, separable one from the other, and pumping mechanism, including a drive-wheel and actuating means therefor, hung in the reservoir from the cover, whereby said pumping mechanism, together with the wheel and actuating means, may be separated from the reservoir.
43. In a device of the character described, a reservoir and cover therefor, separable one from the other, and pumping mechanism, including a worm-wheel hung in the reservoir from the cover, whereby said pumping mechanism, together with the worm-wheel may be separated from the reservoir.
44. In a device of the character described, a reservoir and cover therefor, separable one from the other, and pumping mechanism, including a pump-operating shaft and a drive-wheel, hung in the reservoir from the cover, whereby said pumping mechanism, together with said shaft and wheel, may be separated from the reservoir.
45. In a device of the character described, a reservoir and cover therefor, separable one from the other, and pumping mechanism, including a pump-operating shaft and a worm-wheel, hung in the reservoir from the cover, whereby said pumping mechanism, together with said shaft and worm-wheel, may be separated from the reservoir.
46. In a device of the character described, a reservoir and cover therefor, separable one from the other, and pumping mechanism, including a pump-operating shaft, a worm-wheel, and an actuating worm for said wheel, hung in the reservoir from the cover, whereby said pumping mechanism, together with said shaft, wheel, and worm, may be separated from the reservoir.
47. In a force feed lubricator, the combination with a reservoir and closure plate therefor, separable one from the other and externally connected so as to permit removal of the one thus separated; of a pump on the plate depending into the reservoir, means within the reservoir for operating said pump, and a device for adjusting the stroke of said pump, said pump with its adjusting device and operating means being supported in the reservoir by said plate so as to be detachable as a unit from the reservoir.
48. In a device of the character described, a reservoir and a closure plate therefor, separable one from the other and externally connected so as to permit removal of the one thus separated; pumping mechanism carried on the underside of said plate; and adjustable means on the underside of the plate to vary the throw of the pumping mechanism.
49. In a lubricating device, an oil receptacle and a closure plate therefor, separable one from the other and externally connected so as to permit removal of the one thus separated; a pendent portion extending from said plate into said receptacle and provided with a chamber having an inlet and outlet; a reciprocable plunger adapted to operate in such chamber; means mounted on said pendent portion for reciprocating said plunger; and a plunger-adjusting member having threaded engagement on the plate.
50. In a lubricating device, an oil receptacle and a closure plate therefor, separable one from the other and externally connected so as to permit removal of the one thus separated; a pendent portion extending from said plate into said receptacle and provided with a chamber having an inlet and outlet; a reciprocable plunger adapted to operate in such chamber; a worm-wheel mounted on such pendent portion to reciprocate said plunger; an externally projecting worm-shaft meshing with said wheel; and a plunger-adjusting member having threaded engagement on the plate.
51. In a lubricating device, an oil receptacle and a closure plate therefor, separable one from the other and externally connected so as to permit removal of the one thus

separated; a pendent portion extending from said plate into said receptacle and provided with a threaded bearing and a chamber having an inlet and outlet; a reciprocable plunger adapted to operate in such chamber; a worm-wheel mounted on such pendent portion to reciprocate said plunger; an externally projecting worm-shaft meshing with said wheel; and a plunger-adjusting member having threaded engagement with the bearing.

52. In a device of the character described, a reservoir and cover therefor, separable one from the other; a pump carried on the underside of said cover; means carried on the underside of the cover to operate the pump; and means carried on the underside of the cover to adjust the throw of the pump, whereby the pump and its operating and adjusting means are assembled on the cover for unitary association with and dissociation from the reservoir.

53. In a lubricating device, an oil receptacle and cover therefor, separable one from the other; a pendent portion extending from said cover into said receptacle and provided with a chamber having an inlet opening into said receptacle and a discharge outlet; a reciprocable plunger adapted to operate in such chamber; means mounted on said pendent portion for reciprocating said plunger; and an externally projecting element for actuating said reciprocating means.

54. In a lubricating device, an oil receptacle and cover therefor, separable one from the other; a pendent portion extending from said cover into said receptacle and provided with a chamber having an inlet opening into said receptacle and a discharge outlet; a reciprocable plunger adapted to operate in such chamber; a worm-wheel mounted on such pendent portion and connected to reciprocate said plunger; and an externally projecting worm-shaft meshing with said wheel.

55. In a lubricating device, an oil receptacle and cover therefor, separable one from the other; a pendent portion extending from said cover into said receptacle and provided with a chamber having an inlet opening into said receptacle and a discharge outlet; a reciprocable plunger adapted to operate in such chamber; means for reciprocating said plunger mounted on said pendent portion; means adapted to vary the throw of said plunger; and an externally projecting element for actuating said reciprocating means.

56. In a lubricating device, an oil receptacle and cover therefor, separable one from the other; a pendent portion extending from said cover into said receptacle and provided with a chamber having an inlet opening into said receptacle and a discharge outlet; a reciprocable plunger adapted to operate in such chamber; a worm-wheel mounted on

such pendent portion and connected to reciprocate said plunger; means adapted to vary the throw of said plunger; and an externally projecting worm-shaft meshing with said wheel.

57. In a lubricating device, an oil receptacle and cover therefor, separable one from the other; a pendent portion extending from said cover into said receptacle and provided with a plurality of chambers having inlet openings into said receptacle and discharge outlets; a reciprocable plunger adapted to operate in each of said chambers; a cross-head for actuating said plungers and a drive-wheel for said cross-head, both mounted on such pendent portion; and an externally projecting element for actuating said drive-wheel.

58. In a lubricating device, an oil receptacle and cover therefor, separable one from the other; a pendent portion extending from said cover into said receptacle and provided with a plurality of chambers having inlet openings into said receptacle and discharge outlets; a reciprocable plunger adapted to operate in each of said chambers; a cross-head for actuating said plungers and a drive-wheel for said cross-head, both mounted on such pendent portion; means adapted to vary the throw of said plungers by said cross-head; and an externally projecting element for actuating said drive-wheel.

59. In a lubricating device, an oil receptacle and cover therefor, separable one from the other; a pendent portion extending from said cover into said receptacle and provided with a plurality of chambers having inlet openings into said receptacle and discharge outlets; a reciprocable plunger adapted to operate in each of said chambers; a cross-head and worm-wheel for actuating said plungers, both mounted on such pendent portion; and an externally projecting worm-shaft meshing with said wheel.

60. In a lubricating device, an oil receptacle and cover therefor, separable one from the other; a pendent portion extending from said cover into said receptacle and provided with a plurality of chambers having inlet openings into said receptacle and discharge outlets; a reciprocable plunger adapted to operate in each of said chambers; a cross-head and worm-wheel for actuating said plungers, both mounted on such pendent portion; means adapted to vary the throw of said plungers by said cross-head; and an externally projecting worm-shaft meshing with said wheel.

61. In a device of the character described, the combination with an oil tank and cover therefor, separable one from the other, of an integral series of cylinders extending downward within the tank and stationarily attached to the cover to be separated therewith, pistons in said cylinders, means within

the tank separable with the cylinders for reciprocating the pistons, and discharge nozzles on the cover to receive and discharge the oil delivered by said pistons.

5 62. In a device of the character described, the combination with an oil tank and cover therefor, separable one from the other, of an integral series of cylinders extending
10 attached to the cover to be separated therewith, pistons in said cylinders, means within the tank separable with the cylinders, for reciprocating the pistons, and discharge
15 nozzles to receive and discharge the oil delivered by said pistons.

63. In a device of the character described, an externally supported cover; a reservoir detachable therefrom; and pumping mechanism, including a drive-wheel, hung in the
20 reservoir from the cover, whereby said reservoir may be removed without disturbing said pumping mechanism or drive-wheel.

64. In a device of the character described, an externally supported cover; a reservoir detachable therefrom; and pumping mechanism, including a drive-wheel and actuating
25 means therefor, hung in the reservoir from the cover, whereby said reservoir may be removed without disturbing said pumping mechanism, wheel, or actuating means.
30

65. In a device of the character described, an externally supported cover; a reservoir detachable therefrom; and pumping mechanism, including a worm-wheel and an actuating
35 worm therefor, hung in the reservoir from the cover, whereby said reservoir may be removed without disturbing said pumping mechanism, wheel, or worm.

66. In a device of the character described, an externally supported cover; a reservoir detachable therefrom; and pumping mechanism, including a pump-operating shaft
40 and a drive-wheel, hung in the reservoir from the cover, whereby said reservoir may be removed without disturbing said pumping mechanism, shaft, or wheel.
45

67. In a device of the character described, an externally supported cover; a reservoir detachable therefrom; and pumping mechanism, including a pump-operating shaft, a
50 worm-wheel, and an actuating worm for said wheel, hung in the reservoir from the cover, whereby said reservoir may be removed without disturbing said pumping
55 mechanism, shaft, wheel, or worm.

68. In a force feed lubricator, the combination with an externally supported cover and a reservoir detachable therefrom; of a
60 pump, means for operating said pump, and a device for adjusting the stroke of said pump, all supported by said cover, whereby said reservoir may be removed without
disturbing the same.

69. In a force feed lubricator, the combination with an externally supported cover

and a reservoir detachable therefrom; of a pump, means for operating said pump, and a device for adjusting the stroke of said pump, all supported within the reservoir by
70 said cover, whereby said reservoir may be removed without disturbing the same.

70. In a lubricating device, an externally supported cover; an oil reservoir detachable from said cover; a pendent portion
75 extending from said cover into said receptacle and provided with a chamber having an inlet opening into said receptacle and a discharge outlet; a reciprocable plunger adapted to operate in such chamber; means
80 mounted on said pendent portion for reciprocating said plunger; and an externally projecting element borne by said cover for actuating said reciprocating means.

71. In a lubricating device, an externally supported cover; an oil reservoir detachable
85 from said cover; a pendent portion extending from said cover into said receptacle and provided with a chamber having an inlet opening into said receptacle and a discharge outlet; a reciprocable plunger adapted to operate in such chamber; a worm-wheel
90 mounted on such pendent portion and connected to reciprocate said plunger; and an externally projecting worm-shaft borne by said cover and meshing with said wheel.
95

72. In a lubricating device, an externally supported cover; an oil reservoir detachable from said cover; a pendent portion extending from said cover into said receptacle and
100 provided with a chamber having an inlet opening into said receptacle and a discharge outlet; a reciprocable plunger adapted to operate in such chamber; means for reciprocating said plunger; means adapted to vary the throw of said plunger; and an
105 externally projecting element borne by said cover for actuating said reciprocating means.

73. In a lubricating device, an externally supported cover; an oil reservoir detachable from said cover; a pendent portion extending
110 from said cover into said receptacle and provided with a chamber having an inlet opening into said receptacle and a discharge outlet; a reciprocable plunger adapted to operate in such chamber; a worm-wheel
115 mounted on such pendent portion and connected to reciprocate said plunger; and an externally projecting worm-shaft borne by said cover and meshing with said wheel.

74. In a lubricating device, an externally supported cover; an oil receptacle detachable
120 therefrom; a pendent portion extending from said cover into said receptacle and provided with a plurality of chambers having inlet openings into said receptacle and discharge outlets; a reciprocable plunger
125 adapted to operate in each of said chambers; a cross-head for actuating said plungers and a drive-wheel for said cross-head, both mounted on such pendent portion; and
130

an externally projecting element borne by said cover for actuating said drive-wheel.

75. In a lubricating device, an externally supported cover; an oil receptacle detachable therefrom; a pendent portion extending from said cover into said receptacle and provided with a plurality of chambers having inlet openings into said receptacle and discharge outlets; a reciprocable plunger adapted to operate in each of said chambers; a cross-head for actuating said plungers and a drive-wheel for said cross-head, both mounted on such pendent portion; means adapted to vary the throw of said plungers by said cross-head; and an externally projecting element borne by said cover for actuating said drive-wheel.

76. In a lubricating device, an externally supported cover; an oil receptacle detachable therefrom; a pendent portion extending from said cover into said receptacle and provided with a plurality of chambers having inlet openings into said receptacle and discharge outlets; a reciprocable plunger adapted to operate in each of said chambers; a cross-head and worm-wheel for ac-

tuating said plungers, both mounted on such pendent portion; and an externally projecting worm-shaft borne by said cover and meshing with said wheel.

77. In a lubricating device, an externally supported cover; an oil receptacle detachable therefrom; a pendent portion extending from said cover into said receptacle and provided with a plurality of chambers having inlet openings into said receptacle and discharge outlets; a reciprocable plunger adapted to operate in each of said chambers; a cross-head and worm-wheel for actuating said plungers, both mounted on such pendent portion; means adapted to vary the throw of said plungers by said cross-head; and an externally projecting worm-shaft borne by said cover and meshing with said wheel.

Signed by me, this 7th day of October, 1903.

WILLIAM L. MORRIS.

Attested by—

GRACE PETERS,
ARTHUR T. LONG.