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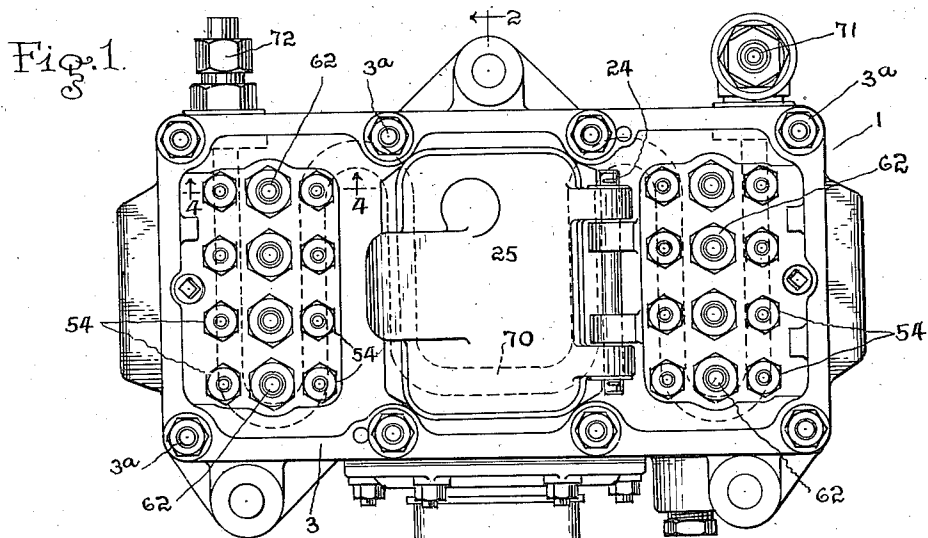
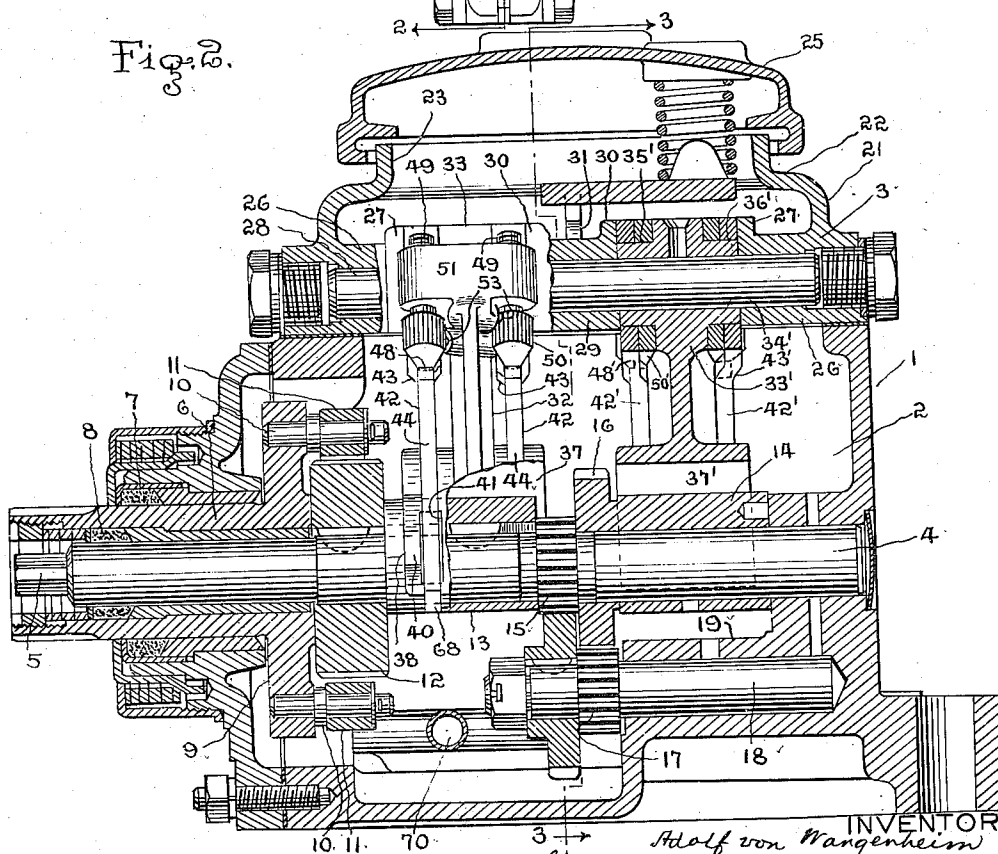
A. VON WANGENHEIM

1,991,340

PUMPING MEANS

Filed Feb. 18, 1931

2 Sheets-Sheet 1



INVENTOR
Adolf von Wangenheim
BY ATTORNEY
[Signature]

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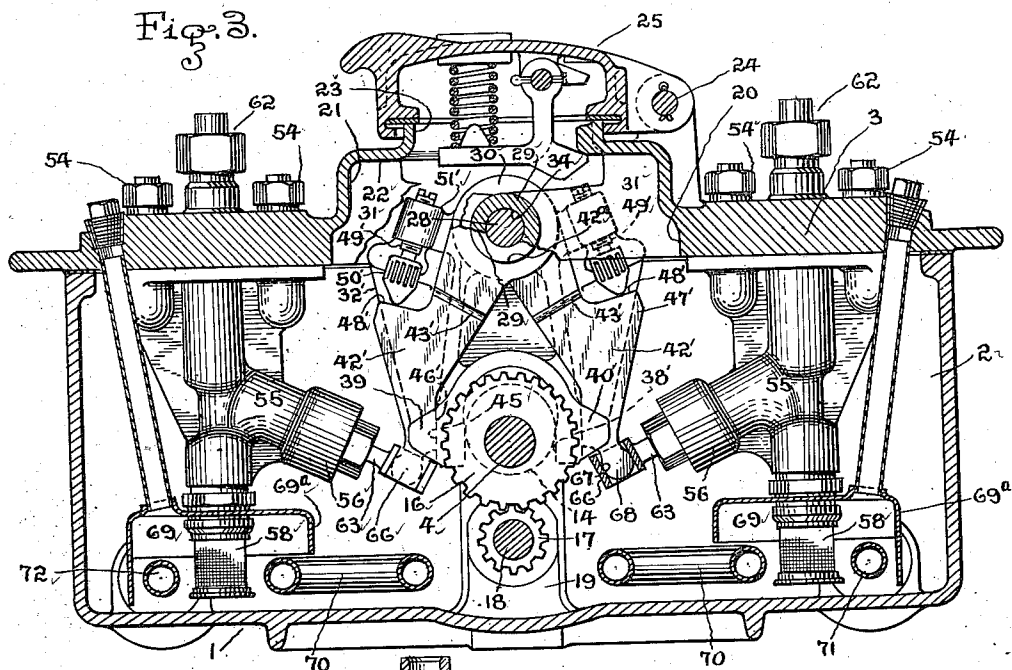
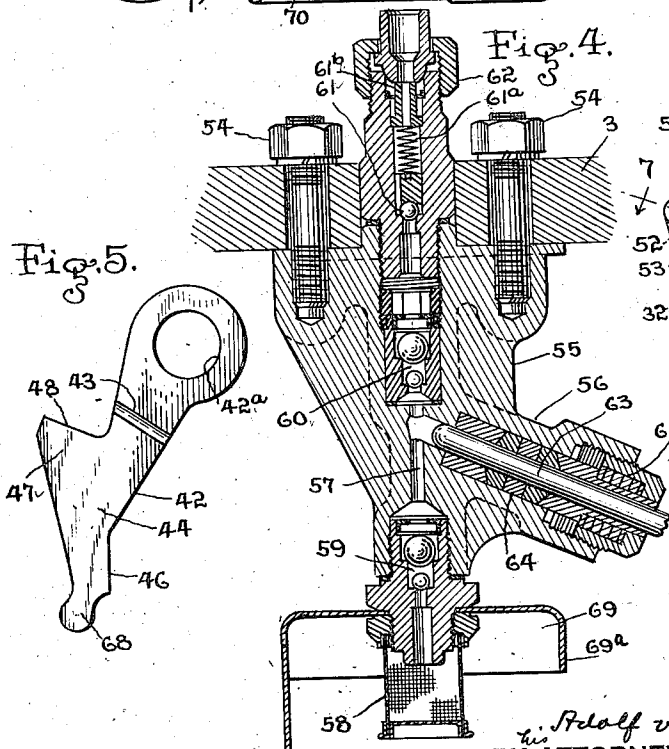
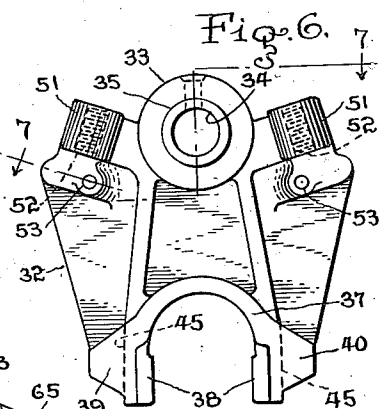
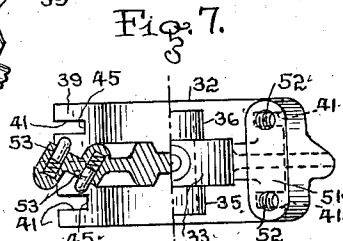
A. VON WANGENHEIM

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,991,340

PUMPING MEANS

Adolf von Wangenheim, Detroit, Mich., assignor
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a corporation of Michigan

Application February 18, 1931, Serial No. 516,764

26 Claims. (Cl. 184—27)

My invention relates to new and useful improvements in pumping means, and more particularly to means for delivering fluid under pressure from a source of supply, and which is particularly adapted for feeding lubricant to working parts of an engine or other machine.

An object of my invention is to provide a device which will deliver fluid such as oil or other lubricant from a source of supply at a desired pressure and rate.

Another object is to provide a device which may be adjusted with facility to control the rate of delivery of lubricant.

Another object is to provide a device which is of simple and compact construction, and which is efficient in operation.

The invention consists in the improved construction and combination of parts, to be more fully described hereinafter, and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawings, to be taken as a part of this specification, I have fully and clearly illustrated a preferred embodiment of my invention, in which drawings—

Figure 1 is a top plan view of a device embodying my invention;

Fig. 2 is a view in vertical section on the line 2—2 of Fig. 1, but with certain parts shown in elevation for clarity;

Fig. 3 is a view in vertical section on the line 3—3 of Fig. 2;

Fig. 4 is a detail view in section on the line 4—4 of Fig. 1;

Figs. 5 and 6 are detail views of elements of the device, and

Fig. 7 is a view in section of the element of Fig. 6, on the line 7—7 thereof.

Referring to the drawings by characters of reference, 1 designates generally a casing or container comprising a body or receptacle member 2 and a cover plate or closure member 3 secured thereto by studs and nuts 3^a, or the like. The casing 1 is preferably substantially rectangular, and journaled in bearings in the front and rear walls thereof is a main drive shaft 4 which extends substantially horizontally across the interior of the casing and projects from the front wall, as at 5, which projecting portion is preferably polygonal to receive a crank for manual rotation of the shaft. Sleeved on the shaft 5 is a tubular drive member 6 which is suitably packed, as at 7, 8, to prevent leakage from the casing. On the inner end of member 6 is a transverse flange 9 from the inner face of which

project horizontal pins 10 on which are pivotally supported pawls or dogs 11, preferably spring pressed, which cooperate with the teeth of a ratchet wheel 12 fixed rigidly on shaft 4 by a key or the like. It will thus be seen that the member 6 may be oscillated, as by connection to an engine cross-head, or the like, and will act through the pawl and wheel to rotate the shaft 4 continuously in one direction. Secured on shaft 4 by a key, or the like, is an eccentric cam means 13, and journaled on the shaft spaced from the means 13 is another eccentric cam means 14 having means to drive or rotate it more slowly than the rate of rotation of means 13. The drive means for means 14 preferably comprises a train of reduction gearing positioned between means 13 and 14 and having a driving pinion or gear wheel 15 preferably integral with driving shaft and a driven gear wheel 16, preferably integral with means 14 which are interconnected by a compound gear wheel 17 carried by a stub shaft 18 journaled in a boss 19 integral with the casing bottom wall.

Through the closure member 3 at its mid-portion, is an aperture 20 (see Fig. 3), preferably substantially rectangular, extending from front to rear of the casing and surrounded by a continuous upstanding flange or wall 21 having at its upper edge a continuous horizontal wall portion 22 which terminates in a vertical marginal lip or bead 23 defining a filling opening. Hinged, as at 24, on the top face of closure member 3, is a cap member 25 cooperable with the bead 23 to close the filling opening. Projecting inwardly from the front and rear portions of wall 21 are opposed bearing bosses 26 terminating in substantially vertical transverse end flanges 27 and having aligned bosses which are vertically above and parallel to shaft 4. Seated in the bores are the ends of a shaft or bearing member 28, which is supported at its mid-portion by a bearing sleeve 29 which terminates at its opposite ends in vertical parallel flanges 30, and which is preferably integral with and rigidly supported by a vertical web 31, also preferably integral with the side portions of wall 21, such that the web extends transversely to the shaft 28. Pivotaly supported by and journaled on the shaft 28 between the front flanges 27, 30 for swinging movement, is a depending driving means 32 (see Figs. 6 and 7). The means 32 preferably comprises a plate-like member having reinforcing ribs and having at its top mid-portion a transversely extending bearing part 33 having a cylindrical bore 34 there-through which receives the shaft 28. The end

portions of the part 33 respectively about the front pair of flanges 27, 30, and are of reduced diameter to define substantially cylindrical external journals, as at 35, 36, for a purpose to be described.

At the lower end of the member is a transversely extending part 37, substantially in the form of a yoke which straddles the eccentric cam 13 and has oppositely disposed abutment members 38 which are spaced apart a distance equal to the diameter of cam means 13, and which bear against diametrically opposite points on means 13 (see Fig. 3). The part 37 has laterally extending portions 39, 40 which are vertically slotted or recessed, as at 41, to provide guide and lateral taining means for driven follower members 42, which are pivotally supported by the shaft 28 and are directly journaled and carried by bearing apertures 42^a on the journals 35, 36 for swinging movement both relative to and with the means 32, and in planes substantially parallel to the plane of movement of means 32. There are preferably two members 42 on each of the journals 35, 36, the members 42 on each journal being offset, as at 43, respectively, rearwardly and forwardly and toward each other so that the lower portions 44 of members 42 lie in a substantially common, substantially vertical plane (see Fig. 2). The members 42 on the journal 35 are inclined to each other, diverging downward (see Fig. 3), to lie on opposite sides of shaft 4 and seat in the directly opposite recesses 41 in portions 39, 40, respectively. The bases 45 of the recesses 41 are substantially vertical, providing substantial abutment faces for cooperable driving engagement with inwardly faced vertical side portions 46 on members 42. Each of the members 42 has a lateral, outward extending flange or arm 47 having an upward facing shoulder 48 which cooperates with an adjustable driving abutment means 49, preferably a screw having its head 50, which engages shoulder 48, provided with longitudinal serrations for a purpose to be described. At the top of member 32 and transverse thereto at the sides of bearing part 33, are supports 51 which extend over the shoulders 48 and have in line therewith threaded apertures 52, in which the screw means 49 are adjustably threaded. On the underside of supports 51 are detent means 53, preferably spring pressed socketed plungers which engage in the screw head serrations to lock the means 49 in adjusted position.

Secured to the underface of the closure member 3, as by studs and nuts 54, are oppositely positioned pump members 55, each having a laterally, downward and inward inclined pump cylinder 56 which communicates with a vertical inlet and discharge passage 57 extending through member 55. At the inlet end of passage 57 which opens substantially at the casing bottom wall, is a strainer element 58, preferably a cylindrical screen of fine wire mesh closed at its bottom end. Within the passage 57 respectively below and above the communication of the pump cylinder therewith, are valve means 59, 60, preferably downward seating ball checks. At the discharge end of passage 57 which opens through member 3, is a valve 61, preferably a ball check, resiliently seated by a spring 61^a held under compression by the tail nut of nipple 62 acting through sleeve 61^b. The valve 61 is provided to prevent siphoning of oil from the casing 1 should a break occur in the oil feed line leading from the lubricator. The upper end of passage 57 terminates above member 3 in a nipple 62 for connection by conduit means to the desired point of

lubricant delivery. In the cylinder 56 is a reciprocable piston or plunger 63 sealed by packing medium 64 held under compression by a spring member 65. The end of the piston which projects from the cylinder has a head 66 which is slotted longitudinally, as at 67, to receive an extension 68 at the free lower end of the follower member 42. As the construction of the pumps and their connection to all of the members 42 is the same, the above description will suffice for all of the pumps.

Secured to and supported by the lower ends of the pump members is a shield 69 having a horizontal top portion and a depending continuous marginal flange or skirt 69^a which terminates below the plane of the inlet to passage 57. Within the casing is a heating means 70 which is positioned beneath the shield 69 and adjacent the passage inlet so that a quantity of heated fluid or lubricant will be maintained by the shield at the pump inlet for supply to passage 57. The means 70 preferably comprises a steam conduit having an inlet 71 and an outlet 72 which open through the rear wall of the casing.

Positioned between the rear pair of flanges 27, 30 and cooperating with the cam means 14, is a pump driving means similar to that above described as positioned between the front flanges 27, 30, and therefore the primes of the reference characters applied to the means cooperating with cam means 13 have been applied to the means cooperating with cam means 14.

The operation of the device is as follows: Oscillation of drive sleeve 6 will rotate the shaft 4 carrying with it the cam means 13 and 14 which bearing against the abutment faces 38 will oscillate members 32 on shaft 28 through a complete reciprocation for each revolution of shaft 4. As the members 32 are moved or swing toward the left of Fig. 3, the left hand recess base portions 45 will engage portions 46 on members 42 and carry the members 42 therewith to effect the pressure stroke of the left hand pump plungers 63 through the connection between extension 68 and plunger head 66. As the left hand plungers 63 are moved through their pressure stroke, expelling fluid from passage 57 past valves 60 and 61, the right hand plungers 63 will be moved through their suction stroke, drawing in heated fluid to passage 57 past the valves 59. This is due to the right hand means 49 engaging the right hand shoulders 48, the means 49 being rigid with means 32. The rate of feed of the pumps or the stroke thereof is regulatable by the means 49, the amount of lost motion between the head 50 and its shoulder 48, or the distance therebetween, when faces 45, 46 are in engagement, determines the length of stroke of the pumps, that is, the setting of means 49 determines the extent to which the plungers 63 will be withdrawn from their respective cylinders on the suction stroke.

From the foregoing, it is apparent that each of the members 42 may have a different length of swing, and therefore impart to its pump piston 63 a different length of stroke due to the individual adjustment for each of members 42. It will also be noted that the pistons driven by means 13 travel at a greater rate than the pistons driven by means 14, so that there is a wide range obtainable between the discharge rates of the various pumps of the device.

Should air become trapped in any or all of the pump units, the tail nuts of nipples 62 may be loosened, thus relieving the spring pressure on the ball checks 61, so that the trapped air may be expelled upon manual operation of the lubricator

through direct rotation of shaft 4 to prime the pump unit or units.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A force feed lubricator, comprising a pump, a pivotally supported member operatively engaging said pump to actuate the same, a pivotally supported member cooperable with said first-named member to impart swinging movement thereto, means acting through said second-named member positively to oscillate said first-named member on both pressure and suction strokes, and means to regulate the degree of swinging movement imparted to said first-named member by said means.

2. A force feed lubricator, comprising oppositely disposed reciprocating pumps, pivotally supported means operatively engaging said pumps to actuate the same alternately and positively on both pressure and suction strokes, pivotally supported means cooperable with and for oscillating said first-named means, said first-named means and said second-named means being movable relative to each other, and means to actuate said second-named means whereby said pumps discharge alternately.

3. A force feed lubricator, comprising oppositely disposed reciprocating pumps, pivotally supported means operatively engaging said pumps to actuate the same alternately, pivotally supported means having pairs of spaced oppositely disposed abutment members operable positively to oscillate said first-named means on both the pump pressure and suction strokes, and cam means to actuate said second-named means whereby said pumps discharge alternately.

4. A force feed lubricator, comprising a plurality of reciprocating pumps, a shaft, members pivotally supported by said shaft and operatively engaging said pumps to actuate the same, means engaging said members and being operable to oscillate said members for driving said pumps, and means to cause one of said pumps to reciprocate more rapidly than another of said pumps.

5. A force feed lubricator, comprising a plurality of reciprocating pumps, pivotally supported members operatively engaging said pumps to actuate the same, cam means to oscillate certain of said members, a drive shaft for each of said cam means, and a reduction gear train interconnecting said shafts whereby to reciprocate one of said pumps more rapidly than another of said pumps.

6. A force feed lubricator, comprising a reciprocating pump, a supporting shaft, a member carried by said shaft for swinging movement and having spaced abutment means, and a second member carried by said shaft for swinging movement and cooperable with said means whereby said means will act to swing said second-named member on swinging movement of said first-named member, said second-named member having operative engagement with said pump to reciprocate the same.

7. A force feed lubricator, comprising a reciprocating pump, a supporting shaft, a member carried by said shaft for swinging movement and having spaced abutment means, and a second member journaled on said first-named member for swinging movement relative to said shaft and said first-named member and cooperable with said means whereby said means will act to swing said second-named member on swinging movement of said first-named member, said second-

named member having operative engagement with said pump to reciprocate the same.

8. A force feed lubricator, comprising a reciprocating pump, a supporting shaft, a member carried by said shaft for swinging movement and having spaced abutment means, and a second member carried by said shaft for swinging movement and cooperable with said means whereby said means will act to swing said second-named member on swinging movement of said first-named member, said second-named member having operative engagement with said pump to reciprocate the same, certain of said abutment means being adjustable whereby to regulate the degree of movement imparted to said second-named member by said first-named member.

9. A force feed lubricator, comprising a reciprocating pump, a depending member pivotally supported adjacent its upper end, a follower member pivotally supported adjacent its upper end and extending into the path of movement of said depending member for movement thereby, means to move said depending member, and means interconnecting said follower member and said pump whereby said first-named means can actuate said pump.

10. A force feed lubricator, comprising a reciprocating pump, a depending member pivotally supported adjacent its upper end, means to move said depending member, a follower member pivotally supported adjacent its upper end and extending into the path of movement of said depending member for movement thereby in one direction, said follower member having a shoulder, means carried by said depending member and operable to engage said shoulder to move said follower member in the opposite direction, and means interconnecting said follower member and said pump whereby said first-named means can actuate said pump.

11. A force feed lubricator, comprising a reciprocating pump, a depending member pivotally supported adjacent its upper end, means to move said depending member, a follower member pivotally supported adjacent its upper end and extending into the path of movement of said depending member for movement thereby in one direction, said follower member having an upwardly facing shoulder, adjustable means carried by said depending member and operable to engage said shoulder to move said follower member in the opposite direction, and means interconnecting said follower member and said pump whereby said first-named means can actuate said pump.

12. A force feed lubricator, comprising a reciprocating pump, a shaft, a depending member pivotally supported on said shaft, means to move said depending member, a follower member pivotally supported on said depending member and having a part extending into the path of movement of said depending member for movement thereby in one direction, said follower member having an upwardly facing shoulder, adjustable means carried by said depending member and operable to engage said shoulder to move said follower member in the opposite direction, and means interconnecting said follower member and said pump whereby said first-named means can actuate said pump.

13. A force feed lubricator, comprising a receptacle having an open top, a cover member for said receptacle operable to close said open top, a bearing member supported by said cover member and positioned within said receptacle, a pump casing supported by said cover member and po-

sitioned within said receptacle, a pump plunger extending laterally from said pump casing, drive means carried by said bearing member and co-operable with said pump plunger to reciprocate said plunger, and means positioned within said receptacle for operating said drive means.

14. A force feed lubricator, comprising a receptacle having an open top, a cover member for said receptacle adapted to close said open top, a shaft extending across said receptacle and supported by said cover member, a pump casing positioned within said receptacle and rigidly secured to said cover member, said pump casing having a pump chamber with its outlet extending through said cover member, said pump casing having a pump plunger projecting laterally from said casing into said receptacle, means supported by said shaft for oscillatory movement, means operatively connecting said last-named means and said pump plunger, and means within said receptacle for imparting movement to said oscillatory means.

15. A force feed lubricator, comprising a receptacle having an open top, a cover member for said receptacle adapted to close said open top, a shaft extending across said receptacle and supported by said cover member, a pump casing positioned within said receptacle and rigidly secured to said cover member, said pump casing having a pump chamber with its outlet extending through said cover member, said pump casing having a pump plunger projecting laterally from said casing into said receptacle, means supported by said shaft for oscillatory movement, lost-motion means operatively connecting said last-named means and said pump plunger, means to regulate the extent of lost-motion, and means within said receptacle for imparting movement to said oscillatory means.

16. A force feed lubricator, comprising a receptacle having an open top, a hollow cover member removably supported by said receptacle and adapted to close said open top, supporting means positioned within and carried by said cover member, a shaft supported at its opposite ends by said supporting means, a pump casing removably secured to said cover member and positioned within said receptacle, said casing having a laterally extending pump chamber, a conduit in said casing opening into said receptacle and into said chamber, a second conduit extending from said chamber and opening through said cover member, a pump plunger in said pump chamber and projecting therefrom into said receptacle, a driving member journaled on said shaft and having operative engagement with said pump plunger, a follower member swingingly supported by said shaft, means to impart movement from said follower member to said driving member, means within said receptacle to actuate said follower member, and a driving member for said last-named means.

17. A force feed lubricator, comprising a receptacle having an open top, a hollow cover member removably supported by said receptacle and adapted to close said open top, supporting means positioned within and carried by said cover member, a shaft supported at its opposite ends by said supporting means, a pump casing removably secured to said cover member and positioned within said receptacle, said casing having a laterally extending pump chamber, a conduit in said casing opening into said receptacle and into said chamber, a second conduit extending from said chamber and opening through said cover member, a

pump plunger in said pump chamber and projecting therefrom into said receptacle, a driving member journaled on said shaft and having operative engagement with said pump plunger, a follower member swingingly supported by said shaft, means to impart movement from said follower member to said driving member, means to regulate the extent of movement imparted to said driving member by said follower member, means within said receptacle to actuate said follower member, and a driving member for said last-named means.

18. A force feed lubricator, comprising a pump, a supporting shaft, a swingable follower member carried by said shaft and having an end portion operatively engaging said pump to actuate the same, a swingable operating member mounted concentrically with said follower member and carried by said shaft and operable to impart movement to said follower member, means to regulate the extent of movement imparted to said follower member by the operating member, and means to swing said operating member.

19. A force feed lubricator, comprising a pump, a supporting shaft, a swingable follower member carried by said shaft and having an end portion operatively engaging said pump to actuate the same, a swingable operating member carried by said shaft and operable to impart movement to said follower member, cooperable means carried by said members to regulate the extent of movement imparted to said follower member by the operating member, and means to swing said operating member.

20. A force feed lubricator, comprising a pump, a supporting shaft, a swingable follower member carried by said shaft and having an end portion operatively engaging said pump to actuate the same, a swingable operating member mounted concentrically with said follower member and carried by said shaft and operable to impart movement to said follower member, means to regulate the extent of movement imparted to said follower member by the operating member, a drive shaft, and cam means on said drive shaft engageable with said operating member to impart movement thereto.

21. A force feed lubricator, comprising a reciprocating pump, a supporting shaft, a swingable operating member carried by said shaft and having a journal member surrounding said shaft, drive means for swinging said operating member, a follower member having a bearing aperture receiving said journal member, said follower member engaging said operating member for movement thereby, and means operatively connecting said follower member and said pump.

22. A force feed lubricator, comprising a plurality of reciprocating pumps, operating members for said pumps, a main drive shaft, means on said shaft for actuating one of said members, a sleeve member journaled on said shaft and having means for actuating another of said operating members, and a gear train operatively connecting said shaft and said sleeve member.

23. A force feed lubricator, comprising a receptacle having an open top, a cover member closing said open top and having an aperture therethrough, a pump casing secured to the underside of said cover member and closing said aperture, said casing having an outlet member projecting upward therefrom through said aperture, said casing having an inlet at its lower end and having a lateral extension, a pump plunger extending laterally from said casing and recip-

rocable in said extension, an operating member for said plunger and carried by said cover member, and means in said casing to actuate said operating member.

24. A force feed lubricator, comprising a receptacle having an open top, a cover member closing said open top, a pump casing secured to the underside of said cover member, said casing having an inlet at its lower end and an outlet at its upper end, a lateral extension projecting from said casing intermediate the ends of said casing, said extension diverging downward away from said casing, a pump plunger extending laterally from said casing and reciprocable in and having one end projecting from the lower end of said extension, an operating member pivotally secured adjacent its upper end to said cover member and extending downward therefrom laterally of said casing, said operating member having its lower end portion operatively engaging the projecting end of said plunger, and means in said casing to actuate said operating member.

25. A force feed lubricator, comprising a receptacle having an open top, a cover member closing said open top and having an aperture therethrough, a pump casing having an inlet and

having an upward facing shoulder engaging the underside of said cover member, said casing having an outlet member projecting upward from said shoulder and through said aperture, a lateral extension on said casing, a pump plunger extending laterally from said casing and reciprocable in said extension, and means in said receptacle to actuate said plunger.

26. A force feed lubricator, comprising a receptacle having an open top, a cover member closing said open top, a pump casing secured to said cover member and extending downward therefrom, said casing having an inlet and an outlet and having a lateral extension, a pump plunger projecting laterally from said casing and reciprocable in said extension, an operating shaft positioned in said receptacle laterally of said casing, a bearing member positioned above said shaft and supported by said cover member, a pivotally supported operating member carried by said bearing member and depending therefrom, said operating member having engagement with said plunger to reciprocate the same, and cam means on said shaft for actuating said operating member.

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