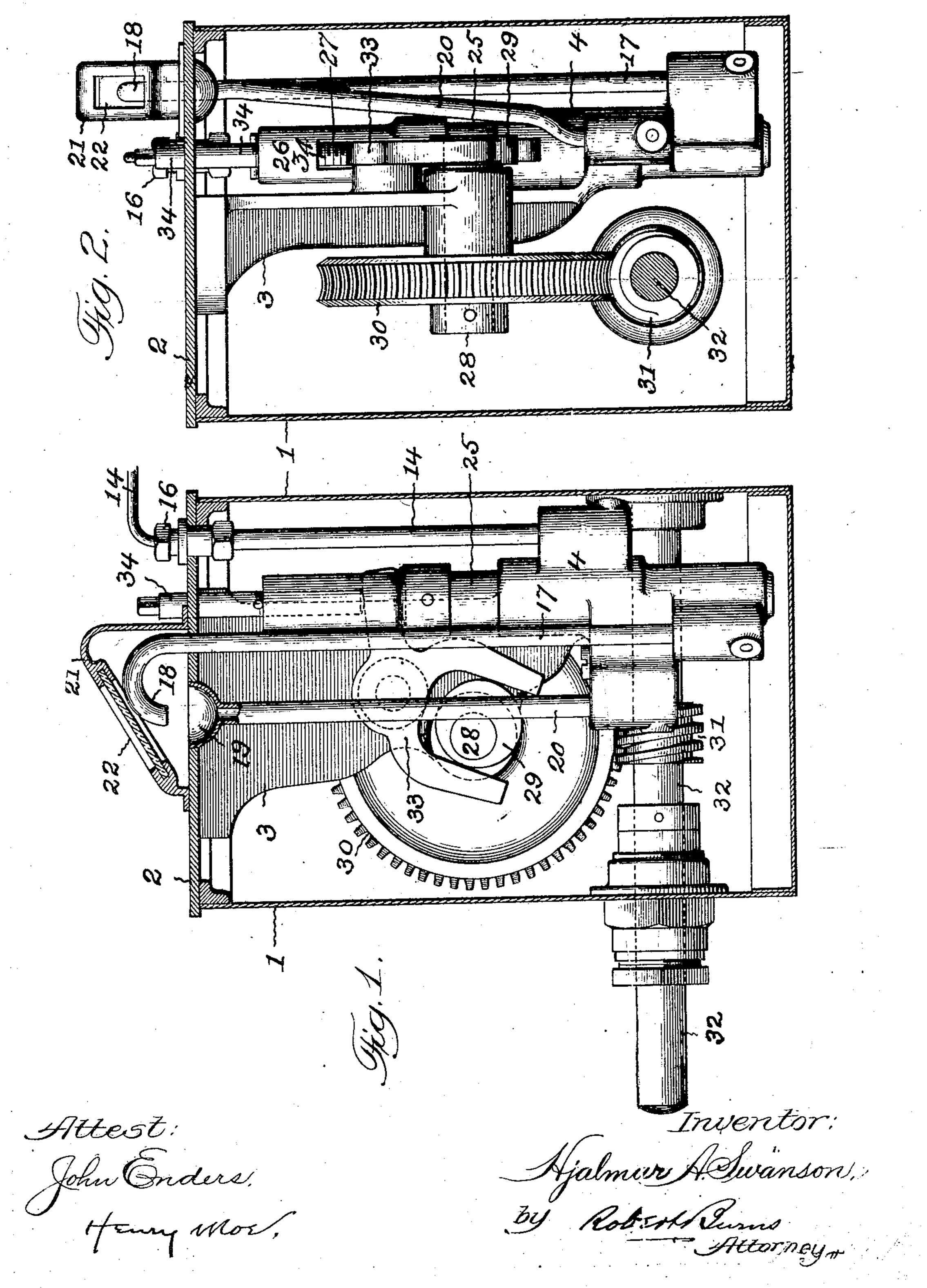
## H. A. SWANSON. LUBRICATOR.

APPLICATION FILED DEC. 12, 1908.

928,819.

Patented July 20, 1909.

2 SHEETS-SHEET 1.



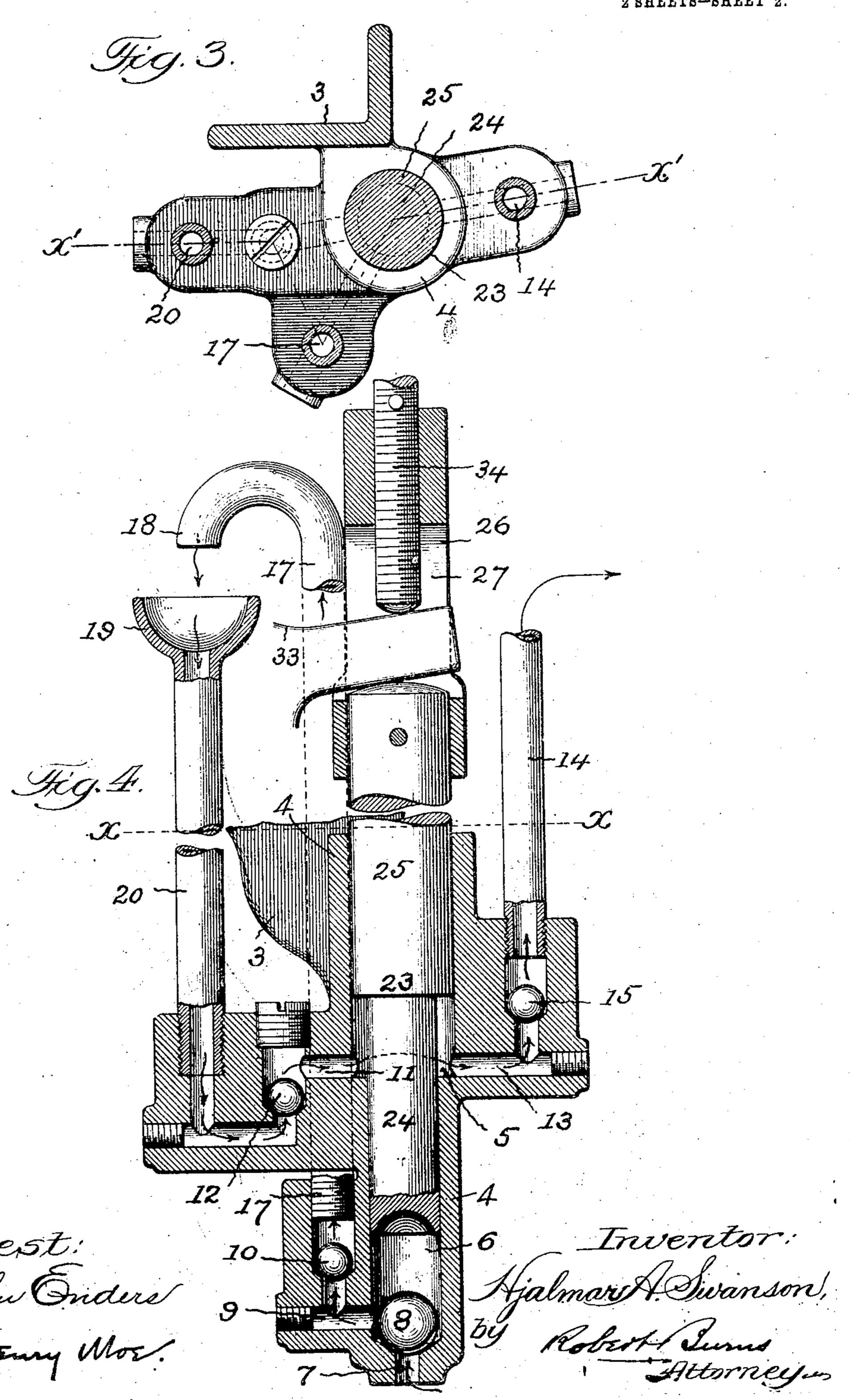
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## UNITED STATES PATENT OFFICE.

HJALMAR A. SWANSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO PRECISION APPLIANCE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

## TUBRICATOR.

No. 928,819.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed December 12, 1908. Serial No. 467,134

To all whom it may concern:

Be it known that I, HJALMAR A. SWANson, a citizen of the United States of America, and a resident of Chicago, in the county
of Cook and State of Illinois, have invented
certain new and useful Improvements in Lubricators, of which the following is a specification.

This invention relates to force feed lubri10 cators, and has for its object to provide a simple and efficient structural arrangement and combination of parts, which at each stroke of the pumping mechanism is adapted to force lubricant through a visible feed appliance and from thence back through the pumping mechanism and to the bearing to be lubricated, all as will hereinafter more fully appear.

In the accompanying drawings:—Figure 1 is a side elevation, with the containing casing and its accessories in section. Fig. 2, is an end elevation with the aforesaid casing in section. Fig. 3, is a detail horizontal section on line x-x, Fig. 4, Fig. 4, is a detail vertical section on the irregular line x'-x', Fig. 3.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 represents an open top casing adapted to contain the lubricant and provided with a cover or cap 2, to the under side of which the pumping mechanism is secured so as to depend into the interior of the casing and be submerged in the 135 lubricant, as usual in the present class of

3 is the carrying frame of the pump, having a flanged upper end by which it is attached to the casing cover 2, and provided with bearing hubs for the hereinafter described operating shaft and intermediate yoke lever by which the pump plunger is operated

4, is a vertical pump housing, preferably formed as an integral portion of the pump carrying frame 3, and formed with two bores of different diameters and arranged in longitudinal alinement to form upper and lower piston chambers 5 and 6 for the dif50 ferential piston or plunger hereinafter de-

7 is an inlet port or passage formed in the lower end of the pump housing and connecting the lower end of the lower piston chamber 6 with the chamber of the casing 1; and

8 is a check valve of the ball or other usual type controlling said port.

9 is an outlet port or passage formed in a lateral extension of the pump housing; such port is arranged adjacent to the lower end of the lower piston chamber 6, and connects the same with the visible feed appliance hereinafter described, and 10 is a check valve of

after described, and 10 is a check valve of the ball or other usual type controlling said port.

another lateral extension of the pump housing and connecting the lower end of the upper piston chamber with the visible feed appliance before referred to, and 12 is a check 70 valve of the ball or other usual type controlling said port.

13 is an outlet port or passage formed in still another lateral extension of the pump housing; such port is arranged in adjacent 75 relation to the lower end of the upper piston chamber 5 and connects the same with the outlet pipe 14 which conducts the lubricant to the point where it is to be used.

15 is a check valve of the ball or other 80 usual type controlling the aforesaid outlet port 13. In my preferred construction the outlet pipe 14 passes through a stuffing box or gland 16 on the cover 2, so as to be removable along with the cover and pumping 85

mechanism.

of the visible feed appliance above referred to. Such pipe connects at its lower end with the outlet port or passage 9 of the lower 90 piston chamber 6, and extends up through the cover 2 and is provided with a curved discharge nozzle 18 at its upper end, as shown.

19 is a receiving tray or funnel carried by 95 the cover 2 in a position beneath the nozzle 18, and adapted to receive the discharge. therefrom.

20 is a pipe connecting the tray or funnel 19 with the inlet port or passage 11 of the upper piston chamber 5 to supply the same with the lubricant passing through the parts just described.

21 is a housing secured to the cover 2 and inclosing the nozzle 18 and tray 19, and provided with a glazed orifice 22 through which the discharge of the lubricant from the nozzle 18 can be clearly and readily observed.

23 is the differential pump piston or plunger formed with a lower portion 24 of a 110

eter of the lower piston chamber 6, and valve in another of said valve casings conforming an individual piston or plunger trolling a passage having communication therefor; with an intermediate portion 25 with the lower end of the upper pump chamof a large diameter corresponding to the ber and with the outlet passage of the lower 70 diameter of the upper piston chamber 5 and | pump chamber, an outlet valve in another forming an individual piston or plunger of said valve casings controlling a passage therefor, and with an upper operating por- near the lower end of said upper pump tion 26 formed with an elongated slot 27 for the reception of an end of the operating, in said pump chambers and operatively con- 75 yoke lever and the means for adjusting the nected together, and means for imparting stroke of the piston or plunger, as herein- reciprocation to said pistons, substantially after more fully described. Such upper por- as set forth. tion 26 of the piston is preferably formed 2. In a lubricator, the combination of a separate from the piston proper and pinned main containing casing, a pump housing ar- 80

shaft carries an eccentric 29 and worm at the lower end of the lower pump chamber, wheel 30, which worm wheel is driven by an an outlet valve in one of said valve casings endless worm 31 carried on a driving shaft; controlling an outlet passage near the lower 32 journaled in the lower portion of the end of said lower pump chamber, an inlet

of the hubs of the carrying frame 3, with pump chamber, an outlet valve in another its yoke portion adapted for operative en- of said valve casings controlling a passage 95 gagement with the aforesaid eccentric 29, near the lower end of said upper pump while its opposite portion is in the form of the chamber, differential pump pistons arranged slot 27 of the upper portion of the pump nected together, a visible feed appliance 35 piston to have operative engagement therewith.

24 is a vertical shaft extending down to said pistons, substantially as set forth. through the cover 2, with its lower portion 3. In a lubricator, the combination of a screw-threaded and screwing through the 40 upper end of the aforesaid piston portion 26 and so that its lower end will constitute an adjustable upper abutment for the piston operating arm of the yoke lever 33, while the lower-abutment for such arm is formed 45 by the upper end of the intermediate piston portion 25, as shown. With the above described construction the amount of lost motion for the arm of the yoke lever can be varied, and so that a minimum to a maxi-50 mum stroke of the pump piston can be attained by the vertical adjustment of the aforesaid shaft 34.

Having thus described my said invention what I claim as new and desire to secure by

55 Letters Patent, is:—

1. In a lubricator, the combination of a main containing casing, a pump housing arranged in said casing and formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings

small diameter corresponding to the diam- end of said lower pump chamber, an inlet chamber, differential pump pistons arranged

or otherwise secured thereto, with a view to ranged in said casing and formed with a economy in manufacture.

pair of pump chambers in longitudinal aline28 is the operating shaft of the pump pisnent and having different diameters, a series ton, journaled in one of the before men-; of lateral valve casings carried by the pump 20 tioned hubs of the carrying frame 3; such shousing, an inlet valve controlling a passage 85 25 casing 1 and extending through the same valve in another of said valve casings con- 90 for connection to a suitable power source trolling a passage having communication from which it receives rotation. with the lower end of the upper pump cham-33, is a yoke tever journaled on another ber and with the outlet passage of the lower a straight arm that extends into the vertical in said pump chambers and operatively conarranged intermediate of the pump cham- 100 bers, and means for imparting reciprocation

> main containing casing, a pump housing arranged in said casing and formed with a 105 pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump cham- 110 ber, an outlet valve in one of said valve casings controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having com- 115 munication with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper 120 pump chamber, differential pump pistons arranged in said pump chambers and operatively connected together, means for imparting reciprocation to said pistons, and means for adjusting the stroke of said pis- 125. tons, substantially as set forth.

4. In a lubricator, the combination of a main containing easing, a pump housing arranged in said casing and formed with a 55 controlling an outlet passage near the lower | pair of pump chambers in longitudinal aline- 130

ment and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump cham-5 ber, an outlet valve in one of said valve casings, controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having com-10 munication with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper 15 pump chamber, differential pump pistons arranged in said pump chambers and operatively connected together, a visible feed appliance arranged intermediate of the piston chambers, means for imparting recipro-20 cation to said pistons, and means for acjusting the stroke of said pistons, substantially as set forth.

5. In a lubricator, the combination of a pump housing formed with a pair of pump 25 chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an 30 outlet valve in one of said valve casings controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication 35 with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper 40 pump chamber, differential pump pistons arranged in said pump chambers and operatively connected together, and means for imparting reciprocation to said pistons, substantially as set forth.

6. In a lubricator, the combination of a pump housing formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, 50 an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings. controlling an outlet passage near the lower end of said lower pump chamber, an inlet 55 valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another 30 of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and operatively connected together, a visible feed appliance ar-15 ranged intermediate of the pump chambers,

and means for imparting reciprocation to said pistons, substantially as set form.

7. In a lubricator, the combination of a pump housing formed with a pair of pump chambers in longitudinal alinement and 7 having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings con- 7 trolling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump chamber and a with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and operatively connected together, a visible feed appliance arranged intermediate of the pump chambers, means for imparting reciprocation to said pistons, and means for adjusting the stroke of said pistons, substantially as set forth.

8. In a lubricator, the combination of a pump housing formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and operatively connected together, means for imparting reciprocation to said pistons, and means for adjusting the stroke of said pistons, substantially as set forth.

9. In a lubricator, the combination of a main containing easing, a pump housing ar ranged in said casing and formed with a pair of pump chambers in longitudina alinement and having different diameters, series of lateral valve casings carried by th pump housing, an inlet valve controlling passage at the lower end of the lower pum chamber, an outlet valve in one of said valv casings controlling an outlet passage nea the lower end of said lower pump chamber an inlet valve in another of said valve cas ings controlling a passage having commun cation with the lower end of the uppe pump chamber and with the outlet passag of the lower pump chamber, an outlet valu

in another of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and opera-5 tively connected together, and means for imparting reciprocation to said pistons, the same comprising an operating shaft carrying an eccentric and a yoke lever engaging said eccentric and provided with an arm engaging the pump pistons, substantially as set forth.

10. In a lubricator, the combination of a main containing casing, a pump housing arranged in said casing and formed with a 5 pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump 0 chamber, an outlet valve in one of said valve casings controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communi-5 cation with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper nump chamber, differential pump pistons arranged in said pump chambers and operatively connected together, a visible feed appliance arranged intermediate of the pump chambers, and means for imparting recipro-5 cation to said pistons, the same comprising an operating shaft carrying an eccentric and a yoke lever engaging said eccentric and provided with an arm engaging the pump pis-

tons, substantially as set forth.

11. In a lubricator, the combination of a main containing casing, a pump housing arranged in said casing and formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and operatively connected together, means for imparting reciprocation to said pistons, the same comprising | valve casings carried by the pump hous- 125 an operating shaft carrying an eccentric, and | ing, an inlet valve controlling a passage at a voke lever engaging said eccentric and the lower end of the lower pump chamber, provided with an arm engaging the pump an outlet valve in one of said valve cas-

pistons, and means for adjusting the stroke 65 of said pistons, substantially as set forth.

12. In a lubricator, the combination of a main containing easing, a pump housing arranged in said casing and formed with a pair of pump chambers in longitudinal aline- 70 ment and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump cham-ber, an outlet valve in one of said valve cas- 75 ings controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump cham- 80 ber and with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged 85 in said pump chambers and operatively connected together, a visible feed appliance arranged intermediate of the pump chambers, means for imparting reciprocation to said pistons, the same comprising an operating 90 shaft carrying an eccentric, and a yoke lever engaging said eccentric and provided with an arm engaging the pump pistons, and means for adjusting the stroke of the pistons, substantially as set forth.

13. In a lubricator, the combination of a pump housing formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, 100 an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve 105 in another of said valve casings controlling a passage having communication with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another of said 110 valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and operatively connected together, and means for imparting recipro- 115 cation to said pistons, the same comprising an operating shaft carrying an eccentric and a yoke lever engaging the eccentric and provided with an arm engaging the pump pistons, substantially as set forth.

14. In a lubricator, the combination of a pump housing formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral

ber, an inlet valve in another of said pump chamber, differential pump pistons valve casings controlling a passage hav- arranged in said pump chambers and oper-5 ing communication with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of 10 said upper pump chamber, differential pump pistons arranged in said pump chambers, and operatively connected together, means for imparting reciprocation to said pistons, the same comprising an operating shaft 15 carrying an eccentric and a yoke lever engaging the eccentric and provided with an arm engaging the pump pistons, and means for adjusting the stroke of said pump pistons, substantially as set forth.

15. In a lubricator, the combination of a main containing casing, a pump housing arranged in said casing and formed with a pair of pump chambers in longitudinal alinement and having different diameters, a 25 series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings controlling an outlet passage 30 near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump chamber and with the outlet 35 passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and 40 operatively connected together, said pistons having an operating portion provided with a vertical slot, an operating shaft carrying an eccentric, a yoke lever engaging said eccentric and provided with an arm engaging 45 in the aforesaid vertical slot, and an adjustable abutment screw passing through the operating portion of the pistons and projecting into said slot, substantially as set forth. 16. In a lubricator, the combination of 50 a main containing casing, a pump housing

arranged in said casing and formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the 55 pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings controlling an outlet passage near the lower end of said lower pump chamber, 60 an inlet valve in another of said valve caschamber and with the outlet passage of the lower pump chamber, an outlet valve in provided with a vertical slot, a visible feed

ings controlling an outlet passage near another of said valve casings controlling a 65 the lower end of said lower pump cham- passage near the lower end of said upper atively connected together, said pistons having an operating portion provided with a 70 vertical slot, a visible feed appliance arranged intermediate of the pump chambers, an operating shaft carrying an eccentric, a yoke lever engaging said eccentric and provided with an arm engaging in the aforesaid 75 vertical slot, and an adjustable abutment screw passing through the operating portion of the pistons and projecting into said slot, substantially as set forth.

17. In a lubricator, the combination of a 80 pump housing formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the 85 lower end of the lower pump chamber, an outlet valve in one of said valve casings controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling 90 a passage having communication with the lower end of the upper pump chamber and with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the 95 lower end of said upper pump chamber, differential pump pistons arranged in said. pump chambers and operatively connected together, said pistons having an operating portion provided with a vertical slot, an 100 operating shaft carrying an eccentric, a yoke lever engaging said eccentric and provided with an arm engaging in the aforesaid vertical slot, and an adjustable abutment screw passing through the upper end of said oper- 105 ating portion of the pistons and projecting into said slot, substantially as set forth.

18. In a lubricator, the combination of a pump housing formed with a pair of pump chambers in longitudinal alinement and hav- 110 ing different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings con- 115 trolling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump chamber and 120 with the outlet passage of the lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump 12! appliance arranged intermediate of the piston chambers, an operating shaft carrying an eccentric, a yoke lever engaging said eccentric and provided with an arm engaging in the aforesaid vertical slot, and an adjustable abutment screw passing through the upper end of said operating portion of the pistons and projecting into said slot, sub-

stantially as set forth. 19. In a lubricator, the combination of a main containing casing, a pump housing arranged in said easing and formed with a pair of pump chambers in longitudinal alinement and having different diameters, a 15 series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings controlling an outlet passage near 20 the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump chamber and with the outlet passage of the 25 lower pump chamber, an outlet valve in another of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and operatively con-30 nected together, a vertical pipe connected to the outlet passage of the lower pump chamber and having a downturned nozzle at its upper end, a receiving funnel arranged beneath said nozzle, a pipe connecting said funnel with the inlet passage of the upper pump chamber, a housing inclosing said nozzle and funnel and provided with a glazed orifice, means for imparting reciprocation to said pistons, and means for adjust-40 ing the stroke of said pistons, substantially as set forth.

20. In a lubricator, the combination of a pump housing formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings controlling an outlet passage near the lower end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump cham-

ber and with the outlet passage of the lower 55 pump chamber, an outlet valve in another. of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and operatively con- 60 nected together, a vertical pipe connected to the outlet passage of the lower pump chamber and having a downturned nozzle at its upper end, a receiving funnel arranged beneath said nozzle, a pipe commenting said 65 funnel with the inlet passage of the upper pump chamber, a housing inclosing said nozzle and funnel and provided with a glazed orifice, and means for imparting reciprocation to said pistons, substantially as set 70 forth.

21. In a lubricator, the combination of a pump housing formed with a pair of pump chambers in longitudinal alinement and having different diameters, a series of lateral 75 valve casings carried by the pump housing, an inlet valve controlling a passage at the lower end of the lower pump chamber, an outlet valve in one of said valve casings controlling an outlet passage near the lower 80 end of said lower pump chamber, an inlet valve in another of said valve casings controlling a passage having communication with the lower end of the upper pump chamber and with the outlet passage of the lower 85 pump chamber, an outlet valve in another. of said valve casings controlling a passage near the lower end of said upper pump chamber, differential pump pistons arranged in said pump chambers and operatively con- 90 nected together, a vertical pipe connected to the outlet passage of the lower pump chamber and having a downturned nozzle at its upper end, a receiving funnel arranged. beneath said nozzle, a pipe connecting said 95 funnel with the inlet passage of the upper pump chamber, a housing inclosing said nozzle and funnel and provided with a glazed orifice, means for imparting reciprocation to said pistons and means for adjust- 100 ing the stroke of said pistons, substantially as set forth.

Signed at Chicago, Illinois, this 10th day of December 1908.

HJALMAR A. SWANSON.

Witnesses:
ROBERT BURNS,
HENRY MOE.