H. A. SWANSON.

LUBRICATOR.

APPLICATION FILED DEC. 12, 1908.

928,819. Patented July 20, 1909.

2 SHEETS—SHEET 1.

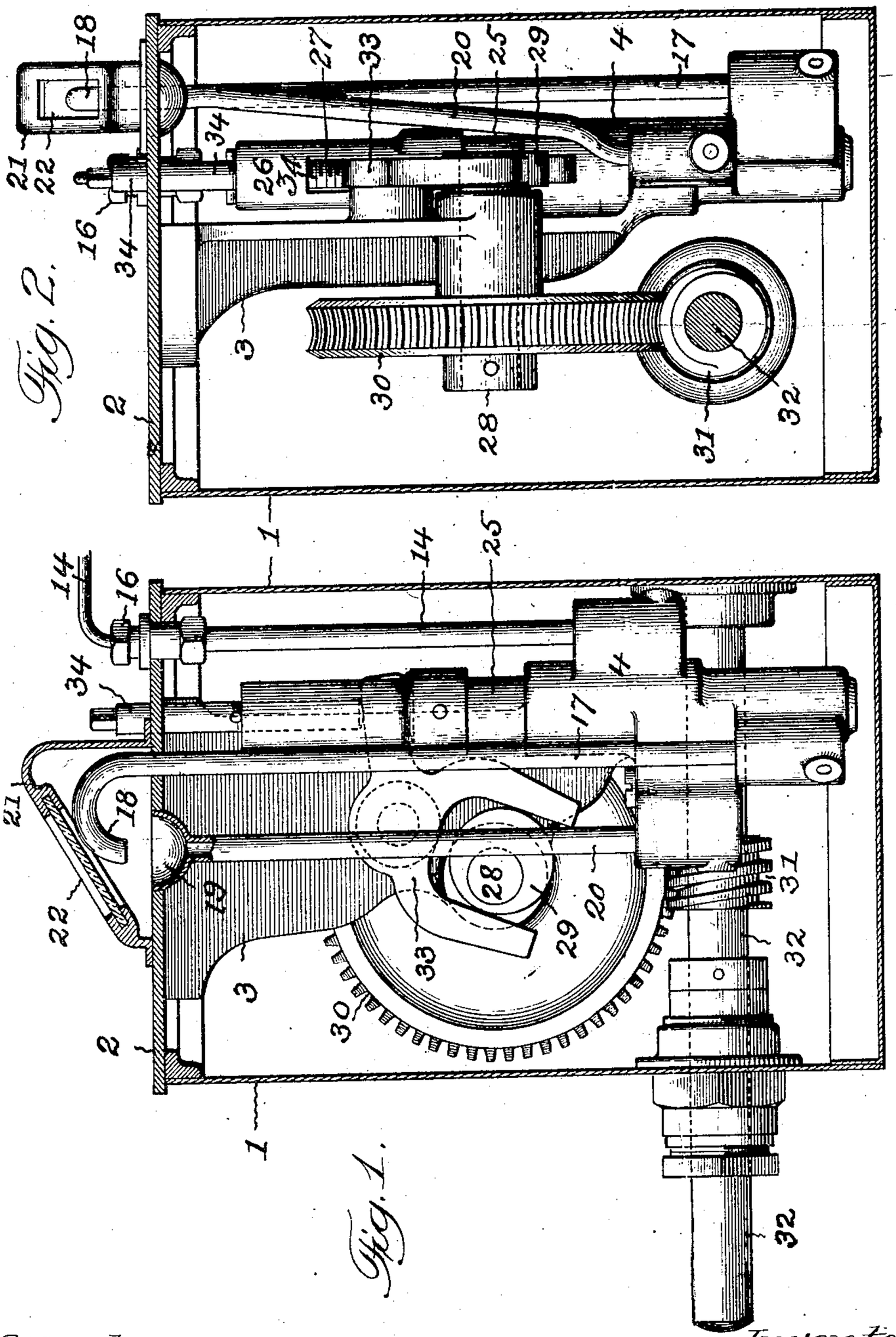


Fig. 2.

Fig. 1.

Attest:
John Enders.
Henry Mock.

Inventor:
Hjalmar A. Swanson,
by Robert H. Rums
Attorney.

H. A. SWANSON.

LUBRICATOR.

APPLICATION FILED DEC. 12, 1908.

928,819. Patented July 20, 1909.

2 SHEETS—SHEET 2.

Fig. 3.

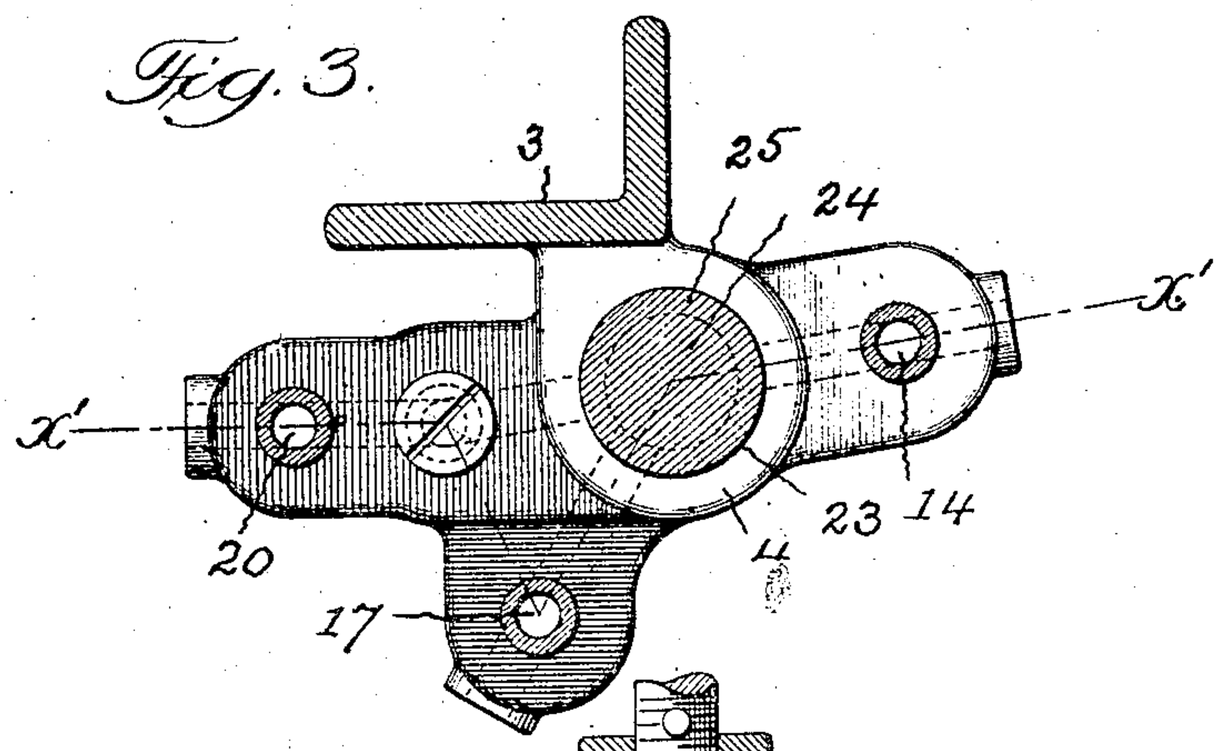
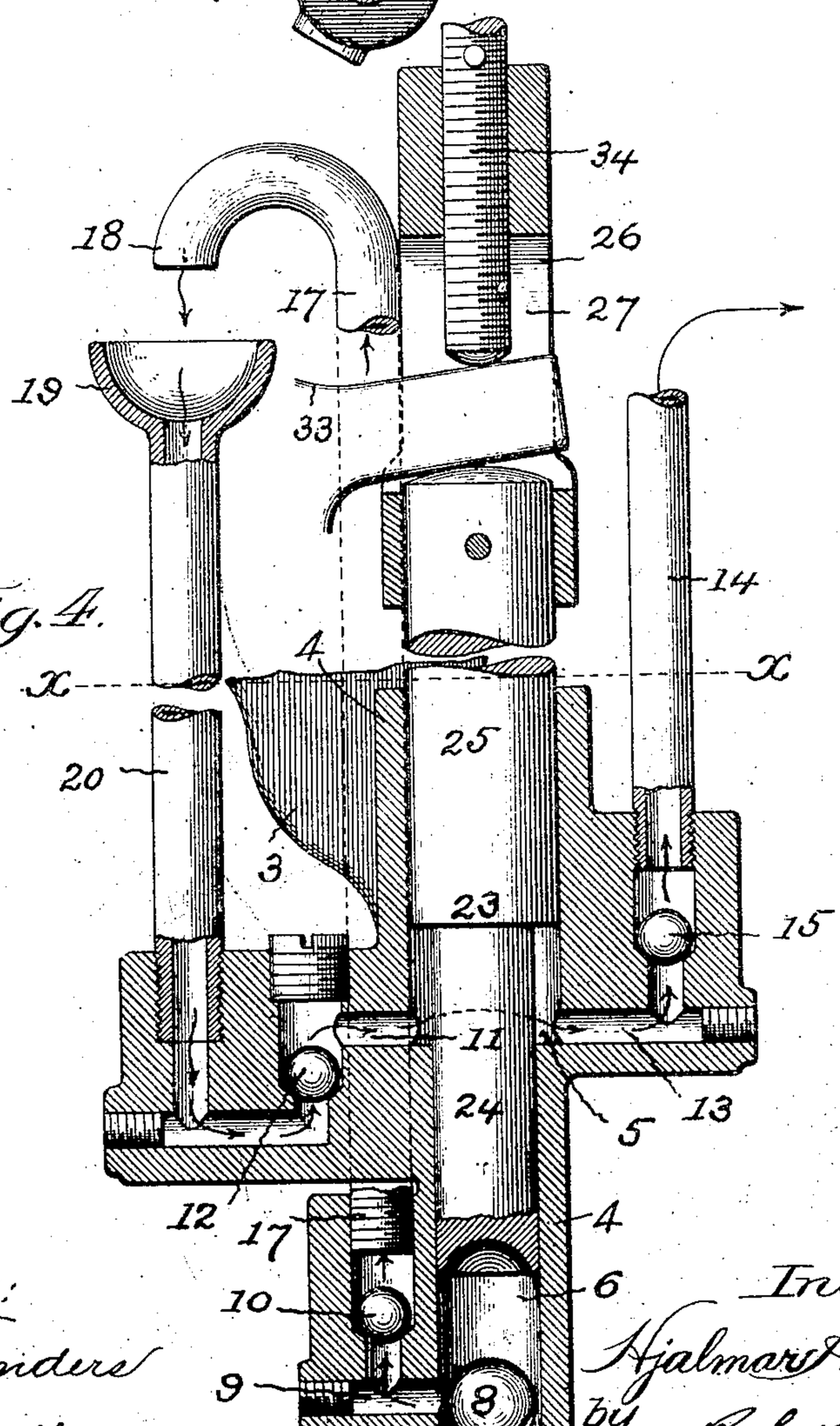


Fig. 4.



Attest:
John Enders
Henry Mox.

Inventor:
Hjalmar A. Swanson,
by Robert Burns
Attorney

UNITED STATES PATENT OFFICE.

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

LUBRICATOR.

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 lubricators, 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 lubricant, as usual in the present class of lubricators.

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 differential piston or plunger hereinafter described.

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 the ball or other usual type controlling said port.

11 is an inlet port or passage formed in 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 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 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 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 mechanism.

17 is a vertical pipe constituting a portion 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 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 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

small diameter corresponding to the diameter of the lower piston chamber 6, and forming an individual piston or plunger therefor; with an intermediate portion 25 of a large diameter corresponding to the diameter of the upper piston chamber 5 and forming an individual piston or plunger therefor, and with an upper operating portion 26 formed with an elongated slot 27 for the reception of an end of the operating yoke lever and the means for adjusting the stroke of the piston or plunger, as hereinafter more fully described. Such upper portion 26 of the piston is preferably formed separate from the piston proper and pinned or otherwise secured thereto, with a view to economy in manufacture.

28 is the operating shaft of the pump piston, journaled in one of the before mentioned hubs of the carrying frame 3; such shaft carries an eccentric 29 and worm wheel 30, which worm wheel is driven by an endless worm 31 carried on a driving shaft 32 journaled in the lower portion of the casing 1 and extending through the same for connection to a suitable power source from which it receives rotation.

33, is a yoke lever journaled on another of the hubs of the carrying frame 3, with its yoke portion adapted for operative engagement with the aforesaid eccentric 29, while its opposite portion is in the form of a straight arm that extends into the vertical slot 27 of the upper portion of the pump piston to have operative engagement therewith.

34 is a vertical shaft extending down through the cover 2, with its lower portion screw-threaded and screwing through the 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 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 maximum 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 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 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, and means for imparting reciprocation to said pistons, substantially as set forth.

2. 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, a visible feed appliance arranged intermediate of the pump chambers, and means for imparting reciprocation to said pistons, substantially as set forth.

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

4. 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 aline-

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 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, a visible feed appliance arranged intermediate of the piston chambers, means for imparting reciprocation to said pistons, and means for adjusting 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 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, 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, 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, a visible feed appliance arranged intermediate of the pump chambers, and means for imparting reciprocation to said pistons, substantially as set forth.

7. 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, 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 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, 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 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, a visible feed appliance arranged intermediate of the pump chambers, 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.

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 an operating 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 said pistons, substantially as set forth.

12. 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, a visible feed appliance arranged intermediate of the pump chambers, 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, 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, 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, and means for imparting reciprocation 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 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 cas-

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 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 an operating shaft 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 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, 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 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 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, said pistons having an operating portion provided with a 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 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 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, 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 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, 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 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, said pistons having an operating portion provided with a vertical slot, a visible feed

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, substantially as set forth.

19. 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, 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 adjusting 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 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, 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, substantially as set 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 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, 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 adjusting 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.