H. A. SWANSON.

LUBRICATOR.

APPLICATION FILED DEC. 1, 1911.

1,036,929.

Patented Aug. 27, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

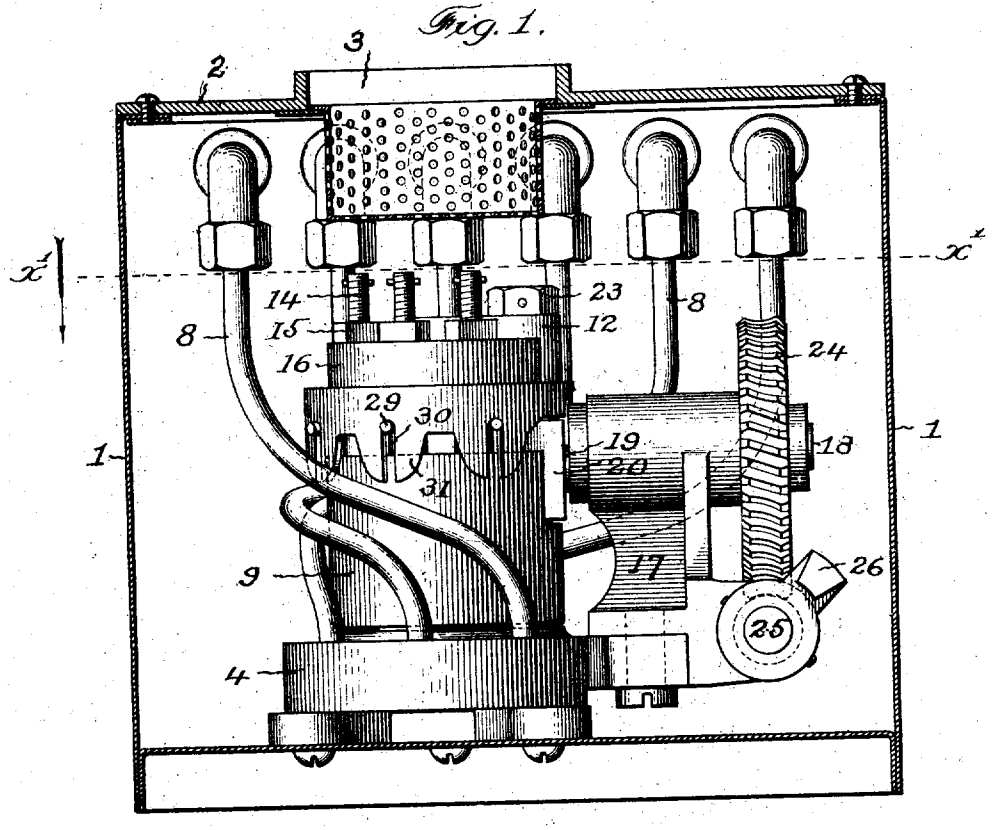
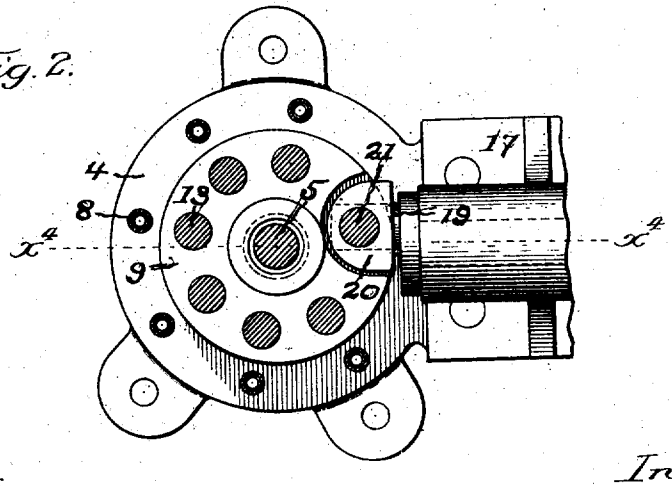


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

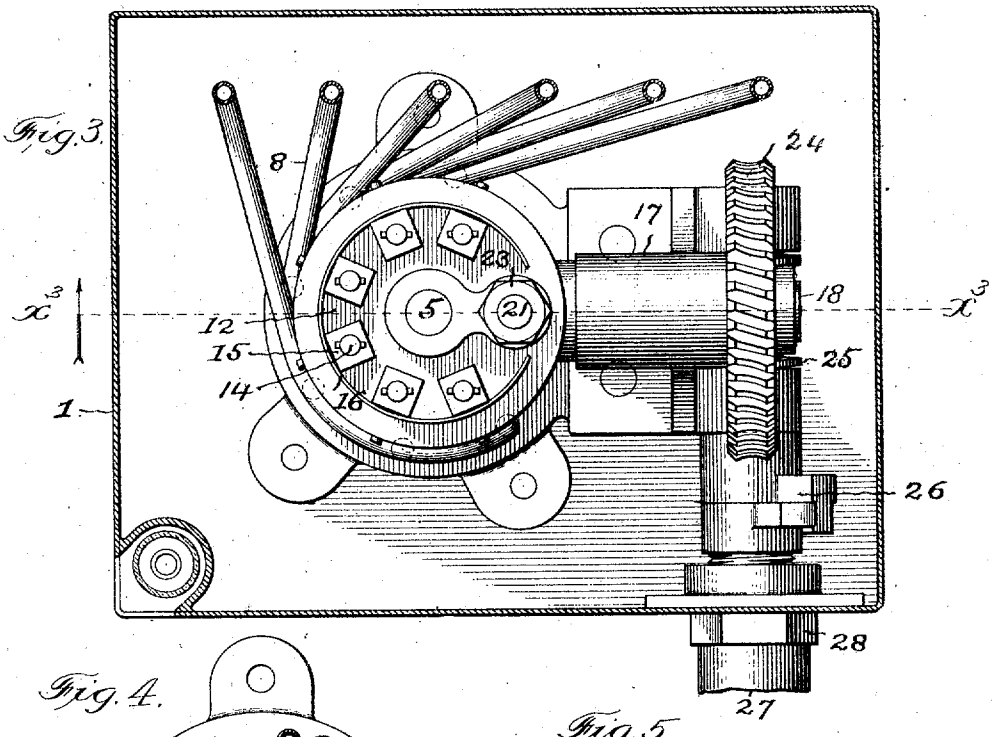


Fig. 4.

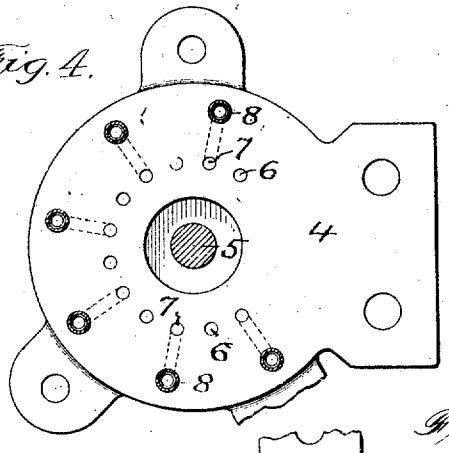


Fig. 5.

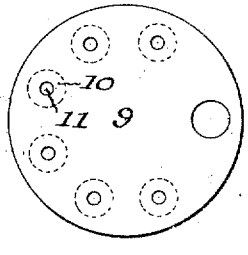
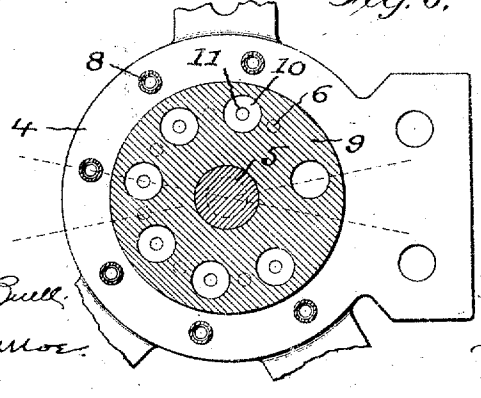


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 7.

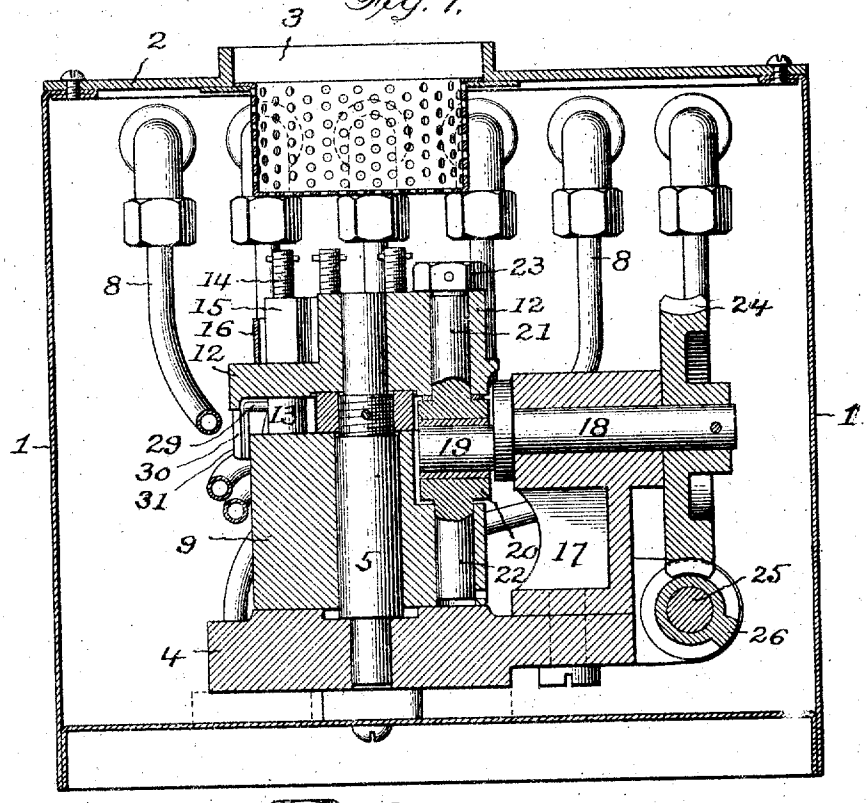


Fig. 8.

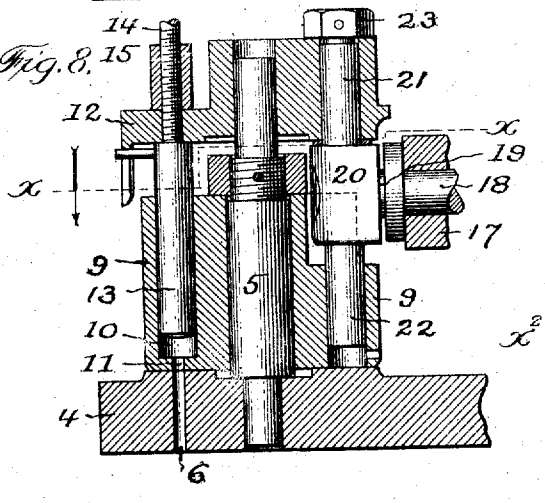
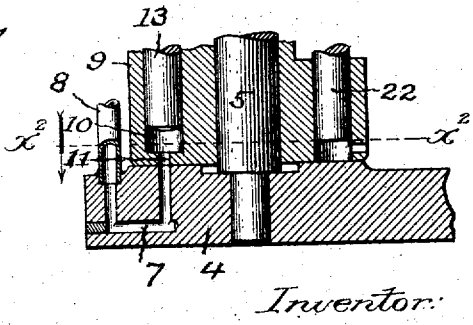


Fig. 9.



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LUBRICATOR.

1,036,929. Specification of Letters Patent. Patented Aug. 27, 1912.

Application filed December 1, 1911. Serial No. 663,375.

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, State of Illinois, have invented certain new and useful Improvements in Lubricators, of which the following is a specification.

This invention relates to the valveless multiple delivery type of force feed lubricators employed in the lubrication of automobiles and the like, and has for its object to provide a simple and efficient structural arrangement and combination of parts whereby the operation of the pump plungers and the change in unison therewith of the flow of the lubricant is attained in a simple, effective and positive manner, all as will hereinafter more fully appear.

In the accompanying drawings: Figure 1, is a side elevation of the mechanism, with the inclosing tank shown in section. Fig. 2, is a detail horizontal section on line x—x, Fig. 8. Fig. 3, is a sectional plan view on line x'—x', Fig. 1. Fig. 4, is a detail plan view of the fixed member of the pump mechanism, with the outlet pipes shown in section. Fig. 5, is an inverted plan view of the movable pump casing illustrating the inlet-outlet ports of the same. Fig. 6, is a detail horizontal section on line x^2—x^2, Fig. 9. Fig. 7, is a central longitudinal section on line x^3—x^3, Fig. 3. Fig. 8, is a detail vertical section on line x^4—x^4, Fig. 2, showing the pump parts in the suction or receiving position. Fig. 9, is a companion view showing the parts in a delivery position.

Similar reference numerals indicate like parts in the several views.

Referring to the drawings, 1 represents an open top tank of any usual form, adapted to contain the supply of lubricant or other fluid to be pumped.

2 is the removable cap or cover of the tank, provided with the usual strainer inlet opening 3, which in the present construction is located directly above the hereinafter described pumping mechanism, for the purpose hereinafter stated.

4, is the fixed member of the pump having attaching ears by which it is attached to the bottom web of the tank 1 in a raised position above the same as shown. In the present improvement said fixed member 4 carries a vertical journal stem 5, and its upper surface, which constitutes a seat for the hereinafter described semi-rotary pump casing, is formed with a series of alternating inlet and outlet ports 6 and 7 in concentric relation to the axis of the aforesaid journal stem 5. The above referred to inlet ports 6 are preferably straight vertical passages extending through the fixed member 4 and opening at bottom into the tank chamber as shown. The outlet ports 7 are preferably of a U form, radially arranged and connected at their outer ends with individual outlet pipes 8, which in turn extend out through an inclosing wall of the tank 1, to the required points of delivery, as usual in multiple delivery lubricators.

9 is the semi-rotary pump casing above referred to, and which has bearing upon the upper surface of the fixed member 4, and is held to its proper semi-rotary movement thereon by a central vertical bore which has engagement with the stem 5 of the fixed member 4. Said casing is formed with a series of vertical pump barrels 10, arranged in concentric relation to the axis of the stem 5, and said barrels at their lower ends are provided with vertical inlet-outlet ports 11, adapted in the practical operation of the mechanism to alternately register with the inlet ports 6 and outlet ports 7 of the fixed pump member above described.

12 is a plunger carrying head or spider arranged above the pump casing 9 and formed with a central vertical bore by which it is guided on the aforesaid vertical stem 5 of the fixed pump member 4, in a manner to permit of its semi-rotation in unison with the semi-rotary pump casing 9, and in a rectilinear manner to and from said pump casing 9, as hereinafter more fully set forth.

13 are a series of vertical plungers carried by the head or spider 12, preferably in the adjustable manner hereinafter described, and fitting and moving in the pump barrels 10 of the pump casing 9, aforesaid.

14 are screw-threaded stems at the upper ends of the respective plungers 13, and arranged loosely in vertical orifices in the plunger carrying head 12. Said stems are of a less diameter than said plungers, in order to provide bearing shoulders at their point of intersection, which shoulders are adapted for bearing engagement with the head 12 in the downward movement of the

same, to impart the downstroke to the plungers 13, in the operation of the mechanism.

15 are a series of square nuts screwing upon the stems 14 above the head or spider 12, and in their adjustment on said stems are adapted to provide more or less lost motion between the pump plungers and the carrying head 12, with a corresponding individual decrease or increase in the stroke of said plungers and the amount of fluid pumped by the same.

16 is a resilient open-sided ring or band encompassing the series of square nuts 15 and having bearing against the outermost flat sides of the same to prevent any turning movement of said nuts under the jarring stress of the mechanism in actual use. The resiliency of the ring however is adapted to permit of a turning adjustment of the nuts by means of a suitable wrench, which can be inserted through the filling opening 3 in the tank cover 2, when such adjustment is to be made.

17 is a standard mounted on the fixed member 4 of the mechanism and provided with upper and lower bearing boxes in which are journaled respectively the operating crank shaft of the pump mechanism and the driving shaft for said crank shaft, now to be described.

18 is the crank shaft above referred to, and carrying at one end a crank pin 19 adapted for operative engagement in a horizontal bearing orifice in a block 20, which in turn is journaled in the plunger carrying head 12 and pump casing 9 by upper and lower vertical trunnions or stems 21 and 22, which have bearing in orifices formed therefor in the respective head 12 and casing 9. In the present construction the lower trunnion 22 in addition to a semi-rotary movement, is adapted to have an independent reciprocating movement in the pump casing corresponding in extent to the throw of the aforesaid crank pin 19, while the upper trunnion 21, has a like semi-rotary movement but is held from any independent reciprocating movement by an abutment nut 23 or other equivalent means, secured to its upper end, and so that the rotation of the crank pin 19, will impart a corresponding up and down stroke to the carrying head or spider 12, and the pump plungers carried thereby.

24 is a worm wheel secured to the crank shaft 18 at the end opposite to the crank pin 19.

25 is a worm shaft journaled in the lower bearing box of the standard 17, and having operative engagement with the worm wheel 24 to impart rotation to the crank shaft 18, aforesaid.

26 is a detachable coupling adapted to connect the worm shaft 25 with an alined power shaft 27 which extends in through a stuffing box 28 on the tank 1, and so that the parts may be conveniently disconnected when it is desired to remove the pump mechanism from the tank for repair and the like.

29 are lateral pins or studs on the sides of the pump plungers 13, which have engagement in vertical slots 30 in a marginal depending skirt or flange 31 of the plunger carrying head 12, to prevent rotation of said plungers in the continued operation of the mechanism.

In the operation of the present mechanism, the crank pin 19 in its normal revolution is adapted to impart the usual up and down stroke to the series of pump plungers, and in unison therewith to impart a semi-rotary movement to the pump casing 9 and its accessories upon the fixed member 4 of the pump mechanism to alternately register the inlet-outlet ports 11 of the series of pump barrels 10, with the inlet and outlet ports 6 and 7 of the aforesaid fixed member 4, and the movements of the parts are so timed that during the main portion of the upstroke of the pump plungers 13, the inlet-outlet ports 11 of the pump barrels will be in communication with the inlet passage 6 of the fixed pump member 4, as illustrated in Fig. 8, and in the downstroke of said pump plungers, the said inlet-outlet ports 11, will be in communication with the outlet ports 7 of the said member 4, as illustrated in Fig. 9. The combined operations of the reciprocation of the pump plungers 13, and the semi-rotation of the plunger carrying head 12 and pump casing 9 are very effectively attained by the crank pin 19 and its connections heretofore described in detail.

Having thus fully 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 fixed member formed with a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing bearing on said fixed member and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, and means for imparting simultaneous reciprocation to said plungers and a semi-rotary movement to the pump casing.

2. In a lubricator, the combination of a fixed member formed with a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing bearing on said fixed member and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted

to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, means for individually varying the stroke of said plungers, and means for imparting simultaneous reciprocation to said plungers and a semi-rotary movement to the pump casing.

3. In a lubricator, the combination of a fixed member formed with a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing bearing on said fixed member and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, a plunger carrying head common to the series of plungers, and means for imparting simultaneous reciprocation to said carrying head and a semi-rotary movement to the pump casing.

4. In a lubricator, the combination of a fixed member formed with a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing bearing on said fixed member and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, a plunger carrying head common to the series of plungers, means for individually varying the stroke of said plungers, and means for imparting simultaneous reciprocation to said carrying head and a semi-rotary movement to the pump casing.

5. In a lubricator, the combination of a fixed member formed with a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing bearing on said fixed member and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, a plunger carrying head common to the series of plungers, and means for imparting simultaneous reciprocation to said carrying head and a semi-rotary movement to the pump casing, the same comprising a crank shaft having a crank pin and a block engaging said crank pin and provided with upper and lower trunnions having respective bearings in the pump casing and plunger carrying head.

6. In a lubricator, the combination of a fixed member formed with a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing bearing on said fixed member and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, a plunger carrying head common to the series of plungers, means for individually varying the strokes of said plungers, the same comprising screw-threaded stems at the upper ends of the plungers and nuts engaging said screw-threaded stems, and means for imparting simultaneous reciprocation to said carrying head and a semi-rotary movement to the pump casing.

7. In a lubricator, the combination of a fixed member formed with a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing bearing on said fixed member and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, a plunger carrying head common to the series of plungers, means for individually varying the stroke of said plungers, the same comprising screw-threaded stems at the upper ends of the plungers, square nuts engaging said screw-threaded stems and a resilient ring encompassing the series of nuts, and means for imparting simultaneous reciprocation to said carrying heads and a semi-rotary movement to the pump casing.

8. In a lubricator, the combination of a fixed member formed with a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing bearing on said fixed member and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, a plunger carrying head common to the series of plungers means for individually varying the stroke of said plungers, the same comprising screw-threaded stems at the upper ends of the plungers and nuts engaging said screw-threaded stems, means for holding the plungers against rotation, and means for imparting simultaneous reciprocation to said carrying head and a semi-rotary movement to the pump casing.

9. In a lubricator, the combination of a fixed member formed with a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing bearing on said fixed member and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said

pump barrels, a plunger carrying head common to the series of plungers, means for individually varying the stroke of said plungers, means for holding the plungers against rotation, the same comprising lateral pins on the plungers and a depending flange on the carrying head formed with vertical slots for engagement with said lateral pins, and means for imparting simultaneous reciprocation to said carrying head and a semi-rotary movement to the pump casing.

10. In a lubricator, the combination of a fixed member provided with a central journal stem and a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing mounted on said journal stem and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, a plunger carrying head common to the series of plungers and mounted on the journal stem aforesaid, and means for imparting simultaneous reciprocation to said carrying head and a semi-rotary movement to the pump casing.

11. In a lubricator, the combination of a fixed member provided with a central journal stem and a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing mounted on said journal stem and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, a plunger carrying head common to the series of plungers and mounted on the journal stem aforesaid, means for individually varying the stroke of said plungers, and means for imparting simultaneous reciprocation to said carrying head and a semi-rotary movement to the pump casing.

12. In a lubricator, the combination of a fixed member provided with a central journal stem and a circular series of alternately arranged inlet and outlet ports, a semi-rotary pump casing mounted on said journal stem and formed with a circular series of pump barrels having at their lower ends inlet-outlet ports adapted to alternately register with the aforesaid inlet and outlet ports of the fixed member, a series of pump plungers moving in said pump barrels, a plunger carrying head common to the series of plungers and mounted on the journal stem aforesaid, and means for imparting simultaneous reciprocation to said carrying head and a semi-rotary movement to the pump casing, the same comprising a crank shaft having a crank pin, and a block engaging said crank pin and provided with upper and lower trunnions having respective bearings in the pump casing and plunger carrying head.

Signed at Chicago Illinois, this 22d day of November 1911.

HJALMAR A. SWANSON.

Witnesses:

ROBERT BURNS,

HENRY MOE.