No. 836,234. PATENTED NOV. 20, 1906.

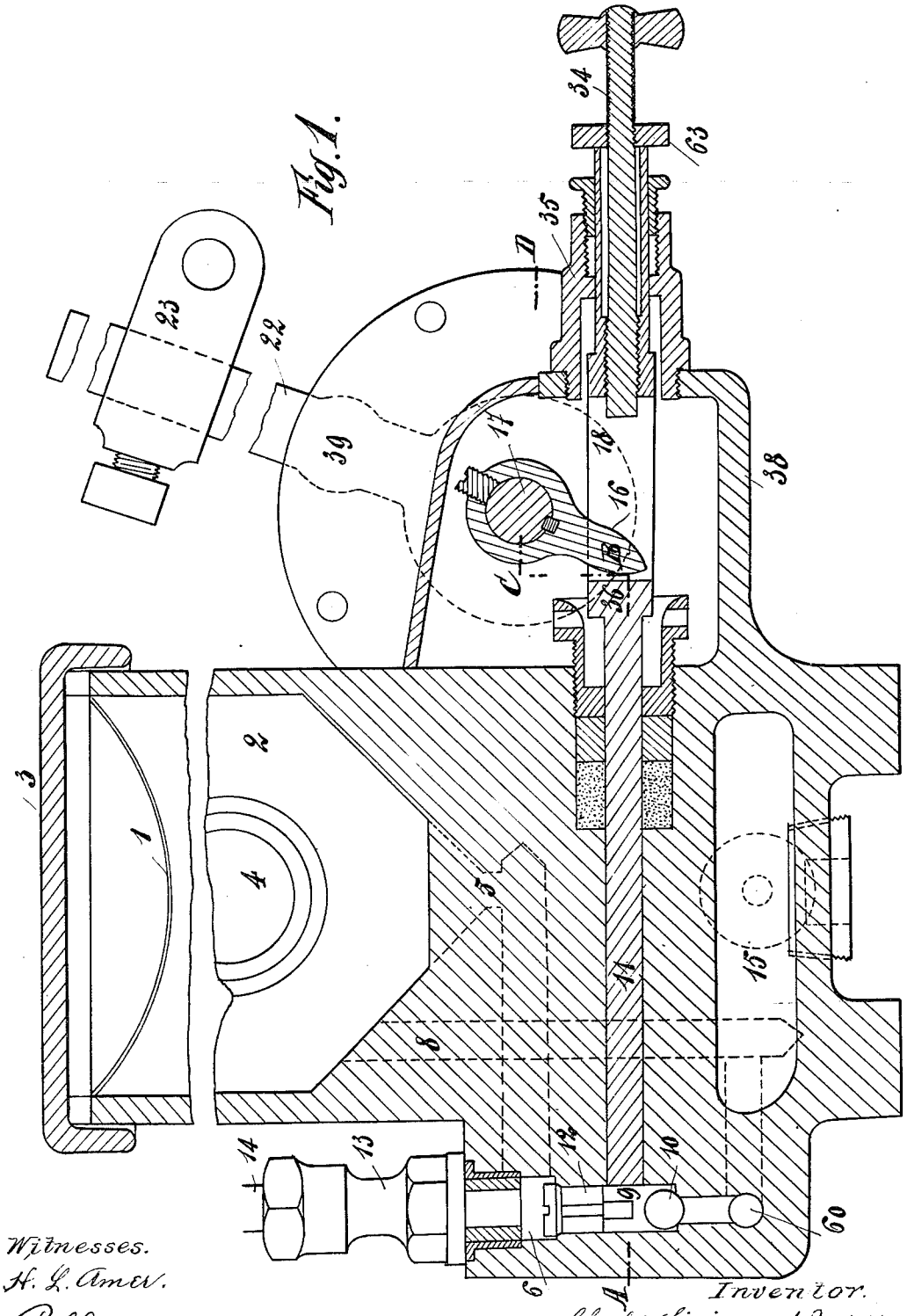
C. S. ZEYEN.

LUBRICATOR.

APPLICATION FILED OCT. 19, 1905.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
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R. W. Sommers

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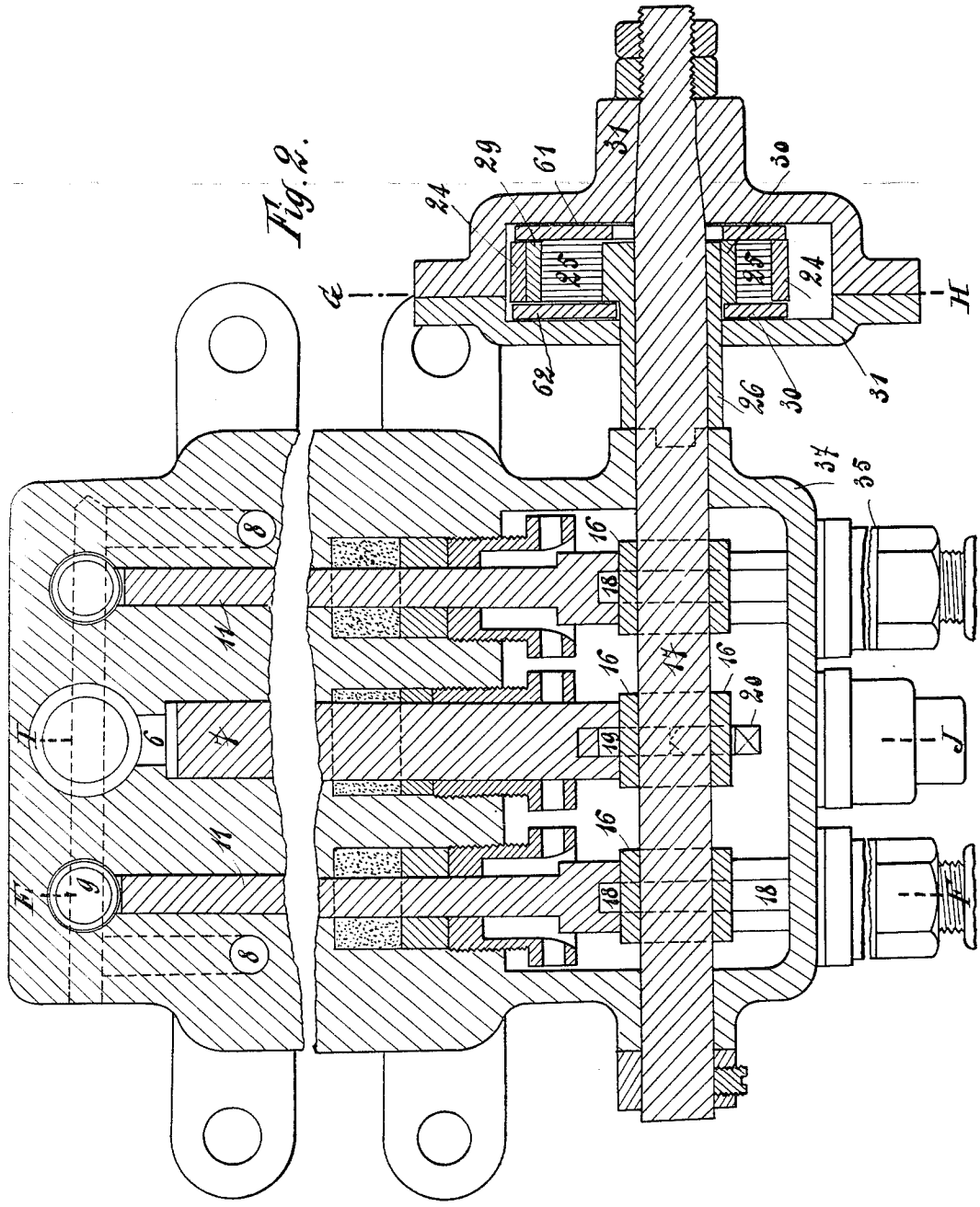
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

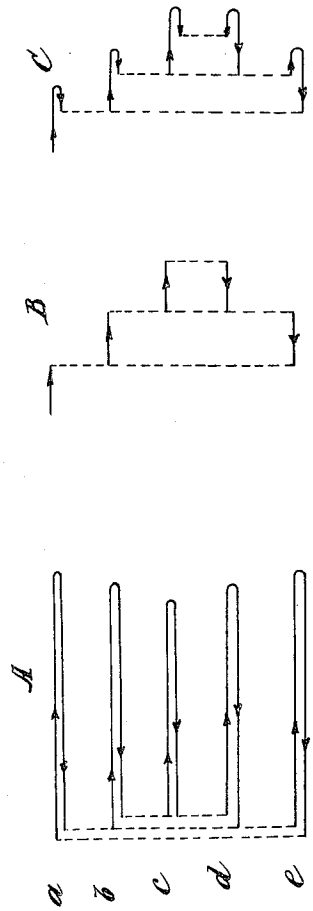
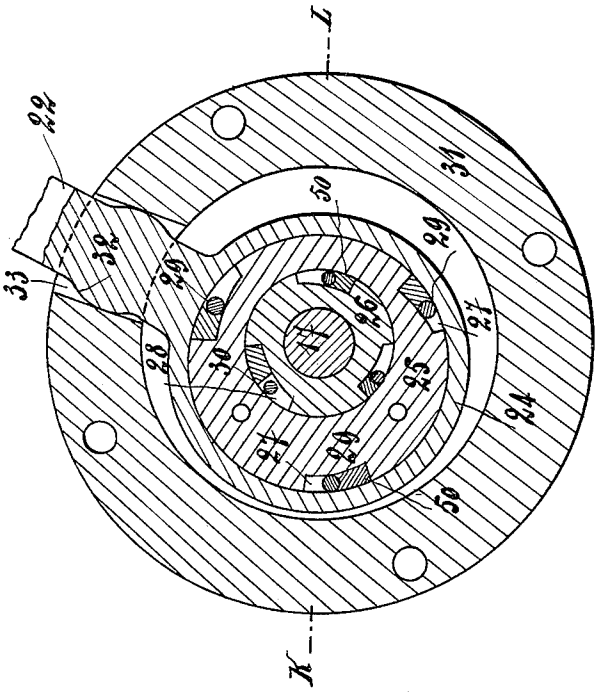


Fig. 3.



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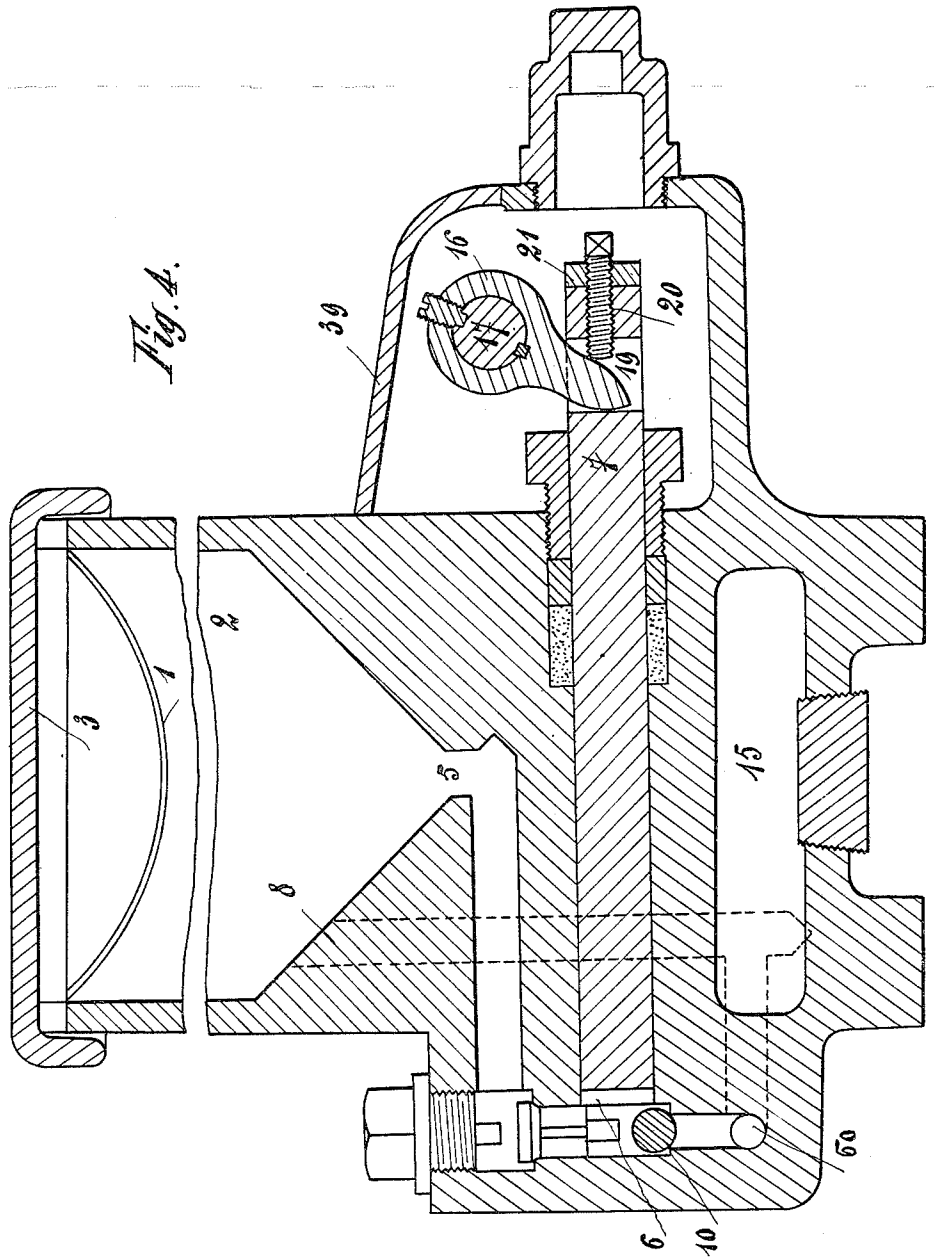
4 SHEETS—SHEET 4.

Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES SIGISMOND ZEYEN, OF JEMEPPE-SUR-MEUSE, BELGIUM.

LUBRICATOR.

No. 836,234. Specification of Letters Patent. Patented Nov. 20, 1906.

Application filed October 19, 1905. Serial No. 283,490.

To all whom it may concern:

Be it known that I, CHARLES SIGISMOND ZEYEN, a subject of the King of Belgium, residing in Jemeppe-sur-Meuse, in the Kingdom of Belgium, have invented certain new and useful Improvements in Lubricators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The object of this invention is to accomplish the continuous introduction of a homogeneous mixture of oil and graphite or other materials into the parts to be lubricated. This result is obtained by a lubricating apparatus comprising two kinds of pistons, a principal piston producing at each revolution of the machine the stirring up or mixing of the oil contained in the reservoir and one or several other pistons having for their object to drive the oil charged with graphite to the cylinders or to the places to be lubricated.

The accompanying drawings show by way of example one arrangement of this system.

Figure 1 is a vertical section of the apparatus on the line E F of Fig. 2. Fig. 2 is a horizontal section of the apparatus on the line AB CD of Fig. 1 and K L of Fig. 3. Fig. 3 is a section on the line G H of Fig. 2. Fig. 4 is a section on the line I J of Fig. 2. Fig. 5 represents diagrams of the movements of the piston.

The oil is poured on a sieve 1, whence it falls into the reservoir 2, closed by the cover 3. The sieve is then lifted and the desired quantity of graphite is added. The reservoir is provided with a sight-hole 4. The bottom of this reservoir is of funnel shape and communicates through the conduit 5 with a hollow cylinder 6, formed in the lower part of the lubricator and in which moves the piston 7.

One or two conduits 8 lead the mixture from the upper part of the funnel to a horizontal conduit 60, with which communicate the suction-conduits of the mixing-piston 7 and of the distributing-pistons 11. At each oscillation of the driving-lever of the lubricator the piston 7 sucks through the conduit 60 a certain quantity of the mixture contained in the reservoir 2, then returns it into this same reservoir by the conduit 5, thus forcing a vertical jet of oil into the bottom of the reservoir and producing a homogeneous mixture of oil and graphite. There are as many distributing-pistons 11 as the number of parts the lubricator is intended to lubricate. Each sucks from the conduit 60 by raising the ball 10, there being one such valve for each piston, a certain quantity of mixture, which it drives by raising its valve 12 into the conduit 13, whence it passes through the tube 14 to the parts to be lubricated.

In the lower part of the lubricator is formed a chamber 15, in which steam may be caused to circulate to maintain the apparatus at a convenient temperature.

The reciprocating movement of the plunger 7 and pistons 11 is caused by cams 16, keyed on the shaft 17 and acting in grooves 18 and 19, formed in the ends of the said pistons. The length of the groove 19 of the plunger 7 is about equal to the width of the cam 16, so that this plunger 7 follows the movements of the end of this cam. This cam making one oscillation for each oscillation of the driving-lever 22, it results that for each of these oscillations the piston 7 will have traveled a complete course—that is to say, sucked a certain quantity of the mixture from the reservoir 2 by the conduit 60, then returned this same mixture into the reservoir by the conduit 5. The length of the groove 19 is regulated by a screw 20, maintained in position by a lock-nut 21.

If the pistons 11 were driven in the same manner, the quantity of lubricant delivered by the lubricator would be too great, for in practice it is not possible to decrease the diameter of these pistons below a certain limit. For this reason and so as to assure by a long stroke of the pistons 11 the infallibility of working of the lubricator in spite of the graphite the parts are arranged so that the pistons 11 only make a complete stroke forward and backward for a certain number of oscillations of the driving-lever 22. This result is obtained in the manner hereinafter described.

The lever 22, operated in any known manner by a rod connected at one end to a revolving part of the machine and at the other end to the part 23, is not pivoted, as in other lubricators, at a fixed point. It carries at its end a collar or strap 24, which surrounds an eccentric 25, which itself may turn on a bushing 26. This bushing is fixed to one side of the lubricator. In this part

25 are formed three inclines 27, all pointing in the same direction around the exterior of the eccentric—that is to say, in contact with the strap 24. In the bushing 26 are arranged similar inclines 28, but arranged in the opposite direction to those marked 27 and being in contact with the interior of the eccentric. In each of these openings forming the inclines is located a small roller 29 or 30. It is advantageous in order to guide these rollers to place toward the base or wider end of the openings a small spring (not shown in the drawings) surmounted by a piece 50, embracing a part of these cylinders. When the rod connected to the machine draws the lever 22 toward the right, (see Fig. 3,) the strap 24 causes the roller 29 to move up the incline toward the narrow part of the opening 27, and this roller by friction between the parts 24 and 25 moves this latter. When, on the contrary, the connecting-rod moves the lever 22 toward the left, this roller 29 becomes disengaged, and it is the roller 30 which clutches the part 25 to the bushing 26 and prevents it moving back. Finally under the action of the alternate movements communicated by the rod connecting the machine to the lever the eccentric 25 will turn in the same direction as the hands of a watch.

Instead of employing the inclines 27 and 28 and rollers 29 and 30 the same effect may be obtained by employing pawls acting upon fixed teeth on the eccentric or other analogous form of construction.

The eccentric 25 and rollers 29 and 30 are held in place by two plates 61 and 62.

In consequence of the rotation of the eccentric the lever 22 receives an oscillating motion around a center movable with respect to the lubricator which may be considered as stationary. In other words, any point of this lever will describe a series of arcs the distances of which will vary from the center of the bushing 26. This lever 22 acts upon the shaft 17 through the medium of a casing 31, keyed upon this shaft and provided with an opening 33, through which passes the lever 22. This lever is provided with an enlargement 32. It is this enlargement 32 which comes into contact with the casing 33. In consequence of the special movement of the lever 22 this point of contact will be, according to the position of the eccentric 25, more or less distant from the center of the shaft. In other words, the arm of the driving-lever acting on this shaft will be longer or shorter. As the travel of the connecting-rod acting on the part 23 remains constant, it results that the extent of the movements of the shaft 17 will vary and that the middle point of each of the oscillations will be displaced during each oscillation.

It has been stated above that the groove of the piston 7 has about the same length as the width of the cam 16, keyed on the shaft. It results from this that the piston receives the same movement as the cam. At each oscillation of the driving-lever it therefore has a complete stroke of slightly-variable length.

The groove 18 of the pistons 11, on the contrary, is much longer than the width of the cam 16. This length is regulated by means of a screw 34, fixed on the piston 11 and maintained in position by the lock-nut 63 and guided by a stuffing-box 35. The length of this groove is such that the cam 16 during the suction of the piston 11, for example, only bears against a part of this piston (that is to say, in this case against the screw 34) at the end of its motion, so as only to advance the said piston a distance equal to a small fraction of the extent of oscillation of the cam 16. At the following oscillation, the middle point of this oscillation being passed, the piston will be moved an equal length, and so on until the relative displacement of the oscillations changes direction. From this moment the cam instead of acting on the screw 34 will act in the same manner upon the bottom 36 of the groove 18.

Finally at each oscillation of the lever 22 the piston 11 will receive a small impulse. These impulses first being produced in one and then in the other direction will thus have the effect of causing a complete stroke of the piston 11 after several oscillations of the lever 22.

If the length of the groove 18 is regulated so that at each oscillation of the cam 16 this latter acts alternately upon the ends 36 and 34 of this groove, each of the partial movements of the piston 11 will comprise a forward motion and a backward motion of less extent. This method of regulation enables an exceedingly small quantity of oil to be driven to the parts to be lubricated at each oscillation of the lever 22. This movement of the pistons having forward and partial backward movement is characteristic of this invention.

The various movements of the pistons 7 and 11 are represented in the diagrams at Fig. 5, in which on five horizontal lines *a b c d e* are represented the displacements of a point of the pistons 7 and 11 for five successive oscillations of the lever 22. In the vertical column A are represented the displacements of a point of the piston 7. In column B are represented the displacements of a point of the piston 11 when the length of the groove 18 is such that at each oscillation of the cam 16 this latter only touches one of the ends of this groove. In the column C is indicated the displacement of a point of the piston 11 when the length of slot 18 is such that the cam 16 will touch both ends thereof when oscillated.

To render the action of this lubricator easy

and prevent it wearing out, the shaft 17, the cams 16, the pistons 11 and 7, and their accessories are located in an oil-bath contained in the reservoir formed by the sides 37 and the bottom 38 cast in one piece with the body of the lubricator. A cover 39 covers this reservoir. It is evident that this same lubricator may be utilized for oil mixed with sulfur or any other analogous matter.

What I claim as my invention is—

1. The combination with a reservoir having a distributing-passage therefrom; of a forcing cylinder and plunger to force the liquid to distributer-tubes, and a mixing plunger and cylinder to force a portion of the liquid through the body of liquid in the reservoir, substantially as described.

2. The combination with a reservoir having a distributing-passage therefrom and a mixing-conduit; of a cylinder communicating with the passage, a piston in the cylinder, a distributing-pipe communicating with the cylinder, valves to control the passage of fluid to and from the cylinder, a mixing plunger and cylinder, said mixing-conduit leading to the bottom of the reservoir from said mixing-cylinder, valves controlling the passage of liquid to and from the mixing-cylinder and a shaft to drive the piston and plunger, substantially as and for the purpose set forth.

3. The combination with an oil-reservoir having a distributing-conduit leading from above the bottom and a passage leading from the bottom thereof; of a plurality of cylinders communicating with the conduit, valves controlling the passage of oil from the cylinder, plungers to force oil from the cylinders, distributer-pipes connected to some of the cylinders and one of said cylinders connected to the passage leading to the bottom of the reservoir, whereby a jet of oil is forced through the contents of the reservoir to mix the same, substantially as described.

4. The combination with an oil-reservoir having inclined sides, a feed-channel leading from above the bottom thereof and a mixing-channel entering the bottom; of a plurality of cylinders, ball-valves controlling the entrance of oil thereto from the feed-channel and lift-valves controlling the exit of oil therefrom, feeding-pistons, and a large mixing-plunger operating in connection with the cylinders; the mixing-plunger and its cylinder delivering into the mixing-channel and the feeding-pistons to distributing-tubes, a driving-shaft, mechanism thereon to reciprocate the mixing-plunger at each revolution thereof, and mechanism on said shaft to impart to the feeding-pistons a complete stroke after a definite number of revolutions, substantially as described.

5. In a lubricator, a reservoir for oil and graphite having a supply-conduit and a mixing-conduit, a mixing plunger and cylinder, said mixing-conduit extending from the cylinder into the bottom of the reservoir to discharge a mixing-jet into the reservoir, substantially as described.

6. In a lubricator, the combination with a reservoir; of feed-pistons, a mixing-plunger, and their cylinders, means to supply oil from the reservoir to the cylinders, said mixing-cylinder discharging into the bottom of the reservoir, a driving-shaft, means to rotate the same step by step, means on the shaft to reciprocate the mixing-plunger at each revolution of the shaft and means to impart progressive forward and backward movements to the feed-pistons, the movement in one direction being longer than in the other to force only part of the contents from the feed-cylinder at each revolution of the shaft.

7. In a lubricator, the combination with the oil-reservoir; of a feed-piston and a mixing-plunger, cylinders therefor, an oil-supply between the reservoir and cylinders, a shaft, cams on the shaft taking into slots in the ends of the piston and plunger, means to adjust the throw of the pistons, an eccentric loose on the shaft, clutch mechanism between the eccentric and shaft, an eccentric-strap having an operating-rod, clutch mechanism between the strap and eccentric, and a casing for said strap having an opening for the rod, said rod oscillating in the opening of said casing to impart a step-by-step movement to the shaft whereby the feed-piston is given greater movement in one direction than in the other, substantially as and for the purposes described.

8. The combination with a reservoir of means to draw off part of the contents from one level and inject it again through the body of the remaining liquid in said reservoir, substantially as described.

9. The combination with a lubricator-reservoir of a forcing cylinder and piston said cylinder connected to the reservoir by supply and delivery passages, the supply-passage drawing off part of the contents from the reservoir from an upper level and the delivery-passage entering the reservoir at a lower level, whereby a jet of liquid is forced through that remaining in the reservoir to maintain the contents mixed.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

CHARLES SIGISMOND ZEYEN.

Witnesses:

GEORGES VAN DER HARGHEN,

L. LEONARD LEVO.