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C. C. DODGE.

LUBRICATOR.

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Fig. 1.

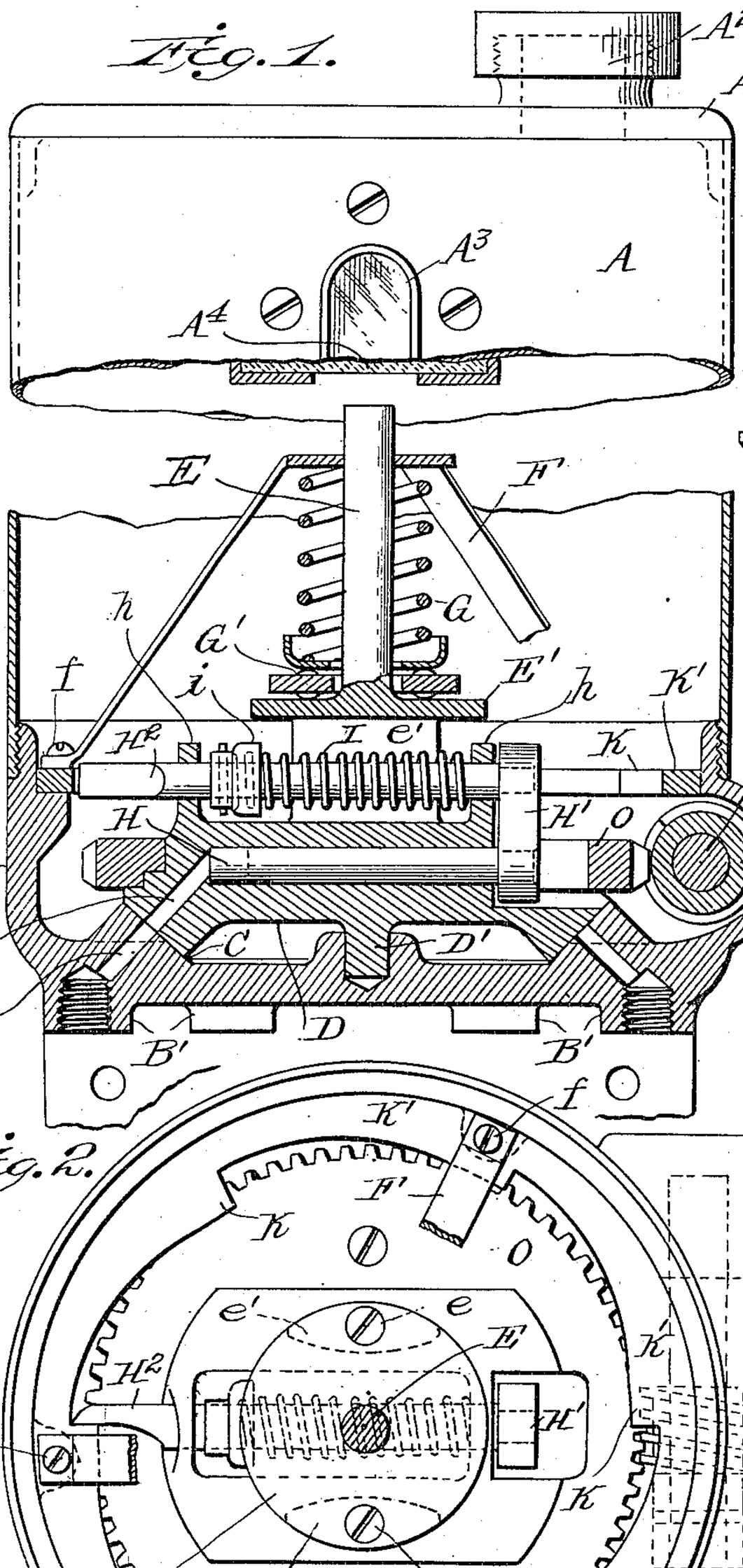

Fig. 3.

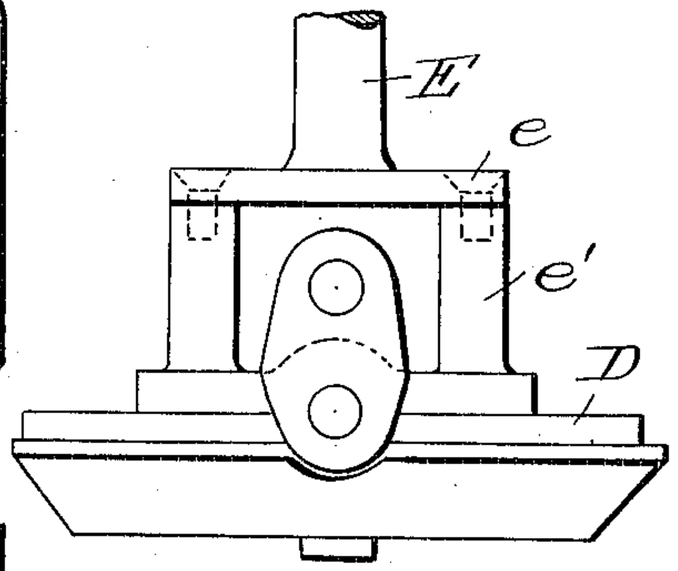

Fig. 4.

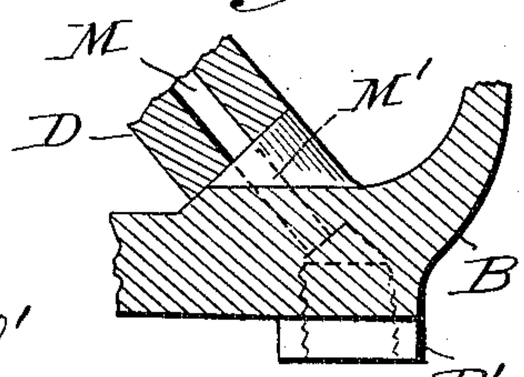

Fig. 5.

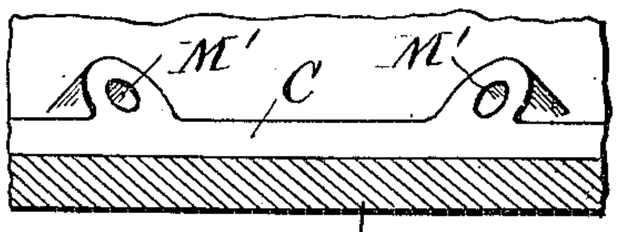

Fig. 2.

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LUBRICATOR.

No. 812,261. Specification of Letters Patent. Patented Feb. 13, 1906.

Application filed November 29, 1904. Serial No. 234,736.

To all whom it may concern:

Be it known that I, CHARLES C. DODGE, a citizen of the United States, residing at Bloomfield, in the county of Essex and State of New Jersey, 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 same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to mechanical force-feed lubricators, and is designed more especially for use in connection with engines—such as gasolene, automobile, or marine engines—or for use in connection with working mechanical structures wherein a number of bearings or working surfaces are to be supplied with lubricating material from a single source.

The objects of the invention are to provide a simple, cheap, and efficient self-contained structure adapted to feed to the several working surfaces a quantity of lubricant exactly proportioned to its needs, to which ends the invention consists, primarily, in a lubricator embodying a reservoir for the lubricant, a rotary pump-carrier having a discharge-orifice adapted to aline or register successively with ducts leading to the several bearings, a fixed member for controlling the throw of the pump and quantity of lubricant discharged thereby, and a means for rotating the pump-carrier driven from the engine or other source of power bearing a relation to the working surfaces to be lubricated.

The invention further consists in certain novel details of construction and combinations and arrangements of parts, all as will be now described, and pointed out particularly in the appended claims.

Referring to the accompanying drawings, Figure 1 is a vertical section, partly broken away and partly in elevation, of a lubricator embodying the present improvements. Fig. 2 is a top plan view of the base-section with portions broken away to show underlying parts. Fig. 3 is a side elevation of the pump-carrier, the upper end of the stem being broken away. Fig. 4 is a vertical detail section showing the seat for the pump-carrier and a small section of the pump-carrier itself. Fig. 5 is a detail sectional elevation of the seat for the pump-carrier, showing two of the terminal openings of the discharge-ducts for the lubricant.

Similar letters of reference in the several figures indicate like parts.

The letter A indicates a reservoir for lubricant, which it is obvious may be of any desired form or material, but is preferably a cylindrical reservoir formed of brass or glass tubing, having a tight-fitting top A′ with a filling-orifice A^2 therein, and, if of brass, a long vertical sight-opening A^3, provided with a transparent celluloid or glass window A^4. The bottom of the reservoir is formed by a base-fitting B, which serves, preferably, as the means for supporting the reservoir and constitutes the seat and support for all of the working parts of the lubricator and the terminal connections for the several ducts through which the lubricant is carried to the working surfaces or bearings to be lubricated. The fittings or nipples forming the terminals of said ducts are indicated at B′. On its inner side said base B is provided with a conical annular seat C, preferably arranged at an angle of forty-five degrees for the reception of the correspondingly-shaped working face of the pump-carrier D and a central bearing for a bottom stem or journal D′ on the pump-carrier. The upper portion of the pump-carrier is provided with a stem E, preferably detachably mounted thereon and held by screws *e*, as shown in Fig. 3, said screws *e* entering the ends of standards *e*′, projecting upwardly from the top of the pump-carrier. The stem E is guided or takes a bearing at the center of a spider F, the arms of which extend down and are attached to the base by screws *f*, said stem and carrier being held down by means of a spring G, preferably surrounding the stem E and bearing on the base-flange E′ of the stem through a ball-bearing G′, as shown clearly in Fig. 1.

The pump-carrier D is provided with a pump barrel or cylinder for the reception of a pump-plunger H, preferably arranged to reciprocate horizontally in the carrier, and in order to operate said plunger it is connected, through a head H′, with a connection-rod or operating-stem H^2, working in bearings *h* in the carrier, so as to travel parallel with the plunger. Reciprocatory motion of the plunger and its operating-rod in one direction is effected by a spring I, preferably surrounding

the stem H^2 between the bearings *h* and at one end engaging a cup or collar *i* on the rod. Motion in the opposite direction or against the tension of the spring is effected by the engagement of the end of the stem H^2 with one or the other of the series of projections K on a controlling-ring K′, secured in the base of the lubricator, preferably by the screws *f*, which also serve to secure the spider F in place. A channel M in the pump-carrier leads from the end of the cylinder or barrel out through the working face of the carrier in position to register at certain times with the ducts M′, forming the terminals of the before-mentioned ducts for conveying the lubricant to the working surfaces to be lubricated. The ducts M′ are in projections, preferably having their ends faced to correspond to the inclination of the seat C, whereby the coöperating surfaces of the pump-carrier and base may be ground to an accurate fit. With this arrangement it is obvious that when the pump-carrier is rotated the discharge-duct from the pump will register successively with the ports or ducts M′, and if at such time the plunger H advances the contents of the pump-cylinder will be discharged into the registering duct and will be forced thence to the bearing.

The spring I before referred to preferably constitutes the means for advancing the pump-plunger with a quick movement, and the projections K on the controlling-ring serve to retract the said plunger. Said projections K are preferably so formed that during the travel of the operating-rod H^2 over them the said rod and pump-plunger will not be moved during the time that duct M is traveling across the walls forming the faces surrounding the ducts M′; but the rearward movement will all take place during the time the duct M is traveling between adjacent ducts M′, at which times the duct M is open to the reservoir, and consequently lubricant will then be drawn into the pump. The pump-stem H^2 rides off the projections K when the ducts are in register with each other, and it is obvious that the quantity of lubricant to be discharged by the pump for any particular bearing may be accurately regulated by the height of the projections K, and the number of ducts which may be supplied from one lubricator is only limited by the space in the periphery of the circle traversed by the pump-carrier. As shown, the device is adapted to supply lubricant to six bearings, although this number may be increased or diminished, as found desirable; but in practice lubricators may be made with a maximum number of outlets, any or all of which may be utilized, as desired. The controlling-ring K′ being removable may be considered the only part necessarily varied to adapt the lubricator to any special conditions.

To impart rotary motion to the pump-carrier, it is preferably provided with a worm-gear O, with which a drive-worm O′ meshes, said drive-worm being mounted on a drive-shaft O^2, passing out of the base through a stuffing-box O^3 and deriving its motion from any suitable source—such, for instance, as the half-time shaft of a gas-engine.

Where the lubricator is used in connection with gas-engines, it is obvious that by imparting a rotation to the drive-shaft O^2 in accordance with the half-time shaft of the engine the pump may be arranged to discharge oil to the cylinder or cylinders when no pressure exists in the cylinder or cylinders, and at all other times the ducts M′ will be closed by the working face of the pump-carrier, thereby preventing back pressure in the reservoir. The seating-spring, as shown, has a compression of ten or fifteen pounds and is sufficient to maintain the pump-carrier on its seat against a back pressure through one of the ducts from a cylinder at the instant of explosion, and hence, if desired, lubricant may be forced into the cylinder even when pressure exists therein.

The arrangement described, it will be noted, entirely dispenses with the employment of valves, although, if desired, the pump can be arranged to work, as has heretofore been proposed, with a check-valve for controlling the admission of lubricant to the pump-cylinder.

It will be noted that the entire working mechanism of the lubricator is directly mounted on the base B and that without disturbing the working relation of the parts immediate access thereto may be had by removing the casing A forming the reservoir. All of said working parts are contained within the lubricator, there being no communication with the exterior save through the stuffing-box O^3 of the operating-shaft, and consequently all danger of lubricant working out through joints in the lubricator is eliminated. Furthermore, the arrangement is such that by raising the pump-carrier from its seat the lubricator will act as an ordinary gravity-feed lubricator, inasmuch as the unseating of the pump-carrier opens the ducts for the direct entry of lubricant, and consequently it is possible in an emergency to make use of the device without the force-feed feature.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lubricator such as described the combination with a reservoir for the lubricant having a plurality of discharge-ducts, of a rotary pump-carrier and pump located in the reservoir in position to be submerged in the lubricant and having a duct adapted to register successively with the first-mentioned ducts, fixed projections for operating the pump and means for rotating the carrier.

2. In a lubricator such as described the

combination with a reservoir for the lubricant having a plurality of discharge-duct openings, of a rotary pump-carrier located in the reservoir in position to be submerged in the lubricant and seated over said openings for closing the same, a pump in the carrier, there being a duct from said pump adapted to register successively with the said openings and means for rotating the carrier and operating the pump; substantially as described.

3. In a lubricator such as described, the combination with a reservoir for the lubricant having a plurality of discharge-duct openings, of a rotary carrier located in the reservoir in position to be submerged in the lubricant and seated over said openings to close the same, a pump in said carrier, there being a duct leading to the pump and normally open to the reservoir but adapted to register with the openings in succession and means for rotating the carrier and operating the pump; substantially as described.

4. In a force-feed lubricator the combination with the reservoir having a seat therein formed by projections constituting the terminals of discharge-ducts, of a rotary pump-carrier mounted on said seat to close the openings, a pump on the carrier, there being a pump-duct normally open to the reservoir but adapted to be brought into registry with the openings by the rotation of the carrier, means for rotating the carrier and operating the pump; substantially as described.

5. In a force-feed lubricator the combination with the reservoir having the annular conical seat therein and openings in said seat constituting the terminals of discharge-ducts, of a rotary pump-carrier having a conical working face having its bearing in said seat, a pump in said carrier, there being a pump-duct leading out through the working face of the carrier, means for rotating the carrier and for operating the pump; substantially as described.

6. In a force-feed lubricator, the combination with the reservoir having the annular conical seat therein with projections constituting the terminals of discharge-ducts, of a rotary pump-carrier having a conical working face having its bearing in said seat, a pump in said carrier, there being a pump-duct normally open to the reservoir between the projections but adapted to be brought into registry with the openings by the rotation of the carrier, means for rotating the carrier and operating the pump; substantially as described.

7. In a force-feed lubricator the combination with the base having the discharge-duct terminals therein, the rotary pump-carrier and pump and the drive-gear for the carrier all journaled in the base and the projections for operating the pump mounted on the base, of the removable casing carried by the base and constituting the reservoir for the lubricant; substantially as described.

8. A force-feed lubricator embodying a separable base and casing constituting the reservoir, of a pump mechanism located within the reservoir and supported together with its operating mechanism entirely on the base and independently of the casing; whereby the casing and base may be separated without disturbing the pump mechanism; substantially as described.

9. In a force-feed lubricator such as described, the combination with the reservoir, having discharge-ducts, reciprocatory pump, operating devices therefor and rotary carrier on which the pump and operating devices are mounted, controlling the communication between the pump and discharge-ducts, of means for rotating the carrier, a fixed ring having projections thereon for retracting the pump-plunger and a spring for advancing the pump-plunger; substantially as described.

10. In a force-feed lubricator such as described, the combination with the reservoir and rotary pump-carrier mounted in the reservoir, of a horizontally-arranged pump in said carrier, a horizontal operating-stem for the pump-plunger and fixed projections in the reservoir with which said stem coöperates to control the said plunger; substantially as described.

11. In a force-feed lubricator, the combination with the reservoir having a base, with an apertured seat in said base and a rotary carrier taking its bearing in said seat, of a pump in the carrier having a discharge-duct adapted to register with said apertures, a spider having arms secured to the base, a spring interposed between the spider and carrier and means for rotating the carrier and operating the pump; substantially as described.

12. In a force-feed lubricator, the combination with the reservoir having a base with an apertured seat in said base and a rotary carrier taking its bearing in said seat, of a pump in the carrier, a spring for advancing the plunger of the pump, a controlling-ring having projections for retracting the plunger of the pump and removably secured in the base, a spring for holding the carrier down and a discharge-duct for the pump adapted to register with the apertures in the seat; substantially as described.

13. In a force-feed lubricator the combination with the reservoir having a base provided with an annular conical seat having discharge-apertures therein, of a rotary carrier having a central bearing and conical working face fitting the conical seat, a pump in said carrier having a discharge-duct adapted to register with the apertures in the seat, fixed annular controlling-ring having projections, a spring-pressed pump-plunger stem

coöperating with said projections and a worm and gear for rotating the carrier; substantially as described.

14. A force-feed lubricator having an annular seat projecting on the inner side of its base, with discharge-apertures in said seat, a rotary carrier taking its bearing on said seat and center bearings for said carrier located entirely within the reservoir, gearing for rotating the carrier also located within the reservoir, a reciprocatory pump in the carrier, there being a discharge-duct for the pump adapted to register with the openings in the seat, a spring for advancing the pump-plunger and fixed projections within the reservoir for retracting the pump-plunger against the tension of its spring, the number of said projections corresponding to the number of discharge-openings in the seat; substantially as described.

15. In a force-feed lubricator, the combination with a reservoir, having a plurality of separated projections constituting the terminals of discharge-ducts, of a rotary pump-carrier bearing against said projections, a pump in said carrier, there being a pump-duct normally open to the reservoir between said projections but adapted to register successively with said terminals as the carrier rotates, and instrumentalities for rotating the carrier and operating the pump.

16. In a force-feed lubricator, the combination with a reservoir, having a plurality of separated projections constituting the terminals of discharge-ducts and arranged substantially in a circle, of a rotary carrier seated against said projections, a pump carried by said carrier, and having a duct adapted to register alternately and successively with the spaces between said projections and said terminals, a pump communicating with said duct, means for rotating the carrier, fixed projections for operating the pump-plunger in one direction, and a spring for operating said plunger in the opposite direction.

17. In a force-feed lubricator, the combination with the reservoir having a circular series of discharge-duct openings, of a rotary carrier journaled on a vertical axis in the reservoir, to normally seat over and close said discharge-duct openings, a pump-barrel in said carrier and having an inlet-outlet passage adapted to register successively with the series of openings aforesaid, means for rotating the carrier, a pump-plunger in said barrel and means for reciprocating the same, a spring for holding the carrier down to its seat in the reservoir and a fixed part for maintaining the tension of the spring; substantially as described.

18. In a lubricator such as described, the combination with the reservoir having a plurality of discharge-duct openings arranged in a circular series, of a rotary pump-carrier located in the reservoir in position to be submerged in the lubricant and having a duct adapted to register with the first-mentioned openings, a central bearing at the lower end of the carrier and a spring for holding the carrier down to its seat; substantially as described.

19. In a lubricator such as described, the combination with the reservoir, a rotary pump-carrier having a central journal, fixed supports for the journal located respectively above and below the carrier, projections in the reservoir having discharge-duct openings therein, a pump located in the carrier and having an inlet-outlet opening adapted to register successively with the said discharge-openings, means for rotating the carrier and means for operating the pump; substantially as described.

20. In a lubricator such as described, a reservoir, a rotary carrier mounted therein on central supporting means held by fixed parts above and below the carrier, there being a circular series of discharge-duct openings in the bottom of the reservoir, a pump in the carrier having an inlet-outlet opening adapted to register successively with the discharge-duct openings, means for rotating the carrier and means for operating the pumps; substantially as described.

21. In a lubricator such as described, the combination with a reservoir for the lubricant having a plurality of discharge-ducts, a pump-carrier located in the reservoir in position to be submerged in the lubricant and having a duct adapted to communicate successively with the first-mentioned ducts, a horizontally-arranged pump in the carrier and horizontally-projecting cam-surfaces for operating the pump.

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