E. T. McKAIG.

LUBRICATING DEVICE.

APPLICATION FILED FEB. 2, 1910.

1,021,421.

Patented Mar. 26, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

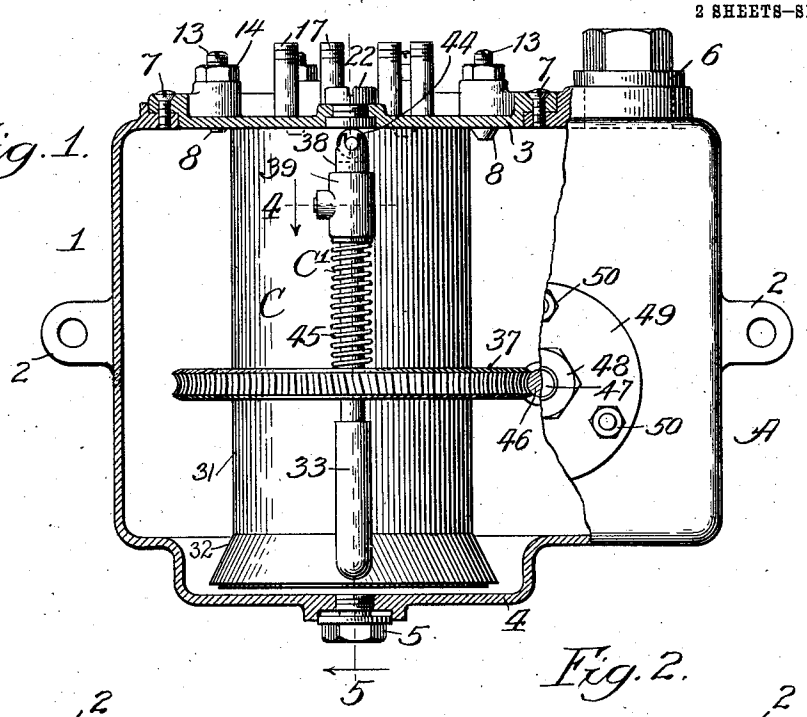


Fig. 2.

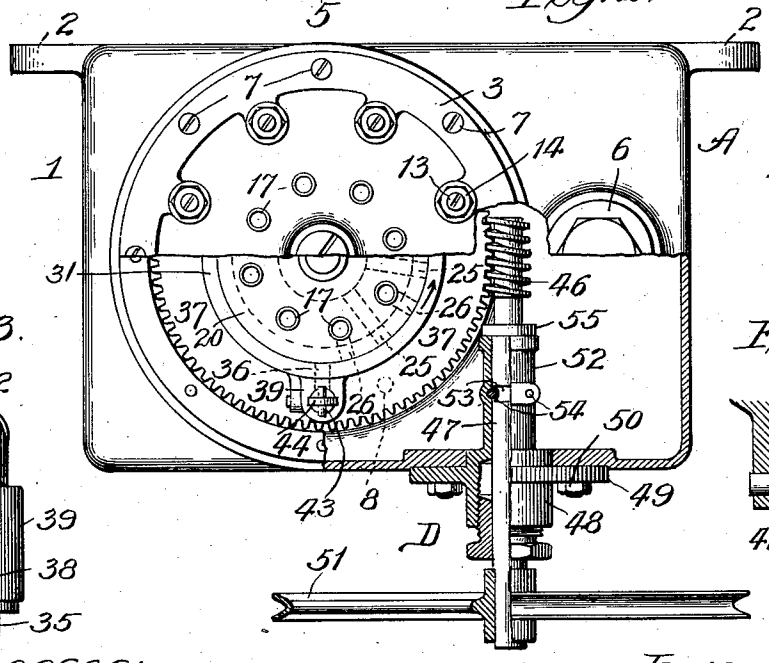


Fig. 3.

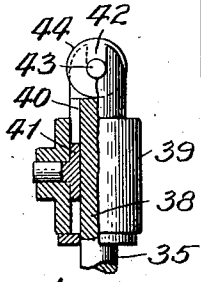
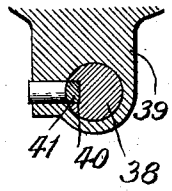


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

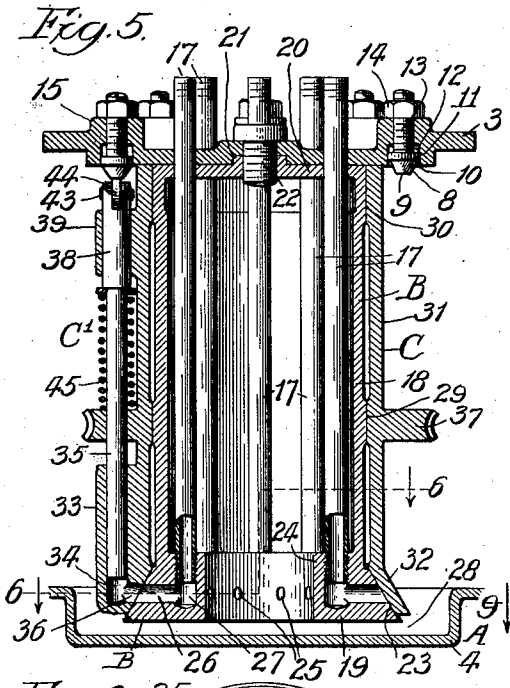


Fig. 8.

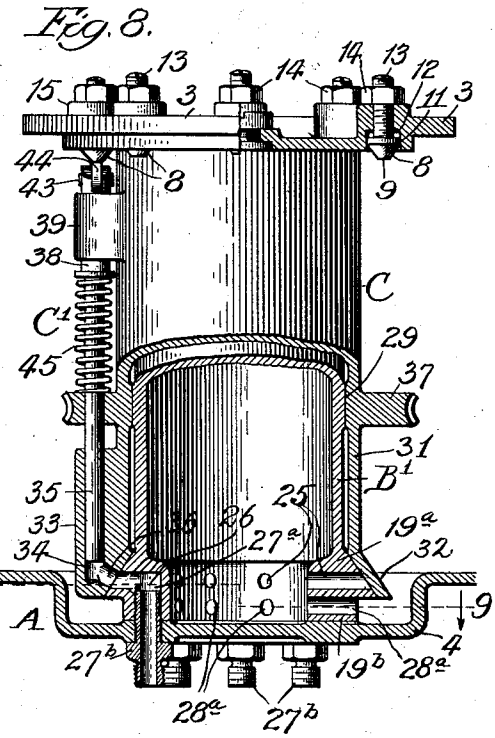


Fig. 6.

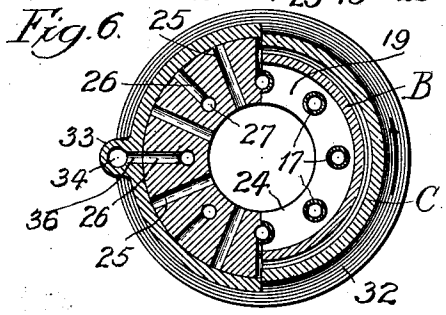


Fig. 9.

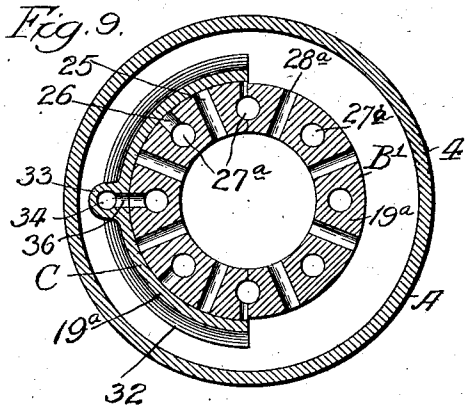
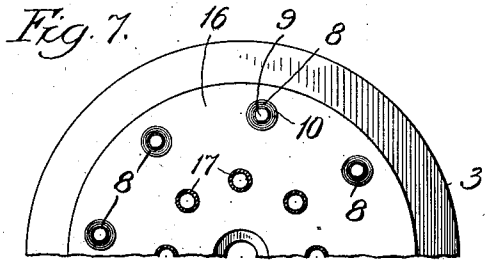


Fig. 7.



Witnesses:

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UNITED STATES PATENT OFFICE.

EDDY THOMAS McKAIG, OF CHICAGO, ILLINOIS, ASSIGNOR TO IVERT LARSEN, OF CHICAGO, ILLINOIS.

LUBRICATING DEVICE.

1,021,421. Specification of Letters Patent. Patented Mar. 26, 1912.

Application filed February 2, 1910. Serial No. 541,608.

To all whom it may concern:

Be it known that I, EDDY THOMAS McKAIG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Lubricating Devices, of which the following is a specification.

My invention relates particularly to lubricating devices, or oilers, of the force-feed type; and my primary object is to provide an oiler of improved general construction and operation which shall be durable in its construction, certain in its operation, and readily adjustable and capable of supplying with accuracy the desired amount of oil to each bearing or part of any machine to which it may be applied, regardless of the consistency of the fluid lubricant employed.

The invention is illustrated in its preferred embodiment in the accompanying drawings in which—

Figure 1 represents a view of my improved lubricating device, showing the casing partly in section and partly in elevation; Fig. 2, a view of the same partly in plan and partly in section; Fig. 3, a broken sectional view showing a detail of the actuating stem of the pump, or plunger, employed; Fig. 4, a broken sectional view taken as indicated at line 4 of Fig. 1 and showing another view of the details shown in Fig. 3; Fig. 5, a vertical sectional view taken approximately as indicated at line 5 of Fig. 1 and showing the rotary pump-carrying member employed and the coacting stationary member supplied with a plurality of suction-ducts and discharge-ducts; Fig. 6, a plan sectional view taken as indicated at line 6 of Fig. 5; Fig. 7, a broken inner face view of the top-plate of the casing which carries the adjustable cams which serve to actuate the pump, or plunger, as the latter is carried in its course by the rotary member on which it is mounted; Fig. 8, a broken sectional view illustrating a modification of the device; and Fig. 9, a plan sectional view taken as indicated at line 9 of Fig. 8.

Referring to Figs. 1 to 7 inclusive, A represents a casing adapted to be attached to any suitable support, as, for instance, the dash of an automobile; B, a stationary cylinder depending from the upper wall of the casing and provided with a series of suction-ducts and a series of discharge-ducts alternating with the suction-ducts; C, a rotary cylinder surrounding the cylinder B and serving to carry a pump, C′ which operates through a duct which is adapted to be brought successively into registration with a suction-duct of the member B to draw in a charge of lubricant, and then into registration with a discharge-duct of the member B to permit ejection of the lubricant; and D, mechanism for rotating the member C. The casing A may be of any suitable construction and configuration. As shown, it comprises a hollow casting 1 having attaching lugs 2 and having its upper wall provided with a removable top-plate, or disk, 3 and its bottom wall formed with a well 4 equipped with a plug 5 which may be removed to enable sediment to be withdrawn from the casing. The top wall of the casing is equipped with a plug 6 which may be removed to enable the casing to be filled with oil. The top-plate 3, which is shown connected with the integral portion of the upper wall of the casing by screws 7, serves to carry a series of cams 8 which are arranged in an annulus and depend into the casing. As shown, each cam 8 has a truncated conical head affording a flat lower surface 9 and a beveled, or conical, surface 10, said head having at its base a cylindrical portion 11 which fits in a cylindrical bearing 12 which is provided at the inner surface of the plate 3. The cam is carried by a stem 13 which extends through and has threaded connection with the plate 3, the upper end of the stem being formed with a slot adapted to receive a screw-driver, and each stem being equipped with a locking-nut 14 which bears upon a boss 15 with which the plate 3 is provided on its upper surface. It will be understood that each cam is independently adjustable, so that a greater or less movement will be given to the pump-plunger, according to the distance which the cam encountered projects beneath the lower surface of the plate 3. The inner surface of the plate 3 is flat, thus affording flat cam surfaces 16 between the projecting cams 8. The plate 3 is further provided with an annular series of perforations through which extend tubes 17 which communicate at the lower ends with the ejection or discharge-ducts of the member B and the upper ends of which may be connected with tubes leading to the various bearings or parts to be lubricated. The stationary cylinder B is preferably formed

with a cylindrical wall 18 having an annular enlargement 19 at its lower end and provided with an end-wall 20 at its upper end. The wall 20 is provided centrally on its upper surface with a boss 21 which is received in a central recess with which the inner surface of the plate 3 is provided, and the cylinder B is fixedly secured to the plate 3 by a central screw, or bolt, 22. The tubes 17 extend through the end-wall 20 of the stationary cylinder B as well as through the end-plate 3 of the casing. The enlargement 19 at the lower end of the cylinder B has a downwardly and outwardly flaring external surface 23, thus affording a tapering, or conical, external flange at the base of the cylinder B, and said enlargement also affords an internal flange 24 at or adjacent the lower end of the cylinder B. Through the enlarged portion 19 of the base of the member B extends a series of radial induction or suction ducts, or passages, 25 the outer ends of which open at the conical surface 23; and alternating with the ducts 25 is a series of radial ejection or discharge ducts 26 which are located in the same horizontal plane with the ducts 25 and the outer ends of which open at the conical surface 23. The ducts 26 turn upwardly and open through the flange 24, as indicated at 27, and the upturned portions of the ducts 27 are enlarged and threaded to receive the threaded lower ends of the tubes 17. The enlargement 19 of the cylinder B depends into the well 4 at the bottom of the casing, but is separated from the walls of said well by a space 28, so that the oil may pass freely from the casing through the well into the interior of the cylinder B. The upper wall 20 of the cylinder B fits accurately against the inner surface of the plate 3 of the casing, and the tubes 17 have an accurate fit in the perforations in the wall 20 and plate 3 which receive them. The conical surface 23 affords a bearing for the lower end of the rotary cylinder C, and the cylinder B also has machined surface bearings 29 and 30 at its intermediate and upper portions. The rotary cylinder C has a cylindrical wall 31 with a flaring extension 32 at its lower end which fits upon the flaring surface 23 of the enlargement 19 of the stationary cylinder B. The upper end of the cylindrical wall 31 contacts with the inner surface of the plate 3, and the cams 8 encircle the upper end of the cylindrical wall 31, being situated at a short distance therefrom. At one side of the cylinder C is provided a longitudinal boss 33 having a longitudinal perforation 34 therein which receives the plunger 35 of the pump C′ carried by the cylinder C. The lower end of the perforation 34 is turned laterally and affords a duct 36 which opens at the internal conical surface of the flaring portion 32 of the cylinder C and lies in the same horizontal plane with the ducts 25 and 26 of the member B. The duct 36 is adapted to be brought into alternate registration with the induction ducts 25 and ejection ducts 26, thereby to enable the oil to be drawn into the duct 36 when the plunger 35 moves upwardly and to be forced from said duct 36 when the plunger 35 is depressed by encountering a cam 8. The cylinder C is provided externally with a worm-wheel 37 which forms a part of the mechanism D which serves to impart rotary motion to said cylinder. Said wheel 37 is shown formed integral with the cylinder, and the plunger 35 is extended through a perforation in said wheel and provided at its upper end with an enlarged shank 38 which moves in a guide, or bearing, consisting of a longitudinal perforation in a longitudinal boss 39 with which the cylinder C is equipped near its upper end, said boss 39 being in alinement with the boss 33. The shank 38 is provided with a longitudinal groove 40 which receives a key, or spline, 41. The upper end of the shank is furcated and provided with a slot 42 which receives the shaft 43 of a roller 44 which is adapted to travel on the inner surface 16 of the plate 3 and over the cams 8. Confined between the wheel, or flange, 37 of the cylinder C and the enlargement 38 of the shank of the pump-plunger is a spring 45 which serves to retract or elevate the plunger after it has been depressed by a cam 8. The interior of the cylinder C is machined at points corresponding with the bearings 29 and 30, as indicated. The mechanism D for rotating the cylinder C comprises, in addition to the worm-wheel 37, a worm 46 having a shaft 47 extending through a stuffing-box 48 carried by a plate 49 secured, by bolts 50, to the front wall of the casing A. The outer end of the shaft 47 is equipped with a driving-wheel, or pulley, 51. The stuffing-box has an inner extension 52 which extends into the casing, and affords a bearing for the shaft 47. Said shaft 47 is provided with a circumferential groove 53 which is engaged by pins, or studs, 54 carried by the extension 52. The screw 46 is shown as a left-handed screw adapted to impart an outward longitudinal thrust on the shaft 47 when the wheel 51 is rotated clockwise and to counteract this thrust, the shaft 47 is equipped with a collar 55 which engages the inner end of the extension 52. The studs 54 are small enough with relation to the circumferential groove 53 to enable the thrust of the shaft to be sustained by the collar 55.

In Fig. 2, I have indicated by dotted lines the position of one of the cams 8 with relation to the corresponding discharge-ducts 26 and induction-ducts 25; and it will be understood therefrom that the relation of the ducts and cams is such that the duct 36 of

the cylinder C will be brought into partial registration with a discharge-duct 26 of the cylinder B before the roller 44 which operates the pump-plunger encounters the corresponding cam 8, and thereupon, the plunger will be actuated to eject the oil through the duct 26. The duct 36 will then move out of registration with the duct 26, and into partial registration with the next succeeding intake-duct 25 of the cylinder B, and about the same time the roller 44 will ride off the cam 8 and travel on the flat inner surface 16 of the plate 3. During the rising movement of the plunger 35, or immediately following the rising movement, oil will be drawn through the duct 25 into the duct 36. The exact time at which the oil is allowed to enter the duct 36 is not of great importance, but it is preferred to have the duct 36 at least in partial registration with the intake-duct 25 while the roller 44 is riding off the cam 8, so that as the plunger recedes the oil will flow into the duct 36 and the likelihood of leakage of air past the plunger of the pump will be reduced; in other words, no opportunity will be allowed for the destruction of the vacuum created by the withdrawal, or elevation, of the pump-plunger.

The manner of operation may be re-stated briefly. Rotary motion is imparted to the cylinder C through the medium of the mechanism D, the wheel 51 being connected with any suitable source of power. As the cylinder C rotates, it carries with it the pump C′, the duct 36 of which is brought into successive registration with the alternating inlet-ducts 25 and discharge-ducts 26 of the stationary cylinder B. The cams 8 are so arranged that the plunger 35 of the pump will be moved in opposite directions at appropriate times to exert first suction and then pressure through the duct 36, thus causing the oil to be drawn into the bore of the pump when the duct 36 registers with a duct 25 and to be discharged from the bore of the pump when the duct 36 registers with a duct 26. In the latter case, it is obvious that the oil will be forced through the corresponding tube 17 and caused to flow to the bearing or part with which the tube may be connected. As has been indicated, the cams 8 may be adjusted at will to cause varying movements of the pump-piston, so that a greater or less amount of lubricant may be discharged, as desired.

In the modification shown in Figs. 8 and 9, the general construction is similar to the construction already described, and the unaltered parts are identified by the same letters and numerals as the corresponding parts of the structure described. In the modified construction, however, the inner cylinder is somewhat modified in form at its lower end, and said inner cylinder is designated B′. The cylinder B′ has at its lower end an enlargement 19^a which corresponds with the enlargement 19 of the cylinder B, but which has a downward extension 19^b which bears upon the inner surface of the well 4. The enlargement 19^a has the same radial intake-ducts 25 and discharge-ducts 26 as has the enlargement 19, but in this case the ducts 26, instead of communicating with upturned ducts, communicate with downturned ducts 27^a which open through the lower surface of the extension 19^b. Through the lower wall of the well 4 extend tubular nipples 27^b which are adapted to be connected with tubes (not shown) corresponding with the tubes 17. To enable the oil to reach the interior of the cylinder B′, the downward extension 19^b is provided with a series of radial perforations 28^a. It will at once be appreciated that the operation of the modified construction is exactly the same as the operation of the first-described construction, except that the oil is ejected through the bottom of the casing A instead of through the top thereof.

Any suitable means may be employed for rotating the pump-carrying member, and the pump-carrying member may be of any desired form not inconsistent with the nature of its movement. Also, the casing A may be of any desired form, and, if desired, may be constituted by the crank-casing of an engine. In other words, it is essential to the operation of my device that oil shall be supplied from the casing to the induction-ducts of the member B, and that suitable discharge-ducts shall be provided. In both constructions illustrated, the rotary member has a conical inner surface which bears upon a corresponding conical surface of the inner stationary member, and the construction thus tends to maintain a close joint between the surfaces at which the ducts open. In both constructions, there is a sharp cut-off as the port of the rotary member passes the ports of the stationary member, and it is possible to regulate with accuracy the discharge or feed of the oil, regardless of its consistency. The parts operate with precision, and no part of the mechanism is subjected to undue shock. The oiler is therefore one of great durability, or long life.

The foregoing detailed description has been given for clearness of understanding only, and no undue limitation is to be understood therefrom, but the appended claims are to be construed as broadly as permissible in view of the prior art.

What I regard as new and desire to secure by Letters Patent is—

1. In a device of the character set forth, the combination of a casing, a stationary cylinder within the casing projecting from one wall thereof and provided with a series of suction-ducts and discharge-ducts alternating therewith, a rotary cylinder inclos-

ing said first-named cylinder and provided with a duct adapted to be brought into successive registration with said first-named ducts, a pump carried by said rotary cylinder and having an actuating stem extending toward the wall of said casing mentioned, and a plurality of adjustable cams connected with said wall of said casing and projecting into the casing adjacent the outer surface of the upper end of said rotary cylinder.

2. In a device of the character set forth, the combination of a casing, a stationary cylinder attached to a wall thereof and located within the casing, said cylinder having a frusto-conical enlargement at its opposite end and having also suction and discharge ducts with orifices opening at the external surface of said enlargement, an encompassing rotary cylinder journaled on said first-named cylinder and having a tapering surface co-acting with the conical surface of said first-named cylinder and having a duct adapted to be brought into successive registration with said first-named ducts, a pump carried by said rotary cylinder and having a stem extending toward the wall of said casing mentioned, and a series of cams arranged about the upper portion of said rotary cylinder and equipped with adjusting stems extending through said wall of said casing.

3. In a device of the character set forth, the combination of a casing provided with a removable top-plate, a stationary cylinder attached to and depending from said top-plate and provided with a series of suction-ducts and discharge-ducts alternating therewith, a rotary cylinder encompassing and journaled on said first-named cylinder, a pump carried by said rotary cylinder and provided with a duct adapted to be brought into successive registration with said first-named ducts, means for actuating said rotary cylinder, and a series of pump-actuating cams having adjusting-stems extending through said plate.

4. In a device of the character set forth, the combination with a casing equipped with a removable top-plate, a stationary cylinder depending from said top-plate and provided with a series of suction-ducts and discharge-ducts alternating therewith, said discharge-ducts extending through said top-plate and adapted for connection with tubes leading to the parts to be oiled, a rotary cylinder encompassing and journaled on said first-named cylinder and equipped with an actuating-wheel, means for rotating said last-named cylinder through the medium of said wheel, a pump carried by said rotary cylinder, and a series of pump-actuating cams encircling the upper end of said rotary cylinder and having adjusting-stems extending through said plate.

5. In a device of the character set forth, the combination of a fixed cylinder provided with a series of suction-ducts communicating with the interior of said cylinder and having orifices at the external surface thereof, and provided, also, with discharge-ducts alternating with said suction-ducts and having orifices at the external surface of said cylinder, an encompassing rotary cylinder having an inwardly opening duct, a pump carried by said rotary cylinder and acting through said last-named duct, and a series of adjustably fixed cams co-acting with said pump.

6. In a device of the character set forth, the combination of an oil-reservoir, a stationary cylinder within the reservoir which is fixedly carried by one wall thereof and provided with a series of discharge ducts, a rotary cylinder encompassing and journaled on said first-named cylinder and provided with a duct adapted to register with said first-named ducts during rotation of said second-named cylinder, a pump carried by said second-named cylinder and having a piston adapted to discharge lubricant through said last-named duct, said piston having a stem extending toward the above-mentioned wall of the reservoir, and a plurality of fixed cams ranged about the end of the rotary cylinder and adapted to engage said stem as the pump is carried by the rotary cylinder.

EDDY THOMAS McKAIG.

In presence of—
R. A. SCHAEFER,
JOHN WILSON.