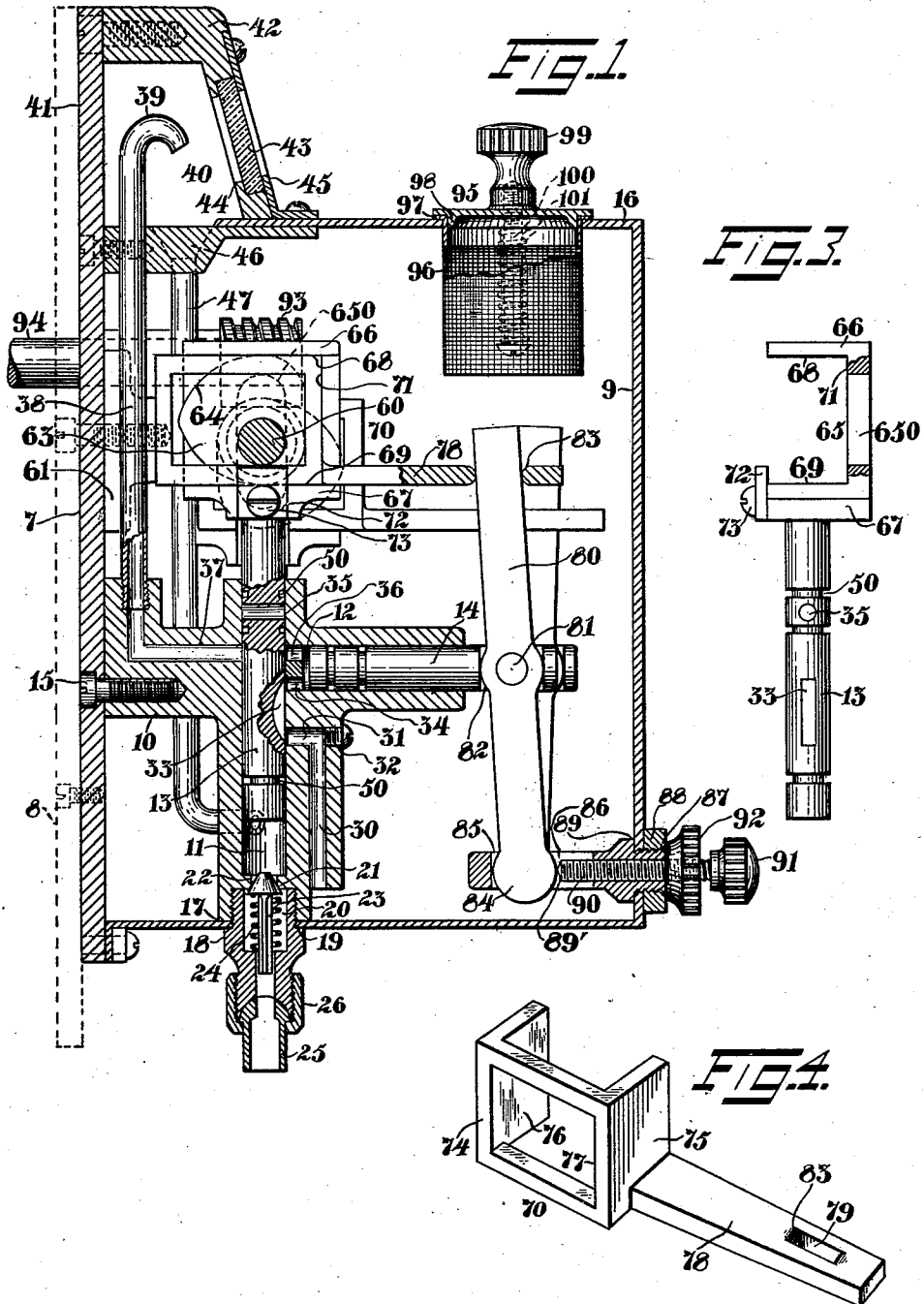


G. W. CARVER.
POWER FEED LUBRICATOR.
APPLICATION FILED NOV. 8, 1906.

997,964.

Patented July 18, 1911.

2 SHEETS—SHEET 1.



Witnesses:
Harry Fleischer
H. D. Penney

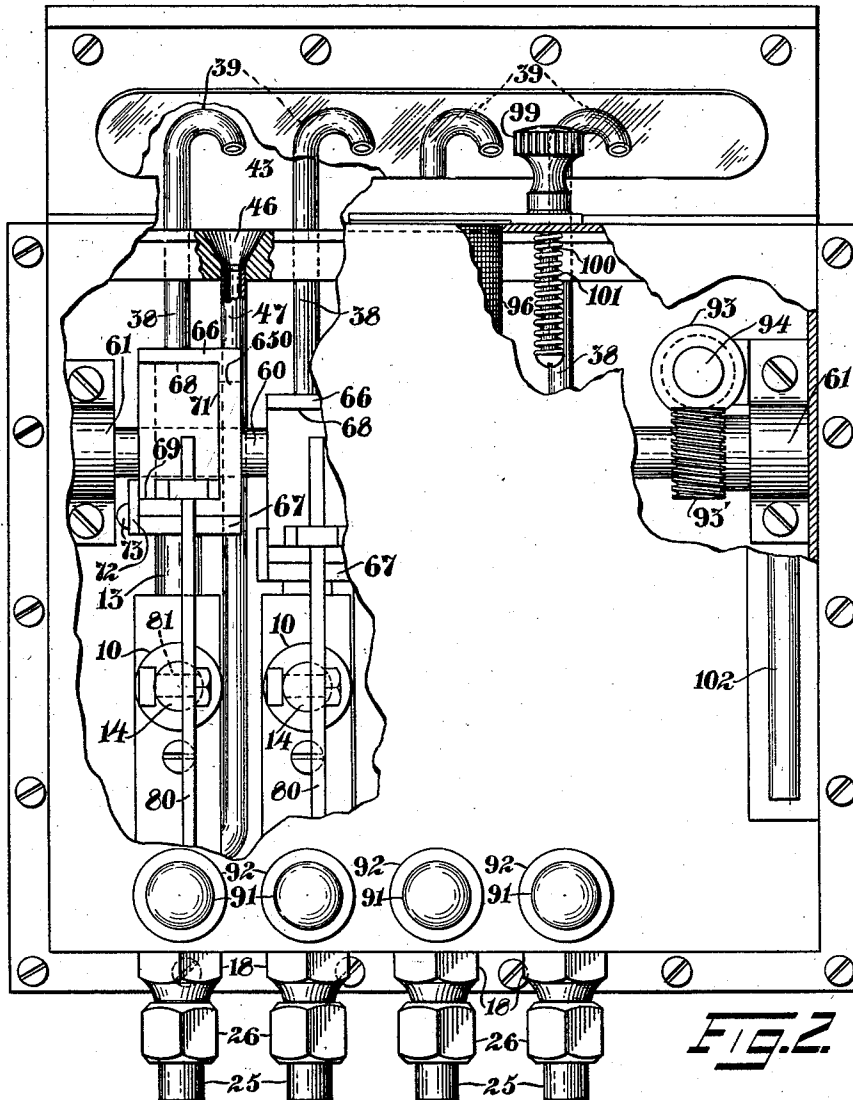
Inventor:
Georgell W. Carver
By his Attorney,
F. A. Richards

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UNITED STATES PATENT OFFICE.

GEORGE W. CARVER, OF NEW YORK, N. Y.

POWER-FEED LUBRICATOR.

997,964.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed November 8, 1906. Serial No. 342,453.

To all whom it may concern:

Be it known that I, GEORGE W. CARVER, a citizen of the United States, residing in the borough of Brooklyn, city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Power-Feed Lubricators, of which the following is a specification.

This invention relates to lubricators, and more particularly to power feed lubricators of that type which are commercially known as valveless lubricators, and is peculiarly adaptable to a structure embodying a sight feed.

The invention has for its object to provide an improved construction embodying but few movable parts, and one wherein the quantity of oil fed may be regulated to a nicety and in which the amount of feed may be readily ascertained.

The invention may be embodied in a mechanism having a pair of plungers, one of which plungers will be constructed and timed for opening and closing the inlet and outlet ports from the cylinder for the other plunger, and the stroke of one of which plungers may be regulated for controlling the amount of lubricant fed at each impulse. In some forms of construction the plunger acting to control the ports of the cylinder for the other plunger will have a stroke of determined and uniform limits. The stroke of the other plunger will be adjustable.

One of the pistons may by its direct impulse force the lubricant to some point in the apparatus where it is desired to there utilize it, or hold it for passing on to the point of utilization and the other of the pistons may be employed for not only controlling the ports of the first piston cylinder, but also for giving an impulse to the oil fed in determined quantities by the first piston and forcing this to the point of utilization.

This invention is particularly adaptable for use on automobiles. A side plate of sufficient strength and rigidity to sustain the apparatus may be constructed for ready securement to a dashboard of an automobile. This will bring the device within the region of heat from the motor and enable all the casing, with the exception of this plate, to be made out of very thin and light material.

Both of the pistons may be actuated from a single cam, and may be so positioned one relative to the other that if of a substantial

length they will act as guides for steadying the cam straps and the parts which they control.

If the device is organized in the manner herein illustrated for the purpose of one piston measuring out and expressing a determined amount of lubricant which may pass in front of a glazed opening, and the other piston for then forwarding the same to the point of application, the pistons will be so actuated that one of these will be moving during a period of idle dwell of the other. For instance, without any limitation as to position of the parts, the horizontal piston, which may be termed the sight feed piston, supplies during the period of rest of the vertical piston, which may be termed the service piston, and then stops; the vertical piston exhausts during the stoppage of the horizontal piston and stops; the horizontal piston exhausts during the stoppage of the vertical piston and stops; and the vertical piston supplies during the stoppage of the horizontal piston and stops. This may all be accomplished by means of simple mechanism involving but few parts. In the present illustration a single cam engaging a pair of cam straps, one for each of the pistons is illustrated.

In the drawings accompanying and forming a part of this present specification a practicable embodiment of a form of my invention is illustrated, wherein—

Figure 1 is a vertical section taken on the plane occupied by the axes of the pair of pistons of a single unit in the lubricator, the drawings herein indicate a lubricator containing four units; any number, however, may be employed in practice. Fig. 2 illustrates a front view of the device with a portion of the front wall of the casing broken away. Fig. 3 illustrates a side view of the plunger, which in Fig. 1 is illustrated as occupying a vertical position, and also shows its cam strap attached; and Fig. 4 is a perspective view of the cam strap for actuating the piston which in Fig. 1 is illustrated as occupying a horizontal position.

The parts are shown mounted upon a plate 7 to which the various parts of the mechanism may be attached, and by which they may be supported when this is attached to some suitable support. The plate may in practice be attached to the dash-board of an automobile which is indicated in dotted lines bearing the reference character 8. A mem-

ber 10 is illustrated, which in the present instance carries a pair of piston cylinders 11 and 12 respectively, and although applicant does not purpose limiting himself to the exact relationship of these cylinders and their pistons, yet for the purpose of greater facility in description the cylinder 11 and its piston 13 may be referred to as vertical and also as the service feed cylinder and piston, and the cylinder 12 and its piston 14 may be referred to as horizontal and also as the sight feed cylinder and piston, such being the positions these parts assume in the drawings herein. A screw 15 is the manner herein illustrated for holding the member 10 to the plate 7. The plate constitutes one side of the reservoir or tank designated in a general way by 9, in which the parts are incased and the lubricant contained. If plate 7 is employed as the means for supporting the device, the walls 16 of the tank may then be made of thin and light material since the parts which these will support may also be made light and but little strain will come upon them. The portion of the member 10 which constitutes the cylinder 11 may be continued as at 17 so that it will come flush with the bottom portion of the casing 16. This portion 17 may be interiorly screw threaded, for receiving a connection 18 having a shoulder 19 for engaging the underside of the bottom of the casing, so that this may be securely clamped between these parts for steadying the device and also for adding additional support to the bottom of the casing and counteracting any tendency of the same to sag incident to the weight of lubricating material which may be contained therein. The member 18 is chambered out as at 20 for receiving a back pressure valve 21 which will seat against a shoulder 22 at the outlet or exhaust port of the cylinder 11. The stem 23 of the valve may be surrounded by some suitable spring 24 for the purpose of holding this against its seat. A tube 25 leading to some point of utilization of the lubricant may be attached to the member 18 by means of a coupling 26, and which tube may for convenience be called the service feed tube. In this instance it will be seen that the tendency of the spring 24 works in the same direction as the pressure within the tube 25 for seating the valve and preventing oil or other lubricant from flowing backwardly into the cylinder 11, more particularly during the supply or suction movement of the piston 13.

The lubricant will be supplied to the cylinder 12 through a channel 30 in the member 10, which channel may run down to a point near the bottom of the reservoir. A channel 31 is illustrated disposed transversely of the channel 30 and for convenience of construction this channel may be bored from the outside and closed in some convenient man-

ner, as for instance by means of a screw 32. The channel 31 opens into the cylinder 11 and the piston 13 has a channel or by-pass 33 for registering with the channel 31 and also communicating, by means of a channel or port 34, with the cylinder 12. The by-pass or opening 33 will, in the form of apparatus herein illustrated always be in communication with the channel 31; but only in its upward position, or that illustrated in Fig. 1, will it be in communication with the channel 34 which constitutes the inlet or supply port for the cylinder 12. When the piston 13 is in its upward position, or that illustrated in Fig. 1, by a movement of the piston 14 toward the right in such figure the cylinder 12 will be supplied with lubricant. Upon the down movement of the piston 13 the inlet port 34 will be closed and a port 35 in the piston 13 will open communication between the exhaust or outlet port 36 from the cylinder 12 and a channel 37 in the member 10, so that upon movement of the piston 14 from its outward or right hand position into the position illustrated in Fig. 1 the contents of the cylinder 12 will be expressed or exhausted through the ports 36, 35 and 37, and will pass to some desired point; in the apparatus herein illustrated will pass up the tube 38, which has a bent-over end 39 within a chamber, designated in a general way by 40 which is surrounded by an extension 41 of the plate 7 and the frame member 42, which will be provided with openings which may be closed with some transparent material, as for instance, glass 43. The glass may rest against a shoulder 44 upon the inside and be held in position by a removable frame 45 upon the outside. The lubricant as it is discharged out of the end 39 of the tube, which may be designated the sight feed tube for clearly distinguishing this from the service feed tube, will flow into a funnel 46 and pass down a tube 47 and into the cylinder 11 and between the piston therein and the valve 21, from which it will be expelled by the stroke of such piston. This gives a power feed device, and one in which the quantity of lubricant delivered at each stroke or impulse of the piston 14 may be observed through the glass 43. In practice the pressure from the tube 25 will find its way into the chamber 40, so that equilibrium will there be established.

The pistons may be provided with circumferential channels 50 for the purpose of assisting these in their work, which channels are found to serve the same purpose as packing applied to pistons, and in devices of this character are found to work more satisfactorily.

The pistons may be driven from a driving shaft 60 mounted in suitable bearings 61 supported from the plate 7, and which shaft

will be driven at proper speed from some suitable part of the apparatus. This, of course, constitutes no part of the present invention and consequently it is sufficient only to state that the shaft 60 will be given proper movement for producing the desired result. Both of the pistons mentioned herein, namely 13 and 14, are, in the present illustration, driven from the shaft 60 by means of a single cam 63 fast upon the shaft. The piston 13 carries a cam strap member, designated in a general way by 65, which is provided with a guideway 650 embracing the shaft 60, which strap has top and bottom members 66 and 67, the faces 68 and 69 of which constitute engaging faces or abutments for the face 64 of the cam, so that upon rotation of the shaft the cam will first engage the face 68 and raise the piston, this being in the position illustrated in Fig. 2, and upon further rotation it will engage the face 69 and depress the piston. The equalization of pressure and the inertia of the parts being sufficient to hold the piston in its respective raised and lowered positions until positively returned by the cam. A cam strap in the form of a slide, designated in a general way by 70, (see perspective view of this in Fig. 4,) is mounted to slide between the faces 68 and 69, and is held against the face 71 by means of a removable plate 72 held in position, as for instance by means of a screw 73. Such slide member 70 has upon its end members 74 and 75 faces 76 and 77 which constitute abutments or cam receiving faces for the cam face 64. The position of these faces is quartering with the faces 68 and 69, so that this slide member will be reciprocated transversely of the direction of movement of the piston 13 during the times when such piston is at rest. The slide member 70 also embodies an arm 78 provided with an aperture 79 which will receive a lever 80 secured by a pivot 81 to the piston 14, and for the economy of space may occupy a recess 82 in the end of the piston. The edges of the aperture 79 may be chamfered off as at 83. This organization is for the purpose of reciprocating the piston 14. The fulcrum of the lever 80 will be provided for and the lever may be given a circular formation, as at 84, which will engage an abutment face 85 upon a bracket 86, which bracket may be secured to the outer wall of the casing 16 by having a screw threaded portion 87 passing through the wall and held in place by a nut 88 drawing the shoulder 89 of the member 86 against the wall 16 so tightly that the part will be rigidly held in position and the lubricant will not be permitted to escape. The fulcrum portion 84 will engage upon the other side an abutment face 89', which in the present instance is the end of a screw 90 which traverses a screw threaded opening

in the member 86 and is provided with a head 91 whereby it may be moved back and forth for the purpose of regulating the amount of lost movement of the fulcrum, which will thereby regulate the extent of the excursion of reciprocations of the piston 14 and consequently regulate the amount of lubricant which is fed forward at each impulse. A jam nut 92 may be mounted upon the screw 90 for the purpose of locking this in its positions of adjustment.

From the foregoing description it will be seen that the machine operates substantially as follows: upon the rotation of the shaft 60 the face 64 of the cam 63 will raise the piston 13, which piston is illustrated in such position in Fig. 1, upon a quarter advance of the shaft the cam face 64 will engage the face 77 of the cam strap member 70 and through means of the lever draw out the piston 14, which will draw lubricant through the channels 30—31—33 and 34 into its cylinder 12; the cam in its further movement will permit the piston 14 to remain in this withdrawn position and upon its further advance the cam face 64 will engage the face 69 and depress the piston 13, expressing or discharging from the cylinder 11 the lubricant that may be within the same, forcing it into the tube 25 past the back pressure valve 21. This movement will cause the by-pass 33 to break connection between the channels 31 and 34 so that the inlet port of the cylinder 12 is closed. The further movement of the cam will permit the piston 13 to remain in this position and the cam face 64 will then engage the face 76 and move the slide member 70 toward the position it occupies in Fig. 1, which will draw the piston 14 into the cylinder 12, expressing or discharging the lubricant contained therein through the ports 36, 35 and 37, the port 35 having been brought into register with the ports 36 and 37 upon the down stroke of the piston 13. The further movement of the cam will permit the piston 14 to remain in the last mentioned position until the cam face 64 has engaged the face 68 and raised the piston 13 to the position illustrated in Fig. 1 wherein the port 35 is moved out of registry with the port 36 and communication has again been established between the ports 31 and 34. It will thus be seen that there is a dwell between the excursions of each of the pistons and that during such dwell the other piston is moved.

In the above description but one lubricator unit has been described; but in practice any number of units may be employed in a single apparatus as occasion may demand.

As a convenient means of rotating the shaft 60 there may be a worm 93 carried by a shaft 94 passing through the back plate 7 meshing with a worm wheel 93' fast upon the shaft 60. This, of course, merely indi-

cates a convenient means which may be employed for this purpose.

The opening of the reservoir or tank 9 may have a strainer 96 within it and the edges of the strainer, as at 97, may overlies the top plate 16 of the casing. This will permit the ready removal of the strainer and it may be held in place and the opening securely closed by means of a plate 95 having a flange 98 to enter the inside of the strainer, the plate being sufficiently large to overlap the flange 97 of this and hold it down upon the plate 16. A suitable handle 99 is shown for manipulating the closure, and a stem 100 will pass through the cover plate and a spring 101 will be carried by this for the purpose of holding the cover down in position. The spring 101 will be interposed between the top plate 16 of the reservoir and the head of the pin 100 so that upon raising the closure by means of the handle 99 the cover may be readily swung from one side to the other for opening and closing the inlet to the reservoir, the spring normally acting to draw the closure toward the plate 16.

A suitable gage glass, indicated herein in a conventional manner and designated by the reference character 102, may be employed for exhibiting at all times the quantity of oil or lubricant within the reservoir.

It will be seen that the device may be supported entirely by the back plate 7 which may be supported by some suitable support, which may be the dashboard of an automobile if the device is employed upon an automobile, and that when it is desired to get at the working parts the casing may be readily removed and the working parts still be supported from such plate, the parts remaining in their working position so that the workman may readily ascertain what adjustments or repairs are necessary and be sure of the position the parts will occupy after the casing has been replaced. This will render the requirement of expert skill in the repair of the device unnecessary.

Having described my invention I claim:

1. In a power feed lubricator, the combination with a pair of cylinders and reciprocating pistons located therein, one of said cylinders having supply and exhaust ports and the other of said cylinders intersecting these ports, the piston in the intersecting cylinder being provided with passages for opening said ports and portions for closing the same, of means for positively reciprocating the pistons with a dwell between excursions and so constructed and timed that each piston shall move during the dwell of the other.

2. In a power feed lubricator, the combination with a pair of cylinders and reciprocating pistons located therein, one of said cylinders having supply and exhaust ports

and the other of said cylinders intersecting these ports, the piston in the intersecting cylinder being provided with a passage for opening one of said ports when at the end of one excursion and for opening the other of said ports when at the end of the opposite excursion, the normal face of the piston being effective for closing said ports, of means for positively reciprocating the pistons with a dwell between excursions and so constructed and timed that each piston shall move during the dwell of the other.

3. The combination with a lubricant reservoir, of a sight feed tube, a cylinder having its supply port in communication with the reservoir, and its exhaust port in communication with the sight feed tube, a piston in said cylinder, a cylinder intersecting the said supply and exhaust ports, a piston mounted in the intersecting cylinder and provided with openings for opening said ports and with portions for closing the same, and a service feed tube in communication with the exhaust of said intersecting cylinder, said sight feed tube being in communication with the supply port of said intersecting cylinder.

4. The combination with a reservoir, of a cylinder having its supply port in communication with the reservoir and its exhaust with the sight feed, a piston in said cylinder, said sight feed, a cylinder having its supply port communicating with the sight feed tube and its exhaust port with the service feed tube, said service feed tube, a piston in said second cylinder effective to close the ports in the first cylinder and provided with ports for opening the said ports, and means for positively reciprocating said pistons.

5. The combination with a reservoir, of a cylinder having its supply port in communication with the reservoir and its exhaust with the sight feed, a piston in said cylinder, said sight feed, a cylinder having its supply port communicating with the sight feed tube and its exhaust port with the service feed tube, said service feed tube, a piston in said second cylinder effective to close the ports in the first cylinder and provided with ports for opening the said ports, means for positively reciprocating said pistons, and means for adjusting the length of stroke of one of said pistons.

6. The combination with a plate and means for attachment therefor, of a sheet metal casing secured to said plate and constituting a reservoir, a member within said casing provided with piston cylinders and secured to said plate and having a portion extending to and engaging the bottom of the reservoir and provided with the exhaust port of one of the cylinders, a tube coupling engaging said bottom engaging portion of said member and having a shoulder for

clamping the said bottom portion against said member, pistons in said cylinders and actuating mechanism supported by the plate for actuating said pistons.

5 7. The combination with a plate and means for attachment therefor, of a sheet metal casing secured to said plate and constituting a reservoir, a member within said casing provided with piston cylinders and
10 secured to said plate and having a portion extending to and engaging the bottom of the reservoir and provided with the exhaust port of one of the cylinders, and a tube coupling engaging said bottom engaging portion of
15 said member and having a shoulder for clamping the said bottom portion against said member.

8. The combination with a pair of cylinders disposed transversely one to the other,
20 of pistons in said cylinders, a cam and means for actuating the same, a cam strap carried by one of said pistons and having faces for the successive engagement of the cam whereby the piston may be raised and
25 lowered, said cam strap being provided with a slideway, a slide member constituting a cam strap mounted on said slideway and having faces for the engagement of the cam between its engagement with the raising and
30 lowering faces upon the other cam strap, a lever secured to the other of said pistons and actuated with said slide member.

9. The combination with a pair of cylinders, of pistons in said cylinders, a cam
35 shaft, a cam carried thereby, a cam strap carried by one of said pistons and having a pair of faces for the engagement of the cam whereby the piston may be reciprocated, there being a guideway embracing said
40 shaft, said strap also having a slideway, a cam strap slidably mounted on said slideway and shiftable with the same and having a pair of faces for the engagement of the

cam between its engagement with the faces of the other cam strap, a lever secured to the
45 other of said pistons and connected to said slidable strap.

10. The combination with a pair of cylinders disposed transversely one to the other, of pistons in said cylinders, a cam and means
50 for actuating the same, a cam strap carried by one of said pistons and having faces for the successive engagement of the cam whereby the piston may be raised and lowered, said cam strap being provided with a slide-
55 way, a slide member constituting a cam strap mounted on said slideway and having faces for the engagement of the cam between its engagement with the raising and lowering faces upon the other cam strap, a lever se-
60 cured to the other of said pistons and connected to said slide member, a fulcrum support for said lever, and adjustable means for permitting a determinate amount of lost-motion at the fulcrum of said lever for regu-
65 lating the stroke of said piston.

11. A lubricator of the class described comprising a casing having inter-communicating cylinders formed therein, a pair of
70 pistons reciprocable in the respective cylinders, one piston serving as a feeding pump and the other piston serving as a valve and distributing pump and means for imparting reciprocatory movements of different rela-
75 tive phases to said pistons embodying a pair of actuating devices for the pistons, and eccentric means common to both of said actuating devices and engaging the latter at different points in its circumference.

Signed at Nos. 9-15 Murray street, New
80 York, N. Y., this 31 day of October, 1906.

GEORGE W. CARVER.

Witnesses:

FRED J. DOLE,

CHAS. LYON RUSSELL.