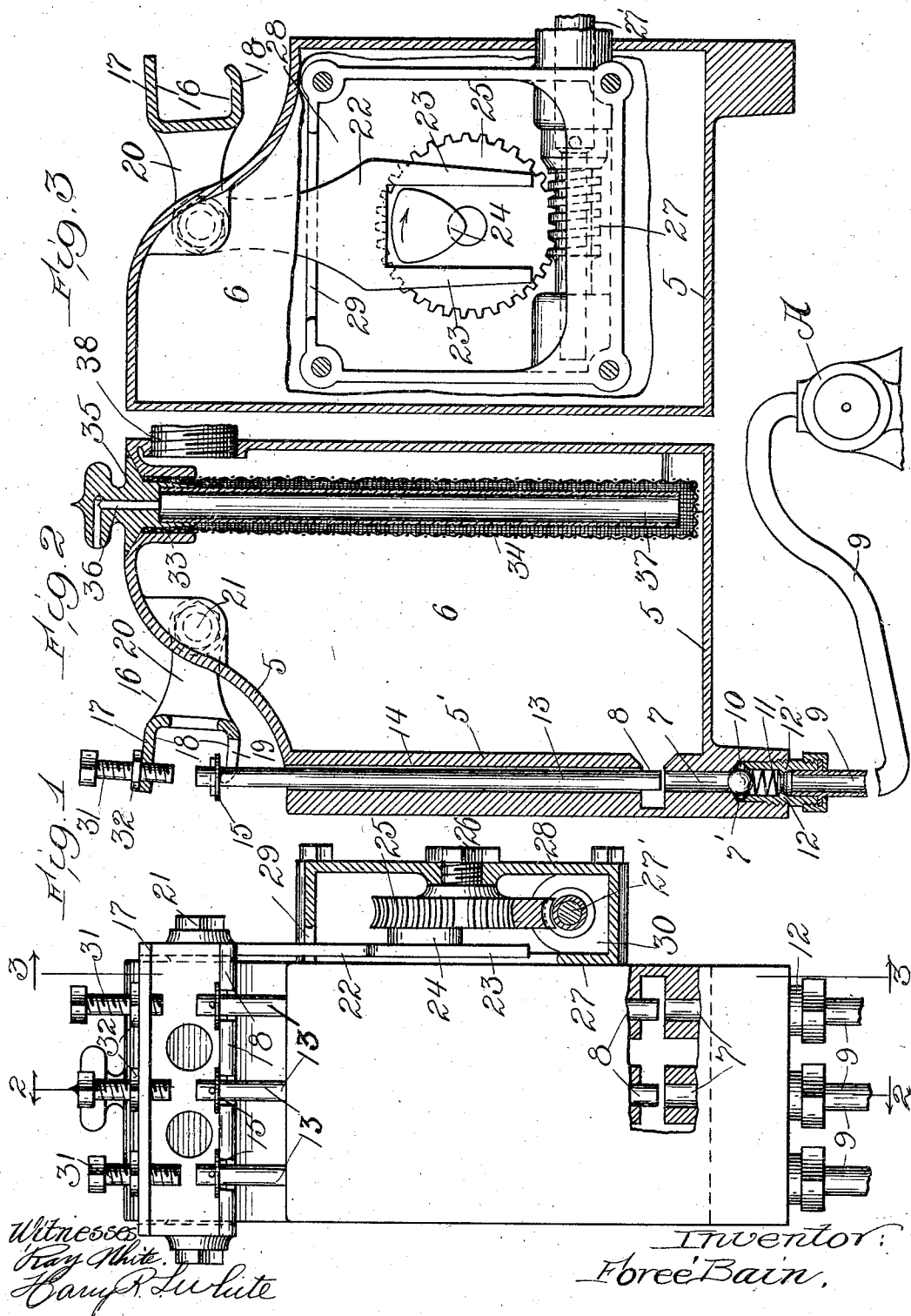


No. 793,499.

PATENTED JUNE 27, 1905.

F. BAIN.
LUBRICATOR

APPLICATION FILED OCT. 10, 1904.



UNITED STATES PATENT OFFICE.

FORÉE BAIN, OF LAGRANGE, ILLINOIS.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 793,499, dated June 27, 1905.

Application filed October 10, 1904. Serial No. 227,934.

To all whom it may concern:

Be it known that I, FORÉE BAIN, of LAGRANGE, in the county of Cook and State of Illinois, have invented certain new and useful
 5 Improvements in Lubricators; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

10 My invention relates to improvements in lubricators, and more particularly to positive-feed lubricators.

Among the salient objects of my invention are to provide a lubricator positive in its action, invariable in its feed under given adjustment, yet readily adjustable as to feed, and, further, to provide such a machine which will be simple in construction, cheap and easy of manufacture, and reliable in operation.

20 In the drawings, wherein I have illustrated the application of my invention to a multiple lubricator, Figure 1 is a front view with parts in section. Fig. 2 is a transverse vertical section on line 2 2 of Fig. 1, and Fig. 3 is a transverse vertical section on line 3 3 of Fig. 1 with parts broken away.

Throughout the drawings, 5 indicates the casing inclosing a chamber 6, constituting an oil-reservoir, said casing being of any suitable shape, preferably provided with a suitably-thickened wall 5' at its front.

7 indicates an oil-receiving chamber, of which any number may be provided, according to the size of the machine. Preferably the chamber 7 is arranged vertically and formed in the thickened wall 5' and at one end communicates with the interior of the reservoir, such communication being in the present case provided for by a channel 8, preferably deeper than to the remote edge of the chambers, running longitudinally of the casing-wall 5' and connecting all of the chambers 7. It will be apparent that oil from the reservoir filling the channel 8 completely surrounds the open upper end of the chamber 7.
 45 The opposite end of the chamber 7 communicates with the bearing A or other parts to be lubricated, as by a pipe 9, a suitable check-valve being provided on the outflow side of

the chamber 7 to prevent the return into the 50 said chamber of oil expelled therefrom.

In the specific illustrative construction, 10 indicates a ball arranged in a counterbore 7' below the chamber 7 and normally maintained in contact with the bottom of said counterbore 55 to close the chamber 7 by a spring 11, abutting at its opposite end against a shoulder 12' of a suitable bushing 12, threaded into the counterbore 7'. Obviously the valve-ball may be unseated only by the application of pressure on its side toward chamber 7 and will reseal as soon as the pressure is relieved.

The means provided for expelling oil from the chamber 7 comprises, preferably, a plunger 13, preferably in the form of a straight 65 rod, arranged to aline with the chamber 7 and adapted to work into or out of the chamber 7 through the channel 8 to expel oil from said chamber and to control its communication with the oil-reservoir or other source of oil-supply. Preferably the rod or plunger 13 is 70 guided in a suitable cylinder or bore 14 in the casing-wall 5, alining with the chamber 7 and extending through said guide 14 to the exterior of the casing, so that its workings may 75 be plainly viewed, the long bearing of the plunger in its bore 14 obviating the probability of leakage around the said plunger.

15 indicates a washer on the upper end of the plunger 13, retained thereon, as by a cotter-pin 15. It will be understood, of course, that a plunger is provided for each of the chambers 7 comprised in the multiple lubricator; but as the constructions of the plungers and their associated devices are exactly 85 identical for all of the chambers a description of one will suffice for all.

Means are provided for actuating all of the plungers 13, such means comprising, preferably, a single rocking frame 16, consisting of 90 a plate 17, beneath which are arranged a plurality of fingers 18, separated by recesses 19 for a purpose to be described, said plate and fingers being carried by arms 20, mounted upon pivots 21 at opposite ends of the casing 95 5. The parts are so arranged that the plate 17 overlies the ends of the plungers 13, and the recesses 19 exactly aline therewith, the

fingers 18 underlying and engaging the washers 15, carried by the corresponding plungers.

22 indicates a lever-arm extending down the side of the casing and preferably bifurcated at its lower end to provide two fingers 23 23, separated a suitable distance. Suitable means are provided for oscillating the arm 22, in the present construction such means comprising a cam 24, arranged between the fingers 23 and carried on the inner side of a worm-wheel 25, mounted on a stud 26 and meshing with a worm-gear 27, finding bearings in a suitable housing 28, detachably secured to side of the casing 5. The housing 28 is provided with a suitable aperture 29 to receive the lever-arm 22 and permit its oscillation therein, and its lower inner edge is preferably provided with an upturned lip, which, with the bottom and opposite side of the housing, forms a receptacle for a lubricant for the worm-gearing. The shaft 27' of worm 27 is extended through the housing for connection with a suitable source of power.

Adjustable operative connection is afforded between the rocking frame 17 and the respective plungers 13 by adjustable screws 31, threaded through a plate 17 and retained in adjusted position, as by set-nuts 32.

To afford means for filling the reservoir 6 and at all times ascertaining the level of the lubricant therein, I provide an aperture 33, from which depends the usual strainer 34 and in which is adapted to fit a plug 35, having a small bore 36 extending to the exterior of the plug, preferably at the side thereof at a position convenient to be covered by the fingers of the user. To the lower end of the plug 35 is secured a hollow glass tube 37 in open communication with the bore 36.

When used with an automobile, the lubricator is adapted to be secured to the dash of the vehicle, and the aperture 38 affords a means for filling the lubricator from the opposite side of the dash over the machinery, and thus avoid the possibility of soiling the interior of the vehicle.

The operation of my device is as follows: The reservoir 6 is filled with oil through the apertures 38 or, if desired, through the aperture 33, and the height of the oil therein may at any time be determined by raising the plug 35 and the glass tube 37, in which the oil is contained, to its general level in the casing. The finger of the user must be placed over the aperture of the bore 36 before the plug with its glass tube is lifted, when the oil will remain in the tube after it is lifted out of the reservoir. The height of the oil in the glass tube 36 will indicate with a practical degree of accuracy the height of the oil in the casing. The shaft of the worm-wheel in use is turned so that the cam 24 is rotated in the direction indicated by the arrow in Fig. 3, so that the arms 20 are lifted with a comparatively quick motion to their uppermost limit, reached

when the forward corner of the cam-surface arrives at an angle less than ninety degrees to the position indicated in Fig. 3. During this lifting operation it will be understood that each of the plungers 13 is lifted by the engagement of the fingers 18 of the rocking frame with the under side of its washer 15, said plungers preferably all alining with the upper side of the longitudinal slot 8 at the end of the upstroke. Now a dwell in the motion of the rocking frame 16 occurs until the forward corner of the cam 24 encounters the arm 23 to the left of Fig. 3. During this interval the chambers 7 are in open communication with the reservoir 6 and receive a supply of oil therefrom, which flows in from all sides through channel 8 until it entirely fills the chambers 7, the oil being prevented from flowing out of said chambers by the check-valves 10. Now the cam 24, acting upon the left-hand finger 23, throws the rocking frame 16 downward, the plungers 13 remaining unmoved in their uppermost position until met by their respective adjusting-screws 31, which with connecting mechanism positively force them downward until the end of the downstroke of the rocking frame is reached. During this movement of the plungers 13 their forward ends traverse the channel 8 and enter the adjacent ends of the chambers 7, with which said plungers make close fit. Accordingly the communication of the chambers 7 with the oil-reservoir is cut off and the pressure of the plunger upon the oil in said chamber unseats the valve 10 and positively forces oil from the chambers 7 into the respective pipes 9 until the rocking frame reaches the end of its downward stroke and the expelling movement of the plunger ceases. It will be apparent that the downstroke is made more slowly, but with greater power than the upstroke, the leverage of the cam on the rocking frame being longer than on the upstroke. Now a dwell again occurs in the movement of the rocking frame 16, giving the valve 10 ample time to close firmly before the relatively quick upstroke begins. It is to be noted, too, that the upstroke tends to create a vacuum in chamber 7, so that when the position shown in Fig. 3 is reached and communication is established between the oil-chamber 7 and the reservoir oil flows quickly into the chamber, owing to the existence of a pressure less than atmospheric pressure therein. Further, the arrangement of the parts makes the filling of the chamber 7 independent of the head of the oil, as difference in pressure is not depended on to fill the chamber, but is only an incidental effect cumulative with gravity. It will be apparent now that by adjustment of the screws 31 the operative stroke of each plunger may be varied, each independently of the other, so that the amount of oil expelled on each stroke may be regulated to a nicety; but at the same time the plungers are all moved

back to definite position on the upstroke of the rocking frame irrespective of the length of their downward excursions. In this way I insure that the plungers are raised free of the slot 8, which is thereby entirely cleared, so that perfectly free communication may be established between the reservoir and all sides of the several chambers 7, the dwell occurring at the end of each stroke giving ample time for the chambers to fill irrespective of any ordinary degree of viscosity of the oil.

While I have herein described in some detail one operative embodiment of my invention, the details whereof I believe to be new and advantageous, it will be apparent to those skilled in the art that numerous changes might be made in the mechanical embodiment of my invention without departing from its spirit and scope, and I do not desire to be understood as limiting myself to the specific features of construction shown and described further than as set forth in the claims.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a lubricator, the combination of an oil-reservoir, a plurality of oil-chambers, a plunger for each chamber arranged to positively control communication between said chamber and the reservoir, and adapted to expel oil from said chamber, common means for reciprocating said plungers, and independent means for each plunger for varying its throw on the forcing stroke and permitting its return to its invariable position on the return stroke, whereby the action of each plunger as to the expulsion of oil may be independently varied and its effect upon communication between the reservoir and chamber maintained constant.

2. In a lubricator, the combination of an oil-reservoir, a plurality of oil-chambers each open to the reservoir at one end, a plunger for each chamber arranged to work past the opening to control the communication of the chamber with the reservoir and expel oil from said chamber, a movable member common to said plungers having a lost-motion connection with each plunger, and independent means for each plunger for varying the amount of lost motion from the end only through which connection is effected with said plunger to move it on its oil-expelling stroke.

3. In a lubricator, the combination of an oil-reservoir, a plurality of oil-chambers each open to the reservoir at one end, a plunger for each chamber arranged to work past the opening to control the communication of the chamber with the reservoir and expel oil from said chamber, comprising independently-adjustable means for each plunger for varying its throw on the oil-expelling stroke, and means for returning the plungers to invariable position.

4. In a lubricator, the combination of a support, a plurality of oil-chambers, a plunger

for each chamber, a rocking member mounted in the support and adapted to reciprocate the plungers, and means carried by said movable member for independently adjusting the throw of each plunger.

5. In a lubricator, the combination of a plurality of oil-chambers, plungers therefor, a moving member arranged to coact with all of said plungers, said member having separate parts for lifting and depressing the plungers, and a separate adjusting means for each plunger carried by the depressing part of said member.

6. In a lubricator, the combination of an oil-chamber, a plunger therefor, a moving member arranged to coact with said plunger and having separate parts for lifting and depressing said plunger, and an adjusting means for the plunger carried by the depressing part of said member.

7. In a lubricator, a reservoir-casing having a thickened front wall, a plurality of chambers formed in said thickened wall, a transverse recess connecting said chambers and extending deeper into the wall than the said chambers, a plunger arranged for reciprocation into and out of each of said chambers through the said recess, said plungers being arranged to slide in said thickened wall and extending to the exterior of the casing, a check-valve at the bottom of each chamber, and means for actuating the plungers.

8. In a lubricator, an oil-reservoir, a chamber arranged for open communication with said reservoir, a plunger for expelling the oil from said chamber and cutting off its communication with the reservoir, a check-valve at the delivery end of the chamber and means for actuating said plunger arranged to afford a dwell in its movement when said plunger is in position to permit communication between the reservoir and the chamber and another dwell when the plunger reaches the end of its expelling stroke.

9. In a lubricator, an oil-containing casing, oil-chambers, plungers therefor, and means for reciprocating said plungers comprising a lever pivoted to the sides of the casing, and having a part adapted and arranged to depress the plungers, and another part adapted and arranged to elevate the plungers, and means for rocking said lever.

10. In a lubricator, force-feed means comprising a reciprocating plunger provided with a projection at some suitable point, and means for reciprocating said plunger comprising a lever having a part adapted to engage said plunger to depress the same, a portion adapted to engage the under side of the projection on said plunger to elevate the same, and an adjusting-screw carried by one of said portions of the lever.

11. In a lubricator, an oil-reservoir consisting of a casing having a plurality of cylindrical chambers provided in an integral wall thereof

and having open communication on all sides
with said reservoir, plungers adapted and ar-
ranged to directly discharge the oil from the
chambers, guides for said plungers formed inte-
5 gral with said wall, and means for reciprocating
said plungers comprising means for simulta-
neously withdrawing the plungers from said
cylinders to invariable, predetermined posi-
tions common to all, and independently-ad-

justable means for each plunger for varying
its discharging stroke.

In testimony that I claim the foregoing as
my own I affix my signature in presence of two
witnesses.

FORÉE BAIN.

In presence of—

C. INEZ WILCOX,
MARY F. ALLEN.