No. 854,948. PATENTED MAY 28, 1907.

C. B. HODGES.

FORCE FEED LUBRICATOR.

APPLICATION FILED APR. 3, 1905.

4 SHEETS—SHEET 1.

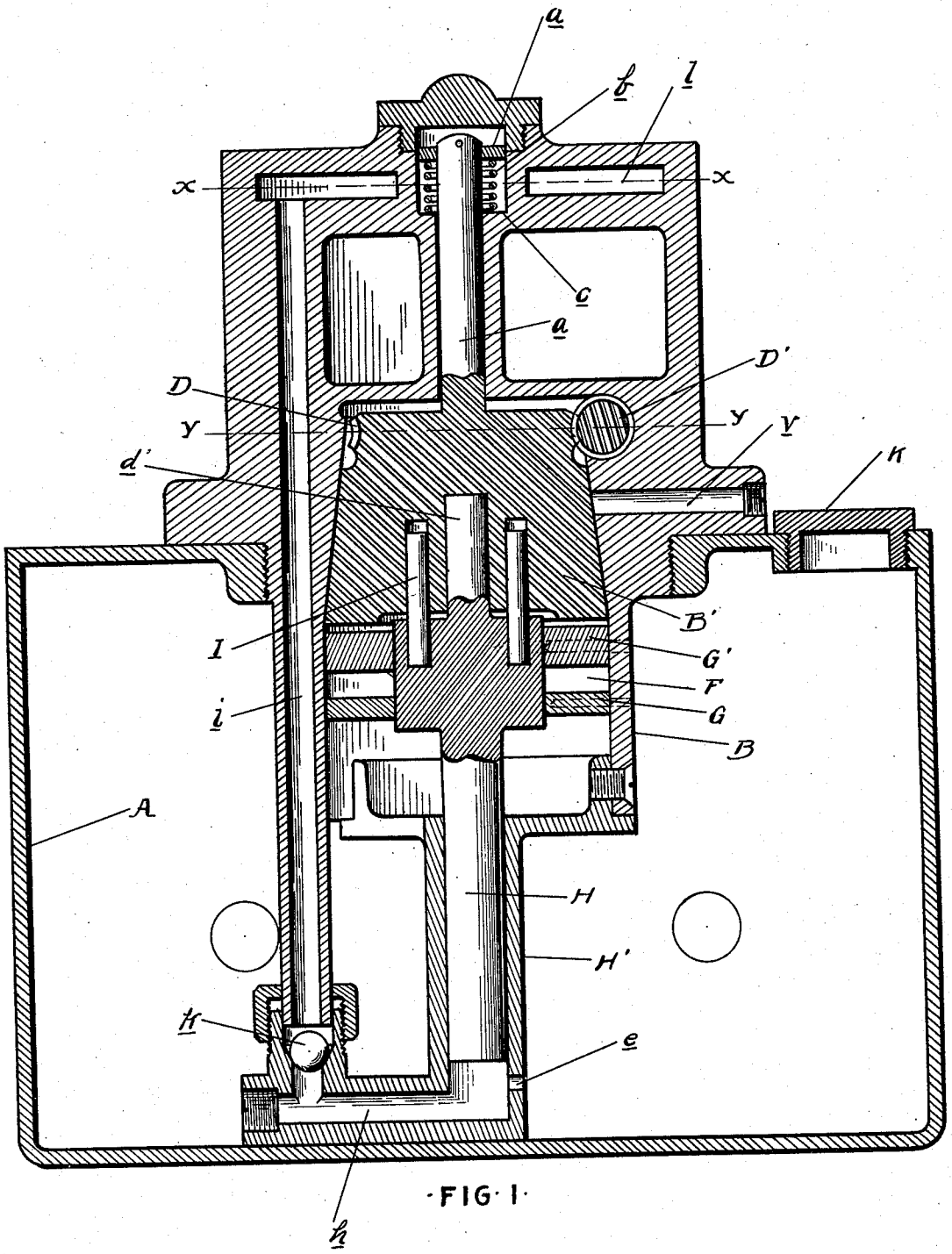


FIG. 1.

WITNESSES

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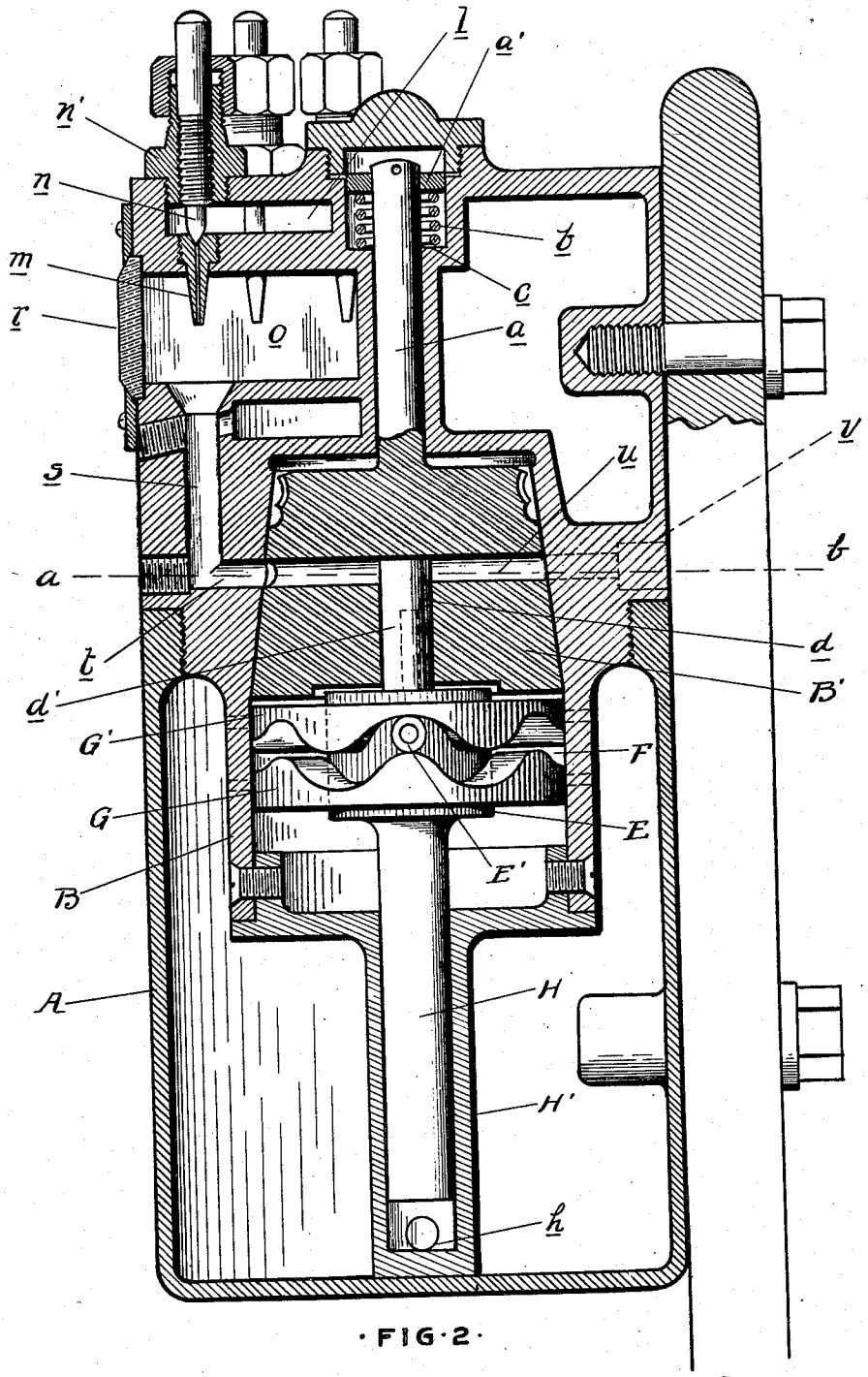


FIG. 2.

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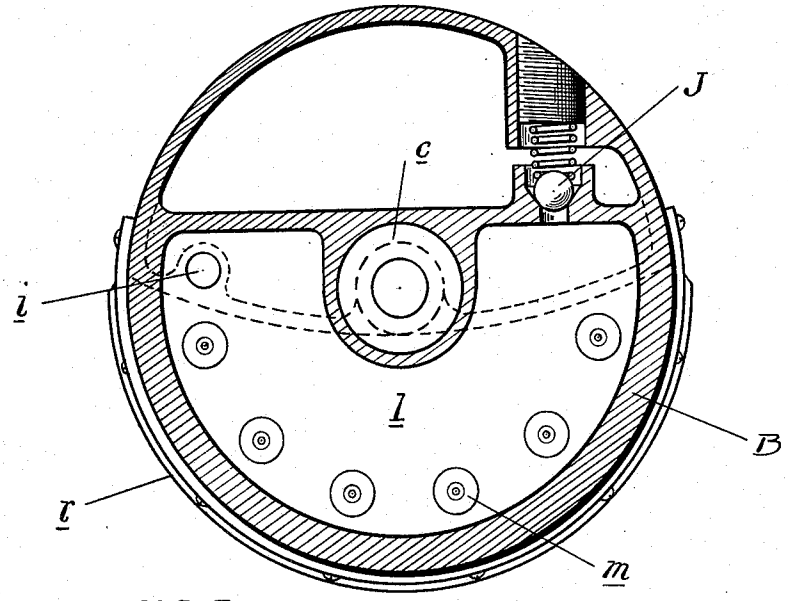
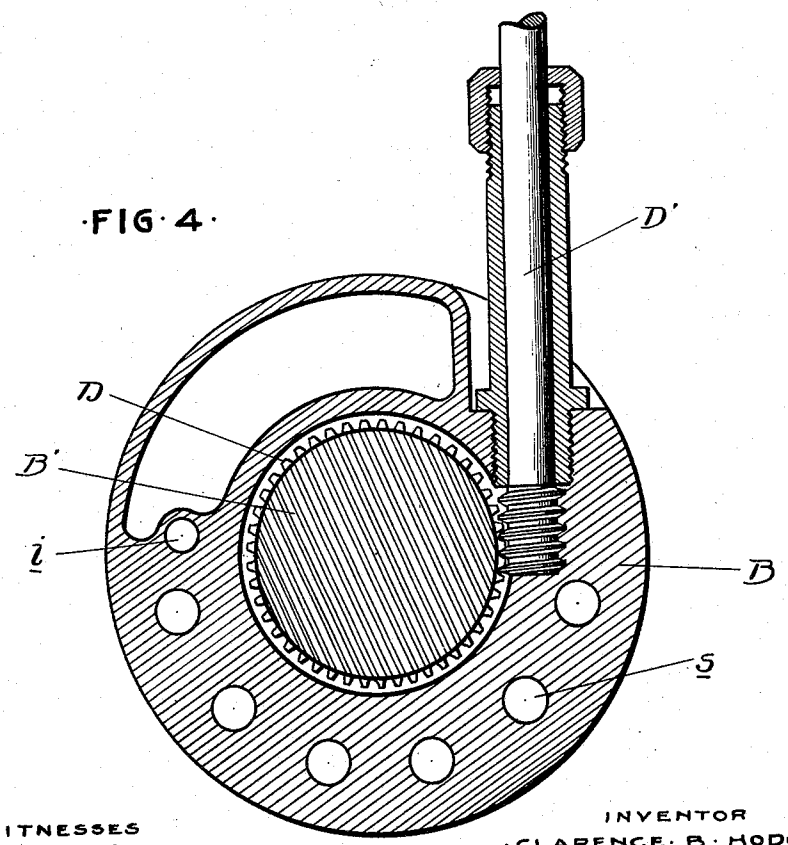



·FIG·3·

·FIG·4·

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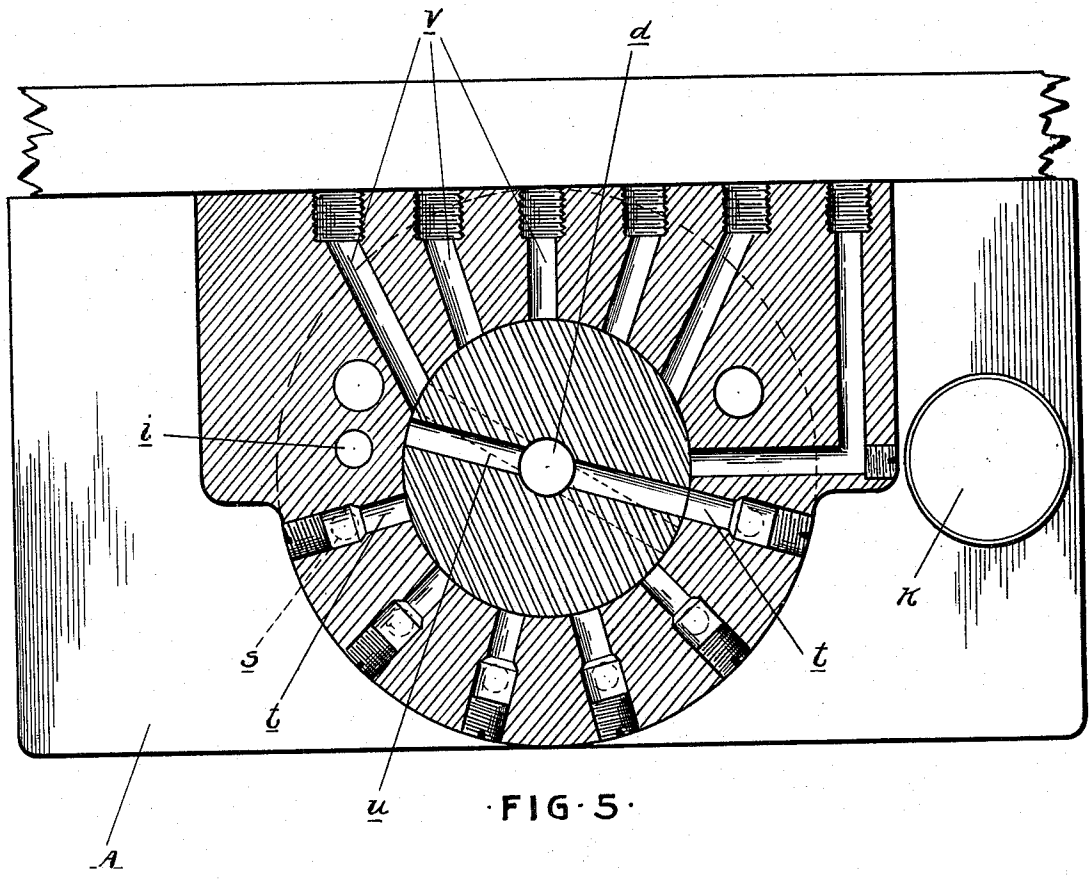


FIG. 5.

WITNESSES

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# UNITED STATES PATENT OFFICE.

CLARENCE B. HODGES, OF DETROIT, MICHIGAN.

## FORCE-FEED LUBRICATOR.

No. 854,948. Specification of Letters Patent. Patented May 28, 1907.

Application filed April 3, 1905. Serial No. 253,429.

*To all whom it may concern:*

Be it known that I, CLARENCE B. HODGES, residing at Detroit, in the county of Wayne and State of Michigan, a citizen of the United States, have invented certain new and useful Improvements in Force-Feed Lubricators, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to force feed lubricators, and consists in the construction of a lubricator comprising a rotary valve having an axially arranged cylinder, a piston therein, and means for operating the piston by the rotation of the valve, and a second piston connected to the first and adapted to supply the oil to the first-mentioned piston, passing the same through a sight-feed device.

The invention further consists in the construction, arrangement and combination of the various parts as more fully hereinafter described and particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical central longitudinal section through my improved device; Fig. 2 is a similar section at right angles to the section line of Fig. 1; Fig. 3 is a horizontal section on line *x*—*x* of Fig. 1; Fig. 4 is a horizontal section on line *y*—*y*, Fig. 1; and Fig. 5 is a horizontal section on line *a*—*b* of Fig. 2.

A represents the reservoir, adapted to take the oil which is desired to be pumped to various points of lubrication, as, for instance, as this device is particularly intended, for use in an automobile.

The reservoir top is provided with a central screw-threaded aperture into which is screwed the valve casing B, having a tapering chamber therein in which is located a tapering valve B′. This valve at its upper end has a spindle *a* projecting through a suitable aperture in the upper part of the valve casing, and carries the collar *a′* at its upper end. Beneath this collar is a spring *b* resting on a shoulder *c*, the spring acting to hold the valve tightly to its seat in the valve casing. The upper portion of the valve is formed into or provided with a suitable worm wheel D, with which a worm on the shaft D′ is adapted to engage, as particularly shown in Fig. 4. This forms the drive shaft for the device, and is driven from any suitable source of power.

The valve is provided with an axially arranged cylinder *d*, in which is the piston *d′* having a head E just below the valve. This head is provided with the roller wrists E′ engaging in a camway F formed upon the two stationary collars G and G′, the proximate faces of which are shaped to give the necessary movement to the piston, and as particularly shown in Fig. 2. Upon the opposite side of the head E is a shaft or extension H, forming another piston, which works in a cylinder H′, which I have shown in this case as supported upon the lower edge of the valve casing. This cylinder has the induction port *e* leading into the reservoir and the eduction passage *h* which leads into a vertical passage *i*, the usual check valve *k* being interposed. The passage *i* I have shown as formed in the valve casing and extending to the top thereof, where it communicates into a chamber *l*. In the bottom of this chamber *l* are a series of nozzles *m*, each controlled by a suitable needle valve *n*, adjustably secured in the nuts *n′* which are screwed into apertures in the top of the valve casing. The nozzles depend into a sight-feed chamber *o*, which is provided with a suitable glass *r*, through which all the nozzles may be inspected. I have shown a single glass for a single chamber *o*, but it is obvious that if desired separate glasses may be arranged for separate chambers without in any way departing from my invention. Below each nozzle is a passage *s* communicating with an inlet passage or port *t* opposite the upper end of the cylinder *d*.

The valve is provided with a cross-passage *u* at the end of the cylinder, and opposite the induction port or passage *t* are a corresponding series of eduction ports or passages *v*. In order to cause the piston to rotate with the valve, I provide the pins I on the head E, engaging in suitable apertures in the valve beside the piston.

The parts being thus constructed, their operation is as follows:—Motion being imparted to the shaft D′, the valve B′ will be rotated, and with it the two pistons and the head E. As the valve rotates, carrying the pistons and the head, the roller wrists E′ engaging in the camway F will reciprocate the two pistons in their cylinders. The piston H will take oil in through the induction port *e* and discharge it through the eduction passage *h* and thence through the passage *i* into the chamber *l* at the top of the valve casing. From this chamber it will pass through the nozzles *m*, falling into the passages *s* and will be drawn in through the induction passages

$t$ by the piston $d'$. The oil drawn in by the piston $d'$ to the cross-passage $u$ when that passage is in registration with one of the induction ports will be forced out through one of the passages $v$ when the other end of the cross passage registers with such eduction port and thus the pump in the valve will successively take the oil from the passages $t$ and deliver it successively into the passages $v$ and thus lubricate the various parts to which these passages connect. It is obvious that the desired amount of oil for each part to be lubricated can be regulated by adjusting the valves $n$. In case the pump H delivers more oil into the chamber $l$ than is allowed to pass out the nozzles $m$, I provide a spring-pressed check valve J in that chamber so that upon pressure being developed therein above the normal this valve will be raised from its seat and the oil will flow back into the reservoir to be pumped over again.

K is a suitable filling aperture.

It will be observed that in this construction a single actuating means operates the valve and both pistons, and that the device is extremely simple and compact and yet I am enabled to deliver oil from a single reservoir to a number of different points and with the use of a single delivery pump.

What I claim as my invention is:—

1. In a force feed lubricator, the combination of a reservoir, a tapering cylindrical valve casing, a rotary valve in the valve casing, an axially arranged cylinder and piston in the valve forming a pump, means for rotating the valve and for thereby reciprocating the piston, there being a cross passage in the valve communicating with the inner end of the cylinder, and inlet and outlet passages on opposite sides of the casing with which said cross passage is adapted to connect in the rotation of the valve.

2. In a force-feed lubricator, the combination of a reservoir, a valve casing therein, a rotary valve in the valve casing controlling the inlet and exit ports of a pump, the pump, a second pump operated by the rotation of the valve, adapted to take the oil from the reservoir and deliver it to a regulated sight-feed chamber, and a connection from the sight-feed chamber to the inlet port of the first mentioned pump.

3. In a force-feed lubricator, the combination of a reservoir, a valve casing therein, a rotary valve in the casing, an axially arranged cylinder in the valve, a piston therein turning with the valve, means for reciprocating the piston by the rotation of the valve, a second piston formed as an extension thereof, a cylinder in which said piston works, connected to take oil from the reservoir and deliver it to a chamber at the top of the reservoir, a series of valve-controlled sight-feed devices leading from the chamber to induction ports in the valve casing, there being a cross-passage in the valve adapted to successively connect with these induction ports, and with eduction ports opposite thereto.

4. In a force-feed lubricator, the combination of a rotary valve, an axially arranged cylinder therein, a reciprocating head having oppositely extending pistons thereon, one piston entering the cylinder in the valve, a cylinder for the other piston having an induction port connecting to the reservoir, and an eduction port leading through a sight-feed passage to the valve, and a passage in the valve adapted to connect with inlet and outlet ports.

5. The combination of a casing having a series of inlet and outlet passages, a rotary valve having a cross passage adapted to successively connect with said series of passages, a pump in the valve, and means for reciprocating the pump.

6. The combination of a pump, a rotary valve, controlling the inlet and outlet of the pump, having a cylinder formed therein, a piston in the cylinder, the piston H connected to said first mentioned piston, a cylinder for the piston H, means for rotating the valve, and means actuated by said rotary means for actuating both pumps, the pumps having suitable inlet and outlet connections.

7. In a force feed lubricator, the combination of a casing having a tapering cylindrical bore, a rotary valve fitting therein having a cross passage, there being a series of inlet and outlet passages arranged on opposite sides of the casing, and a pump adapted to draw oil successively from each inlet passage and deliver it to the complementary exit passage.

8. The combination with a reservoir, a feed pump for delivering oil from the reservoir, a sight feed device in the discharge from said pump, a supply pump having its inlet port connected to the discharge from the feed pump beyond the sight feed, and a rotary valve controlling the inlet and outlet of the supply pump.

In testimony whereof I affix my signature in presence of two witnesses.

CLARENCE B. HODGES.

Witnesses:

EDWARD D. AULT,

AMELIA WILLIAMS.