No. 890,952. PATENTED JUNE 16, 1908.

H. C. WOODBRIDGE.

LUBRICATOR.

APPLICATION FILED SEPT. 23, 1907.

Fig. 1.

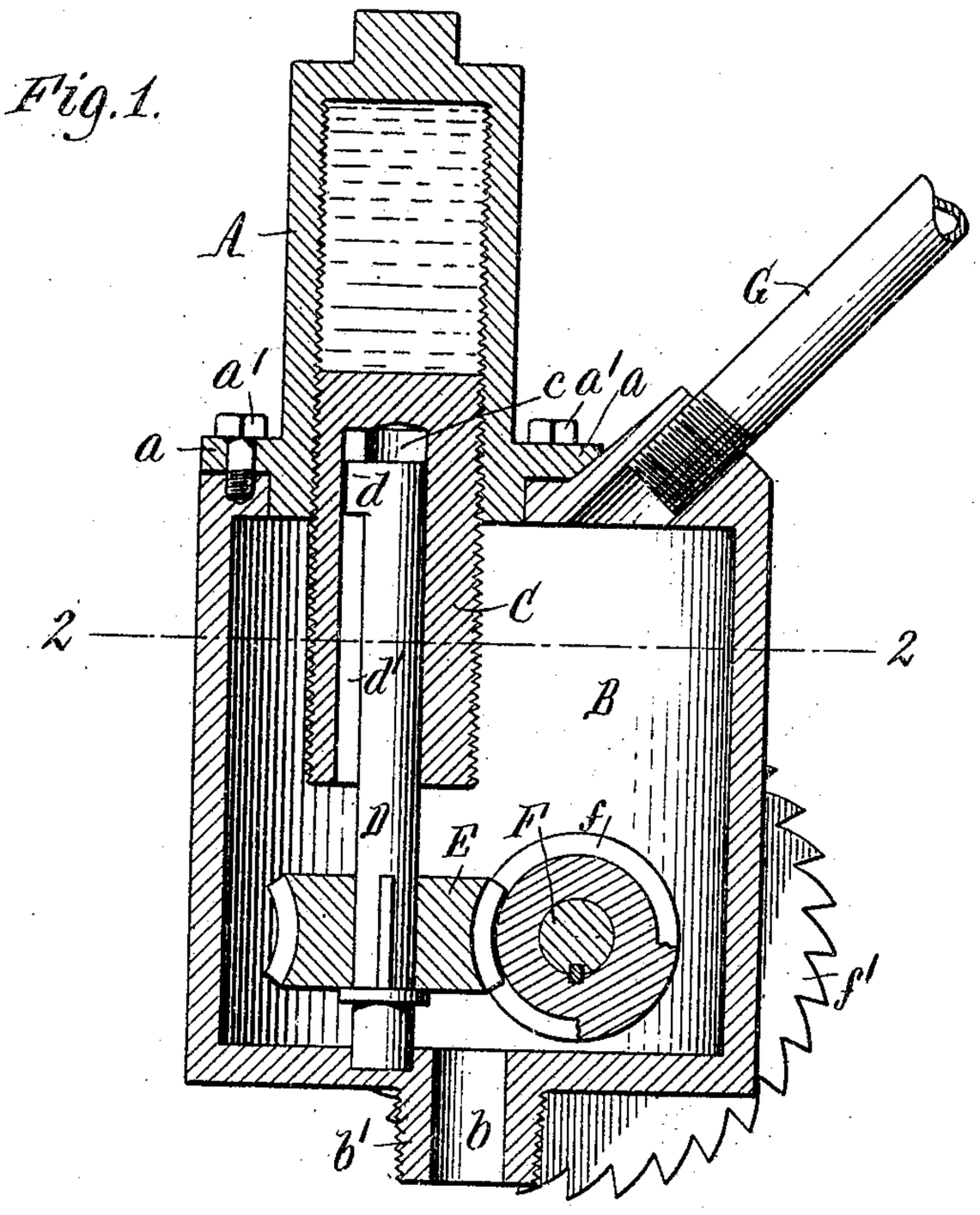
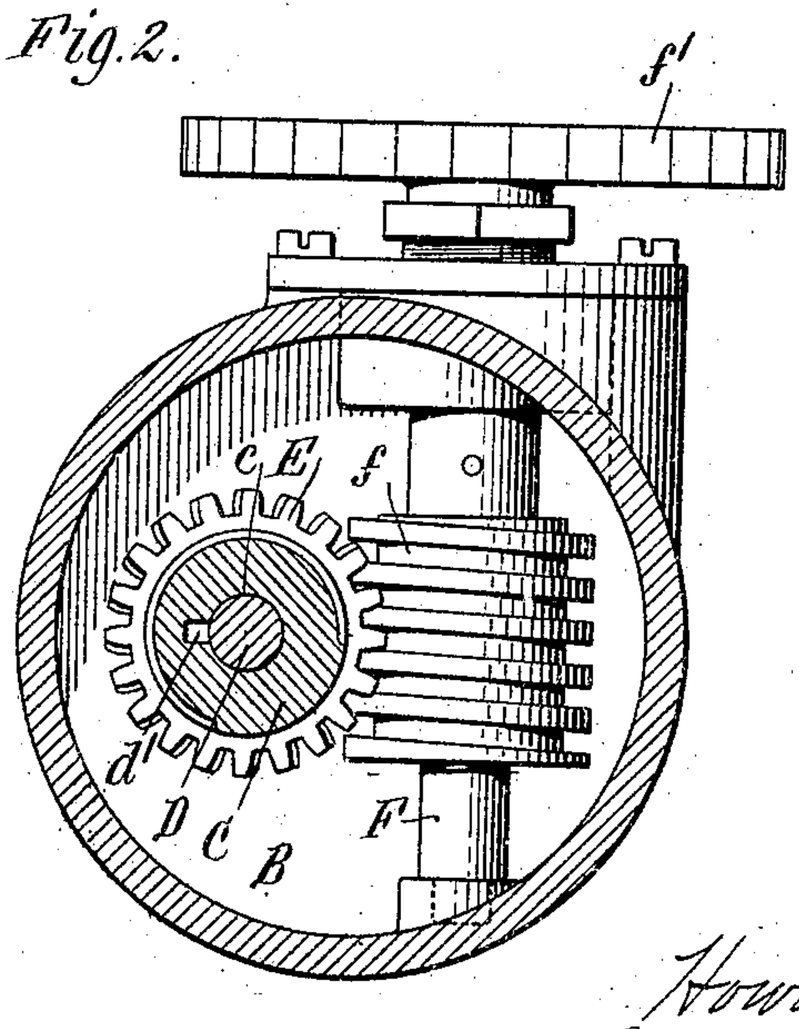


Fig. 2.



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LUBRICATOR.

No. 890,952. Specification of Letters Patent. Patented June 16, 1908.

Application filed September 23, 1907. Serial No. 394,011.

To all whom it may concern:

Be it known that I, HOWARD C. WOODBRIDGE, a citizen of the United States, residing at Salamanca, in the county of Cattaraugus and State of New York, have invented a new and useful Improvement in Lubricators, of which the following is a specification.

This invention relates more particularly to improvements in force feed lubricators of that sort in which the oil is fed gradually from a reservoir or supply cup by slowly forcing a piston or plunger into the reservoir or cup to displace the oil.

The object of the invention is to provide a lubricator of this character which will be positive and regular in its feed and in which there will be no waste of lubricant or cessation of feed resulting from leakage or the stoppage of the feed opening.

In the accompanying drawings: Figure 1 is a sectional view of a lubricator embodying the invention. Fig. 2 is a cross section of the same on line 2—2, Fig. 1.

Like letters of reference refer to like parts in both figures.

A represents an oil reservoir or cup which is preferably inverted and closed at its upper or outer end and open at its lower or inner end, and B a feed chamber to which the oil cup is secured and into which the oil is fed from the cup.

The chamber B has an opening in its top for receiving the open end of the oil cup, and a discharge opening *b* in its bottom which is surrounded by a suitable nipple or coupling *b'* for connecting the feed chamber to an engine cylinder or other part to be lubricated. The cup A may be secured to the feed chamber by the lugs *a* and bolts *a'* shown, or in any other desirable manner.

C represents a plunger which fits within the oil cup A and is preferably externally screw-threaded to engage an internal thread on the oil cup. The plunger is positively rotated whereby its screw connection with the cup causes it to gradually enter the cup and displace the oil. The means illustrated for operating the plunger are constructed as follows:

A central bore or opening *c* extends lengthwise in this plunger nearly to its head and is adapted to receive one end of a shaft D which is journaled at its opposite end in the bottom of the feed chamber B. The shaft D is keyed to the plunger by a lateral lug *d* near its end which engages in a lengthwise spline *d'* in the plunger. This causes the plunger to turn with the shaft, but permits it to move lengthwise independently of the shaft.

A worm wheel E is secured to the shaft D and is engaged by a worm *f* on a shaft F journaled in the feed chamber B. The shaft F extends without the feed chamber and is provided at its outer end with a ratchet wheel *f'* which may be driven by any suitable connection (not shown) with a working part of the engine or machine to which the lubricator is applied. Any other suitable mechanism for slowly turning the plunger can be employed.

The plunger, being thus rotated, is screwed inwardly in the oil cup, and as the head of the plunger is closed, the oil in the cup is forced out through the screw threads between the plunger and the interior of the oil cup and this is the only escape for the oil. The amount of oil which is forced from the cup is, of course, dependent upon the distance which the plunger is advanced therein, and can be regulated by controlling the speed of rotation of the driving member and plunger.

While the plunger shown has a screw-threaded connection with the oil cup which causes it to advance into the cup, it is manifest that a smooth plunger fitting in a smooth surfaced cavity of the oil cup and slowly forced thereinto by any suitable means would likewise displace the oil and cause it to feed from the cup between the sides of the plunger and the cup without providing any other escape passage for the oil in either the cup or the plunger.

The lubricator is primarily intended for lubricating engine cylinders or other parts where the oil must be forced to the part to be lubricated against an opposing pressure, and the feed chamber is therefore preferably provided with a pipe G for admitting steam thereto at a pressure sufficient to balance the opposing pressure and maintain a constant pressure therein. The pressure in the feed chamber supports the film of oil between the plunger and the sides of the oil cup and prevents the escape of the same except where the plunger is positively advanced into the cup to displace the oil. The steam pressure in the feed chamber is not necessary, however, to prevent the leakage of the oil past the plunger when the latter is stationary, as the space between the sides of the plunger and the cup is so small that the film of oil therein would be supported in the same man-

ner by atmospheric pressure in the feed chamber.

The oil cup is imperforate except for the opening in the bottom thereof through which the plunger passes and which serves also as a discharge opening for the oil. The plunger is solid and the oil which it displaces in the cup must necessarily pass through this discharge opening between the cup and the plunger. By thus feeding the oil through the space between the plunger and the oil cup instead of through a restricted feed passage in the plunger or cup, as is common in lubricators of this kind, a passage having extended bounding surfaces is obtained which will not be clogged or stopped by particles of dirt and other foreign matter which may collect in the oil cup, and the movement of the plunger in the cup tends to dislodge any particles which may enter the passage between the same, so that a more positive and regular feed of the oil is thus secured. All of the oil passing between the plunger and the oil cup enters the feeding chamber and it is this oil which is fed to the cylinder or other part to be lubricated, whereas in devices having a separate feed passage, the oil which may leak between the sides of the plunger and the cup is wasted. The feed of the oil is therefore dependent entirely upon the size and speed of movement of the plunger in the cup.

In constructions in which a separate feed passage is employed, the oil leaking between the sides of the plunger and the cup is wasted, and this not only reduces the amount of oil actually fed to the part to be lubricated but makes it impossible to determine what proportion of the lubricant is actually being fed. If the feed passage becomes clogged, the leakage is increased, and while the decreasing quantity of oil in the cup would apparently show that the oil is being fed from the lubricator, this oil would not necessarily pass to the part to be lubricated.

To fill the cup it is only necessary to remove the same and its plunger from the feed chamber and then unscrew the plunger from the cup. After the cup is filled, the plunger is screwed therein until the oil begins to exude, when the cup is inverted and secured in place on the feed chamber with the plunger in engagement with its operating shaft.

I claim as my invention:

1. A lubricator comprising an oil cup which is imperforate except for a plunger opening, a solid plunger entering said cup through said opening, and a screw feed mechanism for forcing said plunger slowly into said cup to displace the oil and force it out through said opening around said plunger, substantially as set forth.

2. A lubricator comprising a feed chamber or passage, an oil cup which is imperforate except for an opening communicating with said feed chamber or passage, and a solid plunger entering the opening in said oil cup and adapted to have a movement relative to said cup to displace the oil and force it out through said opening around said plunger, substantially as set forth.

3. A lubricator comprising a feed chamber or passage, an oil cup having an internally threaded opening communicating with said feed chamber, an externally threaded solid plunger working in said opening, and means for turning said plunger to advance the same therein and force the oil out through said opening around the plunger into said feed chamber or passage, substantially as set forth.

4. A lubricator comprising an oil cup having a plunger opening therein, a plunger entering said cup through said opening and adapted to have a movement relative to said cup to displace the oil therein, and a feed chamber or passage surrounding said opening for receiving the oil which passes through the same around said plunger, substantially as set forth.

Witness my hand, this 19th day of September, 1907.

HOWARD C. WOODBRIDGE.

Witnesses:

E. C. HARD,

C. B. HORNBECK.