No. 702,068. Patented June 10, 1902.

# J. B. L. McKENZIE.

## OIL CUP.

(Application filed Jan. 13, 1902.)

(No Model.)

Fig. 1.

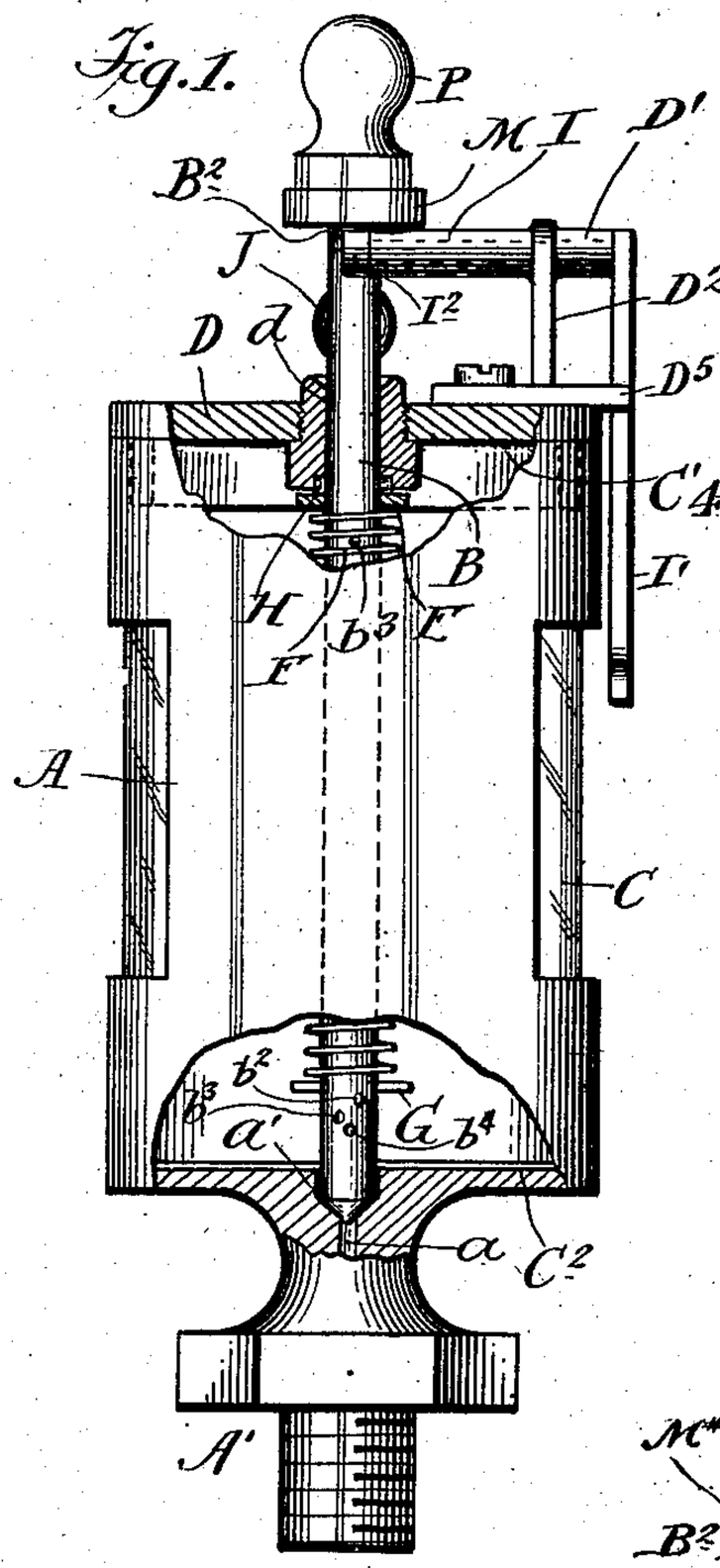
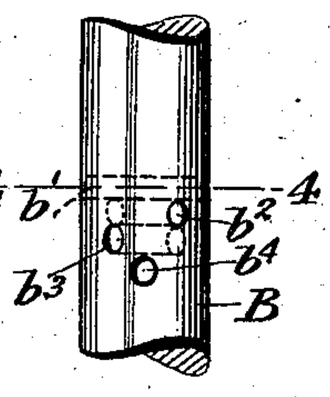



Fig. 4a



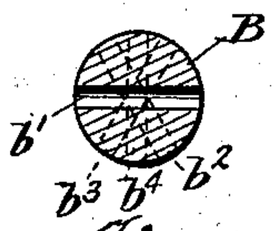




Fig. 4.

Fig. 3.

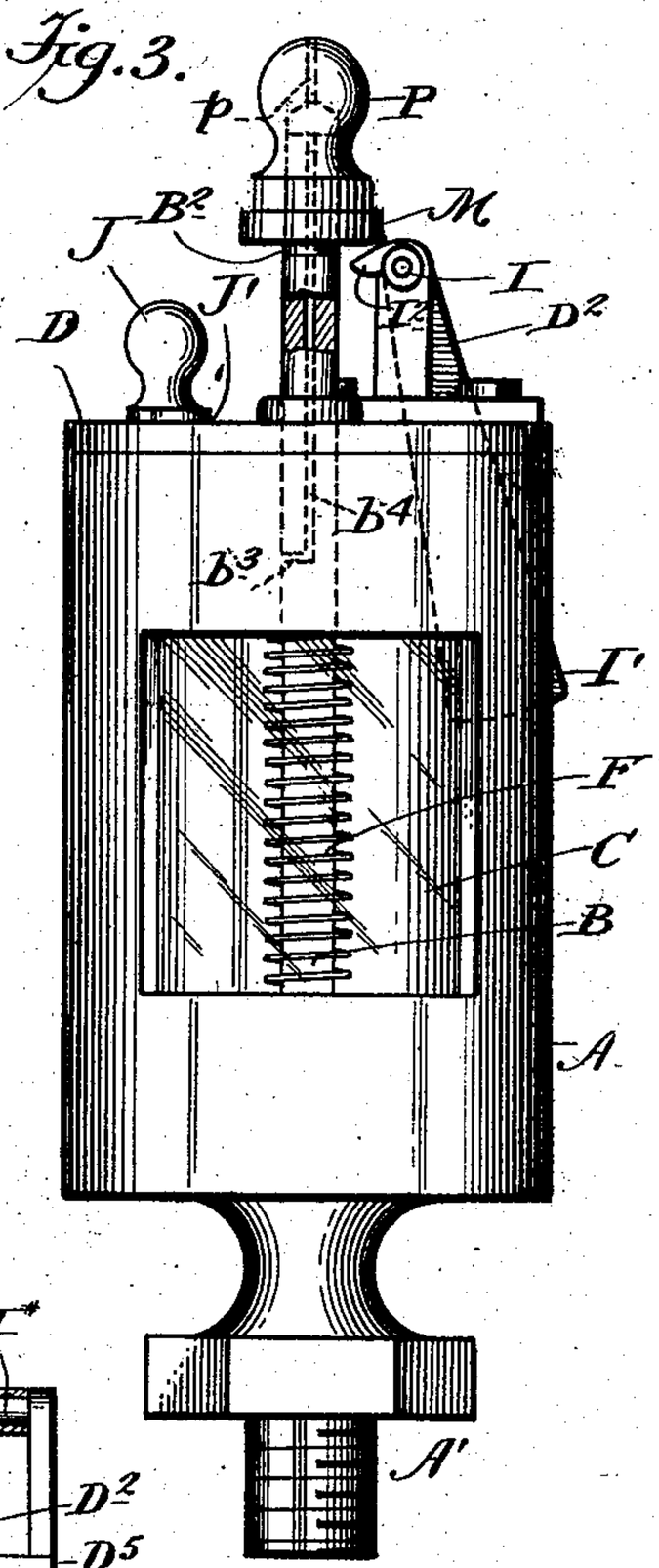
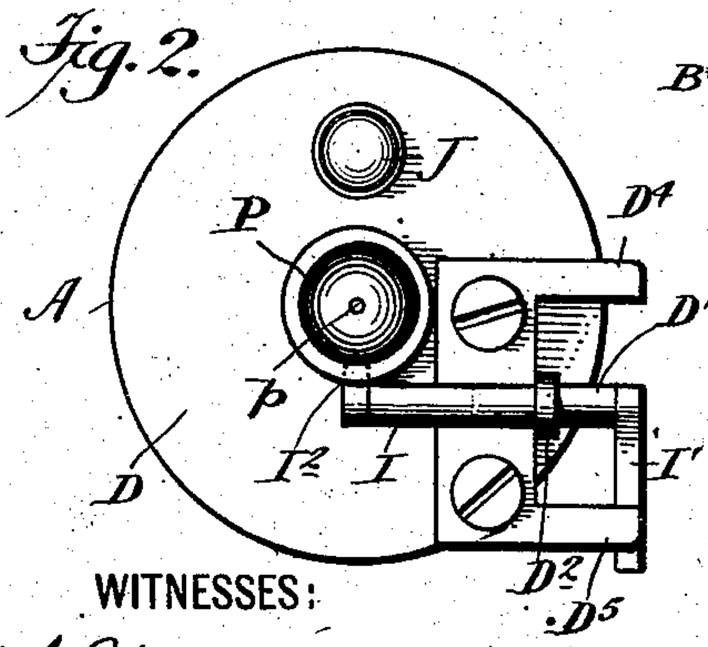



Fig. 2.



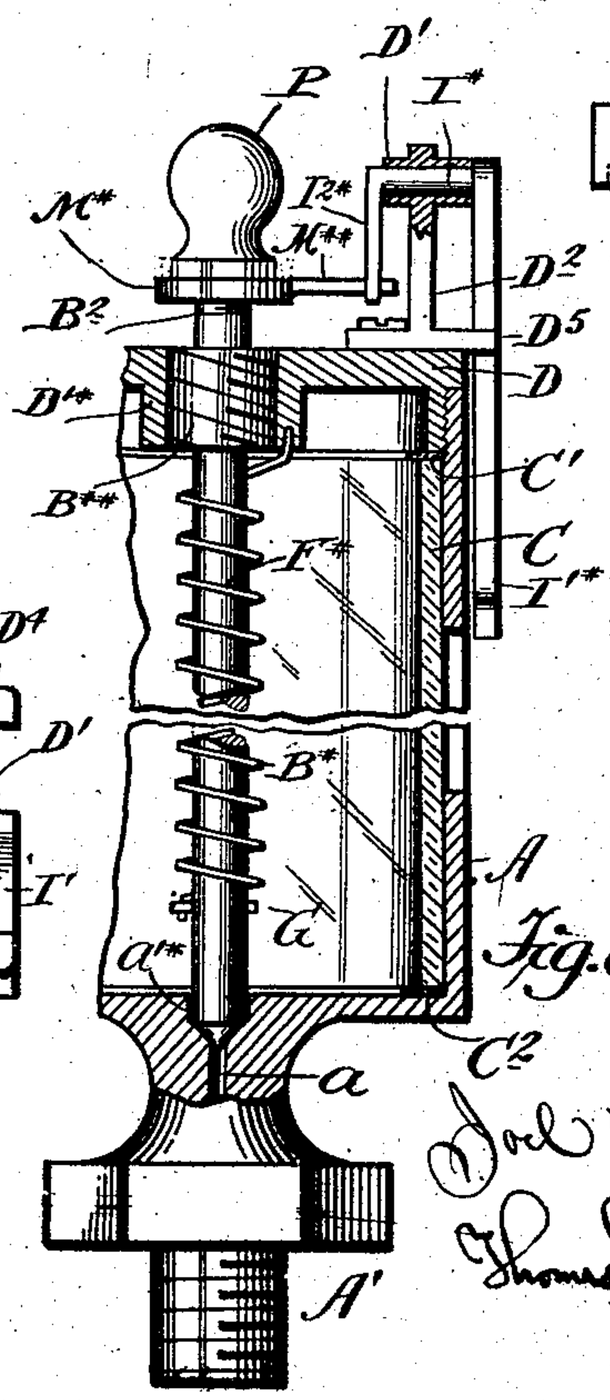




Fig. 5.

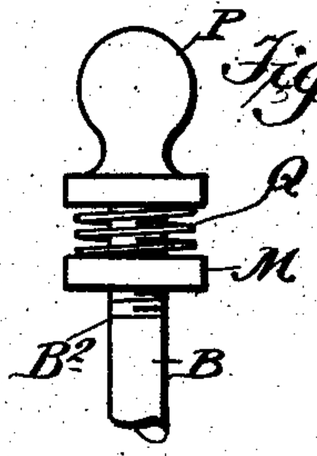



Fig. 6.

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# UNITED STATES PATENT OFFICE.

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## OIL-CUP.

SPECIFICATION forming part of Letters Patent No. 702,068, dated June 10, 1902.

Application filed January 13, 1902. Serial No. 89,402. (No model.)

*To all whom it may concern:*

Be it known that I, JOEL B. L. McKENZIE, a citizen of the United States, residing at Rahway, in the county of Union, in the State of New Jersey, have invented a certain new and useful Improvement in Oil-Cups, of which the following is a specification.

The improved oil-cup is intended to be carried on actively-moving pieces of machinery which shall have more or less of a reciprocating motion. I provide an easily-moving valve controlling the flow of oil and a loosely-mounted part carried on the oil-cup arranged to actuate the valve by its inertia as the motion of the actively-moving cup is reversed. I use the term "inertia" to include both the resistance to moving from a state of rest and the resistance to stopping from a state of motion. I limit the extent of the motion of such part relatively to the main body of the oil-cup, make the motion of the valve conveniently adjustable within wide limits, and finally insure that the valve shall always stand shut when the engine is stopped irrespective of the position of the crank and insure against any obstruction of the action in case there shall accidentally be solid matter of any kind in the oil.

The end attained of feeding with certainty while operating and entirely arresting the feed when stopped in any position has been partially attained before; but my construction is better in important points, which will be pointed out in the claims.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation with certain portions broken away, showing interior parts in central vertical section. Fig. 2 is a corresponding plan view. Fig. 3 is an elevation at right angles to the view in Fig. 1. Fig. 4 is a cross-section of the valve-rod at the line 4 4 in Fig. $4^a$. Fig. 5 is a side elevation of a portion, showing a modification. Fig. 6 is a central vertical section showing another modification. Fig. $4^a$ is a side elevation corresponding to Fig. 4.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the main body of the cup, which may be of brass, having two liberal apertures on opposite sides. The tubular base A′ is screw-threaded externally. The upper portion of the interior of the base is bored larger, as indicated by $a'$, and the junction of the large bore $a'$ with the smaller bore $a$ below is finished nicely to form a conical seat for the valve.

B is the valve-rod, a little smaller than the bore $a'$. Its lower end is finished conically to constitute the valve, and the rod is lifted at each reciprocation to an extent which is variable, but is never sufficient to lift the lower end out of the enlarged bore or chamber $a'$. The oil can always flow down through the small annular space between the rod and the cylindrical portion of the bore $a'$ and can flow downward through the smaller opening $a$ at intervals while the valve is lifted.

C is a cylinder of glass within the main body A and abutting by its smooth upper and lower edges on cork washers C′ and $C^2$. This complete glass cylinder constitutes the oil-receptacle, the main body A serving as a supporting and protecting case, the liberal apertures or windows therein allowing the quantity of oil remaining in the cup to be easily recognized under all conditions.

D is a cover screwed tightly into the body A in the ordinary and obvious manner, making a close fit around the rod B in a sleeve tapped in a central orifice $d$, countersunk, as shown. When the apparatus is working, the conical space thus provided is partially filled with oil, which is splashed about in the cup and alternately drawn up and carried down by its adhesion to the slightly-reciprocating rod. The lower end of the sleeve has a hanging lip providing an annular space around the rod in which I fit a cork washer H, extending a little deeper than the lip. Below this is a loose collar E, under which abuts a helical spring F, which exerts a tension acting on the rod through the medium of a transverse pin G. This spring contributes its force to the gravity of the rod to induce the prompt closing of the valve to remain closed whenever the engine is stopped, but its force must be so gentle that

the inertia of a light pendulous part can overcome it. I provide for adjusting this tension by providing several transverse holes $b'$ $b^2$ $b^3$ $b^4$ one above another in the rod B, any one of which may receive the transverse pin G. When it is desired to change the tension of the spring F, and consequently the force with which the valve is depressed to its seat, the cover D is unscrewed and, with its attachments, lifted out of the oil-cup, the spring F is temporarily forced upward by the finger, and the pin G is shifted into a hole $b'$ above or a hole $b^2$ below its former position. The holes are bored in various directions, (see Fig. 4,) which arrangement allows them to be very near together, cutting into each other at the center, if desired. This gives a capacity for very delicate adjustment.

I provide for the admission of air to the interior of the cup as the oil is consumed. To effect this, a hole $b^3$ is bored radially into the rod B and caused to communicate with a central passage $b^4$, which extends down from the upper end of the rod, and the cap P is provided with a corresponding central hole. This hole $p$ in the cap communicating through the axial passage $b^4$ and the radial passage $b^3$ forms a sufficient passage for the induction of air. The passage thus arranged is well shielded, and I have determined by experiment that oil is not thrown up into this passage, except to a very small distance, even with the most rapid action of the engine.

J is a screw-plug which by the aid of a leather washer J' controls a convenient filling-hole through which the cup may be charged at intervals.

A sufficient length at the upper end of the rod B is screw-threaded, as indicated by $B^2$, and on this is fitted an interiorly-screw-threaded collar M, above which is a correspondingly-tapped knob P.

I is a horizontal shaft mounted in a long bearing D', formed in an attachment $D^2$, rigidly secured on the cover D. The outer end of the shaft I overhangs and carries a pendent arm I', which as the device is reciprocated is acted on by inertia and caused to vibrate between two stops $D^4$ and $D^5$, which form part of the attachment $D^2$. The inner end of the shaft I carries a rigidly-fixed toe $I^2$, which at each revolution of the engine acts under the collar M to lift the rod and open the valve.

The extent to which the valve will be lifted and the length of time which it will remain open are modified at will by raising and lowering the collar M. Under ordinary conditions this collar is set at such height that the rod B is lifted a little, but only a little, for a brief period and allowed to sink again to its seat at each revolution of the engine. If it be desired to supply the oil more liberally, the cap can be slackened, the collar M lowered by turning it, and the knob P again tightened down upon it. Now the same motion of the arm I' between the stops $D^4$ $D^5$ will lift the rod higher at each revolution of the engine and hold it open longer, thus permitting more oil to descend to lubricate the bearing. (Not shown.) The valve is free when the pendent arm I' hangs in or near its central position. This condition is certain to obtain whenever the engine is stopped, so that the oil will be certainly retained ready for starting again.

I esteem the following to be specially important qualities in my oil-cup: first, that the extent of the swinging motion of the pendent arm I' is limited by so simple and substantial a device as the two stops $D^4$ and $D^5$, each constituting a part of a single integral piece which may be fixed on the cover by a single fastener, and that the extent of the lift of the valve may be regulated with any required fineness and to a very great extent by simply screwing the collar M up and down; second, that a partial vacuum and a strong pressure above atmosphere alternately obtain in the recess $a'$ at each rise and descent of the rod B, causing the oil to be first forcibly drawn in and strained through the very limited space around the base of the rod in such recess and a moment later to be forced downward through the oil-passage $a$ by the descent of the said rod, and, third, that the force of the spring F need not be graduated nicely, but can be varied as required by simply compressing it upward and changing the pin G into a different hole.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. Instead of screwing the part P down tightly upon the collar M after each adjustment I can keep it much higher and without shifting its position can use a helical spring exerting so much force between these parts that it will by the friction due to the axial tension of the spring insure the holding of the collar after each adjustment. Such an arrangement is shown in Fig. 4, the spring being marked Q.

A horizontal shaft substantially equivalent to the shaft I and correspondingly actuated by the inertia of a pendent arm I' may instead of acting directly leverwise to raise the valve operate through screw-threads to raise it by turning motion. Fig. 6 shows such a modification. In this a thickened portion B⁂ of the rod B⁂ is provided with a "quick" screw-thread and matches in a corresponding internal thread produced in the boss D'⁂. There is a valve formed on the lower extremity of the rod B⁂ and working over a seat within a cylindrical space $a'$⁂, corresponding to $a'$, except that the rod has a turning motion. The spring F⁂, coiled around the rod, finds an abutment at the upper end in a fixed part and acts at its lower end not only to depress the rod B⁂, and therefore to urge the valve gently but effectively into contact with its seat in the bottom of the cylindrical loose-fitting chamber $a'$⁂, but also exerts a turning force. The shaft I⁂ is short and is mounted

radially on the cover, and the toe $I^2$ extends downward. As the shaft I rocks under the influence of the inertia of the arm I′ it acts by its short arm or toe $I^2$ near one extremity of its motion on the arm M, extending from the adjustable central nut M, and turns the rod B in the direction to raise it and open the valve. During the remainder of the time the arm I′ hangs perpendicularly the valve-rod B is free and is caused to turn under the influence of its spring F until it is again fully depressed with the valve resting firmly in its seat.

Parts of the invention can be used without others. I can dispense with the cork washer H and the recess holding the same. The air-passage $b^3$ $b^4$ may be omitted, allowing the air to enter through the loose joint around the rod B.

The cover D may be formed with a thick boss cast integral therewith instead of a separate sleeve. Such construction is shown in Fig. 6 and may be applied with equal success to the form shown in the other figures.

I claim as my invention—

1. In a lubricator for use on moving parts of machinery, the valve-rod B and the collar M adjustable thereon, and the pendent arm I′ arranged to be vibrated by its momentum, in combination with the fork $D^4$ $D^5$ limiting its play, and with the toe $I^2$ rigidly connected to such arm and extending horizontally, adapted to lift said valve-rod at one extreme of its traverse, all arranged for joint operation substantially as herein specified.

2. In a lubricator for use on moving parts of machinery, the valve-rod B and the collar M adjustable thereon, and the pendent arm I′ arranged to be vibrated by its momentum, in combination with the fork $D^4$ $D^5$ limiting its play, and with the toe $I^2$ rigidly connected to such arm and extending horizontally, arranged to lift said valve-rod at one extreme of its traverse, and the recess $a'$ communicating with the oil-passage below and receiving the nearly tight-fitting base of the said rod, adapted to form a partial vacuum at each vibration, and with the spring F and adjustable pin G adapted to vary the force with which the rod shall be depressed, all arranged to serve substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

JOEL B. L. McKENZIE.

Witnesses:

J. B. CLAUTICE,

M. F. BOYLE.