

No. 777,596.

PATENTED DEC. 13, 1904.

B. F. CAMPBELL & J. BERG.

LUBRICATING DEVICE.

APPLICATION FILED JULY 25, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

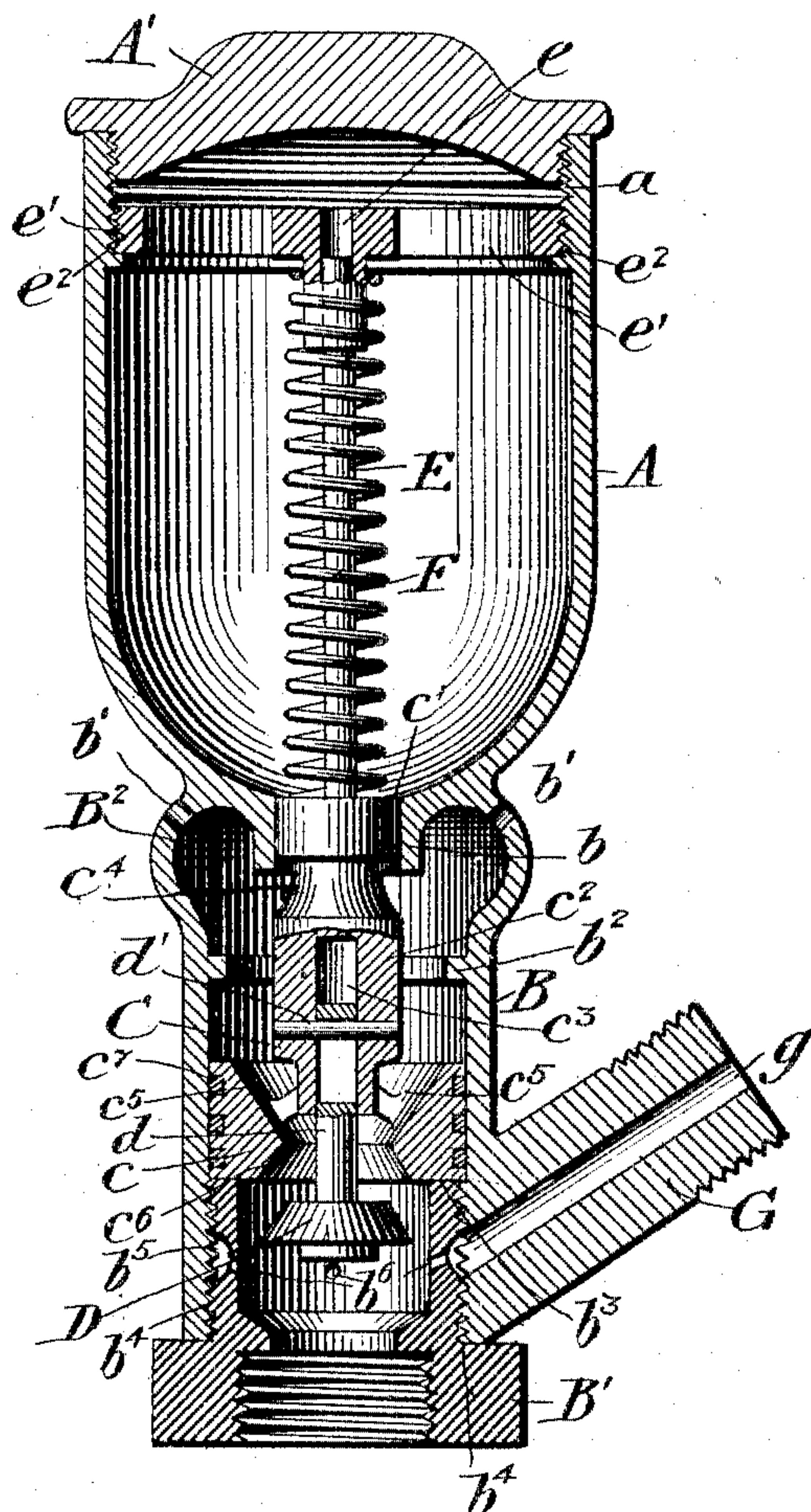
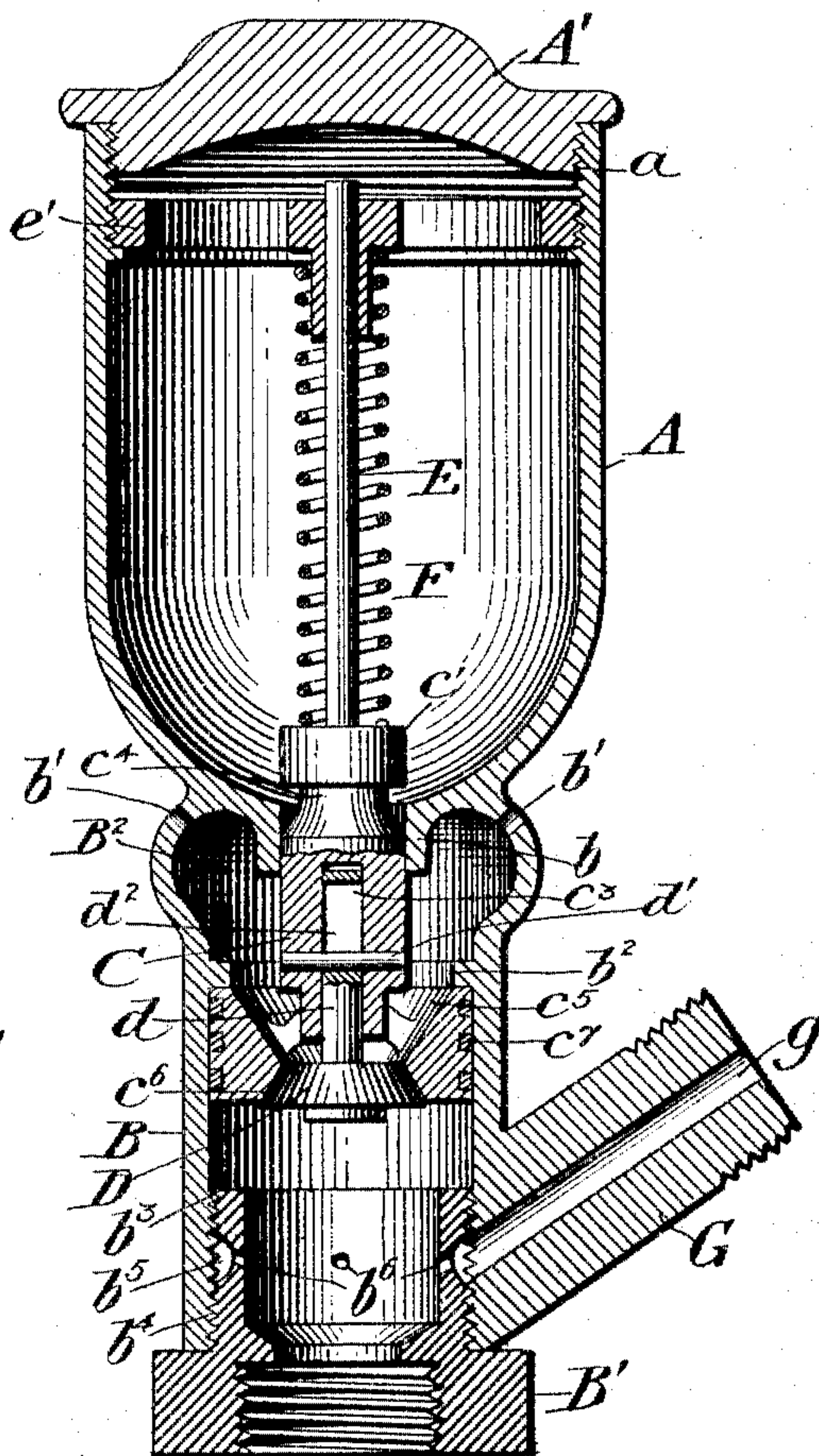


Fig. 2.



Witnesses:

O. W. Edelin.

A. Harveycutter.

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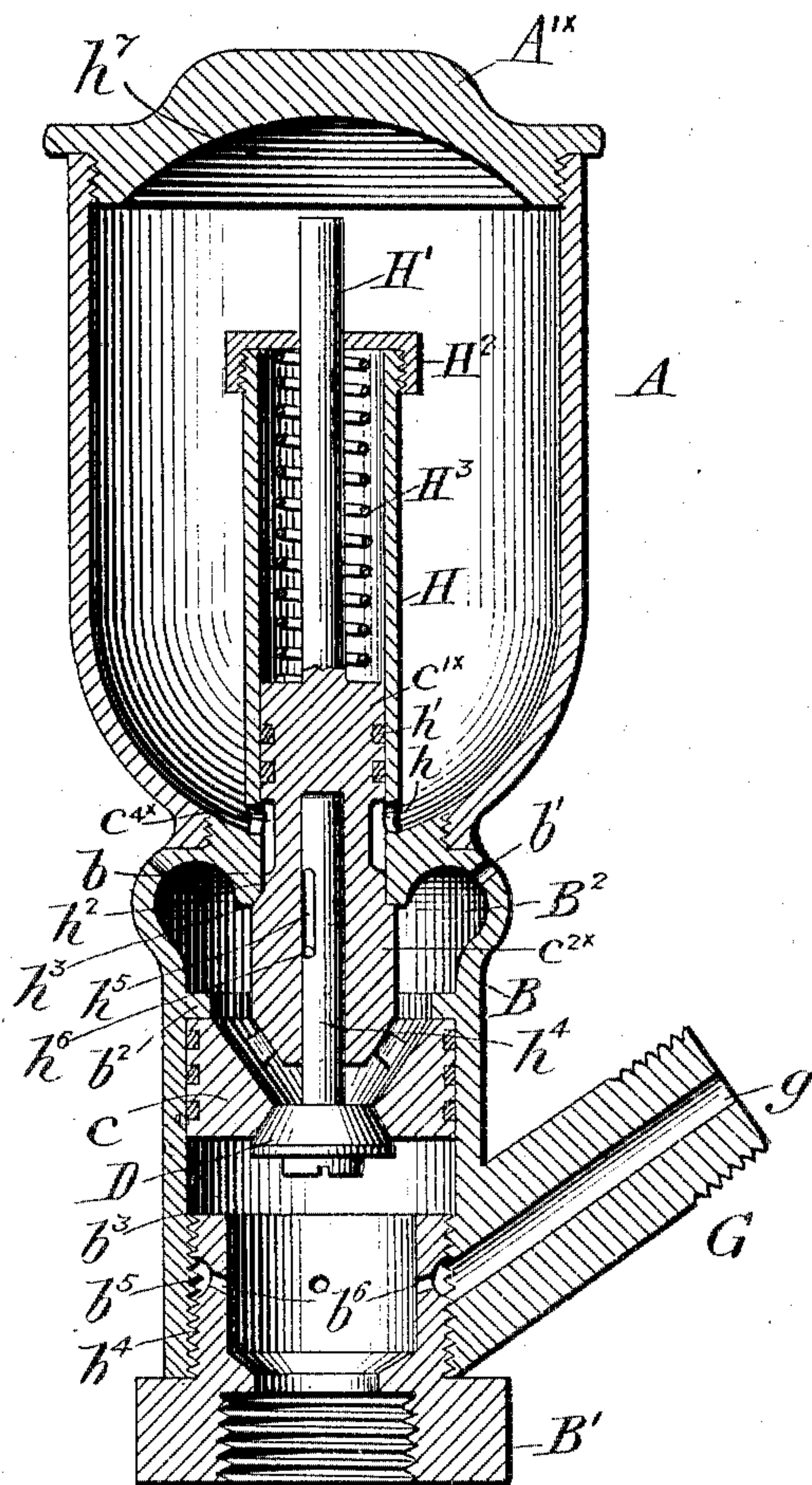
LUBRICATING DEVICE.

APPLICATION FILED JULY 26, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

*Fig. 3.*



*Witnesses*

W. W. Edelin.

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# UNITED STATES PATENT OFFICE.

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## LUBRICATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 777,596, dated December 13, 1904.

Application filed July 25, 1903. Serial No. 166,957. (No model.)

*To all whom it may concern:*

Be it known that we, BENJAMIN F. CAMPBELL and JOSEPH BERG, citizens of the United States, residing at Little Rock, in the county of Pulaski and State of Arkansas, have invented certain new and useful Improvements in Lubricating Devices, of which the following is a specification.

The invention to be hereinafter described relates to lubricating devices of the general type set forth in our prior patent, No. 730,814, for applying graphite or other desired character of lubricant to the moving parts in a steam-chest or cylinder of a steam-engine, the object of the present invention being in general to provide an automatically-acting device of efficient and simple construction which upon the exhaust-stroke of the parts to be lubricated will act to supply a desired quantity of lubricant and upon the working or steam-pressure stroke will automatically operate to shut off the supply of lubricant and close the connection to the lubricant reservoir or cup.

A further object of the invention is to provide, in connection with the character of automatic lubricator above set forth, means whereby a supply of lubricant, such as oil, may be furnished at desired times in addition to or independent from the supply intended to be furnished by the said automatic device.

With these general objects in view our invention consists of the parts and combinations, as will hereinafter more fully appear and be definitely set forth in the claims.

In the drawings, Figure 1 is a vertical sectional view of a lubricating device embodying our invention, the parts being shown in position for supplying lubricant from the lubricant-chamber to the parts to be lubricated. Fig. 2 is a similar view showing the parts in position for closing communication between the lubricant-chamber and parts to be lubricated and opening communication between the lubricant-chamber and the reservoir or cup, and Fig. 3 is a like sectional view showing a slightly-modified form of device.

In the drawings, A represents any usual or preferred form of reservoir or cup for holding a suitable lubricant—such, for instance, as graphite, oil, or the like—said reservoir or cup being provided with a cap or cover A', suitably connected thereto, as by screw-threads *a* or other desired means. Extended from the lower portion of the reservoir or cup is the tube B, provided with reduced and enlarged portions, the latter forming a passage-way and having screw-thread connection with a suitable coupling B', to be hereinafter described, by which the device may be properly secured to the steam-chest, cylinder, or other part of a steam or other engine.

Contained within the tube B, so as to be movable longitudinally, is the plunger, designated as a whole by C and comprising two pistons or heads *c c'*, connected by a stem or other suitable connection *c''*, whereby the pistons or heads *c c'* are made to move in unison. The upper piston or head *c'* moves in the reduced upper portion *b* of the tube B, extended from the lower portion of the reservoir or cup A, and between the two pistons or heads *c c'* of the plunger is formed the lubricant-chamber *c''*, preferably formed by reducing the size or diameter of the main body of the stem *c''*, as clearly shown in Figs. 1 and 2. The lower piston or head *c*, rigidly connected to the stem *c''*, is formed with passage-ways *c''* therethrough, and the lower walls *c''* of the combined passage-way are formed as a valve-seat for a movable valve D, provided with a valve-stem *d*, projecting into a suitable recess *c''* in the main stem *c''*, a pin *d'*, passing through the main stem *c''*, and a slot *d''* in the valve-stem permitting said valve to have limited movement with relation to the lower piston or head *c*. The lower piston or head *c* is provided with a series of packing-rings *c''* to form a close sliding fit between the inner wall of the tube B and the said lower piston or head *c*, to thereby effectually prevent any steam or other pressure from escaping into the reservoir or cup A on the pressure or working stroke of the engine.



Projecting upward from the main stem of the plunger C and into the reservoir or cup A is the guide-rod E, which passes through an aperture  $e$  in a skeleton frame  $e'$ , detachably  
 5 connected to the interior of the reservoir or cup A, as by means of screw-threads  $e^2$ , the said guide-rod being surrounded by a spring F, which at one end bears upon the under  
 10 side of the skeleton frame  $e'$  and at its other end upon the upper surface of the upper piston or head  $e'$ , thereby acting as a means to normally hold the plunger in its lowered position, as shown in Fig. 1, with the upper piston or head  $e'$ , in the reduced upper portion  $b$   
 15 of the tube B, thus interrupting communication between the reservoir or cup A and the said tube.

From the construction thus far described it will be apparent that the normal position of  
 20 the parts when not acted on by an extraneous force, as the pressure, is that indicated in Fig. 1—that is to say, the plunger is in its lowered position, with piston or head  $e'$  closing communication between the reservoir and  
 25 tube B and the lubricant-chamber  $c^4$  in the position indicated, so that while it does not receive a supply of lubricant it is free to discharge any lubricant it may contain into the enlarged portion or passage-way of the tube  
 30 B, the lubricant at such times passing downward through the perforations  $c^5$  in the lower piston or head  $c$  and past the valve D, said valve at such time being open by virtue of its weight, and then said lubricant is free to  
 35 pass to the parts to be lubricated. Upon the working or pressure stroke of the engine and when steam or other fluid is free to pass into the tube B it will act at once upon the valve D to seat the same upon the lower piston or  
 40 head, thus effectually shutting off communication between the parts to be lubricated and the lubricant-chamber  $c^4$  by closing the opening through the lower piston or head  $c$ . The steam or other fluid pressure then acts upon  
 45 the lower piston or head and raises the entire plunger against the spring F or other means, thus carrying the upper piston or head  $e'$  into the reservoir or cup A and placing the lubricant-chamber  $c^4$  in communication with the  
 50 reservoir or cup A to receive a charge of lubricant therefrom, the main body of the stem  $c^2$  at such times entering the opening  $b$  and preventing the lubricant from passing below the lubricant-chamber, all as shown in Fig. 2.  
 55 On the exhaust-stroke, when steam or other fluid pressure is relieved from action on the lower piston or head  $c$ , the spring F will return the plunger to the position shown in Fig. 1, the valve D will drop from its seat, and  
 60 communication be opened through said valve between the lubricant-chamber and parts to be lubricated.

In order to enhance the action of the lubricant in passing to the parts to be lubricated,  
 65 the tube B is provided with an air-chamber

B<sup>2</sup>, having inlet-holes  $b'$  for the passage of air into and through said air-chamber, the position of said chamber and inlet-holes with relation to the lubricant-chamber when the latter is in position to discharge the lubricant to  
 70 the parts to be lubricated being such that the suction action of the engine will cause the air-currents to assist the lubricant in passing through the lower piston or head  $c$  and thence to the steam-chest, cylinder, or other part, as  
 75 will be obvious.

It is desirable that the movement of the plunger C shall be limited to cause a proper positioning of the parts, as indicated in Figs. 1 and 2, and, as described, during the work-  
 80 ing of the engine, and to this end the tube B is provided with a stop or flange  $b^2$ , against which the lower head or piston strikes as it moves upward under fluid-pressure, the downward movement of the piston being limited  
 85 by the upper surface  $b^3$  of the coupling B', as will be clear from Figs. 1 and 2, which show the plunger at the limit of its two movements.

Under some conditions it is desirable to be able to supply lubricant to the parts to be lu-  
 90 bricated in addition to that furnished by the device described or at times when from any cause lubricant is not supplied by said device, and to this end the tube B at its lower portion and beyond the path of movement of the plun-  
 95 ger is provided with a projection G, having a channel-way  $g$ , said projection being adapted for connection with suitable means leading to the cab of the locomotive or other engine, where a supply of lubricant and fluid-pressure  
 100 may be furnished as desired, and in order that this auxiliary means may be employed in conjunction with the automatic lubricating device described the coupling B' is provided, it having formed on its exterior wall a screw-  
 105 thread connection  $b^4$  with the interior of the tube B. The coupling B' between its upper and lower ends has formed in its exterior wall a groove or channel  $b^5$ , communicating with the channel-way  $g$  of projection G, and lead-  
 110 ing from the groove or channel  $b^5$  are a series of holes  $b^6$ . Thus it will be evident that a lubricant being supplied to the channel-way  $g$  as indicated will be carried as a spray to the parts to be lubricated either in addition to the  
 115 lubricant furnished by the automatic device described or independent of any supply therefrom.

In Fig. 3 is shown a slightly-modified form of certain parts of the device to indicate that  
 120 changes may be made in some of the details without departing from the spirit of the invention. In said figure the reservoir or cup A is shown as having a screw-thread connection with the tube B, said reservoir or cup  
 125 having extended upward therein a guide-sleeve or tube H, provided near its lower part with a series of holes or perforations  $h$ , and extended upward into said tube H is the upper piston or head  $e'^x$ , a lubricant-chamber  $c^{4x}$   
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being formed in the stem  $c^{2x}$  of the plunger below said upper piston or head, the said upper head or piston  $c'^x$  moving in said guide-sleeve H to open and close communication  
 5 between the reservoir or cup and the lubricant-chamber through the holes  $h$ . Extending upward from the plunger is the guide-rod H', which passes through the cap H<sup>2</sup> upon the upper end of the guide-tube H, and surrounding said guide-rod H' is a spring H<sup>3</sup>, disposed  
 10 between the cap H<sup>2</sup> and the upper surface of the upper piston or head  $c'^x$  to normally act to press the plunger to its lowest position and close communication between the reservoir or  
 15 cup and the lubricant-chamber  $c^{4x}$ , suitable packing-rings  $h'$  being used about the upper piston or head to form a tight fit. In order to effectually close communication between the lubricant-chamber and the lower piston  
 20 or head in this construction, a portion  $h^2$  of the stem of the plunger is made of a diameter to enter the lower end of the tube H, and a shoulder  $h^3$  is formed on the stem to engage the lower end of the tube, as will be clear  
 25 from Fig. 3. Extending into a suitable socket in the stem  $c^{2x}$  is the valve guide-rod  $h^4$ , having a slot  $h^5$ , which engages a pin  $h^6$  to limit the movement of valve D with respect to the lower piston or head  $c$  of the plunger. The  
 30 cap or cover A'<sup>x</sup> may have a suitable socket portion  $h^7$  to permit the proper rise of the rod H', if desired.

It will be evident that changes of form, size, and disposition of the parts may be varied within the scope of the invention, which  
 35 comprises as its essential features a plunger having two pistons or heads, one to control the entrance of lubricant to the lubricant-chamber formed within itself and the other  
 40 provided with means to control the passage of lubricant from the lubricant-chamber to the parts to be lubricated.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a lubricating device, the reservoir or cup for holding a suitable lubricant, a tube extended therefrom and having an enlarged portion or passage-way, a plunger movable in said  
 50 tube, and provided with two pistons and a lubricant-chamber exterior of said plunger, one of said pistons controlling the flow of lubricant to the lubricant-chamber, and the other of said pistons provided with a valve movable with respect thereto for controlling the flow of lubricant from the lubricant-chamber to the parts to be lubricated, whereby as one of said pistons closes communication between the reservoir or cup and the lubricant-chamber, the said valve moves with respect to the other piston to open communication between the lubricant-chamber and parts to be lubricated.

2. In a lubricating device, the reservoir or  
 65 cup for holding a suitable lubricant, a tube ex-

tended therefrom and having an enlarged portion or passage-way, a plunger movable in said tube and provided with two pistons rigidly connected thereto and a lubricant-chamber exterior of the plunger and disposed between  
 70 said pistons, one of said pistons controlling the flow of lubricant to the lubricant-chamber, and the other of said pistons provided with a valve movable with respect thereto, said valve controlling the flow of lubricant to the  
 75 parts to be lubricated, whereby as one of said pistons closes communication between the reservoir or cup and the lubricant-chamber, the said valve moves with respect to the other piston to open communication between the  
 80 lubricant-chamber and parts to be lubricated.

3. In a lubricating device, the reservoir or cup for holding a suitable lubricant, a tube extended therefrom, a plunger movable in said tube and provided with two rigidly-connected  
 85 pistons and a lubricant-chamber, one of said pistons controlling the flow of lubricant to the lubricant-chamber, and the other of said pistons provided with means for controlling the flow of lubricant from the lubricant-chamber to the parts to be lubricated, and air ducts or inlets leading to the lubricant-chamber only when said chamber is in position to discharge lubricant.

4. In a lubricating device, the combination  
 95 of a reservoir or cup for holding a suitable lubricant, a tube extended from said reservoir or cup and having an enlarged portion or passage-way, a plunger movable in said tube and provided with a piston for closing communication between the reservoir or cup and said tube, said plunger being provided with a lubricant-chamber exterior thereto, a second piston carried by the plunger in fixed relation to the first-mentioned piston and a valve movable with relation thereto to control communication between the lubricant-chamber and parts to be lubricated, devices normally acting to maintain the plunger in position to cause said first-named piston to close communication between the reservoir or cup and lubricant-chamber, said plunger and valve being movable by fluid-pressure in opposition to said devices to establish communication between the reservoir or cup and lubricant-chamber and close communication between the lubricant-chamber and parts to be lubricated.

5. In a lubricating device, the combination of a reservoir or cup for holding a suitable lubricant, a tube extended from said reservoir or  
 120 cup, a plunger movable in said tube and provided with a head for closing communication between the reservoir or cup and said tube, said plunger being provided with an exterior lubricant-chamber, an enlarged head fixed to the plunger below the exterior lubricant-chamber, a valve carried by the enlarged head and movable with relation thereto to control communication between the lubricant-chamber and parts to be lubricated, said tube being  
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provided with perforations which lead to the lubricant-chamber only when the plunger is in position to discharge lubricant to the parts to be lubricated.

5 6. In a lubricating device, the combination of a reservoir or cup for holding a suitable lubricant, a tube extended therefrom, a plunger comprising two pistons and a stem rigidly connecting the same, said plunger being provided  
10 with an exterior lubricant-chamber disposed between said pistons, one of said pistons adapted to control communication between the reservoir or cup and lubricant-chamber, and the  
15 valve for controlling communication between the exterior lubricant-chamber and parts to be lubricated.

7. In a lubricating device, the combination of a reservoir or cup for holding a suitable  
20 lubricant, a tube extended therefrom, a plunger comprising two pistons and a stem rigidly connecting the same, said plunger being provided with an exterior lubricant-chamber disposed between said pistons, means normally  
25 acting upon said plunger to cause one of said pistons to close communication between the reservoir or cup and the lubricant-chamber, a valve carried by the other piston to control communication between the lubricant-chamber  
30 and parts to be lubricated, said valve adapted to be seated by fluid-pressure to close communication between the exterior lubricant-chamber and parts to be lubricated, and the plunger being movable by fluid-pressure  
35 in opposition to said means for opening communication between the reservoir or cup and lubricant-chamber.

8. In a lubricating device, the combination of a reservoir or cup for holding a suitable  
40 lubricant, a tube extended therefrom, a plunger movable in said tube and provided with two pistons, and an exterior lubricant-chamber disposed between said heads, one of said pistons being provided with a passage-way  
45 leading from the exterior lubricant-chamber through the piston, a valve movable with respect to said piston for opening and closing said passage-way, a spring acting upon the plunger to normally maintain the same in position to cause one of said pistons to shut off  
50 communication between the reservoir or cup and lubricant-chamber, said plunger being

movable in said tube by fluid-pressure in opposition to said spring to open communication between the exterior lubricant-chamber  
55 and reservoir or cup, said fluid-pressure acting at such time to cause said valve to close the piston passage-way to interrupt communication between the lubricant-chamber and parts to be lubricated. 60

9. In a lubricating device, the reservoir or cup for holding a suitable lubricant, a tube extended from said reservoir or cup, means disposed within said tube for automatically  
65 discharging a lubricant to the parts to be lubricated, a coupling disposed within said tube and limiting the movement of said means, said coupling being provided with an external channel for a lubricant, holes leading from  
70 said channel below said means to the parts to be lubricated, and means for supplying additional lubricant to said channel as desired.

10. The combination of the casing, the relief-valve, lubricant-cup, and feeder operated by the relief-valve and having an uninclosed  
75 or unobstructed portion in contact with the lubricant in the cup for feeding graphite or other lubricant to the valves and cylinders while drifting, substantially as set forth.

11. In a lubricator, the combination of the  
80 lubricant-cup, a casing below the cup, a relief-valve operating in the casing, and a feeder carried by the valve for conducting the lubricant from the cup to the casing and operating directly in connection with the lubricant in  
85 the cup, substantially as set forth.

12. The combination with the casing, and the lubricant-cup, of the valve operating in the casing, and the feeder or stem carried by the valve and movable therewith to a position  
90 in which it will project into the lubricant-cup and adapted to receive lubricant from the cup in one position of the valve and to discharge such lubricant to the casing in the other position of the valve, the feeder operating directly in connection with the lubricant in the  
95 cup, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

BENJAMIN F. CAMPBELL.  
JOSEPH BERG.

Witnesses:

B. E. SCOTT,  
J. E. COATES.