No. 872,249. PATENTED NOV. 26, 1907.

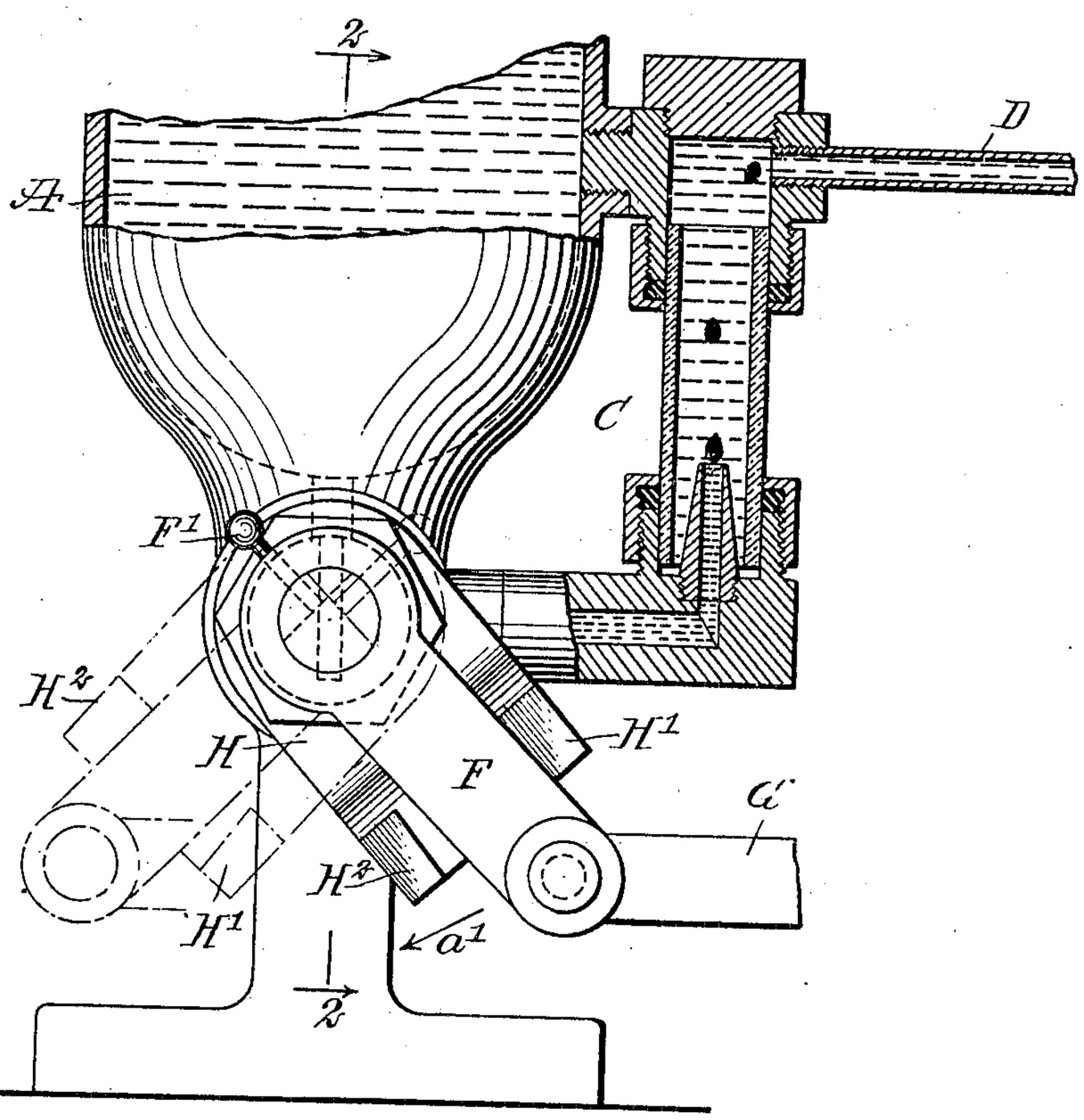
H. L. McCULLOUGH.

PUMP LUBRICATOR.

APPLICATION FILED APR. 6, 1907.

3 SHEETS—SHEET 1.

Fig. 1



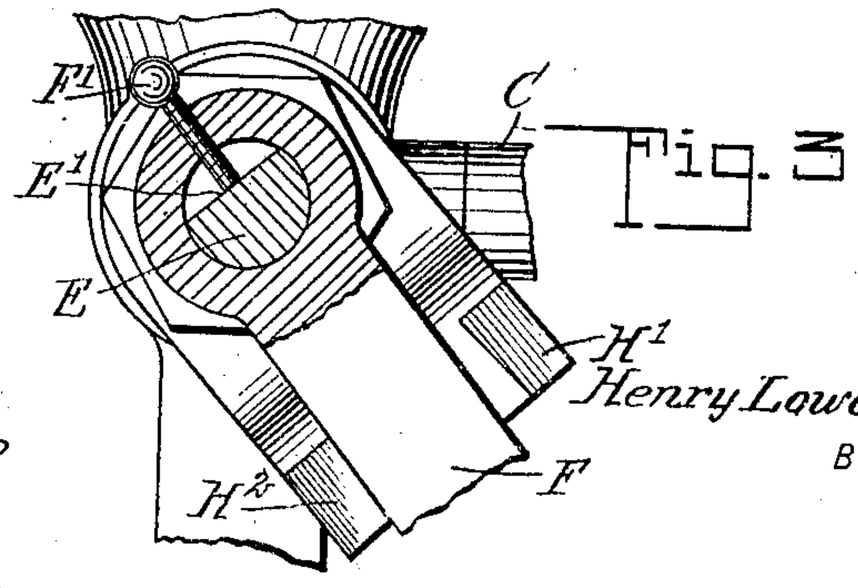


Fig. 3

WITNESSES

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3 SHEETS—SHEET 2.

Fig. 2

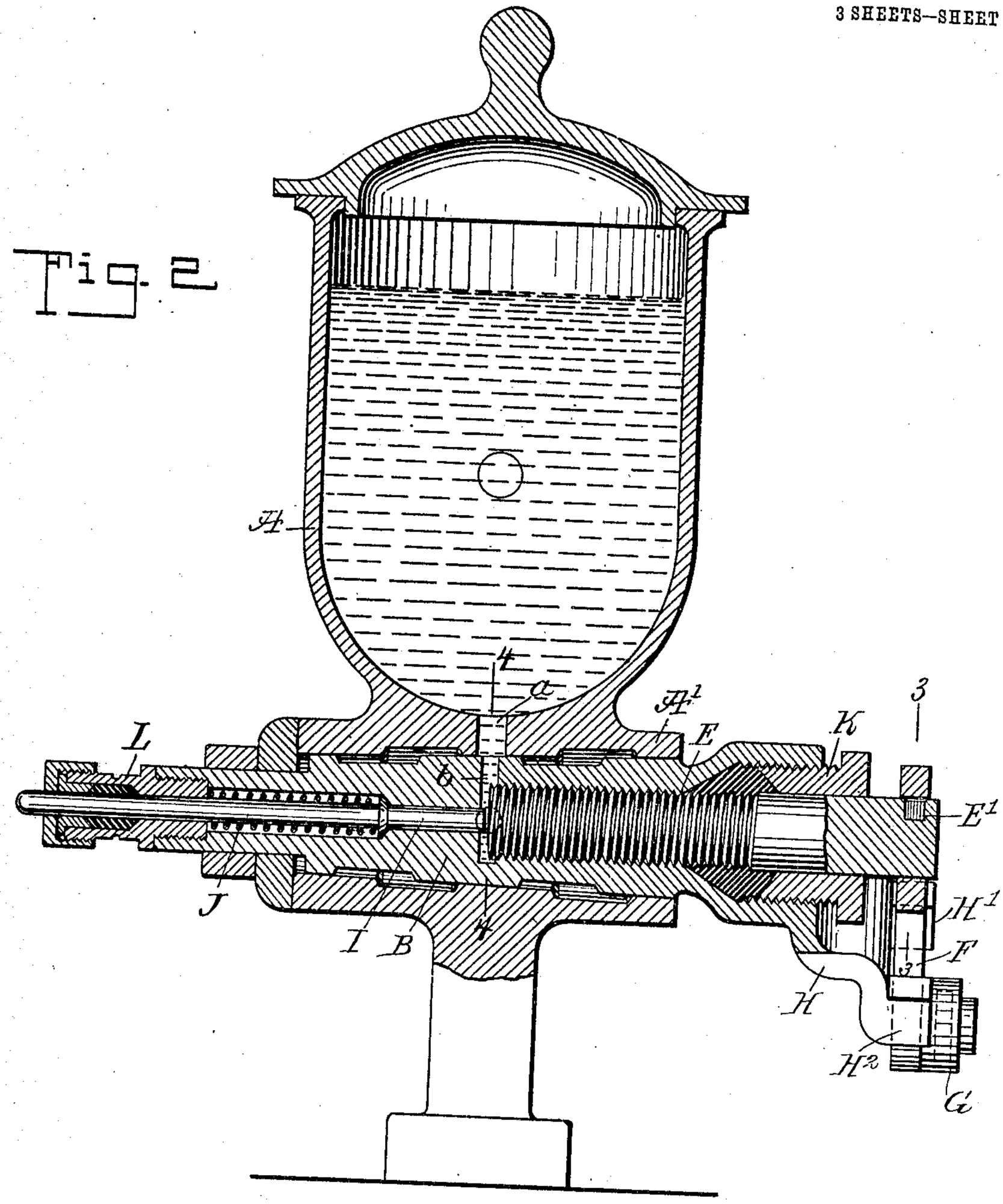
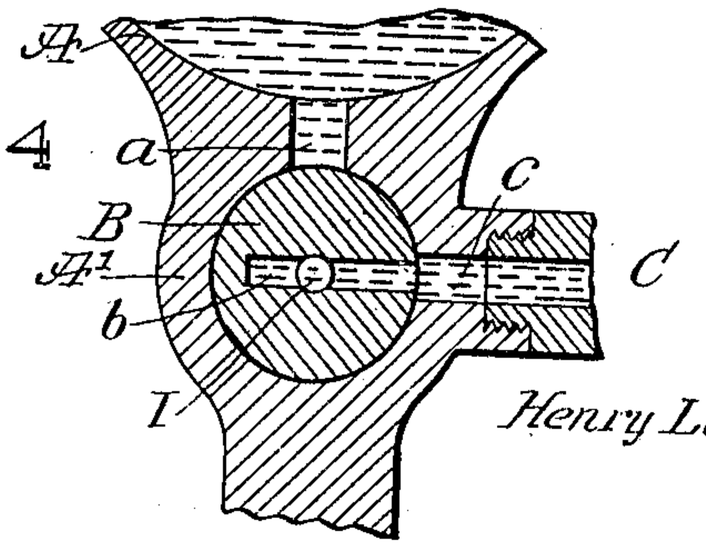


Fig. 4



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3 SHEETS—SHEET 3.

Fig. 6

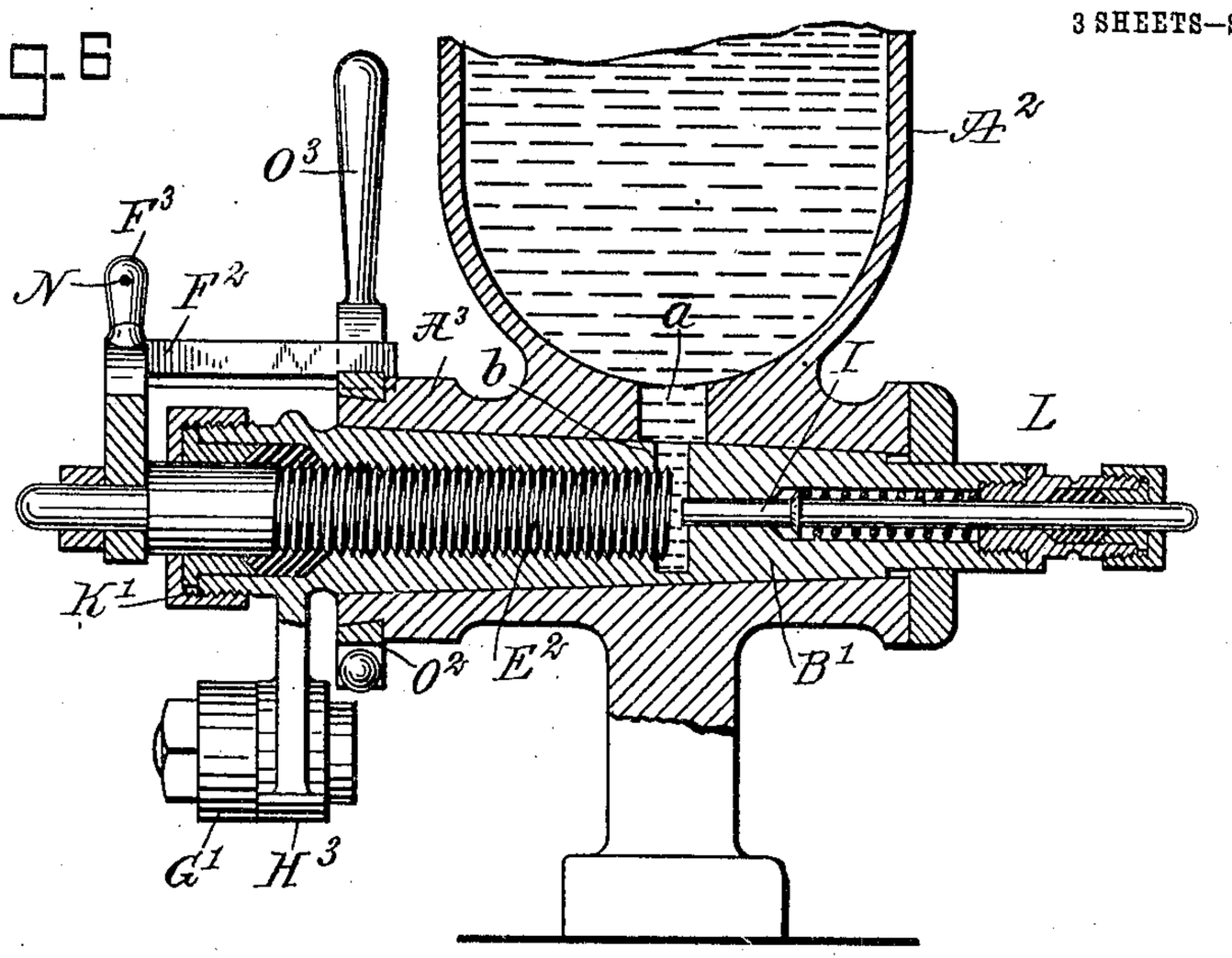
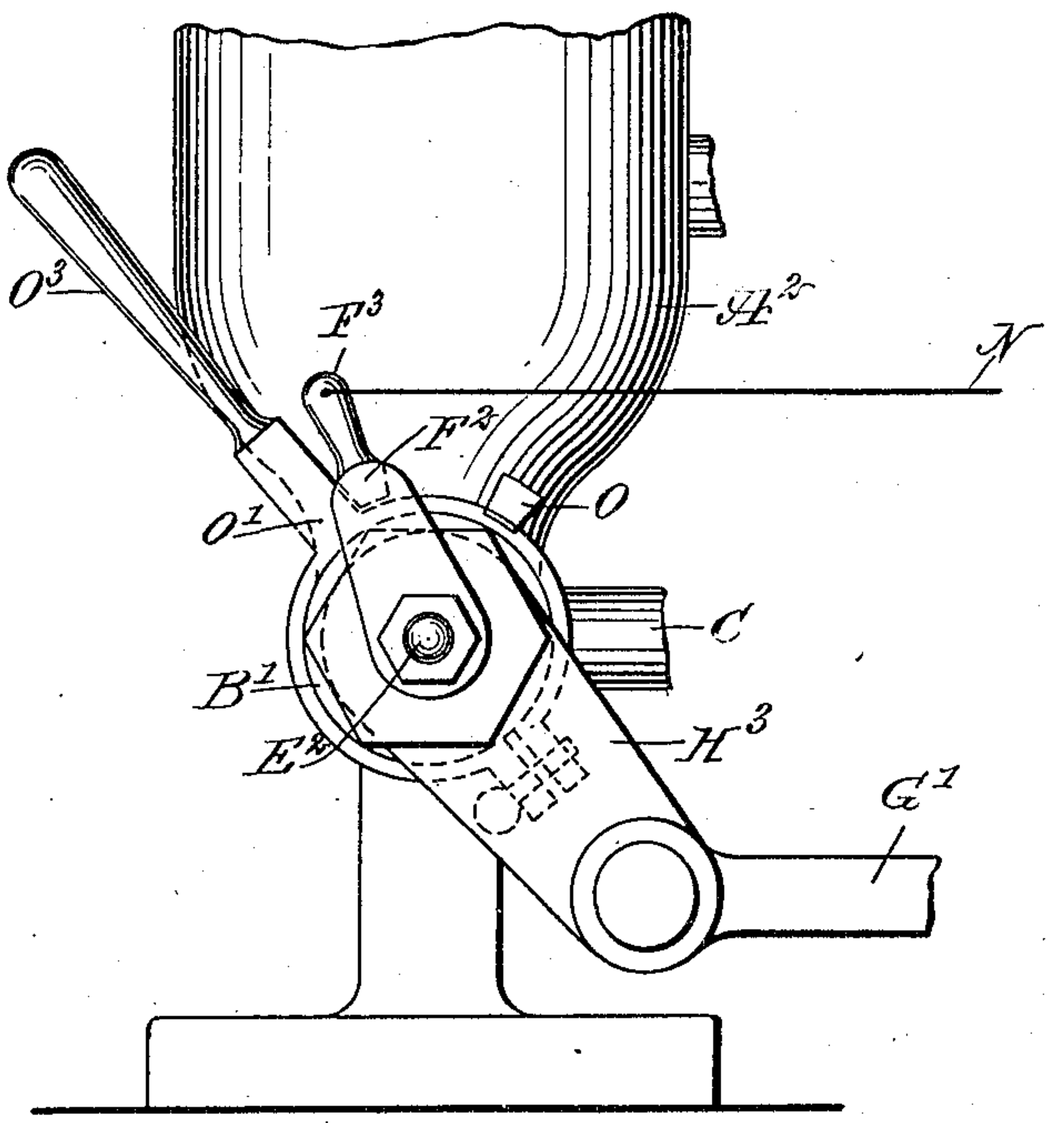


Fig. 5



WITNESSES

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PUMP-LUBRICATOR.

No. 872,249. Specification of Letters Patent. Patented Nov. 26, 1907.

Application filed April 6, 1907. Serial No. 366,678.

To all whom it may concern:

Be it known that I, HENRY LOWELL McCULLOUGH, a citizen of the United States, and a resident of Cropsey, in the county of McLean and State of Illinois, have invented a new and Improved Pump-Lubricator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved pump lubricator, more especially designed for lubricating cylinders, valves, bearings and other parts of steam engines, air compressors, gas engines and other machinery, and arranged to permit minute regulation of the amount of the lubricant desired to be delivered, and to automatically relieve the pump of undue pressure incident to clogging up of the discharge passageways or the like, thus preventing injury to or stopping of the pump or a waste of the lubricant.

The invention consists of novel features and parts and combinations of the same, which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement, parts being shown in section; Fig. 2 is a transverse section of the same on the line 2—2 of Fig. 1; Fig. 3 is a sectional side elevation of part of the improvement on the line 3—3 of Fig. 2; Fig. 4 is a sectional side elevation of the improvement on the line 4—4 of Fig. 2; Fig. 5 is a side elevation of a modified form of the improvement, and Fig. 6 is a transverse section of the same.

The container A for containing the lubricant is provided in its bottom with a port *a* adapted to register with a chamber or recess *b* formed in the oscillating valve B, in the form of a plug mounted in a suitable bearing A′, arranged on the base or support for the container A, as plainly indicated in the drawings. The chamber *b* is adapted to register with a discharge port *c* (see Fig. 4), leading to the delivery device for conducting the lubricant to the part to be lubricated, the said delivery device being preferably in the form of a sight feed C having an outlet pipe D leading to the part to be lubricated.

In the valve B is mounted to move axially the pump plunger E in the form of a threaded plunger, adapted to be alternately turned forward and backward, so as to screw inward and outward in the valve B, with the inner end moving in or out of the chamber *b*. Thus when the chamber *b* is in register with the port *a* and the plunger E is screwed outward, then the lubricant contained in the container A is readily drawn by way of the port *a* into the chamber *b*. Now when the valve B has been given a quarter turn, so as to move the chamber *b* in register with the discharge port *c* (see Fig. 4) and the plunger E is screwed inward, then the lubricant contained in the chamber *b* is forced out of the same through the discharge port *c* into the sight feed C, to pass from the latter by way of the delivery pipe D to the part to be lubricated. Now in order to give an oscillating motion to the valve B and an axial movement to the plunger E, the following arrangement is made: On the outer end of the plunger E is adjustably secured a crank arm F connected by a link G with a reciprocating part of the engine or other machine to be lubricated by the device, so that when the machine is running a turning motion is given to the plunger E, so as to screw the same alternately inward and outward for the purpose above mentioned. The crank arm F extends between the lugs H′ and H² of an arm H, secured to or formed on the outer end of the valve B, and hence when a swinging motion is given to the crank arm F, then the latter by coming alternately and intermittently in contact with the lugs H′ and H² imparts an intermittent rocking motion to the valve B, so as to bring the chamber *b* alternately in register with the ports *a* and *c*.

When the several parts are in the position illustrated in Figs. 1 and 2, then the chamber *b* is in register with the inlet port *a*, and the crank arm F is now in its extreme right hand position against the lug H′. Now when the machine is running, a swinging motion is given to the arm F in the direction of the arrow *a′*, so that the plunger E is turned and screwed in an outward direction, to insure filling of the chamber *b* with lubricant from the container A. Shortly after the crank arm F has swung in the direction of the arrow *a′*, it moves in contact with the lug H², thus carrying the arm H along and thereby giving a quarter turn to the valve B, to move the chamber *b* out of register with the port *a* and into register with the port *c*. Now during this movement of the valve B, the plunger E moves with it and consequently

does not screw in the valve. Now when the arm F next starts on the return movement, that is, swings in the inverse direction of the arrow *a'* from the position shown in dotted lines in Fig. 1, then the valve B remains, at the beginning of the stroke, stationary, so that the plunger E screws in the valve B in an inward direction, thereby forcing the lubricant contained in the chamber *b* out of the same and through the port *c* into the sight feed C and to the part to be lubricated. The crank arm F in its return movement finally engages the lug H' of the arm H, thus carrying the arm H along and thereby turning the valve B in the reverse direction, that is, to move the chamber *b* out of register with the port *c* and back into register with the port *a*. During this return movement of the valve B the plunger E turns with it, and hence does not screw in the valve for the time being.

Now from the foregoing it will be seen that the relative movement between the plunger E and the valve B controls the amount of lubricant forced to the part to be lubricated, and by regulating the movement of the arm F relative to that of the arm H, it is evident that any desired amount of lubricant may be forced by the plunger E to the part to be lubricated at each full stroke of the arm F. For the purpose mentioned the crank arm F is provided with a set screw F' adapted to contact at its inner end with a flattened surface E', formed near the outer end of the plunger E, and consequently by screwing the set screw F' inward in firm contact with the flattened surface, a full discharge of lubricant is had; but upon screwing the set screw outward a lesser amount of lubricant is pumped by the pump, as the arm F then swings a short distance before the inner end of the set screw F' comes in contact with the flattened surface E', to turn the plunger E in the then stationary valve B, thus regulating the stroke of the plunger in the valve B.

In order to relieve the device of any undue pressure in case the port *c*, for instance, or the sight feed becomes clogged up, or for other causes, the following relief device is provided: In the rear end of the valve B is slidingly mounted the relief plunger I extending with its forward end into the chamber *b*, and the said relief plunger I is pressed inwardly by a spring J, so as to normally hold the relief plunger I in a forward position. Now in case the port *c* becomes clogged up and the plunger E moves inward, then the undue pressure against the lubricant contained in the chamber *b* is transmitted to the relief plunger I, which thus moves rearward against the tension of its spring J, thus relieving the chamber *b* and the plunger E of undue pressure, and as soon as the valve B has returned to its filling position shown in Figs. 1 and 2, then the lubricant contained in the chamber *b* is returned to the container A by the relief plunger I moving forward by the action of its spring J. This action is repeated as long as the discharge port *c* remains clogged up, and consequently the device is relieved of undue pressure and no lubricant whatever is wasted, as the same is returned to the container at each return stroke. As illustrated in the drawings the forward portion of the plunger E moves in a suitable stuffing box K held on the outer end of the valve B, and the relief plunger I extends with its rear end in a suitable stuffing box L.

In the modified form shown in Figs. 5 and 6, the valve B' is provided with a fixed crank arm H^3 connected by a link G' with a reciprocating part of the machine on which the lubricator is used, and the screw or threaded plunger E^2 screws axially in the valve B' and extends through a stuffing box K' held on the valve B' sufficiently tight for the plunger E^2 to turn with the valve B', as hereinafter more fully described. On the outer end of the plunger E^2 is secured an arm F^2 having a handle F^3 connected with one end of a cord N, fixed at its other end to a suitable fixed part. The arm F^2 extends between a fixed lug O on the outside of the container A^2 and a lug O' held on a clamping ring O^2 mounted to turn on the bearing A^3 for the valve B'. This ring O^2 is provided with a handle O^3 under the control of the operator, for turning the ring O^2, to bring the lug O' in the desired position for holding the arm F^2 and hence the plunger E^2, stationary, sooner or later according to the amount of lubricant to be fed at each full stroke given to the crank arm H^3. Now when the several parts are in the position shown in Figs. 5 and 6, the crank arm H^3 swings to the left, and the valve B' is turned and with it the plunger E^2, owing to the tightness of the stuffing box, until the arm F^2 strikes the fixed lug O. When this takes place the valve B' is turned still further while the plunger E^2 is held stationary and hence screws inward in the valve B', to force the lubricant out of the chamber *b* into the discharge port *c*, with which the said chamber *b* now registers. On the return stroke of the arm H^3, the valve B' and with it the plunger E^2 are turned to bring the chamber *b* in register with the port *a*, and when the arm H^3 nears the end of its stroke the arm F^2 strikes the lug O', so that the plunger E^2 is held against turning but screws outward in the valve B', which keeps on turning until the arm H^3 reaches the end of its stroke. During the outward movement of the plunger E^2 the lubricant is drawn into the chamber *b*. By the operator turning the clamping ring O^2 to move the stop lug O' nearer to or farther from the fixed lug O, the capacity of the pump can be decreased or increased correspondingly by giving more or less axial movement to the

plunger E^2. By the operator holding the arm F^2 in contact with the corresponding lugs O, O′ during the oscillation of the arm H^3, a maximum movement of the plunger and consequently a maximum feed can be obtained. Suitable devices may be employed to take up wear of the valve and the pump plunger.

Although I have shown preferred forms of the invention I do not limit myself to the detail construction shown and described, as the same may be varied without deviating from the spirit of my invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A pump lubricator comprising a container for the lubricant, an oscillating valve for receiving a quantity of the lubricant from the said container and carrying it to a discharge, and a pump plunger moving axially in the said valve for forcing the lubricant in the valve through the discharge to the part to be lubricated.

2. A pump lubricator comprising a container for the lubricant, an oscillating valve for receiving a quantity of the lubricant from the container and carrying it to a discharge, a pump plunger moving axially in the valve for forcing the lubricant in the valve through the discharge, and means for regulating the relative movement between the valve and plunger to control the amount of lubricant forced to the part to be lubricated.

3. A pump lubricator comprising a container for the lubricant, an oscillating valve for receiving a quantity of the lubricant from the said container and carrying it to a discharge, a pump plunger moving axially in the said valve for forcing the lubricant in the valve through the discharge to the part to be lubricated, and a relief device for automatically relieving the pump of undue pressure on the clogging up of the said discharge.

4. A pump lubricator comprising a container for the lubricant, an oscillating valve having a chamber adapted to connect alternately with the said container and with a discharge for conducting the lubricant to the part to be lubricated, a pump plunger mounted in the said valve and movable axially therein, to draw the lubricant into the said chamber from the said container, and to force it out of the chamber into the said discharge, means for imparting a rocking motion to the said valve, and means for imparting an axial movement to the said pump plunger.

5. A pump lubricator comprising a container for the lubricant, an oscillating valve having a chamber adapted to connect alternately with the said container and with a discharge for conducting the lubricant to the part to be lubricated, a pump plunger mounted in the said valve and movable axially therein to draw the lubricant into the said chamber from the said container and to force it out of the chamber into the said discharge, means for imparting an axial movement to the said pump plunger, and means for transmitting the motion given to the said pump plunger to the said valve.

6. A pump lubricator comprising a container for the lubricant, an oscillating valve having a chamber adapted to connect alternately with the said container and with a discharge for conducting the lubricant to the part to be lubricated, a threaded plunger screwing axially in the said valve to draw the lubricant from the said container into the said chamber and to force it out of the chamber into the said discharge, actuating means for turning the said threaded plunger for screwing the same alternately inward and outward in the said valve, and a connection between the said actuating means and the said valve, for imparting an intermittent rocking motion to the said valve from the said actuating means.

7. A pump lubricator comprising a container for the lubricant, an actuating valve having a chamber adapted to connect alternately with the said container and with a discharge for conducting the lubricant to the part to be lubricated, a threaded plunger screwing axially in the said valve to draw the lubricant from the said container into the said chamber and to force it out of the said chamber into the said discharge, a crank arm attached to the said plunger and connected with a reciprocating part to turn the plunger alternately in opposite directions, and a valve arm on the said valve and having lugs adapted to be alternately and intermittently engaged by the said crank arm, to rock the valve intermittently.

8. A pump lubricator comprising a container for the lubricant, an oscillating valve having a chamber adapted to connect alternately with the said container and with a discharge for conducting the lubricant to the part to be lubricated, a threaded plunger screwing axially in the said valve to draw the lubricant from the said container into the said chamber and to force it out of the said chamber into the said discharge, a crank arm attached to the said plunger and connected with a reciprocating part, to turn the plunger alternately in opposite directions, a valve arm on the said valve and having lugs adapted to be alternately and intermittently engaged by the said crank arm, to rock the valve intermittently, and means for adjusting the said crank arm relative to the said valve arm.

9. A pump lubricator comprising a container for the lubricant, an actuating valve having a chamber adapted to connect alter-

nately with the said container and with a discharge for conducting the lubricant to the part to be lubricated, a threaded plunger screwing axially in the said valve to draw the lubricant from the said container into the said chamber and to force it out of the said chamber into the said discharge, a crank arm attached to the said plunger and connected with a reciprocating part, to turn the plunger alternately in opposite directions, a valve arm on the said valve and having lugs adapted to be alternately and intermittently engaged by the said crank arm, to rock the valve intermittently, and a pressure relief device in the said valve to relieve the pressure in the said valve chamber in case the discharge is clogged up.

10. A pump lubricator comprising a container for the lubricant, an oscillating valve having a chamber adapted to connect alternately with the said container and with a discharge for conducting the lubricant to the part to be lubricated, a threaded plunger screwed axially in the said valve to draw the lubricant from the said container into the said chamber and to force it out of the said chamber into the said discharge, a crank arm attached to the said plunger and connected with a reciprocating part, to turn the plunger alternately in opposite directions, a valve arm on the said valve and having lugs adapted to be alternately and intermittently engaged by the said crank arm, to rock the valve intermittently, and a spring pressed relief plunger, movable axially in the said valve and pressed on by the lubricant in the said valve chamber.

11. A pump lubricator comprising a container for the lubricant, an oscillating valve having a chamber adapted to connect alternately with the said container and with a discharge for conducting the lubricant to the part to be lubricated, a threaded plunger screwing axially in the said valve to draw the lubricant from the said container into the said chamber and to force it out of the said chamber into the said discharge, a crank arm attached to the said plunger and connected with a reciprocating part, to turn the plunger alternately in opposite directions, a valve arm on the said valve and having lugs adapted to be alternately and intermittently engaged by the said crank arm, to rock the valve intermittently, and a screw screwing in the said crank arm against a flattened portion on the said plunger, to regulate the throw of the crank arm relative to the plunger and to the valve arm.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY LOWELL McCULLOUGH.

Witnesses:

WILLIAM A. BALCKE,
EDWARD E. LAWS.