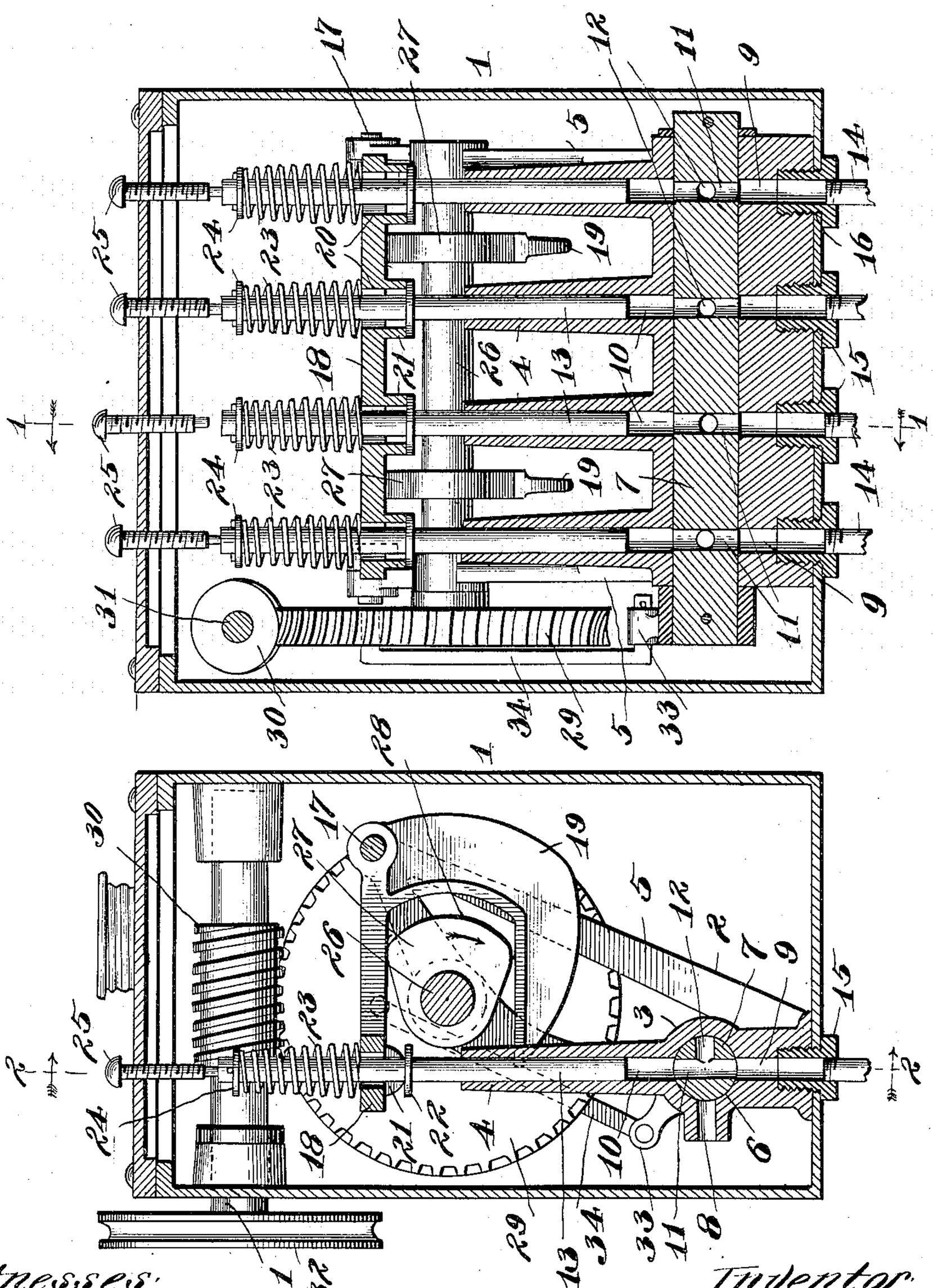
H. W. HANCOCK.

FORCE FEED LUBRICATOR.

APPLICATION FILED NOV. 29, 1905.

923,832. Patented June 8, 1909.

Fig. 2.



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HARRY W. HANCOCK, OF CHICAGO, ILLINOIS.

FORCE-FEED LUBRICATOR.

No. 923,832. Specification of Letters Patent. Patented June 8, 1909.

Application filed November 29, 1905. Serial No. 289,642.

To all whom it may concern:

Be it known that I, HARRY W. HANCOCK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Force-Feed Lubricators, of which the following is a specification.

This invention relates to apparatus for forcing lubricants from a reservoir to the bearings of a machine, and one of its objects is to provide an apparatus of the character mentioned, which is simple in construction and positive in its operation.

Another object of the invention is to provide simple and reliable means for varying the rate of discharge to any particular bearing and without affecting the quantity delivered to any other bearing.

A further object is so to arrange the mechanism of a force-feed lubricator that it may be almost wholly housed, as, for example, within the oil reservoir, thus lessening the risk of injury to the mechanism and decreasing the opportunity for tampering.

The invention further refers to the various advantageous features of construction hereinafter set forth.

In the accompanying drawings, Figure 1 is a vertical sectional view through a force-feed lubricator embodying the features of my invention, said view being taken on the plane of dotted line 1 1 of Fig. 2. Fig. 2 is a vertical sectional view on dotted line 2 2 of Fig. 1.

In the embodiment herein shown of this invention the operating mechanism is inclosed in an oil reservoir 1 of suitable construction. A framework 2 is secured within the oil reservoir 1 upon the bottom thereof in a manner to be hereinafter described, said framework comprising a valve casing 3, tubular stems 4, and end frames 5 all formed, in this instance, from an integral casting. The valve casing 3 has a chamber 6 for the reception of a rock valve 7 and is provided with inlet ports 8 and outlet ports 9. The longitudinal central opening 10 of each of the stems 4 is alined with one of the outlet ports 9. The rock valve 7 is provided with a plurality of oil passages 11 adapted to be brought into alinement with the openings 10 and the outlet ports 9, and also has a plurality of ducts 12 adapted to connect the passages 11 and the openings 10. The tubular stems 4 constitute cylinders for the feeding plungers 13, the central opening 10 of each stem being connected with an inlet port 8 and an outlet port 9 by means of the passages 11 and 12 in the rock valve 7, and each tubular stem forming with its plunger a pump unit. It will be understood that there will be as many pump units as there are bearings to be lubricated, the embodiment shown in the drawings comprising four units. Delivery pipes 14 convey the oil from the outlet ports 9 to the bearings to be oiled, said pipes in this instance being connected to the oil reservoir by means of flanged bushings 15 screw-threaded into coinciding openings 16 in the reservoir 1 and valve casing 3. Said bushings thus also serve to secure the valve casing 3 and the end frames 5 in position within the oil reservoir.

A rock shaft 17 is mounted in the upper end of the end frames 5. Upon this shaft is fixed a plunger-operating frame comprising the bar 18 and two yokes 19. In the bar 18 of said plunger-operating frame are formed openings 20 through which the feeding plungers 13 extend, said bar having at each side of each of said openings a rounded bearing lug 21 adapted to bear upon a collar 22 fixed upon the feeding-plunger. The downward or ejecting movement of the plungers 13 is positive, being produced by the direct pressure of the bar 18, but the upward or suction movement of the plungers is capable of being varied in extent, notwithstanding the fixed range of movement of the bar 18, by reason of a yielding connection between said plungers and the bar 18, which yielding connection in this instance comprises a coiled spring 23 surrounding each plunger and bearing on said bar and on a washer or collar 24 fixed on the plunger. A screw 25 seated in the top wall or cover of the oil reservoir 1 in the line of movement of each plunger provides means for limiting the upward movement of the plungers thus regulating the quantity of oil delivered to the bearings.

On a cam shaft 26 rotatably mounted in the end frames 5 are fixed two cams 27, one for each of the yokes 19 before alluded to. The rotation of said shaft causes a tilting movement of the plunger-operating frame and a reciprocation of the feeding plungers. The high portion of each cam has a peripheral surface 28 curved on the arc of a circle concentric with the axis of the cam, in order to hold the plungers 13 stationary for a time at the extremities of their reciprocatory movement. The shaft 26 is rotated by means of a worm wheel 29 fixed on one end of

said shaft and meshing with a worm 30, which worm is fixed on a drive shaft 31 rotatably supported on the inner walls of the oil reservoir above the normal level of the oil. One end of said drive shaft projects through one side of the reservoir and there carries a drive pulley 32 adapted to receive a belt (not shown) for driving the mechanism of the lubricator. If preferred, the shaft 31 may be rotated by a gear connection or a pawl and ratchet mechanism.

The rock valve 7 is turned to bring its oil passages alternately into register with the inlet ports 8 and the outlet ports 9 by means of an arm 33 fixed on one end of said valve outside the valve casing 3, which arm is connected with the worm wheel 29 by a connecting rod 34.

While I have herein shown a rock valve oscillating through an arc of ninety degrees and a crank for oscillating said valve, it is apparent that a valve having a greater or smaller arc of oscillation might be used and that other means might be employed for operating it.

It will be seen from an inspection of Fig. 1 that the cams 27 are set about a quarter-revolution in advance of the connection of the rod 34 with the worm wheel 29. Assuming the parts to be in the position shown in said figure, the operation will be as follows: The cams 27, moving in the direction indicated by the arrow, will depress the plungers 13, forcing the oil out of the plunger openings 10, through the passages 11 in the rock valve 7 and the outlet ports 9 into the delivery pipes 14. During such downward movement of the plungers the rock valve will not be rocked sufficiently to carry the passages 11 out of register with the outlet ports 9, but as soon as the cams 27 have passed the lowest point of their orbit the rotation of the worm wheel 29 rocks the valve 7 through about one-quarter of a revolution, bringing the passages 11 and 12 into register with the inlet ports 8 and plunger openings 10, respectively, the plungers 13 in the meantime remaining stationary, owing to the shape of the cams 27 hereinbefore alluded to. Continuing rotation of the cams 27 raises the plungers 13, drawing a charge of oil into the plunger openings 10. The valve 7 is then turned into the discharging position and the cycle of operation just outlined is repeated.

I wish it to be understood that I desire not to be limited to the details of construction herein set forth, as various modifications will occur to persons skilled in the art.

I claim as my invention:

1. In a force-feed lubricator, in combination, a cylinder having an inlet and an outlet; a plunger in said cylinder; a single means for reciprocating said plunger adapted to positively move said plunger in one direction and yieldingly move it in the opposite direction; and an adjustable stop to limit the movement of said plunger in the last mentioned direction.

2. In a force-feed lubricator, in combination, a cylinder having an inlet and an outlet; a plunger in said cylinder; a member having a fixed range of movement adapted to bear at one side against a fixed portion of said plunger for moving the latter in one direction; a spring interposed between the other side of said member and a fixed point of said plunger; and an adjustable stop for limiting the movement transmitted to said plunger through said spring.

3. In a force-feed lubricator, in combination, a plurality of pump units each comprising a plunger; means for reciprocating said plungers; a single rock valve for all of said pump units, said rock valve having a fixed arc of oscillation; and means for adjustably limiting the stroke of said plungers.

4. In a force-feed lubricator, in combination, a plurality of pump units each comprising a plunger; means for simultaneously reciprocating said plungers; a yielding connection between said plunger and said reciprocating means; and an adjustable stop located in the path of each of said plungers.

5. In a force-feed lubricator, in combination, an inclosing casing; a plurality of pump units in said casing, each comprising a plunger; a member having a fixed ranges of movement for reciprocating said plunger; a yielding connection between said member and each of said plungers; and an adjustable stop screw extending through the cover of said casing into the path of each of said plungers.

6. In a force-feed lubricator, in combination, a plurality of pump units each comprising a plunger; a pivoted plunger-operating frame comprising a bar having openings therein through which said plungers extend, said bar being adapted to bear at one side upon a fixed portion of each of said plungers; a spring for each of said plungers extending between the other side of said bar and a fixed portion of the plunger; an adjustable stop for each of said plungers; and means for moving said plunger-operating frame.

7. In an apparatus of the kind described, a pump having a plunger therein, means for actuating said plunger, a resilient connection between said plunger and actuating means, and an adjustable stop adapted to limit the motion of said plunger.

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