No. 772,427. PATENTED OCT. 18, 1904.

G. W. MOSER.

FORCE FEED LUBRICATOR.

APPLICATION FILED APR. 8, 1904.

NO MODEL.

Fig. 1.

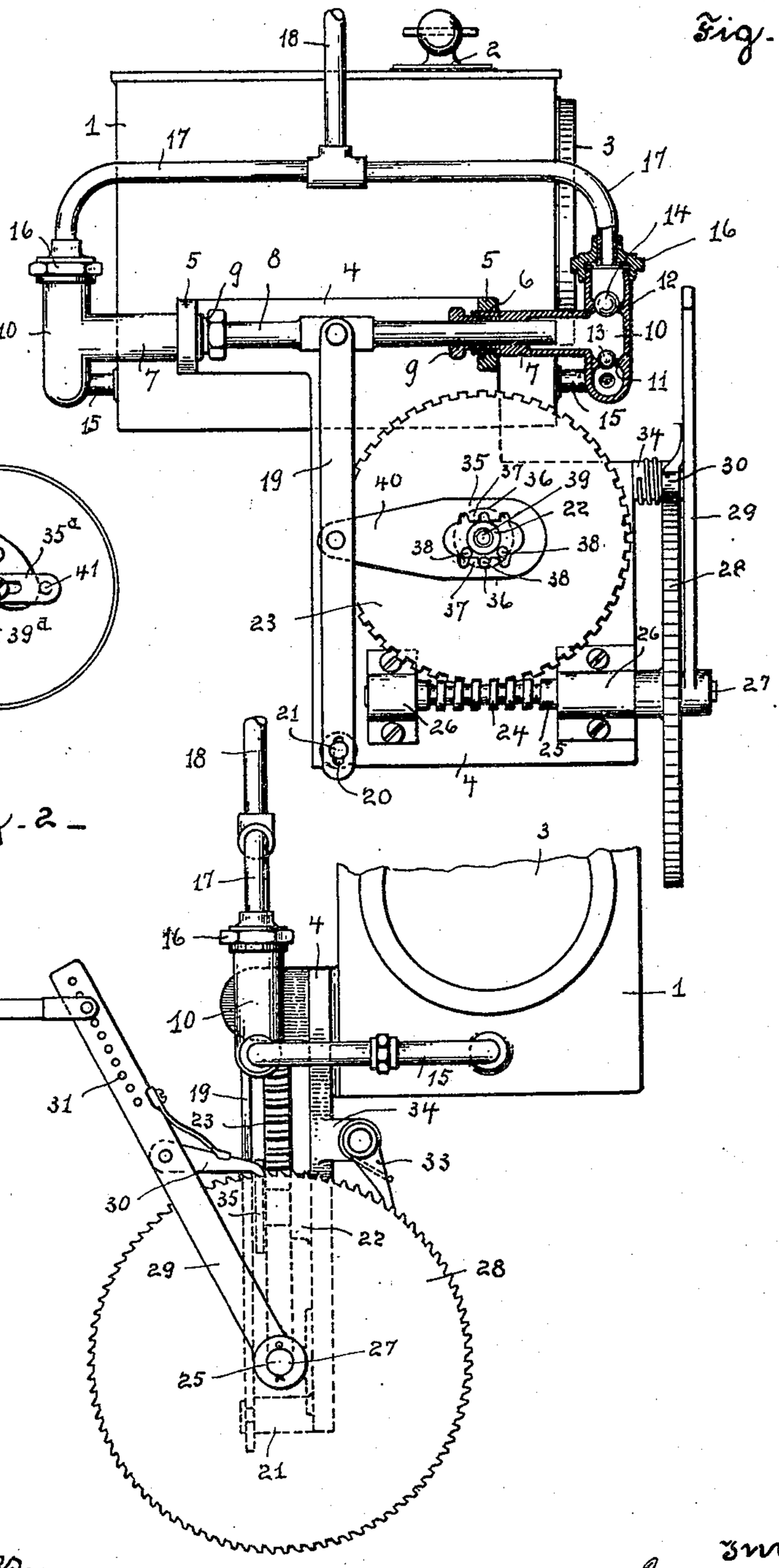

Fig. 3.

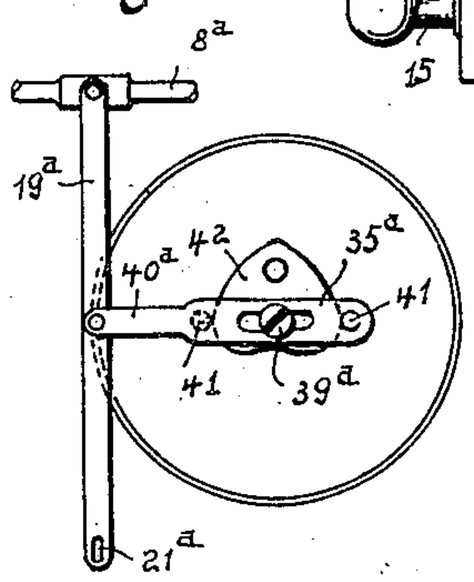

Fig. 2.

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No. 772,427. Patented October 18, 1904.

UNITED STATES PATENT OFFICE.

GEORGE W. MOSER, OF PERRYSBURG, OHIO.

FORCE-FEED LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 772,427, dated October 18, 1904.

Application filed April 8, 1904. Serial No. 202,126. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. MOSER, a citizen of the United States, and a resident of Perrysburg, Wood county, Ohio, have invented a new and useful Improvement in Force-Feed Lubricators, of which the following is a specification.

My invention relates to a force-feed lubricator, and has for its object to provide a device of the kind that is adapted to positively force lubricant to supply moving parts at a constant ratio of feed to the speed of the parts supplied and that may be readily adjusted to different rates of constant feed.

The objects of my invention are accomplished as hereinafter described, and illustrated in the drawings, in which—

Figure 1 is a front elevation, partly in section, of a force-feed lubricator constructed in accordance with my invention. Fig. 2 is a side elevation of the same, and Fig. 3 is a modification showing a heart cam employed to reciprocate the slotted yoke connected to the operating-lever.

The lubricant-reservoir is preferably a closed vessel of a suitable form and capacity and is provided at the top with a filling-opening that may be closed by the removable plug 2. The reservoir is also fitted with a sight-glass 3 in a position to readily show the stage of lubricant contained therein. To the face of the reservoir there is secured a plate 4, having a pair of suitably-separated brackets 5 extending from its face. The brackets are horizontally alined, and each is provided with a transverse bore 6 in axial alinement and are threaded to couple a pump-cylinder 7 to each bracket-arm. These pump-cylinders extend in axial alinement in opposite direction outward from the respective brackets and are provided with a common plunger 8 and each with a gland 9 to pack the opening for the plunger into the respective cylinders. At the outer end of each cylinder there is formed a valve-chamber 10, which intercepts the bore of the cylinder and is provided with centrally-perforated diaphragms, one above and one below the bore of the cylinder. The lower diaphragm is provided with the valve-seat 11 and the upper diaphragm with the valve-seat 12, upon which are respectively seated the inlet-valve 13 and the outlet-valve 14, the inlet-valve being of reduced size, adapting it to be dropped through the port of the valve-seat 12 to the valve-seat 11 vertically below. Below the inlet-valve 13 each valve-chamber 10 is connected by a conduit 15 to the lubricant-reservoir, and to avoid sediment being drawn into the valve-chambers the port to each conduit is located a suitable distance above the bottom of the reservoir. To the top of each valve-chamber there is coupled, by means of a union 16, an outlet-pipe 17, which may be jointed to deliver lubricant in a continuous flow through one or more conduits 18.

Centrally of the length of the plunger there is pivoted thereto one end of an operating-lever 19, the opposite end of which is provided with a slot 20, through which a stud-pin 21 is projected to fulcrum the lever and permit it being rocked to reciprocate the plunger. The stud-pin is mounted to the face of the plate 4, which is also provided with a stud-journal 22, located off to one side about centrally of the length of the lever. Upon this stud 22 there is journaled a gear 23 of a suitable diameter, the teeth of which are adapted to mesh with a worm-gear 24. The shaft 25, upon which the worm-gear is formed, is journaled in bearings 26, secured to the plate 4, and has an end 27 extending beyond the plate to receive thereon a fixed ratchet-wheel 28 and a journaled lever 29. This lever is provided with a spring-pressed pawl 30, adapted to engage the teeth of the ratchet-wheel in one direction, and is also provided with a plurality of apertures 31 to adjustably couple a rod 32 to the lever. The rod receives motion from a reciprocating part of a motor (not shown) and imparts it to the ratchet-wheel in one direction, thereby revolving the worm and therewith the gear 23, the movement of the ratchet-wheel in the opposite direction being prevented by a spring-pressed pawl 33, pivoted to a bracket-arm 34, extending from the plate 4.

Upon the end of the stud-journal 22 of the gear-wheel 23 is mounted a yoke 35, which upon the inner edge of both its upper and lower sides is provided with a rack 36, hav-

ing a series of teeth 37, which are adapted to intermesh with a series of pins 38, projecting from the side of the gear-wheel 23, parallel with and concentrically half around the stud 22, at uniform intervals and together forming the equivalent of a half-pinion, which during one revolution of the gear 23 alternately engages the upper and lower series of rack-teeth, thereby imparting a slow reciprocating motion to the yoke of uniform speed, the number of teeth in each rack corresponding with the number of pins and the teeth of the racks and the pins being so arranged that when the last pin has moved the last tooth of either rack of the yoke out of engagement therewith the first pin is coming into engagement with the opposite tooth of the other rack, thereby reversing the direction of movement of the yoke without any perceptible pause in such movement. The end of the stud-journal is axially bored and threaded to receive the cap-screw 39, by which the yoke is retained on the stud.

The yoke 35 at one end has a bar extension 40, which is pivotally connected to the operating-lever 19, whereby as the yoke is reciprocated the lever is slowly rocked back and forth, thereby producing alternating pumping and suction strokes of the plunger 8 in each cylinder 7, with the suction-stroke in one cylinder simultaneous with the pumping stroke in the other and being the equivalent of a substantially continuous pumping stroke and a substantially continuous suction-stroke. During the suction-stroke in each cylinder it is obvious that the inlet-valve 13 of that cylinder will be opened to admit oil from the reservoir and that the outlet-valve 14 will be closed thereby and that the action of these valves will be reversed during the pumping stroke in each cylinder, whereby a substantially continuous flow of lubricant is established and maintained from the reservoir alternately through the opposite pairs of pipes 15 and 17 and thence through the common delivery pipe or pipes 18 to the point or points of lubrication. It is manifest also that the motion of the ratchet-wheel is intermittent and that without change of speed of the motor the fractional revolution of the ratchet-wheel produced by one revolution of the shaft of the motor may be increased or diminished by the adjustment of the point of connection of the rod 32 to the ratchet-lever 29, that the motion thus transmitted through the ratchet-wheel 28, the worm 24, the gear 23, and the pins 38 produces a very slow and slightly intermittent movement of the yoke 35, so that each stroke of the plunger is made up of a succession of short slow movements that form a uniform, slow, and substantially continuous movement of the plunger that is well adapted to produce a positive, slow, and uniform feed of oil, such as is required for the cylinder of an engine and the like, and that by the construction shown and described the ratio of feed to the speed of the motor established by the point of connection of the rod 32 with the ratchet-lever 29 will thereafter be the same however the speed of the motor may vary.

By the use of the pin-teeth 38 of the sector-pinion and the semicircular incuts between the teeth of the racks the yoke 35 is made adapted for the arc movement of its pivotal connection with the operating-lever 19 without creating undue strain on or wear of the rack-teeth.

In Fig. 3 is shown a modified form of yoke 35^a in which the racks are omitted and the yoke is provided at the ends of the yoke-slot with the pins 41, and in lieu of the pins 38 there is secured to the side of the gear 23, eccentric to the stud-journal 22, the heart-shaped cam 42, which as it revolves with the wheel engages alternately the pins 41, thereby producing a uniform movement of the yoke 35^a similar to the movement of the rack-yoke 35 by the sector-pins 38. Therefore while preferring to use the rack-yoke 35 I do not limit myself to that form of yoke alone to produce the uniform and substantially continuous reciprocation of the pump-plunger, which is necessary to produce a uniform rate of feed. The yoke 35^a is retained on the stud by a suitable cap-screw 39^a.

What I claim to be new is—

1. In a force-feed lubricator, the combination with a double-acting pump, of a rock-lever adapted to actuate the pump, a fixed journal, a worm gear-wheel mounted on the journal, a yoke embracing the journal and having an end extension pivoted to the rock-lever, means secured to the side of the gear-wheel adapted to engage the yoke alternately in opposite directions and continuously reciprocate the yoke at a uniform speed as the wheel revolves, a worm-gear adapted to actuate the gear-wheel and means to actuate the worm-gear at differential speeds substantially as set forth.

2. In a force-feed lubricator, the combination with a double-acting pump, of a rock-lever adapted to actuate the pump, a fixed journal, a gear-wheel mounted on the journal, a yoke embracing the journal and having an end extension pivoted to the rock-lever, racks on opposite sides of the yoke, pins secured at uniform intervals to the side of the gear-wheel concentrically to and half around the journal, said pins being adapted to intermesh consecutively with the teeth of each rack, and alternately with the opposite racks as the wheel revolves, a worm-gear adapted to actuate the gear-wheel and means to actuate the worm-gear, substantially as set forth.

3. In a force-feed lubricator the combination with a double-acting pump, of the operating rock-lever 19, adapted to actuate the pump, the rack-yoke 36, having an end exten-

sion pivoted to the operating-lever, a fixed journal extending through the yoke, a gear-wheel mounted on the journal, a series of pins secured to the gear-wheel semiconcentric to the journal, adapted to engage the teeth of the rack-yoke and reciprocate the yoke as the gear-wheel revolves, a worm-gear mounted on an axle and intermeshing with the worm-gear, a driving-wheel fixed on the axle of the worm-gear, and means to differentially revolve the driving-wheel.

4. In a force-feed lubricator, the combination with a lubricant-reservoir of a pair of lengthwise-alined single-acting pump-cylinders, a common plunger for the cylinders, separate inlet connections from the reservoir to the cylinders, a common outlet for the cylinders, an operating-lever pivoted to the plunger at one end and to a fixed fulcrum at the opposite end, a fixed journal adjacent to the lever, a gear-wheel mounted on the journal, a slotted bar pivoted at one end to the lever and yoked around the journal, rack-teeth in the bar on opposite sides of the slot, pins on the gear-wheel adapted to successively mesh with the teeth of the racks and reciprocate the bar, and means to worm-drive the gear-wheel at differential speeds, substantially as set forth.

In testimony whereof I have hereunto set my hand this 23d day of March, 1904.

GEORGE W. MOSER.

Witnesses:

WILLIAM H. MOOR,

LAURA S. YOUNGS.