

No. 779,609.

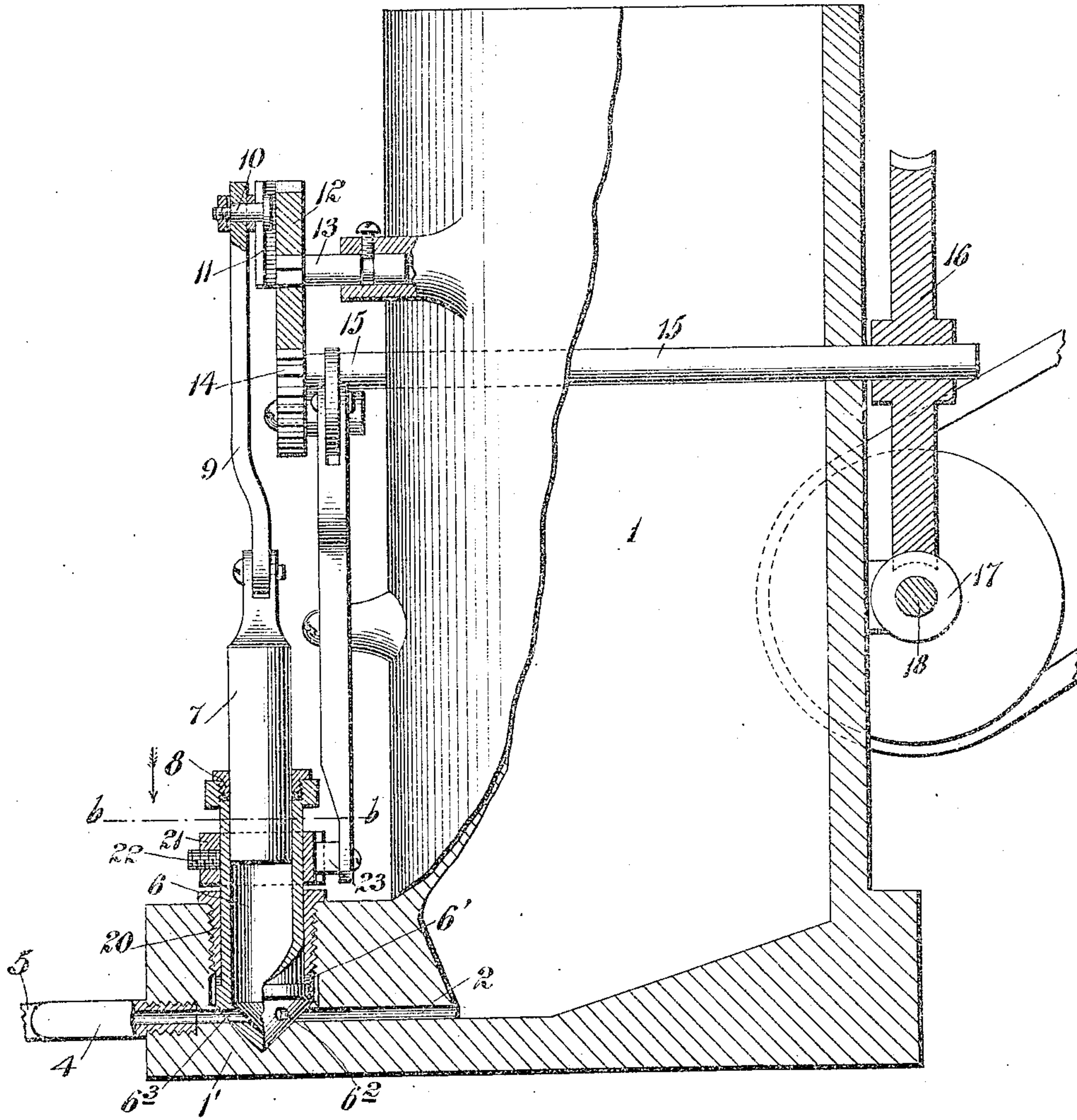
PATENTED JAN. 10, 1905.

P. H. KNIPPER & S. C. MACKAYE.  
LUBRICATOR.

APPLICATION FILED FEB. 20, 1903.

2 SHEETS—SHEET 1.

Fig. 1.



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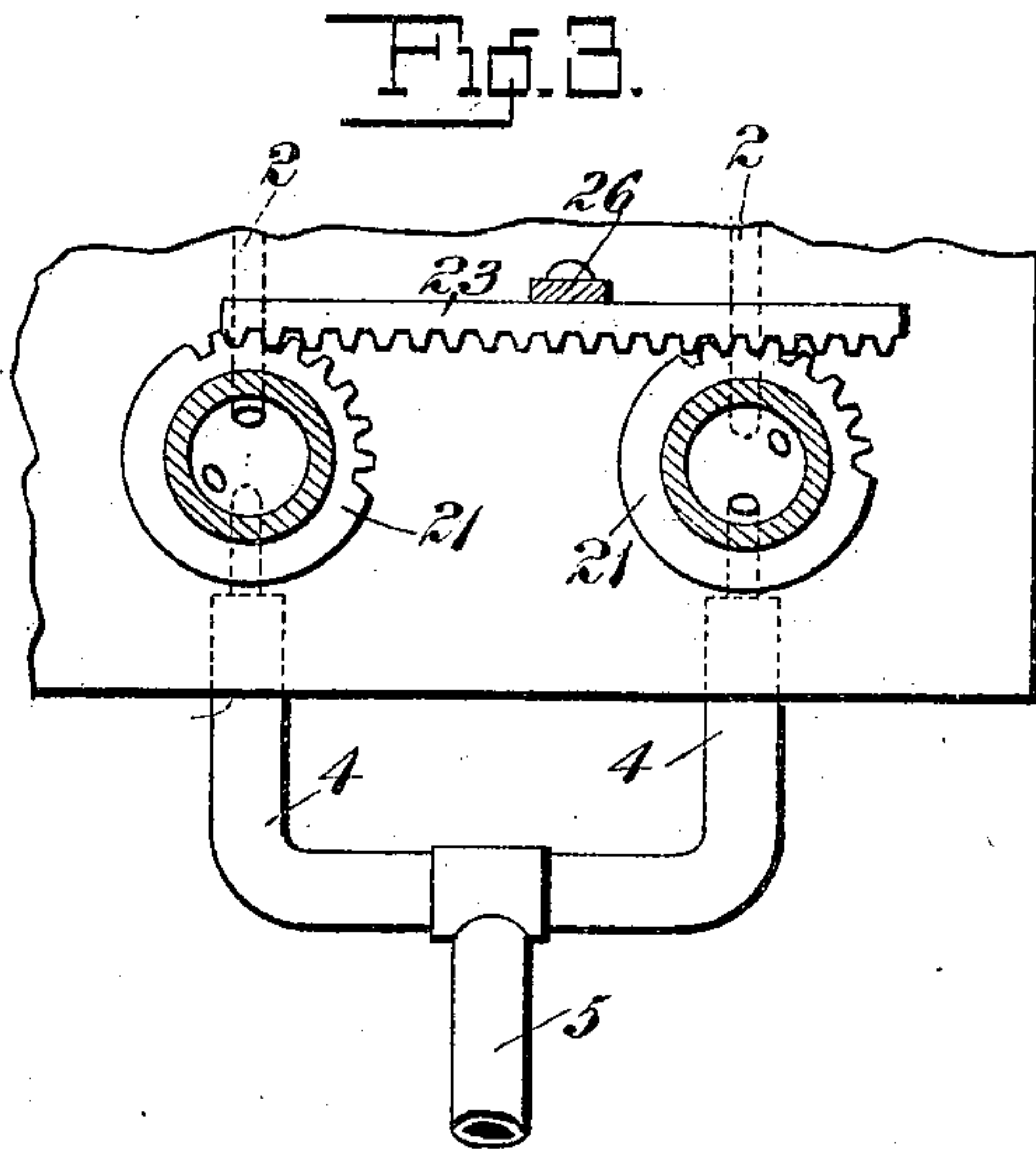
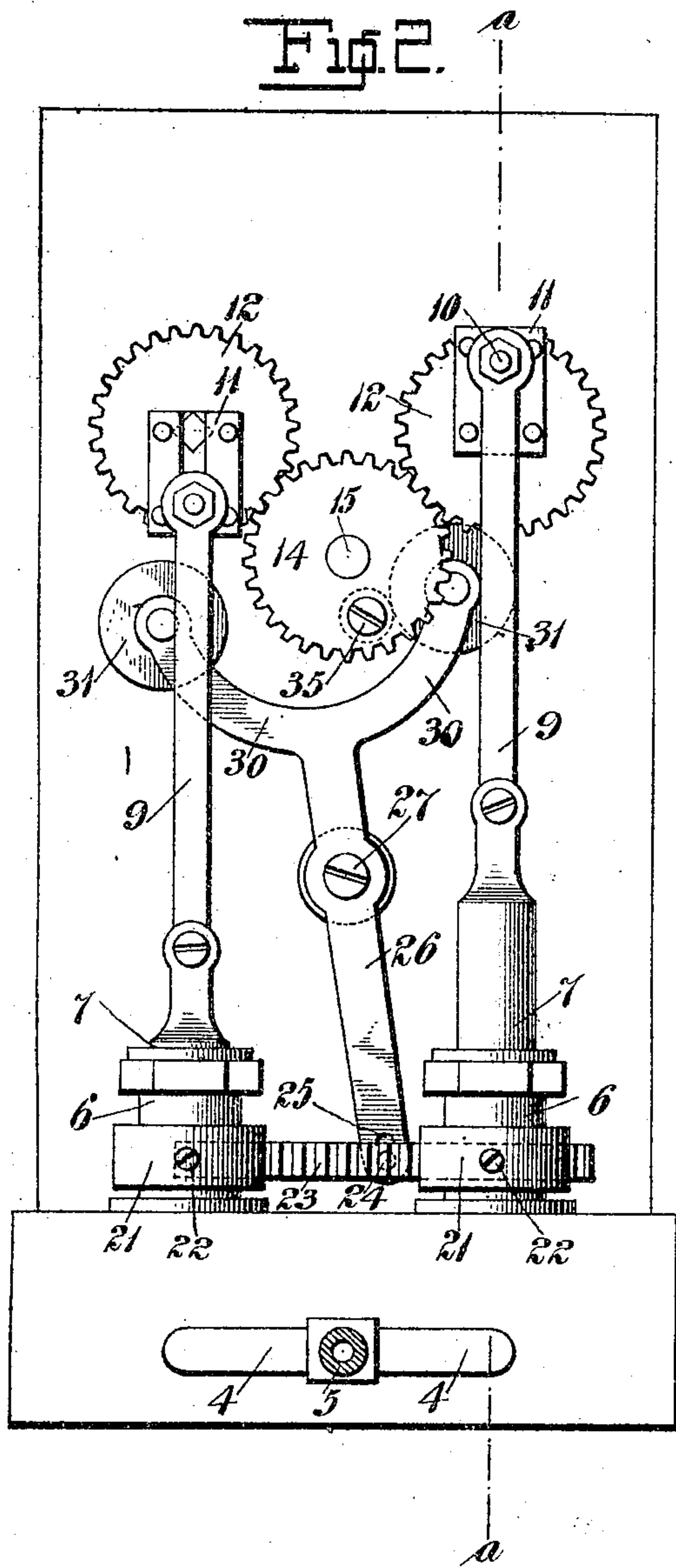
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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## LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 779,609, dated January 10, 1905.

Application filed February 20, 1903. Serial No. 144,269.

*To all whom it may concern:*

Be it known that we, PETER HENRY KNIPPER and SIDNEY CHURCH MACKAYE, citizens of the United States, and residents of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Lubricators, of which the following is a specification.

This invention relates to lubricators of the kind wherein pumping devices are employed to automatically feed the lubricant from a reservoir to the parts to be lubricated.

The object of the invention is to provide an improved lubricator capable of distributing lubricants consisting of solid particles—such, for instance, as a heavy oil and plumbago or other similar materials—without clogging the pump-cylinder or any of its receiving or distributing connections.

Ordinarily lubricators are so constructed that the passages for the lubricant between the reservoir and the pumping devices are controlled by valves. So, also, are the passages for the lubricant leading from the pumping devices to the parts to be lubricated. These valves are objectionable features in lubricators, particularly where heavy lubricating materials of the above-described character are employed. The valves have a tendency to choke or clog either in receiving the lubricant from the reservoir or distributing it to the parts to be lubricated. In either instance the lubricator is rendered useless and the valves must be cleared before it can again be properly operated.

The present invention discloses a lubricator that removes the above-named objections and facilitates the feeding of the lubricants to the desired parts in the simplest possible manner. In order that our invention may be fully understood, we will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a vertical sectional view on the line *a a*, Fig. 2. Fig. 2 is an elevation; and Fig. 3 is a detail sectional view on the line *b b*, Fig. 1.

In the drawings, 1 denotes the reservoir for the lubricant, having passages 2 at the bot-

tom leading to the pump-cylinders. Leading from the pump-cylinders are branch pipes 4, uniting with a common delivery-pipe 5, through which the lubricant is fed to the parts to be lubricated. Reciprocating in the pump-cylinders 6 are pistons or plungers 7, that pass through the ordinary stuffing-boxes 8 in the top of the cylinders and are pivotally connected with connecting-rods 9, the upper ends of the connecting-rods having pins 10, that slide in guide-blocks 11, secured to the face of gears 12. The gears 12 are mounted on shafts 13, said shafts being journaled in lugs projecting from the walls of the reservoir 1 and are driven by a gear 14, located under and in engagement with said gears, the shaft 15, carrying the gear 14, being journaled in the reservoir 1. At the opposite end of the shaft 15 is a worm-wheel 16, meshing with a worm 17 on a shaft 18, connected in any suitable manner with a rotating part of the engine or machine to which the lubricator is to be attached.

The lower ends of the pump-cylinders 6 are of conical formation and are seated in the base 1' of the reservoir. The cylinders are held in their seats by means of threaded sleeves 20 engaging the base 1', the bottoms of the sleeves abutting the annular projections 6' on the cylinders. The cylinders are designed to oscillate by means of intermediate mechanism connecting the cylinders with the shaft 15, comprising sector-pinions 21, that encircle the cylinders just above the base 1' and are held in position by means of set-screws 22. A rack-bar 23 engages these pinions and intermittently oscillates the cylinders to open and close the ports or passages to permit the oil to be pumped from the reservoir to the parts to be lubricated. The conical ends of the cylinders have ports 6<sup>2</sup> and 6<sup>3</sup>. The ports 6<sup>2</sup> are inlet-ports through which the oil is supplied to the cylinders, and the ports 6<sup>3</sup> are outlet-ports through which the lubricant is distributed. The rack-bar 23 has a pin-and-slot connection 24 25 with a dependent arm 26, that is pivotally supported at 27 on a stud or post projecting from the outer wall of the reservoir. The upper part of the arm 26 is bifurcated and has mounted at each extremity of



its bifurcations 30 suitable antifriction-rollers 31. During each revolution of the gear 14 the rollers 31 are alternately engaged by a stud 35, carried on the face of the gear-wheel 14, Fig. 2. This alternate engaging of the rollers 31 on the bifurcated arm 26 by the stud on gear 14 will cause the said arm 26 to be oscillated, which in turn, by reason of its connection therewith, will reciprocate the rack-bar 23 and oscillate the cylinders 6 through the medium of the sector-pinions 21 secured thereto.

It will be noticed that for each revolution of the shaft 15 the dependent arm 26 will be shifted twice—that is, the stud 35 (see Figs. 2 and 3, which show the pistons in their extreme positions or about to begin a new stroke) will cause the arm 26 to move the rack-bar to the left, thereby oscillating the cylinders to open the reservoir-port in one cylinder and close it in the other and open the discharging-port in one cylinder and close it in the other. Whenever the pistons reach the extreme of their stroke in either direction, the arm 26 will be oscillated by the above-described contact with the stud on gear 14, and the inlet and outlet ports of the cylinders will alternately open and close to receive the lubricant from the reservoir and supply it to the parts to be lubricated.

By referring to Fig. 1 it can be clearly observed that the oscillation of the cylinder acts effectually as a valve to open and close the ports, but allows the passages and ports to be made large enough to permit the use of heavy oils, plumbago, or similar lubricating material without any clogging action in the cylinders.

It will be seen that the flow of lubricant will be practically constant through the supply-pipe 5 by the alternate supply of oil from the branch pipes 4, leading from the cylinders.

The operation of the apparatus is as follows: In the position shown in Fig. 1 one of the pistons is at its extreme upward stroke, while the other is at its extreme lower stroke, and the stud on the gear 14 is in position to operate the bifurcated arm to move the rack-bar and through the medium of the pinions oscillate the cylinders to open and close the alternate ports to accommodate the action of the pistons in controlling the flow of the lubricant into and out of the cylinders. Fig. 3 clearly shows the relation of the ports to the supply and exhaust passages and also to each other.

Having thus described our invention, the following is what we claim as new therein and desire to secure by Letters Patent:

1. In a lubricator, the combination with a casing or support having admission and discharge ports formed therein, and a source of supply communicating therewith, of a cylinder mounted to oscillate in said casing and having a port adapted to communicate with

the ports of the casing, a plunger mounted to reciprocate longitudinally within the cylinder and operating means for oscillating the cylinder on its axis.

2. In a lubricator, the combination with a casing or support having admission and discharge passages therein, and a reservoir communicating therewith, of a cylinder mounted to oscillate on its axis in the casing, and having ports therein adapted to communicate alternately with the passages of the casing, a reciprocatory plunger mounted axially within the cylinder and means for operating the cylinder and plunger to establish a flow of fluid through said passages.

3. In a lubricator, the combination with a casing having admission and discharge passages therein, and a source of supply communicating therewith, of a hollow cylinder axially rotatable in the casing and having ports adapted to communicate with the passages of the casing during the rotation of the cylinder, a plunger mounted to operate axially of the cylinder, and operating means for oscillating the cylinder during the operation of the plunger to control the communication between the passages and ports.

4. In a lubricator, the combination with a casing or support having admission and discharge apertures formed therein, and a reservoir for supplying the lubricating material thereto, of a cylinder rotatable axially in the casing and having ports adapted to communicate alternately with the admission and discharge passages of the casing, a plunger movable axially of the cylinder, and means cooperating to reciprocate the plunger and rotate the cylinder to establish a flow through said passages.

5. In a lubricator, the combination with a casing having admission and discharge passages therein, and a reservoir in communication therewith, of a cylinder rotatably mounted in the casing and having a conical portion at its end cooperating with a corresponding portion of the casing, ports being provided in the conical portion adapted to communicate with the passages of the casing, a plunger, and means for operating the plunger and cylinder.

6. In a lubricator, the combination with a casing or support having a conical seat formed therein, admission and discharge passages formed in the casing and communicating with said seat, and a reservoir communicating with said passages, of a cylinder rotatably mounted in the casing and having a conical portion cooperating with the corresponding portion of the casing, ports being formed in said conical portion adapted to communicate with the passages of the casing, a plunger operating in the cylinder, and operating means for the cylinder and plunger.

7. In a lubricator, the combination with a casing having admission and discharge pas-



sages therein, and a reservoir communicating therewith, of a cylinder rotatably mounted in the casing and having ports therein adapted to establish communication with said passages during the rotation of the cylinder, a plunger operating in the cylinder, operating mechanism for the latter, and rack-and-pinion devices interposed between said mechanism and cylinder for operating the latter.

8. In a lubricator, the combination with a casing having admission and discharge passages therein, and a source of supply communicating therewith, of a cylinder revolubly mounted therein and having a shoulder cooperating with a relatively fixed shoulder of the casing, and a conical portion formed on the cylinder cooperating with a corresponding portion in the casing and having ports formed therein adapted to communicate with the passages of the casing, a plunger, and means for operating the plunger and cylinder.

9. In a lubricator, the combination with a casing having admission and discharge passages therein, a source of supply communicating therewith and an aperture formed in the casing having a conical seat formed therein, with which said passages communicate, of a sleeve fitted in said aperture having a shoulder thereon, a cylinder revolubly fitted in said sleeve having a shoulder thereon cooperating with the shoulder of the sleeve, a conical portion on the cylinder cooperating with the correspondingly-shaped seat of the casing and having ports therein communicating with the passages of the casing, a plunger, and operating means for the plunger and cylinder.

10. In a lubricator, the combination with a casing having admission and discharge passages therein, and a source of supply communicating therewith, of a plurality of cylinders rotatably mounted therein having ports adapted to communicate with the passages of the casing, a plunger for each cylinder, a driving-shaft having projections thereon, cranks connected to said shaft for operating the plungers, a swinging arm having portions cooperating with the operating projections of the driving-shaft, and rack-and-pinion devices interposed between the swinging arm and the cylinders for operating the latter at predetermined intervals.

11. In a lubricator, the combination with the reservoir, of oscillating cylinders, pinions on the cylinders, a rack-bar engaging the pinions, and an oscillated bifurcated arm connected with the rack-bar, and intermittently operated to reciprocate the rack-bar and oscillate the cylinders.

12. In a lubricator, the combination with a reservoir, of oscillating cylinders, pistons operating in the cylinders, a driving-shaft operatively controlling the pistons, a bifurcated arm intermittently operated by the driving-shaft, a rack-bar capable of being reciprocated by the bifurcated arm, and pinions on the cylinders engaging the rack-bar to oscillate the cylinders for the purpose explained.

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