No. 658,019. Patented Sept. 18, 1900.

J. POWER.

LUBRICATOR.

(Application filed Apr. 30, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

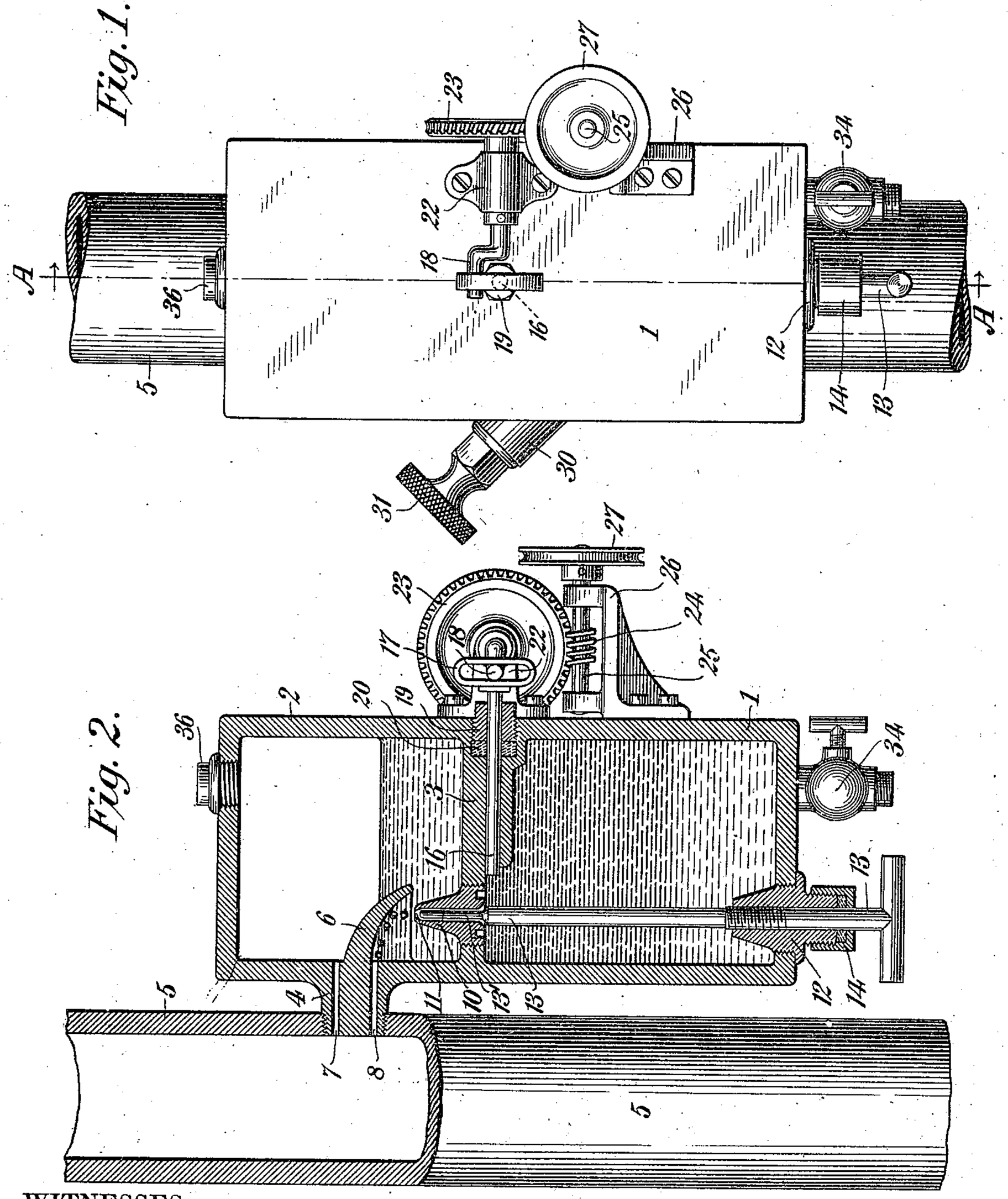

Fig. 2.

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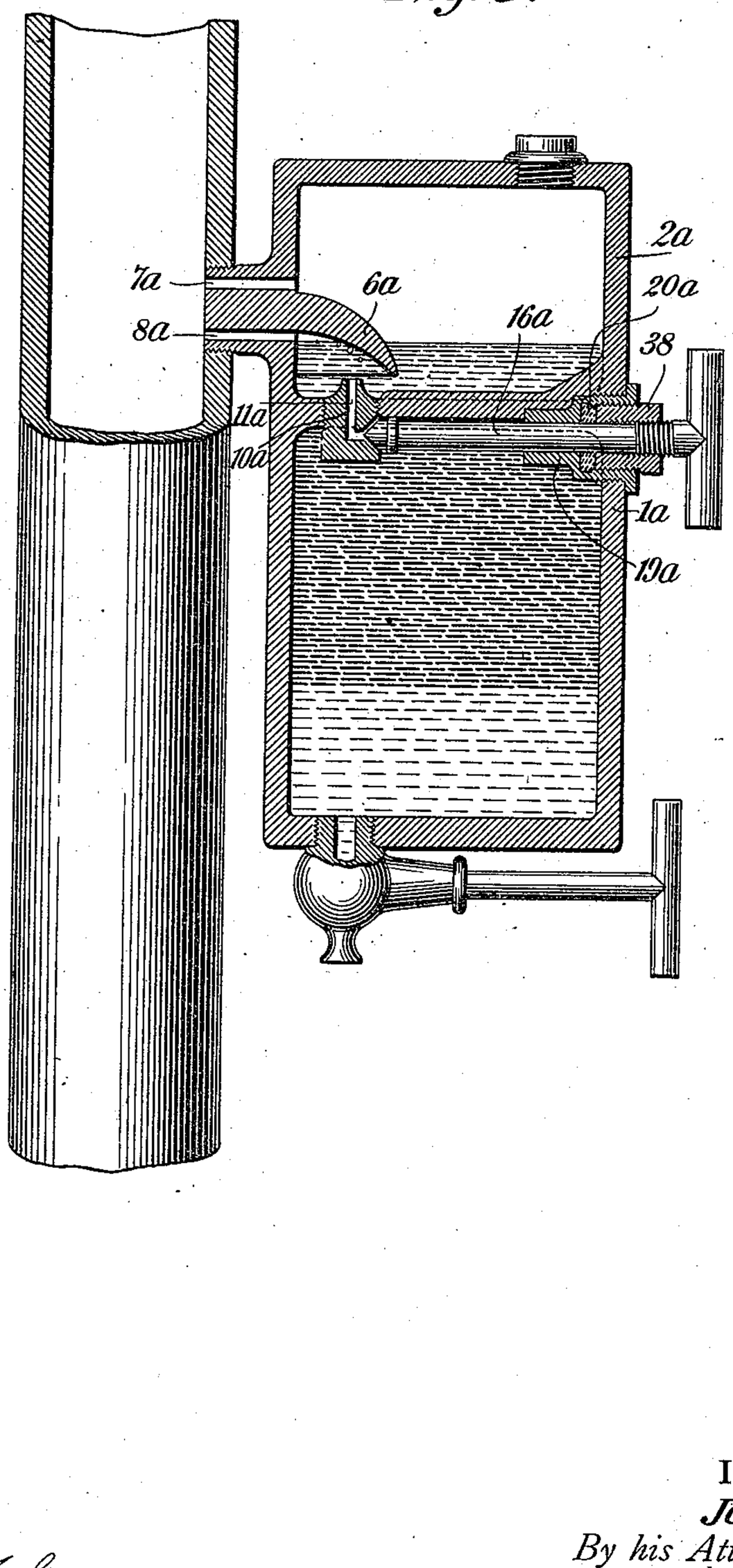
Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN POWER, OF NEW YORK, N. Y.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 658,019, dated September 18, 1900.

Application filed April 30, 1900. Serial No. 14,886. (No model.)

To all whom it may concern:

Be it known that I, JOHN POWER, a citizen of the United States of America, and a resident of the borough of Bronx, city, county, and State of New York, have invented certain new and useful Improvements in Lubricators or Oil-Pumps, of which the following is a specification.

This invention relates to new and useful improvements in lubricators and refers to that class of lubricators generally used to lubricate steam-engines and the like.

The object of the invention is to provide improved means for pumping oil or other lubricating compound from a reservoir and feeding it into a steam-pipe or other conductor through which it is led to the parts to be lubricated; to avoid the use of check-valves, which are always liable to be troublesome, and to utilize the difference in the specific gravity between a liquid lubricant and another liquid, preferably water, instead of check-valves, and to produce a simple and easily-constructed pumping mechanism and improved regulating means therefor.

With these objects in view my invention consists of the novel devices and the arrangement and construction of the parts, as hereinafter described, and illustrated in the accompanying drawings.

In the drawings, Figure 1 is a front elevation of a lubricator made in accordance with my invention and of my preferred form of construction. Fig. 2 is a perpendicular sectional view taken on the dotted line A A in Fig. 1 and shows the parts as they appear looking to the right in the drawings. Fig. 3 is a similar sectional view to Fig. 2 and shows a modified form of constructing some of the parts and also shows improvements which may be combined with the form shown in Figs. 1 and 2.

Referring to the several figures, the parts when similar are designated by like reference-numerals.

The body of the lubricator, as shown in Figs. 1 and 2, is formed in a rectangular box shape. The oil-reservoir 1 and the steam-condenser or water-reservoir 2 are formed integral, made, preferably, of brass casting cored out and having a horizontal partition-wall 3, separating the oil-reservoir and the water-reservoir. A threaded coupling projection 4 is formed upon the rear wall of the water-reservoir and is screwed into a steam-pipe 5, upon which the lubricator is supported. The pipe 5 is a steam-engine supply-pipe and is the usual channel through which oil is fed to the valves and cylinder.

Formed upon the rear wall within the condenser is a semi dish-shaped hood 6, located opposite the coupling 4 and having its concaved side facing downwardly, and thus forming an inverted pocket. A steam-passage 7 is bored through the coupling 4 above the hood and connects the water-reservoir with the steam-pipe 5. A second passage 8 is formed through the coupling and connects the upper portion of the pocket under the hood 6 in the water-reservoir with the steam-pipe. A nipple 10 is screwed into a threaded aperture through the partition-wall 3 and is bored through to form a passage 11 for connecting the reservoirs. A valve-fitting 12 is screwed into a threaded aperture in the bottom of the reservoir 1 and is provided with a packing-nut 14 for containing packing for the valve-stem 13. The valve-stem 13 is threaded to the fitting 12 and extends upwardly to and is adapted for regulating the passage 11 through the nipple 10. A small stem 13′ upon the upper end of valve 13 enters the passage 11 in the nipple, and being smaller than the passage leaves a space through which oil or water can be forced. This stem 13′ when adjusted longitudinally regulates the cubical size of the space for liquid in the passage 11. A pump-plunger 16 is mounted in an aperture which extends through the front wall of the oil-reservoir and through an enlarged portion of the partition-wall 3 and opens into the reservoir. The outer end of the pump-plunger is furnished with a yoke 17, which is elongated laterally relative to the plunger and which is adapted to be engaged by the crank 18, by which the plunger is reciprocated. A packing-nut 19 is screwed into a threaded recess in the front of the lubricator and compresses the packing 20 against the plunger. A crank-shaft 18 is journaled in a bracket 22, fastened upon the front of the lubricator, and a worm gear-wheel 23 is fastened upon the crank-shaft outside the bracket. A worm 24 is mounted

on a shaft 25, supported by the bracket 26, and engages with and is adapted for rotating the wheel 23. A pulley-wheel 27 is fastened upon the worm-shaft 25 and has a groove in its periphery for receiving a driving-belt. A tubular filler projection 30 is formed upon the side wall of the lubricator, opens into the oil-reservoir, and is adapted for being closed by the filler-plug 31. A drain-valve 34 is attached to the bottom of the oil-reservoir and is used for emptying water from the reservoir. An opening is formed in the upper wall of the water-reservoir and is normally closed by the plug 36.

The lubricator operates as follows: The oil-reservoir is first filled with oil. Water will accumulate in the condenser or water-reservoir 2 and elevate to the level of the outlet-passage 8 under the hood 6. When the pulley-wheel 27 is rotated by a belt connected to a wheel on the engine, the worm 24 will rotate the wheel 23 and the crank-shaft 18. The crank will then operate the plunger 16. Upon the outward stroke of the plunger some of the oil in the oil-reservoir will be drawn into the pump-chamber, and as the pressure in the reservoir will thus be made less than that in the water-reservoir enough water from the water-reservoir will be drawn into the oil-reservoir through the passage 11 in the nipple to compensate for the oil taken into the pump-chamber. As soon as water enters the oil-reservoir it will descend to the bottom because it is heavier than oil. When the pump-plunger is forced inwardly, the pressure in the oil-reservoir will be increased to greater than that in the water-reservoir, and consequently the oil which is near the passage 11 will be forced upwardly through the passage and into the water in the water-reservoir and directly beneath the hood, where, it being lighter than the water, it elevates to the upper part of the pocket under the hood and flows through the passage 8 into the steam-pipe, from whence it will be carried by the steam to the parts to be lubricated.

The quantity of oil which is displaced by the pump-planger is equal at each stroke, and consequently the variation in pressure in the oil-reservoir is also equal at each stroke. It is obvious that the throw of the plunger could be regulated by changing the throw of the crank, but as that would be undesirable without having an adjustable-crank a more simple way for regulating the amount of the oil which is fed through the passage 11 is employed. This is done by adjusting the valve-stem 13′ longitudinally to regulate the size of the opening through the passage 11 in the nipple 10.

It will be obvious that while the lubricator is operating the passage 11 will always be filled with either oil or water and that the amount of the oil or water therein can be regulated by adjusting the stem 13′, that by withdrawing the stem and increasing the size of the space for the liquids, so that the passage will contain an amount equal to that displaced by the plunger, the action of the plunger will be, during the outward stroke, to simply withdraw oil from the nipple-passage and fill the passage with water, and during the inward stroke of the plunger the water will be returned to the water-reservoir and the passage will again be filled with oil, but no oil would be forced through the passage. Thus it will be seen that the less the cubical size of the space for liquid in the passage the greater will be the amount of oil actually fed therethrough.

The threaded part of the valve-stem 13 where it engages with the fitting 12 is of sufficient length to allow of the necessary adjustment of the stem 13′.

It is not necessary to use a condenser to supply the water for taking the place of the oil nor to lead the oil through a steam-pipe. The water or other liquid heavier than the oil or lubricant can be held in a reservoir above the lubricant-reservoir, and the lubricant can be carried therefrom in a tallow pipe or other suitable conductor to the place where it is used.

In the modification shown in Fig. 3 the body of the lubricator is formed similar to the form shown in Figs. 1 and 2. The lower chamber 1^a is the oil-reservoir, and the upper chamber 2^a is the water reservoir and condenser. The inverted dish-shaped hood 6^a forms a pocket and a leader for the oil to the passage 8^a similar to that described relative to Figs. 1 and 2. The passage 7^a is the steam-inlet to the condenser. The nipple 10^a has an angular aperture therethrough, the valve-seat at the mouth of which is upon the side of the nipple facing forwardly. A threaded tubular fitting 19^a is screwed into an aperture in the front of the oil-reservoir 1^a, and a packing-nut 38 is screwed into a recess in the fitting and holds the packing 20^a in place. A part of the aperture through the packing-nut 38 is threaded for engagement with the threaded part of the pump-plunger 16^a. The said plunger 16^a is mounted in the bore of the fitting 19^a and through the packing-nut 38, and the inner end thereof is formed conical to constitute a valve for regulating the passage 11^a through the nipple. It will be seen that while the threads on the pump-plunger are in engagement with the threads in the packing-nut 38 the plunger can be used as a valve and that by unscrewing the plunger from the threads it may then be used as a pump-piston. To operate the lubricator when made in this form, unscrew the pump-plunger 16^a until the threads thereon are free from the packing-nut 38 and then by reciprocating the plunger the oil and water will change places and the oil will be led to its conducting-pipe in the same manner as described in reference to the first-named form. When the lubricator is at rest or not feeding and the passage in the nipple, in either form, is left open, the water and oil will not change

places. This is due to the fact that the passages through the nipples are too small to permit the oil and water to pass each other. Although, owing to the difference in specific gravity, the liquids would pass each other in a passage large enough for the oil to form in drops, the difference in specific gravity is so slight that in a small passage less than the diametrical size of a drop of either liquid the pressure is not sufficient to cause the drops to pass each other. Hence the necessity for check-valves is avoided and gravity is utilized.

Other lubricants than oil can be used, any liquid heavier than the lubricant can take the place of water, and other pressure-changing means can be applied to either reservoir without departing from the spirit of my invention.

Having thus described the invention, what I claim is—

1. In a lubricator the combination of a lubricant-reservoir and a second reservoir for containing a liquid of different weight than the lubricant; a passage for the liquids intermediate between the reservoirs; a passage for the lubricant from the second reservoir; means for alternately changing the pressure in one of the reservoirs relative to the pressure in the other reservoir to thereby force the liquids alternately through the said intermediate passage substantially as described.

2. In a lubricator the combination of a lubricant-reservoir and a reservoir surmounting the lubricant-reservoir and adapted for containing a liquid heavier than the lubricant; a passage between the reservoirs; an outlet-passage for the lubricant from the surmounting reservoir; means for alternately changing the pressure in one of the reservoirs relative to the pressure in the other reservoir to force the liquids alternately through the passage between the reservoirs, substantially as described.

3. In a lubricator the combination of a lubricant-reservoir and a water-reservoir above the lubricant-reservoir; a passage between the reservoirs; means for alternately changing the pressure in the lubricant-reservoir relative to that in the water-reservoir to force the lubricant and the water alternately through the said passage, and an outlet-passage for the lubricant from the water-reservoir to a leading-pipe substantially as described.

4. In a lubricator the combination of a reservoir for containing a liquid lubricant and a second reservoir for containing a liquid of different specific gravity than the lubricant; a pump-plunger in one of the reservoirs for varying the pressure therein relative to the pressure in the other reservoir; a passage between the reservoirs; a passage for the lubricant from the second reservoir to a conducting-pipe substantially as described.

5. In a lubricator the combination of an oil-reservoir and a water-reservoir; a passage connecting the reservoirs; a plunger in the oil-reservoir for drawing water from the water-reservoir into the oil-reservoir and forcing oil into the water-reservoir, an oil-outlet passage from the water-reservoir to a pipe and means for regulating the size of the passage between the reservoirs, substantially as described.

6. In a lubricator the combination of a lubricant-reservoir and a water-reservoir; a passage between the reservoirs a regulating-stem projecting into said passage and therein adjustable to regulate the cubical size thereof; a passage for lubricant from the water-reservoir to a conductor, and means for alternately changing the pressure in the reservoirs substantially as described.

7. In a lubricator the combination of a lubricant-reservoir and a water-reservoir; a passage between the reservoirs; a valve for controlling the passage having a stem projecting into the passage and adjustable longitudinally therein to regulate the cubical space thereof; a pump in the lubricant-reservoir adapted for forcing alternately a quantity of lubricant and a quantity of water through the said passage from their respective reservoirs, and a lubricant-outlet from the water-reservoir substantially as described.

8. In a lubricator the combination of an oil-reservoir and a water-reservoir surmounting the oil-reservoir; a passage connecting the reservoirs; an oil-outlet passage from the water-reservoir; a hood-shaped projection on the wall of the water-reservoir and adapted for leading oil to the outlet-passage; a pump-plunger in the oil-reservoir, and means for operating the plunger substantially as described.

9. In a lubricator the combination of a steam-condenser and an oil-reservoir; a steam-pipe connected to the condenser; a passage for steam between the condenser and the steam-pipe; a passage for liquid between the oil-reservoir and the steam-condenser; means for alternately changing the pressure in the oil-reservoir relative to that in the condenser to force oil from the oil-reservoir into water in the condenser, and to draw water into the oil-reservoir substantially as described.

10. In a lubricator the combination of two reservoirs one above the other, formed integral and separated by a partition-wall; the lower reservoir adapted for containing oil and the upper reservoir for containing water; a passage for the liquids between the reservoirs; an oil-passage from the upper reservoir and means for alternately increasing and decreasing the pressure in the oil-reservoir, substantially as described and for the purpose set forth.

Signed by me at New York, N. Y., this 21st day of April, 1900.

JOHN POWER.

Witnesses:
T. F. KEHOE,
E. J. O'CONNOR.