J. E. CRANDALL.

LUBRICATOR.

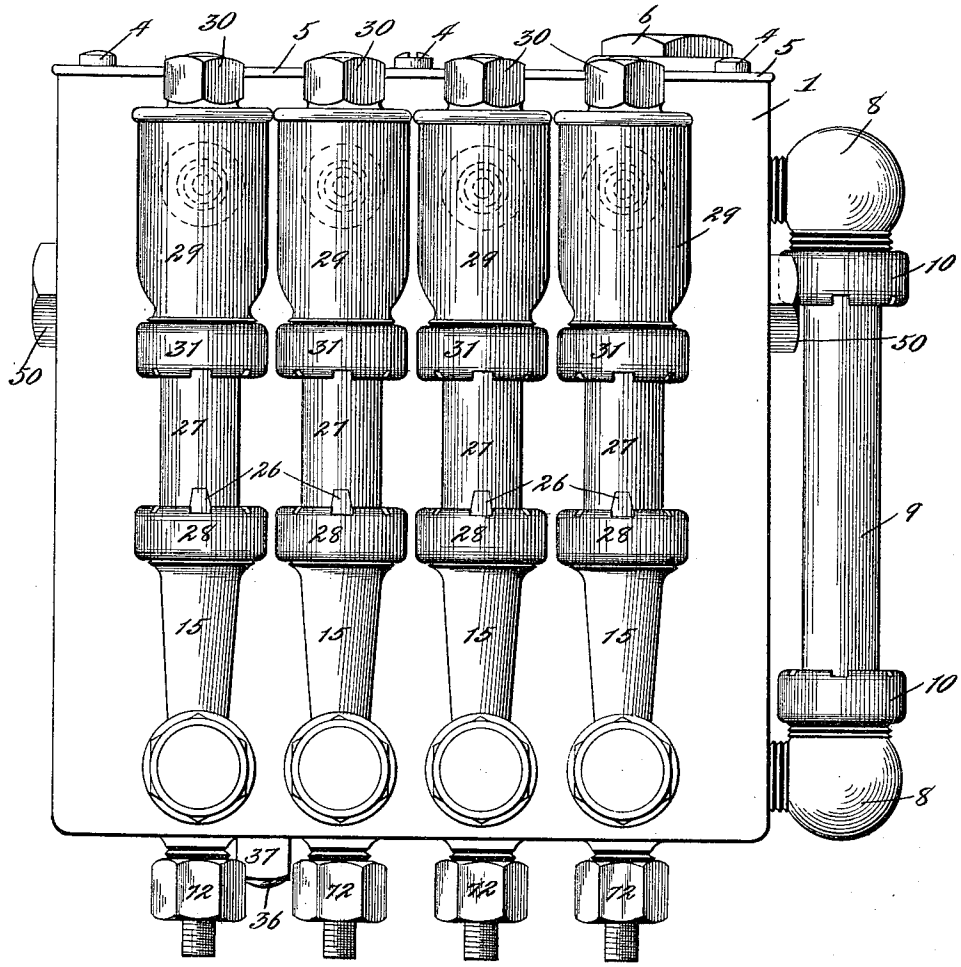
APPLICATION FILED NOV. 20, 1905.

1,007,849.

Patented Nov. 7, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



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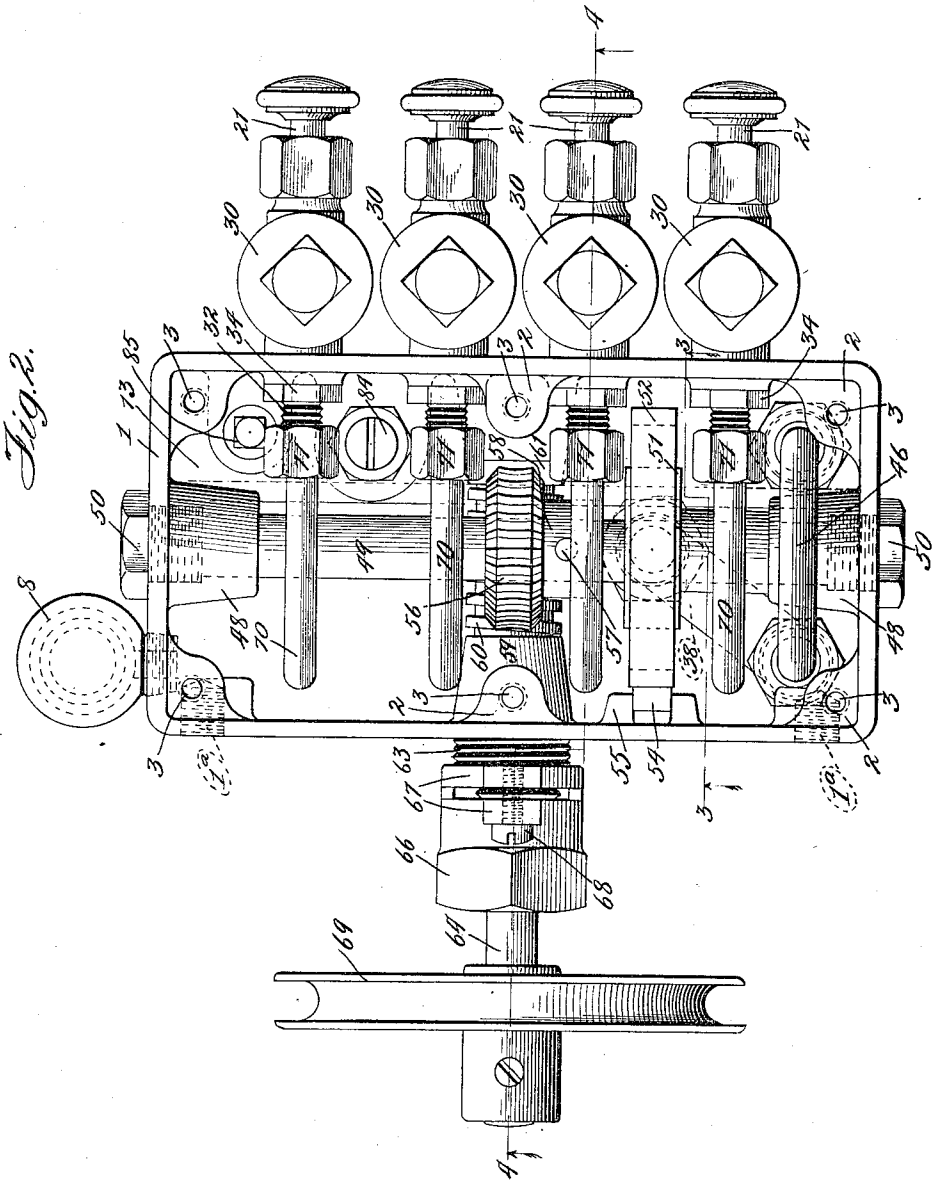
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

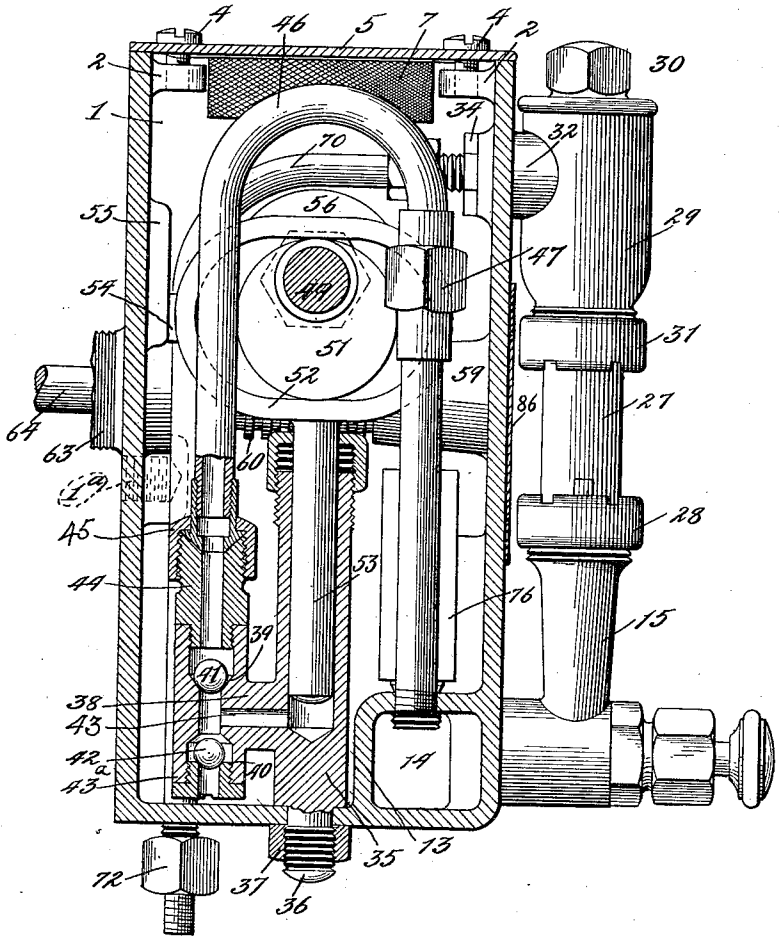


Fig. 5.

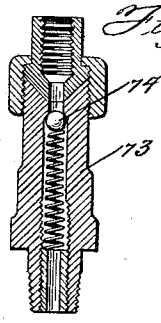
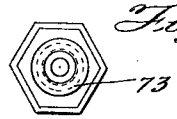


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 4.

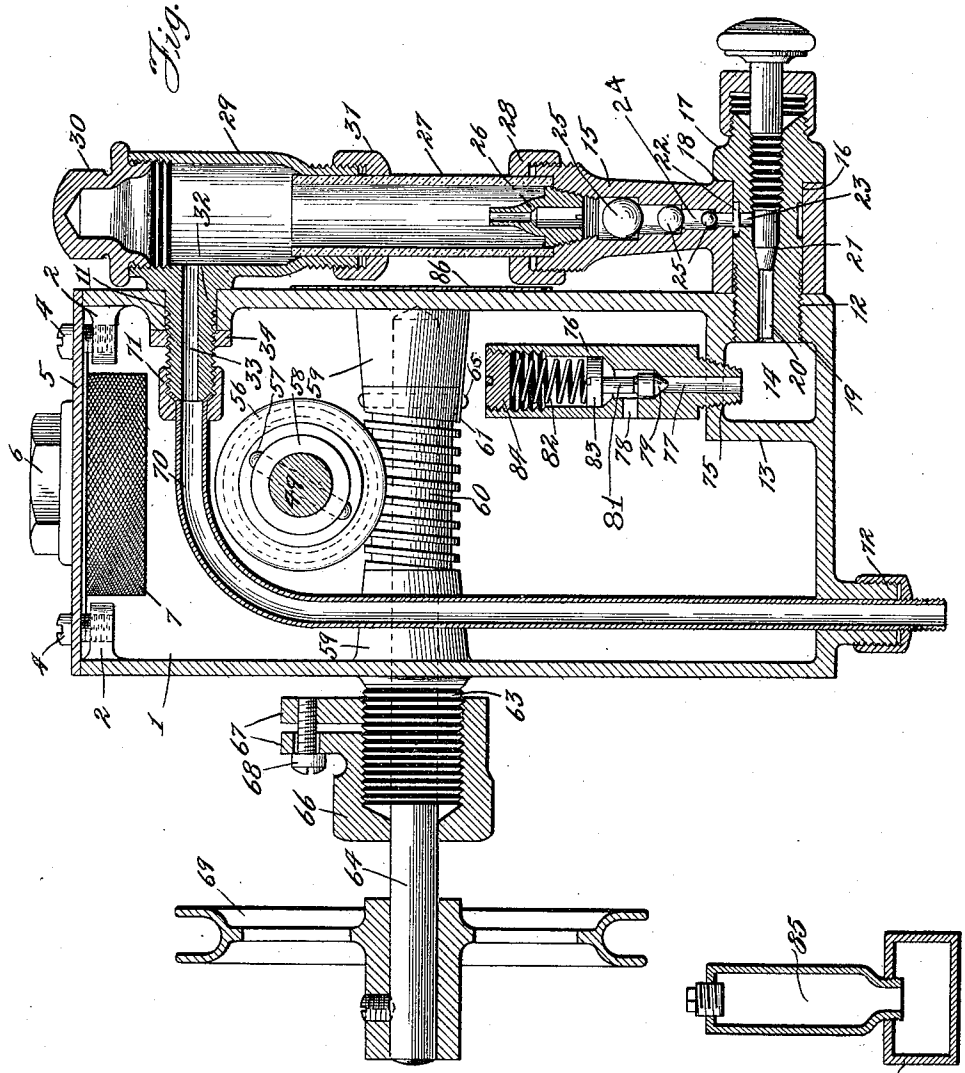

Fig. 7.

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UNITED STATES PATENT OFFICE.

JAY E. CRANDALL, OF BELVIDERE, ILLINOIS, ASSIGNOR TO NATIONAL SEWING MACHINE COMPANY, OF BELVIDERE, ILLINOIS, A CORPORATION OF ILLINOIS.

LUBRICATOR.

1,007,849. Specification of Letters Patent. Patented Nov. 7, 1911.

Application filed November 20, 1905. Serial No. 288,114.

To all whom it may concern:

Be it known that I, JAY E. CRANDALL, a citizen of the United States, residing at Belvidere, in the county of Boone and State of Illinois, have invented certain new and useful Improvements in Lubricators, of which the following is a full, clear, and exact specification.

My invention relates to improvements in force feed lubricators, and the object of the same is to construct an improved lubricator of the type described, in which the sight feed is provided with water or other suitable liquid through which the lubricant is forced, and in which the transparency is maintained by preventing the oil from backing or flowing down in the glasses or sight tubes, which is caused by the changing or lowering of the level of the lubricant in the supply tank.

A further object is to produce an improved lubricator which will be simple and durable in construction, and efficient and positive in operation.

To this end and the accomplishment of other new and useful objects, as will appear, the invention consists in features of novelty in the construction, arrangement and operation of the several parts as hereinafter set forth and claimed, and shown in the accompanying drawings, illustrating an example of my invention, in which—

Figure 1 is a front elevation of my improved lubricator. Fig. 2 is a top plan view with the top of the supply tank or reservoir removed. Fig. 3 is a section on line 3—3 of Fig. 2, looking in the direction of the arrows. Fig. 4 is a section on line 4—4, looking in the direction of the arrows. Fig. 5 is an enlarged detail sectional view of the pressure regulating valve; Fig. 6 is a top plan view thereof; and Fig. 7 is a detail sectional view showing the air chamber in the tank.

Referring more particularly to the drawings, the numeral 1 designates the body proper of the lubricator comprising the reservoir or supply tank which may be supported and held in position in any desirable manner, but preferably by bolts engaging the threaded apertures 1^a, and is provided with a plurality of inwardly projecting lugs 2 preferably arranged near the top thereof and said lugs are provided with screw threaded apertures 3 adapted to receive the ends of the bolts or screws 4, which pass through the cover 5, for holding the latter in position on the reservoir or tank. The cover 5 is provided with an aperture in which is removably seated a nut or cap 6 and a strainer 7 is supported preferably by the cover, beneath the aperture therein, through which the lubricant passes when poured into the tank or reservoir through the aperture in the cover.

Preferably secured to one side of the tank or reservoir 1, and communicating therewith, are caps 8, which support a sight tube 9, whereby the height of the liquid in the tank or reservoir may be ascertained, and 10 are collars or sleeves adapted to surround the tubes 9 and engage screw threaded portions on the caps 8 for holding the tube securely in position. The tank or reservoir is also provided in its face with a plurality of apertures 11, near the upper end thereof, and a plurality of threaded apertures 12 near the base thereof, and a housing 13 is arranged in the tank or reservoir to form a chamber 14, and said chamber is preferably so arranged that the side of the reservoir or tank forms one wall thereof with the threaded aperture 12 therein communicating with the chamber 14. A valve-housing 15, having a transverse aperture 16 near the lower extremity, is adapted to be held against the face of the tank or reservoir 1 by means of a bolt or stem 17 which passes through the aperture 16 therein, and said stem is provided with shoulders 18 which are adapted to engage the face of the valve-housing 15. The inner end of the stem extends slightly beyond the valve-housing 15 and is provided with screw threads 19 adapted to engage the threaded aperture 12 in the wall of the tank or reservoir 1. Seated within the bore 20 of the stem 17 is a needle valve 21, and 22 is a circumferential groove on the stem which communicates with the bore 20 therein by means of the transverse aperture 23. The object of this circumferential groove is to permit the stem to be screwed securely into the threaded aperture 12 and yet maintain a communication between the chamber 14 and the passage 24 in the valve housing 15, through the medium of the bore 20 in the stem 17. Said passage 24 is provided with a plurality of super-imposed valve seats adapted to receive the ball valves 25, and said seats and valves are preferably of a different size, as shown. The valve housing

15 is also provided near its upper end with a screw threaded recess adapted to receive the threaded end of a drop former 26.

Surrounding the recess is a seat adapted to receive the end of a sight tube 27, and 28 is a collar surrounding the end of the tube 27 to form an exterior packing to hold the tube in position by engaging a screw threaded portion carried by the end of the valve housing 15 adjacent thereto.

The numeral 29 designates an oil cup or receptacle provided with a removable cap 30. The lower end of said cup or receptacle is adapted to receive the upper end of the tube 27, and said cup or receptacle is of a diameter somewhat greater than the external diameter of the tube 27, to form an unobstructed passage to the tube through the cup or receptacle, when the cap 30 is removed and to permit the tube to be readily drawn therethrough when desired to remove the latter. A collar 31 is adapted to surround the tube and engage the lower end of the cup in any desired manner, preferably screw threads, to form an external packing for holding the tube 27 in position. This cup or receptacle 29 is provided with an extension or arm 32, provided with a bore 33 connecting with the cup, and peripheral screw threads. Said extension or arm is adapted to pass through the apertures 11 and into the tank or receptacle 1, and 34 is a nut engaging the threads for holding the cup or receptacle in position.

A cylinder 35 is secured within the tank or reservoir 1 in any desired manner, but I have preferably shown the same as being provided with a screw threaded portion 36 which passes through the base thereof, and 37 is a nut engaging the thread on the outside thereof, and by means of which the cylinder is firmly held. The cylinder is provided with an arm 38, having valve seats 39 and 40 upon which are seated the oppositely operating valves 41 and 42, and 43 is a communicating passage leading from the seats to the cylinder. If desired, either one or both of these valve seats may be made removable. The arm is constructed with the portion 43^a terminating short of the base of the lubricator while the upper portion 44 has connected thereto, by means of a suitable coupling 45, one end of a pipe 46; the other end thereof is adapted to be secured in an aperture in one of the walls of the chamber 14, and 47 is a coupling of any desired construction for connecting the end portions of the pipe. This pipe is preferably shaped and so arranged that the highest point thereof is located above the sight feed.

Journaled transversely in the tank or reservoir 1, in suitable bearings 48, is a shaft 49, which is held in position by any suitable means, such as nuts 50. Secured firmly to said shaft is an eccentric 51, and 52 is a strap or link loosely surrounding said eccentric. Carried by the strap or link is a piston 53, which is adapted to reciprocate in the cylinder 35, when the shaft 49 is rotated, causing the liquid in the tank to be first drawn into the cylinder by the opening of the valve 42 and the closing of the valve 41, and then discharged into the chamber 14 through the pipe 46, when the valves operate in the opposite direction.

A projection 54 is carried by the strap or link 52 and is adapted to move between the guides 55 secured to the inside of the tank or reservoir 1, and said projection and guides serve to prevent the displacement of the strap or link from the eccentric 51, and also to prevent the piston 53 from binding in the cylinder. A worm or gear wheel 56 is also carried by the shaft 49 and said wheel is secured thereto in any desired manner but preferably by means of a pin 57 passing through the collar 58 of the gear and through the shaft 49, as shown in Fig. 4.

Secured to the walls of the tank or reservoir 1 are bearings 59 arranged opposite to each other, and 60 is a worm gear provided with a central bore and a collar or smooth end 61. One of the bearings 59 projects through the wall of the tank or reservoir 1 and is provided with a screw threaded extremity 63. The worm 60 is adapted to stand between the ends of the bearings 59 and a shaft 64 is passed through the extended end of one of the bearings 59, through the central bore of the worm 60, and into the other bearing 59. When in this seated position an aperture in the collar 61 of the worm 60 registers with a transverse aperture in the shaft 64 (not shown), and a pin or key 65 is inserted in the registering aperture to lock the worm and shaft together. It will be seen that with this arrangement it is impossible for the shaft to become displaced. The bearings 59 should be arranged transversely of the shaft 49 and in such a position that the worm 60 will mesh with the worm gear 56, whereby motion will be communicated to the shaft 49 when the shaft 64 is rotated.

A packing box or nut 66 surrounds the shaft 64 and engages the threaded extremity of the bearing 59, and said box or nut is provided with a split portion 67. A transverse screw 68 passing through the box or nut 66 and across the split portion thereof tends to draw the portions together or shove them apart to bind the box and hold the same in position. Motion may be transmitted to the shaft 64 from any source by means of a pulley 69 adjustably secured thereto. A pipe 70 having one end secured to the arm or extension 32, by means of a coupling 71, passes through the reservoir, preferably the base thereof, and through a boxing 72 and leads

to the bearings to be lubricated. Located between the end of this pipe and the bearing is a regulator 73 having a spring seated valve 74 and being provided with threaded extremities to permit of its ready attachment to the pipe and bearing. A safety device is secured within the tank or reservoir 1 and to the chamber 14 by means of the threaded extremity 75. And said device comprises a body 76 having a valve seat and a passage 77 communicating with the chamber 14. A transverse passage 78 passes through the body 76 and communicates with the passage 77 above the valve seat therein. A valve 79 provided with a stem 81 and a head 83 is adapted to be seated upon the seat, with a spring 82 resting upon the head 83 thereof, and 84 is threaded plug or cap engaging the other end of the spring and which is adapted to adjust the tension of the spring 83. Arranged within the tank is an air compression chamber 85, which has communication with the chamber 14. The purpose of this chamber 85 is to maintain an equal pressure upon the lubricant, so as to overcome the fluctuations or pulsations of the drops of oil in the sight tube due to the movements of the pump, the elasticity of the lubricant not being sufficient to overcome this objection when short tubes are used as in this instance.

The operation of my improved lubricator is as follows: The caps 30 are first removed from the sight feed tubes and each tube is filled with glycerin and water, preferably in the proportions of about 60% glycerin and 40% water, until said tubes are full to a point adjacent the outlet of the drop former 26. The caps are then replaced and oil is emptied into the tank or reservoir 1 through the screen 7. The shaft 64 should be run at the rate of approximately 300 revolutions per minute, and the revolution of said shaft will cause the reciprocation of the piston 53 in the cylinder 35 which will cause the pump to take oil at the point 43 causing it to pass by the valve 42 and into the cylinder upon the upward stroke of the piston and to be discharged through the valve 41 on the downward stroke, thus closing the valve 42, and through the pipe 46 and into the chamber 14 and air chamber 85, the capacity of which is a little more than one stroke of the pump, thus permitting a steady feed. From there the lubricant passes the valves 25 and up through the sight tubes 27, through the pipes 70, by the valves 74, and into the bearings. The pressure of the valve 79 upon its seat is such that under ordinary conditions it will remain seated, but should the pressure upon the lubricant be increased after having entered the chamber 14 the valve 79 will be unseated by the excess pressure and permit the surplus oil to flow out of the chamber through the passages 77 and 78 and back into the reservoir or tank 1, thereby releasing all excess pressure. When the pump is stopped a drop or two of oil will be fed from each feed of the pipes 70, until the low pressure point of the spring seated check valve 74, arranged between said pipes and the bearings, is reached, which allows said valves to seat themselves, thereby insuring that the pipes are always full of oil. It will be noted that the highest point to which the lubricant is raised is above the outlet 33 of the sight feeds so as to counterbalance the column of liquid in the sight feed and prevent the oil from backing down in the reservoir, should the valves 25 leak. In order to permit the feed to be seen at night, without making a light, I removably secure in any manner to the tank or reservoir 1, adjacent each of the sight feeds, strips of metal 86, enameled with white aluminum or any other suitable coating, and said strips may be easily removed so as to be cleaned.

In order that the invention might be fully understood the details of an embodiment thereof have been thus specifically described.

What I claim is:

1. In a force feed lubricator, the combination of a tank or reservoir, a housing therein, a sight feed communicating with the chamber of the housing, said chamber being located below the sight feed discharge, means for forcing the lubricant into the chamber by raising the same to a point above the sight feed discharge, and an air chamber having communication with the first said chamber for maintaining a uniform pressure upon the lubricant in the first said chamber.

2. In a lubricator, the combination of a tank, a sight feed, having an oil passage therein and being provided with a transverse aperture communicating with the passage, a stem passing through the aperture and engaging the tank, said stem being provided with an oil passage therein, there being a circumferential groove, a passage connecting the oil passage with the groove, and a needle valve seated in the stem for closing the oil passage, said groove being adapted to continually register with the oil passage in the sight feed when the stem is seated.

3. A device of the class described, including a sight feed having an oil passage therein and provided with a transverse aperture communicating with the passage, a support, a stem passing through the aperture and engaging the support, said stem being provided with an oil passage therein and a circumferential groove, a passage connecting the oil passage and the groove, and means within the stem for closing the oil passage, said groove being adapted to continually register with the oil passage in the sight feed when the stem is seated.

4. A device of the class described, including a sight feed having an oil passage therein and provided with a transverse aperture communicating with the passage, a support, a stem passing through the aperture and engaging the support, said stem being provided with an oil passage therein, a circumferential groove, a passage connecting the oil passage and the groove, means within the stem for closing the oil passage, said groove being adapted to continually register with the oil passage in the sight feed when the stem is seated, and a chamber on the support, said chamber having communication with the oil passage in the stem.

5. A device of the class described, including a sight feed having an oil passage therein and provided with a transverse aperture communicating with the passage, a support, a stem passing through the aperture and engaging the support, said stem being provided with an oil passage, there being an extended opening in one of the members communicating with the respective oil passage therein whereby the oil passages in the members will continuously register, and means for controlling the oil passage in one of the members.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 17th day of November, A. D. 1905.

JAY E. CRANDALL.

Witnesses:
F. P. ELDRIDGE,
D. PATTON.