No. 796,973. PATENTED AUG. 8, 1905.

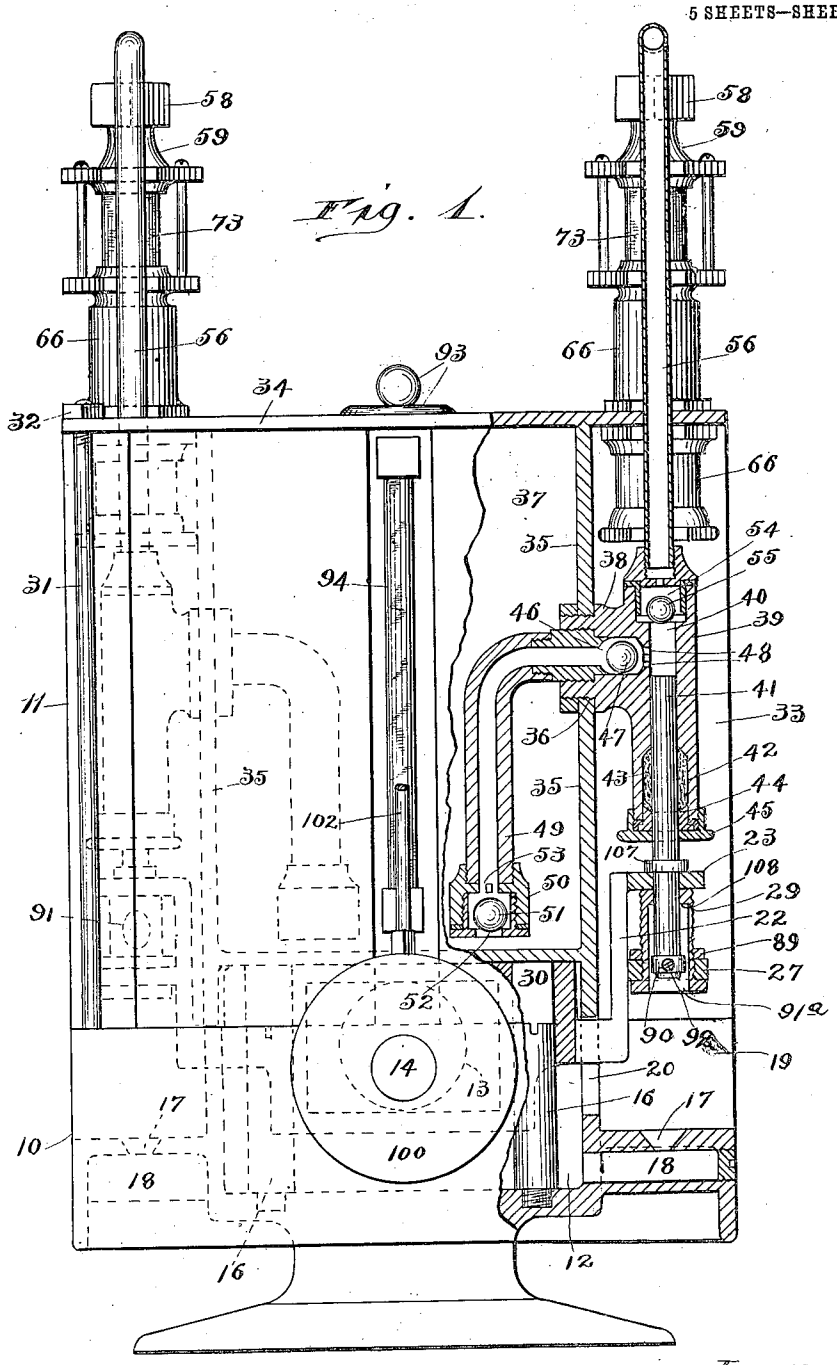
B. IVOR & J. S. WARD.

SIGHT AND FORCE FEED LUBRICATOR.

APPLICATION FILED MAR. 21, 1904. RENEWED JAN. 18, 1905.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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A. Gustafson

Inventors:

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By Chas. C. Tillman

Atty.

No. 796,973. PATENTED AUG. 8, 1905.

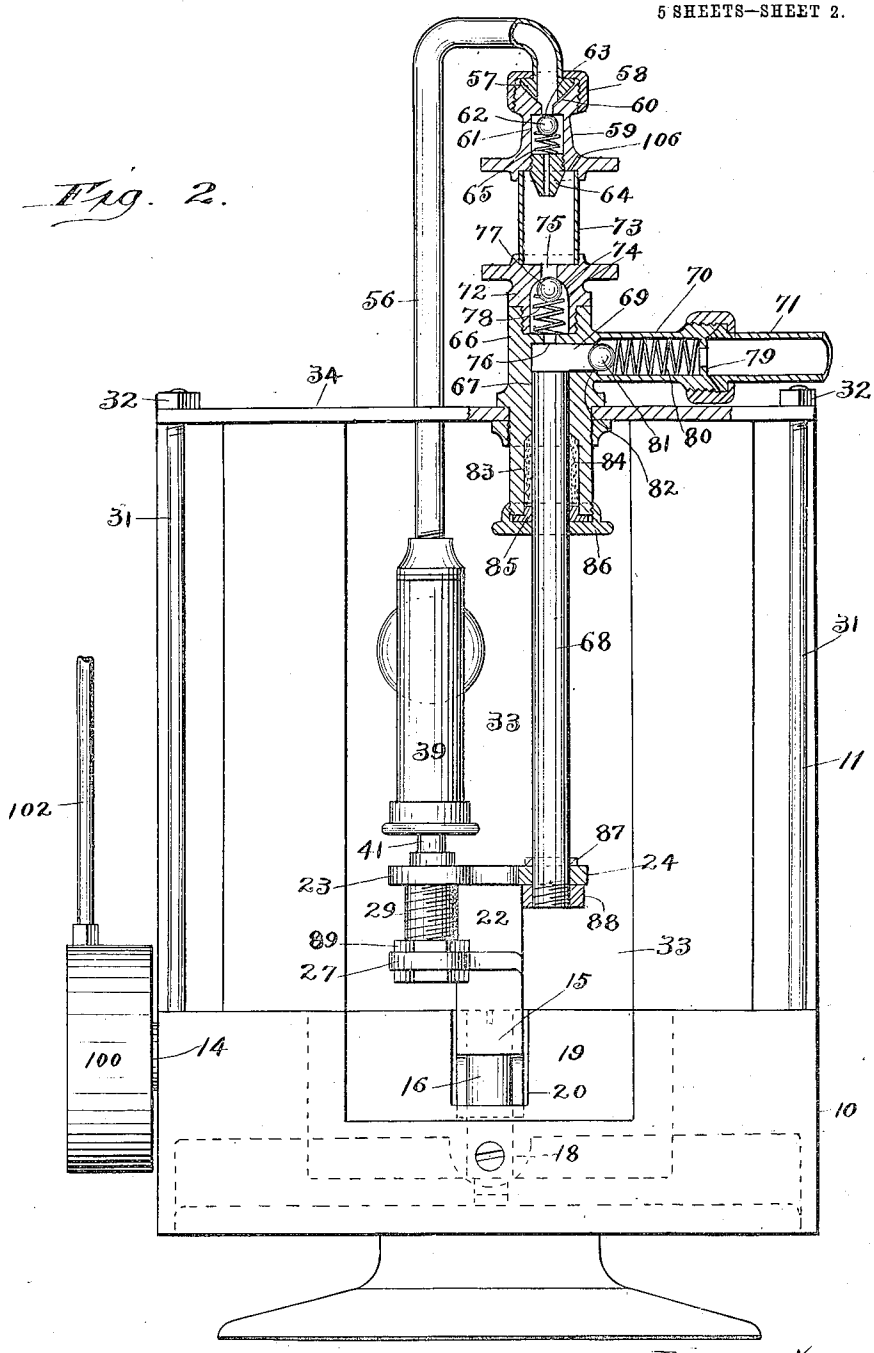
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5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

Fig. 3.

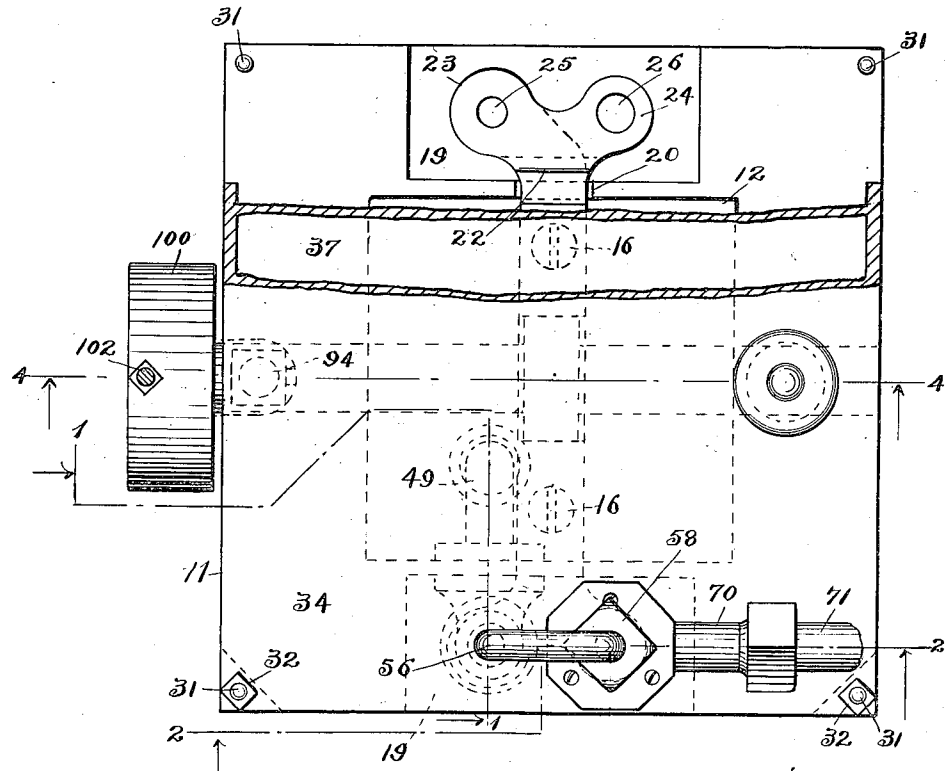
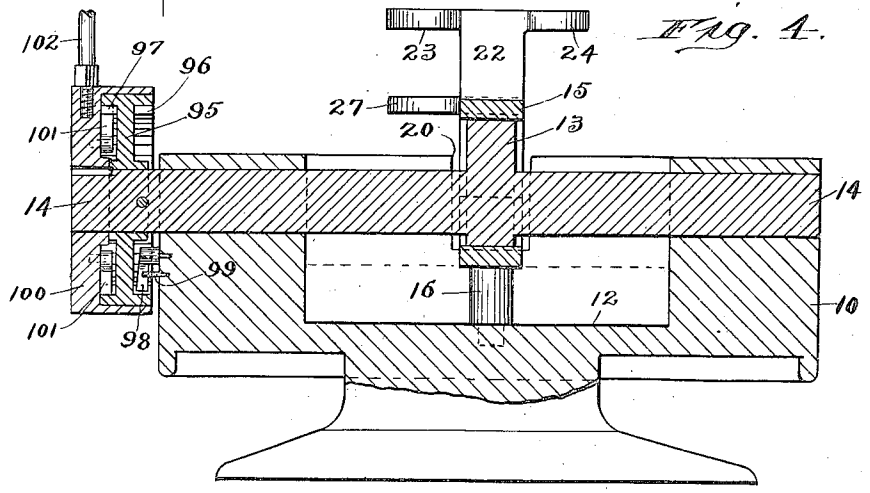


Fig. 4.



Witnesses

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5 SHEETS—SHEET 4.

Fig. 5.

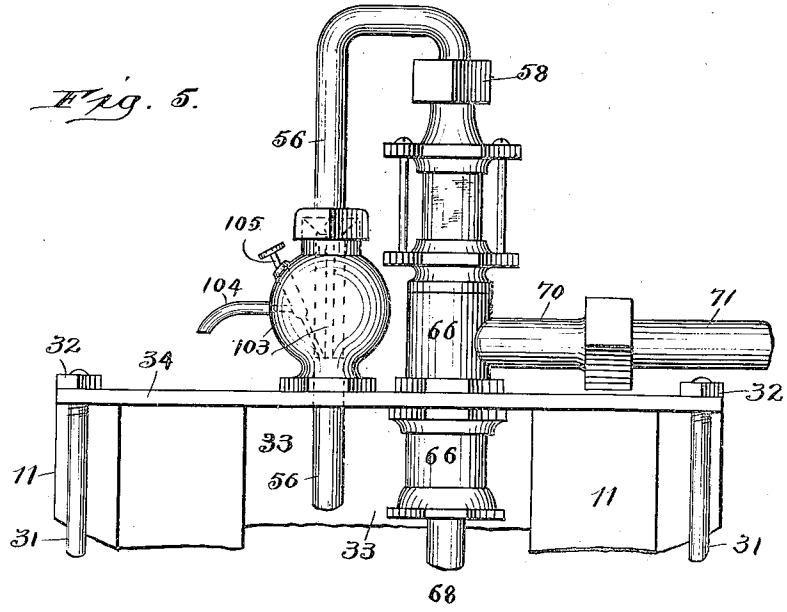


Fig. 6.

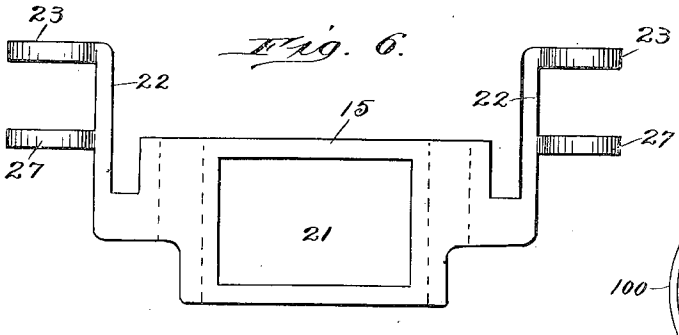


Fig. 7.

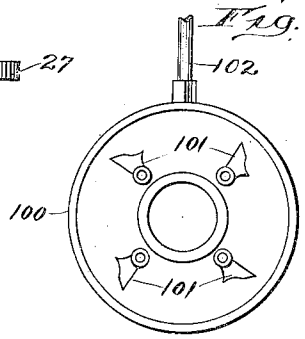
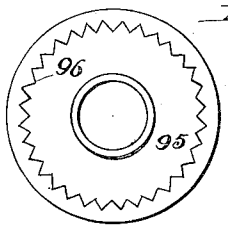


Fig. 8.



Witnesses:

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No. 796,973. PATENTED AUG. 8, 1905.

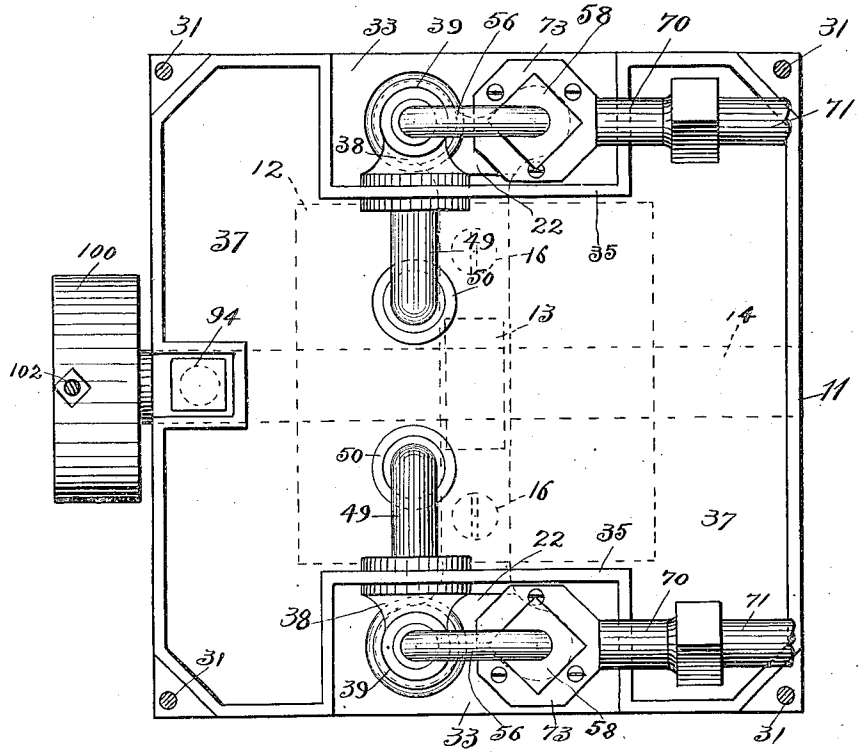
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APPLICATION FILED MAR. 21, 1904. RENEWED JAN. 18, 1905.

5 SHEETS—SHEET 5.

Fig. 9.



Witnesses:

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UNITED STATES PATENT OFFICE.

BARRY IVOR AND JOHN S. WARD, OF CHICAGO, ILLINOIS; SAID IVOR ASSIGNOR TO SAID WARD.

SIGHT AND FORCE-FEED LUBRICATOR.

No. 796,973. Specification of Letters Patent. Patented Aug. 8, 1905.

Application filed March 21, 1904. Renewed January 18, 1905. Serial No. 241,550.

To all whom it may concern:

Be it known that we, BARRY IVOR and JOHN S. WARD, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sight and Force-Feed Lubricators, of which the following is a specification.

This invention relates to lubricators of the type known as "force feed," or that class of lubricators employed for supplying oil or lubricant from a single reservoir and by means of single operating mechanism to various machines or parts, such as valves, pistons, journals, and the like; and it consists in certain novel features of the construction, combination, and arrangement of the several parts of the improved lubricator whereby certain important advantages are attained and the device is made simpler, cheaper, and is otherwise better adapted and made more convenient for use and operates more satisfactorily, all as will be hereinafter fully set forth and specifically claimed.

In order to enable others skilled in the art to which our invention pertains to make and use the same, we will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a face view, partly in elevation and partly in section, taken on line 1 1 of Fig. 3 looking in the direction indicated by the arrows and illustrating a lubricator embodying one form of our invention. Fig. 2 is a side view thereof, partly in elevation and partly in section, taken on line 2 2 of Fig. 3 looking in the direction indicated by the arrows. Fig. 3 is a plan view showing a portion of the reservoir-casing broken away and one pair of the pumps removed. Fig. 4 is a cross-sectional view through the lower portion of the main frame, showing the mechanism for operating the pumps. Fig. 5 is a side view in elevation of the upper portion of the lubricator, showing a modification in the construction thereof. Fig. 6 is a detail view of the operating-bar or cross-bar for supporting and operating the pistons of the pumps. Fig. 7 is a face view of a pawl-bearing cap or casing. Fig. 8 is a similar view of a ratchet-wheel, which wheel and casing are employed for turning the driving-shaft; and Fig. 9 is a plan view of the lubricator with the cover of the casing removed.

Like numerals of reference refer to corresponding parts throughout the different views of the drawings.

The main frame comprises a base 10 and a reservoir-casing 11, which are preferably rectangular in shape, as shown.

The base portion 10 of the main frame is provided with a recess or oil-well 12 for the reception and operation of the eccentric 13 on the driving-shaft 14, as well as for a portion of the operating or cross bar 15 and its guide-rods 16, which are vertically located in the well 12 and secured to the bottom thereof at their lower ends near each of its sides. This well is also adapted for retaining a quantity of oil sufficient to lubricate the parts operating therein, which oil may be supplied to the well through openings 17 and channels 18, located in the sides of the base. Each side of the base 10 is provided with a recess 19 for the reception and operation of the ends of the operating-bar 15 and the lower ends of the pistons, which said bar carries. Leading from each of the recesses 19 to the well 12 is a vertical slot or opening 20, in which the end portions of the bar 15 are located and operate.

As is clearly shown in Fig. 6, the bar 15 is provided with a central rectangular opening 21 and has at each of its ends upturned arms 22, each of which is provided at its upper end with horizontal extensions or projections 23 and 24, having openings 25 and 26, respectively, for the lower ends of the pistons of the force and distributing pumps. Each of the arms 22 has below its extension 23 and in alinement therewith another extension 27, which is provided with a screw-threaded opening to engage an external screw-threaded sleeve 29, used for adjusting the stroke of the force-pistons, as will be presently explained. On each side of the opening 21 in the bar 15 is provided a vertical opening 30, in which the guide pins or rods 16 fit, so that the said bar will be guided in its vertical movements. The casing 11, which comprises a part of the main frame, is mounted on the base 10 and is secured thereto by means of rods 31 and nuts 32, located at the corners of the frame. As shown in Figs. 1, 2, and 5 of the drawings, the casing 11 is provided on each of its sides with recesses 33, which extend from the top 34 to its bottom and register with the recesses 19 in the sides of the base and are for the purpose of partially in-

closing or housing the force and distributing pumps.

As is clearly shown in Figs. 1 and 9 of the drawings, the inner walls 35 of each of the recesses 33 of the casing 11 is provided with an opening 36, which communicates with the oil-reservoir 37 of said casing. Located in each of these openings and suitably secured therein is a boss 38 on one side of each of the force-pump cylinders 39, which are vertically supported thereby, and each has a piston-chamber 40 for the reception and operation of the piston 41, which extends below the lower end of the cylinder 33 and has its lower portion located in the openings of the extensions 23 and 27 on each of the arms 22 of the operating-bar. The lower end of each of the cylinders 39 is provided with a suitable stuffing-box 42, having packing 43 held therein by means of a gland 44 and a cap 45, screwed on the lower end of the cylinder. Each of the bosses 38 is provided with a valve-chamber 46, in which is located a ball-valve 47 to open and close the ports 48, leading from said chamber to the piston-chamber. Communicating at its upper end with each of the valve-chambers 46 is an oil-supply pipe 49, the lower end of which extends to near the bottom of the oil-reservoir and is provided with a valve-casing 50, in which is located a ball-valve 51 to open and close the ports 52 and 53 thereof. The upper end of each of the force-pump cylinders 39 is provided with a valve-chamber 54, in which is located a ball-valve 55, as is clearly shown in Fig. 1 of the drawings. Communicating at its lower end with each of the valve-chambers 54 is a pipe 56, which passes through a suitable opening in the top 34 of the casing and is bent laterally and then downwardly at its upper portion. The above-described construction, as well as that which follows, is clearly shown in Figs. 1, 2, and 9 of the drawings, one of the force-pumps and its connections being shown by dotted lines on the left-hand side of Fig. 1, while one of said pumps and its connections is shown in section on the right-hand side of said figure. In Fig. 2 one of the distributing-pumps and its connections is shown in section and illustrated as being connected to one of the force-pumps, which is shown in elevation. The downwardly-deflected part of the upper portion of the pipe 56 is provided with an annular enlargement 57, on which rests a cap-nut 58, into which is screwed a plug 59, which has in its upper end a recess 60 to receive the tapered end of the pipe 57, which is closely joined to the plug 59 by means of said cap-nut. The plug 59 is formed with a valve-chamber 61, in which is located a ball-valve 62, which normally closes the port 63, leading from the pipe 56 to the valve-chamber 61 below the same. The lower portion of the valve-chamber 61 has fitted therein an apertured nozzle 64, and between the upper end of this nozzle and the ball-valve 62 is preferably located a spring 65, which causes said valve to normally close the port 63, as above stated. Vertically located in suitable openings in the top 34 of the casing and near the pipes 56 are distributing-pump cylinders 66, each of which is provided with a piston-chamber 67 for the piston 68 and with an oil-chamber 69, which communicates with a hollow and horizontal extension 70, to which a distributing-pipe 71, which may be furnished with branch pipes (not shown) leading to the different machines or machine elements to be lubricated. The upper portion of the cylinder 66 is provided with a valve-casing 72, between the upper surface of which and the lower surface of the plug 59 is located a sight-feed tube or cylinder 73 of a transparent construction in order that the falling drops of oil from the nozzle 64 may be seen and the rapidity of the feed thus estimated. The chamber 74 of the valve-casing 72 has communication through ports 75 and 76 with the tube 73 and oil-chamber 69, respectively. Located in the valve-chamber 74 is a ball-valve 77, which is preferably held to normally close the port 75 by means of a spring 78, located in said valve-chamber. The outer portion of the tubular extension 70, which communicates with the oil-chamber 69, is provided with an internal annular flange 79, against the inner surface of which rests one end of a spiral spring 80, the other end of which presses a ball-valve 81 against the valve-seat 82 of the oil-chamber, thus normally closing said chamber. The lower portion of the cylinder 66 is formed with a stuffing-box 83, in which packing 84 is held by means of a gland 85 and a cap 86, screwed on the lower end of said cylinder. The lower portion of the piston 68 of each of the distributing-pump cylinders 66 is located in the opening of the extension 24, on each arm of the operating-bar 15 and may be adjusted therein by means of nuts 87 and 88, as is apparent.

Referring again to Fig. 1 of the drawings, it will be understood that each of the pistons 41 of the force-pumps may be adjusted in order to increase or decrease the amount of oil forced through the pipes 56 thereby by loosening the lock-nuts 89, so that the screw-threaded sleeves 29 may be raised or lowered by turning the same in their bearings 27, when the lock-nuts may again be tightened, thus fixing the sleeves in the desired position. It is apparent that in this adjustment of the sleeves 29 the stops 90 on the pistons, which stops in the present instance are shown as being collars fastened to the pistons with pins 92 passing through the same and which may be reached through openings 91 and 91ª in the walls and bottoms of the sleeves, but which may be any suitable kind of projections or stops, serve to check the downward movement of the sleeves, so that when it is desired

the pistons shall have the full effect of the strokes of the bar 15 and a greater quantity of oil pumped the sleeves 29 should be screwed down until their internal flanges 108 rest on the stops 90 and there fastened, while the extensions 23 will rest against the lower surface of the flanges or stops 107 on the pistons. To decrease the flow of oil or shorten the strokes of said pistons, it is only necessary to screw up the sleeves 29 and fasten them by means of the lock-nuts 89, so that there will be a space or "play" between the flanges 108 and the upper surfaces of the stops 90 or lower stops. In this adjustment it will be understood that the operating or cross bar 15 carries the adjusting means and that there are no screw-threads or nuts required on the pistons.

The top 34 of the casing is provided with an opening and a cover 93 therefor, which opening communicates with the reservoir 37 and is used for supplying oil thereto. The front or face of the casing is preferably provided with a sight-gage 94 of the ordinary construction, used to indicate the quantity of oil contained in the reservoir.

As shown in Fig. 4 of the drawings, the driving-shaft 14 projects at one of its ends through the front or face of the base portion of the main frame and has fixed thereon a wheel 95 of the overhanging-periphery type and has on the inner surface of its periphery on each of its faces ratchet-teeth 96 and 97, with the former of which a pawl 98, pivoted on the face of the base 10, will engage to prevent backward movement of the driving-shaft. This pawl is checked by a pin or projection 99 on the face of the base, as shown in Fig. 4. Loosely mounted on the shaft 14 is a cap or casing 100, the periphery of which is overhanging and surrounds the wheel 95, as shown. The inner surface of the casing 100 is provided with a number of pawls 101 to engage the ratchet-teeth on the outer face or surface of the ratchet-wheel, so that when the casing 100 is turned in one direction the pawls 101 will engage the teeth on the ratchet-wheel 95 and transmit intermittent rotary motion to the driving-shaft. The casing 100 is provided with an operating-rod 102, which may be connected in any suitable manner to an actuating mechanism of the desired kind.

In Fig. 5 of the drawings we have shown a modification which we may sometimes employ and which consists in using the construction above set forth, except that the pipes 56, leading from the force-pumps, may be formed of two sections, which are united just above the top 34 of the casing by means of a globular coupling 103, which is provided with a drip-spout 104 and a needle-valve 105, which may be opened, so as to allow the oil to pass out through the spout 104 in order that the rapidity of feed may be disclosed. While we have shown in Fig. 5 both the sight-feed device 73 and the coupling 103, yet it is apparent that when the latter is employed the former may be dispensed with, yet the device may be equipped with both of them. This modified construction is particularly useful when the lubricator is located in a dark place, where the drops cannot be readily seen through the sight-feed device 73, which, as before stated, is of transparent construction.

While we have shown and described a lubricator casing or frame equipped with four pumps—that is, two force-pumps and two distributing-pumps—located in pairs on each side thereof, yet it is evident that we may employ only one pair of such pumps—that is, a force-pump and a distributing-pump communicating therewith—or we may employ any number of such pumps as may be desired.

From the foregoing and by reference to the drawings it will be seen and clearly understood that by applying power to the connecting-rod 102 the driving-shaft 14 will be rotated by reason of the pawls 101 engaging the teeth 97 of the ratchet-wheel 95, which is fixed to the shaft. In the rotation of the driving-shaft 14 the eccentric 13 thereon will impart to the operating-bar 15 a reciprocatory vertical motion, which movement will also be imparted to the pistons 41 and 68 of the force and distributing pumps, respectively. In this operation oil will be drawn through the supply-pipes 49 into the piston-chambers 40 and from thence forced through the pipes 56, from which it will issue drop by drop into the sight-feed cylinders 73, by means of which or by means of the coupling 103 the rapidity of the feed may be ascertained. In the downward strokes of the pistons 68 suction will be created in the oil-chambers 69, thus drawing a small quantity of air through the vents 106, and thereby allowing the ball-valves 77 in the valve-chambers 74 to be depressed, so as to permit the oil to pass through the ports 75 into the oil-chambers 69, from whence it will be forced on the upward strokes of the pistons 68 through the tubular extensions 70 into the distributing-pipes 71, which, as before stated, may lead to the parts to be lubricated.

By reference to Figs. 2 and 5 it will be seen that the pistons of the distributing-pumps are larger than those of the force-pumps. In other words, the former pumps preferably are of greater capacity than the latter, so as to cause the oil-chambers 69 to receive all of the oil from the force-pumps without causing the same to unduly accumulate therein and besides enabling the oil to be forced through distributing-pipes of lower temperature, where more power is required.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the character described the combination with the main frame,

of an operating-bar movably mounted thereon and carrying apertured extensions located in alinement, a force-pump having communication with a supply of oil, a piston in said pump and extending through said apertured extensions and having spaced projections, a sleeve encircling the piston and one of said projections and adjustably secured in the opening of one of the extensions, and means to reciprocate the operating-bar, substantially as described.

2. In an apparatus of the character described the combination with the main frame, of an operating-bar movably mounted thereon and carrying apertured extensions located in alinement, an oil-reservoir on the frame, a force-pump communicating with said reservoir, a discharge-pipe communicating with one end of said pump, a piston in said pump and extending through said apertured extensions and having spaced projections, a sleeve encircling the piston and adjustably secured in the opening of one of the extensions, a lock-nut on said sleeve between the extensions, and means to reciprocate the operating-bar, substantially as described.

3. In an apparatus of the character described the combination with the main frame, of an operating-bar movably mounted thereon and carrying two apertured extensions located in alinement with one another and another apertured lateral extension, a force-pump having communication with a supply of oil, a piston in said pump and extending through said alined apertured extensions and having spaced projections, a sleeve surrounding the piston and adjustably secured in the opening of one of the alined extensions, a distributing-pump mounted near the force-pump, a piston in the said pump having one of its ends secured to the said lateral extension, a distributing-pipe communicating with the distributing-pump, a pipe connecting the discharging end of the force-pump with the receiving end of the distributing-pump, feed-ascertaining means in communication with said pipe between the pumps, and means to reciprocate the operating-bar, substantially as described.

4. In an apparatus of the character described the combination with the main frame, of an operating-bar movably mounted thereon and carrying two apertured extensions located in alinement with one another and another apertured lateral extension, a force-pump having communication with a supply of oil, a piston in said pump and extending through said alined apertured extensions and having spaced projections, a sleeve surrounding the piston and adjustably secured in the opening of one of the alined extensions, a lock-nut on said sleeve between said extensions, a distributing-pump mounted near the force-pump, a piston in the distributing-pump having one of its ends secured to the said lateral extensions, a distributing-pipe communicating with the distributing-pump, a pipe connecting the discharging end of the force-pump with the receiving end of the distributing-pump, a feed-determining device communicating with said pipe between the pumps, and means to reciprocate the operating-bar, substantially as described.

5. In an apparatus of the character described the combination with the main frame, of an operating-bar movably mounted thereon and carrying two apertured extensions located in alinement with one another and another apertured lateral extension, a force-pump having communication with a supply of oil, a piston in said pump and extending through said alined apertured extensions and having spaced projections, a sleeve surrounding the piston and adjustably secured in the opening of one of the alined extensions, a lock-nut on said sleeve between the alined extensions, a distributing-pump mounted near the force-pump, a piston in the said pump having one of its ends secured to the lateral extension, a distributing-pipe communicating with the distributing-pump, a pipe connecting the discharging end of the force-pump with the receiving end of the distributing-pump, and means to reciprocate the operating-bar, substantially as described.

6. In an apparatus of the character described the combination with the main frame, of an operating-bar movably mounted thereon and carrying two apertured extensions located in alinement with one another and another apertured lateral extension, a force-pump having communication with a supply of oil, a piston in said pump and extending through said alined apertured extensions and having spaced projections, a sleeve surrounding the piston and adjustably secured in the opening of one of the alined extensions, a distributing-pump mounted near the force-pump, a piston in the distributing-pump having one of its ends adjustably secured to the said lateral extension, a distributing-pipe communicating with the distributing-pump, a pipe connecting the discharging end of the force-pump with the receiving end of the distributing-pump, a sight-feed device communicating with the said pipe between the pumps, and means to reciprocate the operating-bar, substantially as described.

7. In an apparatus of the character described, the combination with the main frame having an oil-well in its lower portion and an oil-reservoir in its upper part, of a driving-shaft journaled on the frame and extending through the oil-well, an eccentric on said shaft within the well, an operating-bar movably mounted on the frame and having an opening for the reception and operation of the shaft and eccentric thereon and provided with extensions one above the other, the said extensions having alined apertures, a force-pump communicating with the reservoir, a

piston in said pump and extending through said apertured extensions and having projections one above and the other between the extensions, a sleeve surrounding the piston and adjustably secured in the opening of the lower extension, and means to rotate the driving-shaft, substantially as described.

8. In an apparatus of the character described, the combination with the main frame, of an oil-reservoir thereon, a driving-shaft journaled on the frame, an eccentric on said shaft, an operating-bar movably mounted on the frame and having an opening for the reception and operation of the shaft and eccentric thereon, and provided with extensions one above the other, the said extensions having alined apertures, a force-pump communicating with the reservoir, a piston in said pump and extending through said apertured extensions and having a projection above the upper and another projection between said extensions, a sleeve surrounding the piston and adjustably secured in the opening of the lower extension, and means to rotate the driving-shaft, substantially as described.

9. In an apparatus of the character described, the combination with the main frame, of an oil-reservoir thereon, a driving-shaft journaled on the frame, an eccentric on said shaft, an operating-bar movably mounted on the frame and having an opening for the reception and operation of the shaft and eccentric thereon and provided with extensions one above the other at each of its ends, the said extensions at each end having alined apertures, a force-pump located on each side of the main frame and each having communication with the reservoir and provided with a discharge-pipe, a piston in each of said pumps and extending through said extensions at the ends of the operating-bar, each of said pistons having spaced projections, a sleeve surrounding each of the pistons and adjustably secured in the opening of the lower extension, and means to operate the driving-shaft, substantially as described.

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