

J. L. OSGOOD.

LUBRICATOR.

APPLICATION FILED JULY 20, 1910.

1,008,052.

Patented Nov. 7, 1911.

3 SHEETS-SHEET 1.

Fig. 1.

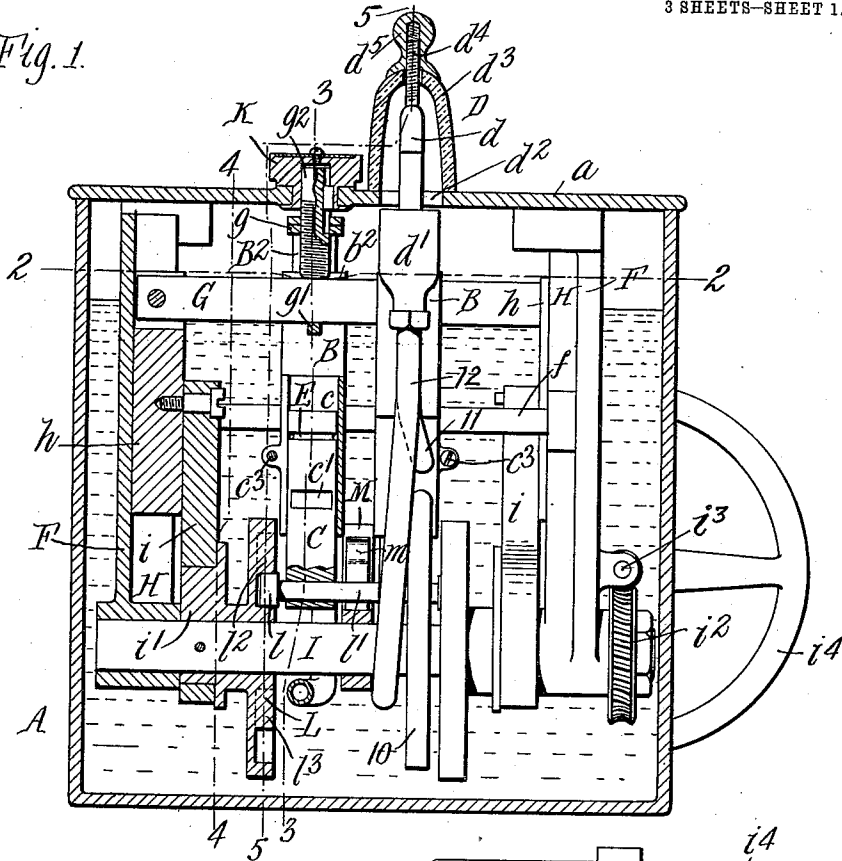
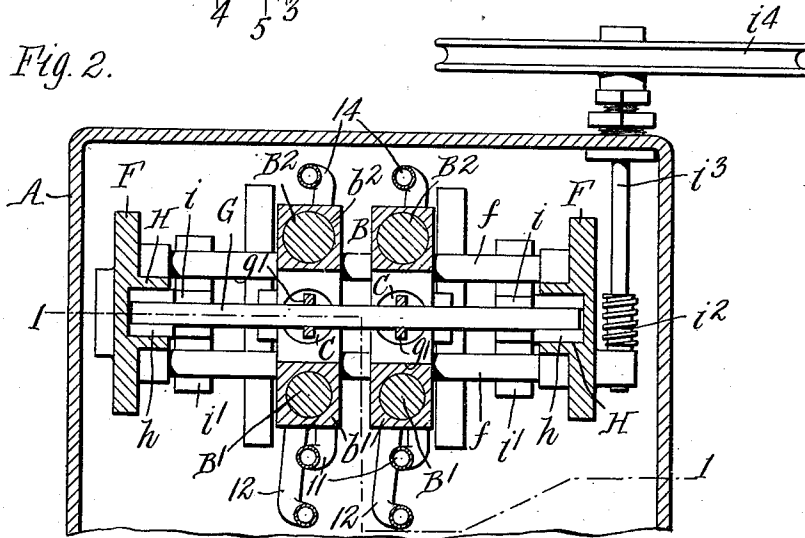


Fig. 2.



Witnesses.

A. F. Diamond.

A. L. McGee.

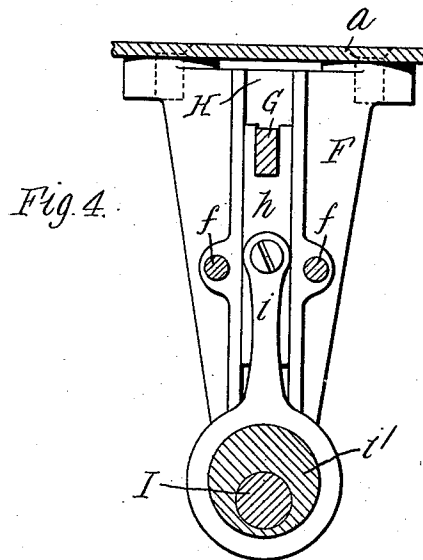
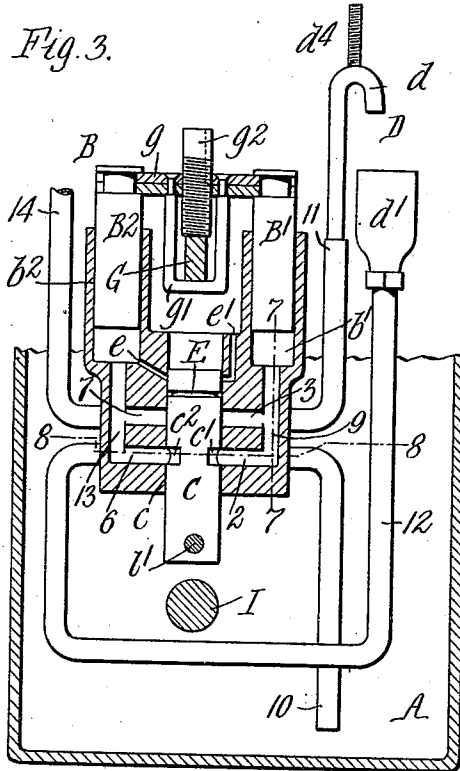
Inventor.

John L. Osgood,
By William Parker Ward,
Attorneys.

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3 SHEETS—SHEET 2.



Witnesses.
C. F. Diamond.
A. L. McGee.

Inventor.
John L. Osgood.
By Wilhelm, Parker & Hard,
Attorneys.

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3 SHEETS—SHEET 3.

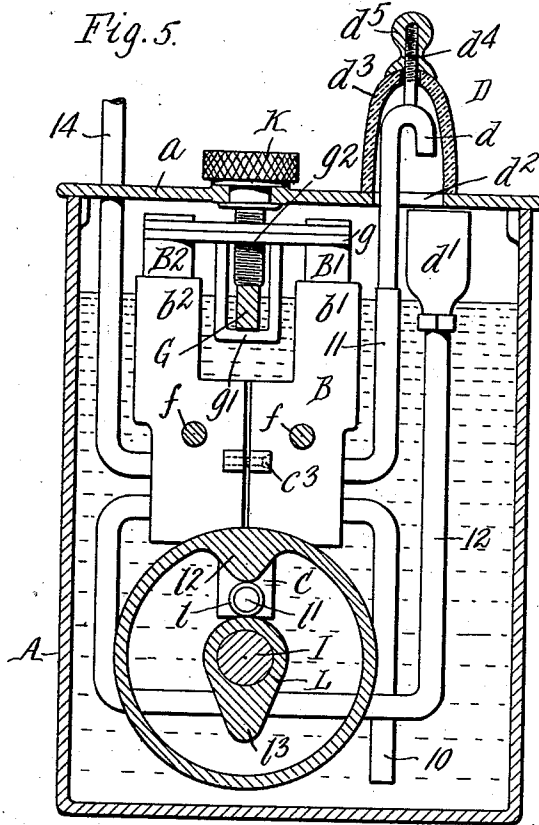


Fig. 7.

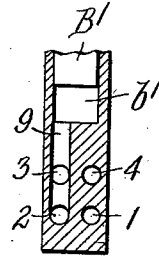


Fig. 8.

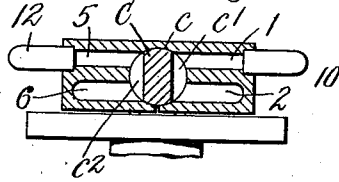


Fig. 9.

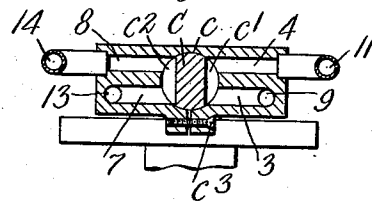


Fig. 6.

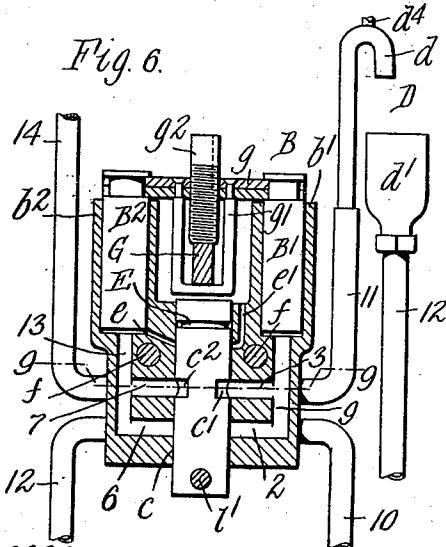
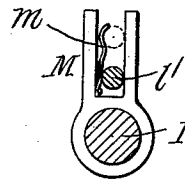


Fig. 10.



Witnesses.

C. F. Dimond.
A. L. McFar.

Inventor.

John L. Osgood,
By Wilhelm Parker & Ward,
Attorneys.

UNITED STATES PATENT OFFICE.

JOHN L. OSGOOD, OF BUFFALO, NEW YORK.

LUBRICATOR.

1,008,052.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN L. OSGOOD, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Lubricators, of which the following is a specification.

This invention relates to sight feed lubricators of that type which comprise one or more pumps or pumping units each of which delivers the oil intermittently in separate charges to a sight feed device from a supply reservoir, and draws these charges of oil separately from the sight feed device and forces them to the part being lubricated, whereby the sight feed device shows definitely the quantity of oil which the pump is feeding. These lubricators are ordinarily constructed so that the pumping units with their companion sight feed devices can be combined in any number, one or more, depending upon the number of different parts to be lubricated, and operated by a common drive shaft or member, while nevertheless the several pumps can be independently adjusted to regulate, as required, the supply of oil to each part being lubricated.

The object of the invention is to produce an efficient and reliable sight feed lubricator of this type which is certain and positive in action, is adapted to deliver the oil under a very high pressure to the part or parts to be lubricated, and is adapted to be operated by the rotation of its drive shaft in either direction.

In the accompanying drawings, consisting of three sheets: Figure 1 is a longitudinal sectional elevation, substantially in line 1—1, Fig. 2, of a multiple pump lubricator embodying the invention. Fig. 2 is a sectional plan view thereof in line 2—2, Fig. 1. Fig. 3 is a fragmentary transverse sectional elevation thereof in line 3—3, Fig. 1. Fig. 4 is a fragmentary transverse sectional elevation thereof in line 4—4, Fig. 1. Fig. 5 is a transverse sectional elevation thereof in line 5—5, Fig. 1. Fig. 6 is a fragmentary section thereof similar to Fig. 3 but showing a different position of the parts. Fig. 7 is a section of the primary pump cylinder in line 7—7, Fig. 3. Fig. 8 is a horizontal section through the valve chamber in line 8—8, Fig. 3. Fig. 9 is a similar section in line 9—9, Fig. 6. Fig. 10 is a transverse sectional elevation showing the valve holding device.

Like reference characters refer to like parts in the several figures.

A represents a casing which forms an oil reservoir and incloses the operative parts of the lubricator. This casing or reservoir may be of any suitable construction, but is preferably provided with a flat removable cover *a*.

B represents the pumps or pump units, of which there are two arranged side by side in the lubricator shown in the drawings, but any desired number, one or more, can be employed in a single reservoir of suitable size. These pumps or pump units are alike and each comprises primary and secondary pump plungers *B'* and *B²* which reciprocate in cylinders or chambers *b'* and *b²*, respectively, and a valve *C* which reciprocates in a valve chamber *c* and controls the admission of the oil to and its discharge from both of the pump cylinders *b'* *b²*. Each pump unit is also connected, as hereinafter described, with a sight feed device *D* which may be of any suitable construction. The sight feed devices shown are arranged side by side and each consists of a bent nozzle *d* which projects up through a hole *d²* in the cover of the casing *A* and is adapted to discharge into a cup or receptacle *d'*. Each sight feed device *D* is inclosed by a glass bell or cover *d³* through which the feeding of the oil can be observed. This bell is removably secured in place, for instance, by a screw stud *d⁴* projecting from the nozzle through the bell and a nut *d⁵*. The two pump cylinders and the valve chamber are conveniently formed by cylindrical chambers in a single body or casting, the valve chamber *c* being located between and parallel with the cylinders *b'* and *b²*.

The valve *C* is provided at opposite sides with cross slots or passages *c'* and *c²*, and the valve chamber is provided at one side with two pairs of ports 1, 2 and 3, 4, and at the opposite side with two pairs of ports 5, 6 and 7, 8. The ports 2 and 3 connect by a passage 9 with the primary pump cylinder *b'*, the port 1 connects by a suction pipe 10 with the oil reservoir, and the port 4 connects by a pipe 11 with the discharge nozzle *d* of the companion sight feed device *D*. The port 5 connects by a suction pipe 12 with the sight feed cup *d'*, the ports 6 and 7 connect by a passage 13 with the secondary pump cylinder *b²*, and the port 8 connects with a discharge pipe 14 which leads to the

cylinder, bearing or other part to be lubricated. The walls of the valve chamber *c* are shown split at one side and the parts connected by a screw *c*³, see Figs. 1, 5 and 9, for contracting the walls around the valve to prevent leakage.

The two plungers move together and during their upward or suction stroke the valve C is in the position shown in Figs. 3 and 8, in which its passage *c'* connects the ports 1 and 2 so that the primary plunger B' draws the oil from the reservoir into the cylinder *b'* through the suction pipe 10 and these ports 1 and 2, while the secondary plunger B² draws the charge of oil which was previously discharged into the sight feed cup *d'* from this cup through the pipe 12, port 5, passage *c*² and port 6 into the cylinder *b*². The valve is shifted as the plungers near the end of their suction stroke, and during the discharge stroke of the plungers the valve is in the position shown in Figs. 6 and 9. The primary plunger B' then forces the oil from the cylinder *b'* through the port 3, valve passage *c'*, port 4 and pipe 11, causing it to discharge from the nozzle *d* into the cup *d'* of the sight feed device. At the same time the secondary plunger B² forces the oil from the cylinder *b*² through the port 7, valve passage *c*², port 8 and discharge pipe 14 to the part to be lubricated. Thus the primary plunger B' draws a charge of oil from the reservoir and delivers it to the sight feed device, and the secondary plunger B² draws a charge of oil from the sight feed device and forces it to the part to be lubricated upon each complete reciprocation or in and out movement of the plunger. A secondary plunger B² of somewhat larger diameter than the primary plunger is preferably employed as this insures the complete emptying of the sight feed cup at each suction stroke of the plungers and prevents the accumulation of oil in the cup, which would make it difficult to ascertain the amount of oil which is being fed.

When the pump is feeding oil to a part which is under pressure, as for example, when supplying oil to an engine cylinder, the column of oil in the passage 13 and port 6 of the valve chamber will be under pressure at the time that the valve C is shifted. In order to prevent this pressure from being communicated through the pipe 12 to the oil in the sight feed cup and causing an objectionable pulsation therein, the valve C is provided with a small groove or channel E which connects a passage *e* leading from the secondary cylinder *b*² with a relief or vent passage *e'*, see Figs. 3 and 6, when the valve is in an intermediate position with its passage *c*² between the ports 6 and 7. When the passage *e* is thus connected with the vent passage *e'*, a sufficient quantity of

oil will escape from the cylinder to relieve the pressure in the passage 13 and port 6. Any other provision for relieving this pressure can be used.

The several pumps are supported side by side in the reservoir A in any suitable way, for instance, as shown in the drawings, the pump bodies are supported by horizontal rods *f* which pass through the bodies and are secured at opposite ends to brackets F which are secured to and depend from the cover *a* of the reservoir.

The plungers of the several pumps can be reciprocated by any suitable mechanism which will permit their strokes to be independently varied for regulating the feed of the oil by the several pumps. As shown, the two plungers B' B² of each pump are connected by a yoke *g* having slotted ends embracing the reduced necks at the outer ends of the plungers. The yoke preferably consists of two metal strips riveted together between their ends, as shown in Figs. 3 and 6, whereby the ends of the strips spring apart enough to bear against the shoulders at the opposite ends of the reduced parts of the plungers so as to prevent any play between the yoke and the plungers.

A reciprocating cross head or bar G extends through loops *g'* depending from the several yokes *g* beneath regulating screws *g*² carried by the yokes, and is secured at its opposite ends to blocks *h* which slide in vertical guide-ways H in the inner sides of the brackets F. These blocks or slides *h* are connected by pitmen *i* to eccentrics or cranks *i'* on an operating shaft I which is journaled in bearings in the brackets F and is connected by worm gearing *i*² with a drive shaft *i*³ extending out of the reservoir and provided with a pulley *i*⁴. The operating shaft I may be driven in the manner described or in any other suitable way. The eccentrics *i'* are located at the opposite ends of the group of pumps, only two eccentrics being required for the entire group of pumps. The rotation of the shaft I in either direction will reciprocate the cross head and the plungers of the several pumps. The cross head has a uniform stroke, but the stroke of the plungers of any pump can be changed to regulate the supply of oil fed by that pump by adjusting the regulating screw *g*² for the pump so as to cause more or less lost motion between the same and the cross head. The regulating screw *g*² is turned by a knob K which is journaled in a hole in the cover *a* of the reservoir and is splined to the screw so as to permit the screw to move endwise in the knob.

The valve C of each pump is operated so that it remains stationary and retains one or the other set of ports open to the full extent during nearly the entire stroke of the pump plungers in either direction, and

is quickly shifted from one position to the other at the times when the actuating eccentrics for the pump plungers are passing their dead center positions, at which times the movements of the plungers are very slight. The mechanism shown for operating the valves in this manner consists of cams L secured on the shaft I at the opposite ends of the group of pumps and engaging rollers or parts 7 on the opposite ends of a connecting rod 7' passing through the valves C of the several pumps. The cams are conveniently made integral with the plunger operating eccentrics 2'. Each cam has an outer inwardly-projecting cam portion 7² at one side of its center and a central outwardly-projecting cam portion 7³ diametrically opposite to the first cam portion. During each revolution of the shaft I the cam portions 7³ strike the rollers on the connecting rod 7' and raise the valves when the pump plungers near the limit of their upward or suction stroke, and the cam portions 7² strike the rollers on the connecting rod 7' and lower the valves when the pump plungers near the limit of their downward or discharge stroke. The connecting rod 7' prevents the valves from turning in the valve chambers.

The valves are held up and prevented from descending until positively lowered by the cam portions 7², by a device M, Figs. 1 and 10, which loosely surrounds the shaft I and has a vertical forked or slotted portion embracing the connecting rod 7' for the valves. A spring m secured in the holding device is adapted to bear against the connecting rod 7' and hold the valves in their upper position. The connecting rod 7' prevents the holding device M from turning on the shaft. Any other suitable means can be employed for this purpose. By operating the valves in this manner they require no lead and the pumps work in the same manner irrespective of the direction of rotation of the operating shaft. This is a great advantage as the manufacturer does not have to make the lubricators to drive in one direction or another to suit a particular installation, the lubricator being thus adapted to be applied to an engine or machine in the most convenient location and to be driven in either direction. As the valve remains stationary with the ports wide open during practically the complete strokes of the plungers and is shifted only at the times when the motion of the plungers is being reversed, and as the ports in the valve chamber can be spaced a considerable distance apart, the pump can develop a very high pressure, thus especially adapting the lubricator for lubricating engine cylinders.

I claim as my invention:

1. The combination of a supply reservoir, a sight feed device, a pump having two sep-

arate cylinders, separate plungers which reciprocate in said cylinders and one of which takes liquid from the reservoir and delivers it to said sight feed device and the other of which takes liquid from said sight feed device and discharges it, and a single positively operated valve which controls the admission of the liquid to and its discharge from both of said pump cylinders, substantially as set forth.

2. The combination of a supply reservoir, a sight feed device, a pump having two cylinders, plungers which reciprocate in said cylinders and one of which takes liquid from the reservoir and delivers it to said sight feed device, and the other of which takes liquid from said sight feed device and discharges it, and a single positively reciprocated valve which controls the admission of the liquid to and its discharge from both of said cylinders, substantially as set forth.

3. The combination of a supply reservoir, a sight feed device, a pump having two parallel cylinders, plungers which reciprocate in said cylinders and one of which takes liquid from the reservoir and delivers it to said sight feed device and the other of which takes liquid from said sight feed device and discharges it, and a reciprocating valve which is arranged parallel with said cylinders and controls the admission of the liquid to and its discharge from both of said cylinders, substantially as set forth.

4. The combination of a supply reservoir, a sight feed device, a pump body having two parallel cylinders and a valve chamber arranged parallel with said cylinders, plungers which reciprocate simultaneously in the same direction in said cylinders and one of which takes liquid from the reservoir and delivers it to said sight feed device and the other of which takes liquid from said sight feed device and discharges it, and a single reciprocating valve which controls the admission of the liquid to and its discharge from both of said cylinders, substantially as set forth.

5. The combination of a supply reservoir, a sight feed device, a pump having two cylinders, plungers which reciprocate in said cylinders and one of which takes liquid from the reservoir and delivers it to said sight feed device and the other of which takes liquid from said sight feed device and discharges it, a single valve which controls the admission of the liquid to and its discharge from both of said cylinders, and means for reciprocating said valve which leave the valve stationary in each of its two positions during a considerable portion of the stroke of said plungers, substantially as set forth.

6. The combination of a supply reservoir, a sight feed device, a pump having two cylinders, plungers which reciprocate in said cylinders and one of which takes liquid

from the reservoir and delivers it to said sight feed device and the other of which takes liquid from said sight feed device and discharges it, a single valve which controls the admission of the liquid to and its discharge from both of said cylinders, means for reciprocating said valve which leave the valve stationary in each of its two positions during a portion of the stroke of said plungers, and means for releasably retaining the valve in one position, substantially as set forth.

7. The combination of a supply reservoir, a sight feed device, a pump having two cylinders, plungers which reciprocate in said cylinders and one of which takes liquid from the reservoir and delivers it to said sight feed device and the other of which takes liquid from said sight feed device and discharges it, eccentric actuating mechanism for said plungers, a reciprocating valve which controls the admission of the liquid to and its discharge from both of said cylinders, and cam mechanism which shifts said valve and leaves it stationary in each of its two positions during a considerable portion of the strokes of said plungers, substantially as set forth.

8. The combination of a supply reservoir, a sight feed device, a pump having two cylinders, plungers which reciprocate in said cylinders and one of which takes liquid from the reservoir and delivers it to said sight feed device and the other of which takes liquid from said sight feed device and discharges it, a reciprocating valve which controls the admission of the liquid to and its discharge from said cylinders, a shaft adapted to rotate in either direction, and means actuated by said shaft for reciprocating the plungers and said valve, substantially as set forth.

9. The combination of a supply reservoir, a sight feed device, a pump having two cylinders, plungers which reciprocate in said cylinders and one of which takes liquid from the reservoir and delivers it to said sight feed device and the other of which takes liquid from said sight feed device and discharges it, a reciprocating valve which controls the admission of the liquid to and its discharge from said cylinders, a shaft adapted to rotate in either direction, an eccentric on said shaft and connections for reciprocating said plungers, and a cam on

said shaft and connections for reciprocating said valve, substantially as set forth.

10. The combination of a supply reservoir, a plurality of pumps arranged side by side and each comprising a sight feed device, two cylinders, two plungers which reciprocate in said cylinders, and a valve which controls the admission of the liquid to and its discharge from both of said cylinders, one of which plungers takes liquid from said reservoir and delivers it to said sight feed device, and the other of which plungers takes liquid from said sight feed device and discharges it, a shaft, and mechanism actuated by said shaft for reciprocating the plungers and the valves of the several pumps, substantially as set forth.

11. The combination of a supply reservoir, a sight feed device, a pump having primary and secondary cylinders, primary and secondary plungers which reciprocate in said cylinders, the former of which takes liquid from said reservoir and delivers it to said sight feed device and the latter of which takes liquid from said sight feed device and discharges it, a valve which controls the admission of the liquid to and its discharge from said cylinders, and means for relieving the pressure in the discharge passage when the valve is shifted to connect said secondary cylinder with said sight feed device, substantially as set forth.

12. The combination of a supply reservoir, a sight feed device, a pump having primary and secondary cylinders, primary and secondary plungers which reciprocate in said cylinders, the former of which takes liquid from said reservoir and delivers it to said sight feed device and the latter of which takes liquid from said sight feed device and discharges it, a valve which controls the admission of the liquid to and its discharge from said cylinders, and a vent passage with which said valve connects said secondary cylinder when the valve is shifted to connect said secondary cylinder with said sight feed device, substantially as set forth.

Witness my hand in the presence of two subscribing witnesses.

JOHN L. OSGOOD.

Witnesses:

A. L. MCGEE,

C. W. PARKER.