(No Model.) 2 Sheets—Sheet 1.

C. F. ENGMAN.

LUBRICATOR.

No. 596,863. Patented Jan. 4, 1898.

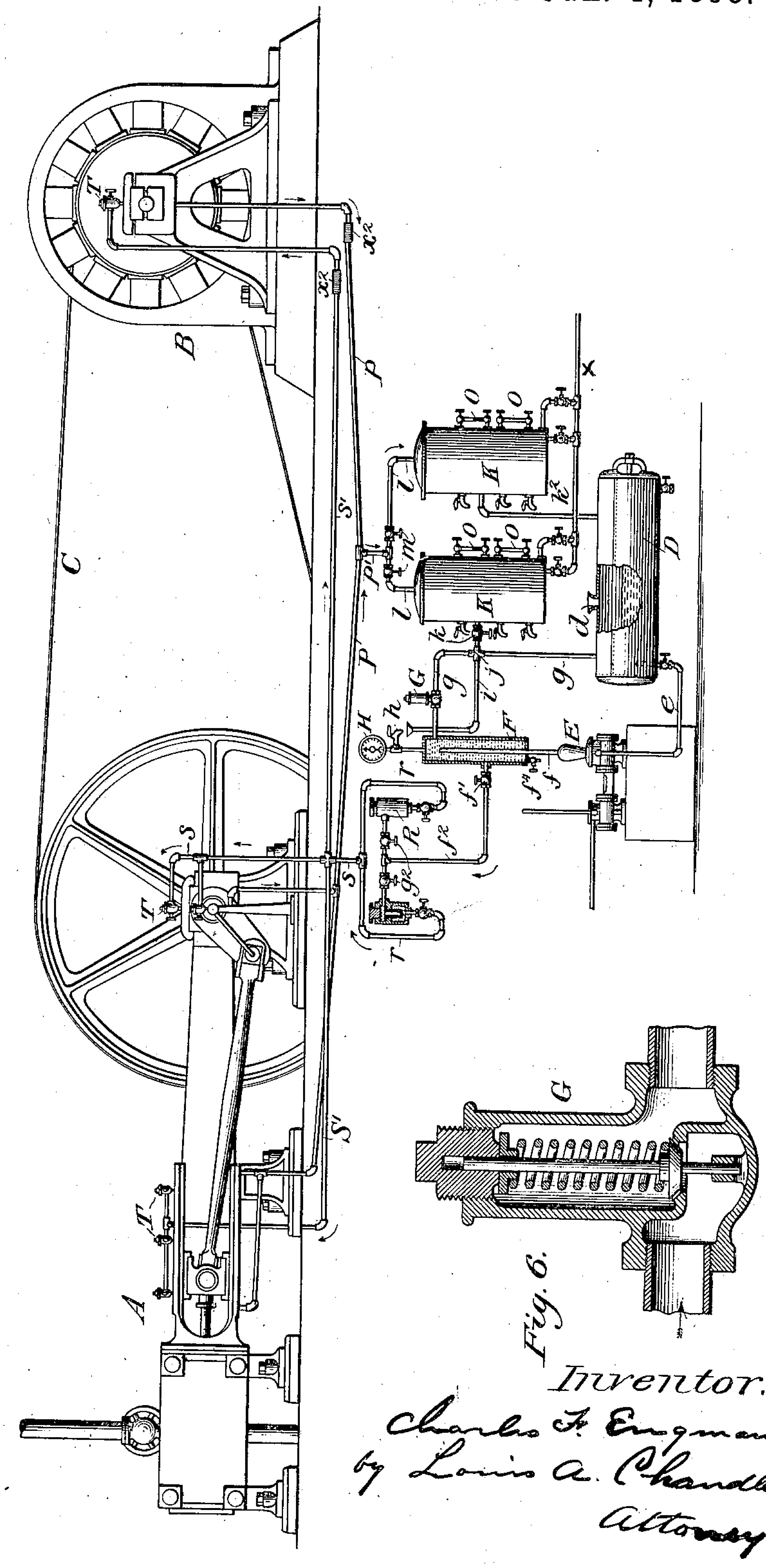

Fig. 1.

Fig. 6.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

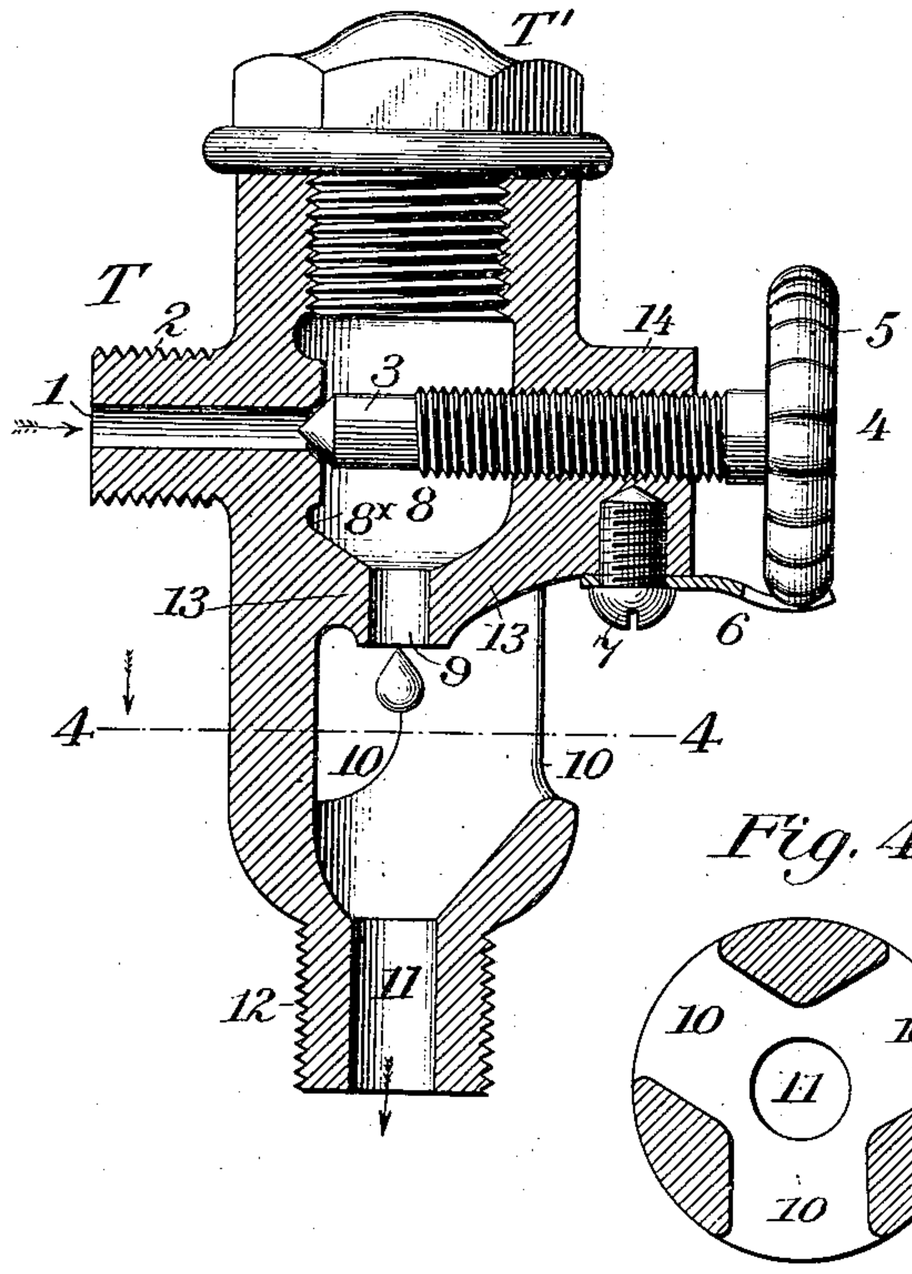


Fig. 3.

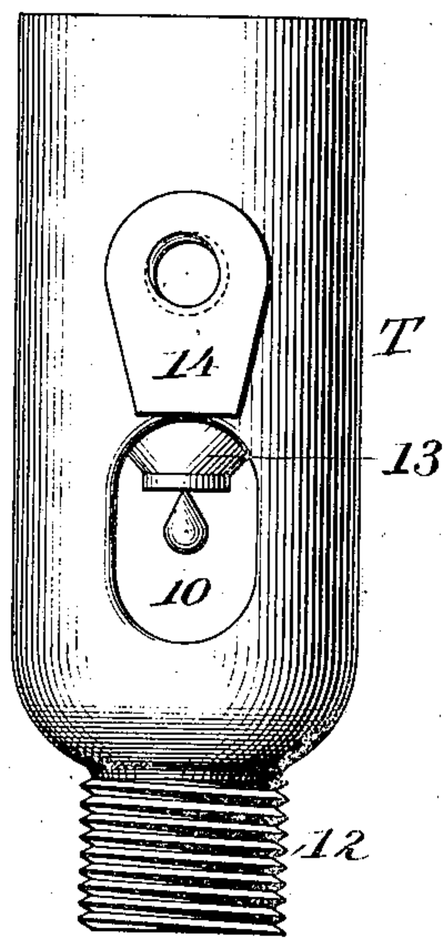
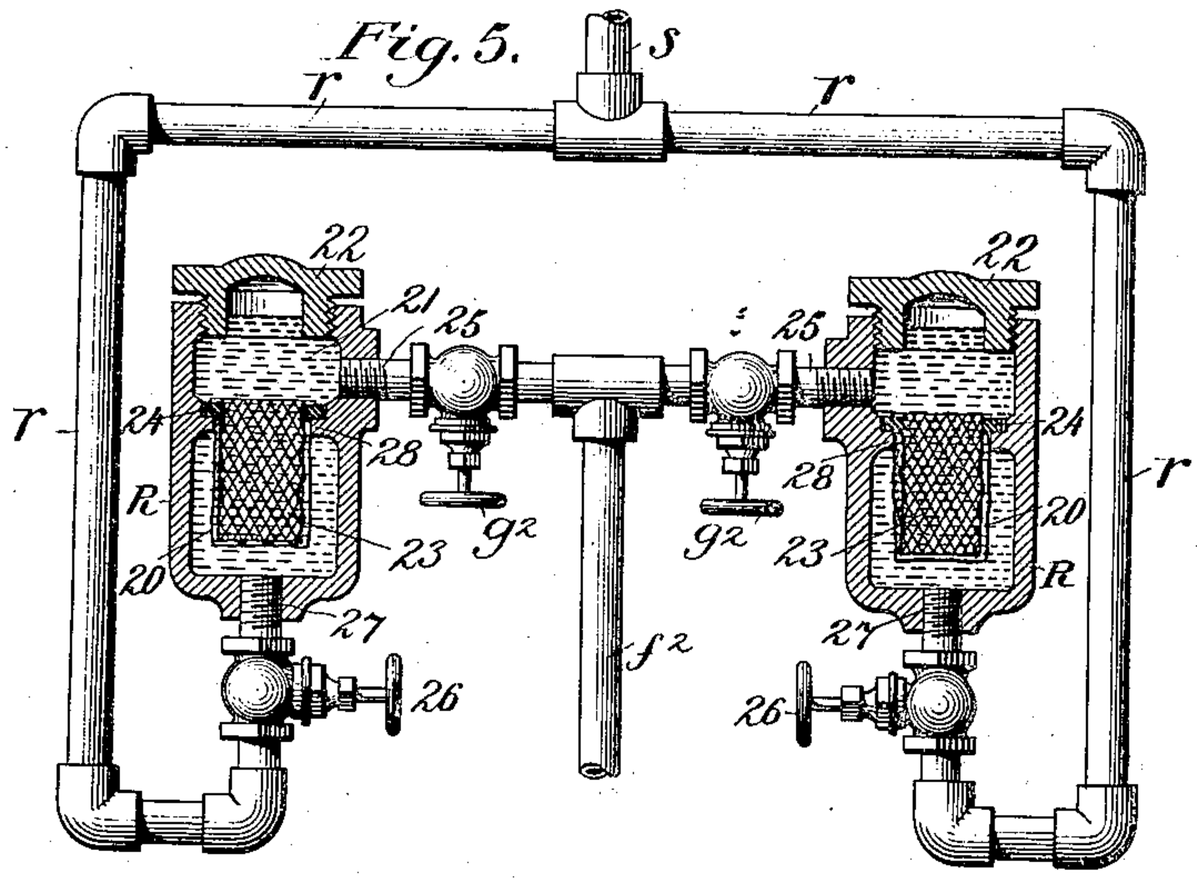


Fig. 4.

Fig. 5.



Witnesses.
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UNITED STATES PATENT OFFICE.

CHARLES F. ENGMAN, OF NEW YORK, N. Y., ASSIGNOR TO LOUIS A. CHANDLER, OF SAME PLACE.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 596,863, dated January 4, 1898.

Application filed December 5, 1895. Serial No. 571,178. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. ENGMAN, a citizen of the United States, and a resident of the city of New York, county of New York, State of New York, have invented certain new and useful Improvements in Automatic Oiling Systems, of which the following is a specification.

My invention relates to automatic oiling plants or systems for the boxes, bearings, and other parts of machinery.

It is the especial purpose of the invention to avoid all fluid-pressures, such as that of compressed air, as the agent for impelling the oil to the bearings, because I find such fluid-pressures to be detrimental to the operation, and I therefore aim to get rid of even such small quantities of air as may in any manner get into the oil. The invention is operated, therefore, by pumping oil against a valve loaded to the proper pressure, which pressure is, according to hydraulic principles, distributed throughout the system. At the parts to be lubricated I also do away with oil-cups and substitute a peculiarly-formed regulating-valve which chokes down the feed to the desired rate, and the outlet side of this valve is freely opened to atmosphere.

The invention also relates to the details and combinations of parts of the apparatus by which the oil-feed is maintained and controlled.

Referring to the drawings which accompany the specification to aid the description, Figure 1 is a view of a machinery plant equipped with my invention. It is designed to clearly present a comprehensive view of how the invention may be applied and operated in connection with a steam-engine and other apparatus. Fig. 2 is a vertical section, on a larger scale, of one of the regulating-valves; and Fig. 3 is an elevation of the body part of the same, Fig. 4 being a horizontal section on line 4 4 of Fig. 2. Fig. 5 is a detail of certain parts of the system on a larger scale than that of Fig. 1 and showing the filters in section. Fig. 6 is a section of the pressure-valve.

The construction and application of my invention are as follows:

A being an engine, and B any apparatus driven thereby by belt C, the various moving joints are oiled by my regulating-valves T T, in connection with other parts of my invention to be hereinafter described.

D is an oil-tank having an opening *d* to atmosphere and connected by pipe *e* with any suitable pump E, driven by any suitable engine. Pipe *f* leads from the delivery side of pump E into and nearly to the top of cylinder F. Said cylinder F, which is closed at the top and connected with a pressure-gage H and petcock *h*, is an intermediate oil chamber or reservoir wherein I develop the pressure and separate any air that may have gotten into the oil, for as the oil enters from pipe *f* it falls down to the bottom of said cylinder F, displacing the air, which is gradually compressed at the top and from time to time drawn off by petcock *h*, any oil that may escape with the air being caught in the funnel at the top of pipe *i* and returned to the tank D through pipe *g*, with which pipe *i* connects at the cross *j*. Said cross *j* may also be connected with filters K K, of suitable description. The oil finally returns to tank D by pipe *g*. I may of course omit said filters from the system, but when said filters are used I prefer to warm the oil in the filters by means of a steam-pipe *x*.

In the manner just described I separate practically all the air from the oil and much increase the efficiency of the system thereby.

I effect the distribution of the oil as follows: On pipe *g* from the top of cylinder F, and which pipe *g* is returned to tank D, I place a weighted valve G, of any suitable description, arranged to open from cylinder F. In practice I prefer a spring-weighted valve where the valve-plug is forced on a seat in the ordinary manner by a spring, the pressure being regulated by the compression of the spring. Said valve G is arranged to close with any desired pressure sufficient to force the oil to all desired points, cylinder F being abundantly strong enough to withstand that pressure, and whenever the pressure increases above that limit valve G opens as a relief, a certain quantity of oil escaping from cylinder F and returning to tank D. Thus my invention in this respect consists in pumping oil against a valve, as G, loaded to a desired pressure, which pressure thus generated in cyl-

inder F goes by pipe f^2, provided with valve f', ultimately to the main pipe s, and thence to the said regulating-valves T T. Between said cylinder F and said valves T T, I prefer to interpose filters R R, though my invention can be operated without them. Said filters R are two in number, so that in case one clogs up it may be cut out by valves g^2 and 26 without stopping the system. Said filters R have a chamber 21, connected with inlets 25, controlled by said valves g^2, and from which chambers 21 are suspended baskets 23, constructed of wire mesh soldered on metal rings 24, said rings resting on a diaphragm 28, as shown. I prefer to surround said baskets 23 with a filtering-cloth 20, such as burlap. The outlets 27, controlled by valves 26, connect with pipes r r, which ultimately join into main pipe s. Caps 22 22 are provided to permit the inspection of the filters R and removal of the baskets 23. Said main s and its branches s' go in any suitable direction to whatever point or joint or bearing is to be oiled—as, for example, to the cross-heads and pillow-blocks of an engine and the bearings of other machines. At those points said main s and branches s' connect with my said regulating-valves T. (Shown approximately full size in Figs. 2, 3, and 4.)

1 is the inlet through threaded boss 2.

3 is a cone-ended spindle threaded through boss 14 and seating on inlet 1.

Disk 4, fixed on spindle 3, has peripheral notches 5, in some one of which bears a spring 6, positioned by a screw 7. When the disk 4 is turned by the operator to any position, spring 6, engaging some one notch 5, holds the disk and spindle in that position, thus maintaining the desired opening in the valve. Chamber 8 has a sloping bottom 13, down which the oil trickles drop by drop to orifice 9. Said orifice 9 is of good size and is connected with atmosphere by openings 10 through the wall of the valve T. From orifice 9 the drops of oil fall into outlet 11 through boss 12, which is screwed on the joint to be lubricated and connected in the usual manner with the points where the oil is to be delivered.

T' is a plug seating in the valve, as shown.

Said valves T are not oil-cups, are expressly designed not to contain oil, but merely to provide controlled channels through which the oil can trickle at a desired rate, and for this purpose the chamber in said valves is connected directly with atmosphere by a good-sized opening, as described, so that no pressure can be developed in the valve. Oil does not collect in the valve, but merely trickles down the sides and bottom of chamber 8, and I facilitate this by the groove $8^{\times}$ beneath inlet 2.

From the lower side of the cross-heads, pillow-blocks, and other joints where a valve T is placed lead return drip-pipes p p, preferably graded downward to a pipe p', from which, controlled by proper valves m, lead branches l l to the aforesaid filters K K. Ultimately the waste oil from the drip-pipes p p, having been filtered in filters K K, goes again into the tank D by pipes k^2 and g.

The aforesaid openings 10 are used as sight-feeds to determine the rate at which the oil is dripping.

From the description hereinbefore given it will be seen that in my system there is a continual circulation of oil produced by the action of the pump combined with that of the loaded valve from the oil-tank to the bearings and thence back by the drips and through suitable filters to the tank and that the oil is to the greatest possible degree free from air or other gaseous fluid.

In lubricating bearings of dynamos the pipes s or s' and p' can be insulated in any suitable manner, as at x^2.

Now, having described my improvements, I claim as my invention—

1. The combination in a lubricating system, of a reservoir for the lubricant, a pump adapted to draw the lubricant therefrom, an oil and air separating chamber, a pipe from the pump to the upper part of said chamber, and an outlet-pipe from below the oil-level of said chamber, substantially as and for the purpose described.

2. The combination in a lubricating system, of a reservoir for the lubricant, a pump adapted to draw the lubricant therefrom, an oil and air separating chamber F operatively connected at its upper part with said pump, an outlet-pipe from below the oil-level of said chamber F, and a loaded valve operatively connected with said chamber F and against which the pump works, substantially as described.

3. The combination in a lubricating system and with joints to be lubricated, of a reservoir for the lubricant, a pump operatively connected therewith, an oil and air separating chamber operatively connected with the outlet side of the pump, a loaded valve operatively connected with the said chamber and against which the pump works, a pipe from the outlet side of said valve back to the reservoir, a pipe from below the oil-level of said separating-chamber to the joints, drip-pipes from the joints back to the aforesaid reservoir, and filters operatively connected with said drip-pipes, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 4th day of December, 1895.

CHARLES F. ENGMAN.

Witnesses:

HENRY C. JOHNSON,

DAVID W. BROWN.