

(No Model.)

3 Sheets—Sheet 1.

P. S. WHITING.
LUBRICATOR.

No. 543,918.

Patented Aug. 6, 1895.

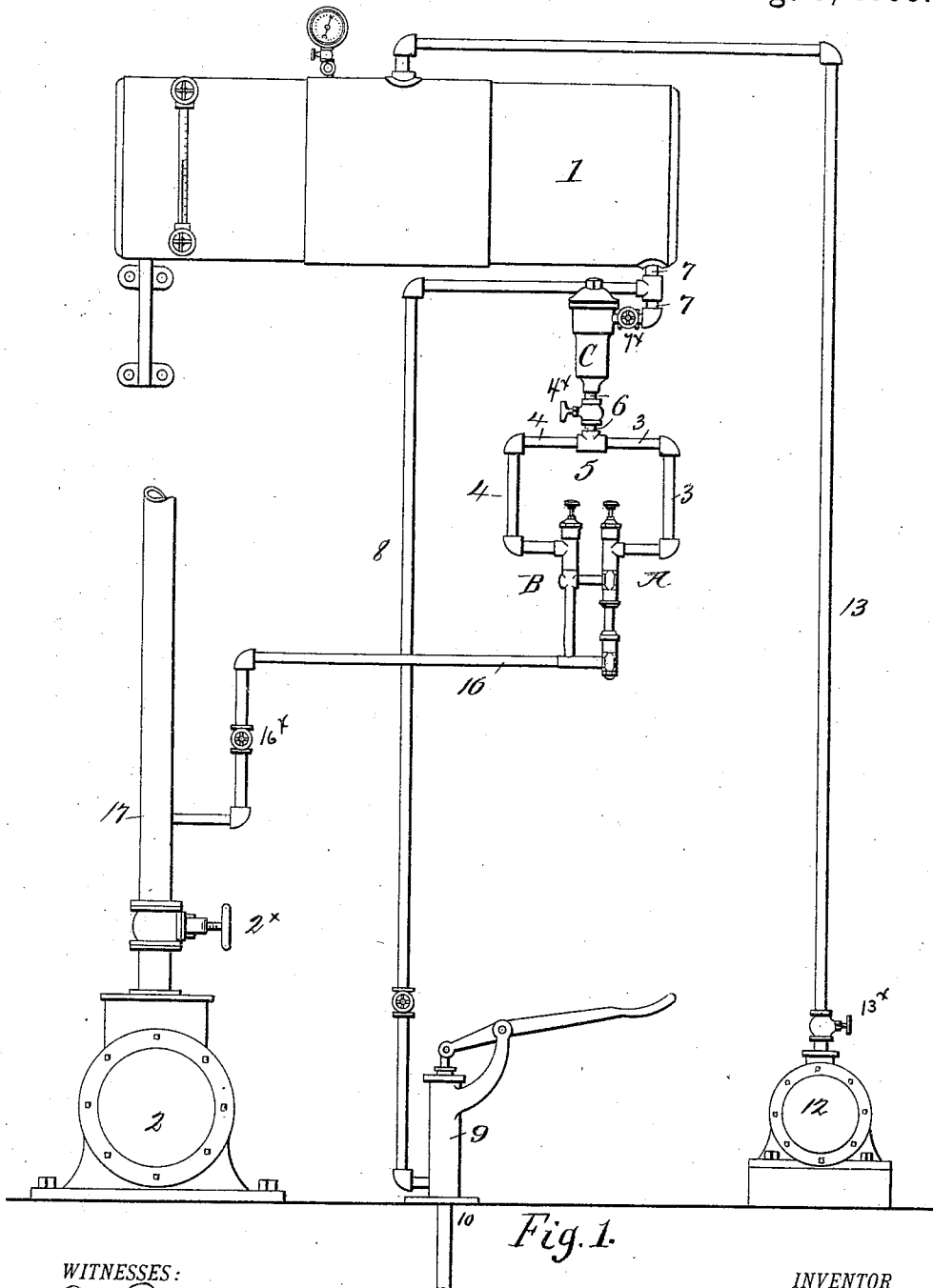


Fig. 1.

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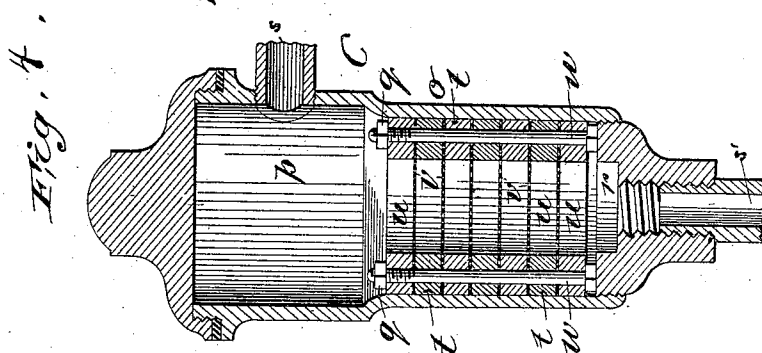
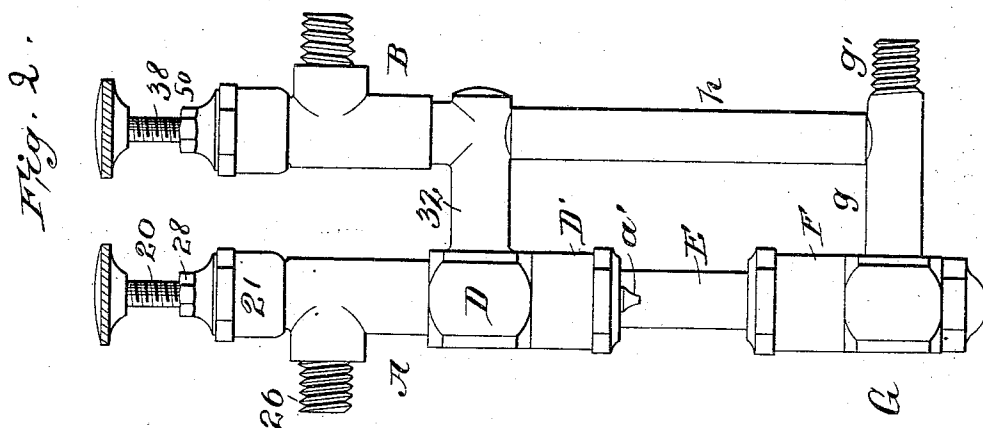
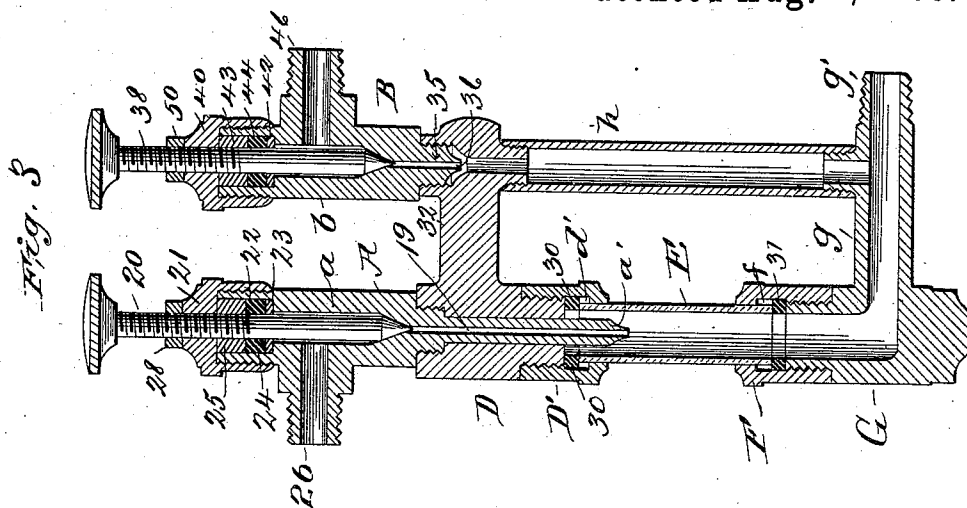
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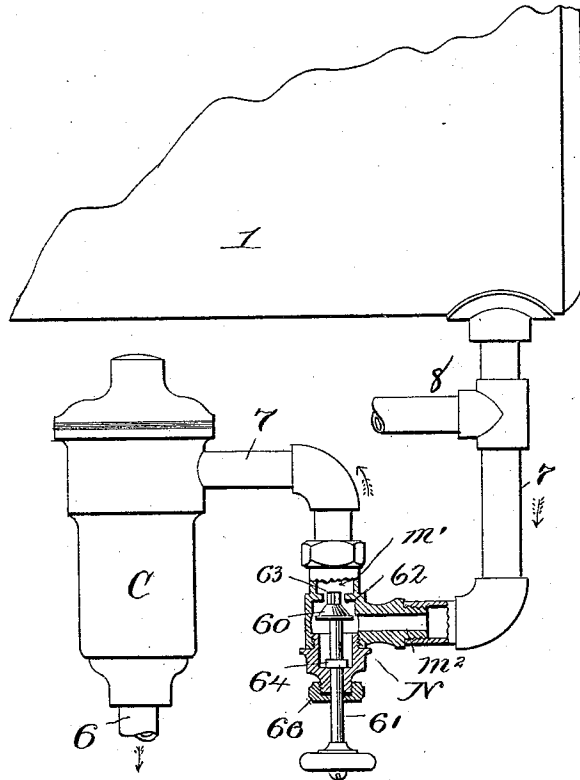
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Fig. 5.



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UNITED STATES PATENT OFFICE.

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LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 543,918, dated August 6, 1895.

Application filed June 19, 1894. Serial No. 515,010. (No model.)

To all whom it may concern:

Be it known that I, PHINEAS S. WHITING, a citizen of the United States, and a resident of Des Moines, county of Polk, State of Iowa, have invented certain new and useful Improvements in Systems of Lubrication, of which the following is a specification.

My invention relates to improvements in lubricating systems, especially of that general class wherein the machines and apparatus requiring lubrication are supplied with the lubricant from a central reservoir in which there is sufficient pressure to force the lubricant to all the machines and apparatus. A system of this general kind, but designed for the lubrication of bearings of shafting and other apparatus where there is no pressure to resist the feeding of the lubricant, was patented by me on May 1, 1894, No. 519,055.

The present invention relates to systems of lubrication which are adapted as well to lubricate steam-cylinders and other apparatus in which there is a pressure. It is the first object of this invention to provide such a system with a regulating-valve of peculiar construction which is adapted to an absolutely regular feed of the lubricant against the pressure in the steam-cylinder or other apparatus. This regularity of feed insures the greatest possible economy of the lubricant, since it accurately apportions the consumption to the demands of the apparatus, insures the most satisfactory and reliable lubrication at the minimum cost of labor and reduces the waste to practically nothing. In order to obtain the accurate adjustment necessary for such regularity of feed it is indispensable that, when the rate of feed has been once determined, especially in uniform-speed engines, such as are used in electric-light plants, the regulating-valve shall not be disturbed. Therefore, in the first place, this invention consists in providing valves having what I term "set-feeds." When once set the valve will always feed the same quantity of oil in the same time under like pressures.

In the second place, this invention relates to the combination with the set-feed, as just above referred to, of a variable valve, which I term the "flush." The use of this valve is to permit of discharging into the cylinder or

other apparatus an increased quantity of the lubricant when necessary—as, for example, when a steam-engine is first started up after remaining idle for some time and its surfaces are dry. The combination of the flush with the set-feed enables this to be performed without disturbing the set-feed, which is, as before explained, accurately adjusted to the normal needs of the apparatus.

In the third place, this invention relates to the combination with the said valves of filters for straining or filtering the lubricant, in order to remove any particles therefrom which might clog the valves. Especially are such filters necessary when the lubricant after one using is returned to the reservoir to be used again.

In the fourth place, this invention relates to the combination with lubricating systems of valves so arranged that when the pressure against which the lubricant is fed falls the valve will automatically shut off the feed.

Referring to the drawings, which accompany the specification to aid the description, Figure 1 is a diagrammatic representation of a complete system as applied to lubricating a steam-cylinder. This figure shows an air-compressor as the means of producing the requisite pressure in the reservoir; but it will be understood that in place of air and the air-compressor I could bring steam into the reservoir for the same purpose. Fig. 2 is an elevation of the set-feed and flush-valves on a large scale. Fig. 3 is a vertical section of the same. Fig. 4 is a vertical section of the filter on a large scale. Fig. 5 is a detail of a modification of the system when a valve is employed to automatically shut off the lubricant when the pressure against which it is feeding falls.

The set-feed valve A and auxiliary flush-valve B are connected with the reservoir 1, which contains a suitable lubricant—as oil—by any suitable piping.

In Fig. 1, 3 and 4 are branch pipes, respectively connected with set-feed valve A and flush-valve B and uniting in a cross 5. 6 is a pipe from said cross; C, a filter connected therewith and also by pipe 7 with the bottom of reservoir 1. 8 is an oil-supply pipe from a pump 9 to said pipe 7, though, of course, said

pipe 8 may enter said reservoir by an independent connection. 10 is a pipe from the pump 9 to a receptacle of oil arranged below the floor and not shown. 16 is a pipe from the valves A B to the steam-pipe 17 and by which oil is fed to the cylinder 2.

It will be understood that the diagram is given only as an illustration of one arrangement merely of my invention, and that the position and arrangement of the reservoir, air-compressor, pump, and piping will be altered according to the requirements of each case.

The aforesaid set-feed valve A is composed of a case *a*, provided with a fine vent 19, on which seats a spindle 20, threaded through the bonnet 21, which in turn threads on the case *a*.

22 is a counterbored chamber in the top of the case *a*; 23, a ring therein supporting packing 24, and 25 a gland above the packing; 26, a branch for connecting the valve A with the pipe 3, and 28 a lock-nut, whereby the feed is regulated in the following manner: The spindle 20 is run up slowly until just the proper rate of feed of oil through the vent 19 is obtained. Then the lock-nut 28 is run down the spindle 20 until it jams on the bonnet 21, thus locking the spindle and setting the feed.

Essentially, the operation of the valve A is complete when the vent 19 opens into any suitable pipe or channel—as, for example, the pipe 16—that leads to the apparatus which is to be lubricated; but I prefer to combine said valve A with the flush-valve B in the special manner shown on the drawings. In this case the nozzle *a'* of the vent 19 threads into and projects through a block D, D' being a cap therefor, which is chambered at *d'* to admit one end of a glass tube E. F is a cap, chambered at *f* to admit the other end of the tube E and threading on the bend G, 30 31 being packing-rings, respectively above and below the glass E. Said glass E permits the operator to observe the dripping of the oil from the valve A and thus obtain the accurate adjustment of the set-feed above referred to, and is therefore termed the "sight-feed." Said block D has a bracket 32, which is connected with the tube *h* in any suitable manner—as being made integral therewith—and tends to support and give rigidity to the combined structure of the valves A B. The tube *h* is connected with the branch *g* of the bend G, *g'* being a nozzle to connect with the pipe 16.

The case *b* of the flush-valve B is provided with a nozzle 35, having a vent 36, and threaded into the bracket 32, said bracket being perforated, as shown. On said vent 36 seats the spindle 38, which threads through the bonnet 40. The construction and functions of the ring 42, gland 43, and packing 44 are the same as of the similar parts in the valve A. 46 is a branch to connect with the pipe 4. I prefer to put a lock-nut 50 on the spindle 38,

in order to insure that when properly closed the flush-valve B shall remain closed until the special occasion for opening it occurs.

The filter C, which is placed between the reservoir 1 and the valves A B, has a case *o*, chambered at *p* and *q* and preferably counterbored at *r*, as shown, *s* being the inlet and *s'* the outlet. Rings *tt* of brass or other suitable material, and each having a central hole *u* of about the same diameter as the counter-bore *r*, are arranged one above the other in the chamber *p*, there being a layer *v* of fine wire-mesh or other suitable material under each ring. The rings *t* and mesh *v* are held together by bolts *w w*, which pass through holes in the rings and mesh.

o' is the cap of the case *o*. In assembling the parts, the cap *o'* being off the case, the rings *t* and mesh *v* are laid on each other and fastened together by the bolts *w*. Then the whole is passed into the chamber *p* by way of the open top of the case *o*. Finally, the cap *o'* is put on said case.

The operation is as follows: Supposing the air compressed in reservoir 1 above the oil therein, the engine running, and the valves 2^x 4^x 7^x 16^x open, then the operator, observing the dripping of the oil through the glass E, regulates the set-feed valve A with great accuracy to deliver just the necessary quantity of oil in a given time, the flush-valve B being closed. The operator now locks or sets the valve A by the lock-nut 28, as described, and the lubrication continues automatically at the determined rate, the pipe 16 being continuously open to the cylinder 2; but suppose that for any reason the engine is stopped and remains idle for a considerable time, the throttle 2^x and the valve 4^x being closed during that time. Now, when the engine is first started again the cylinder 2 will need more rapid lubrication than can be obtained by the set-feed of the valve A; but it is very undesirable to disturb said valve A and take the chances of again obtaining the accurate adjustment necessary. Consequently, the valve A is not touched but the flush-valve B is opened, so that the oil can be fed rapidly to the cylinder 2 by way of the vent *h*, which forms a by-pass around the valve A. When a sufficient quantity of oil is thus fed to the cylinder 2, the flush-valve B is shut off and the lubrication continues through the set-feed valve A.

N, Fig. 5, shows a valve which may be arranged, as shown, between the reservoir 1 and the filter C. The valve-disk 60, set on a stem 61, working through a stuffing-box 66, is normally off the seat 62 and the oil passes onto the valves A B and thence to the cylinder; but if the pressure against which the oil is feeding falls for any reason the pressure in the reservoir almost instantly lifts the disk 60 against the seat and prevents the further feed of the oil. When it is desired to resume lubrication the valve N is opened again by drawing down the spindle. 63 is a guide-rib,

and 64 a stop, as will be readily understood on examining the drawings.

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

5 1. The combination in a lubricating system, of a reservoir containing a lubricant under pressure, a main connected therewith, branches connected with said main, one of
10 said branches having a set feed and the other a flush valve therein, and a single connection from both said set feed and flush valves to apparatus to be lubricated, substantially as described.

2. The combination in a lubricating system, of a reservoir containing a lubricant
15 under pressure, a main connected with said reservoir, branches connected with said main, one of said branches having a set feed and the other a flush valve, means for locking
20 said set feed valve to a constant rate of feed, and a single connection from both said set feed and flush valves to apparatus to be lubricated, substantially as described.

3. The combination in a lubricating system, of a reservoir containing a lubricant
25 under pressure, a main connected therewith, branches connected with said main one of

said branches having a set feed and the other a flush valve therein, a single connection from said set feed and flush valves to apparatus to be lubricated, and a filter operatively
30 connected with said system between the reservoir and said valves, substantially as described.

4. The combination in a lubricating system, of a reservoir containing a lubricant
35 under pressure, a main connected therewith, branches connected with said main, one of said branches having a set feed and the other a flush valve therein, a single connection
40 from both said set feed and flush valves to apparatus to be lubricated, and a valve connected with said system between said reservoir and said set feed valve and arranged to close automatically as the pressure in said
45 apparatus falls, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 16th day of June, 1894.

PHINEAS S. WHITING.

Witnesses:

LOUIS A. CHANDLER,
S. CRISTY MEAD.