(Model.)

W. P. PHILLIPS.

Locomotive-Lubricator.

No. 228,215. **Patented June 1, 1880.**

Fig. 1

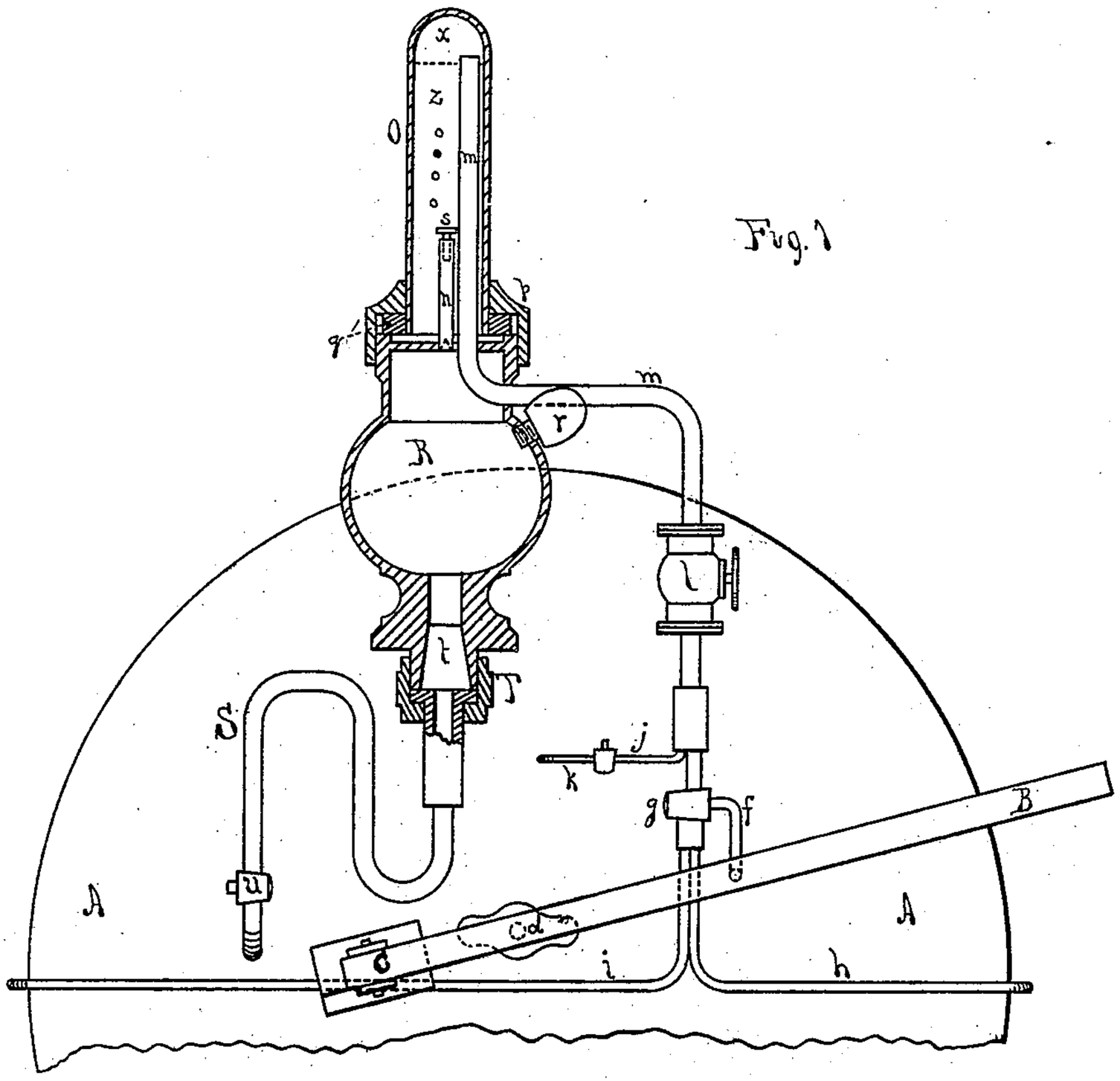


Fig. 2

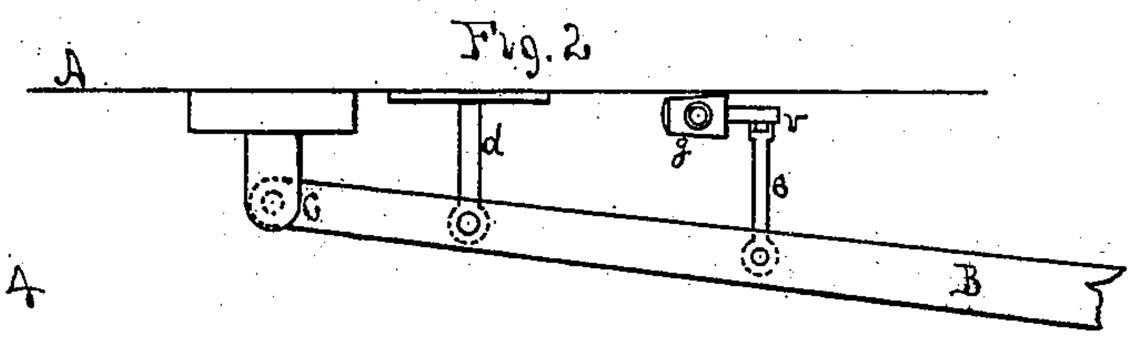


Fig. 4

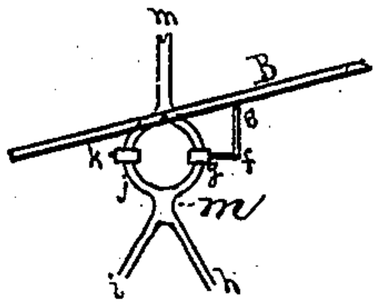
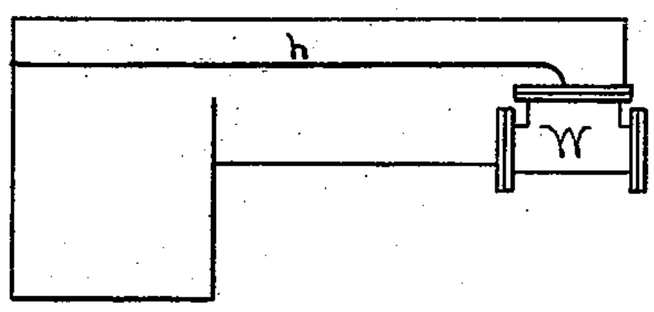


Fig. 3



Witnesses

John W. Cox.

J. Walter Cox

Inventor

Wm. P. Phillips,

By Charles E. Pratt,

Atty.

UNITED STATES PATENT OFFICE.

WILLIAM P. PHILLIPS, OF BOSTON, MASSACHUSETTS.

LOCOMOTIVE-LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 228,215, dated June 1, 1880.

Application filed April 12, 1880. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM P. PHILLIPS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Locomotive-Lubricators, of which the following is a specification.

This invention relates to devices for lubricating the steam-cylinders and other parts of steam-engines, and to the attachments connecting and enabling my improved lubricator to be used on locomotive and other movable engines; and the nature of it will appear in the following description and drawings, wherein—

Figure 1 represents the front end of a boiler and a view of a contrivance embodying my invention, partly in section. Fig. 2 is a view of part of the same, looking down, showing the throttle-lever and connections more fully. Fig. 3 shows, on a smaller scale, a steam-box and cylinder and the part of said contrivance leading thereto; and Fig. 4 shows a modification of one part of my improvement, explained in the description below.

In all these figures similar letters refer to corresponding parts.

A is the cab end of a locomotive-boiler, and B is a throttle-valve lever, hinged at C to its fulcrum, and connected with the stem *d* of the throttle-valve.

S is a pipe leading from the boiler either above or below the water-line. *u* is a plug-cock or a valve in the pipe S. T is a coupling or connection of the pipe S with the lower part of an oil cup or reservoir, R.

The entrance to the reservoir from the pipe S is by a conical opening, *t*, and there is a cap or threaded stopper, *r*, whereby the oil may be replenished when required; and there may also be a screw-tap at or near the bottom of the reservoir for drawing off the water which accumulates in it.

Directly over and upon the reservoir R is a glass tube, O, closed at the upper end and held at the bottom end (which has a lip or flange in this contrivance) tightly in the coupling *p*, and is packed with rubber or other yielding substance at *q*, and which contains a water-chamber, *z*, and an oil-chamber, *x*, above.

Leading into the chamber *z* from the reservoir below is a short and small tube or opening, *n*, in the upper end whereof is a check-valve, *s*.

Leading out of the oil-chamber *x*, and down through the chamber *z* and the bottom of the tube O, is a tube, *m*, which is continued downward outside the reservoir, and has in it a valve or cock, *l*, and below this another valve or plug-cock, *g;* and below the valve *g* this pipe *m* divides and extends in the branches *h* and *i* to the steam-chest W on either side of the boiler. The valve *g* has a bent stem or crank, *f*, which is connected at a hinge-joint, *v*, with a crank-rod, *e*, extending and hinged to the throttle-lever B. Above the valve *g*, or between it and the reservoir, is a branch tube or pipe, *j*, leading from the pipe *m*, as shown in Fig. 1, through the boiler into the steam-pipe leading to the cylinder on either side; or, as shown in Fig. 4, the pipe *j*, branching from *m*, above the cock *g*, may lead around the valve *g*, and again enter *m* between the valve *g* and the division of *m* into the branches *h* and *i*, and the pipe *j* has in it, and near its beginning from the pipe *m*, a valve or plug-cock, *k*.

The operation of this contrivance is as follows: The reservoir R is first filled with water, and then, the valves *l* and *k* or *g* being open, the valve *u* is turned until the pressure from the boiler forces the water upward past the check *s*, filling the water-chamber *z*. The water in R is then drawn off, either by loosening the coupling T or, preferably, by means of a tap-cock in the pipe S, below T, or in the bottom of R, and the reservoir R is then filled with oil. Then, when the valve *u* is turned, (more or less, according to the rate of flow of oil required,) the pressure from the boiler causes the steam or water in the pipe S to press upon the oil in the reservoir R, and forces it upward through the short tube *n*, past the check *s*, into the chamber *z*, where it rises drop by drop through the water into the oil-chamber *x*, from which the oil passes into and along the tube *m* by the open valve *l*, and toward the valves and pistons in the cylinders, where it is wanted.

The oil is shown passing through the water in the transparent chamber *z* by the little rings in Fig. 1, where it is readily observed and the

rate of flow noted, and the latter is regulated by means of the cock *u*.

The check *s* admits of upward flow of oil or water, but prevents downward flow, and so prevents either oil or water in the tube O from returning to the chambers in the reservoir R. The valve *l* is also both a shut-off and a regulating valve, serving to hold the oil and water above when the other valves are open, if necessary, or to prevent too great a suction from the cylinders; or otherwise drawing all the oil and water out of the chambers *x* and *z*, is a set or lock valve, so that it is not varied by the jar.

When the lever B is brought forward to open the throttle-valve by drawing outward the stem *d*, the rod *e* is also brought forward and moves the crank *f* so as to open the valve *g*, and thus, the valve *k* remaining closed, the oil is allowed to pass downward along the branches *h* and *i*, and so into the steam-chests W, along with the steam, as usual, to the valves and pistons; and when the throttle-valve is closed the valve *g* is also closed, by means of the crank *f* and rod *e*, at the same time and with the same movement of the lever B. If—as in running a locomotive on a down-grade, for instance—oil is required in the cylinders when steam is not, the valve *g* being shut, the valve *k* is opened, and the oil is thus forced through the branch *j*, and thence (drawn by suction) into the cylinders until the valve *k* is again closed.

The drawings being made to represent the construction and relations of the parts, the proportions and position of the parts, which may be varied, as well as the material of which they are made, are not, of course, shown as in the working drawings, as any mechanic would see.

The flow of oil is caused by the difference in pressure between that in the boiler and that in the steam-chest.

These improvements, as will be seen, consist in the single oil-cup and indicator for both cylinders, in an indicating gage-lubricator adapted especially to movable engines, in the conical entrance to the reservoir by which the pressure is conserved and increased, in the check-valve within the indicator, in an automatic arrangement for shutting off the flow of oil at the same time that the steam is shut off, and in the alternative attachment by which the cylinders can be supplied with oil when running without steam and yet avoid the total loss of oil by suction. These are the more especial features, and I regard each of them as new.

The advantages are, among other things, greater economy of oil, more perfect lubrication, accessibility, convenience, saving in time, certainty in operation, avoiding the use of waste, and saving repairs in valve-seats and piston-rods; and the special construction of the indicator, held only at one end in a packed seat, enables a transparent indicator to be used on a movable engine, where the jar and yielding of parts make the indicating-lubricators heretofore constructed impracticable.

I also make the entrance from the oil-reservoir to the water-chamber wider at the bottom, so as to be slightly in the form of a hollow truncated cone, as I find it aids the flow of oil under light pressure upward, in the same way as described for the entrance below at *t*. This is indicated by a dotted line in the drawings, as the proportions are so small.

I claim as new and of my invention—

1. Combined in an indicating-lubricator, substantially as set forth, the pipe S, reservoir R, tube O, packing *q*, chambers *z* and *x*, tube *n*, check-valve *s*, pipe *m*, and set-valve *l*, arranged and constructed to operate essentially as shown and described.

2. In a lubricator, the truncated hollow-cone entrance *t*, combined with a steam-pipe, S, an oil-reservoir, R, and the inductor *n* of an indicator, substantially as described.

3. Combined with a throttle-lever and valve-stem, the cock *g*, the oil-pipe of a lubricator, and a connecting stem and rod, *f e*, substantially as described.

4. In combination with an oil-reservoir and other parts of a lubricator, the pipe *m*, having a cock, *l*, and branches *i* and *h*, and alternate pipe *j*, with its valve *k*, substantially as described.

5. The combination of an oil-conducting pipe, *m*, valve *k*, set-valve *l*, and a pipe, *j*, leading to the steam-pipe supplying the chests, substantially as described.

6. The combination of an oil-conducting pipe, *m*, valve *g*, branches *i* and *h*, connection *f e*, and throttle-lever B, substantially as described.

WILLIAM P. PHILLIPS.

Witnesses:

CHARLES E. PRATT,

G. V. PRATT.