

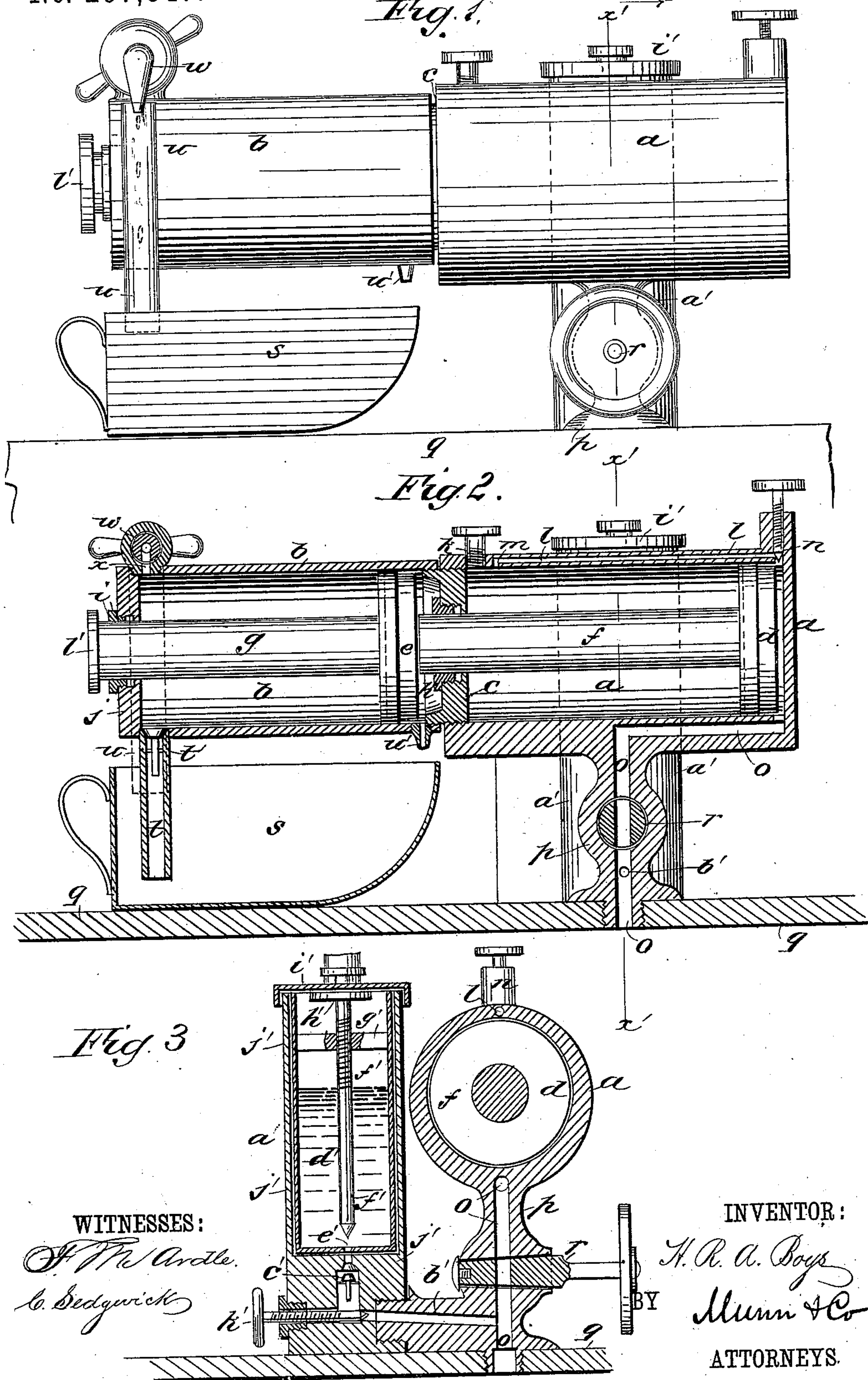
(No Model.)

H. R. A. BOYS.

LUBRICATOR.

No. 297,347.

Patented Apr. 22, 1884.



UNITED STATES PATENT OFFICE.

HENRY R. A. BOYS, OF BARRIE, ONTARIO, CANADA.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 297,347, dated April 22, 1884.

Application filed January 17, 1884. (No model.)

To all whom it may concern:

Be it known that I, HENRY RAMMEL ALVES BOYS, of Barrie, in the Province of Ontario and Dominion of Canada, have invented a new and Improved Lubricator, of which the following is a full, clear, and exact description.

The object of my invention is to provide a simple and efficient lubricator to feed oil or other lubricant to the valves of steam-engines more particularly, but which will serve well in other situations or for other or more general lubrication.

The invention consists of an arrangement of an oil-feeding cylinder and piston and a gage-cylinder and piston, so that the outward movement of the piston to feed the oil from the oil-cylinder shall cause a corresponding outflow of the gaging-liquid from the gage-cylinder to measure the rate of feed of the oil; and in an arrangement of a sight-glass on the gage-cylinder to indicate the feed of the oil; and in the combination, with the oil-feed and gage-cylinders so arranged, of an oil-reservoir adapted to supply oil to the moving valves of the engine when the steam-pressure is cut off and the feed from the oil-cylinder ceases.

The invention includes, also, special constructions and combinations of the parts of the apparatus to insure its economical construction and operation, all as hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of my improved lubricator. Fig. 2 is a longitudinal sectional elevation of the same; and Fig. 3 is a cross-sectional elevation on the line $x' x' x'$, Figs. 1 and 2.

In constructing my improved lubricator the oil-feeding and gage cylinders may have a variety of forms, and may be differently positioned with relation to each other within the scope of my invention.

The drawings illustrate a preferred arrangement of the cylinders and connections as adapted for feeding the lubricant to the steam-chest and valves of a locomotive-engine, the oil and gage cylinders being arranged in line with each other.

The letter a indicates the oil-cylinder, and b the gage-cylinder, connected in line by a screw-plug, c , and having, respectively, the packed pistons $d e$, with rods $f g$ passing through stuffing-boxes $h i$ in plug c and the end wall, j , of cylinder b , respectively. The oil-cylinder a has an opening at k , through which the cylinder is filled with oil, and which is closed by a screw-plug, as shown. Cylinder a also has a passage, l , in and along its side wall. (Shown in this instance at the top of the cylinder.) Said passage l opens at m to the bore of the cylinder at one end, and at the other end is fitted with a plug-valve, n , by which the discharge of oil from the cylinder may be regulated to a nicety.

In and along the wall or cylinder a , preferably opposite the passage l , I form a passage, o , which ranges down through the post or standard p , which supports the cylinders $a b$ upon the steam-chest cover q , and opens into the chest for a steam and oil way to and from the cylinder a . A valve, r , controls the flow of steam to the cylinder a , as shown.

Below the gage-cylinder b , I place a pan or vessel, s , over which three separate pipes or nozzles connecting with the cylinder are arranged, viz: a pipe, t , valved at t' , and through which the gaging-liquid—preferably glycerine—is drawn from vessel s to charge the cylinder on the back-stroke of piston e , a nozzle, u' , for escape of liquid which may have leaked past piston e back into the vessel s , and a pipe or tube, u , made of glass or other transparent material, through which the gaging-liquid drops back to the vessel s on the forward stroke of piston e , caused by the pressure of the end of the piston-rod f against it.

The drop of the gaging-liquid through the sight glass or tube u is controlled by a suitable valve, w , which connects with the cylinder b by a passage, x . The valve w may be closed to check the feed of oil by preventing the escape of the liquid from cylinder b , and consequently resisting the advance of the piston d in the oil-feeding cylinder a , or valve w may partly be closed to aid the oil-feed valve n in checking the flow of oil to the steam chest; but in practice I propose to leave the valve w wide open when the oil is feeding to the engine-valves, and close it only when the cylinder b

is to be refilled with the gaging-liquid; and I therefore rely mainly or wholly on the valve *n* to regulate the feed of the lubricant.

As thus far described, the lubricator is completely adapted for use with any ordinary type of stationary engine where the steam-supply is constant, or nearly so; but for use on locomotives or hoisting and other engines, where the steam-supply is intermittent, as when stopping and starting the engine or machine, it is necessary that the moving valves be lubricated independently of the pressure of steam through the passage *o*, and to effect this I arrange an oil-reservoir, *a'*, near cylinder *a*, with a passage, *b'*, connecting with the steamway *o*, and preferably between the valve *r* and the steam-chest *q*.

The oil-reservoir *a'* may have any suitable construction embodying the passage *b'*, and a downwardly-opening plug-valve, *c'*; but I prefer to make the oil-reservoir proper, *d'*, as a separate vessel with a feed-aperture, *e'*, at the bottom, controlled by a plug-valve, *f'*, screwing into a cross-bar, *g'*, of the vessel *d'*, and having any suitable head, *h'*, to which access may be had on removing the cover *i'* of the reservoir for setting the valve *f'* to control the feed of oil to passage *b'*; and the vessel *d'* may be refilled while in its seat in the reservoir-case *j'*, or may be removed therefrom for the purpose. This case *j'* affords convenient means of holding and seating the valve *c'*, and also the side valve, *k'*, by which latter valve the flow of oil from the reservoir may wholly be cut off.

The operation is as follows: To charge the lubricator the valve *w* is closed after piston *e* has been drawn out or fully forward by grasping the head *l'* of the rod *g*, or otherwise, and by forcing the piston back again the glycerine placed in the vessel *s* will be drawn by suction through the upwardly-opening valve *t'*, following the piston *e*, and filling the cylinder *b*, the piston *e* at the same time acting on the end of rod *f* to force piston *d* to the farther end of the oil-cylinder *a*. The plug at *k* is now removed, and said cylinder *a* is filled with the oil or other lubricant and the plug replaced. The reservoir-vessel *d'* is charged with oil, and the valve *n* *f'* adjusted for the desired rate of feed of the oil. The valve *w* is fully opened for escape of the glycerine from cylinder *b*, and the apparatus is ready for action upon opening the valve *r*, which, being done, the steam from chest *q* passes through passages *o* behind the piston *d* and drives it forward, forcing the oil through passages *m* *l* *o* to the steam-chest, and driving the piston *e* forward also by the rod *f*, to force through valve *w* and the sight-glass *u* a quantity of the glycerine from cylinder *b*, corresponding exactly with the amount of oil discharged from cylinder *a*, and hence the flow of the glycerine drop by drop through the sight-glass *u* clearly indicates always the rate of feed of the oil to the steam-chest and steam-valves of the engine. While the steam passes

freely to the steam-chest from the steam-boiler, the valve *k'* being open, the steam pressure through passage *b'* seats the valve *c'* and cuts off the flow of oil from the vessel *d'*; but when the steam-pressure is cut off the valve *c'* drops and permits free flow of the oil to the chest *q*, to lubricate the moving valves as the engine or machine is stopping, as will readily be understood.

The piston-rod *f* is made large to give a considerable greater area for the steam to act on the piston *d* than the area of the inner face of the piston, which forces the oil forward to insure a positive oil-feed.

The quantity of oil in cylinder *a* always is indicated by the extent of the projection of the end of rod *g* from its cylinder *b*; and if the vessel *s* be closely covered from dust the same charge of glycerine may be used over and over again for a long time, and the lubricator can be made to work in any position by adapting its passages or steam and oil ways to the special conditions of use.

Where low pressure of steam is employed, the steam may be admitted between plug *c* and the piston *e* of the cylinder *b*, to aid the effective action of the apparatus.

Although I prefer to operate the lubricator by direct steam-pressure, as above described, and as used for lubricating the valves of engines, it will readily be seen that the duplicate oil and gage cylinder pistons may be pulled or pushed by spring-power, or by the gravity of weights suitably arranged for the purpose; hence my improved lubricator may be applied to use not only with steam-valves, but in many other situations where steady and economical lubrication is required.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A lubricator constructed with an oil-cylinder and forcing-piston and a liquid-gage cylinder and forcing-piston so arranged with relation to each other that the outward pressure of the lubricant by the piston of one cylinder shall cause a corresponding outflow of the liquid from the other cylinder to measure the rate of feed of the lubricant, substantially as shown and described.

2. A lubricator constructed with an oil-cylinder, *a*, and a gage-cylinder, *b*, provided with connecting-pistons *d* *e*, and having a transparent passage, *u*, for the gaging-liquid, to indicate the rate of feed of the lubricant, substantially as shown and described.

3. A lubricator constructed with oil-cylinder *a* and gage-cylinder *b*, connected in the line by a plug, *c*, and provided with pistons *d* *e*, to be moved one by the other, substantially as shown and described.

4. The combination, with the oil-cylinder *a*, of its piston *d*, passages *m*, *l*, and *o* in and along the side wall of the said cylinder, and the valve *n*, substantially as shown and described.

5. The combination, with the gage-cylinder

b, of its piston *e*, pipe and valve *t t'*, and the valve *w*, substantially as shown and described.

6. The combination, with the oil-cylinder *a*, having piston *d*, and rod *f*, passages *m l o*, and valve *n*, of the gage-cylinder *b*, having piston *e*, pipe and valve *t t'*, valve *w*, and sight-glass *u*, substantially as shown and described.

7. The combination, with the gage-cylinder *b* and its piston *e*, pipe *t*, valve *t'*, and drop-valve *w*, of the vessel *s*, substantially as shown and described.

8. The combination, with the gage-cylinder *b* and vessel *s*, of the drip-nozzle *u'*, substantially as shown and described.

15 9. A lubricator constructed with oil and gage cylinders *a b*, having pistons *d* and *e* acted on one by the other, and arranged to feed the oil and measure the feed, and with an oil-reservoir having a downwardly-opening valve, *c'*, to be closed by steam-pressure while the piston of cylinder *a* is forced forward by the steam-pressure to feed the oil from said cylinder, and said reservoir being arranged to feed oil by an opening of its valve

c' when the steam-pressure is cut off and the feed from the oil-cylinder *a* ceases, substantially as shown and described. 25

10. The reservoir *a'*, constructed with a case, *j'*, apertured to receive the oil-vessel *d'*, constructed with an opening, *e'*, and a valve therefor, and the valve *c'*, and said case connecting 30 by a passage, *b'*, with the steam-chest *q*, substantially as shown and described.

11. The combination, with the case *j'*, of the reservoir *a'*, having the oil-vessel *d'*, apertured at *e'*, and valve *c'* of the cut-off valve *k'*, substantially as shown and described. 35

12. The reservoir *a'*, constructed with an apertured case, *j'*, having a valve, *c'*, controlling a passage, *b'*, to the steam-chest, and an oil-vessel, *d'*, apertured at *e'*, and having the adjustable plug-valve *f'*, substantially as shown and described. 40

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Witnesses:

S. M. SANFORD,
F. M. SMITH.