(No Model.)

C. W. BOLUSS.

STEAM ENGINE LUBRICATOR.

No. 305,887. Patented Sept. 30, 1884.

FIG. 1.

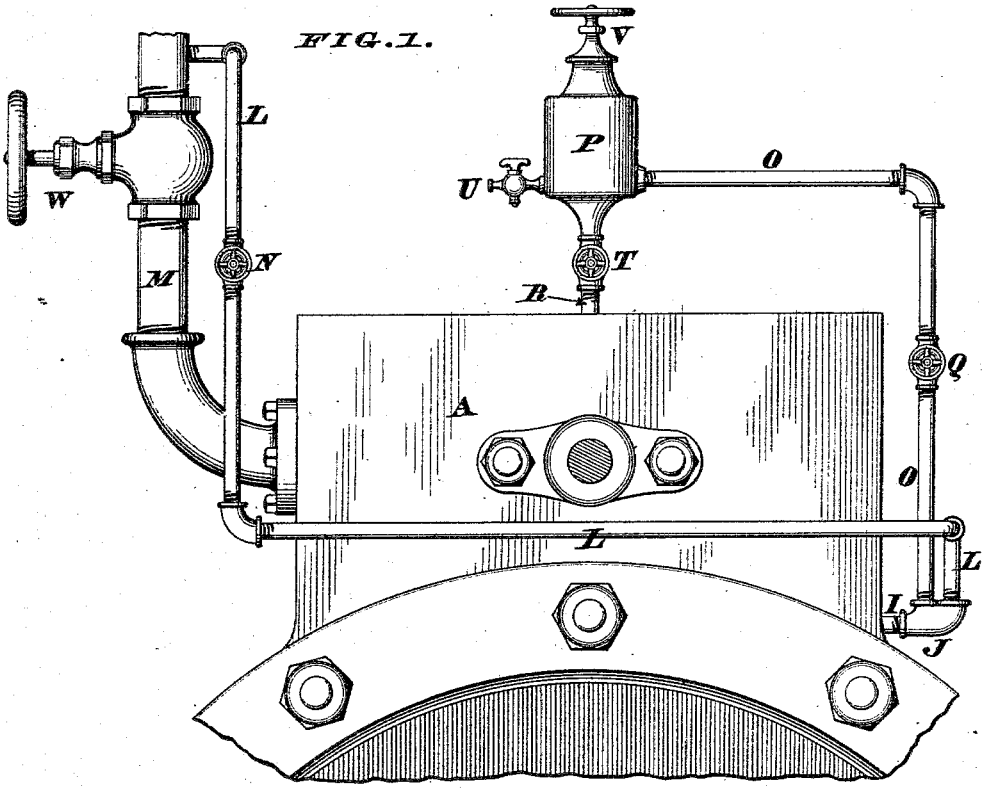


FIG. 2.

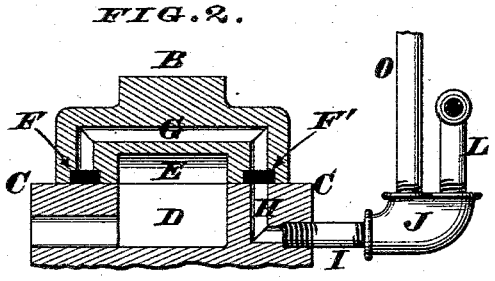


FIG. 3.

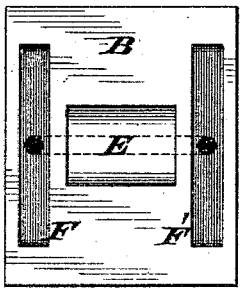


FIG. 4.

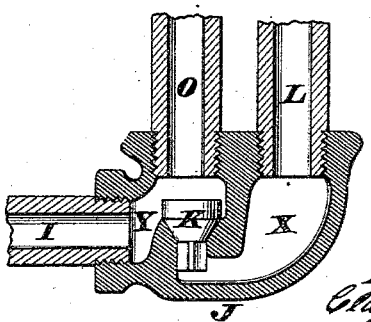
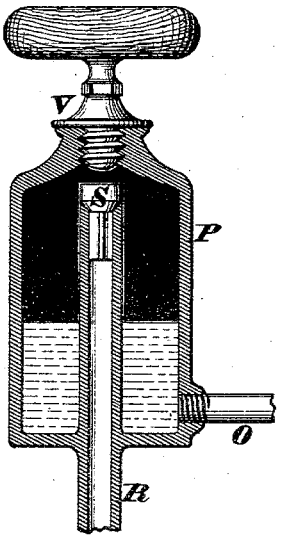


FIG. 5.



Attest.
S. S. Carpenter,
Chas. Beresford

Inventor.
Clarence W. Boluss.
by James H. Layman
Atty.

UNITED STATES PATENT OFFICE.

CLARENCE W. BOLUSS, OF NORWOOD, ASSIGNOR OF ONE-HALF TO MICHAELS & SCHUERMANN, OF CINCINNATI, OHIO.

STEAM-ENGINE LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 305,887, dated September 30, 1884.

Application filed June 19, 1884. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE W. BOLUSS, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Steam-Engine Lubricators, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention comprises a novel combination of devices for insuring a regular but intermittent forced feed of oil or other lubricant between the valve and seat of any form of steam-engine. Said combination includes an oil cup or reservoir mounted on the steam-chest of the engine, a pipe for delivering oil from said reservoir, an automatically-operating valve that allows the oil to flow from this delivery-pipe, and a pipe that admits live steam at boiler-pressure to close said valve and inject the lubricant into a special duct made in the seat of the main valve. The main valve reciprocates on the aforesaid seat, and has in its working face a cavity that communicates with the steam-ports in the usual manner, and on each side of said cavity a longitudinal groove is made, which should be as long and wide as the size of the valve will permit, although the exact depth of said grooves is immaterial. Furthermore, these grooves are connected by an internal transverse channel or passage in order that steam may flow freely from one groove into the other, the receiving-groove being at all times in communication with the aforesaid special duct of the valve-seat. The other groove, however, has no duct, ventage, or outlet of any kind, as it is necessary that live steam shall constantly be chambered in both of said grooves, thereby balancing the valve in exact proportion to the area afforded by these side cavities, while at the same time a thorough distribution of lubricant is effected, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a front elevation of a steam-chest provided with my lubricating attachments. Fig. 2 is an enlarged transverse section of the slide-valve, the seat, and the pipe-connections to the latter. Fig. 3 is a plan of the face of the valve. Fig. 4 is an enlarged vertical section of the double elbow that connects the oil-pipe and the live-steam pipe of the lubricator. Fig. 5 is an enlarged axial section of the oil cup, reservoir, or fount.

A represents the steam-chest, within which is fitted any approved form of slide-valve B, (seen in Figs. 2 and 3,) said valve being adapted to travel on the seat C, and the latter being furnished with two customary inlet-ports, and an exhaust-port, D. E is the cavity in the face of said valve, which cavity communicates with the exhaust-port D in the usual manner. Furthermore, the face of this valve has a long receiving-groove, F, parallel with one of its edges, and a similar groove, F′, parallel with its other edge, these grooves being united by a transverse passage, G. Groove F′ is at all times in communication with the lubricating-duct H, that is preferably located at the mid-length of the seat C; but the other groove, F, has no communication either with a duct, passage, or escape channel of any kind whatever, as an outlet or ventage to this groove would defeat the principal feature of my invention, it being designed to have the oil and live steam at all times chambered in said connected grooves F and F′. Proceeding from this lubricating-duct is a short pipe, I, attached to a double elbow, J, within which latter is fitted an upwardly-opening valve, K. (Seen in Fig. 4.) Coupled to the chamber X of this double elbow is a pipe, L, attached to the main pipe M, and above the throttle of the latter, so as to furnish steam at boiler-pressure.

N is a cock or throttle of the pipe L.

Coupled to the discharge-chamber Y of elbow J is a delivery-pipe, O, that connects with the bottom of oil cup or reservoir P, the latter being of any approved construction. Delivery-pipe O has a cock, Q. The oil cup, reservoir, or fount P is mounted on top of the steam-chest A, and has an axial tube, R, closed at top by a valve, S.

T is a cock, which, when opened, affords communication between the steam-chest and the reservoir P, said cock being situated either at the lower end of tube R or being coupled to a short pipe attached to said tube.

U is a drain-cock for the reservoir, and V is a screw-threaded cap, whose removal allows

said reservoir to be charged with oil or other suitable lubricant.

W is the throttle-valve of the engine.

The operation of my lubricating attachment is as follows: The main throttle W being closed, and the engine in a cold condition, the valve Q is shut and the valves N and T opened, thereby allowing steam at boiler-pressure to flow through the pipe L, lift the valve K and enter the special duct H of steam-chest C. As there is now no pressure in this chest the steam raises the slide-valve B, passes down the inlet-ports into the cylinder, and thus warms up the engine in a few minutes. At the same time the engine is being warmed the steam passes up the pipe R, lifts the valve S at the upper end thereof, and fills all the space above the oil in cup P. Valve T is now closed, throttle U opened, and the engine set in motion, after which the lubricating devices effect a regular but intermittent injection of oil into the duct H, owing to the peculiar action of valve K, the latter being normally held up against the lower end of pipe O by the pressure of live steam beneath said valve. Consequently a limited quantity of oil accumulates in said pipe O; but the instant the slide-valve B is shifted to admit steam into either end of the cylinder there is a momentary reduction of pressure in the pipe L, which causes the valve K to close on its seat and the oil to flow into the chamber Y; but as soon as this momentary reduction of steam ceases, the boiler-pressure again prevails, thereby lifting the valve K and holding it firmly against the end of pipe O. Furthermore, this admission of the boiler-pressure drives the oil out of chamber Y into pipe I, and thence up the special duct H, and finally into the receiving-groove F′, which action is repeated at every stroke of the engine, the result being to insure a regular but intermittent forced supply or feed of oil into the said duct H, or any suitable opening or channel in the steam-chest, that will allow the lubricant to obtain access between the double-grooved valve and its seat. From the duct H the oil is driven into the receiving groove F′, and thence along the passage G into the opposite groove, F, thereby lubricating the valve and seat in the most thorough and uniform manner. Furthermore, this introduction of live steam beneath the slide-valve serves to balance the valve to a very material extent, thereby increasing the working capacity of the engine and diminishing the consumption of fuel. It is evident this balancing of the valve will be in exact proportion to the united areas of the two longitudinal grooves F F′, which communicating grooves, having no outlet or ventage, act as chambers to retain live steam, the upward pressure of which neutralizes to a certain extent the constant force that holds said valve down upon its seat.

In the drawings the invention is shown as applied to a steam-engine using an ordinary D slide-valve; but it is evident the improvement may be as readily applied to engines having reciprocating rotary valves.

I am aware that it is not new to provide a slide-valve with an internal receiving-channel on one side of its cavity and an internal discharging-channel on the other side thereof, into which channels lubricant is admitted and expelled at certain intervals during the stroke of the slide-valve, as such a construction is seen in Letters Patent No. 239,483, granted March 29, 1881, to J. Gates; but I know of no instance where a valve has been furnished with a pair of communicating but ventless grooves within which live steam is constantly chambered so as to assist in balancing the valve, while at the same time said grooves insure a continuous distribution of lubricant; therefore my claims are confined to this novel feature.

I claim as my invention—

1. The within-described method of lubricating a steam-engine whose valve has on its working-face a pair of communicating but ventless grooves, into which latter a suitable quantity of oil is injected by means of a jet of live steam, for the purpose described.

2. In combination with a steam-engine valve provided on its under face with a pair of communicating but ventless grooves, and traveling on a valve-seat having a lubricating-duct, H, communicating with the double elbow J, the pipe O, leading to an oil-reservoir, and the pipe L, for conducting steam into said elbow, substantially as herein described.

3. In combination with a valve-seat having a lubricating-duct, H, through which oil and steam are injected in the manner described, the double-grooved and ventless slide-valve B E F F′, provided with a passage, G, for the purpose specified.

4. The combination, in a steam-engine lubricator, of the double elbow J X Y, inclosing the vertically and automatically acting valve K, and provided with an oil-pipe, O, live-steam pipe L, and common outlet I, for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

CLARENCE W. BOLUSS.

Witnesses:
JAMES H. LAYMAN,
SAML. S. CARPENTER.