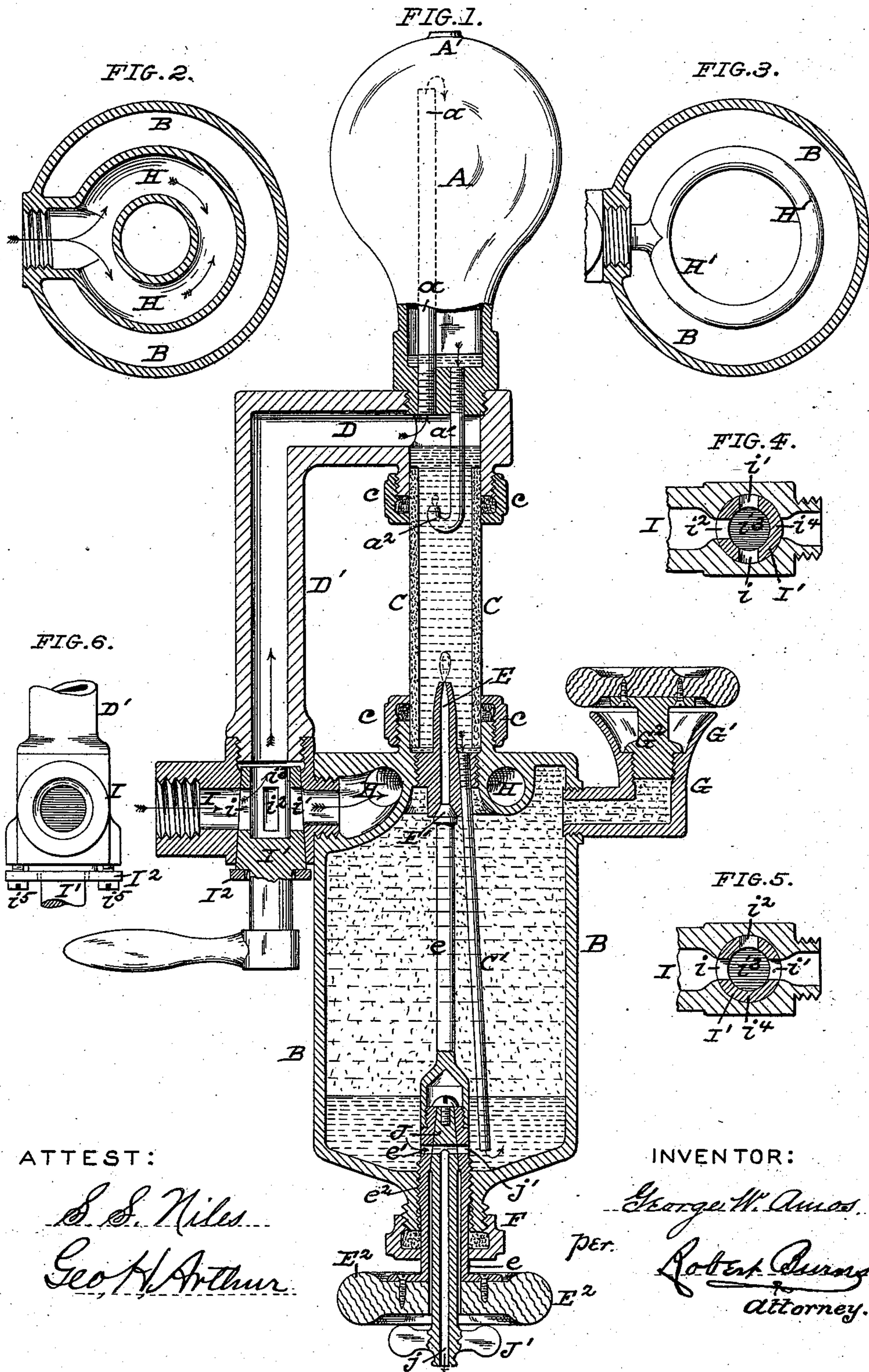


(No Model.)

G. W. AMOS.
LUBRICATOR.

No. 377,593.

Patented Feb. 7, 1888.



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GEORGE W. AMOS, OF CHICAGO, ILLINOIS.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 377,593, dated February 7, 1888.

Application filed June 4, 1886. Serial No. 204,172. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. AMOS, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Engine Lubricators; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is an axial sectional elevation of a lubricator to which my improvements are adapted; Fig. 2, a horizontal section through the upper portion of the oil-containing tank or reservoir, illustrating the steam-heating passage or caliduct for imparting the requisite liquefying temperature to the upper stratum of the lubricant, to keep the same in a fluid condition best adapted to effect the constant limited feed required in the present type of lubricators; Fig. 3, a similar view of a modified arrangement of the same; Figs. 4 and 5, detail horizontal sections of the steam-supply-controlling valve in two of its positions, and Fig. 6 a detail end elevation of the same at right angles to the plane of Fig. 1.

Similar letters of reference indicate like parts in the several views.

My invention relates to that class of steam-engine lubricators in which a limited and constant flow of the lubricant to the engine-valve and parts is achieved by the gradual displacement of such lubricant by the pressure of a body of water in the form of a constant hydrostatic column that is supplied by the condensation of steam in the upper portion of the apparatus; and my present improvement has for its objects, first, to provide means for communicating to the lubricant at or adjacent to its point of outflow a sufficient liquefying heat or temperature to impart fluidity to the same, so that it will flow through the discharge-opening of the lubricator in an easy and ready manner; second, to afford means for tempering the degree of heat to which the lubricant is exposed, the action of which will be independent of the other controlling appliances of the lubricator; third, to supply a combined means for regulating and controlling the feed of the lubricant and the water discharge or drainage of the apparatus, and,

fourth, to provide means for the ready and constant supply of the hydrostatic column of the apparatus, and with which any liability of the lubricant passing up into the condensing-chamber is entirely obviated.

To enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to more fully describe the mode of construction and operation of my improvements.

The steam-engine lubricator to which my improvements are more especially adapted is of the form shown in the drawings, in which the condensing-chamber A is arranged vertically above the lubricant-containing tank or reservoir B and connected thereto by means of a sight-feed hydrostatic column that is formed by a tube, C, of glass, secured to the top of the reservoir B and to the bottom of the condenser A by glands or packing-boxes *c c*.

The condenser A is supplied with steam from the main inlet pipe or passage D of the lubricator by means of a small pipe or passage, *a*, extending to near the top of the condensing-chamber, as shown, and the water of condensation as it forms in said chamber is carried down into the sight-feed column C by means of a tube or passage, *a'*, to form the operating hydrostatic column of the apparatus. The pipe or passage *a'* is formed with a "trapped" or upwardly-bent discharge end, *a''*, to prevent any liability of the lubricant passing up into the condenser through said tube, due to the lighter specific gravity of such lubricant.

C' is a pipe or passage extending from the bottom of the column C to near the bottom of the lubricant-reservoir B, for conducting the body of water from said column into the bottom of the reservoir to forcibly displace the lubricant therefrom, and discharge in drops through the drop-discharge tube or nozzle E at regulated intervals, the frequency of which is regulated by the axially-arranged valve E', the operating shank or stem *e* of which extends down and out through the bottom of the reservoir B, as shown, and is provided with an operating hand-wheel, E², by which it is adjusted, such adjustment being effected by a screw-threaded portion, *e''*, of the valve-stem passing through an internally-screw-threaded part of the opening in the bottom of the res-

ervoir, the lower end of which is closed by a gland or packing-box, F, to prevent leakage.

The drop-discharging nozzle E is axially arranged, as shown, and projects up into the sight-column C a sufficient distance to enable the drops of the lubricant as they discharge from the top of the same to be readily observed through the transparent wall of the column C.

G is the filling-orifice of the reservoir B, having a funnel-mouth, G', and closed by a screw-plug, G², as shown.

A' is a neck or socket at the top of the condenser A to receive a vent-valve (not shown) to admit of the ready removal of the air from the condenser in first starting the apparatus, and when desired a regulating-valve can be arranged in the outflow-passage D to prevent fluctuations in the return-water of condensation and oil-feed.

The general constructive features and arrangement of parts so far described are common to a number of lubricators heretofore proposed or used, and no broad claim of novelty is made in the application to any of such features, the novelty in the present invention consisting, mainly, in furnishing an improved means or method whereby the very heavy and solid lubricants or oils can be as readily and certainly fed from the present type of lubricators as has heretofore been accomplished with the ordinary light fluid lubricating-oils, heretofore almost exclusively used with this class of lubricators. This I accomplish by the provision of a caliduct, H, at or adjacent to the point of outlet for the lubricant, and which receives a supply of steam from the live-steam pipe to engine, or from any other suitable source, the action of which is to heat and liquefy the stratum of lubricant at such point, so that it will readily flow through the contracted drop-tube or feeding-nozzle E of the apparatus, and which, while keeping the balance of the lubricant in a proper fluid or semi-fluid condition by conduction, does not raise the temperature of the same or of the displacing body of water to such a degree as to generate a steam or vapor, which, collecting in the top portion of the lubricant-reservoir, would interfere with or entirely prevent the proper feeding of the apparatus.

As the presence of a body of water in the caliduct or heating-chamber H would hinder or prevent a radiation of the proper degree of heat therefrom into the body of the lubricant, I have, in order to overcome such difficulty, arranged the bottom of the caliduct in a plane above its source of steam-supply, as shown, so that the water of condensation as fast as formed therein will drain back into the steam-supply pipe I and leave such caliduct free to perform its functions under the most advantageous conditions. In use I prefer to form such caliduct H integral with the reservoir-casing by coring out the upper portion of the same, as shown in Fig. 1, and preferably in the form of

a horizontally-arranged annular duct, as indicated in Fig. 2; yet, when desired, said caliduct may be made entirely separate from the reservoir-casing in the form of an annular tube, H', and afterward connected thereto, as indicated in Fig. 3; and in like manner the form of the duct may be varied from the horizontally-arranged annular form shown to any other desired form, as the circumstances and judgment of the constructor may suggest, without departing from the spirit of my invention.

Steam is supplied to the apparatus to effect the proper working of the same by the following means:

I is the receiving-neck, having communication by a valved branch pipe (not shown) with the live-steam pipe to the engine, or with any other suitable source, and is provided with a three-way plug-valve, I', having horizontal passages i^1 i^2 , that communicate with an open-topped axial passage, i^3 , the arrangement being such that when the valve is turned to the position indicated in Fig. 5 steam will be admitted both to the caliduct H and to the condenser A through the passage in the supporting-elbow D', the vertical portion of the passage in such elbow being axially above the open-topped passage i^3 of valve I', and in constant communication therewith. When the valve is turned to the position shown in Fig. 4, steam will be shut off from the caliduct, and yet admitted to the condenser through passages i^2 and i^3 , as shown; and to shut off completely the supply of steam to the apparatus such valve is turned so as to bring its solid portion i^4 over the inlet-opening in the neck I, to close the same and prevent further ingress of steam to any portion of the apparatus. By such construction the quantity or degree of heat imparted to the lubricant can be regulated in a very perfect manner without interfering in the least with the operation of the balance of the apparatus.

I² is a follower-ring that surrounds the stem of the valve I', and having adjustment-bolts i^5 , by which slack or play due to wear of the valve can be taken up as it occurs, as illustrated in Fig. 6.

The drainage of the lubricant-reservoir B of its body of contained water that collects therein by the continued use of the apparatus is effected by means of a plug-valve, J, which in my improvement is seated in an enlargement of the valve-stem e of the oil-feed-controlling valve E, and has its valve-stem made tubular to form a vertical axial passage, j , ending at bottom in a discharge-nozzle and at top in a cross-passage, j' , which can be brought in line with the openings e' in the valve-stem e to admit of the discharge of the water. J' is a handle by which the valve J is manipulated. The portion of the valve-stem e below the valve J is made tubular, as shown, and passes through a stuffing-box or gland, F, at the lower end of the reservoir B, to prevent any leakage around the same, as before described.

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

1. A lubricator having a caliduct arranged at or adjacent to the point of outlet for the lubricant, with its bottom in a plane above its source of steam-supply, substantially as set forth.

2. The combination, with a lubricator, of a caliduct arranged within the reservoir, with its bottom in a plane above its source of steam-supply, and its walls forming an integral part of the casing of the lubricator-reservoir, substantially as set forth.

3. In a lubricator in which the feed of the lubricant is effected upwardly through a visible feed-discharge tube by the force of a heavier column of water, a caliduct, H, at the upper end of the lubricant-containing reservoir, and with its bottom arranged in a plane above its source of steam supply, substantially as and for the purpose set forth.

4. The combination, in a lubricator, of a condenser, A, steam-inlet passage D, water-column C, reservoir B, independently-arranged caliduct H, and three-way valve or cock I', substantially as described, and for the purpose set forth.

5. In a lubricator constructed essentially as herein described, the combination, with the inlet-passage D to the condenser and independently-arranged caliduct H and its supply-passage, of a three-way valve having passages i i' i'' i''' and solid portion i^4 , essentially as and for the purpose set forth.

6. In a lubricator, the combination of the condenser A, reservoir B, connecting water-column C, water-conducting tube a' , extending down into the water-column and provided with a return-bend or trap portion, a^2 , steam-

inlet passage D, communicating with the water-column at its upper end, and oil-discharge nozzle E, communicating with the water-column at its lower end, substantially as described.

7. In a lubricator, the combination of the condenser A, reservoir B, connecting water-column C, water-conducting tube a' , extending down into the water-column and provided with a return-bend or trap portion, a^2 , steam-inlet passage D, communicating with the water-column at its upper end, oil-discharge nozzle E, communicating with the water-column at its lower end, and caliduct H, substantially as described.

8. In a lubricator, the combination, with an oil outlet or nozzle, E, arranged at the upper end of the reservoir, of a valve, E', having a stem extending down through said reservoir and provided with a tubular lower portion forming a valve-seat, and drain-valve J, the parts being arranged and adapted to operate in the manner substantially as herein described.

9. In a lubricator, the combination, with an oil outlet or nozzle, E, arranged at the upper end of the reservoir, of the valve E', having the lower end of its stem made tubular and provided with openings e' , in combination with the plug-valve J, having a tubular stem provided with vertical passage j and cross-passage j' , essentially as and for the purpose set forth.

In testimony whereof witness my hand, this 2d day of June, 1886, at Chicago, Illinois.

GEORGE W. AMOS.

In presence of—

ROBERT BURNS,
S. S. NILES.