E. D. TYNE.

THERMOSCOPIC LUBRICATOR.

No. 180,505. Patented Aug. 1, 1876.

Fig. 1.

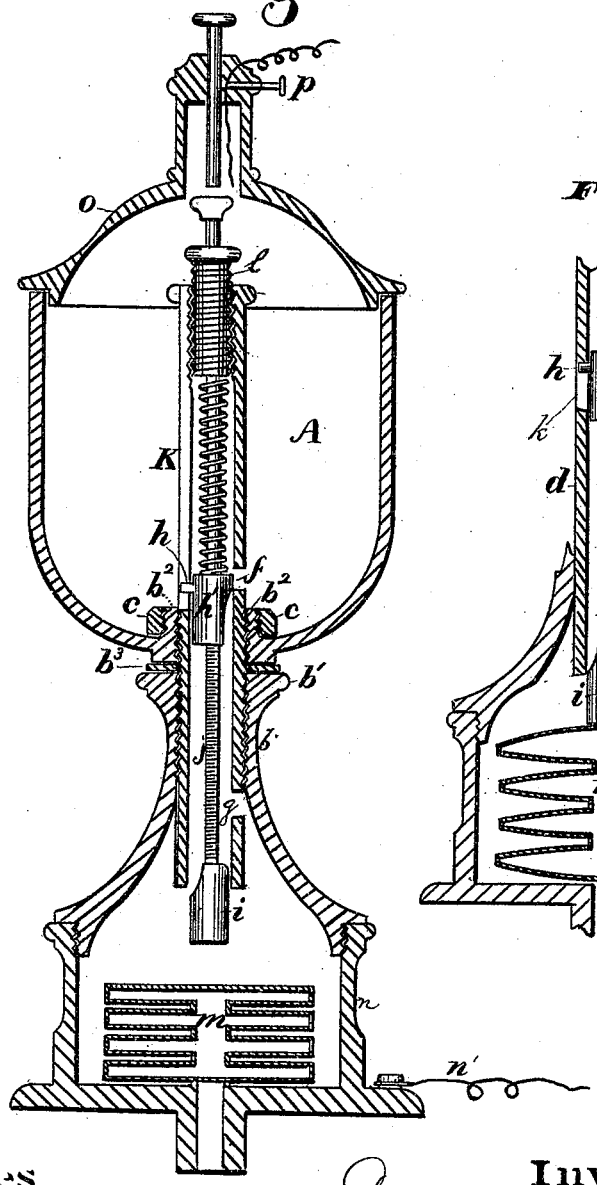
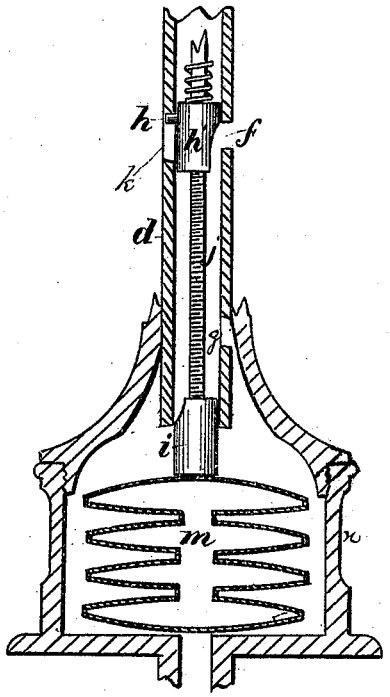


Fig. 2.



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EDMOND D. TYNE, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN THERMOSCOPIC LUBRICATORS.

Specification forming part of Letters Patent No. 180,505, dated August 1, 1876; application filed April 3, 1876.

To all whom it may concern:

Be it known that I, EDMOND D. TYNE, of San Francisco city and county, State of California, have invented an Improved Thermoscopic Lubricator; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment.

My invention relates to an improved safety-lubricator for supplying oil to the friction-surfaces of machinery, its object being to entirely obviate the trouble heretofore experienced with hot journals.

My improved oil-cup consists of a cup for containing the lubricant and a tube which connects the oil-chamber in the cup with the passage which conveys the oil to the journal. The tube is provided with a novel arrangement of valves and a regulating-screw by which the device can be adjusted to feed the oil slowly and regularly to the surfaces to be lubricated.

It also consists in the combination of a thermoscope of peculiar construction with the spindle or oil-tube of the lubricator, by which any increase of temperature will cause the thermoscope to expand and open the valves in the oil-spindle or tube, and thus supply a sufficient quantity of oil to relieve the friction and reduce the temperature.

It further consists in the combination of the circuit-wires of an electrical signal device with the oil-cup and its base in such a manner that when the frictional surfaces generate sufficient heat to expand the thermoscope to a certain extent, (which extent is adjustable,) metallic connection is completed between the two wires, and the circuit completed, so as to allow the electrical current to pass, and thus sound a signal or alarm.

The thermoscope is itself a novelty and a great improvement in that class of devices, and it can be used wherever it may be desirable or necessary to indicate a temperature above the volatilizing-point of the liquid which is used in the device.

Referring by letter to the drawing, A represents a cup, which may be of metal, glass, or other material, for containing oil. The present devices for connecting the oil-cup with its stem or support *b* consist, essentially, of a shoulder, b^1, upon which the cup and packing-rings are seated, an upper screw-threaded stem, b^2, extending into the oil-receptacle, and a screw-nut, *c*, arranged to work upon the stem b^2, and compress the cup tightly upon packing-rings b^3. The main tube or casing *d* of the valves for regulating the flow of oil from the oil-cup for lubricating purposes is provided with orifices *f g*, and an opening at its lower end, said orifice *f* being for the inflow, and the two latter for the overflow, of oil, and it is arranged to screw into the hollow support *b*, so that the inflow orifice or passage *f* shall open into the oil-cup, and the outflow orifice *g*, and open end of tube *d*, below, or into a chamber formed in the base of the support.

The valves *h' i*, for regulating such flow of oil, may be either cone-shaped or, as represented in the drawing, have the bevel upon one side only. These valves are arranged upon a common valve-rod, *j*.

The upper valve *h'* is adjustably secured upon a screw-threaded portion of the rod *j*, and with its bevel sloping downward, so that communication with the oil-cup through orifice *f* will be established only when said valve is raised and its beveled surface brought on a level with the opening.

The valve *g* is secured to the lower end of the valve-rod, and is arranged within the lower end of the tube *d*, so that a portion of its beveled surface, which slopes reversely to that of the upper valve, shall project below the mouth of the tube, and a passage be established which shall be closed only when the valve is raised. By this arrangement the lower valve will be open while the upper valve is closed, and vice versa, the orifice *g* above said lower valve being at all times free for the overflow. In order to prevent the upper valve *h'* from rotating upon its screw-stem while the latter is being turned in in either direction to vary the projecting length of the lower valve *i* below the valve-tube, I have, in this instance, provided it with a pin, *h*, arranged to work in a longitudinal slot, *k*, formed in the valve-tube. This, however, may be dispensed with.

The valve-stem *j* is centered by means of a sleeve, *l*, which screws into the upper end of the valve-tube, and which serves to regulate

the power of a coiled spring, which abuts against the same and depresses the valves. Another useful feature of this sleeve is that the valve-rod may be raised and maintained in an elevated position by partially unscrewing the sleeve, whereby the upper valve *h* may be kept open as long as desired for a continuous flow of oil from the oil cup.

The devices thus far described may be advantageously employed on lubricating journals and other machinery by raising the valve-rod from above until communication is established between the oil cup and chamber surrounding the lower end of the valve-tube through the said valve-tube and orifices *f g* therein, the overflow being at the latter point. After the valve-rod is released, and the upper valve closed, the lower valve will be opened, and a supply of oil, which has accumulated in the valve-tube above the lower valve and below the orifice *g*, will flow out through said lower valve, and insure a sufficient quantity for lubricating purposes. The above devices may be operated in this way, when occasion requires, with good results, but a most important feature of my invention consists in automatically operating the stem *j*, either for opening the valves or for establishing the circuit of an electric alarm or other alarm device, as hereinafter described, or both, by means of a device, which is constructed to have the greatest amount of expansion when subjected to heat. This device, which I will designate a thermoscope, consists of a series of flexible metallic chambers, *m*, communicating and connected with each other by means of central stems, or equivalent connection, so that, collectively, they shall constitute a sort of expansive bellows, which are, however, after having a very small quantity of alcohol, mercury, ether, naphtha, or other volatile substance placed inside of them, hermetically sealed.

The quantity of the volatile substance contained within the thermoscope may be limited according to the power required, the vaporization of such liquid by heat producing all the desirable results presently referred to. The sides of these chambers, which are formed of flexible metal, will, when the chambers are not exposed to the action of heat, lie closely together, similarly to a closed bellows.

The thermoscope is arranged under the lower end of rod *j* in any suitable way—as for instance, within a metallic case, *n*, which is provided with a central oil-passage through its base. Said case, which would otherwise be mounted upon the journal-box, may be dispensed with, and the thermoscope be secured directly within a chamber formed in said box. In such cases, should the journals and bearings become too hot, and require lubricating, the thermoscope will be immediately affected by such heat, thereby causing the alcohol, ether, or other volatile substance, to vaporize and expand the flexible sides of the several chambers, as shown in Fig. 2, the upper one of which will, as it rises, strike against and raise the rod or valve which projects below the main valve-tube *d*, and consequently open the valves for an inflow and outflow of oil through the orifices *f g*, as hereinbefore explained, and such flow will continue so long as the thermoscope is kept in a heated and distended condition by the heat from the journals.

Another important advantage arising from the arrangement of valves hereinbefore described is that if, during the overflow, while the upper valve is open, the oil should cool the thermoscope before the journals are sufficiently lubricated, the valve *i*, which will open upon the contraction of the expander, will allow the oil which has accumulated in the tube to flow out, and consequently insure perfect lubrication. If the expander should at any time continue in a heated and extended condition, and the supply of oil in the cup become fed out too rapidly through the open valve, the tube *b* may be raised or partially unscrewed, whereby the flow of oil may be regulated and lessened.

Another important feature of this invention is that it affords a means for giving an alarm-signal either in case of extreme heat of the machinery or of fire. To this end I connect a ground-wire, *n'*, with the lower part of the device, and to a cap, *o*, a wire connecting with the alarm. The cap, in this instance, is mounted upon a glass cup, and is consequently insulated, so when the rod *j* rises by the action of the expander, it will strike against, and form metallic connection with, a set-screw, *p*, which is arranged to work through said cap. This screw may be adjusted correspondingly with the temperature at which it is desired the alarm shall be given, and in case the oil-cup is made of metal, it may be insulated by any suitable non-conductor. In place of this, however, a trigger or other device for sounding an alarm may be employed.

My invention may be employed in lubricating the journals of cars, and for machinery of all descriptions, for governor or heat regulators, for dampers, for fire or other alarms, or for opening a faucet to allow a flow of water in case of fire, and a consequent increased degree of temperature, the change in the operative parts being in every instance very slight.

The number of chambers or compartments in the thermoscope may be multiplied at pleasure, so that its expansive power is only limited by the number of chambers employed and the quantity of volatile substance employed, varied according to the exhaustive power required.

It will also be observed that in this device the distance of the valve or lower end of the valve-rod from the thermoscope may be regulated by turning said rod in the screw-sleeve, as hereinbefore set forth.

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

1. In a device for regulating the flow of oil

from an oil-cup to the journals or machinery to be lubricated, the tube *d*, provided with inlet and outlet orifices *f g*, and also an opening at its lower end, in combination with the valves *h' i*, secured upon rod *j*, substantially as described, and operating in the manner set forth.

2. The screw-sleeve *l*, in combination with the rod *f*, valve *h'*, and tube *d*, provided with inlet and outlet orifices, substantially as set forth.

3. The expansive bellows *m*, in combination with valve-rod *j*, carrying valves for establishing the flow of oil, and operating within a tube, provided with inlet and outlet orifices, substantially in the manner and for the purpose specified.

4. In combination with a lubricating device, constructed substantially as described, an electric or other alarm, operated by the expansion of the herein-described expansive bellows or thermoscope, substantially as specified.

5. The insulated set-screw *p*, or equivalent device, connected with an alarm apparatus, in combination with the rod *j*, and expansive bellows *m*, operated substantially in the manner and for the purpose set forth.

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