(No Model.)

S. REID.

LUBRICATOR.

No. 273,312. Patented Mar. 6, 1883.

Fig. 1.

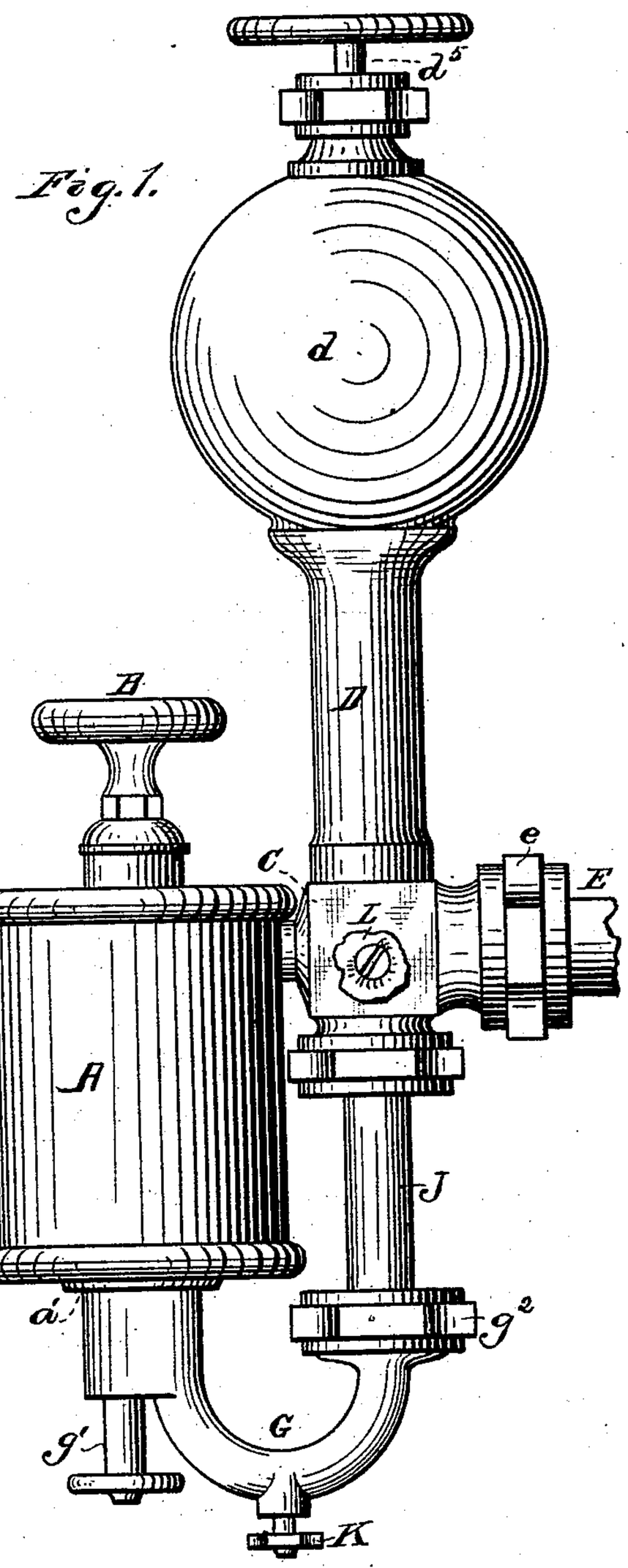
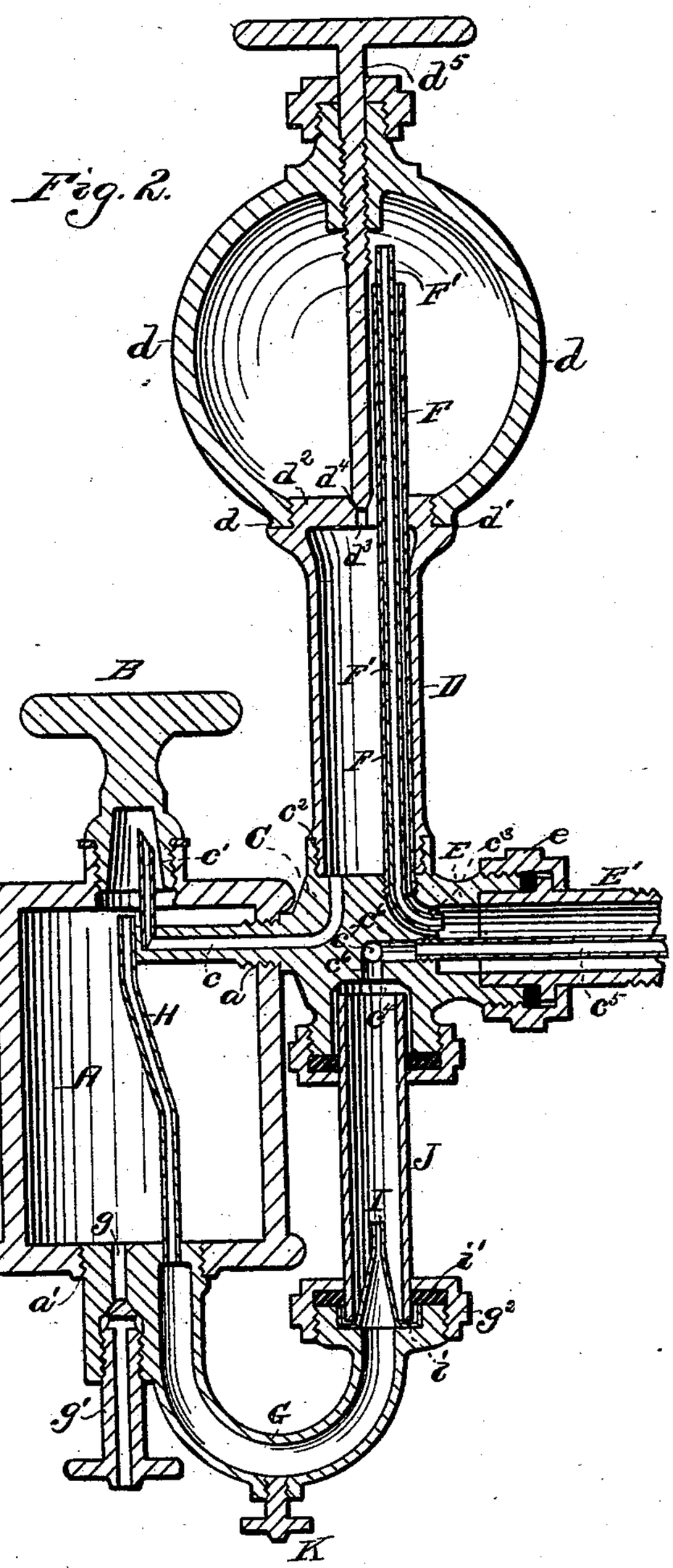


Fig. 2.



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SAMUEL REID, OF CHICAGO, ILLINOIS.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 273,312, dated March 6, 1883.

Application filed June 7, 1881. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL REID, of the city of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Lubricators, of which the following is a description, reference being had to the accompanying drawings, in which—

Figure 1 represents a front view of a lubricator embodying my improvement, and Fig. 2 is a longitudinal sectional view.

The object of my improvement is to provide a simple, compact, and cheap, but efficient lubricator, readily attachable to the pipes, cylinders, and other portions of a steam-engine, for supplying oil in an even, constant, and perfectly regulated quantity under all conditions and circumstances.

My invention consists, first, in providing the condensing chamber or tube of a lubricator with means for producing a constant circulation of steam therein, whereby with the slowest feed and in a cold room the oiling is constantly maintained, and whereby this result is accomplished with but a single connection of the lubricator to the steam pipe or cylinder; second, in providing a siphon tube or connection through a single shank from the condensing chamber or tube to the elevated portion of the oil-chamber; third, in providing the tube or passage from the oil-chamber to the glass tube or chamber, with a screw-plug at or near the lower part thereof, whereby the lubricator can be readily blown out and cleaned by the passage of steam through either portion thereof, either through the condensing-pipe and oil-chamber or through the glass tube or chamber, as desired; and, fourth, in the provision of a detachable nozzle to the passage from the oil-chamber to the water-chamber at the lower end of the latter, and held in place by an outer nut, together with packing, and through which the oil is fed into and through the water in the glass, all of which will be hereinafter more fully described, and pointed out definitely in the claims.

In the drawings, A represents the oil chamber or reservoir, formed, in the usual manner, of brass or other suitable metal.

The stopple B, screwed into the central portion of the upper end of the chamber A, is chambered within, so that when screwed into place it forms within an elevated portion of the chamber A, as clearly shown in Fig. 2 of the drawings.

The shank C is screwed into the side of the chamber A at *a*. It is also provided with a passage or water-duct, *c*, preferably cast in it by a core. Into the inner edge of the passage *c* is screwed the short pipe *c'*, extending upward within the chamber in the stopple B.

Within the upper portion of the shank C, at its outer end, at c^2, is screwed the condensing-tube D. To present the greater condensing-surface, the tube D is expanded at the top into the form of a globe, and in the preferable construction this globe is a separate piece, *d*, screwed upon the top of the tube D at *d'*, as shown in the drawings, a partition, d^2, extending across the top of the tube D. The partition d^2 is provided with an aperture, d^3, for the passage of steam or water from the globe into the tube below. This aperture is closed, when desired, by the valve d^4, of which the valve-stem d^5 passes up through an aperture in the center of the upper portion of the globe and terminates in a knob or other suitable handle.

The outer end of the shank C is bored out at E, forming an extension in the form of a tube, and its end is provided with an exterior screw-thread, upon which is screwed the nut *e*, attaching to the shank the short flanged tube E', the outer edge of which is also provided with an exterior screw-thread.

In attaching the lubricator the nut *e* is first slipped over the short tube E', and the latter is then screwed into place into the steam pipe or cylinder. The flanged end of the tube E' is then brought into contact with the outer end of the tube E, an annular packing-ring being interposed between them, and the nut *e* is then screwed upon the tube E, thus uniting the parts firmly together, and without the necessity of revolving the lubricator to screw it into place, which is an important advantage. The tube F is screwed into the top of the shank C, and fits into a passage, c^3, therein, opening into the short tube E. The tube F extends upward, preferably within the condensing-tube D, and through an aperture in the partition d^2 into the globe *d*, thus forming with the passage c^3 a continuous steam-duct from the

source of supply of the steam to the condensing-chamber and tube. In the form of construction illustrated in the drawings a second tube, F′, of smaller size, is inclosed within the tube F, thus forming a second or double steam-duct leading from the source of supply. The upper end of the tube F′ projects a short distance above the upper end of the tube F, as illustrated in the drawings. The lower end of the tube F′ also preferably extends a short distance outward beyond the end of the passage c^3.

The oil-chamber A is provided at its lower end with a central opening, a', into which is screwed one end of a curved tube, G, preferably cast of metal, with the passage therein formed by the insertion of a core. A short passage is made through the metal at the end of the tube G, where it is inserted in the end of the chamber A, for the purpose of draining the chamber when required. This passage is closed by the screw-plug g'. A tube, H, is also screwed through the metal, closing the inner end of the tube G, and extends upward to at or near the top of the chamber A, as shown in the drawings. The tube G is curved around so as to bring the top of its outer end preferably at or nearly in a plane with the bottom of the chamber A. This outer end is formed with an interior annular recess, fitted to contain the lower end of the detachable nozzle I. The form of the nozzle I is plainly shown in sectional view in the drawings. Its base is provided with an annular recess, i, upon its upper side, which permits of the insertion loosely of the lower end of the glass tube J, and it is held in place by the annular nut g^2, screwed upon the exterior of the outer end of tube G, an annular packing-ring, i', being interposed between the nut and the outer flange upon the base of the nozzle I. The glass tube J is inserted at its upper end in a circular recess, c^4, in the lower side of the shank C, and is held in place by a similar annular nut and packing-ring to those used at the lower end of the tube. The glass tube J is of such size and length that it stops slightly short of touching the metal at both ends, and is held at the sides by the pressure of the packing-rings, thus permitting its free expansion and contraction under the influence of heat and relieving it from undue strain.

The advantage of constructing the detachable nozzle I plain, as described, with the screw upon the nut, and exterior to the pipe G, instead of upon the nozzle, is that in putting the lubricator together the nuts and packing-rings are first slipped upon the glass tube and the nozzle inserted in its lower end. The upper end of the tube is then thrust into the circular recess c^4, to the top thereof, when the lower end of the tube, together with the base of the nozzle, can be slipped over the outer end of the tube G and down into place in the cavity i, and the nuts are then screwed into place. A much more simple and compact construction is thus secured than when the nozzle I is screwed into place and the glass tube afterward inserted; and, moreover, in my construction the nozzle I can be made of any desired length without increasing the difficulty of inserting it in place.

A screw-plug, K, is inserted in the lower side of the tube G, and by its removal either side of the lubricator may be cleaned by blowing the steam from the source of supply through that side and out through the passage fitted by the screw-plug K.

A short tube, c^5, is screwed into the outer end of the passage c^6, which extends through the shank C from the upper end of the glass chamber through to the outer end of the shank C into the tube E, as shown in the drawings.

A valve and screw-valve stem, L, (shown in Fig. 1,) is fitted into the passage c^6 at c^7, by turning which the passage c^6 may be closed when desired.

In the operation of my improved lubricator it is first attached to the steam pipe or cylinder, as hereinbefore set forth, and the chamber A is filled nearly full with oil and the stopple B inserted in place. The glass chamber J may be filled with water, either by previously pouring it into the tube H or by opening the valve at c^7 and permitting the steam to enter and condense therein until the chamber is full of water. The valve d^4 is also opened and the steam from the source of supply enters through the tubes F and F′ into the globe d, and is rapidly condensed into water, which fills the tube D. This water, owing to the weight of its column in the tube D, is forced through the passage c and tube c' into the chamber A, and, owing to its superior gravity, it then falls to the bottom of the chamber, displacing an equal quantity of oil, which is thus forced through the tubes H and G and nozzle I into the glass chamber J, whence, owing to its lighter specific gravity, it rises, usually in drops, through the column of water, in visible feed, and, passing through the passage c^6 in the shoulder C and the projecting tube, it is delivered into the steam pipe or cylinder at the place desired. The quantity of oil thus fed through the nozzle I is regulated by the amount of opening given to the valve at c^7. When the oil is nearly or quite exhausted in the chamber A the valves are closed and the screw-plug g' opened, when the water is drained off, and the chamber is then filled with oil, as before, the stopple B having been removed. The passage c in the single shank C is given an upward turn by the insertion of the pipe c', to prevent the oil from passing through and upward into the pipe D, where it is not wanted, and this passage is placed in the single shank C, containing also the passages c^3 and c^6, for simplicity, compactness, and cheapness of construction.

The tube H is preferably terminated at its upper end at or near the top of the chamber A, as shown in the drawings, that the lighter impurities in the oil may ascend above into

the recess or chamber in the stopple B, while the heavier impurities descend to the bottom of the chamber and are drawn off when the cup is drained of its water.

In operating lubricators provided with the single steam duct or tube F, leading from the source of supply of steam to the condensing chamber or tube, I found that under some circumstances the lubricator ceased to act, appearing to be clogged from some cause. To discover the nature of the difficulty, I constructed a lubricator in which the globe *d* and tube D were made of glass, that I might, by close observation, discover the cause of the stoppage. I found that under conditions in which condensation took place more rapidly than required to displace the oil, either when the condenser was placed in a very cold room or when a very slow feed was employed, the water in the globe *d* rose above the aperture in the upper end of the tube F, and the steam, rising through the water, was still more rapidly condensed until the globe was entirely filled with water, when I observed that it gradually filled the tube F in a downward direction from the top, in an analogous form to the accretions to an icicle, until the tube F was filled with a column of water, when, the pressure of the two water columns being equalized, the lubricator ceased working. Having thus discovered the nature of the difficulty, I wholly overcame it by devising means which should produce a constant circulation of steam in the condensing-chamber, thereby insuring at all times steam-pressure upon the top of the water-column in the tube D, and consequently a continuous movement of this water column, even with the slowest feed and in the coldest room. This constant circulation of steam may be produced in a variety of ways and by a combination of tubes or steam-ducts, either exterior or interior to the tube D, or both. The most simple and what I deem the best form of construction is illustrated in the drawings, in which the smaller tube F′ is inserted within the tube F, as hereinbefore described. In operating this form of construction the steam from the source of supply passes upward through both the tubes F and F′ and condenses until with a slow feed or in a very cold room the condensed water rises to the level of the aperture in the upper end of the tube F. Steam then continues to pass through the aperture in the upper end of the tube F′, above the upper end of the tube F, and condenses, as before; but the surplus water formed passes down through the tube F and is conveyed to the general source of steam-supply, so that the water in the condensing-chamber never rises so as to check the flow of the steam through the tube F′. As an experiment, the valve d^4 may be tightly closed, stopping the feed of the lubricator altogether, and constant circulation of steam in the globe *d* will be maintained, the water of condensation being continually drained off by the tube F, thus demonstrating the perfection of the process.

It will be observed that the main portions of the lubricator—the chamber A, the shank C, the tube D, and globe *d*—are each so centered that the work to be done upon them in fitting and finishing them can readily be done upon a lathe with few changes in position, which is an important element in cheapness of construction.

The lubricator herein described is simple, compact, economical in construction, and a uniform, perfectly-regulated, and never-failing supply of oil is thereby afforded to the parts sought to be lubricated.

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

1. In a hydrostatic-column lubricator, the combination of a condensing chamber or tube with two open independent ducts extending from the source of steam-supply to the condensing chamber or tube and opening therein at different heights, substantially as described.

2. In a hydrostatic-column lubricator, the combination of a condensing chamber or tube with three ducts opening therein at different heights—viz., the lower one for conducting the condensation-water to the oil-cup, the upper one for admitting steam uninterruptedly to the condensing-chamber, and the intermediate one for admitting steam to the condensing-chamber when the level of the water therein is below the intermediate opening, and allowing the surplus water, when its level is at or above such opening, to flow directly back to the source of steam-supply—substantially as described.

3. A sight-feed lubricator having a single shank or stem for attachment to the machinery to be lubricated, and combining in its construction the following elements, viz: an oil-passage from the oil-cup and sight-feed glass, through said shank to the steam source, two separate passages through said shank to the condensing-chamber, and a water-passage from the condensing-chamber to the oil-cup, substantially as described.

4. In a sight-feed lubricator, the combination of the sight-feed glass and the duct leading from the oil-cup thereto with a flanged detachable nozzle seated loosely in the end of said duct and extending into the sight-feed glass, a compressible packing-ring surrounding the glass and resting on the flange of the nozzle, and a screw-ring inclosing the compressible packing and serving to tighten it against both the glass and the flange of the nozzle, whereby the joints can be readily and perfectly packed, and the parts can be easily detached when desirable, substantially as described.

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