

T. W. MITCHELL & R. A. JONES.
LUBRICATOR.

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1,060,692.

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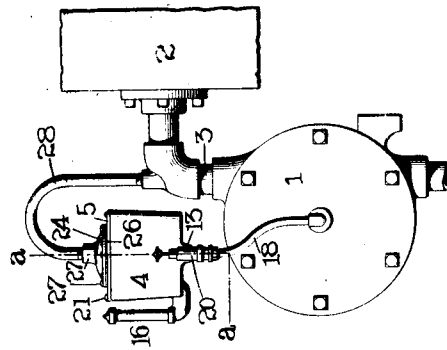


Fig. 1.

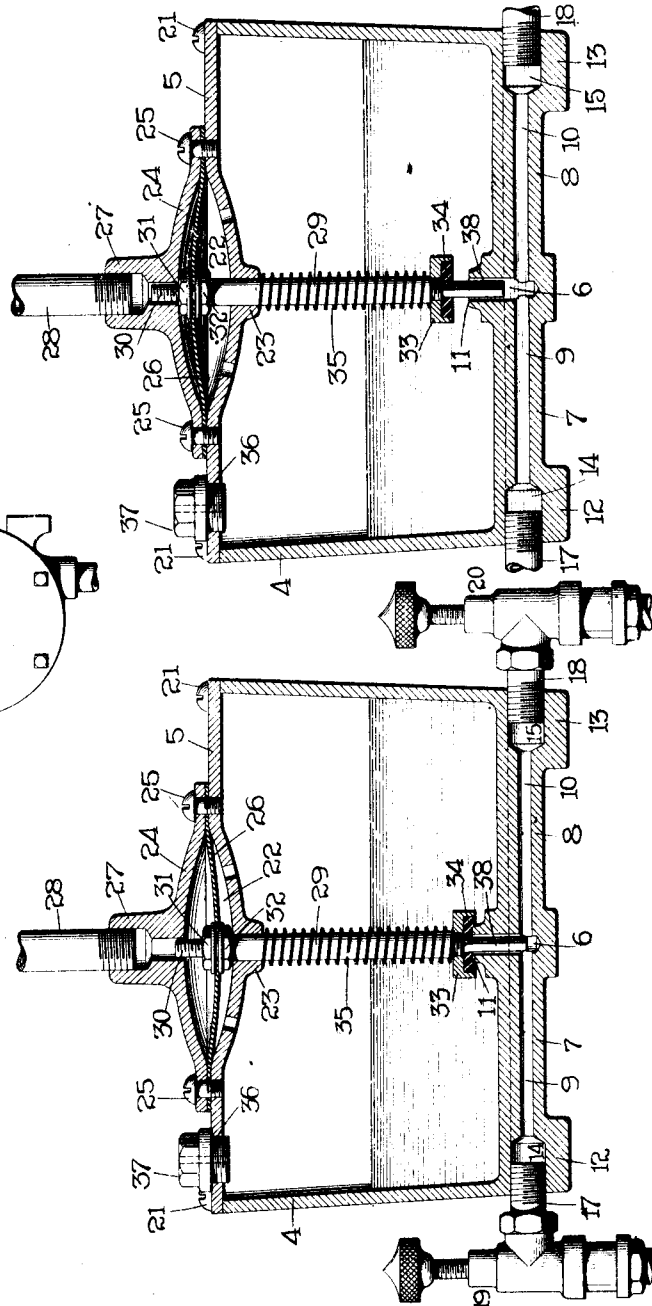


Fig. 3.

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LUBRICATOR.

1,060,692.

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To all whom it may concern:

Be it known that we, THOMAS W. MITCHELL and RALPH A. JONES, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, and at East Aurora, in the county of Erie and State of New York, respectively, have invented certain new and useful Improvements in Lubricators, of which the following is a specification.

This invention relates to improvements in lubricators, and more particularly to lubricators employed in connection with vacuum cleaning apparatus.

The principal object of the invention is to provide for automatically cutting off the flow of lubricant from the lubricator when the machinery of the vacuum cleaning apparatus stops.

The invention also relates to certain details of construction of the lubricator, which will be hereinafter described and claimed, reference being had to the accompanying drawings in which a preferred adaptation of the improved lubricator is illustrated both in connection with one type of a vacuum cleaning apparatus, and in detail construction.

Figure 1 is a fragmentary side elevation of a vacuum cleaning apparatus equipped with the improved lubricator. Fig. 2 is an enlarged vertical longitudinal section through the lubricator on line *a a*, Fig. 1, showing the outlet valve closed. Fig. 3 is an enlarged vertical longitudinal section through the lubricator on line *a a*, Fig. 1, showing the outlet valve open.

In referring to the drawings in detail, like numerals designate like parts.

In the accompanying drawings, a preferred form of the improved lubricator is illustrated in connection with the rotary pump and vacuum tank of a vacuum cleaning apparatus for disclosing one of the purposes to which this invention is applicable. The rotary pump 1 and the vacuum tank 2, illustrated in Fig. 1, are connected to each other by a pipe 3, so that the rotation of the pump will create a partial vacuum in the vacuum tank.

The form of our improved lubricator, illustrated in the accompanying drawing, comprises a box or casing for containing lubricant, and having an outlet, a pipe or pipes leading from the outlet to the point or

points requiring lubrication, a valve for closing the outlet, and suction means controlled from the rotary pump for moving the valve to free the outlet.

In Fig. 1 the lubricator is shown mounted above the rotary pump and to one side of the vacuum tank, being connected by piping to the rotary pump for lubricating purposes, and to the pipe connected to the vacuum tank and suction pump for valve operating purposes. The box or casing of the lubricator for containing the desired lubricant, consists of a body 4 and a top cover 5 removably fitted on said body. The body 4 is preferably cast of suitable metal, with its bottom, sides and ends complete in one piece. A vertical outlet opening 6 is cast in the bottom of the box body, and two ribs 7 and 8 are also cast on the under surface of the bottom of said box body, said ribs 7 and 8 extending oppositely from the opening 6 to the ends of the box, and being provided with longitudinally extending openings 9 and 10 which communicate with the vertical outlet opening 6 and form passages for the oil or other lubricant. An annular valve seat 11 is formed on the top surface of the bottom of the body of said box or casing, and is located at the upper end of the vertical outlet opening 6. Said valve seat is preferably cast integral with the box body, and is ground or otherwise suitably finished on its top surface. Enlargements or lugs 12 and 13 are cast at the bottoms of the ends of the box body, and are located at the outer ends of the ribs 7 and 8, being provided with enlarged screw-threaded openings 14 and 15 which register with the outer ends of the openings 9 and 10 extending longitudinally through the ribs 7 and 8. A gage 16 is attached to one of the sides of the box body and surface to indicate the amount of oil or other lubricant within the lubricator. Pipes 17 and 18, for conveying the oil or other lubricant, have their upper ends screwed in the screw-threaded openings 14 and 15 of the enlargements or lugs 12 and 13, and their lower ends connected to suitable points on the rotary pump requiring lubrication. Valves 19 and 20 are mounted in the pipes or tubes 17 and 18 for the purpose of regulating the flow of oil or other lubricant. The top cover 5 is detachably fastened in place on the box body by screws 21, or other suitable fasteners, and is pro-

vided with a central concavity 22 and a central depending tubular portion 23. A small supplementary cover or dished plate 24 is fastened on the main cover over the central concavity 22, by screws 25, or other suitable fasteners.

The metal portion of the small supplementary cover 24 is slightly concaved or dished upward, and the opposed concavities in the main cover and supplementary cover constitute a chamber in which a flexible diaphragm 26 of leather or other suitable material, is operatively arranged. The diaphragm chamber is of a convexo-convex form, as shown in the drawings.

The type of diaphragm shown in the accompanying drawings, consists of a circular piece of leather having its surrounding margin fitted and clamped between the main cover and the small supplementary cover, and its central portion loosely extending horizontally across the diaphragm chamber. The small supplementary cover 24 is provided with a central upwardly extending vertical portion 27 which is internally screw-threaded, and which when the small supplementary cover is in place on the main cover, is in vertical alinement with the depending tubular portion 23 of the main cover.

A suction pipe 28 is connected at one end to the vertical tubular portion 27, and at the opposite end to a source of suction, preferably the suction pipe 3, connecting the vacuum tank to the rotary pump. A closure valve device, adapted to coact with the valve seat 11 and thereby close the outlet opening 6, is arranged within the box or casing of the lubricator. This valve is constructed and arranged to be automatically closed against the valve seat 11 by the tension of a spring, and to be automatically opened when the vacuum cleaning apparatus is running by suction.

The closure valve device consists of a stem 29 having a screw-threaded portion 30 at its upper end, which passes through a central opening in the diaphragm 26, and is adjustably clamped or fastened to said diaphragm by lock nuts 31 and 32, a valve disk 33 fastened near the lower end of the valve stem, a packing disk 34 of leather fastened on the valve stem against the lower surface of the valve disk, and a coil spring 35 loosely fitted around the valve stem and bearing with its respective ends against the lower edge of the depending tubular portion 23, and the top face of the valve disk 33.

When the vacuum cleaning apparatus is not running the valve disk and its packing disk are adapted to be pressed by the spring 35 against the valve seat 11 to close the outlet passages through the ribs, and thereby prevent the outflow of lubricant.

An opening 36 is provided in the cover,

which is normally closed by a screw cap 37. The purpose of the opening 36 is to provide a means for conveniently filling the box or casing with oil or other lubricant.

The lower end 38 of the valve stem 29, projecting below the valve disk 33, is reduced considerably in size and fits loosely in the vertical outlet opening 6, thereby serving to center and guide the stem of the valve with respect to the valve seat.

The operation of this improved apparatus is as follows: When the vacuum cleaning apparatus is stationary, or in other words, not in operation, the outlet opening 6 is closed by the valve device, and the lubricant is thereby prevented from flowing to the points requiring lubrication and flooding or over-lubricating said points. When the rotary pump is started it creates a partial vacuum in the vacuum tank, and also by drawing the air from the suction pipe 28, creates a partial vacuum in the diaphragm chamber, and a sufficient suction upon the top surface of the flexible diaphragm to lift or elevate the diaphragm and carry with it the valve stem and valve disk, thereby freeing the outlet opening 6 and permitting the lubricant to flow by gravity through the openings 9 and 10 and pipes or tubes 17 and 18, to the points requiring lubrication. When the vacuum cleaning apparatus is stopped, the suction action ceases and the partial vacuum becomes weak. The tension of the spring 35 now being stronger than the suction of the partial vacuum, forces the valve disk 33 downward against the valve seat and closes the central outlet opening 6. This prevents the outflow of lubricant from the lubricator. The flow of lubricant from the lubricator is easily regulated by opening or closing the valves 19 and 20 as required.

The principal object of this improved lubricator is that the valve controlling the flow of lubricant therefrom is so constructed and arranged that it is opened automatically by suction when the apparatus starts, and is closed automatically when the apparatus stops.

While the improved lubricator is illustrated and described in connection with a vacuum cleaning apparatus, it is apparent that it is also applicable to, and may be used in connection with other types of machines or apparatus for the purpose of moving certain movable parts.

We claim:—

1. In a lubricator, a box or casing for containing lubricant consisting of a body having a raised portion on the upper surface of its bottom provided with a vertical opening and the top surface of said raised portion forming an annular valve seat and longitudinal openings extending through the bottom of said body and communicating at an intermediate point with the vertical

opening in the raised portion; said longitudinal openings being adapted to form passage ways for the lubricant and to connect with lubricant discharge pipes, a main cover
 5 for said body provided with a concavity and a short vertical depending tubular portion, a smaller supplementary cover attached to the main cover and having a concavity opposed to the concavity in the main
 10 cover; said concavities together constituting a diaphragm chamber, a flexible diaphragm in said diaphragm chamber, a vertical valve stem in the box or casing having its upper portion extending through the tubular
 15 portion of the main cover and being adapted to slide in said tubular portion, its upper end extending within and attached to the flexible diaphragm and its lower end fitting loosely and being adapted to slide in
 20 the vertical opening in the raised portion of the bottom, and a closure valve attached to the stem above its lower end and being adapted to co-act with the annular valve seat on the bottom of the body.
 25 2. In a lubricator, a box or casing for containing lubricant consisting of a body having an annular valve seat, a main cover for said body provided with a concavity and a short depending tubular portion, a
 30 smaller supplementary cover attached to the main cover and having a concavity opposed to the concavity in the main cover and a vertical upwardly extending tubular portion which is connected to a source of air
 35 suction and has an opening in vertical alignment with the opening in the short depending tubular portion of the main cover; the concavities of the main and supplementary covers together constituting a diaphragm
 40 chamber, a flexible diaphragm having its surrounding margin clamped between the main cover and the supplementary cover and its central portion arranged loosely in said diaphragm chamber, a valve stem hav-

ing its lower end loosely fitting in the opening in the annular valve seat and its upper portion fitting loosely through the tubular portion of the main cover with its upper end projecting within and fastened to the flexible diaphragm, and a valve attached
 50 to the valve stem above its lower end and adapted to co-act with the valve seat.

3. In a lubricator, a box or casing for containing lubricant consisting of a body having an annular valve seat formed on
 55 its bottom surface and a vertical opening extending downward from the valve seat; said bottom also being provided with two hollow ribs on its under surface, the openings through said ribs communicating with
 60 the outlet opening of the valve seat and forming passages for the lubricant, a main cover for said body provided with a concavity and a short depending tubular portion and a smaller supplementary cover at-
 65 tached to the main cover and having a concavity opposed to the concavity in the main cover; said concavities together constituting a diaphragm chamber, a flexible diaphragm in said diaphragm chamber, a valve co-act-
 70 ing with the valve seat in the body and a vertical valve stem in the box or casing on which the valve is mounted; said valve stem extending vertically through approximately
 75 the center of said box or casing and having reduced upper and lower end portions which are located respectively above and below the points of attachment of the flexible diaphragm and the valve and project
 80 and are adapted to slide in the vertically extending tubular portions of the supplementary cover and the annular valve seat.

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