(No Model.) 2 Sheets—Sheet 1.

M. A. DEES.

AUTOMATIC LUBRICATOR.

No. 305,678. Patented Sept. 23, 1884.

Fig. 1.

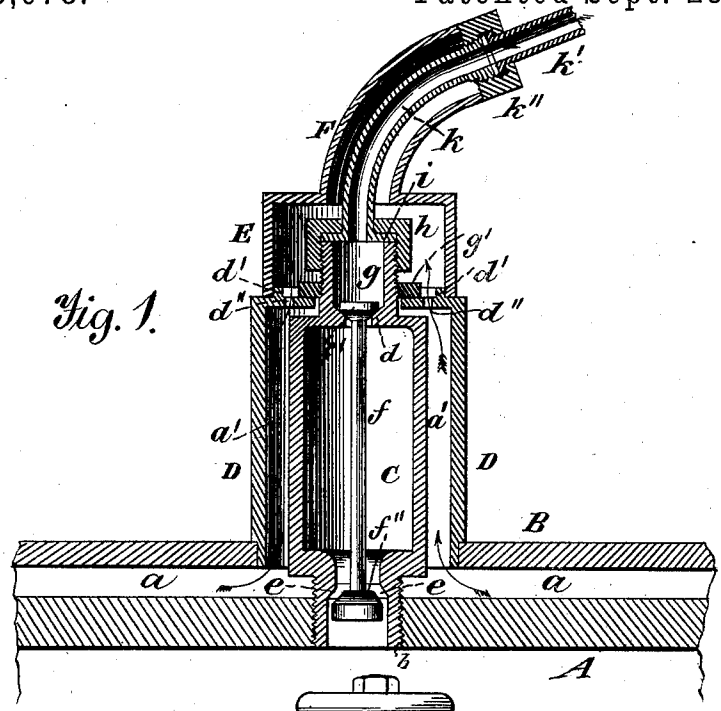
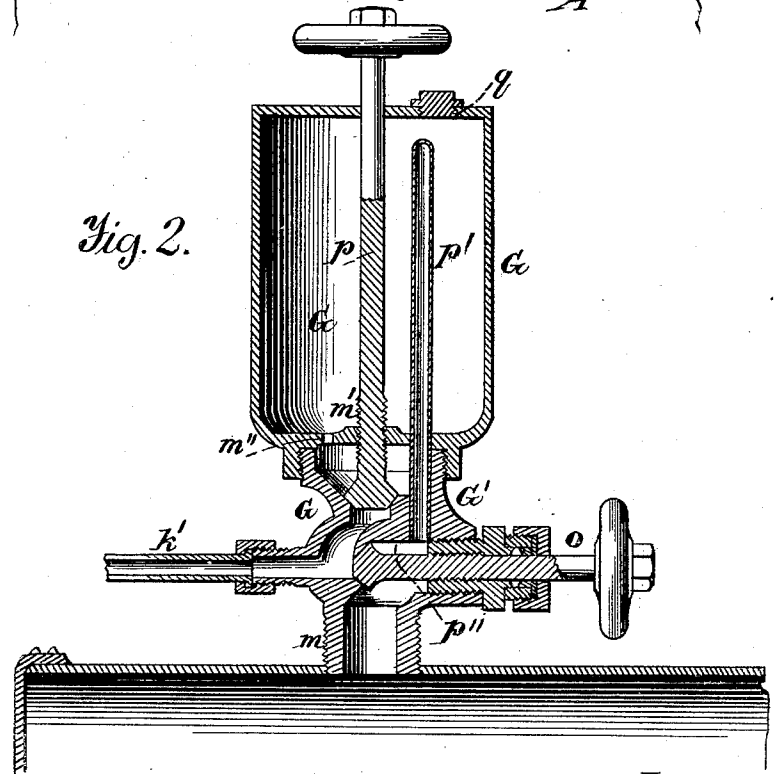


Fig. 2.



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(No Model.) 2 Sheets--Sheet 2.

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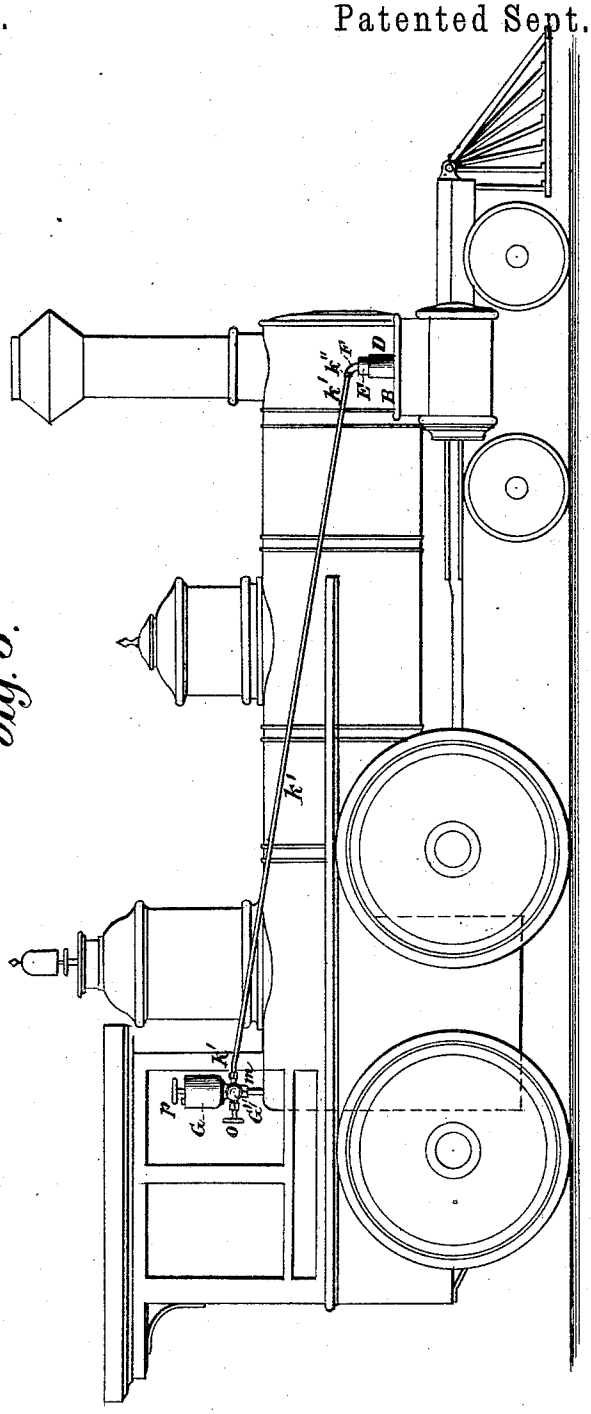


Fig. 3.

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UNITED STATES PATENT OFFICE.

MARK A. DEES, OF MOSS POINT, MISSISSIPPI.

AUTOMATIC LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 305,678, dated September 23, 1884.

Application filed February 20, 1884. (No model.)

To all whom it may concern:

Be it known that I, MARK A. DEES, of Moss Point, in the county of Jackson and State of Mississippi, have invented certain new and useful Improvements in Automatic Lubricators, of which the following is a specification.

My invention is specially intended for use in connection with locomotive-engines, and is designed to automatically feed the oil or lubricant to the steam-chest at times when lubrication is most needed, and in suitable and determined quantities, as hereinafter more particularly specified.

Figure 1 is a vertical section of my automatic lubricator as applied to a steam-chest. Fig. 2 is a similar section of the main reservoir from which the automatic lubricator, Fig. 1, is fed, the reservoir being applied to the boiler, as shown. Fig. 3 is a view, upon a reduced scale, showing the connection and relative arrangement of the two parts of the invention represented in Figs. 1 and 2.

Referring to Fig. 1, A is the top of the steam-chest, and B a part of the cover, a hot-air space, *a*, being provided between the top and the cover.

C is a vessel, the lower end of which is screwed into the top of the steam-chest, as shown at *b*. The vessel C is provided with an upper and a lower conical valve-seat, *d* and *e*, respectively, the upper seat, *d*, having its face standing up and being smaller than the seat *e*, the face of which turns downward. The vessel C is intended to hold enough oil to oil the slide-valve of the engine and the interior of the cylinder during one stroke of the piston. A double valve is placed within the vessel C, consisting of a stem, *f*, and the valves *f' f''* united thereby, the valves corresponding in arrangement and size with the two seats *d* and *e*. The length of the stem *f* is such as to permit of the necessary movement of the double valve, so that when the valve at one end of the stem rests upon its seat the valve at the other end is unseated. At the upper end of the vessel C is an exteriorly-threaded neck or gland, *g*, having a nut, *h*, which, with the neck, incloses and secures the flange *i* of the bent pipe *k*, leading to the corresponding pipe, *k'*, of the main reservoir, Fig. 2, the connection being shown in Fig. 3. Resting or suitably secured within an opening cut in the top of the steam-chest cover is a jacket, D, which surrounds the vessel C, leaving a hot-air space, *a'*, around it, which communicates with the hot-air space *a*, existing between the steam-chest and its cover. The upper part or top flange, *d'*, of the jacket D is perforated and surrounds the neck or gland *g* of the vessel C, a nut, *g'*, being screwed upon the exterior of the neck or gland, and resting upon the top flange, *d'*, of the jacket D, as shown. A jacket, E, surmounts the jacket D, and surrounds the gland *g*, its nut *g'*, and the lower end of the pipe *k*. Communication is established between the interior of the jacket D and that of the jacket E by apertures *d''*, cut in the top flange, *d'*, of the jacket D. The jacket E is provided with a jacket-pipe, F, extending therefrom, and which surrounds the bend of the pipe *k*. A nut, *k''*, fits over the exteriorly-threaded end of the bent pipe *k*, as shown, and also incloses the end of the pipe *k'*, which connects with the main reservoir. There is a free circulation of hot air around all parts of the vessel C and its bent pipe connection.

Referring to Fig. 2, the fountain or main reservoir G is mounted upon a globe-valve, G', the shank *m* of which is screwed to the locomotive-boiler, as shown. The fountain or reservoir need not be attached to the boiler, but may be conveniently located in the cab and connected by a pipe to the boiler. Either one reservoir may be used with a pipe leading to each cylinder, or a separate reservoir for each cylinder. The globe-valve G' is double, having a horizontally-working valve, *o*, and a vertically-moving valve, *p*, the stem of which is threaded at its lower part, *m'*, and works in the threaded base of the reservoir. The base is perforated at *m''*. The liquefying of the lubricant is effected through the medium of the pipe *p'*, which is closed at the top and open at the bottom, the lower end leading into the space *p''* back of the valve *o*, so that there is always communication between the pipe *p'* and the interior of the boiler. The pipe *p'* extends upward into and nearly to the top of the main reservoir. The oil or tallow is admitted to the reservoir through the opening *q*, which may, if desired, be large enough to admit lumps of tallow. The opening is closed by a suitable

cap. The valve *p* closes communication between the interior of the main reservoir and the pipe leading to the automatic oiler, Fig. 1.

When the throttle-valve of the engine is opened and steam admitted into the steam-chest, the pressure at once closes the valve *f''*, the valve *f'* being in consequence opened. The vessel C will therefore slowly fill with oil through the pipes *k k'*. When the throttle-valve is closed and there is no pressure in the steam-chest, the valve *f''* will open, closing the valve *f'*, and the slide-valve and piston will be immediately oiled by the rapid outflow of the oil from the vessel C, induced both by gravity and by the partial vacuum induced in the cylinder.

When the locomotive is running along under ordinary conditions, the valve *p* will be open and the valve *o*, that connects the reservoir with the boiler-steam, closed. While using steam, the larger and lower valve, *f''*, of the stem *f* in the vessel C will be closed, and the smaller or upper valve, *f'*, open, and the vessel C will fill with oil. When steam is shut off from the engine, it becomes important that the oil should begin to flow at once to the steam-chest. This is effected automatically by the gravity of the oil and the vacuum produced in the engine-cylinder and steam-chest, the valve *f''* falling, and thus closing the upper valve and preventing the inflow of oil to the vessel C. Suppose the engine to be approaching several short downgrades in the road, where it becomes necessary to shut off steam, and where it is not desired to use much oil, or suppose the engine is engaged in switching in a yard or at side tracks and the engineer does not wish to use oil every time he shuts off steam. In either of these cases, or in similar contingencies, all that is necessary to be done is that the valve *p* shall be closed, which at once stops the feed of oil from the main reservoir to the vessel C.

The lower valve, *f''*, is made larger than the upper one, *f'*, for several reasons. First, it is desirable that the vessel C shall fill slowly and empty quickly; hence the small valve is used above and the larger valve below. Then, supposing the engine to be drawing a long train up a heavy grade, it would be inexpedient to shut off steam. Now, considering that the pressure in the boiler is always greater than in the steam-chest, the engineer would close the valve *p* and open the valve *o*, and the steam from the boiler passing through the pipes *k' k* will partially open the valve *f''*, but not fully close the valve *f'*, and in this way the engineer could, if desired, run all the oil out of the vessel C and into the steam-chest and cylinder. The important function of the valve *o* is thus seen. This last contingency will, however, rarely arise. The pipes and lubricator could also in this manner be cleaned out when gummed up by blowing steam through the pipes.

If it is desired to take off the steam-chest cover, the nut *k''* must be unscrewed, which allows the jacket E to be lifted. By then unscrewing the nuts *h* and *g'* all is left clear.

The main reservoir G may be made of metal or glass. If made of glass, the feed of oil will be visible.

Having described my invention, I claim—

1. In a lubricator, the combination of a main reservoir and a vessel communicating therewith, provided with a duplex valve having a single stem, each end of the valve being adapted to be alternately seated and unseated, substantially as and for the purposes set forth.

2. In a lubricator, the combination of a main reservoir and a vessel having valves of unequal areas on a common stem, and pipe-connections, substantially as set forth.

3. In a lubricator, an oil-vessel surrounded by a hot-air jacket, substantially as set forth.

4. In a lubricator, an oil-vessel and pipe-connections surrounded by hot-air jackets, substantially as set forth.

5. In a lubricator, an oil-vessel adapted to screw into the steam-chest, combined with a hot-air jacket surrounding said vessel, and adapted to communicate with the hot-air space surrounding the steam-chest, substantially as set forth.

6. In a lubricator, an oil-vessel adapted to be secured to the steam-chest and having suitable pipe-connections, combined with hot-air jackets adapted to communicate with the hot-air space about the steam-chest, substantially as set forth.

7. In a lubricator, the vessel C and pipe-connections, combined with the jackets D and E, the latter having the jacket-pipe F and nut *k''*, substantially as set forth.

8. In a lubricator, the vessel C, having the screw-shank *g*, and nuts *g'* and *h*, combined with the jackets D and E, the latter having the jacket-pipe F and the pipe *k i* and nut *k''*, substantially as set forth.

9. In a lubricator, a vessel provided with differential valves upon a common stem, combined with a main fountain or reservoir communicating with the boiler-steam, and suitable pipe-connections and valves, whereby oil may be applied from the main fountain or reservoir to the oil-vessel, and automatically fed therefrom to the steam chest or cylinder, substantially as set forth.

10. In a lubricator, a main fountain or reservoir, combined with a close-ended pipe extending thereinto, and having constant communication with the boiler-steam, substantially as set forth.

11. In a lubricator, a main fountain or reservoir, combined with a globe-valve having a space in constant communication with the boiler-steam, and provided with a pipe having its upper end closed and reaching into the main fountain or reservoir, and its lower end open and in communication with said space, substantially as set forth.

12. In a lubricator, a main fountain or reservoir having its base perforated, and screwed

upon a globe-valve having constant communication with the boiler-steam, substantially as set forth.

13. In a lubricator, a main fountain or reservoir having the vertically-moving screw-valve *p*, combined with the globe-valve G′, provided with the horizontally-moving valve *o* and the pipe *p′*, substantially as set forth.

14. In a system of lubrication, the method of feeding oil to the steam chest or cylinder of the engine, by admitting steam from the boiler to a vessel containing oil, and balancing the pressure through the medium of valves of different area arranged within said vessel, substantially as set forth.

15. In the system of lubrication, the method of feeding oil automatically to the steam chest or cylinder, and in determined quantities, when the engine is running without steam, by allowing the oil to flow by gravity, and by the vacuum produced in the cylinder of the engine, from a vessel charged from a main reservoir, during the time when the engine is running under steam, through the medium of gravitating differential valves arranged in the oil-vessel, substantially as set forth.

16. The method of supplying oil to the steam chest or cylinder of the engine when running under steam, by closing the communication between the main reservoir and the oil-vessel, and opening communication between the boiler-steam and said vessel, whereby the excess of pressure in the boiler over that in the steam-chest, acting upon the differential valves, will hold both valves partially open and allow the oil to pass from the oil-vessel to the steam-chest, substantially as set forth.

In testimony whereof I have hereunto set my hand this 16th day of February, A. D. 1884.

MARK A. DEES.

Witnesses:
WILLIAM REED,
E. C. LINGAN.