

(No Model.)

2 Sheets—Sheet 1.

J. W. GRAHAM.
LUBRICATOR.

No. 597,903.

Patented Jan. 25, 1898.

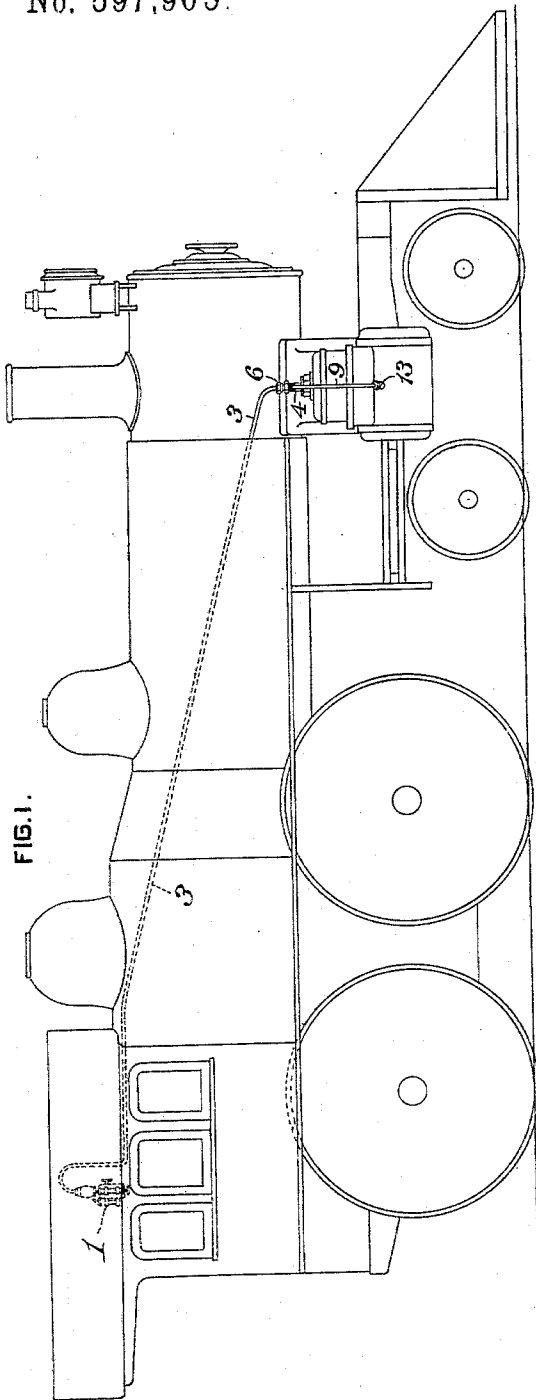


FIG. 1.

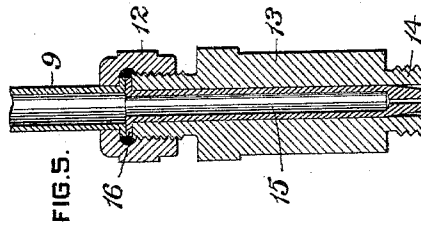


FIG. 5.

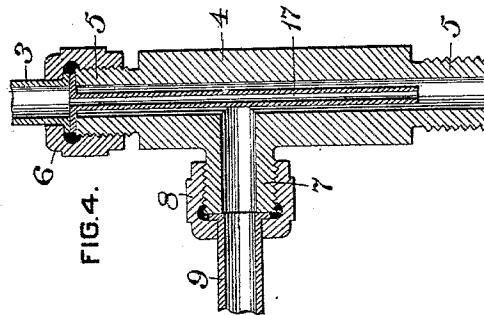


FIG. 4.

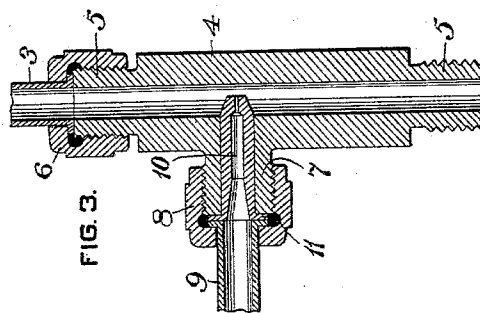


FIG. 3.

WITNESSES:

Chas. F. Miller.
J. E. Gaither.

INVENTOR,

John W. Graham
by *Darwin B. Wolcott*

Att'y.

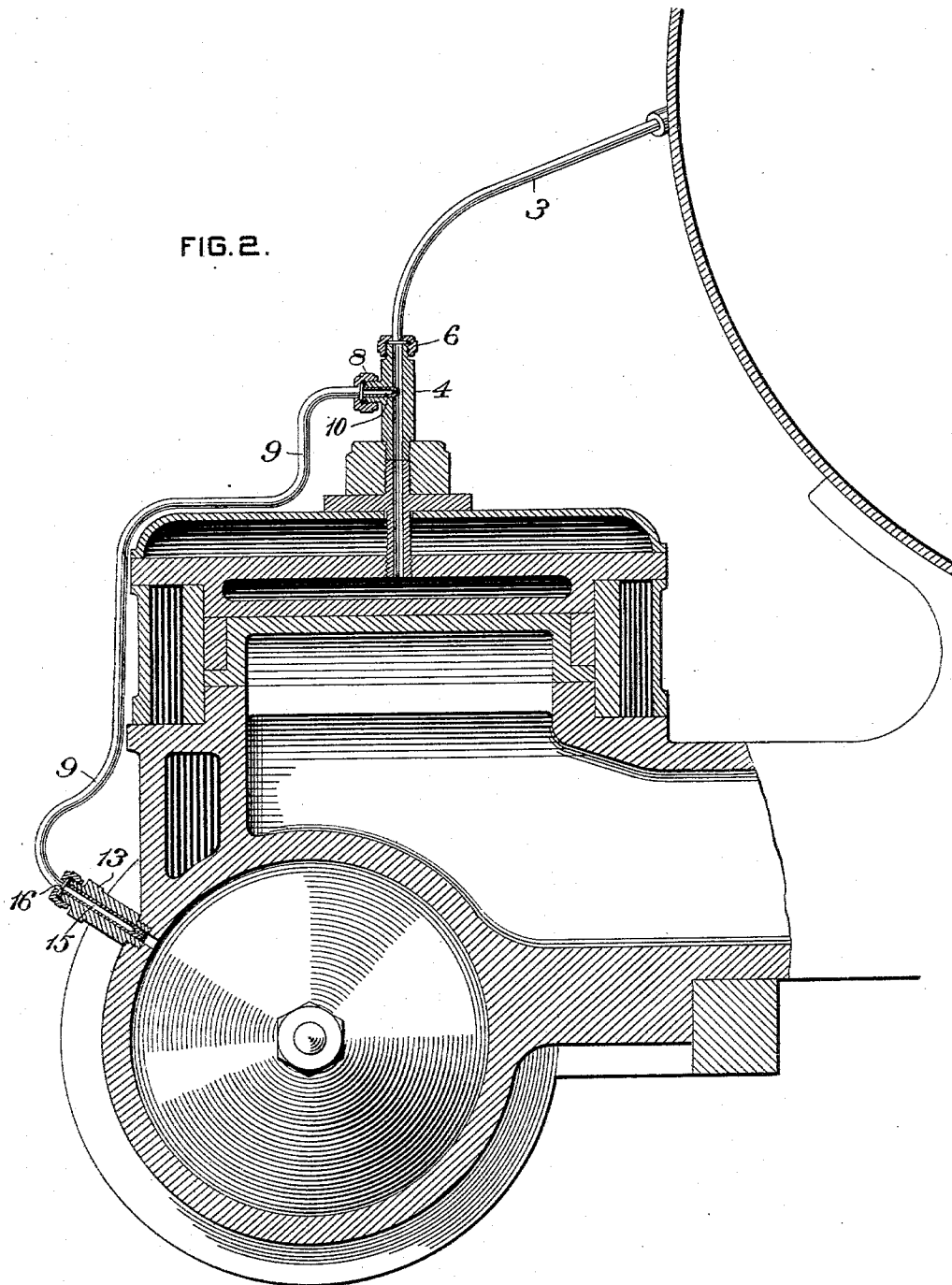
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

JOHN W. GRAHAM, OF AVALON, PENNSYLVANIA.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 597,903, dated January 25, 1898.

Application filed September 1, 1897. Serial No. 650,227. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. GRAHAM, a citizen of the United States, residing at Avalon, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Lubricators, of which improvements the following is a specification.

The invention described herein relates to lubricators for the valves and cylinders of steam-engines, and has for its object a construction whereby a uniform, continuous, and regular feed of the oil to the valve-chest of the cylinder may be insured.

The general type of lubricators consists of an oil-feed-regulating device located in the cab of the engine, having one part in communication with the steam-space in the boiler and another part connected by a pipe passing along under the lagging of the boiler to a suitable nozzle projecting into the cap of the steam-chest. The intended operation of this device consisted in allowing the oil to be fed drop by drop into the pipe leading to the steam-chest, and as this pipe was supposed to contain pressure equal to that in the boiler it was thought that the drops of oil would flow along the pipe into the valve-chest. It has been ascertained by experiment that the oil would not flow into the valve-chest until the pressure therein became reduced below the boiler-pressure. When the pressures in the boiler and steam-chest reached such a relative stage, all the oil contained in the pipe would pass immediately into the steam-chest. As the oil would not flow into the steam-chest except under the conditions stated, the steam in the exposed portions of the pipe would become condensed, forming a water-plug with the oil floating on top of it.

My invention consists in maintaining or producing at short intervals the difference of pressure between the oil-feed pipe and the boiler necessary to effect a movement of the oil preferably by so connecting the oil-feeding pipe with the cylinder as to reduce the pressure in such pipe at or near its junction with the steam-chest to or below a point at which the oil will flow into the steam-chest at each stroke of the piston.

The invention is hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of the boiler and cylinder of a locomotive having my improvement applied thereto. Fig. 2 is a transverse section of the cylinder and steam-chest, the plane of section being indicated by line II II, Fig. 1. Fig. 3 is a sectional view, on an enlarged scale, of the plug connecting the oil-feed pipe with the steam-chest. Fig. 4 is a sectional view, on an enlarged scale, of the plug attached to the cylinder and adapted to be connected with a plug on the steam-chest; and Fig. 5 is a view similar to Fig. 4, illustrating a modification in the cylinder-plug.

In the practice of my invention the oil-feed regulator 1 is located in the cab of the engine, as is usual, and connected by a pipe to the steam-space of the boiler. A pipe 3 connects the lubricator to a plug on the steam-chest, said pipe passing under the lagging of the boiler, as is customary. The steam-chest plug consists of a shell 4, having threaded bosses or projections 5 on its ends for attachment to the top of the steam-chest and connection by a union 6 with the pipe 3. This shell is provided at a point about midway of its length with a branch socket 7, externally threaded so as to be connected by a coupling 8 to the pipe 9. Through this branch opening is inserted a nipple 10, having an opening therethrough and provided at its outer end with a flange 11, whereby it may be held in place by the coupling 8. This nipple is preferably made of such a length as to project into the axial opening through the shell 5 a distance approximately equal to half the diameter of the axial opening. The opposite end of the pipe 9 is connected by a coupling 12 to one end of a hollow plug 13, the opposite end of such plug being provided with a threaded boss or projection 14, whereby it may be attached to the cylinder, preferably about midway of its length. Within this plug is arranged a nipple 15, having an opening therethrough, said opening being preferably contracted at the discharge end of the nipple, so that its contents may be discharged with considerable force into the cylinder. The nipple is provided at its outer end with a flange 16, whereby it may be secured in position by the coupling or union

connecting the pipe 3 with the shell 4. The nipple is made of such a length that its inner or discharge end will be flush, or approximately so, with the inner surfaces of the cylinder.

5 It will be readily understood that in the construction hereinbefore described the pressure in the steam-chest nipple will be reduced considerably below that of the boiler-
10 pressure at each stroke of the piston, as the portion of the cylinder to which the socket is connected will be open to the exhaust after each passage of the piston beyond such point of connection. By reference to Fig. 3 it will
15 be seen that as the connection to the cylinder is at right angles to the line of flow of the oil to the steam-chest, and as such connection is formed by a comparatively small opening in the nipple very little of the oil or lubricant
20 will be drawn into the cylinder, and whatever oil or other lubricant should be so drawn into the cylinder direct will be utilized in lubricating the same.

In lieu of the construction shown in Fig. 4
25 that shown in Fig. 5 may be employed, and consists of a tube 17, of slightly less diameter than the axial opening in the shell or plug 4, inserted in such opening, and made of a length sufficient to project beyond the lateral
30 opening in the plug leading to the cylinder. This construction will insure the flow of the oil beyond the exhaust-opening to the cylinder and the delivery of the major part of such oil or other lubricant into the steam-chest.

35 It is characteristic of my improvement that the formation of a water-plug in the oil-feed pipe is entirely prevented, and it is also characteristic that by the exhaust or reduction of pressure in the oil-feed pipe at each stroke of
40 the piston a continuous and regular feed of the oil is insured.

I claim herein as my invention—

1. In an engine the combination of a valve-
45 chest, an oil-receptacle connected to the valve-chest and means for reducing pressure between the valve-chest and oil-receptacle, substantially as set forth.

2. In an engine the combination of a valve-

chest, an oil-receptacle connected to the valve-
chest and to the steam-generator, and means
50 for reducing pressure between the oil-receptacle and valve-chest, substantially as set forth.

3. In an engine, the combination of a cylinder, a valve-chest, an oil-receptacle con-
55 nected to the valve-chest and to the steam-generator, and a connection from the cylinder to a point between the valve-chest and the oil-receptacle, whereby a reduction of pressure between the oil-receptacle and valve-
60 chest may be effected, substantially as set forth.

4. A locomotive having in combination therewith an oil-receptacle connected to the boiler, and to the valve-chest, and a pipe
65 uniting with the connection between the oil-receptacle and steam-chest at a point adjacent to the latter and connected to the cylinder at a point intermediate of its ends, whereby a reduction of pressure between the oil-receptacle
70 and valve-chest may be effected, substantially as set forth.

5. A locomotive having in combination therewith an oil-receptacle connected to the boiler, a plug connected to the oil-receptacle
75 and to the steam-chest, and having a lateral outlet and a connection from said lateral outlet to the cylinder, whereby a reduction of pressure between the oil-receptacle and valve-
80 chest may be effected, substantially as set forth.

6. A locomotive having in combination an oil-receptacle, a plug connected to the oil-
receptacle and to the steam-chest, a nipple
85 projecting into the longitudinal passage of the plug at an angle to the axis thereof, and a connection from said nipple to the cylinder, whereby a reduction of pressure between the oil-receptacle and valve-chest may be ef-
90 fected, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOHN W. GRAHAM.

Witnesses:

DARWIN S. WOLCOTT,
G. I. HOLDSHIP.