No. 678,234. Patented July 9, 1901.

J. FARLEY & J. MEEHAN.

AUTOMATIC LUBRICATOR.

(Application filed Dec. 3, 1900.)

(No Model.)

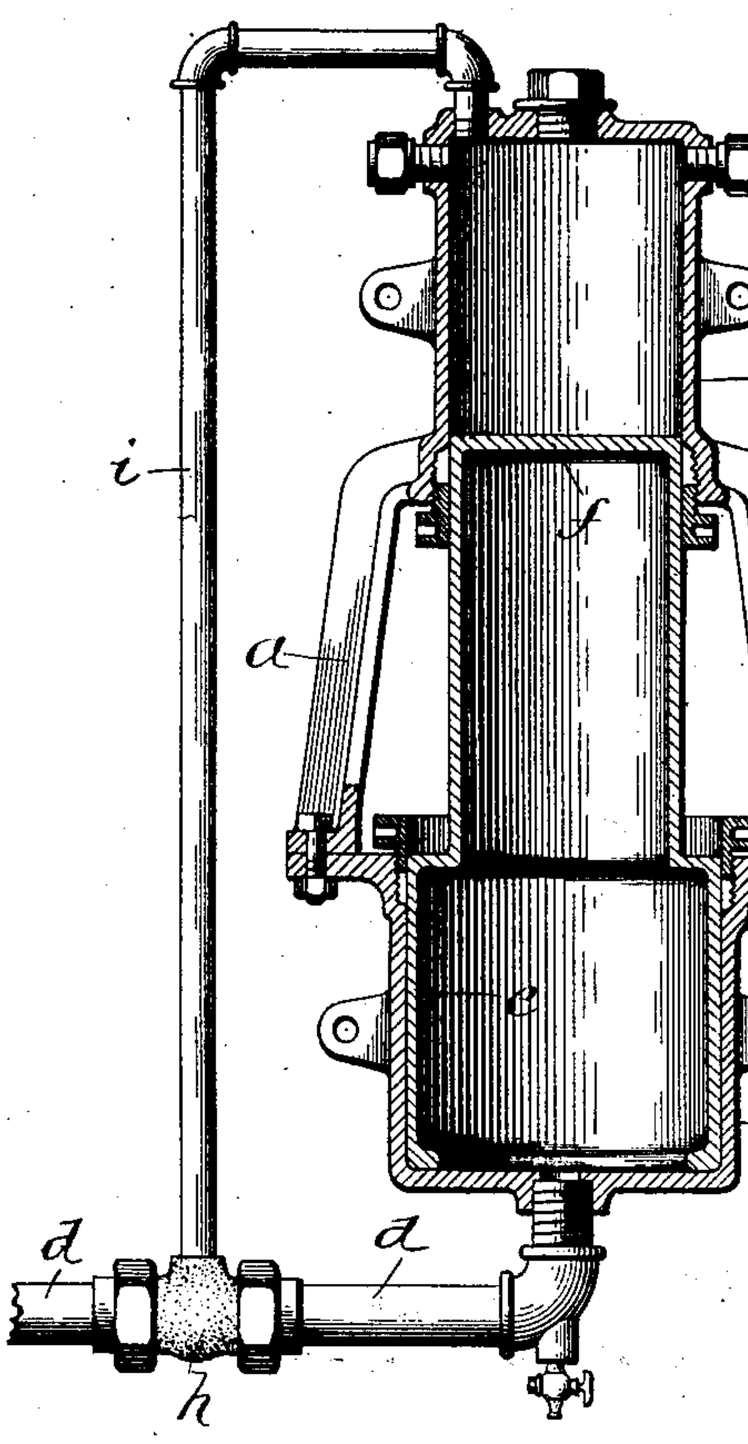


Fig. 1.

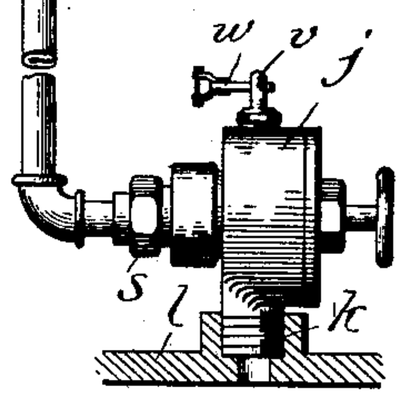
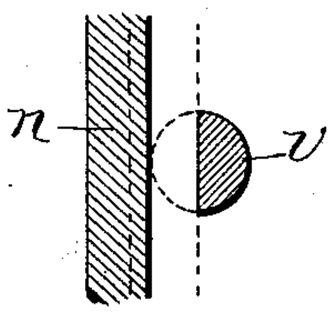
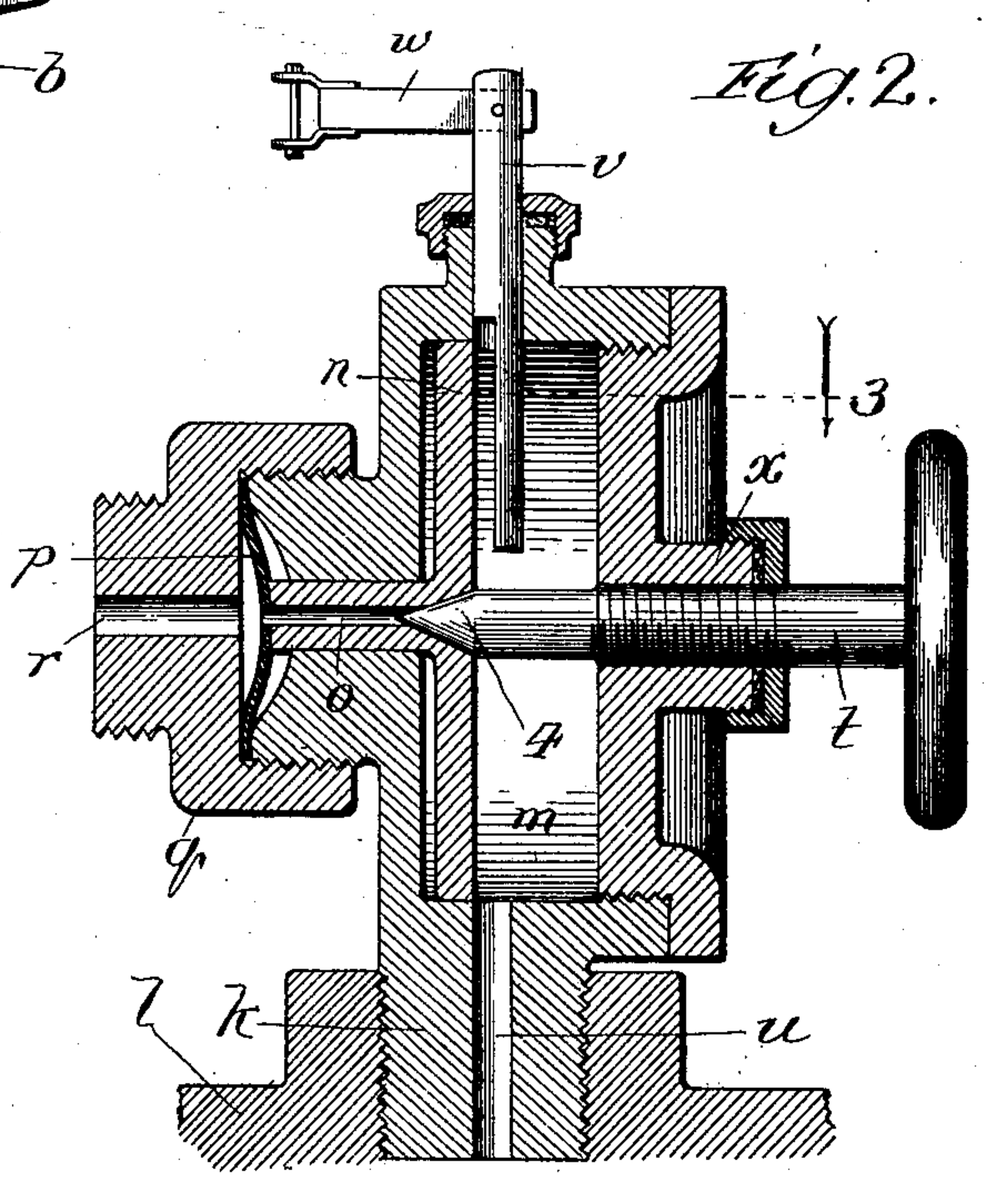


Fig. 2.

Fig. 3.





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UNITED STATES PATENT OFFICE.

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AUTOMATIC LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 678,234, dated July 9, 1901.

Application filed December 3, 1900. Serial No. 38,432. (No model.)

To all whom it may concern:

Be it known that we, JAMES FARLEY, residing at Waukesha, Wisconsin, and JAMES MEEHAN, residing at Chicago, Illinois, citizens of the United States, have invented certain new and useful Improvements in Automatic Lubricators, of which the following is a specification.

The invention relates particularly to automatic lubricators for use with locomotive-engines which are arranged to be operated by steam in the valve-chest thereof, although it will be understood from the following description and an examination of the drawings that it may be used in connection with practically all types of engines.

The principal object of the invention is to provide a simple, economical, and efficient lubricator adapted to be attached to the valve-chest of the locomotive and be operated by the steam under pressure therein; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an elevation of our improvements with the attached mechanisms shown partly in section; Fig. 2, a full-sized longitudinal sectional elevation of a lubricator constructed in accordance with our improvements; and Fig. 3, a sectional detail, taken on line 3 of Fig. 2, looking in the direction of the arrow.

In the art to which this invention relates it is well known that it is desirable to provide means by which the valve-chest of the locomotive-engine may be automatically lubricated at any and all times without regard to the amount of steam under pressure in the valve-chest.

The principal object of the invention, therefore, is to provide an automatic lubricator which will accomplish the above-desired result.

Other objects will appear from an inspection of the drawings and the following description and claims.

It is well known that the steam-pressure within the valve-chest is practically the same as that contained within the boiler of the locomotive, and that in order to force lubricant into such steam-chest it must either go in with the steam or be injected into the steam-chest at a pressure slightly superior to that within the valve-chest. It is also well known that the steam within the boiler varies directly with the heat generated within the fire-box and that as a consequence the pressure for supplying the oil to the valve-chest should always be slightly greater than that in the valve-chest. To accomplish this result, we provide an oil-supplying reservoir, which comprises a frame portion *a*, having two cylinders *b* and *c* secured thereto in alinement with each other, the cylinder *b* being of a larger diameter than the cylinder *c* and being what we term a "pressure-cylinder," while the cylinder *c* being the smallest forms a reservoir for the lubricant. An examination of the drawings will show that steam under pressure may be supplied to the pressure-cylinder directly from the steam-dome of a locomotive (not shown) through a supply-pipe *d*, and that on account of the greater superficial area of the piston *e* within the pressure-cylinder over the piston *f* in the oil-reservoir the oil contained in the reservoir will be kept under greater than boiler-pressure. This oil-reservoir is provided with an outlet-pipe *g*, through which the oil is fed to the automatic valve for furnishing lubricant to the valve-chest, as hereinafter set forth. A steam-inlet pipe is provided with a three-way cock *h*, connecting with a branch pipe *i*, which leads to the upper part of the oil-reservoir, so that steam under pressure may be furnished thereto at any desired time for the purpose of forcing the differential piston back to its initial position, as shown in the drawings.

In order to furnish a lubricant automatically to and by the steam-pressure within the valve-chest a valve is provided, which consists of a casing *j*, having a nipple portion *k*, secured to and in line with an opening *u* in the head of the valve-chest *l*. This valve-casing is provided with a valve-chamber *m*, in which a differential piston *n* is slidingly mounted, so as to move in a direction substantially at right angles to the outlet. The larger diameter of this differential piston is located within the valve-chamber and is adapted to be operated upon by the steam under pressure from the valve-chest. The pis-

ton is provided with an axial perforation *o*, which forms a portion of the oil-suppy channel, as hereinafter set forth, and the forward end is provided with a perforated diaphragm *p*, which assists in normally keeping the differential piston in its valve and the perforation of which is in line with the perforation in the piston. A cap *q* is secured to the valve-casing, so as to hold the perforated diaphragm in position and is provided with an inlet axial opening *r*, which also forms a portion of the oil-channel.

As shown in the drawings, the automatic valve is secured to the valve-casing, so that oil may enter therein when the automatic valve is in position to permit the oil to pass therethrough. Oil under pressure flows through the pipe *g*, which is secured thereto by means of a union-nut *s*, impinges against the diaphragm, and moves it with the differential piston over against an adjusting needle-valve *t*, which enters a conical valve-seat 4 at the end of the perforation in the differential piston and acts to hold the piston in such position or as long as there is any oil under pressure in the oil-supplying cylinder. When steam under pressure enters the valve-chest, it flows up through the channel or passage *u* into the chamber *m* of the automatic valve. Impinging against the larger superficial area of the differential piston it moves such piston forward against the superior pressure of oil at the other end. This movement of the differential piston away from the needle-valve permits the oil to pass through the passages *r* and *o* into the valve-chamber *m* and down through the oil-channel *u* into the valve-chest *l*, the oil being forced in by a pressure superior to that contained in the valve-chest. As the pressure diminishes or is entirely released in the valve-chest it diminishes in like manner in the chamber of the oil-valve, so that the action of the diaphragm and superior pressure of the oil on the smaller end of the differential piston can move it to the right until it is seated on the needle-valve and closes the oil-passage.

It is at times highly desirable, and particularly just prior to the starting of the locomotive, that oil be supplied to the valve-chest, so that when the slide or balance valve begins to operate it will have sufficient lubricant to permit the easy operation thereof. To accomplish this result, a cam-pin *v* is provided, passed through the valve-casing and flattened at one side, as shown in Fig. 3, so as to be kept out of contact with the differential piston when in one position, but to contact it and raise it off the needle-valve at other times and positions. This valve-pin is provided with a lever-arm *w*, adapted to be connected, by means of a rod or otherwise, (not shown,) with the cab of the locomotive, so that the pulling of such connecting-rod and operating of the lever will rotate the cam or flattened pin shown in Figs. 2 and 3, slightly raise the differential piston off of the needle-valve, and permit oil to flow through the channel above described into the valve-chest. The needle-valve, as shown in Fig. 3, is provided with a threaded portion *x*, engaging with a threaded opening in one head of the valve, so that its position may be adjusted to suit different circumstances and conditions.

We claim—

1. In an apparatus of the class described, a valve-casing provided with a needle-valve adjustably mounted therein, a differential piston mounted therein provided with an oil-channel extending therethrough forming a valve-seat at one end and in line with the needle-valve arranged to be operated upon by steam on one side to open the valve and oil under pressure on the other side to close the same, substantially as described.

2. In an apparatus of the class described, an automatic lubricating-valve comprising a casing having a threaded portion by which it may be secured to a valve-chest and a valve-chamber therein, a needle-valve screw-threaded into one head of the valve-casing, a differential piston having its larger piston in the valve-chamber mounted in line with the needle-valve and provided with an axial oil-channel extending therethrough forming the valve-seat at one end arranged to be seated in the needle-valve, a perforated diaphragm arranged in contact with the smaller end of the differential piston, a cap secured to the valve-casing and provided with an oil-channel in line with the perforation in the diaphragm, the casing having a passage leading therefrom at the rear of the larger differential piston to admit steam to the steam-chamber of the valve-casing and permit oil to pass out therethrough, substantially as described.

3. In an apparatus of the class described, an automatic lubricating-valve comprising a casing having a threaded portion by which it may be secured to a valve-chest and a valve-chamber therein, a needle-valve screw-threaded into the head of the valve-casing, a differential piston having its larger piston in the valve-chamber mounted in line with the needle-valve and provided with an axial oil-channel extending therethrough forming the valve-seat at one end arranged to be seated on the needle-valve, a perforated diaphragm arranged in contact with the smaller end of the differential piston, a cap secured to the valve-casing and provided with an oil-channel in line with the perforation in the diaphragm, the casing having a passage leading therefrom at the rear of the larger differential piston to admit steam to the valve-chamber of the valve-casing and permit oil to pass out therethrough, and cam mechanism by which the differential piston may be operated at any time, substantially as described.

4. In an apparatus of the class described, an automatic lubricating-valve comprising a casing having a threaded portion by which it may be secured to a valve-chest and a valve-

chamber therein, a needle-valve screw-threaded into the head of the valve-casing, a differential piston having its larger piston in the steam-chamber mounted in line with the needle-valve and provided with an axial outlet-channel extending therethrough and forming a valve-seat at one end arranged to be seated on the needle-valve, a perforated diaphragm arranged in contact with the smaller end of the differential piston, a cap secured to the valve-casing and provided with an oil-channel in line with the perforation in the diaphragm, the casing having a passage leading therefrom at the rear of the larger differential piston to admit steam to the valve-chamber of the valve-casing and permit oil to pass out therethrough, and a flattened pin extending through the valve-casing to contact the differential piston and operate the same, substantially as described.

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