No. 744,625. PATENTED NOV. 17, 1903.

E. SARVER.

LOCOMOTIVE LUBRICATOR.

APPLICATION FILED APR. 7, 1900.

NO MODEL

Fig. 1.

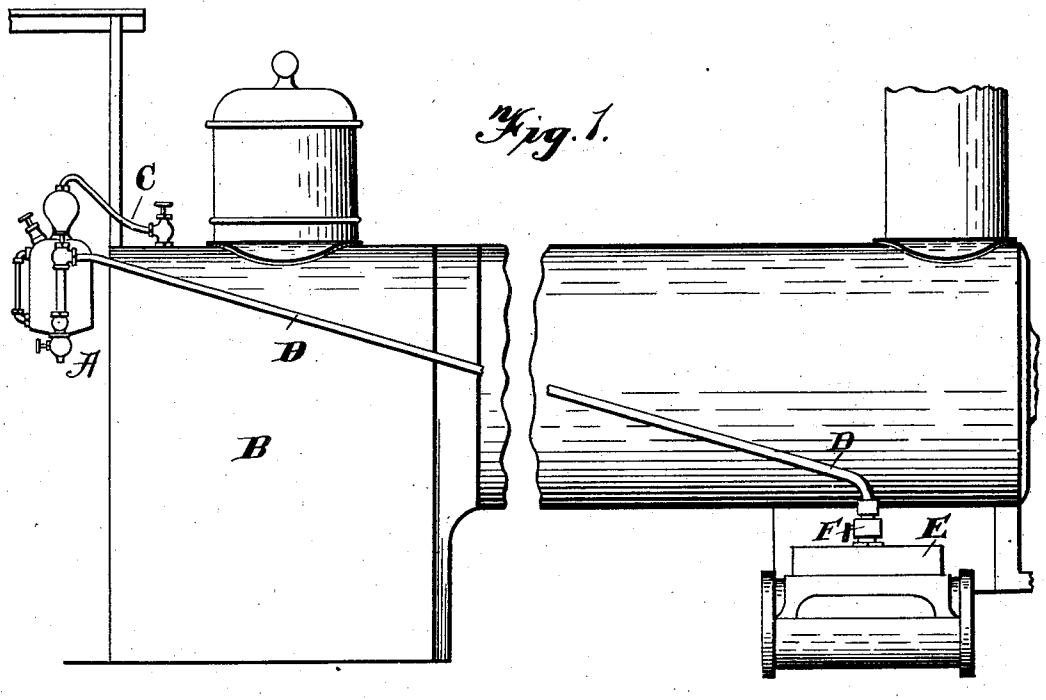


Fig. 2.

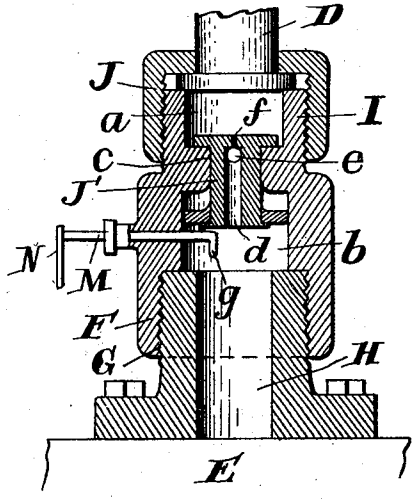


Fig. 3.

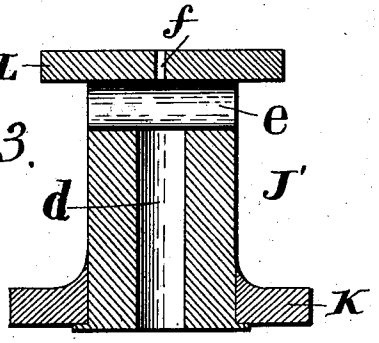
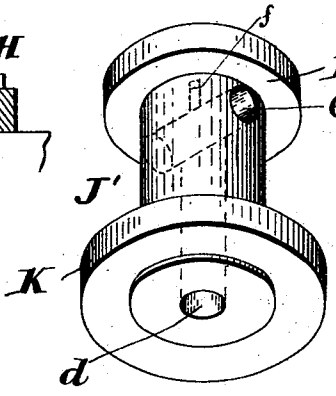


Fig. 4.



Witnesses
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No. 744,625. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

EDWARD SARVER, OF DEADWOOD, SOUTH DAKOTA.

LOCOMOTIVE-LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 744,625, dated November 17, 1903.

Application filed April 7, 1900. Serial No. 11,994. (No model.)

To all whom it may concern:

Be it known that I, EDWARD SARVER, a citizen of the United States, residing at Deadwood, in the county of Lawrence and State of South Dakota, have invented new and useful Improvements in Locomotive-Lubricators, of which the following is a specification.

My invention relates to an automatic pressure-retainer and oil-feeder for the oil-pipes of locomotive-lubricators, whereby pressure is automatically retained in the oil-pipes leading from the lubricator to the steam-chest of the locomotive for the purpose of insuring a regular and uniform feeding of the lubricant from the lubricator to the steam-chest and cylinders, said feeding being thus uninterrupted or uninterfered with by the cutting off and the turning on of the steam to the steam-chest through the medium of the engine-throttle for regulating the motion of the engine.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of parts of a locomotive, showing my invention applied thereto. Fig. 2 is an enlarged longitudinal sectional view of the feeding-pipe connected to the steam-chest, showing my automatic pressure-regulator located therein. Fig. 3 is an enlarged detached sectional view of my pressure-regulator, taken at right angles to that shown in Fig. 2. Fig. 4 is a detached perspective view of my automatic pressure-regulator.

Referring now to the drawings, A is a lubricator, which is of the usual form and is in connection with the boiler B through the medium of a steam connection C in the usual way. The lubricator A is not intended to be shown fully, since it is well understood by those skilled in the art.

D is an oil-feeding pipe which is in communication with the lubricator A, as usual, at its upper end and at its lower end is in communication with the steam-chest E through my improved pressure-retainer.

In the use of the ordinary type of lubricator a "choke" is located at or adjacent the lubricator for the purpose of preventing sufficient steam passing to the engine-cylinder to move the engine when at rest. In the practice of the usual form of lubricator, with the choke located as just mentioned, it is found that when the engine is at rest or drifting without steam in the steam-chest, because of the closing of the throttle, the lubricator steam-pipe has about a five-pound pressure between the choke (located at the lubricator) and the steam-chest, and oil from the lubricator feeds very fast, sometimes wastefully, unless the valve is closely watched by the engineer and closed a trifle or regulated by hand. When, however, the engine is at work, the boiler-throttle is open, and the steam from the boiler passes into the steam-chest and rushes up through the lubricator oil-pipe, sweeping with it the oil conveyed therein to or adjacent the choke, which is located, as before mentioned, near the lubricator and about thirty-five feet from the steam-chest. By tests made it is found that it requires about thirty or forty minutes for the oil to again find its way by gravity from the choke through the aforesaid thirty-five feet of pipe to the steam-chest. Consequently the engine must run from ten to forty miles without any lubrication to the valve or the cylinders, in consequence of which much damage is often done by this lack of oil at the proper time.

The object of my invention is to provide a pressure-retainer for the oil-pipe which is so constructed that the boiler-pressure will be maintained in the steam-pipe between the steam-chest and the lubricator. When this pressure is absolutely maintained between the lubricator and the steam-chest, oil is located directly at the steam-chest and is ready to enter the steam-chest as soon as a sufficient oil passage-way is provided, if it is permitted to do so. If the pressure of the steam in the feed-pipe between the steam-chest and the lubricator is practically equal to the boiler-pressure, the opening of the throttle and the entrance of the steam to the steam-chest does not cause any back pressure in the oil-feeding pipe D, and hence the oil, if an opening is provided therefor, will at once find its way to the steam-chest, since it is not forced backward by any backward pressure. By means of a pressure-retainer and oil-feeder having the characteristics of that hereinafter described the boiler-pressure is automatically retained in the oil-feeding pipe between the steam-chest and the lubricator when the

throttle is closed, and at the same time the feed of the oil to the steam-chest is limited and the feed of the oil from the feed-pipe D is automatically increased when the throttle is open and the engine is working to provide the necessary quantity of lubricating-oil to the engine-cylinder.

The construction of my device consists in providing a casting or chamber F, which has its lower end provided with a screw-threaded socket G, adapted to receive a screw-threaded nipple H, which is in communication with the steam-chest. The upper end of this casting or member F is provided with a screw-threaded nipple or portion I, adapted to receive a screw-threaded pipe connection J, which latter is connected in any suitable manner with the lower end of the feed-pipe D. This places the said feed-pipe D in communication with the space or chamber *a* in the upper end of the casting or member F. The casting or member F is provided with a space or chamber *b* at its lower portion, and between the upper chamber *a* and the lower chamber *b* is located a valve-seat *c*.

My improved pressure-retainer consists of a member J′, the said member having a large lower end K, which acts as a piston to force the member up when steam-pressure is in the steam-chest by the opening of the throttle, and this member is also provided with a relatively smaller upper end L, which is a combined piston and valve in that it seats itself upon the valve-seat *c* and makes a tight joint and maintains in practice the boiler-pressure in the oil-feed pipe D between the lubricator and the steam-chest E. The stem or body portion of the pressure-retainer J′ is provided with a longitudinally-extending main oil-feeding passage *d*, which extends from its lower end upward and communicates with the transversely-arranged main oil-feeding passage-way *e*, located under the upper head L. The oil-passages *d* and *e* are preferably about three-sixteenths of an inch in diameter, which is found of about the proper size to feed the proper quantity of oil to the engine when at work. A small vertically-arranged passage-way *f* passes through the upper end L of the pressure-retainer and communicates with the cross-passage *e*, and thereby with the passage *d*. This opening *f* is of about a sixtieth of an inch in diameter and constitutes a means for preventing sufficient steam passing to the engine-cylinder when the engine is standing or drifting to operate the engine, while it also furnishes sufficient escape for a small quantity of oil and for any condensation of the steam in the pipe D. The larger or main passage-ways D and E provide sufficient oil when the engine is working.

In the operation of this device when the engine is at rest or drifting the body of the pressure-retainer acts as a piston, and the boiler-pressure in the feed-pipe D forces the pressure-retainer downward into position, (shown in Fig. 2,) where it also acts as a valve by the enlarged end L seating upon the valve-seat *c* and tightly closes steam communication between the feed-pipe D and the steam-chest. The small passage-way *f* provides an escape for a small quantity of the oil to the engine-cylinder and also for any condensed steam, but, as aforestated, is so small that sufficient steam cannot pass therethrough to operate the engine when it is at rest or drifting. When, however, the throttle is open and the steam is admitted to the steam-chest, the pressure upon the relatively larger area of the piston K of the pressure-retainer forces the pressure-retainer upward against the pressure of the steam upon the relatively smaller area of the upper end L. When the valve is in this upward position, the main oil-passages *e* and *d* are in communication with the chamber *a*, and thereby in communication with the feed-pipe, which will permit an increased feed of oil for supplying the proper quantity to the engine when at work. From this it will be observed that when the throttle is open and the engine is working my pressure-retainer is held constantly in an upward position and does not oscillate back and forth, and hence the main oil-passages *d* and *e* are constantly in communication with the feed-pipe D and with the steam-chest, as before explained, and this action of the pressure-retainer is automatic. As soon as the throttle is closed and steam-pressure is removed from the lower end K of the pressure-retainer the pressure upon its upper end instantly seats the valve portion L and practically closes the steam communication with the steam-chest or engine-cylinders.

By means of a pressure-retainer which, as stated, is, in effect, a combined pressure-retainer and oil-feeder, a choke *f* is provided, and a tightly-closing valve for cutting off the steam-pressure between the pipe D and the steam-chest and adjacent the steam-chest is provided. If the valve portion L or its equivalent in the way of a valve-seat is not provided, it is not practical to make an easy-working and reliable device by making it sufficiently tight in its longitudinal wall to accomplish a steam-tight joint. Should a steam-tight joint (which is not believed to be practical) be provided between the straight walls of a device of this character by removing any valve-seating action, it would soon become worn and there would be leakage which would defeat the object of the invention by causing an escape of the steam-pressure in the pipe D to the engine-cylinder, which would cause the engine to move, which must be absolutely provided against. By constructing the combined pressure-retainer and oil-feeder, as here shown, with a valve action by means of a valve-seat an absolute steam-tight joint or closing of the communication between the pipe D and the engine-cylinder and steam-chest is provided, and also at the same time an absolutely fixed

passage-way *f* of such a size as to prevent sufficient steam passing therethrough to effect the engine, while at the same time an escape for the condensed steam and a small quantity of oil is arranged for.

For the purpose of operating the valve, should it become stuck from any cause, I provide a crank M, which is journaled in the casting F and provided at its inner end with a short crank or cam *g*, resting under the lower end of the valve J' and at its outer end with a crank-arm N, whereby the same may be rotated for forcing the valve upward and unseating it. Preferably the handle N extends in the same direction as the cam or short crank end *g*, whereby the operating device M is normally held in an inoperative position.

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

1. The combination with a locomotive having a lubricator in communication with the boiler and a steam-chest, of an oil-pipe communicating with the lubricator and said steam-chest, the steam-chest communicating with said oil-pipe through a valve-seat passage-way, only, said valve-seat located adjacent the steam-chest, and a combined pressure-retainer and oil-feeder consisting of an elongated stem portion passing through said valve-seat passage-way, the upper end of the stem having an enlarged valve-head controlling the passage-way and its lower end a piston relatively larger than said valve, a main oil passage-way controlled by the valve, the valve having a restricted passage-way, the parts operating as described to automatically open and close communication with the steam-chest through said main oil passage-way.

2. The combination with a locomotive having a lubricator in communication with the boiler and a steam-chest, of an oil-pipe communicating with the lubricator and the steam-chest, the communication having a valve-seat located adjacent the steam-chest, and a combined pressure-retainer and oil-feeder consisting of an elongated stem portion passing through said valve-seat, the stem having an enlarged valve-head at its upper end adapted to seat upon said valve-seat, and a relatively larger piston at its lower end, the valve having a restricted passage-way for the purpose described, the stem having a transverse main oil-passage below said valve and a vertically-arranged main oil-passage communicating at its upper end with the transverse passage and extending through the piston at its lower end.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDWARD SARVER.

Witnesses:
D. M. GILLETTE,
J. DEETKEN.