

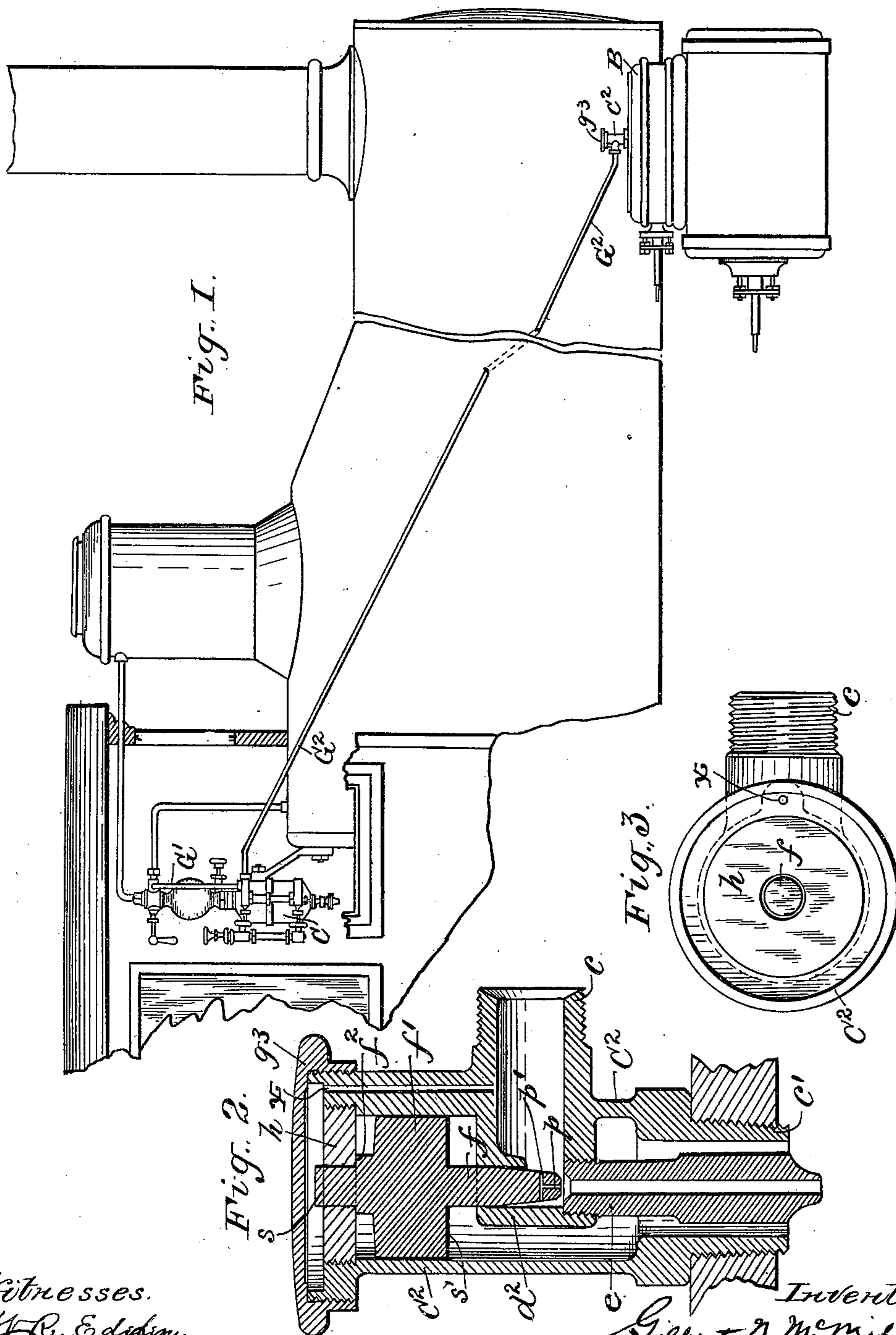
No. 627,624.

Patented June 27, 1899.

G. N. McMILLAN.
LUBRICATOR.

(Application filed Jan. 31, 1899.)

(No Model.)



Witnesses.
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UNITED STATES PATENT OFFICE.

GILBERT N. McMILLAN, OF DETROIT, MICHIGAN, ASSIGNOR TO THE DETROIT SHEET METAL AND BRASS WORKS, OF SAME PLACE.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 627,624, dated June 27, 1899.

Application filed January 31, 1899, Serial No. 703,980. (No model.)

To all whom it may concern:

Be it known that I, GILBERT N. McMILLAN, a resident of the city of Detroit, State of Michigan, have invented a new and useful Improvement in Lubricators, which invention is fully set forth in the following specification.

This invention has reference generally to lubricators, but more particularly relates to what is known as an "automatic choke-plug," the function of which is to control the delivery of oil from the tallow-pipe of a locomotive into the steam-chest thereof. In the application of Elijah McCoy, (assignor to the Detroit Sheet Metal and Brass Works,) filed November 19, 1898, Serial No. 696,853, is shown and described an automatic choke-plug which in points of economy—in the saving of oil—and efficiency in operation is believed to be far superior to anything that preceded it. In the practical operation thereof, however, it has been found that when the locomotive is standing still or at rest the pressure of the steam and oil in the tallow-pipe acting against the contacting surfaces of the plug and its seat is often, if not always, sufficient to lift said plug from its seat to an extent that permits steam at full boiler-pressure to pass to the steam-chest by way of the tallow-pipe, and thus move the engine.

The object of my present invention is to avoid this defect in operation, and to that end (instead of depending upon the weight of the plug and its piston and atmospheric pressure, which have been found insufficient for the purpose) I provide means whereby the plug is firmly held to its seat by steam-pressure while the locomotive is at rest, such pressure not being sufficient, however, to prevent or interfere with the proper reciprocation of the plug during the running of the locomotive. In the preferred form of apparatus embodying the invention a small passage leads from the tallow-pipe in advance of the plug or valve to the upper closed end of the casing of the choke-plug, and steam conducted through this passage acts, preferably, against the upper extremity of the plug to hold the same firmly to its seat while the locomotive is at rest, it being understood, of course, that there is at this point practically no steam-pressure against the under side of the piston; but, as

above stated, this downward pressure of steam on the plug, which is constantly exerted, must not be sufficient to prevent or interfere with the lifting of the plug at each reciprocation of the main locomotive-piston and its valve, for otherwise the whole function of the choke-plug would be destroyed. This is prevented in the apparatus here described by making the surfaces of the plug, against which the steam (at approximately the same pressure) acts in opposite directions, of different areas, the surface of larger area being exposed to the action of the steam in the valve-chest.

In other respects the choke-plug herein shown and described is substantially the same as that of the application above referred to.

The invention will be best understood by reference to the accompanying drawings, wherein—

Figure 1 is an elevation of part of a locomotive, showing my improved automatic choke-plug attached thereto. Fig. 2 is a vertical sectional view through the automatic choke-plug. Fig. 3 is a top view of Fig. 2, the cap being removed from the casing.

Referring to the drawings, C is the lubricator, having over-pressure pipes G' (only one of which is shown in Fig. 1 of the drawings) and tallow-pipes G², one of which is shown leading to the top of one of the steam-chests B.

C² represents the casing of the automatic choke-plug, having thereon two screw-threaded connections—one, c, for the tallow-pipe G² and the other, c', for engagement with a screw-threaded opening through the top of the steam-chest. The opening through connection c is closed at its inner end by wall d², cast integral with the casing C² and having an opening through the bottom thereof, in which the upper end of small tube or nozzle e is screw-threaded, said tube extending downwardly into the steam-chest through the casing C².

f is the choke-plug, having a conically shaped extremity which is adapted to fit a corresponding seat in the upper end of nozzle or tube e, said stem reciprocating at its lower end through the top of wall d². On the stem f is a piston, preferably cast integral therewith and of considerable weight. Above the piston is a shoulder f².

Through its lower conical end plug f has a central vertical perforation p , intersected by lateral perforations p' . The motion of the plug is so limited that these perforations are always in communication with the tallow-pipe for the purpose of carrying off water of condensation that would otherwise accumulate therein when the locomotive is standing still. When the piston is raised, the circulation tends to clear these perforations of any sediment that may collect therein.

As thus far described my automatic choke-plug does not differ from that of the application above referred to. I will now describe my improvement.

At its upper end stem f fits closely, but is adapted to reciprocate in an opening through a disk h , screw-threaded into the interior of casing C^2 , the shoulder f^2 on the stem acting by coming in contact with the disk to limit the upward movement of the piston. The upper end of casing C^2 is tightly closed by a cap g^3 , (not perforated, as is the cap of the aforementioned application,) screw-threaded thereon. A small passage x through the wall of the casing connects the space above the disk h with the tallow-pipe, thus subjecting the surface s at the upper extremity of plug-stem f to the pressure in the tallow-pipe.

By reason of the close fit of stem f in the opening through disk h little, if any, steam gains access to the upper side of piston f' .

In the operation of my device it will be understood that when the throttle is open and the locomotive running or when the throttle is closed and the locomotive is drifting (in which case the main piston acts as an air-pump) the pulsations of pressure in the steam-chest and against the under surface s' of piston f' , due to the movement of the valve over its ports, reciprocates plug f , thus opening and closing the oil-delivery passage for controlling the feed of lubricant to the steam chest and cylinder.

As the rapidity of reciprocation of the plug f varies directly with the rapidity of reciprocation of the main slide-valve and driving-piston, it will be seen that the amount of oil fed to the parts to be lubricated will vary directly with the speed at which the locomotive is running.

The steam conducted from tallow-pipe G^2 through passage x to the upper part of casing C^2 exerts a constant downward pressure against the surface s of the plug-stem whether the engine be running or at rest; but the surface s being of less area than the under surface s' of the piston the pressure on the former is not sufficient to counteract the pressure exerted against the latter upon each reciprocation of the main valve when the engine is running, and hence reciprocation of the plug f , as already described, is not interfered with or prevented. When the engine is at rest, however, there being then little, if any, pressure against surface s' , the downward pressure against surface s is sufficient to hold

the plug firmly to its seat against any force that may tend to lift it therefrom.

Of course my invention is not limited to the precise construction shown and described, as other embodiments may be made without departing from the principle thereof.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a steam-chest or similar part and a tallow-pipe for conducting lubricant thereto, of a delivery-controlling device interposed between the tallow-pipe and steam-chest, and two opposed actuating-surfaces for said device, one exposed to the pressure in the steam-chest through a passage independent of the tallow-pipe, and the other to steam-pressure from the boiler.

2. The combination with a steam-chest or similar part and a tallow-pipe for conducting lubricant thereto, of a reciprocatory choke-plug interposed between the tallow-pipe and steam-chest for controlling the delivery of lubricant into the steam-chest, and two opposed actuating-surfaces for said plug, one exposed to the fluctuating pressure in the steam-chest through a passage independent of the tallow-pipe and the other to constant steam-pressure from the boiler.

3. The combination with a steam-chest and a tallow-pipe for conducting lubricant thereto, of a reciprocatory choke-plug or valve for controlling the delivery of lubricant from the tallow-pipe to the steam-chest and two opposed actuating-surfaces for said plug, one exposed to the pressure in the steam-chest through a passage communicating directly therewith but independent of the tallow-pipe, and the other to the pressure in the tallow-pipe through a passage communicating therewith.

4. The combination with a steam-chest and a tallow-pipe for conducting lubricant thereto, of a reciprocatory choke-plug or valve for controlling the delivery of lubricant from the tallow-pipe to the steam-chest, and two opposed actuating-surfaces for said plug of different areas, the surface of larger area being exposed to the fluctuating pressure in the steam-chest through a passage independent of the tallow-pipe and the surface of smaller area to constant steam-pressure from the boiler.

5. The combination with a steam-chest and a tallow-pipe for conducting lubricant thereto, a choke-plug or valve for controlling the delivery of lubricant from the tallow-pipe to the steam-chest, and two opposed actuating-surfaces on the choke-plug or valve one exposed to the pressure in the steam-chest through a passage separate from the oil-feed passage, and the other to the pressure of steam in the tallow-pipe through a passage leading from the tallow-pipe in advance of the choke-plug or valve.

6. An automatic choke-plug consisting of a casing tightly closed at one end and open at its other end through which it is adapted to

communicate with a steam-chest or similar part to be lubricated, an oil-passage through said casing, a plug or valve seated at one end in said oil-passage, the stem of said valve projecting through the wall of the oil-passage, and upper and lower actuating-surfaces on said projecting stem, the lower surface being adapted to be exposed to the pressure in the part to be lubricated through the open end of the casing, and a passage leading from the oil-passage in advance of the plug to the interior of the casing in front of the upper actuating-surface whereby it is adapted to be exposed to the pressure of the steam in the tallow-pipe.

7. An automatic choke-plug consisting of a casing having an oil-passage therethrough, said casing being closed at its upper end but open at its lower end through which it is adapted to communicate with the interior of the steam-chest or similar part to be lubricated, a valve stem or plug projecting at its lower end through the wall of the oil-passage and adapted to be seated in and to open and close said passage to control the delivery of oil therefrom, a piston on the valve-stem fitting closely and adapted to slide in the casing and exposed on its under side through the lower open end of the casing to the pressure in the part to be lubricated, a partition or disk within the casing above the piston having an opening therethrough in which the

end of the valve-stem closely fits but is adapted to reciprocate, and a passage leading from the oil-passage in advance of the plug to the upper closed end of the casing above the partition whereby the upper end of the stem is exposed to the pressure in the oil-pipe.

8. An automatic choke-plug consisting of a casing having an oil-delivery passage through the side thereof, a feed-nozzle connected with said oil-delivery passage and extending downwardly within the casing, a valve stem or plug projecting through the upper wall of the oil-passage and seated at its lower extremity in the lower end of the feed-nozzle, a bearing-disk screw-threaded into the upper part of the casing and having a central perforation therethrough in which the upper extremity of the valve-stem closely fits, a piston on the valve-stem loosely fitting and sliding within the casing, a cap screw-threaded on and tightly closing the upper end of the casing, and a passage leading from the oil-passage to the upper part of the casing above the disk, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GILBERT N. McMILLAN.

Witnesses:

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M. E. FARR.