No. 735,074. PATENTED AUG. 4, 1903.

F. W. EDWARDS.

AUTOMATIC CHOKE VALVE.

APPLICATION FILED DEC. 13, 1902.

NO MODEL.

Fig. 1.

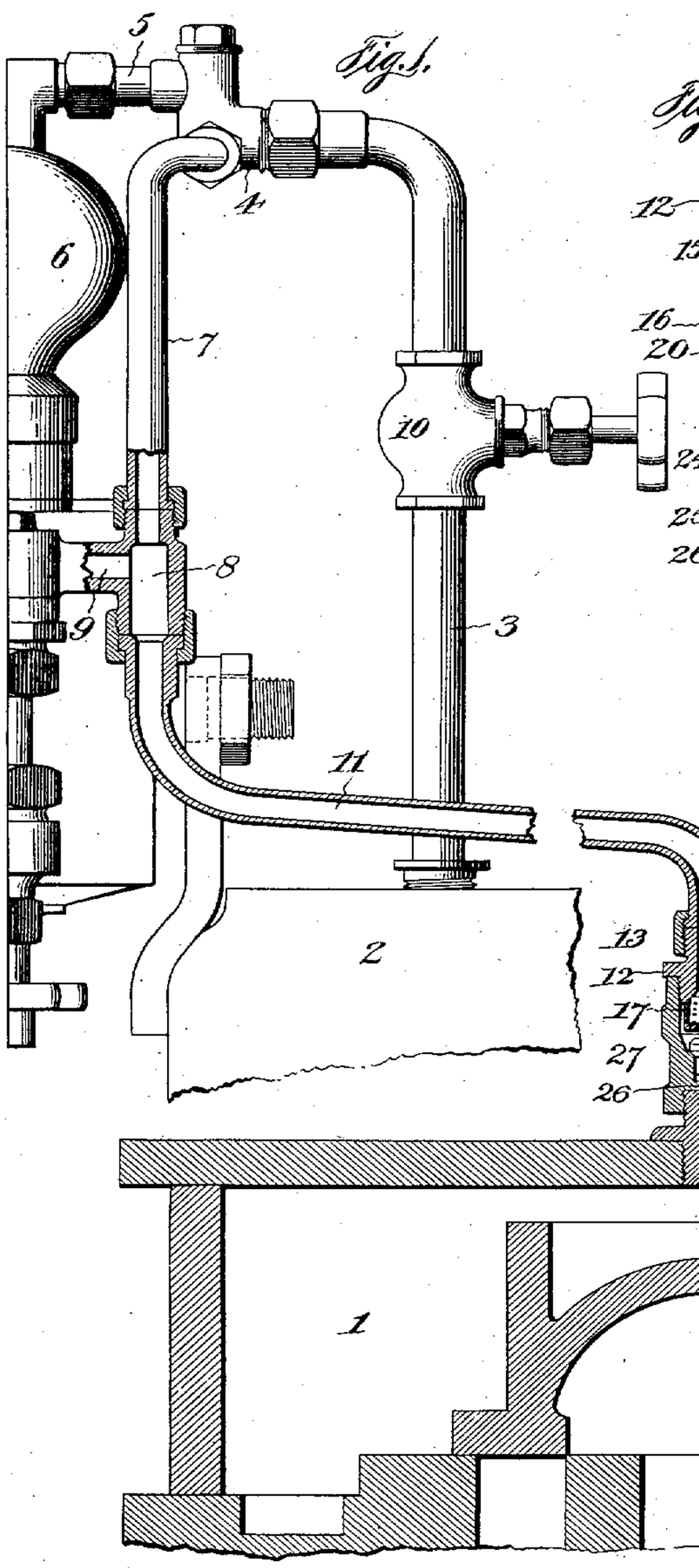



Fig. 2.

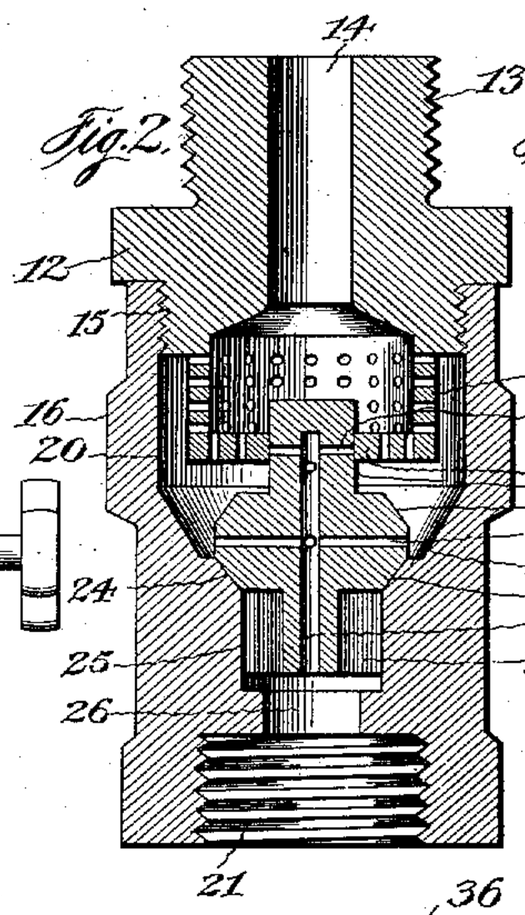



Fig. 3.

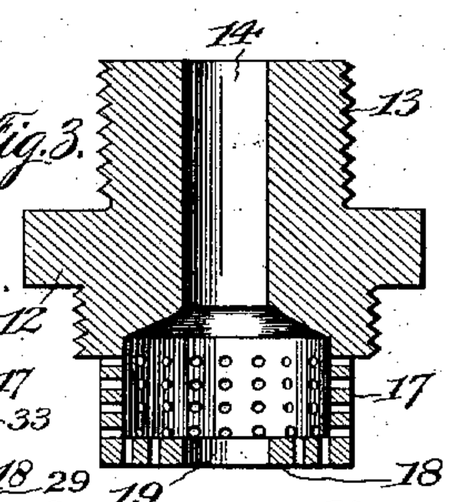



Fig. 4.

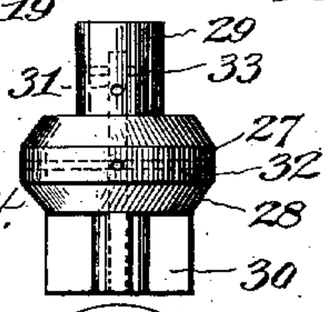



Fig. 5.

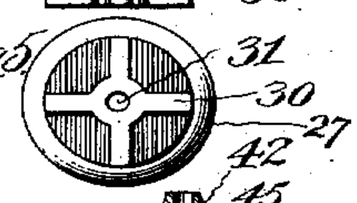



Fig. 6.

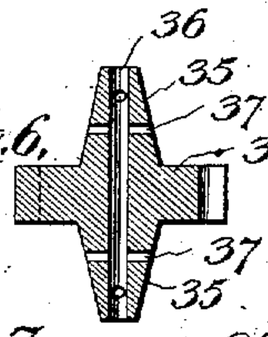



Fig. 8.

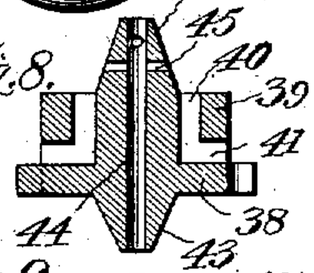



Fig. 7.

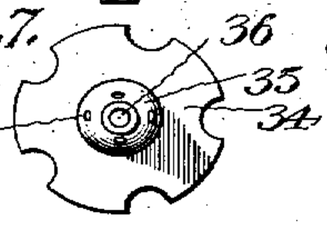



Fig. 9.

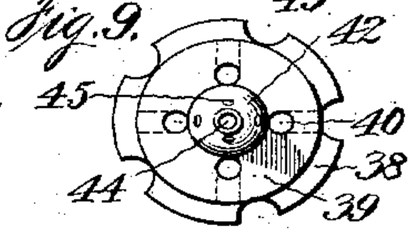
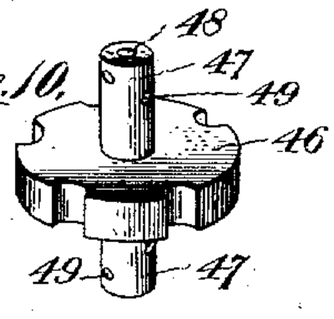



Fig. 10.




Witnesses:
B. F. Ober.
E. A. Finckel.

Inventor.
Frank W. Edwards.
by Wm. F. Finckel.
Atty.

No. 735,074. Patented August 4, 1903.

# UNITED STATES PATENT OFFICE.

FRANK W. EDWARDS, OF LOGANSPORT, INDIANA, ASSIGNOR TO THE CHICAGO LUBRICATOR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## AUTOMATIC CHOKE-VALVE.

SPECIFICATION forming part of Letters Patent No. 735,074, dated August 4, 1903.

Application filed December 13, 1902. Serial No. 135,117. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK W. EDWARDS, a citizen of the United States, residing at Logansport, in the county of Cass and State of Indiana, have invented a certain new and useful Improvement in Automatic Choke-Valves, of which the following is a full, clear, and exact description.

This invention relates to the class of valves used to regulate the flow of lubricant from a lubricator to a part to be lubricated, and more especially to such as are interposed between the sight-feed lubricator and the cylinder of locomotives, and commonly known as "choke-valves."

The primary object of the invention is to provide against the choking of the always-open lubricant-passage in the valve-plug by impurities carried in or by the lubricant.

The invention comprises a choke-valve having a valve-plug provided with an always-open main lubricant-passage arranged in the line of passage of the lubricant and having lateral openings into it which are in the nature of auxiliaries to the main passage and serve to conduct the lubricant into it should such main passage become choked or clogged above such auxiliary openings.

In the accompanying drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is an elevation and partial section of sufficient of a locomotive boiler, engine, and lubricator to show the application of my invention, the choke-valve being in vertical section with the plug on its seat. Fig. 2 is a vertical section of the valve detached. Fig. 3 is a vertical section of the upper member of the valve-casing. Fig. 4 is an elevation of the plug. Fig. 5 is a bottom plan view of the plug. Fig. 6 is a vertical section, and Fig. 7 a plan view, of a modified form of plug. Fig. 8 is a vertical section, and Fig. 9 a plan view, of still another form of plug. Fig. 10 is a perspective view of still another form of plug.

1 may represent a steam-chest with slide-valve and ports of my approved construction.

2 is a fragment of a boiler.

3 is a pipe leading from the steam-space of the boiler to the fitting 4, which communicates through pipe 5 with the lubricator-condenser 6, and also through pipe 7 with the oil-receiving chamber 8 of the upper feed-arm 9 of the lubricator. The supply of steam is controlled by valve 10 in steam-pipe 3. The tallow or oil delivery pipe 11 is coupled to the chamber 8, and thence extends to and is connected with my novel choke-valve herein shown as applied directly to the steam-chest.

The parts thus last above described are in principle and operation substantially the same as corresponding parts shown and described in my two applications for Letters Patent for automatic choke-valves, one filed November 14, 1901, Serial No. 82,329, and the other filed December 31, 1901, Serial No. 87,898, and the plugs shown, respectively, in Figs. 6 and 7 and 8 and 9 are the plugs, respectively, of the applications mentioned, but supplied with the additional feature and capable of the additional function of the present invention, as will presently appear.

The valve-casing member 12 is supplied with an external screw-thread 13, whereby it may be coupled with the pipe 11, and it has a steam and oil passage 14 and an external screw-thread 15 for connection with the lower member 16 of the casing. The steam-passage 14 opens into a laterally-perforated cup 17, having a vertically-perforated bottom 18, in the center of which bottom is an opening 19. The lower member 16 of the casing has a valve-chamber 20 in its upper end and an internal screw-thread 21 at its lower end, whereby it may be attached to the nipple 22 on the steam-chest. The lower part of the chamber 20 has a reduced part, as at 23, in the bottom of which is a valve-seat 24 and below which is the guideway 25, opening into the discharge-port 26. The plug has a flange 27, the bottom of which is chamfered to form a valve member 28 to coöperate with the valve-seat 24. Above the flange 27 is a stem 29, which plays in the opening 19 in the bottom 18 of the cup 17. Below the flange are wings 30, which fit in the guideway 25, and the stem 29 and wings 30 serve to hold the plug in operative position and guide it in its movements in the casing. The plug is provided with a

longitudinal bore 31, which is open at one end and closed at the other and constitutes the main lubricant-passage, and this main passage 31 is intersected at intervals by lateral passages 32 in the flange and 33 in the stem, and these lateral passages are preferably of smaller diameter than the bore. The holes in the sides and the bottom of the cup are also of smaller diameter than the bore.

In the operation of the device if any impurities are carried along with the lubricant they are arrested in the first instance by the perforated cup, which acts as a strainer, and should any such particles escape the strainer they would be excluded from entrance into the bore 31 if they were larger than the lateral passages 32 and 33. Thus the main lubricant-passage is always kept open and the supply of the lubricant insured. I have shown this principle of operation applied to the plugs of the valves of the prior inventions already referred to and as illustrated in Figs. 6 and 7 and 8 and 9.

Referring to Figs. 6 and 7 it will be seen that the plug comprises a peripherally-notched flange 34, having conical projections 35 from opposite sides, which are pierced by a continuous longitudinal passage-way 36 for the passage of the lubricant, and this passage-way or bore is intersected by any desired number of lateral openings 37 of smaller diameter than the main passage 36. In Figs. 8 and 9 the peripherally-notched flange 38 has the turret 39, provided with the communicating vertical openings 40 and lateral openings 41, and there are conical projections 42 and 43 from opposite sides of the flange with a through-bore or lubricant passage-way 44, which is intersected by the opening 45 of smaller diameter.

In Fig. 10 is shown still another form of plug, in which there is a peripherally-notched flange 46, from opposite sides of which project cylindrical portions 47, pierced longitudinally, as at 48, and laterally, as at 49.

Inasmuch as the plugs of Figs. 1, 2, 4, 5, and 8 and 9 are not reversible, the lateral openings are provided on one side only; but because the plugs of Figs. 6, 7, and 10 are reversible these lateral openings are provided in the projections on both sides of the flange. It will thus appear that provision is made for insuring a clear passage-way for the lubricant at some portion of the plug, notwithstanding the fact that the main passage-way may have been choked wholly or in part above the lateral openings.

By the provision of a perforated cup, whose perforations are smaller than the main lubricant-passage in the plug, it is clear that particles escaping from the cup must be so small as to pass freely through the main passage-way of the plug, and hence the danger of this main passage-way becoming clogged is minimized.

Referring now particularly to the valve of Figs. 1, 2, 3, 4, and 5, when steam is turned into the oil-delivery pipe 11 it passes into and through the strainer, which screens out of it all dirt particles. After the steam passes through the strainer its pressure falls upon the plug and seats it. This brings into action the lateral passages and vertical passages, and since the vertical passage 31 does not extend entirely through the stem 29 of course it is impossible for the dirt particles to enter that passage direct, and, as stated, since the perforations in the cup and the lateral perforations are smaller than the passage 31 the said passage 31 under all conditions would be open, and thus there is insured a constant supply of lubricant to the valve in the steam-chest and to the cylinder whenever the lubricator feed-valves are open. The reverse action of the valve is caused by the increase of the steam-chest pressure above that of the boiler-pressure in the oil-delivery pipe, at which time the valve is raised from its seat and arrested by its flange coming in contact with the bottom of the cup, and the perforations in the cup are brought into action for equalizing the steam-pressures, and since the combined area of the holes in the strainer is equal to or greater than the superficial area of the discharge end of the steam-passage 14 it is evident that the steam or back pressure from the steam-chest will equalize freely with the boiler-pressure in the oil-delivery pipe, permitting the lubricant to be fed freely and regularly to the steam-chest, valve, and cylinder of the engine.

By the term "always open" as applied to the main lubricant-passage through the plug I mean a passage which is not affected by the operation of the valve, or, in other words, one that is not opened and closed by the movements of the valve.

The strainer is shown as a sort of cup made integral with the upper member of the casing; but the invention is not limited to a cup-shaped strainer or to a strainer made integral with the casing.

The strainer may be used or not, as desired, in connection with the plugs of Figs. 6 to 10, inclusive.

It is to be noted that the multiplication of lateral passages in the plug adds to the insurance of an always-open through-passage.

The invention provides an equalizing-valve of very simple form which permits the back pressure from the steam-chest to equalize in chamber 20 with the boiler-pressure present in the tallow-pipe, thus preventing or retarding the flow of oil to the steam-chest and cylinder when there is an excess of pressure present in the steam-chest.

What I claim is—

1. An automatic choke-valve, having a casing provided with a valve-seat, an admission-port on one side of said seat, and a discharge-port on the other side thereof, and a plug having a flange and projections from opposite sides of said flange, said flange adapted to engage the valve-seat on the admission-

port side thereof, a main contracted passage in the projections and flange opening into the discharge-port, and lateral openings in the projection on the admission-port side communicating with the main contracted passage and of smaller diameter than it, thereby insuring a passage through the plug whether it be seated or not.

2. An automatic choke-valve, having a plug provided with a vertical bore and lateral openings communicating with said bore, combined with a casing having a seat to and from which the plug is movable, and a strainer arranged above and independent of the plug, said strainer constructed as a cup having lateral and bottom perforations of less diameter than the bore in the plug.

3. An automatic choke-valve, comprising a casing, a strainer in the upper inlet end thereof provided with a guide-opening, a plug seated in the lower portion of the casing and having a stem playing in said opening, said plug having a longitudinal bore extending into but not through the stem, and lateral openings in said stem in the closed end portion thereof and intercepting said bore.

4. An automatic choke-valve, comprising a casing, a strainer in the inlet end thereof provided with a guide-opening, a plug having a flange formed with a valve portion, a stem on the upper side of said flange playing in the strainer-opening, a winged portion on the opposite side of said flange, a valve-seat in the lower portion of said casing and a guideway for the winged portion below said seat.

5. An automatic choke-valve, comprising essentially a casing having a tallow-pipe connection to the boiler and lubricator and a steam-chest connection and located next the steam-chest, provided with a steam-chamber and a valve-seat in the bottom of said chamber and next the discharge-port into the steam-chest, a plug provided with a flange forming a valve member to coöperate with said seat, and projections from opposite sides of said flange, said plug provided in its projections and flange with an always-open contracted main passage for the lubricant, and said passage having lateral openings communicating with the steam-chamber and lubricant-supply at all times.

In testimony whereof I have hereunto set my hand this 10th day of December, A. D. 1902.

FRANK W. EDWARDS.

Witnesses:
GEO. W. WALTERS,
ELIZABETH HOMBURG.

Correction in Letters Patent No. 735,074.

It is hereby certified that Letters Patent No. 735,074, granted August 4, 1903, upon the application of Frank W. Edwards, of Logansport, Indiana, for an improvement in "Automatic Choke-Valves," an error appears in the printed specification requiring correction, as follows: In line 47, page 1, the word "my" should read *any;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 15th day of September, A. D., 1903.

[SEAL.]

F. I. ALLEN,
*Commissioner of Patents.*

port side thereof, a main contracted passage in the projections and flange opening into the discharge-port, and lateral openings in the projection on the admission-port side communicating with the main contracted passage and of smaller diameter than it, thereby insuring a passage through the plug whether it be seated or not.

2. An automatic choke-valve, having a plug provided with a vertical bore and lateral openings communicating with said bore, combined with a casing having a seat to and from which the plug is movable, and a strainer arranged above and independent of the plug, said strainer constructed as a cup having lateral and bottom perforations of less diameter than the bore in the plug.

3. An automatic choke-valve, comprising a casing, a strainer in the upper inlet end thereof provided with a guide-opening, a plug seated in the lower portion of the casing and having a stem playing in said opening, said plug having a longitudinal bore extending into but not through the stem, and lateral openings in said stem in the closed end portion thereof and intercepting said bore.

4. An automatic choke-valve, comprising a casing, a strainer in the inlet end thereof provided with a guide-opening, a plug having a flange formed with a valve portion, a stem on the upper side of said flange playing in the strainer-opening, a winged portion on the opposite side of said flange, a valve-seat in the lower portion of said casing and a guideway for the winged portion below said seat.

5. An automatic choke-valve, comprising essentially a casing having a tallow-pipe connection to the boiler and lubricator and a steam-chest connection and located next the steam-chest, provided with a steam-chamber and a valve-seat in the bottom of said chamber and next the discharge-port into the steam-chest, a plug provided with a flange forming a valve member to coöperate with said seat, and projections from opposite sides of said flange, said plug provided in its projections and flange with an always-open contracted main passage for the lubricant, and said passage having lateral openings communicating with the steam-chamber and lubricant-supply at all times.

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