

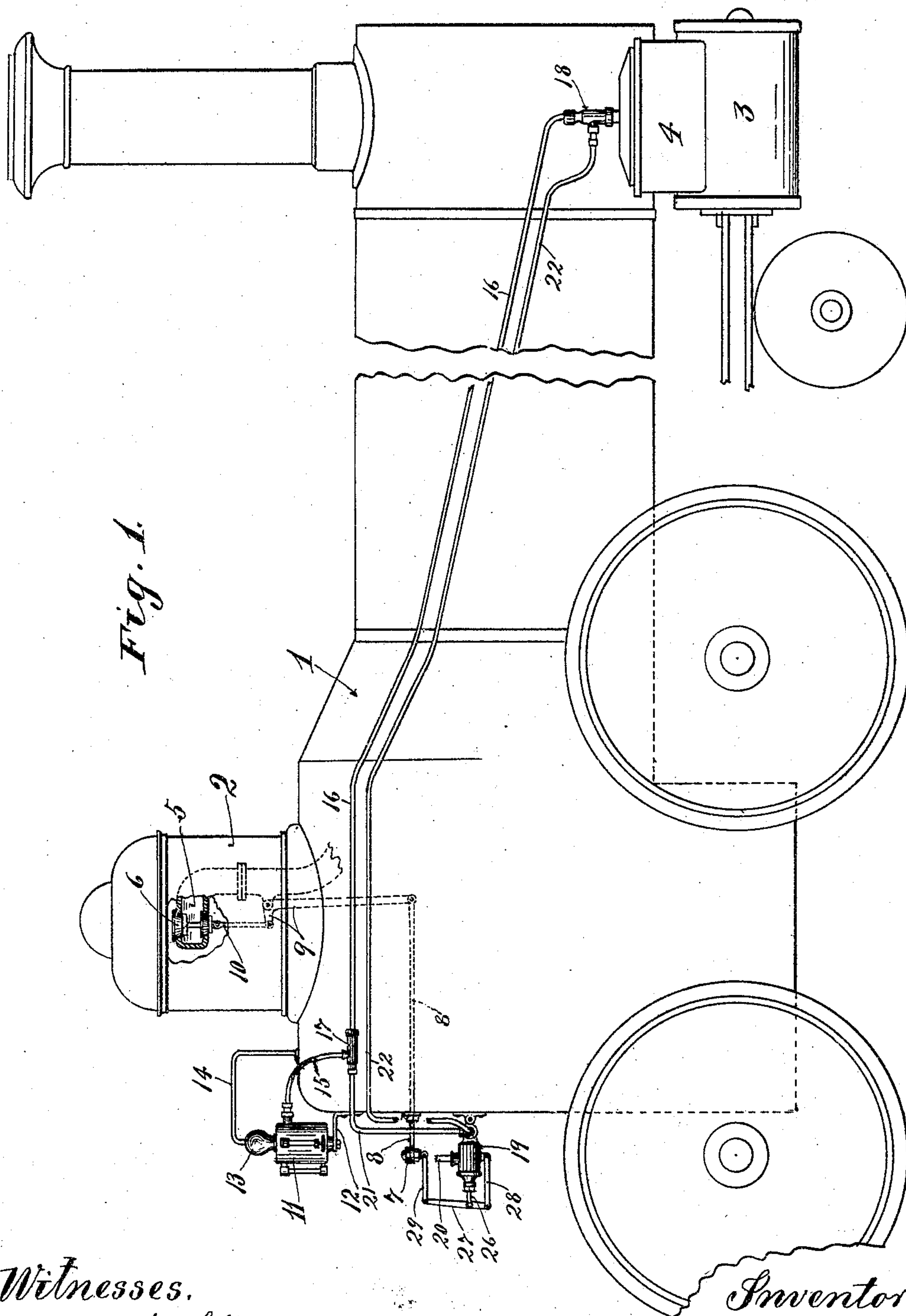
No. 772,240.

PATENTED OCT. 11, 1904.

B. F. KELSEY.
CYLINDER LUBRICATOR.
APPLICATION FILED DEC. 29, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses.
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H. D. Kilgore.

Inventor.
Benjamin F. Kelsey.
By his Attorneys.
Williamson & Merchant

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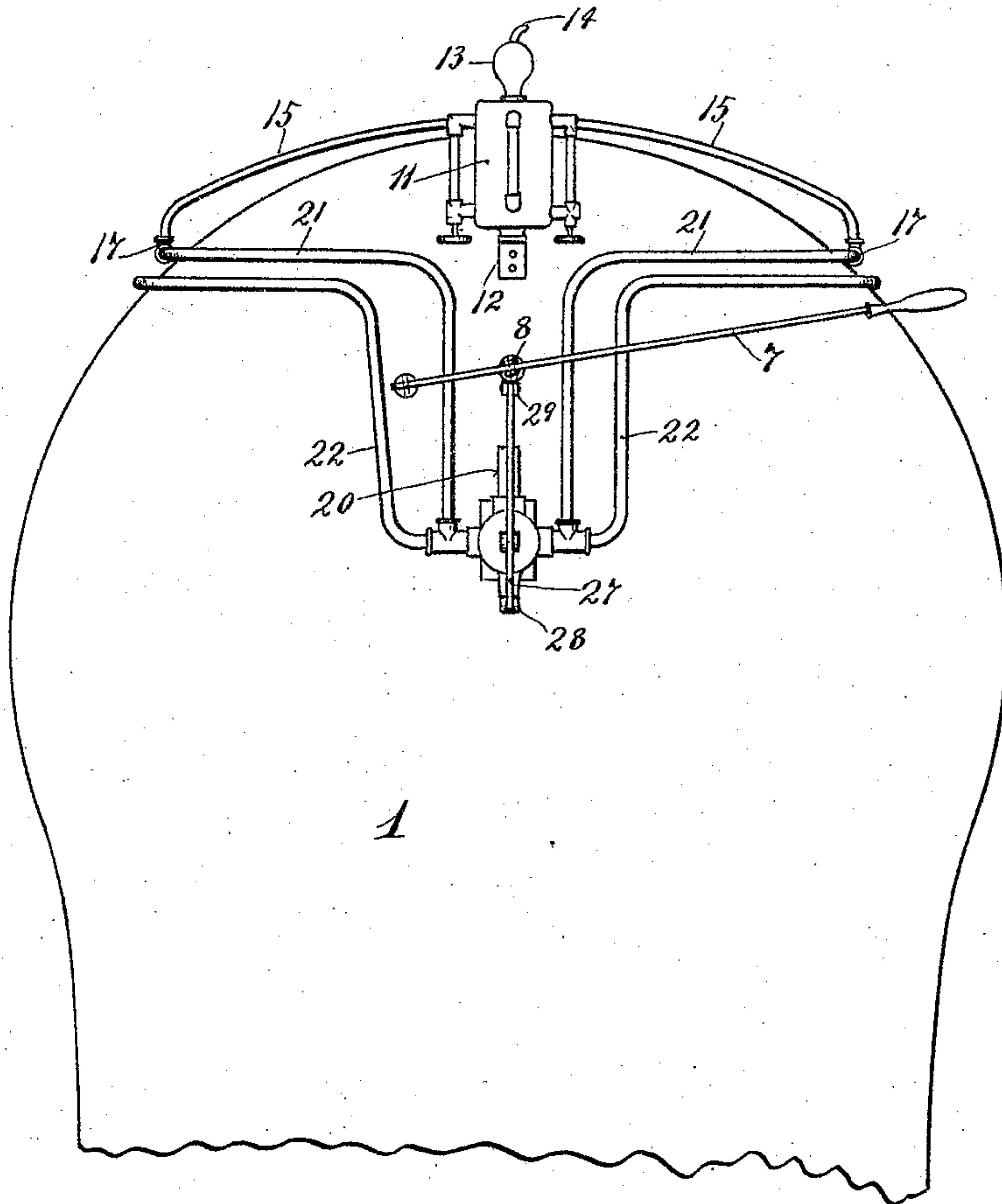
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3 SHEETS—SHEET 2.

Fig. 2.



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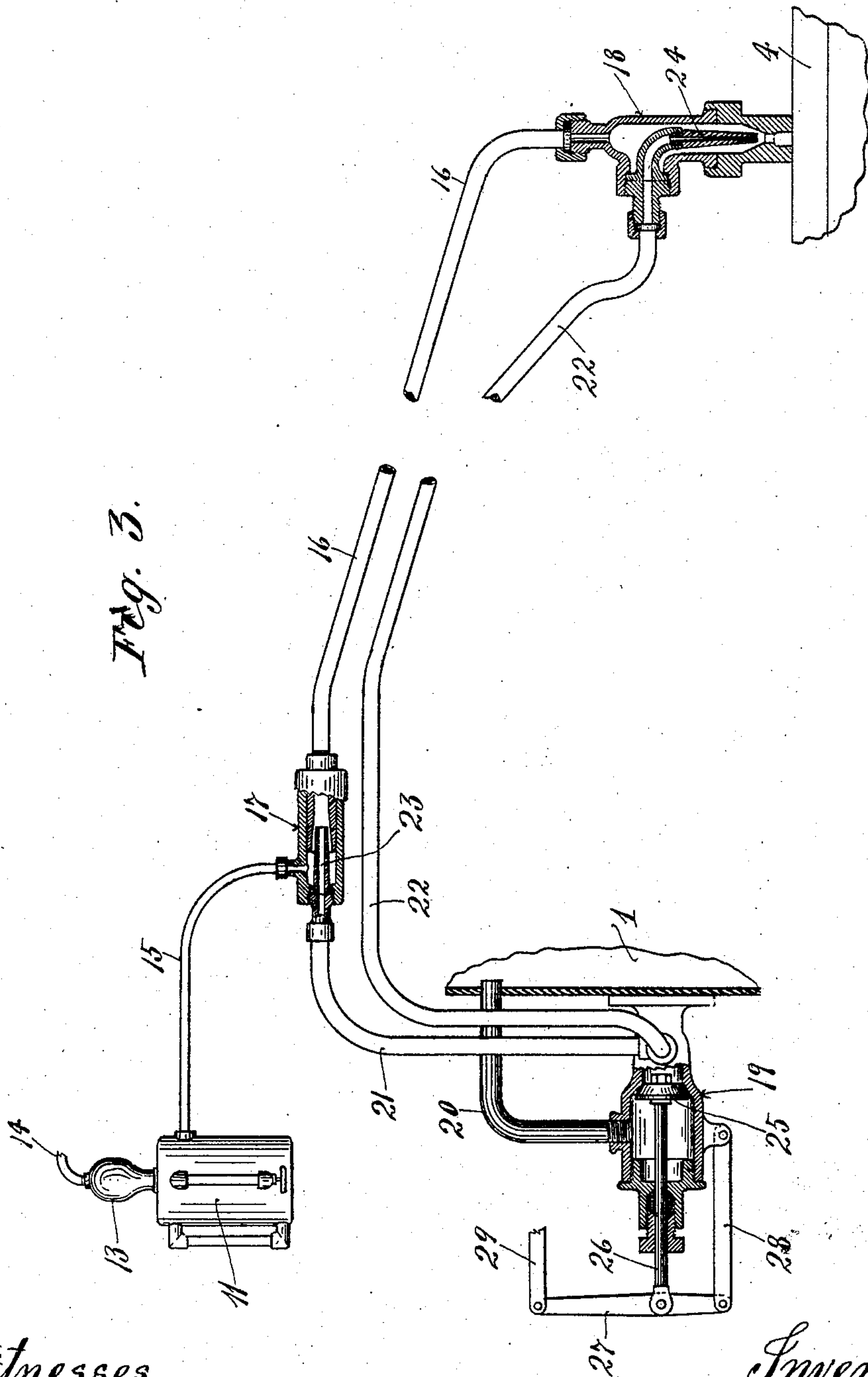
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

BENJAMIN F. KELSEY, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF ONE-HALF TO A. O. HOYT, OF MINNEAPOLIS, MINNESOTA.

CYLINDER-LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 772,240, dated October 11, 1904.

Application filed December 29, 1902. Serial No. 136,898. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. KELSEY, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Cylinder-Lubricators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of lubricator feeding devices for locomotives generally designated as "choke-feed" or "force-feed" lubricators, and has for its object to improve such lubricators in point of increased efficiency, greater reliability, and simplicity of construction.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

In ordinary choke-feed lubricating devices of the above character the oil will be fed to the steam-chests and cylinders in sufficient quantities as long as there is sufficient difference between the pressures in the lubricator and in the steam-chests. Otherwise stated, as long as the throttle-valve is closed or nearly closed the ordinary feed device will supply the needed oil and sometimes even more oil than is required; but if the throttle-valve be wide open, as when the engine is drawing a heavy load, the pressure in the steam-chests will approximate so closely the pressure on the lubricator that sufficient oil will not be fed to the cylinders. The above tendency must be overcome in order to provide an efficient and satisfactory lubricating device. This I accomplish in my present invention by a simple mechanism, illustrated in its preferred form in the accompanying drawings and hereinafter described.

In the accompanying drawings like characters indicate like parts throughout the several views.

Figure 1 is a side elevation with some parts broken away, showing diagrammatically parts of a locomotive having my improved lubricat-

ing device applied thereto. Fig. 2 is a rear elevation of what is shown in Fig. 1, some parts being broken away; and Fig. 3 is a view, partly in diagram and partly in section, showing my improved lubricating device in side elevation but removed from the engine.

The numerals 1, 2, 3, and 4 indicate, respectively, the boiler, the dome, and one cylinder and steam-chest of an ordinary locomotive. Further, in Fig. 1 the numeral 5 indicates the dry pipe, the numeral 6 the throttle-valve, the numeral 7 the throttle-lever, and the numeral 8 the throttle-lever plunger, of the said engine. The plunger 8 is, as is ordinary, connected to said throttle-valve by a bell-crank 9 and a link 10, the former of which is pivoted to the dry pipe 5. The numeral 11 indicates the oil cup or reservoir of a standard lubricator, which is suitably supported by a bracket 12 or otherwise from the boiler and is provided at its top with a dome 13, which is subject to boiler-pressure through a pipe 14, that connects it with the upper portion of the boiler. For the purposes of this case the internal construction of the oil-reservoir 11 and its dome 13 need not be considered, since they are well understood by all persons familiar with lubricating devices of this general character involving what is usually known as the "hydrostatic" principle. It is only necessary to state that under boiler-pressure directed into the dome 13 oil is forced out from the reservoir 11 into an oil-delivery pipe or tube 15 16. The pipe-sections 15 and 16 are connected by a sleeve 17, and the delivery end of the pipe-section 16 opens into the upper end of a sleeve-like head 18, which in turn opens into one of the steam-chests 4. There are of course in a locomotive lubricating device two of the oil-delivery connections 15, 16, 17, and 18, which lead independently from the oil-reservoir 11 one to each of the steam-chests 4.

A lubricating device involving only the oil-delivery connections so far specifically described would be subject to the several objections pointed out in the introductory part of this description: To accelerate the feed of the oil and to insure the delivery thereof to the steam-chests against high pressure and against

impulses of pressure in the steam-chests, such as are produced therein when the throttle-valve of the engine is wide open, I provide for each oil-delivery pipe a primary and a secondary steam-delivery tube, which lead from the boiler and open into said oil-delivery tube or pipe, the former near the receiving end and the latter near the delivery ends thereof. By these primary and secondary steam-delivery tubes the feed of the oil is accelerated at the two points noted. Furthermore, with this arrangement of the primary and secondary steam-delivery or oil-feed accelerating tubes impulses due to back pressure from the steam-chests are entirely overcome. Such back-pressure impulses will be nearly overcome at the delivery ends of the oil-tubes by the pressure and blowing action of the steam delivered thereinto by the secondary steam-tubes and will be finally and completely overcome at the points where the primary steam-tubes open into the said oil-tubes. In the best arrangement of the device the primary and secondary steam-delivery tubes terminate in contracted discharge-nozzles located axially within the oil-pipes, so that, in effect, oil-injectors are provided. In this connection it is, further, important to note that any back-pressure impulses from the steam-chests will not be delivered simultaneously onto the primary and secondary injectors, but will be delivered thereto at different times—to wit, first to the secondary injectors and a little later to the primary injectors—so that when one of the said class of injectors is acting to overcome the impulse the other will be feeding freely. By actual practice I have demonstrated that the primary and secondary steam-delivery tubes opening into the oil-pipes at the two points noted are necessary to produce a satisfactory feeding action of the oil to the steam-chests and cylinders.

Secured to the rear end of the boiler, below the throttle-valve, is a cylindrical valve-casing 19, the outer portion of which is in constant communication with the boiler above the water-line through a pipe 20. From the forward portion of the valve-casing 19 a plurality of auxiliary steam-pressure tubes lead to the oil-delivery tubes 15 16. As shown, there are four of such tubes, leading two to each of the said oil-delivery tubes. The auxiliary tubes 21 lead to the rear ends of the sleeve 17 and terminate therein in spraying-nozzles 23, as best shown in Fig. 3. The auxiliary tubes 22 lead from the said casing 19 to the hollow heads 18 and terminate thereon in spraying-nozzles 24, as also best shown in Fig. 3. The nozzles 23 and 24 project in the direction in which the oil is fed through the pipes or tubes 21 and 22.

In the valve-casing 19, between the delivery end of the tubes 20 and the receding ends of the tubes 21 and 23, is a valve-seat which is adapted to be opened and closed by a valve 25,

the stem 26 of which works outward through said casing and is connected to a lever 27. The lever 27 is fulcrumed to the casing 19 by a link 28 and is connected to the throttle-lever 7 by a link 29, as best shown in Figs. 1 and 3. By this arrangement the valve 25 and the throttle-valve 6 are both operated by the throttle-lever 7 and are simultaneously opened by one movement and closed by the other movement thereof.

Operation: The operation is substantially as follows: When the throttle-valve is closed, the valve 25 will also be closed and a minimum feed of oil to the steam-chests will take place, due only to the pressure delivered to the oil-reservoir 11 through the pipe 14. When, however, the throttle-valve is open and increased back pressure is produced in the steam-chests, (which increased back pressure, as already pointed out, greatly resists the flow of the oil through the oil-supply pipes,) the valve 25 is open, thereby letting steam under boiler-pressure escape through the auxiliary tubes 21 and 22. The steam escaping through the nozzles 23 and 24 of the tubes 21 and 22 is discharged into the oil-delivery pipe in the direction in which the oil is fed therethrough to the steam-chests, and thus accelerates the feed or travel of the oil in the proper direction. Furthermore, the escape of the steam from said nozzles has an atomizing action on the oil, and thus insures the complete vaporization thereof.

From what has already been said it will of course be understood that the lubricating device above described is capable of many modifications within the scope of my invention as herein set forth and claimed. As one modification I might run the pipe 20 or a pipe corresponding thereto into the receiving end of the dry pipe, and thus make the throttle-valve 6 serve to open and close the auxiliary tubes or pipes. Again the oil-delivery pipes might open directly into the delivery ends of the dry pipes. Neither of these suggested modifications would, however, be the full equivalent of the construction illustrated in the drawings and above specifically described.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. A lubricating device for locomotives, comprising an oil-reservoir and oil-delivery pipes leading therefrom to the steam-chests, or other parts communicating with the cylinders, and primary and secondary steam-delivery tubes, leading from the boiler, and opening into said oil-delivery pipes, the former near the receiving ends thereof, and the latter near the delivery ends thereof, whereby the feed of the oil is accelerated in each oil-pipe at the two points noted, substantially as described.

2. A lubricating device for locomotives and similar engines, comprising an oil-reservoir

having oil-delivery pipes or passages leading therefrom to the steam-chest or other parts having communication with the cylinder, and primary and secondary steam-supply tubes or
5 passages leading from the boiler and continuously subject to boiler-pressure and opening into said oil-delivery pipes, the former near the receiving ends thereof, and the latter near the delivery ends thereof, whereby the feed
10 of the oil is accelerated, in each pipe, at the two points noted, said oil-delivery passages being contracted or restricted at points between the delivery ends of the secondary steam-pipe and the steam-chests and the said
15 steam-tubes terminating in contracted nozzles located axially within said oil-pipes, substantially as described.

3. A lubricating device for locomotives and similar engines, comprising an oil-reservoir,

having oil-delivery pipes leading therefrom to the steam-chests or other parts communicating with the cylinders, primary and secondary steam-delivery tubes leading from the boiler, and opening into said oil-feed pipes, the former near the receiving ends and the latter near
20 the delivery ends thereof, and valve mechanism, independent of the throttle-valve, having a common controller for simultaneously opening and simultaneously closing the said
25 steam-delivery pipes, substantially as described.
30

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN F. KELSEY.

Witnesses:

GENEVIEVE HIRSCH,
F. D. MERCHANT.