No. 789,960. PATENTED MAY 16, 1905.

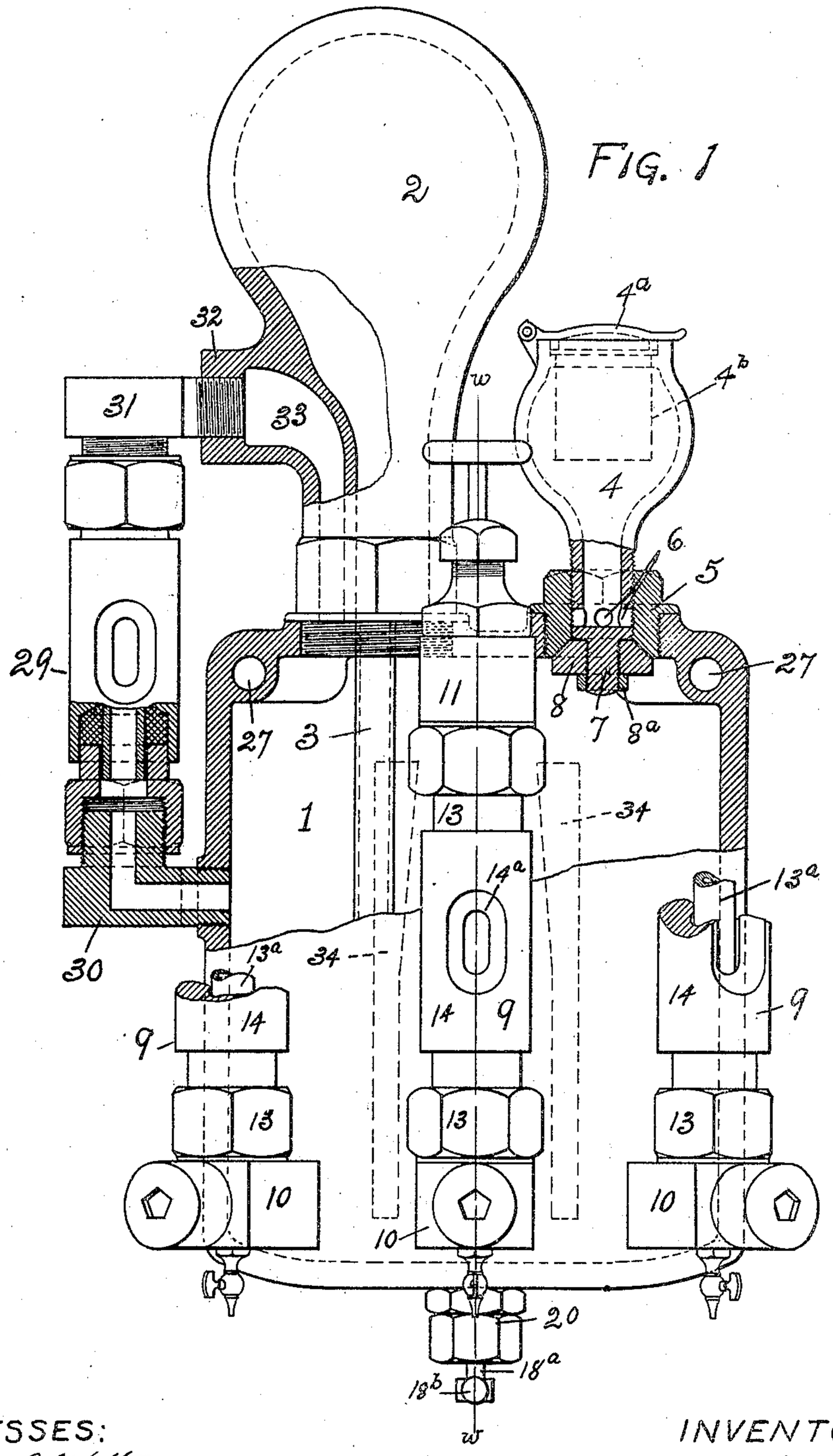
J. E. BURNS.

FORCE FEED LUBRICATOR.

APPLICATION FILED DEC. 3, 1904.

2 SHEETS—SHEET 1.

FIG. 1



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2 SHEETS—SHEET 2.

FIG. 4

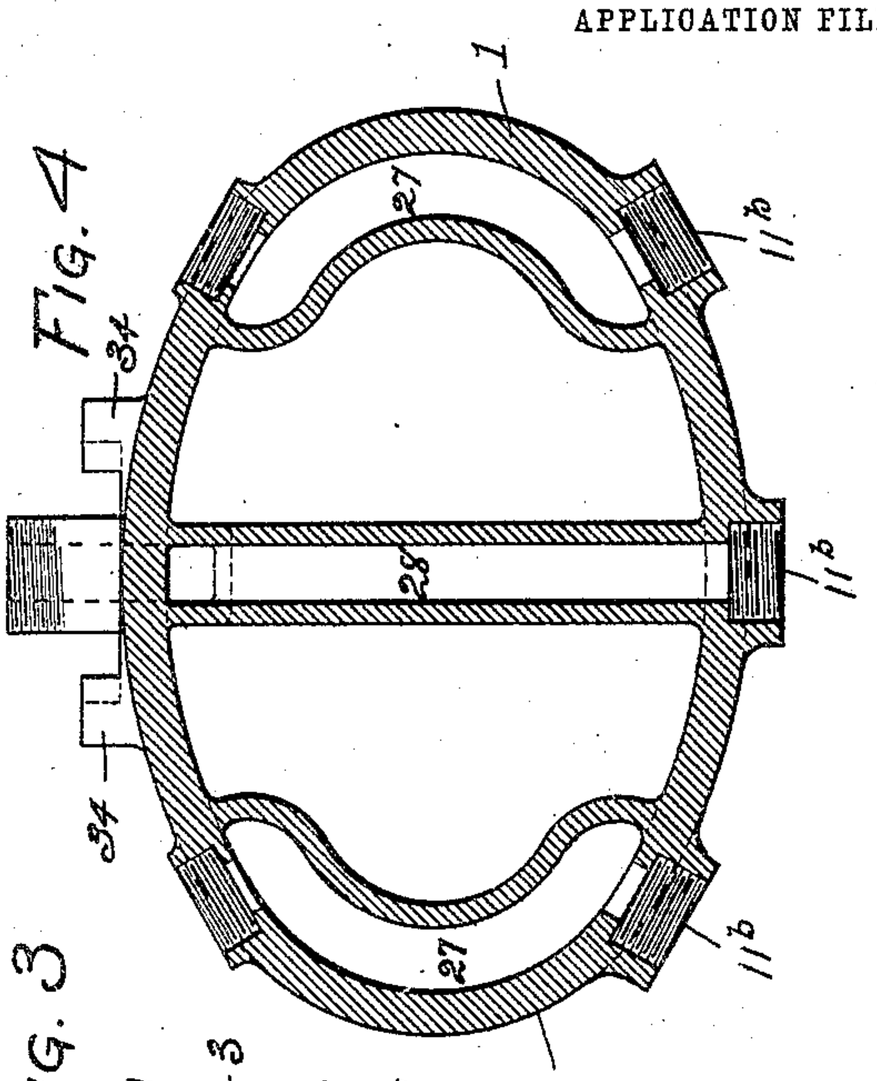


FIG. 5

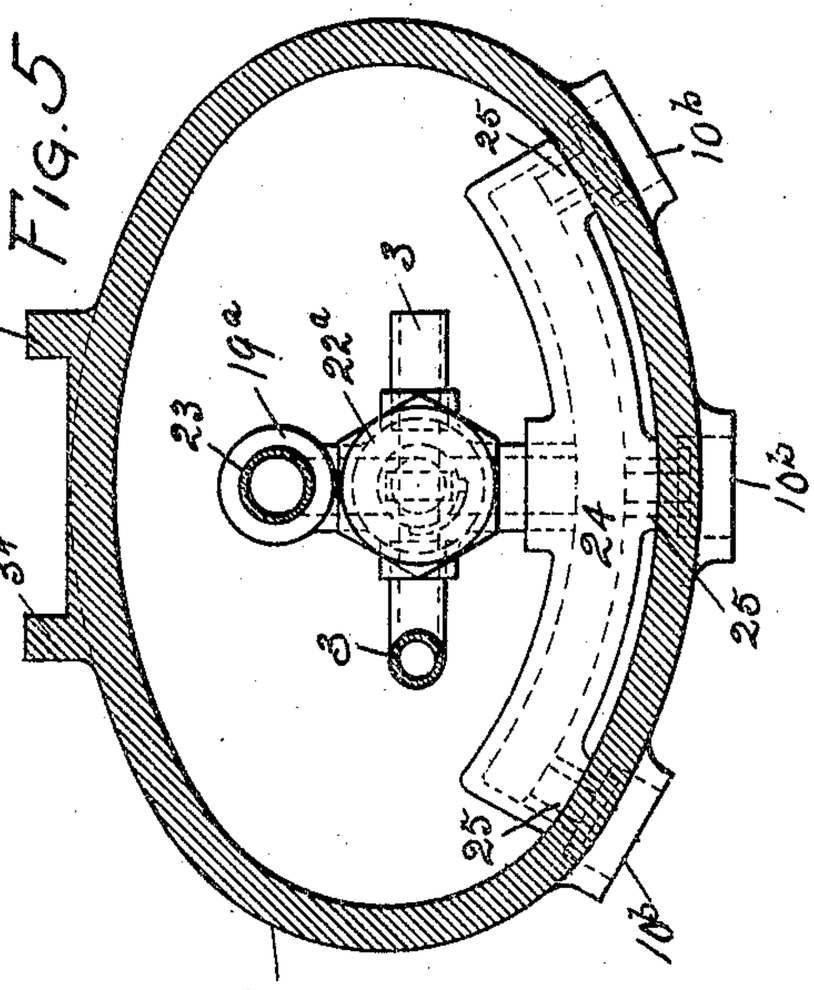


FIG. 3

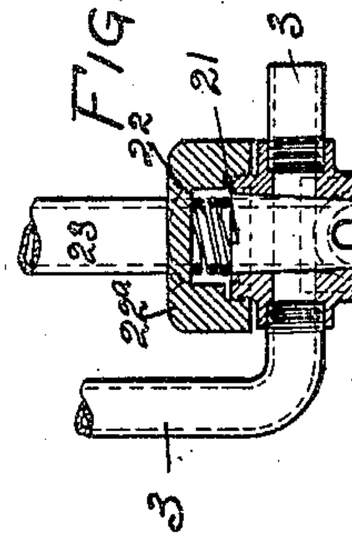
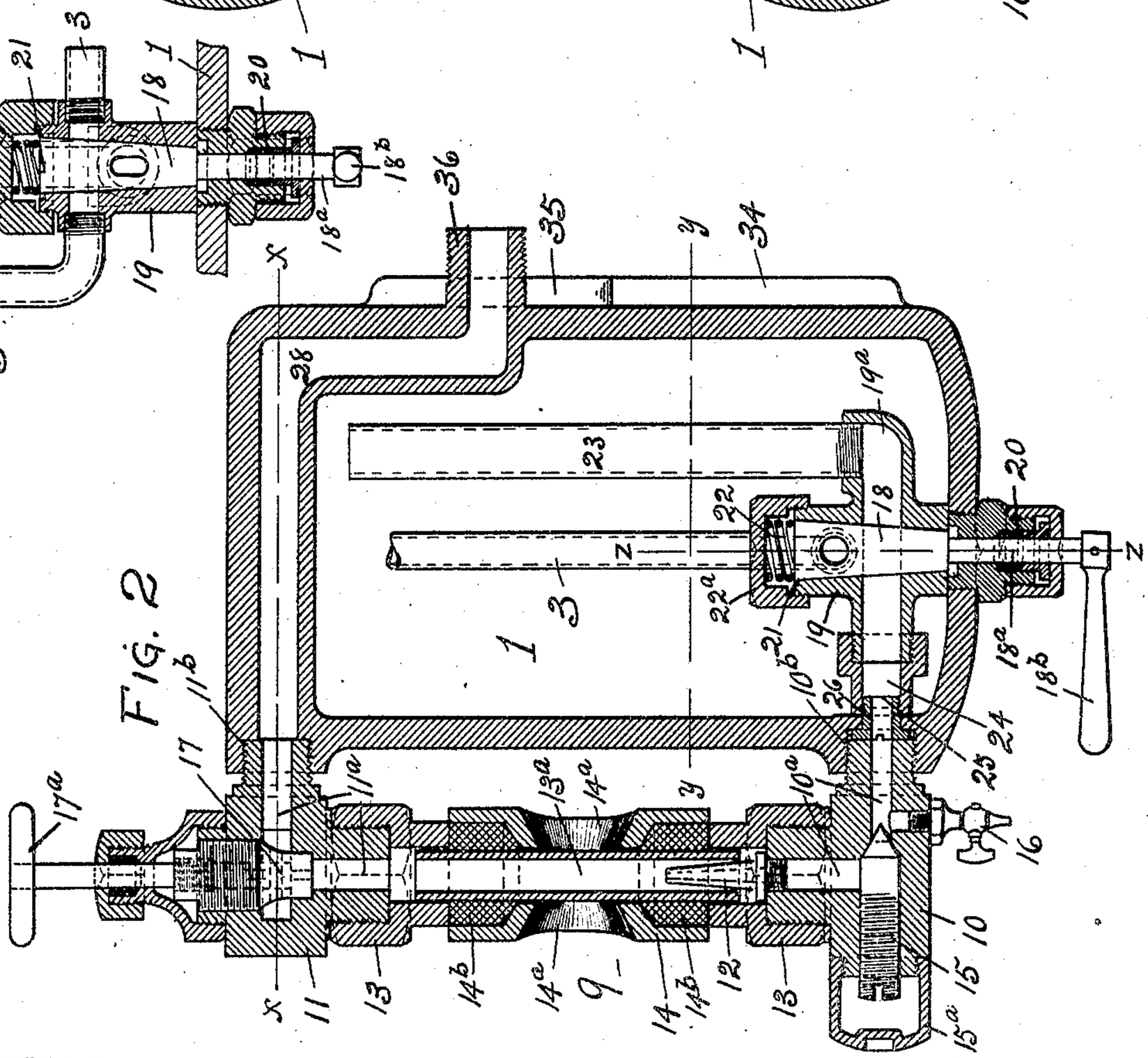


FIG. 2



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UNITED STATES PATENT OFFICE.

JAMES E. BURNS, OF NORWALK, OHIO.

FORCE-FEED LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 789,960, dated May 16, 1905.

Application filed December 3, 1904. Serial No. 235,329.

To all whom it may concern:

Be it known that I, JAMES E. BURNS, a citizen of the United States, and a resident of Norwalk, in the county of Huron and State of Ohio, have invented certain new and useful Improvements in Force-Feed 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to the class of lubricators designed on hydrostatic or water-displacement principles and in which a plurality of feeds is employed to communicate oil from a single oil-bowl to the several parts of a locomotive or similar engine. In lubricators of this class it has been customary to employ a single valve in each discharge-outlet, both to open the feed and to control the amount thereof, thereby entailing upon each engineer the necessity of separately gaging and regulating the oil-feed to the several parts each time the feed-valves are opened preparatory to the starting of an engine after it has been standing on a siding or in the yards. The amount of feed necessary to properly lubricate the parts and at the same time avoid waste must be gaged by the service conditions and requirements to which the engine is put, hard service requiring a heavier feed than light service. Owing to the large number of engineers in service and to the shifting of crews on an engine during a run thereof, will readily be seen the difficulty existing in providing a uniform feed of the oil under certain conditions of service, as no two engineers might have the same understanding as to the feed requirements of an engine under like conditions.

The primary object of my invention is to obviate this difficulty by the provision of means on a lubricator whereby the discharge of oil from the oil-bowl to the several feed-outlets is controlled by a single valve, while the amount of the oil fed to each source of discharge is regulated by a separate valve that is intended to be adjusted to the proper feed prior to the starting out of an engine by a person in the yards having such special duty in charge, thus placing the oil-feed of all engines running out of a terminal under the control of some one person skilled in such line instead of under the varied judgments of the different engineers.

A further object of my invention is to so arrange the pipe opening communication between the steam-condenser and the oil-bowl as to place the water-feed to said bowl under the control of the same valve-plug that regulates the oil-discharge from said bowl, thereby simplifying both the construction and operation of the lubricator.

Further objects of my invention will be apparent by reference to the following specification, which fully describes the same, and to the accompanying drawings, in which—

Figure 1 is a front elevation of my lubricator, having portions broken away to disclose the internal mechanism. Fig. 2 is a central vertical section taken on the dotted line *w w* in Fig. 1. Fig. 3 is a central vertical section of the feed-valve plug, taken on the dotted line *z z* in Fig. 2. Fig. 4 is a cross-section of the oil-bowl, taken on the dotted line *x x* in Fig. 2; and Fig. 5 is a similar view taken on the dotted line *y y* in Fig. 2.

Referring to the drawings, 1 represents the oil-bowl of my invention, which is preferably made elongated in cross-section, as shown, to form broadened front and rear surfaces and also make a compact body for securing to the boiler of an engine. At the upper end of the bowl 1 is suitably mounted a condenser-chamber 2, which has a suitable source of steam-supply and is adapted to communicate with the interior of the bowl 1 through the feed-pipe 3. A filling-cup 4 also communicates with the interior of the bowl 1, at the upper end thereof, as shown in Fig. 1. The cup 4 is reduced at its lower end to form a hollow neck or stem, which is exteriorly threaded to be received within the threaded aperture provided centrally through the plug 5, that is suitably secured within an opening provided through the upper casing of the bowl 1. The lower end of the stem of the cup 4 is closed,

except for a series of transversely-disposed openings 6 provided therein, and is formed with the axially-projecting stud 7, on which the valve 8 of greater diameter than said stem is threaded and secured against movement thereon by the locking-nut 8[a]. The valve 8 has its upper surface tapered to adapt it to seat snugly against the lower tapered portion of the aperture through the plug 5. The cup 4 has its filling-opening normally closed by a hinged cover 4[a] and has a screen 4[b] supended below said opening for straining the oil as it is poured therein. This manner of constructing the filling-cup 4 enables it to be turned down until the openings 6 in the stem communicate with the interior of the bowl, thus permitting the oil to pass through said openings into the bowl during the filling operation, after which it is turned up to cause the valve 8 to seat and tightly close the opening through the plug 5.

Secured in vertical position to the front of the bowl 1 is a plurality of sight-feeds 9, each of which communicates at its lower end with the interior of said bowl and at its upper end with a part of the engine to be lubricated. In the present case three feeds are shown, the two outer ones each connecting with a cylinder on opposite sides of a locomotive-engine and the center one communicating with the air-pump thereof. Each feed 9 comprises a lower and an upper feed-arm 10 and 11, respectively, which are suitably bored, as shown at 10[a] and 11[a], and communicate horizontally with the openings 10[b] and 11[b], formed at the lower and upper portions of the oil-bowl casing, to which they are respectively threaded. A feed-nipple 12 is secured within the vertical bore 10[a] of the lower feed-arm 10, and a sleeve 13 is threaded to the vertical arm of each feed-arm 10 and 11 in converging position and have their outer ends reduced to a size adapted to receive the ends of a cylindrical glass 13[a], said glass having its lower end surrounding the nipple 12, as shown in Fig. 2. Surrounding the glass 13[a] is a protecting-sleeve 14, which has the transverse sight-opening 14[a] provided centrally therethrough and its axial bore enlarged at the ends thereof to receive a gasket or suitable packing 14[b], said packing having its outer end bearing against the end of the contiguous sleeve 13. In the packing of glasses of this nature it has been customary to secure the same within a packing-nut adapted when tightened to compress the packing material, usually of rubber, toward the end of the glass. Difficulty has arisen from this manner of packing, as it is found that the condition of the service to which the packing is subjected causes the same to become soft and to crumble, the crumbled particles working around the end of and within the glass, due to the endwise pressure of the packing-nut, thereby frequently causing the feed to become impaired to a more or less extent. In the present apparatus this difficulty is obviated by reason of the packing 14[b] being pressed toward the center of the glass 13[a] when the sleeves 13 are turned against the same. The feed of oil to the glass 13[a] is regulated by a plug-valve 15, that is threaded within an enlarged portion of the feed-bore 10[a] in the lower feed-arm 10 and is formed with a tapered valve end to seat against a corresponding taper formed at one end of the reduced portion of the bore 10[a]. A cap 15[a] is threaded to the feed-arm 10 and is adapted to inclose the projecting end of the plug 15. 16 is a cock secured to the lower feed-arm 10 for the purpose of bleeding the same. A valve 17 of ordinary construction is mounted in the upper feed-arm 11 for closing the bore 11[a] therein and is controlled by a hand-wheel 17[a].

The admission of oil from the bowl 1 to the three feeds 9 is controlled by a plug-valve 18, which is mounted within the valve-casing 19, that is centrally secured in suitable manner within the bowl 1 to the bottom thereof. The stem 18[a] of said valve projects through a suitable stuffing-box 20 at the bottom of the bowl and has an operating handle or lever 18[b] secured to its extended end. The movement of the plug 18 is limited to a quarter-revolution by reason of the pin 21 formed thereon operating within a quarter-groove provided in the interior of the valve-casing, as shown by dotted lines in Fig. 5. An expansion-spring 22 coacts with the head of the plug 18 to insure a proper seating thereof and is retained in position by the cap 22[a]. Oil is admitted to the valve-casing 19 through the vertical pipe 23, which has its inlet disposed adjacent to the upper casing of the bowl 1 and its lower end threaded to an elbow 19[a] on the casing 19. Connected to a nipple on the opposite side of the valve-casing 19 is a transversely-disposed distributing-pipe 24, which is shaped to conform to the contour of the front surface of the bowl 1 and has an outlet 25 communicating with the feed-opening 10[a] in each lower feed-arm 10, as shown in Fig. 5. A coupling 26 is employed at each outlet 25 of the pipe 24 to retain it in proper connection with the respective feed-arms.

In order that communication between the condenser-chamber 2 and the oil-bowl 1 may be closed at the same time the oil-feed is stopped, I pass the terminus of the water-feed pipe 3 through the plug-valve 18 and casing 19, as shown in Fig. 3, thereby making a single turn of the valve control both the feed of oil and the force for actuating such feed.

The two side and the center feed 9 each communicate at their upper ends with the conduits 27 and 28, respectively, which are formed in the upper part of the bowl 1, as shown in Figs. 1, 2, and 4, and have their terminals on the opposite side of the bowl suitably threaded to connect with pipes lead-

ing to the cylinders and air-pump of a locomotive-engine.

29 is an index-glass which is constructed substantially the same as the sight-feeds 9 with the exception of the feed-nipple 12, regulating plug-valve 15 and shut-off valve 17, which latter is substituted by an automatic check-valve of any suitable design. (Not shown.) This index-glass has its lower feed-arm 30 communicating with the interior of the bowl 1 through a suitable opening provided in one side thereof midway between its ends and its upper feed-arm 31 threaded to a nipple 32, formed on the side of the condenser-chamber, which nipple communicates with the bowl 1 through the downwardly-extending bore 33, formed in the casing of said condenser-chamber, as shown in Fig. 1. The positioning of the index-glass in this manner elevates the sight-opening in the sleeve surrounding the glass to a plane with the extreme upper part of the oil-chamber, thereby enabling the level of the oil to be seen until it has been completely exhausted.

Formed on the rear surface of the bowl 1 are two vertical parallel ribs 34, which have their upper inner surfaces gradually tapered at 35 to form a gradually-contracted intervening space for seating upon a wedge-shape bracket or support secured to the boiler-front. The lubricator is prevented from forward movement with respect to the supporting-bracket by means of the coupling of the projected end 36 of the conduit 28 with its connecting-pipe.

The operation of my improved lubricator is as follows: Before a locomotive is sent out from a railroad terminal or yard the cap 15^a of each feed 9 is removed and the valves 15 adjusted to a feed suitable to meet the demands of service to which the locomotive is put. After the adjusting of said valves the caps 15^a are replaced, thus preventing the changing of the feed during the run. The filling of the oil-bowl is accomplished by turning the filling-cup 4 down until the openings 6 communicate with the interior of the bowl, as above described. When the bowl has been filled, the opening by way of the filling-cup is tightly closed by the seating of the valve 8 when the cup is turned up in the position shown. The steam having been turned into the condenser-chamber 2, it remains only for the engineer on starting his engine to throw the valve 18 into open position when it is desired to start the feed of oil through the several feeds 9 to the parts to be lubricated, which also opens the communication between the condenser and the bowl, thus admitting the pressure for feeding the oil. As steam enters the chamber 2 it condenses and forms a body of water above the oil-bowl, thus providing a pressure for forcing one or more drops of water into the bottom of the oil-bowl and a like quantity of displaced oil through the pipe 23 and into the feed-passages. It will thus be apparent that for every drop of oil fed out of the bowl 1 a drop of water has been forced in to displace it.

It is obvious that such changes in the form, proportion, and minor details of construction of the parts as fairly fall within the scope of my invention may be made without departing from the scope or sacrificing any of the advantages thereof.

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

1. In a lubricator, the combination with an oil-bowl having an opening through its casing, of a filling-cup having its lower end reduced and threaded in the opening in said bowl and provided adjacent to its lower end with transverse openings adapted to open communication between the cup and bowl when said cup is turned down and to close such communication when the cup is turned up.

2. The combination with an oil-bowl having an opening therein, of a filling-cup having its lower end reduced and mounted to turn in said opening and provided with an outlet to said bowl, said outlet having its outer end open to the bowl when the cup is turned in one direction and closed when turned in the opposite direction.

3. In a lubricator, the combination with an oil-bowl having an opening through its casing with a seat on the inner rim thereof, of a filling-cup having its lower end shaped to fit said opening and provided with an outlet, said cup being adapted to be moved to have its outlet communicate with said bowl, and a valve on the under side of said cup adapted to seat around the rim of said opening when the communication between the cup and bowl is closed.

4. In a lubricator, an oil-bowl, a plurality of oil-feeds leading therefrom a conduit within said bowl having one end open to the interior thereof adjacent to its top and its other end branched to communicate with the several feeds, and a valve disposed between the inlet and branched ends of said conduit to control the discharge of oil to said feeds.

5. In a lubricator, an oil-bowl, a plurality of feeds communicating with the interior of the bowl, an oil-distributing member located within the bowl and having connection with each feed, and a single valve disposed within the bowl for controlling the oil-supply to said distributing member.

6. In a lubricator, an oil-bowl, a plurality of feeds leading therefrom, a conduit within said bowl having one end open to the interior thereof adjacent to its upper part and its other end communicating with the several feeds, a valve disposed in said conduit to control the discharge of oil to said feeds, and an independent feed-regulating valve in each feed.

7. In a lubricator, an oil-bowl, a plurality of oil-feeds leading therefrom, a regulating-

valve in each feed, means for inclosing said valves when adjusted, and a common valve in advance of said regulating-valves for admitting oil to said feeds.

8. In a lubricator, an oil-bowl, a water-feed communicating therewith, a plurality of oil-feeds, a conduit opening communication between the interior of said bowl and the several feeds, and a common valve for controlling the water-feed to the bowl and the flow of oil through said conduit.

9. In combination in a lubricator, an oil-bowl, a condenser-chamber communicating therewith, a plurality of oil-feeds leading from said bowl, a conduit having its inner end opening within said bowl and its outer end communicating with each of said feeds, and a single valve for controlling the communication between the condenser and bowl and closing the passage through said conduit.

10. In combination in a lubricator, an oil-bowl, a condenser-chamber communicating therewith, a plurality of oil-feeds, a common conduit through which the oil in the bowl is fed to the several feeds, a single valve for opening or closing the communication between the condenser-chamber and bowl and the passage through the conduit, and a feed-regulating valve associated with each feed.

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

JAMES E. BURNS.

Witnesses:

WILBER A. OWEN,

POWELL SCHREIBER.