

(No Model.)

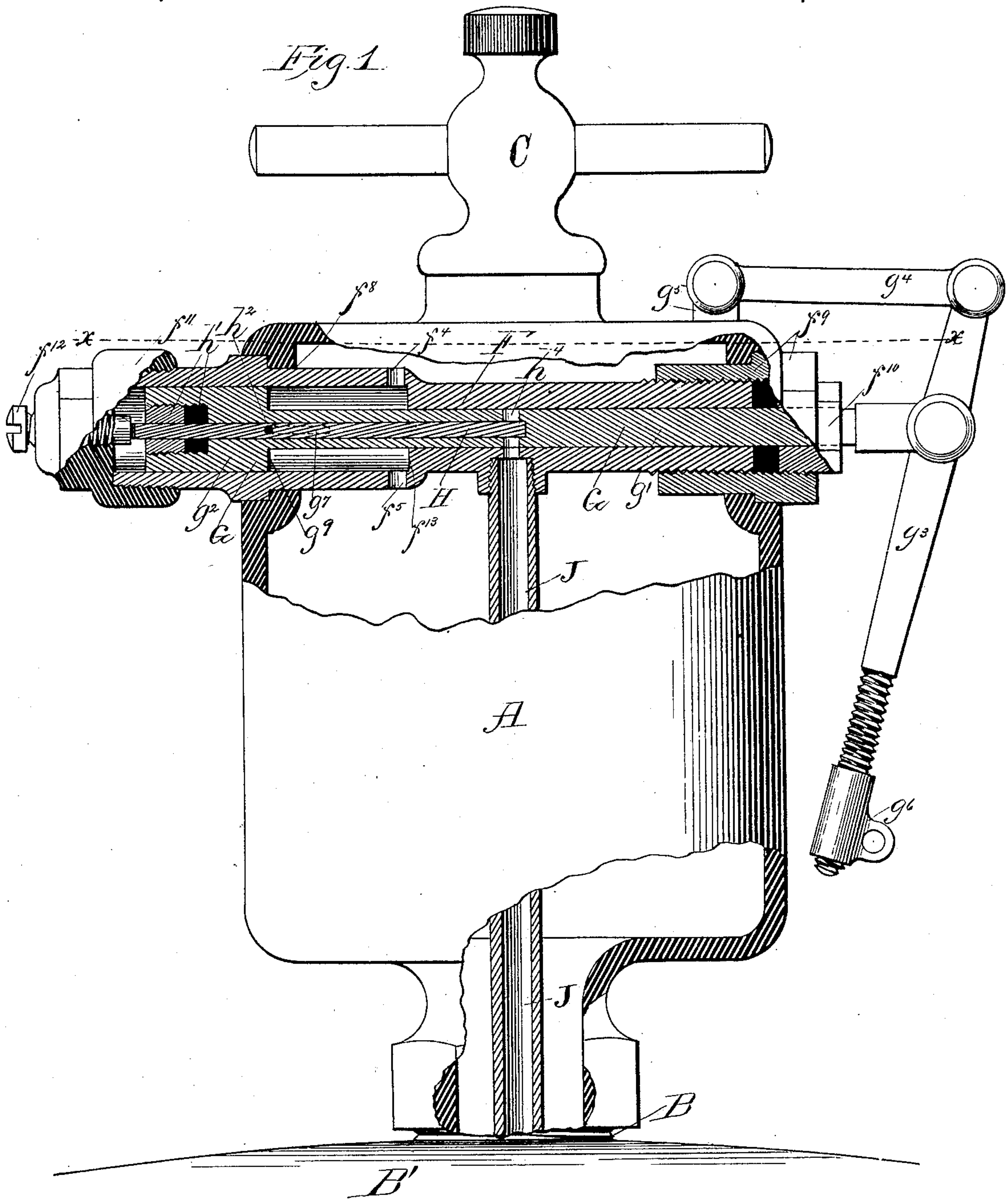
3 Sheets—Sheet 1.

J. VIN RENCHARD.

LUBRICATOR.

No. 273,314.

Patented Mar. 6, 1883.



Witnesses:

E. G. Smith
Chas. L. L. L.

Inventor:

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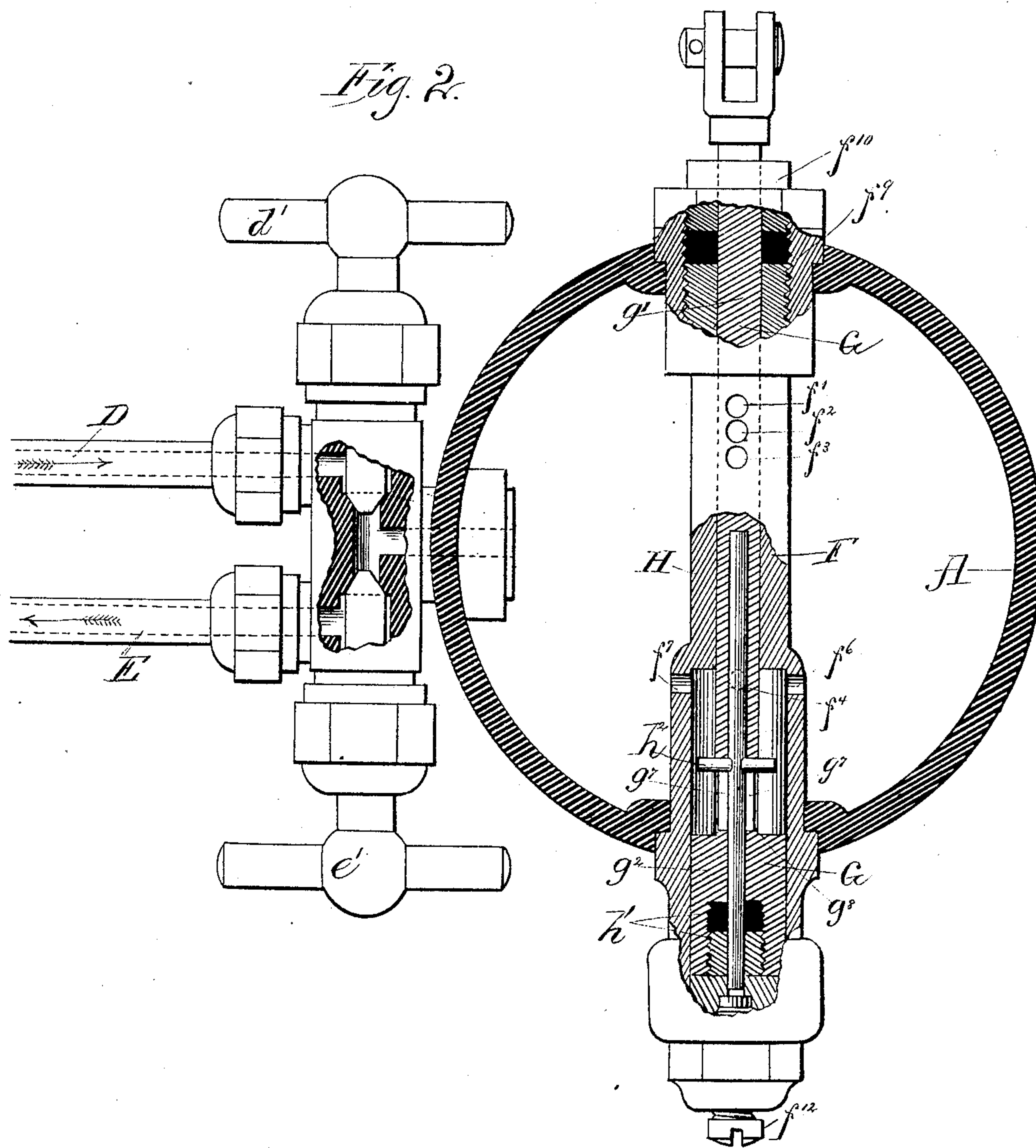
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J. VIN RENCHARD.
LUBRICATOR.

3 Sheets—Sheet 2.

No. 273,314.

Patented Mar. 6, 1883.



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(No Model.)

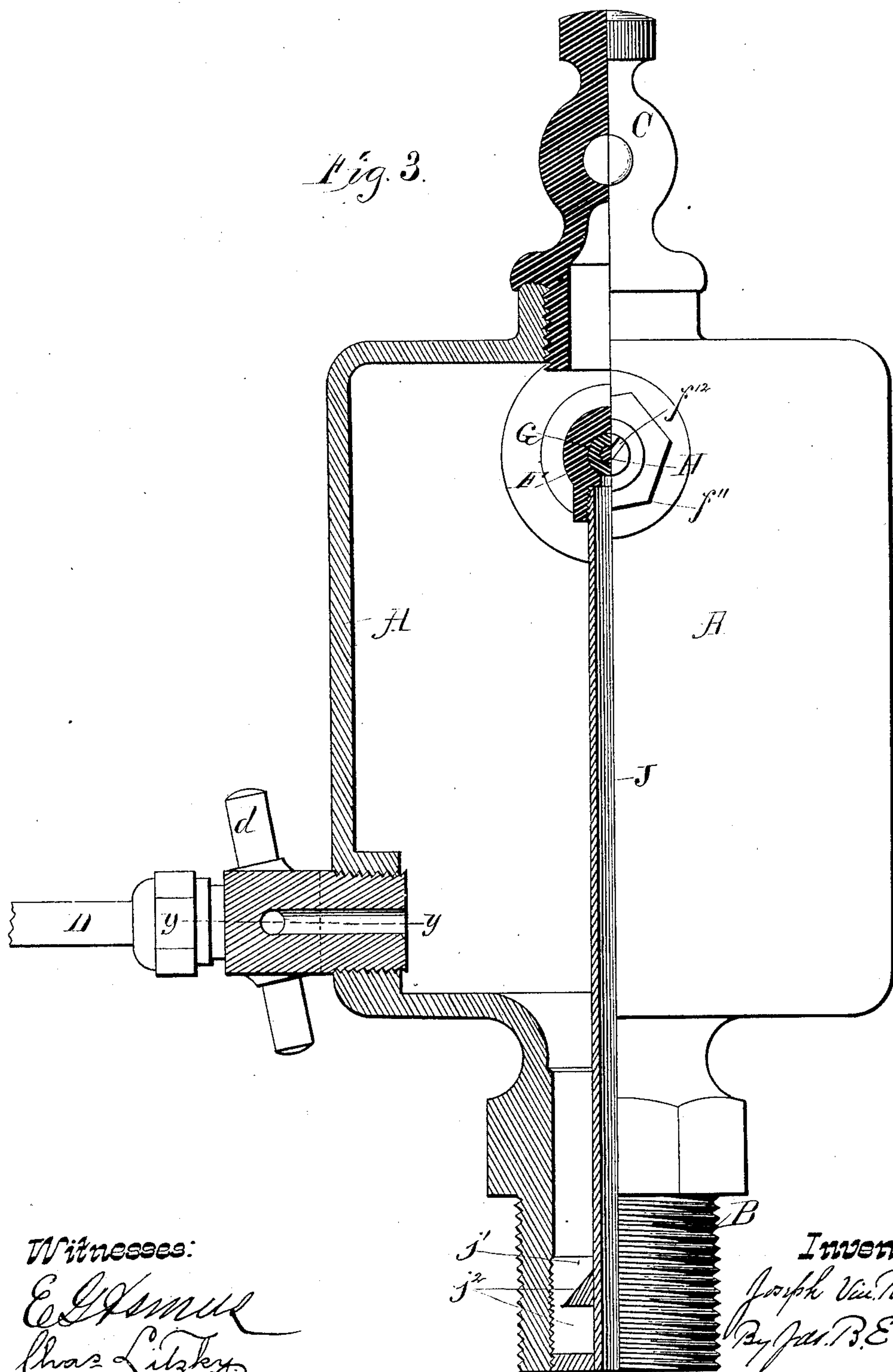
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UNITED STATES PATENT OFFICE.

JOSEPH VIN RENCHARD, OF WINDSOR, ONTARIO, CANADA.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 273,314, dated March 6, 1883.

Application filed September 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH VIN RENCHARD, a citizen of the United States, residing at Windsor, in the county of Essex, Province of Ontario, Canada, have invented certain new and useful Improvements in 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 letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in lubricators for locomotive-engines.

Heretofore lubricators have been operated exclusively either by pressure from the boiler or by the operative mechanism of the engine. By my improvement the lubricator is adapted to be operated by the joint action of both of these agencies, whereby I am enabled to produce a uniform feed of oil proportionate with the requirements of the engine, the same being varied automatically to conform to the speed of the locomotive or to its varying requirements on light and heavy grades, and, depending in part upon the motion of the engine, the escape of oil is cut off when the locomotive is at rest.

My invention pertains both to the mechanical construction of the lubricator and the method employed for operating the same.

My device consists in an oil-receptacle provided with pistons adapted to be actuated by the operative mechanism of the engine, and inlet and outlet ducts communicating with the boiler, said pistons being adapted to be actuated in one direction by pressure from the boiler and in the other direction by the operative mechanism of the locomotive, whereby a more positive and uniform feed of oil is attained than could be produced by the action of either of these agencies alone.

My invention is further explained by reference to the accompanying drawings, in which—

Figure 1 represents a side elevation, partly in section, of the lubricator and steam-chest cover of a locomotive-engine. Fig. 2 is a top view of the lubricator, drawn on line *x x* of Fig. 1, showing also the arrangement of the

inlet and discharge valves and inclosure, partly in section through the line *y y* of Fig. 3. Fig. 3 is an elevation in semi-section, showing a part of the inlet and discharge valves.

Like parts are represented by the same reference-letters throughout the several views.

A is the oil-receptacle.

B is the connecting-trunk, by which trunk the lubricator is attached directly to the steam-chest cover B', as shown in Fig. 1.

C is the stopper to the oil-filling hole.

D is the water or steam inlet tube, which communicates between the boiler and the oil-receptacle.

d' is the inlet-valve.

E is the discharge-tube, used when emptying and cleaning out the oil-chamber.

e' is the discharge-valve.

F is the piston-chamber, which chamber is provided with radial openings *f'* *f*² *f*³ *f*⁴ *f*⁵ *f*⁶ *f*⁷. Said chamber passes through an opening, *f*⁸, where it is brought to a face-joint against the front end of said chamber, and is drawn into place by the faced nut *f*⁹, the latter being provided with a recess for packing, and packing-nut *f*¹⁰. The rear end of said piston-chamber is provided with a cap-nut, *f*¹¹. The cap-nut *f*¹¹ is provided with a regulating-screw, *f*¹².

G is a piston having two—a less and a greater—diameters, as shown at *g'* and *g*². Said piston is connected at its protruding end with the lever *g*³, link *g*⁴, and fulcrum-stud *g*⁵. The lever *g*³ is provided with an adjustable eye-socket, *g*⁶, to which a cord or other flexible attachment, communicating from the operative part of the engine, is attached, whereby said piston is drawn outward.

H is a piston or plunger located within the piston G. Said piston H projects from the rear end of piston G, and is surrounded at its projecting end by packing and packing-nut *h'*, through which it protrudes, and is adapted by the reciprocating movement imparted thereto to be alternately brought into and out of contact with the adjusting-screw *f*¹². The main piston G is provided with a lateral slot, *g*⁷, exposing a portion of the internal piston, H, through which a pin, *h*², projects on each side through the lateral slots *g*⁷, and is adapted to be brought in contact with the faced end of the piston-chamber F at *f*¹³.

My lubricator operates as follows: The piston G is first drawn outward by the action of the lever g^3 , as mentioned, carrying with it the internal piston, H, until the projecting ends of the cross-pin h^2 are brought against the shoulder f^{13} of the chamber, by which contact the outward movement of said piston H is arrested, while said external piston continues to move, whereby said external piston is partially drawn from the internal piston, thereby leaving the space occupied by the internal piston vacant, whereby a vacuum is formed, into which the surrounding oil is forced. When the lever g^3 and the piston G have thus completed their forward movement, the actuating-cord or flexible attachment being slackened, the piston G is forced inward by the pressure from the boiler, which pressure is communicated through the water and oil in the cup to the enlarged end of the piston G at g^9 , and is brought in contact with said piston through ports f^6 and f^7 . As the piston G is thus pressed backward it carries with it, as before, the internal piston, H, until the protruding end of said internal piston is brought in contact with the adjusting-screw f^{12} , which determines its backward movement, while the exterior piston, G, still continues to move backward, whereby the internal piston is forced back into its original chamber within the piston G, thereby forcing the oil therefrom out through the port h^4 and oil-discharge tube J into the steam-chest. The oil-discharge tube J communicates at its lower end directly with the inside of the steam-chest or other place of attachment of the engine, and is connected at its upper end by a "boss" to the piston-chamber F, from which it extends downward through the oil-chamber A and gland-nut j^6 , packing, and nut j^2 . The pipe D, Figs. 2 and 3, is adapted to communicate water-pressure thereto, the arrangement of the device on locomotive-engines being such that when two lubricators are used the pipe D from each lubricator on the respective steam-chests may lead directly under the boiler, where a two-way valve is inserted, whereby the oil is forced into the space in the external piston as the internal piston is withdrawn therefrom; also, whereby the pressure from the steam-chest received through pipe J shall be counterbalanced when the locomotive is working under steam-pressure.

It is obvious that by thus connecting the lubricator to the boiler and steam-chest a uniform pressure is maintained therein, and the pistons are consequently less liable to leak, while an easy, gradual movement is communicated to the pistons, as mentioned, which is much preferred to any direct mechanical action.

It is also obvious that when the locomotive is running down grade or slackening its speed, as when running without steam, the valves and pistons require the greatest quantity of oil, their bearings being then deprived of the limited lubricating effect of the steam. It follows, under such condition, that pressure from

the boiler is against the oil, with no resisting counter-pressure from the engine or steam-chest side of the oil. Consequently the passage of oil to the steam-chest is augmented when most required. A decided advantage is attained by the use of water with the steam, in that they can be utilized for cleaning out the interior of the oil-chamber by widely opening the valve d' and partially opening the valve e' , and the reverse of such adjustment.

The operation of my lubricator is as follows: The plug C being removed and the oil-receptacle filled with any desired lubricant, the valve d' is then opened, admitting water from the boiler or other part of the engine. A cord or other flexible connection having been attached at one end to the adjustable eye-socket g^6 and at the other to an operative part of the engine, by which said lever is operated, the engine is then put in motion, when the lever g^3 and pistons G and H are drawn outward by the operative part of the engine and forced inward by the pressure from the boiler, as mentioned. The piston G will always have a backward tendency, caused by the pressure of oil or other substances against its face g^8 . The internal piston, H, will move in one direction with the exterior piston until the projecting ends of the cross-pin h^2 come in contact with the cylinder-face f^{13} , and in the other direction until its protruding end is brought in contact with the adjusting-screw f^{12} . The adjusting-screw f^{12} necessarily determines the extent of the backward motion of both pistons. The object of my employing a flexible connection between the lubricator and valve-rod of the engine is to prevent the various and undetermined movement of the valves being transmitted to the piston of the lubricator, and as such movement in locomotives in particular are so various it will be apparent that a flexible attachment only can be made available. Thus I am enabled to regulate the length of the backward movement by the adjusting-screw, while the forward motion of the flexible attachment will control their forward movement. Thus, as before stated, while the running of the engine will, according to its requirement, regulate the quantity of lubricant used, the general average quantity of the lubricant used will be determined by the adjustable eye-socket or sleeve g^6 , the quantity used being increased by raising said socket and decreased by lowering it, which change in the position of the socket involves a readjustment of the flexible cord to correspond therewith, else the lever may be pulled out of place or the mechanism of the lubricator be deranged.

The advantages of this device are particularly valuable to the locomotive-engine, inasmuch as its action is positive, operating the same under all the varying pressure—steam, atmosphere, or vacuum—and automatically varies the supply of oil to meet the various requirements and conditions of the engine. For example, when drawing a heavy train up grade

the full boiler-pressure being upon the slide-valves, they are then worked at full stroke and at such time they require, say, seventy-five per cent. of full lubrication, which required quantity the lubricator is adapted to support. Also, that the engine, having gained momentum, the travel of the valves is reduced. Hence the lubrication is limited to suit requirements; or, say, fifty per cent. as the reduction of valve-travel causes a similar reduction in the feed of the lubricant. Again, when the locomotive is approaching a station or running down grade, the steam being shut off at such a time, the valves and pistons require full lubrication, which they receive, there being a limited steam or vacuum pressure within the steam-chests, the pressure of the boiler being upon the lubricant and against the vacuum, the feed of oil is accelerated to its fullest capacity, owing to the extra pressure within the oil-chamber. The flow of lubricant can be still further augmented by the engine-driver, according as he increases the throw of the valves by adjusting the reversing-lever under his control, so it will be apparent that no matter under what condition the engine is laboring the supply of oil is always in proportion to the quantity required.

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

1. The combination and arrangement, in a lubricator, of a piston-chamber and two pistons, one arranged within the other, said pistons being connected with and adapted to be moved in one direction by an operative part of the engine and in the other direction by boiler-pressure, whereby the joint action of said forces and the discharge of the lubricant corresponds both to the speed of the locomotive and the changes in boiler-pressure, as set forth.

2. In a lubricator for steam-engines, the combination of the oil-reservoir A, piston-chamber F, provided with one or more radial openings, pistons G and H, arranged one within the other in said chamber, and oil-duct J, communicating from said piston-chamber to the engine,

said piston being adapted to be drawn outward by mechanical appliances, and inwardly by boiler-pressure, substantially as set forth.

3. The combination, with the pistons G and H, of lever g^3 , link g^4 , stud g^5 , and adjustable sleeve g^6 , said sleeve being adapted to be adjusted higher or lower, whereby the length of the stroke of said pistons may be increased or diminished, as set forth.

4. The combination, with the piston-chamber F, pistons G and H, and nut f^{11} , of the adjusting-screw f^{12} , said screw being adapted to be brought in contact with and check the inward movement of said piston H at the desired point of adjustment, substantially as set forth.

5. The combination, with reservoir A, of the water or steam inlet tube D and discharge-tube E, said tubes being respectively provided with valves d and e , and adapted to communicate between said oil-reservoir and the interior of the boiler, substantially as and for the purpose specified.

6. The combination of piston G, provided with slot g^7 , piston H, and check-pin h^2 , said check-pin being adapted to project through said slot and check the outward movement of said piston by contact with the projecting shoulders of the piston-chamber, substantially as set forth.

7. The combination, with the piston-chamber F and oil-tube J, of the gland j' , packing, and packing-nut j^2 , as set forth.

8. The method herein described of producing a uniform discharge of oil from a lubricator by the joint application of mechanical appliances of the engine and the hydraulic or steam pressure from the boiler, by the co-operation of which agencies the supply of oil is automatically regulated to meet the varying requirements of the engine, as set forth.

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

JOSEPH VIN RENCHARD.

Witnesses:

WILLIAM ERIC GREENE,
JOSEPH CHRISTIAN.