

No. 672,415.

Patented Apr. 16, 1901.

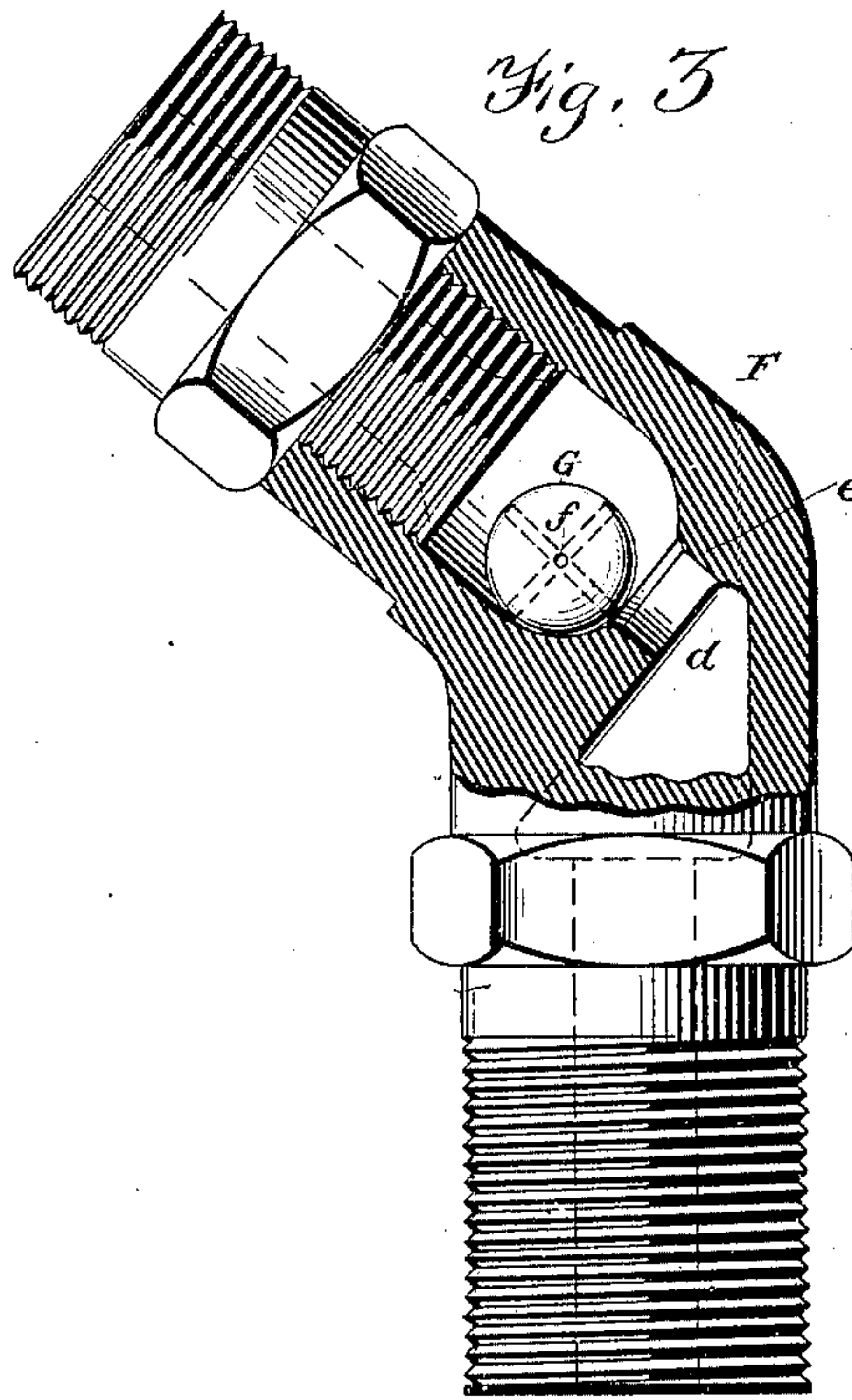
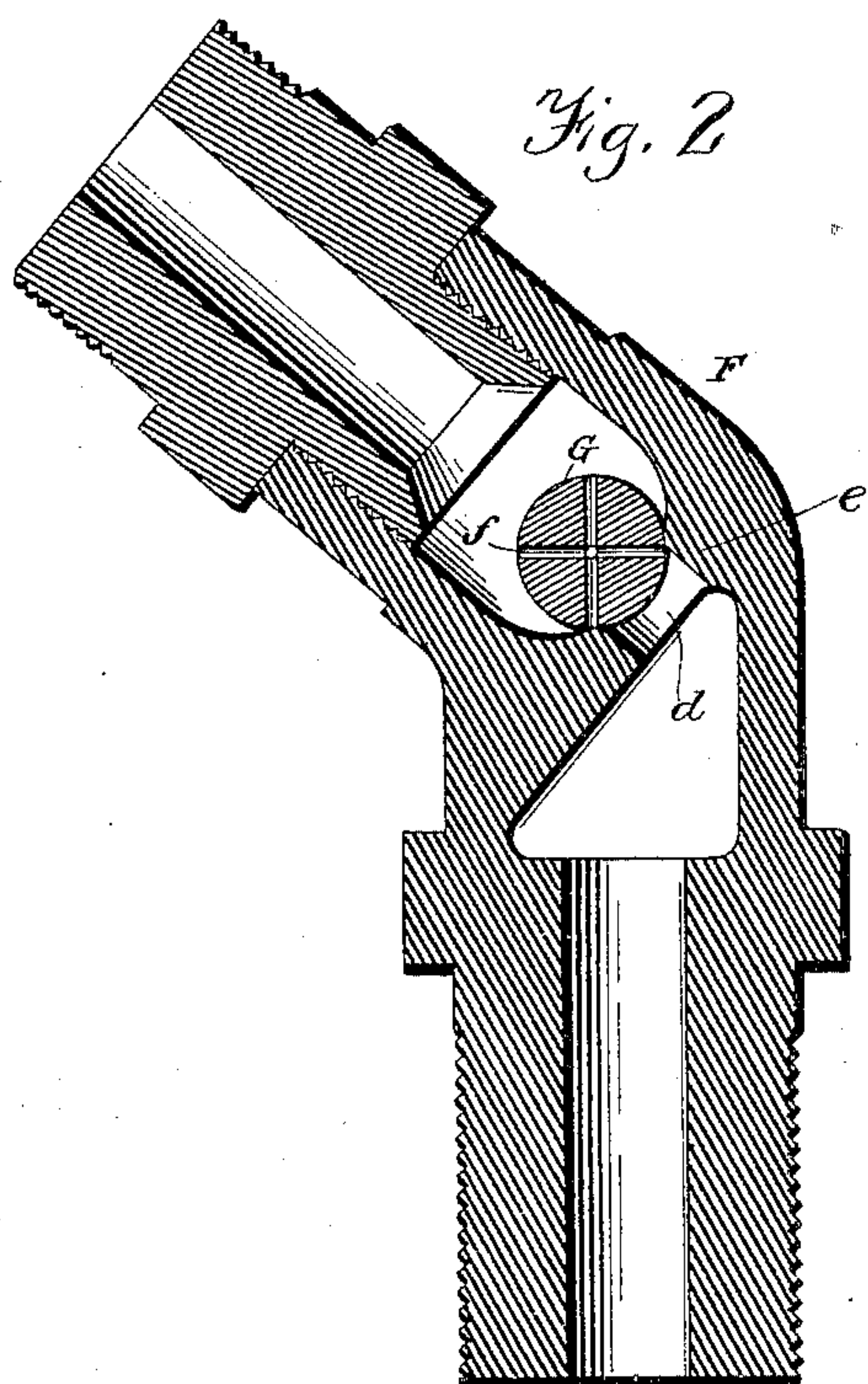
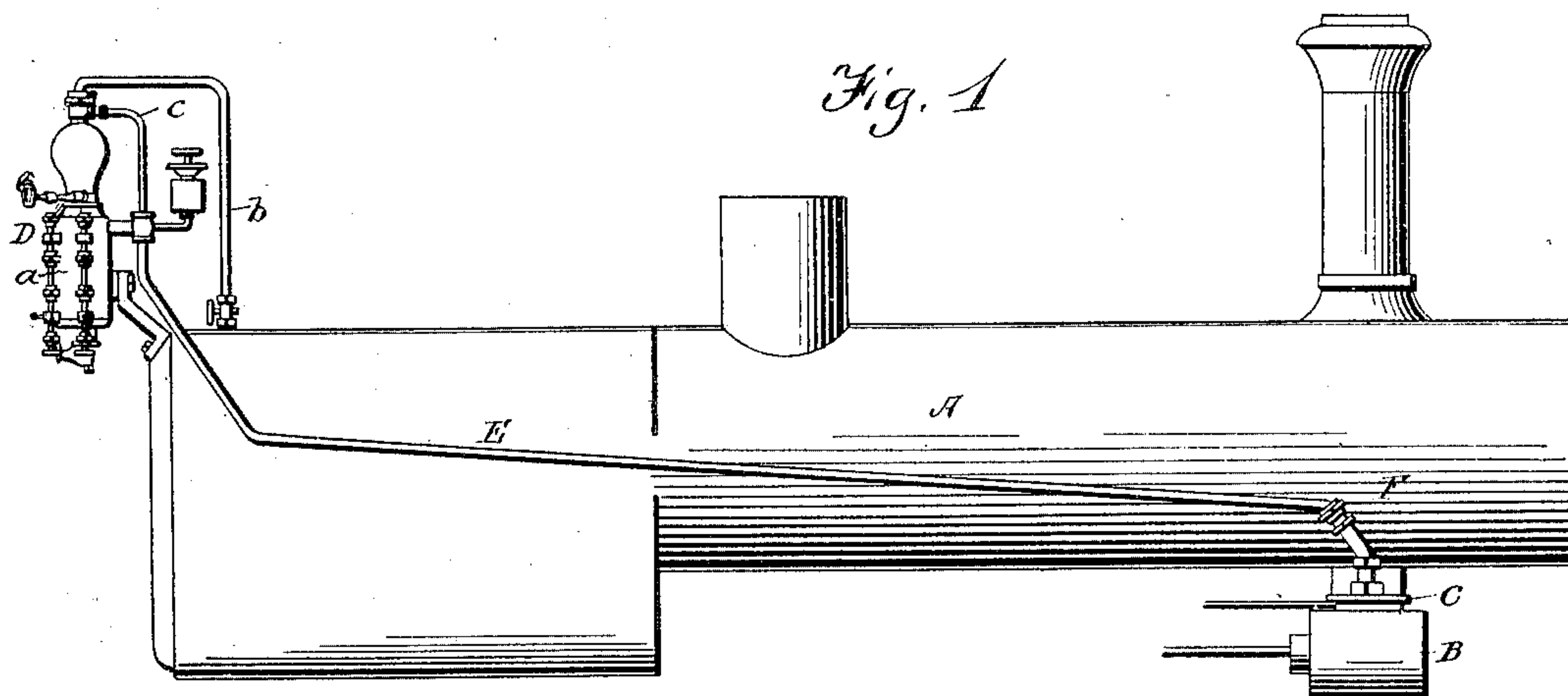
W. W. DODGE.

LUBRICATOR.

(Application filed Nov. 14, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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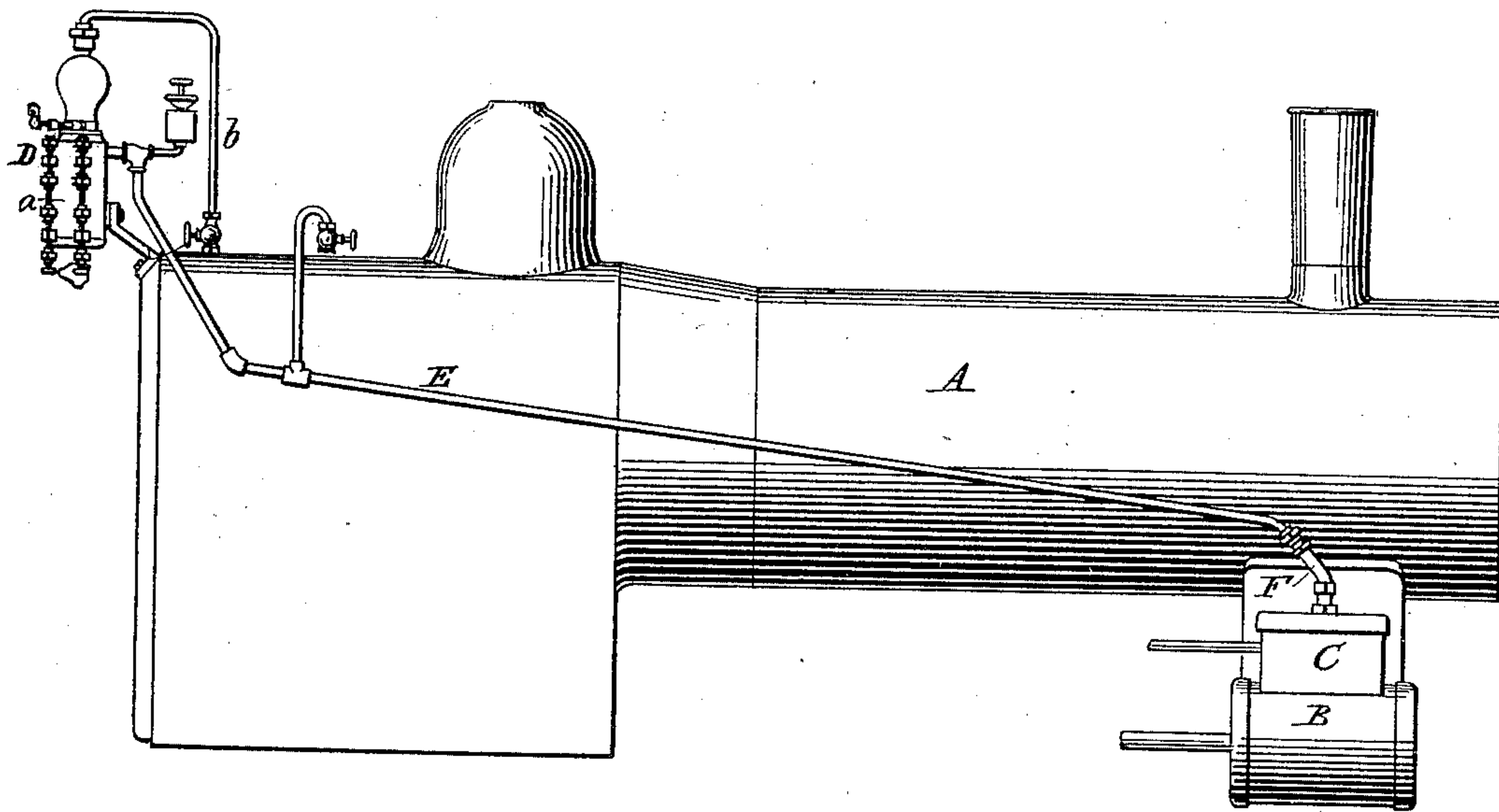
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2 Sheets—Sheet 2.

Fig. 4



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UNITED STATES PATENT OFFICE.

WILLIAM W. DODGE, OF BROOKLYN, NEW YORK, ASSIGNOR TO MICHIGAN LUBRICATOR COMPANY, OF DETROIT, MICHIGAN.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 672,415, dated April 16, 1901.

Application filed November 14, 1900. Serial No. 36,520. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. DODGE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Lubricators, of which the following is a specification.

This invention pertains to lubricating apparatus for engines, and is designed more especially for use in connection with modern high-pressure locomotives, though not restricted to such use.

The invention is in the nature of an improvement upon that set forth in Letters Patent No. 657,924, dated September 18, 1900, granted upon an application filed in the name of George B. Essex.

It consists, essentially, in suppressing or dispensing with the separate or secondary opening or by-pass in the choke-plug diaphragm and providing in lieu thereof a constantly-open passage directly through the ball-valve. By this change I avoid the necessity of drilling the small hole through said diaphragm and overcome the liability of the by-pass becoming clogged or partially closed by battering its mouth. By forming the by-pass or constantly-open passage in the valve itself with a series of intersecting branches I insure repeated change of direction of flow of steam and oil through said passage, owing to the frequently-changing position of the ball or valve, and I thus secure a constant scouring or clearing of the branch passages. Since all the branch passages intersect at the center of the ball or valve, it is apparent that no matter how many branch passages may be brought within the area of the opening in the diaphragm or partition the area of the by-pass or constantly-open passage is only that of the central space or opening produced by the intersection of the branch passages. Hence the capacity of the by-pass will be constant whatever be the position of the ball or valve upon its seat.

Referring now to the accompanying drawings, Figure 1 is a side elevation in the nature of a diagram of a locomotive boiler, cylinder, and valve-chest, with my lubricating apparatus applied thereto; Fig. 2, a longitudinal sectional view of the "choke-plug"

which contains my improvement; Fig. 3, a side elevation of the same with the wall broken away to show the interior; Fig. 4, a side elevation similar to Fig. 1, but showing a modified embodiment of the invention.

A indicates a boiler or steam-generator; B, a steam-cylinder; C, a valve-chest; D, a lubricator, here represented as of the balanced hydrostatic sight-feed class, having a reservoir *a*, boiler-connection pipe *b*, and equalizer-pipe *c*, and E a pipe or duct for conveying lubricant from the reservoir *a* to the valve-chest or other place to which it is to be supplied, commonly called the "tallow-pipe."

F indicates a shell, usually termed a "choke-plug," for the reason that it contains a passage for the lubricant, which passage may be reduced or choked down to lessen the flow of steam and lubricant at proper times.

The choke plug or shell F has formed within it a diaphragm or partition *e*, through which is a way or passage *d*, advisably of the same area as the tallow-pipe or thereabout. The partition *e* is advisably though not necessarily set at an angle of about forty-five degrees to the horizon to cause the automatic unseating of its valve by gravity when subjected to substantially equal pressure on opposite sides.

G indicates a ball-valve, which normally occupies the position indicated in Fig. 3, leaving the port or passage *d* open and unobstructed. When, however, the throttle is closed, the forward pressure of steam by way of the lubricator will lift the ball or valve and place it upon its seat at the mouth of port or opening *d*, as illustrated in Fig. 2. If the valve were solid and fitted perfectly to its seat, all communication between the lubricant-reservoir and the valve-chest would obviously be cut off through the seating of the valve. It is, however, desirable to maintain communication constantly between them in order to permit constant feeding of the lubricant and to automatically vary or increase the size of the passway, so as to prevent the formation of a water seal in the tallow-pipe when the throttle of the engine is open. To this end I drill the ball or valve with a series of radial holes *f*, which meeting or intersecting at the center of the ball form a central

opening or cavity of approximately the same diameter as the individual holes *f*. The number of these holes may vary, and their diameter will be greater or less as required in any given case. In practice six such radial holes or three holes passing entirely through the ball and intersecting at its center at right angles will be found to answer well. With a valve-seat properly proportioned to the diameter of the ball or valve but one hole or passage can fall within its boundaries, though it will be impossible to prevent one hole thus coming within its limits. As indicated, however, I do not restrict myself as to the number of holes or passages, nor is the number a matter of importance provided they be so spaced that at least one shall come within the boundaries of the passage *d* whenever the valve is seated.

While it is preferred to provide the intersecting passages for reasons stated, quite good results are attainable through the use of independent passages. Hence I do not wish to be understood as restricting myself to their intersection in all cases.

In the drawings I have represented a sight-feed lubricator of the hydrostatic feed variety provided with an equalizing-pipe *c*; but while in practice I may and frequently prefer to use a lubricator of this character provided with the equalizer-pipe this is not essential. The tallow-pipes may be directly tapped into the boiler and the oil-delivery arms of the lubricator tapped into said tallow-pipes, thereby rendering the equalizer-pipes unnecessary. In other words, the equalizer-pipe *c* of Fig. 1 can be omitted and direct communication made from the boiler to the tallow-pipe, as shown in Fig. 4, all else remaining unchanged. The equalizing effect will, under such construction and arrangement, be attained by the free passage of steam into the tallow-pipe from both ends when the throttle is open, and the flow will at other times be restricted by the automatic seating of the valve.

In the foregoing description I have referred to a ball-valve, and in the drawings I have shown such. This form is advantageous for various reasons, and will under ordinary circumstances be employed. I do not, however, mean to restrict myself absolutely to the spherical form, as other forms may be employed with quite satisfactory results.

It is particularly to be noted that under my construction the valve is equally subject to pressure from the lubricator and from the valve-chest side, that the valve is free to move to and from its seat subject only to the direct pressure of the steam on its opposite faces and to gravity, that being mounted in an open space and free to shift about at will the valve will constantly change its position, and therefore wear evenly, maintaining its original form. Being wholly contained within the tallow-pipe and subject to the direct action of the steam, it will be kept clean and prevented

from clogging, binding, or becoming in any manner inoperative. The spherical or substantially spherical form of the valve permits it to make at least a partial rotation in any direction or about different axes, so that a large wearing-surface is insured, and the wear being thus distributed over a relatively large area will be slow and even. While a perfectly free ball capable of completely rotating in all directions affords the most satisfactory results and is rendered possible by employment of the intersecting passages, quite good results are obtainable where that portion of the valve which comes in contact with the seat is of spherical or partially spherical form, so as to permit a rocking or turning of the valve about different axes. So long, therefore, as this feature is retained and provision is made for keeping a passage or opening always within the limits or boundaries of the valve-seat, I consider the construction as within the spirit and scope of my invention.

The claims herein are to be understood as restricted to a valve having a hole or perforation or a series of holes or perforations, as distinguished from mere grooves or channels. Such construction possesses the advantage over grooves or channels that it provides a permanent and fixed area of passage for steam and oil, which area cannot be varied by tendency of steam to force the valve aside in passing through the hole or perforation, as might happen with a groove or channel.

Having thus described my invention, what I claim is—

1. In a lubricating apparatus for engines, the combination of a lubricant-reservoir; a pipe for connecting the reservoir with a steam boiler or generator; a pipe or duct connecting the reservoir with the chamber to which lubricant is to be supplied; an equalizer-pipe; a diaphragm or partition in the pipe or duct through which the lubricant is delivered, provided with a passage for the lubricant and with a valve-seat; and a valve free to move to and from said seat and to rock or turn about different axes, and provided with a series of holes or perforations so spaced that the mouth of at least one hole or perforation shall fall within the area of the valve-seat and lubricant-passage, whenever the valve is seated.

2. In a lubricating apparatus for engines, the combination of a lubricant-reservoir; a pipe for connecting the reservoir with a steam boiler or generator; a pipe or duct connecting the reservoir to the chamber to which lubricant is to be supplied; a diaphragm or partition in the pipe or duct through which the lubricant is delivered, provided with a passage for the lubricant and with a valve-seat; and a valve mounted to move freely to and from said seat and to rock or turn about different axes, and provided with a series of holes or perforations so spaced that the mouth of at least one hole or perforation shall fall

within the area of the lubricant - passage whenever the valve is seated.

3. A choke-plug for the tallow-pipe of engines, provided with a diaphragm or partition having a passage through it, and a valve-seat; and a valve mounted to freely move to and from said seat and to rock or turn upon different axes, and provided with perforations in such relation as to permit a limited passage of steam, lubricant, or both, in whatever position the valve is seated.

4. A choke-plug for engine-lubricators, provided with a diaphragm or partition having a passage through it, and a valve-seat; and a valve having a series of intersecting holes or passages through it, and movable to and from the valve-seat and free to rock or turn upon different axes; the space at the intersection of the passage serving as a common passage and gage for all the passages, and determining the quantity of lubricant that may at any time pass through the valve.

5. A choke-plug for the tallow-pipes of engines provided with a partition having a passage through it, and with a valve free to seat over and unseat from said passage and to

rock about an axis transverse with respect to said passage; and a valve having a plurality of perforations so spaced that at least one perforation shall provide communication between the spaces on opposite sides of the partition in whatever position the valve may be seated.

6. In combination with a shell containing a passage for steam and lubricant, and provided with a valve-seat, a valve having a spherical portion to rest upon said seat and perforated to permit the passage of steam and lubricant through it, the valve being free to rock or turn about different axes, and the perforation being so arranged as to maintain at all times an opening through the valve and within the boundaries or limits of the valve-seat.

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

WILLIAM W. DODGE.

Witnesses:

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DUDLEY E. BURDINE.