(No Model.)

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E. S. MOORE.

LUBRICATOR.

No. 560,595. Patented May 19, 1896.

Fig. 7.

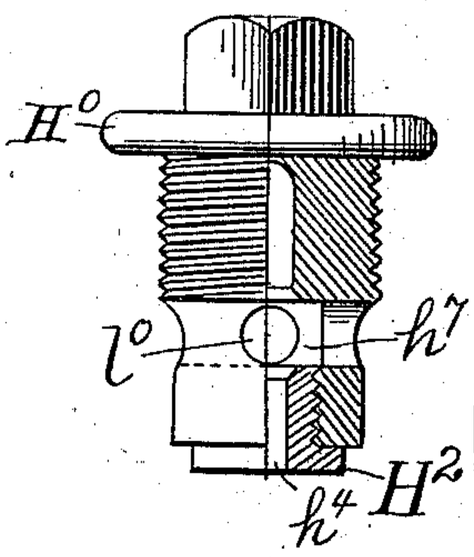

Fig. 1.

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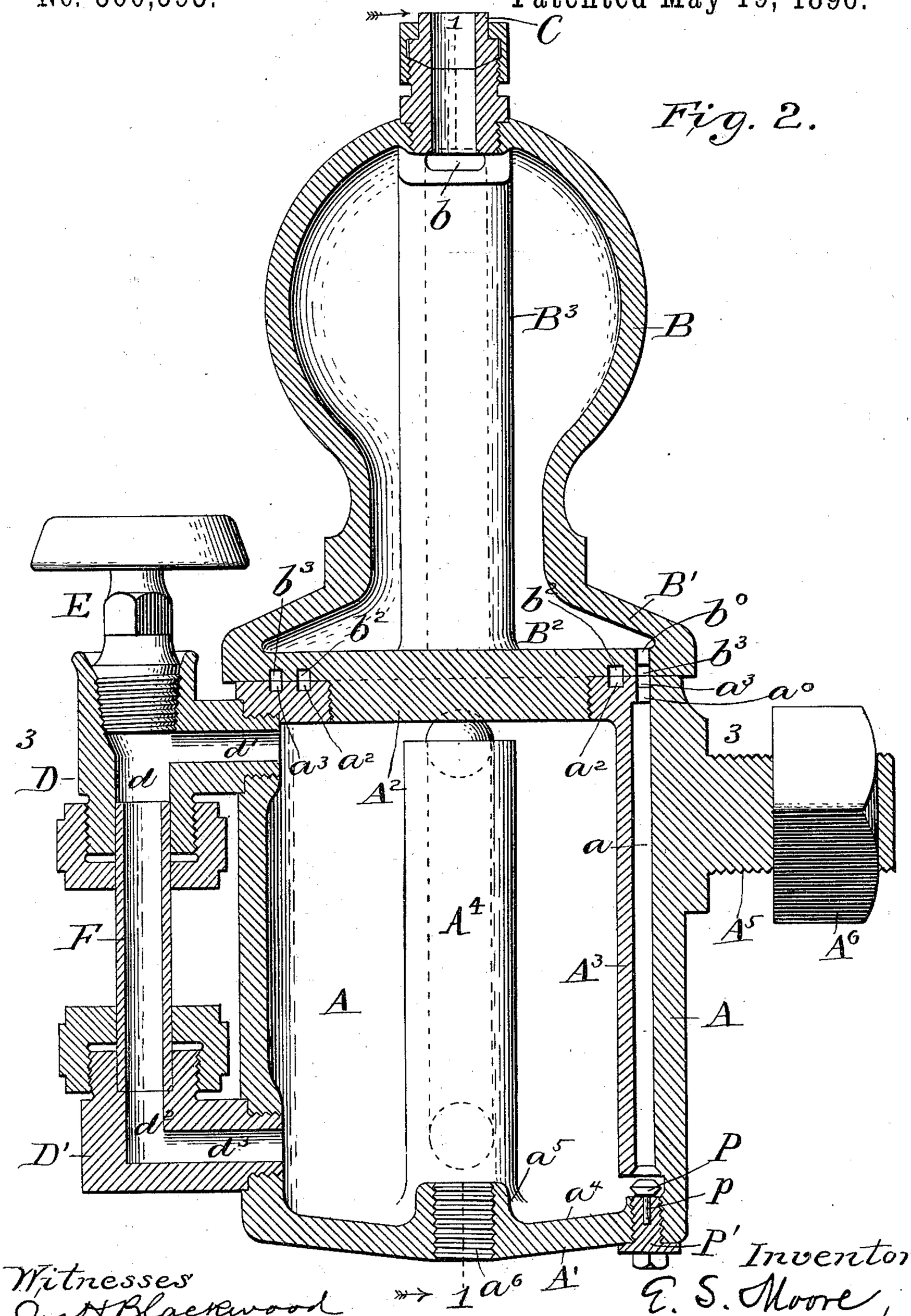
Fig. 2.



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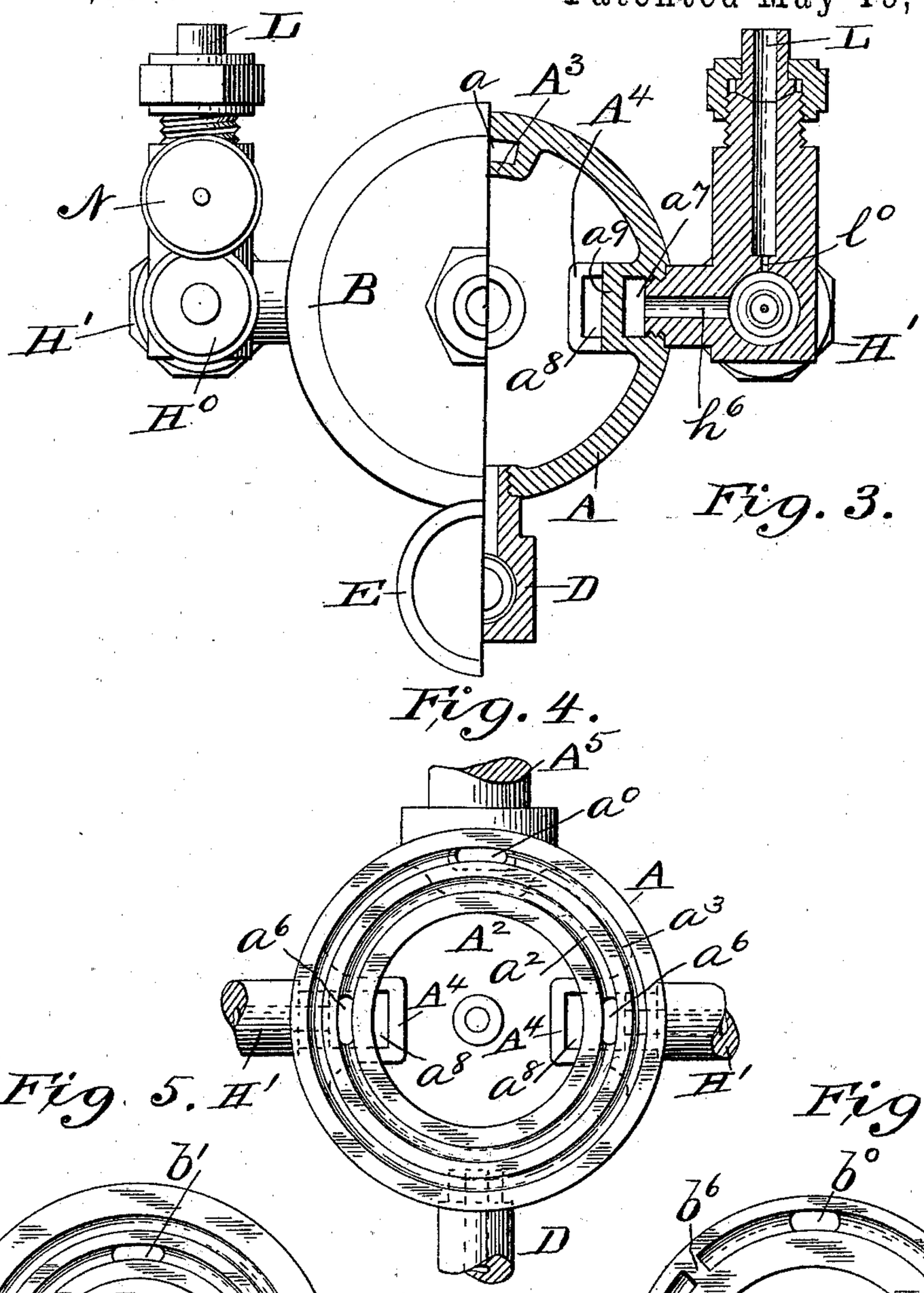


Fig. 3.

Fig. 4.

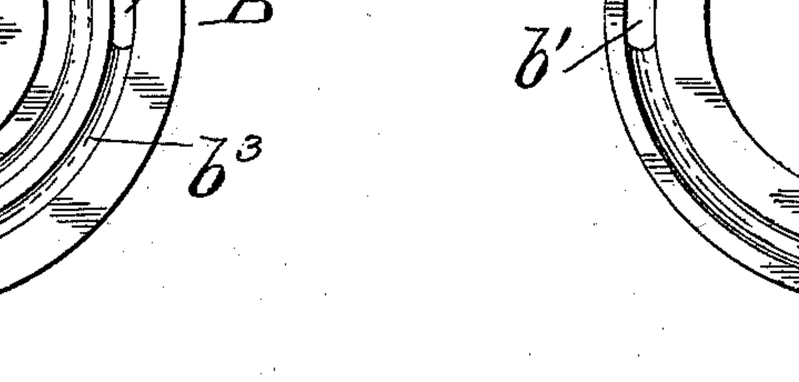


Fig. 5.

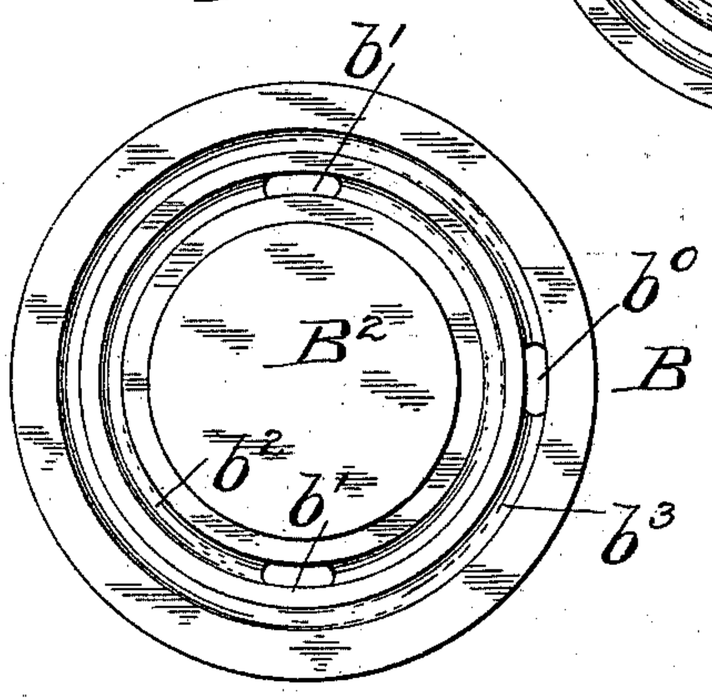
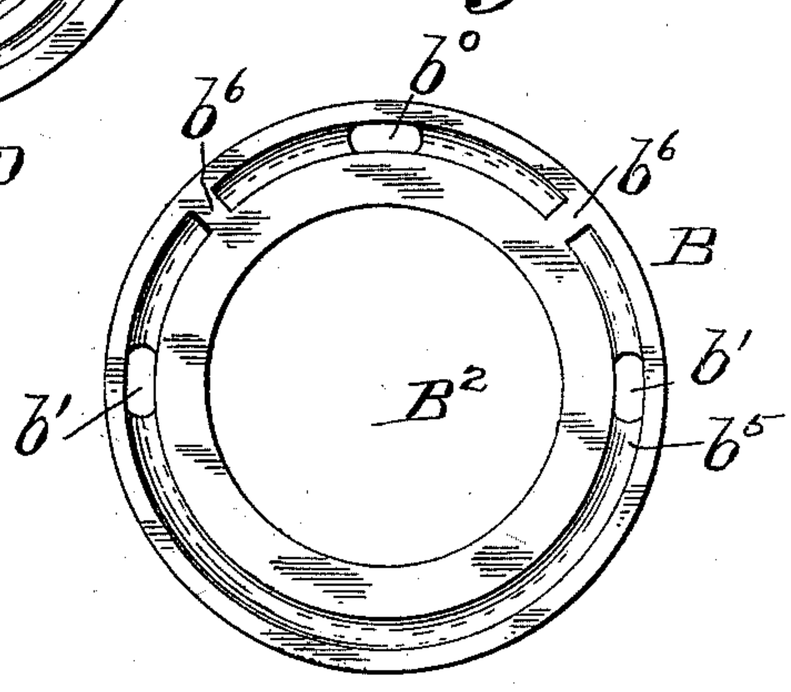


Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

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Fig. 11.

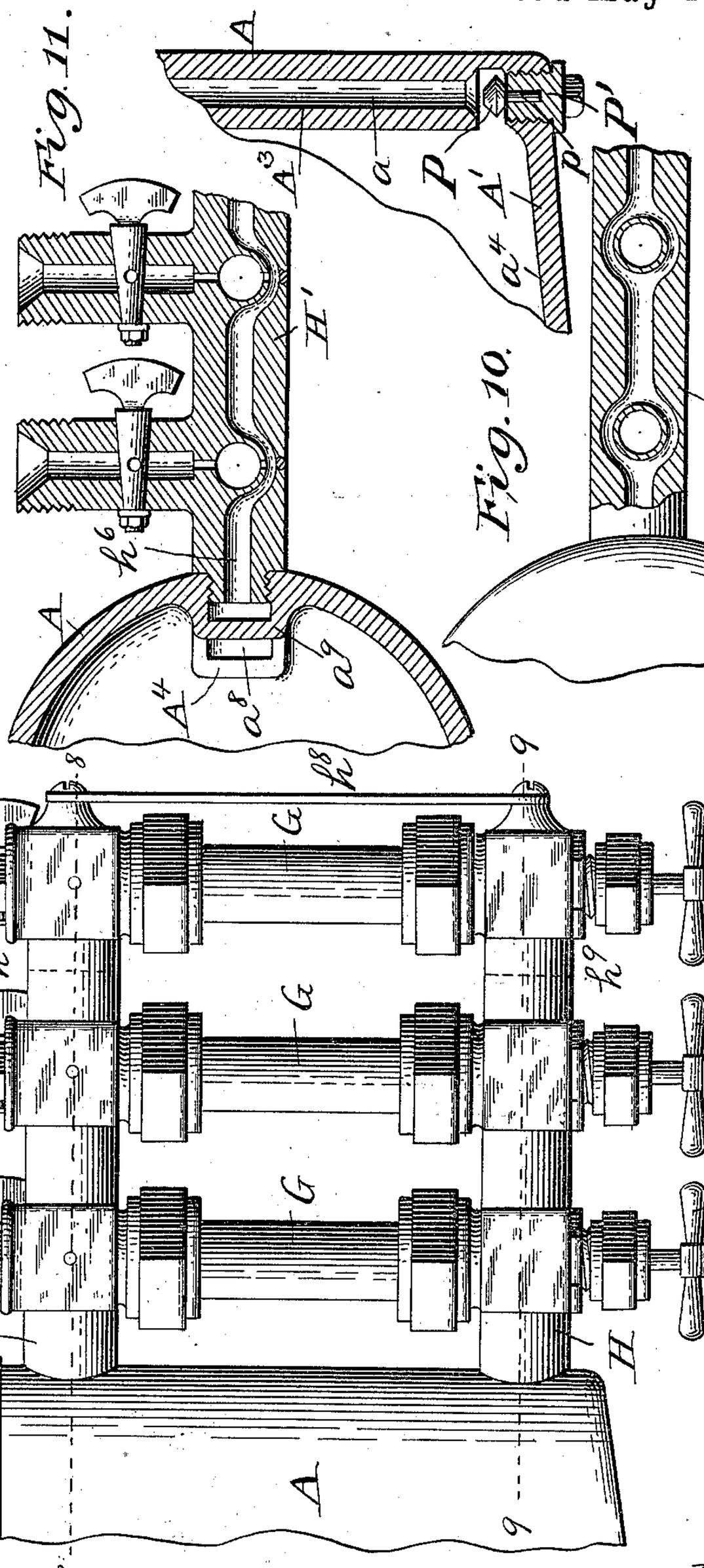

Fig. 10.

Fig. 8.

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UNITED STATES PATENT OFFICE.

EDWIN S. MOORE, OF PINE BLUFF, ARKANSAS.

LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 560,595, dated May 19, 1896.

Application filed September 19, 1895. Serial No. 563,027. (No model.)

To all whom it may concern:

Be it known that I, EDWIN S. MOORE, a citizen of the United States, residing at Pine Bluff, in the county of Jefferson and State of Arkansas, 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.

My invention relates to improvements in lubricators, and especially to that class of lubricators which are more generally used on locomotives, in which the oil is fed into the cylinder or parts to be lubricated by the condensation of steam and in which the feed of the oil is regulated as may be desired.

The said invention is intended especially to provide certain improvements in lubricators of the type shown in the expired patent, No. 179,226, granted June 27, 1876, to Nicholas Seibert.

The said invention is intended to provide improved, simplified, and cheaper means for accomplishing the desired result than is now accomplished by lubricators of this general type.

My invention will be understood by reference to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a side elevation, partly in section, along the line 1 1 of Fig. 2 and looking in the direction of the arrows. Fig. 2 represents a section along the line 2 2 of Fig. 1 and looking to the left. Fig. 3 represents a plan view on a smaller scale and partly in section along the line 3 3 of Fig. 1. Fig. 4 represents a plan view, also on a smaller scale, of the top of the oil-reservoir after the steam-chamber has been removed. Fig 5 represents an inverted plan view of the steam-chamber. Fig. 6 represents a modification of the device shown in Fig. 5. Fig. 7 is a detail view of the plug with its connection. Fig. 8 represents a modification, showing three sight-feed tubes connected to one oil-reservoir. Fig. 9 represents a section along the line 8 8 of Fig. 8. Fig. 10 represents a section along the line 9 9 of Fig. 8, and Fig. 11 represents a detail view of the automatic check-valve by which the contents of the oil-chamber are prevented from being drawn into the steam-chamber when the latter contains only condensed steam or vapor at a very low pressure.

A represents the oil-reservoir, which is provided with a bottom A′, sloping downward, as at a^4, and provided with a central boss a^5, with a female screw-thread a^6 for the drip-cock. (Not shown.) This shape of the bottom keeps some water always in the oil-reservoir, which assists in condensing the steam, whereby the device is caused to operate more promptly.

The top of the oil-reservoir is screwed in, as shown most clearly in Fig. 2, and the body of the oil-reservoir exterior to this screw top is provided with two annular grooves a^2 and a^3, as shown most clearly in Fig. 4, or a single annular groove corresponding to that shown in Fig. 6 and hereinafter to be described may be adopted, if preferred. The annular groove a^2 is provided with ports a^6, opening into the ports a^7 or chambers in the opposite side of the body of the oil-reservoir casting and cut off from the central chamber therein by walls a^9.

The interior of the oil-reservoir is provided with a downwardly-projecting passage a, connected at its upper end with the annular groove a^3 by the ports a^0 and opening at its lower end into the oil-reservoir near the base thereof. The lower end of this passage is automatically closed when a vacuum exists in the steam-chamber, as would occur in running downgrade, by means of the check-valve P, provided with a stem p, projecting down into a recess in the plug P′, which is screwed into the bottom of the oil-reservoir. The interior of the oil-reservoir is also provided with two passages a^8, separated from the body of the chamber by the walls A^4 and opening into the chamber or oil-reservoir near the top thereof and terminating at their bottoms in the passage h in the plug H′, as shown most clearly in Fig. 1.

The oil-reservoir and parts connected thereto are attached to any of the fixed parts of the engine-frame by means of the screw-threaded lug A^5 and the nut A^6. It is purposed to cast the oil-reservoir and the lug A^5 in one piece and to screw the top, the drip-cock, and the various other plugs into suit-

able screw-threaded openings provided in the said chamber.

B represents the steam-dome or steam-chamber, into which steam is admitted by means of the inlet C from the boiler through suitable connections. (Not shown.) The base of this steam-chamber is flared outward, as at B′, and terminates in a flat circular bottom plate B^2, having a downwardly-extending lug screwing into and forming the top of the oil-chamber. The said plate is provided with a port b^0, connected to the annular groove b^3 on the lower face of the bottom plate B^2, while a second annular groove b^2 is connected by ports b' to the steam-passage b, which opens into the top of the dome and is separated therefrom by the wall B^3. There are ordinarily two of these passages b, (shown most clearly in Figs. 1 and 2,) but only one may be used, if desired. Instead of having two of these annular grooves between the base of the steam-chamber and the top of the oil-reservoir a single annular groove may be provided, as shown at b^5 in Fig. 6, which is separated into two parts by the partition b^6 and provided with a single port b^0 in one part for the condensed steam and with two ports b' for the live steam from the passages b. It will be obvious that but one of these passages b, and consequently a single port b', may be provided, connected to the annular groove b^2 or b^5, for the live steam, but two ports will be required in the lower annular groove a^2 when it is desired to have two pipes for the distribution of oil or to oil two cylinders at once. I prefer the double-annular-groove system shown in Fig. 5 to that shown in Fig. 6 for the reason that no nice adjustment of the steam-dome on the oil-reservoir is required, while with the device shown in Fig. 6 the top of the oil-chamber A would have to be constructed similar to the bottom of the steam-dome, and it would be necessary to have the ribs or partitions in the annular groove in both members correspond.

The object of having an annular groove or annular grooves between the oil-reservoir and the condensing-chamber and connecting with the various ports in the said reservoir and condensing-chamber is to render a nice adjustment of the ports relative to each other unnecessary, as the water or steam passing through one of the ports in the condensing-chamber will find a passage through its proper port in the reservoir by passing along the annular groove until it comes to this port, which may connect with the same annular groove at any point. Thus when the condensing-chamber is screwed into the top of the oil-reservoir it will not be necessary for the ports in the respective chambers to exactly register with each other, as would be necessary if such annular grooves were not provided.

The oil is fed to the oil-reservoir by means of the connection D, which is closed by the screw-plug E, and is provided with the passage d', leading into the oil-reservoir, and the passage d, leading downward to the gage-tube F, whose lower end terminates in the connection D′, provided with oil-passages d^2 and d^3.

When the oil-reservoir is charged with oil, the plug E is screwed in and the apparatus operates automatically, as will be hereinafter more fully described.

The oil-passage a^8 in the oil-reservoir communicates with the passage h, which opens into the chamber h' in the lower connection H. There are two of these connections on either side, where the apparatus is intended to oil in two directions, and as the parts are symmetrical but one side will be described.

Each connection H is provided with an oil-passage h^2, terminating in a nozzle h^3, which passage is controlled by the regulating-valve K, having a screw-threaded stem k', turned by the handle k^2, and thus the distance this valve is moved off its seat may be regulated at will.

Above and surrounding the nozzle h^3 is a sight-tube G, terminating in the upper connection H′, provided with a screw-plug H^0, in which is an upward passage h^4 for the oil and a lateral passage h^7 for the oil, into which lateral passage the live steam coming from the passages b, a^7, and h^6 enters and carries the oil with it through the port l^0, leading to the delivery-pipe L, as shown most clearly in Fig. 3.

The lower portion of the screw-plug H^0 is provided with a perforated screw-plug H^2, through which the passage h^4 is provided, above which passage is a valve-seat h^5 for the check-valve M, which valve has a stem m, extending up into the recess h^{16} in the plug H^0.

When the device is in operation, the pressure in the different parts will create a balanced effect upon the valve M, and steam entering the passage b in the steam-chamber will pass downward through the passages a^7 and h^6 and condense in the sight-tube G; but by shutting the valve K and thus releasing the pressure from below the valve M will be caused to drop on its seat. In this latter case the oil from the hand-feed N may be fed into the passage l^0 and it will be carried along by the live steam also entering this passage l^0 from the passage h^6; but the principal function of this valve is to shut off the live steam from the passage h^4 in case the sight-tube is broken. The valve-stem m may also be extended up through the recess h^{16} to the exterior and there provided with means for lifting the said valve by hand, if desired.

The operation of the device is as follows: The oil-reservoir being supplied with oil through the connection D, and the plug E being screwed in place, steam is admitted into the steam chamber or dome B. Part of this steam condenses and the water of condensation falls into the lower part of the steam-chamber, whence it is drained through the water-port b^0 and the water-grooves b^3 and a^3 and port a^0 into the oil-reservoir. At the same time some uncondensed steam passes

through this port b^0 into the oil-reservoir, where it becomes condensed by contact with the cooler oil and settles as water to the bottom of the oil-reservoir, while the oil floats on top of the water which, whether as water or as uncondensed steam, has entered the oil-reservoir. When the surface of the oil rises above the top of the wall A^4, the oil will run down in the passage a^8 and through the passage h into the chamber H′, whence it will rise into the passage h^2, if the regulating-valve K be open, due to the pressure within the oil-chamber, and will rise in drops through the water in the sight-tube G, which has condensed therein, as hereinbefore stated. This oil will flow through the passage h^4 into the passage or chamber h^7, where it will be carried by the live steam coming through the passage h^6 into the outlet l^0 and thence by the oil-delivery pipe L to the desired point, ordinarily the cylinder to be lubricated. The live steam that enters this passage h^6 and carries off the oil with it is fed from the top of the steam chamber or dome B by means of the passage b and thence through the steam-ports b' to the steam-grooves b^2 and a^2, whence it goes through the steam-ports a^6 and steam-passages a^7 to the passages h^6 in the connections H′. It will be obvious that if after the dome B be filled with steam the connection be cut off with the source of steam supply, then the steam will condense in the said dome, causing a vacuum to exist there, which under certain conditions will draw the oil from the oil-reservoir, and to prevent this the automatic check-valve P is provided, which closes the passage a when the pressure in the oil-reservoir is materially in excess of that in the steam-chamber.

Instead of having the oil connections on opposite sides of the oil-reservoir A, several oil-supply pipes may be led out from a single pair of connections on one side of the oil-reservoir, as is shown in Figs. 8, 9, and 10. In Fig. 8 three of these sight-tubes G, with apparatus for conducting oil thereto, are shown as connected to an upper connection H′ and a lower connection H, from which the oil-supply pipes are led out, as shown, from a single connection in Fig. 3. Where more than two of these sets of oil connections are used, as indicated in Fig. 8, it would be preferable to have the connections H and H′ jointed, as shown at h^9, and steadied by means of the tie-brace h^8 or in any other convenient way. It will be obvious that with an apparatus constructed as shown in Fig. 8 three lubricating-pipes may be connected to as many points where a lubricant is required. Moreover, the number of these oil connections may be varied at will, and again an equal or a greater or less number of oil connections may be provided on the other side of the oil-reservoir, if that be desired. These and various other modifications of the herein-described apparatus might be made, which could be used without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a lubricator, the combination with an oil-chamber provided with a condensed-water passage opening from the top thereof down near the bottom of said oil-chamber, a check-valve preventing the return through said passage of the condensed water, an oil-passage opening into said oil-chamber near the top thereof, and connections from said oil-passage to the point to be lubricated, of a steam-chamber fitting on top of said oil-chamber, with annular grooves between said steam-chamber and said oil-chamber, said steam-chamber and said oil-chamber each having condensed-water ports opening therefrom into one of said grooves, a dry-steam passage provided on the interior of said steam-chamber, and opening at one end into the top of said steam-chamber, and at the other end into the second of said grooves, a steam-outlet from said second groove connected to the system for carrying off the oil, a sight-tube in said system, and an automatically-operating check-valve adapted to shut off the steam-pressure from said sight-tube, when the latter is broken, substantially as described.

2. In a lubricator, the combination with an oil-chamber provided with a condensed-water passage opening from the top thereof down near the bottom of said oil-chamber; an automatic check-valve situated beneath the lower opening of said condensed-water passage and preventing the return through said passage of the condensed water; an oil-passage opening into said oil-chamber near the top thereof, and connections from said oil-passage to the point to be lubricated; of a steam-chamber fitting on top of said oil-chamber, with annular grooves between said steam-chamber and said oil-chamber, said steam-chamber and said oil-chamber each having ports opening into one of said grooves; a dry-steam passage provided on the interior of said steam-chamber, and opening at one end into the top of the steam-chamber, and at the other end into the second of said annular grooves, said second groove being connected to the system for carrying off the oil by an outlet for the steam; a sight-tube in said system, and an automatically-operating check-valve adapted to close the passage to said sight-tube from above, when the upward pressure thereon is released, substantially as described.

3. In a lubricator, the combination with an oil-chamber provided with a condensed-water passage opening from the top thereof down near the bottom of said oil-chamber; an automatically-acting check-valve situated beneath the lower opening of said condensed-water passage and adapted to close said opening and prevent the return of the condensed

water; said oil-chamber having an oil-inlet near the top thereof, and connections with said inlet leading to the point to be lubricated; of a steam-chamber fitted on top of said oil-chamber, and having annular grooves provided between said steam-chamber and said oil-chamber, said steam-chamber and said oil-chamber each having ports opening into one of said grooves, and said steam-chamber having a dry-steam passage provided on the interior thereof, opening at one end into the top of said steam-chamber, and opening at the other end into another of said annular grooves, said latter annular groove being connected to the system for carrying off the oil by an outlet through which the dry steam escapes; a sight-tube in said system and a valve for closing the entrance to said sight-tube from above, substantially as described.

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

EDWIN S. MOORE.

Witnesses:
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WILLIAM BRANNAN.