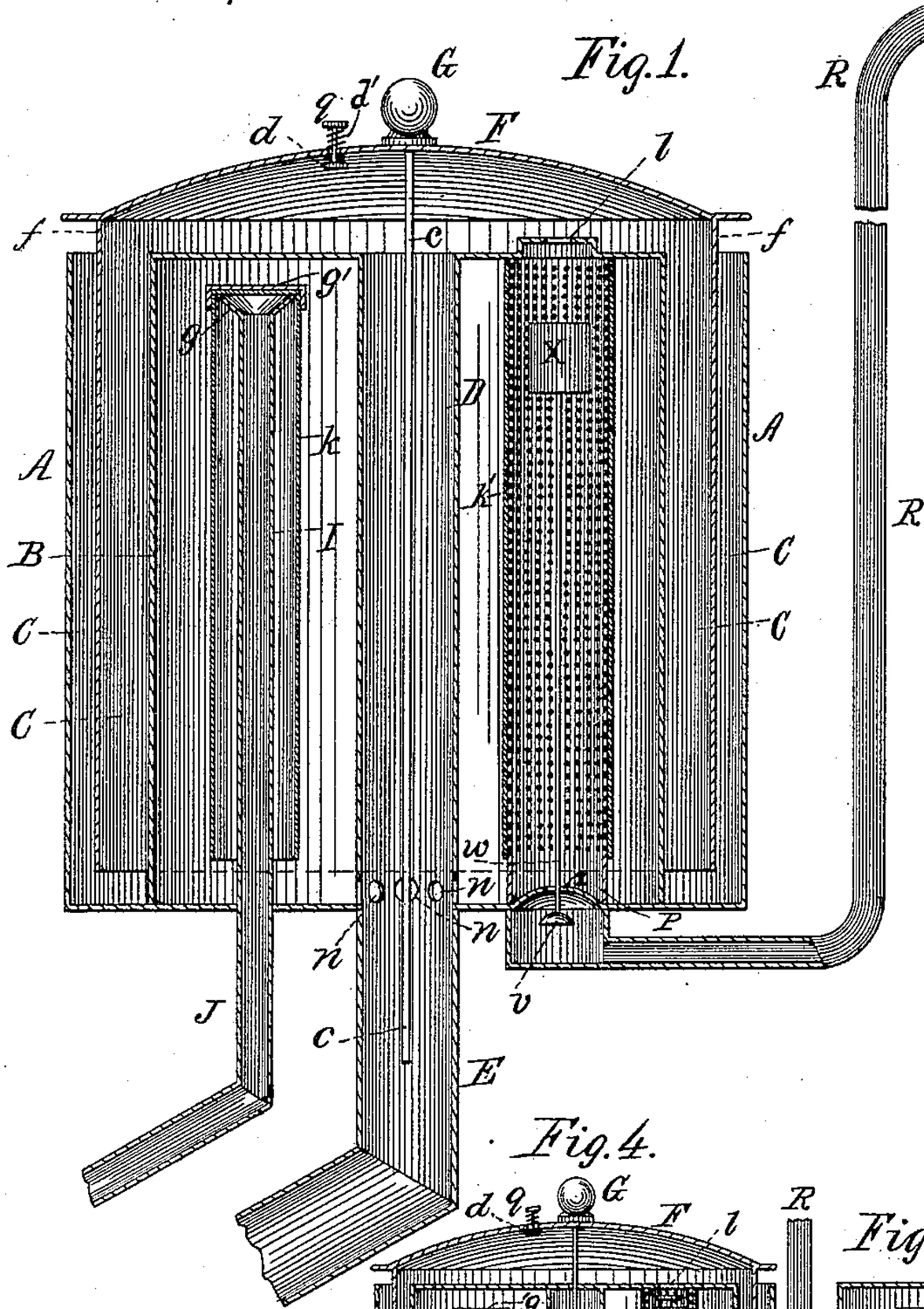
(No Model.)

J. STUBBERS.

GASOLINE APPARATUS FOR ILLUMINATING AND HEATING PURPOSES.

No. 397,255. Patented Feb. 5, 1889.

Fig. 1.



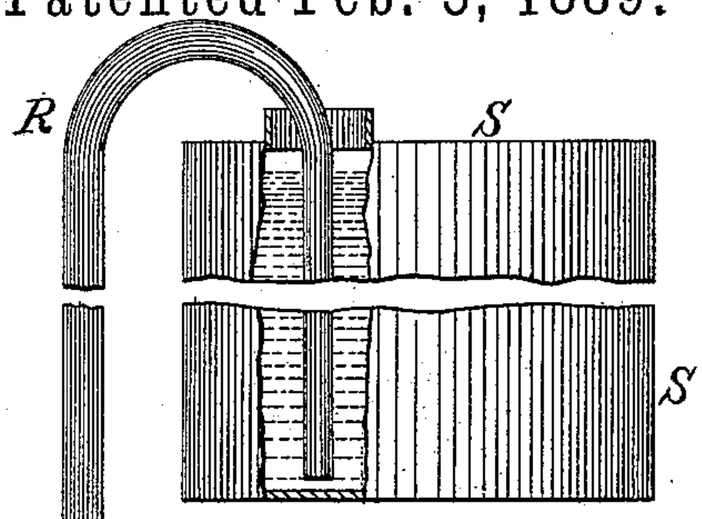


Fig. 5.

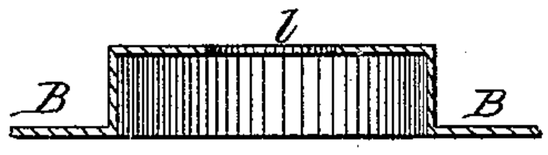


Fig. 3.

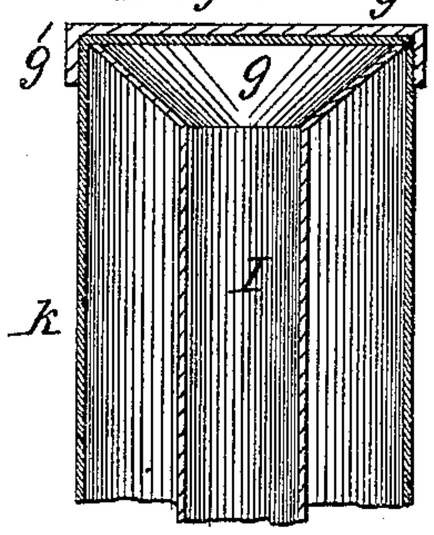


Fig. 4.

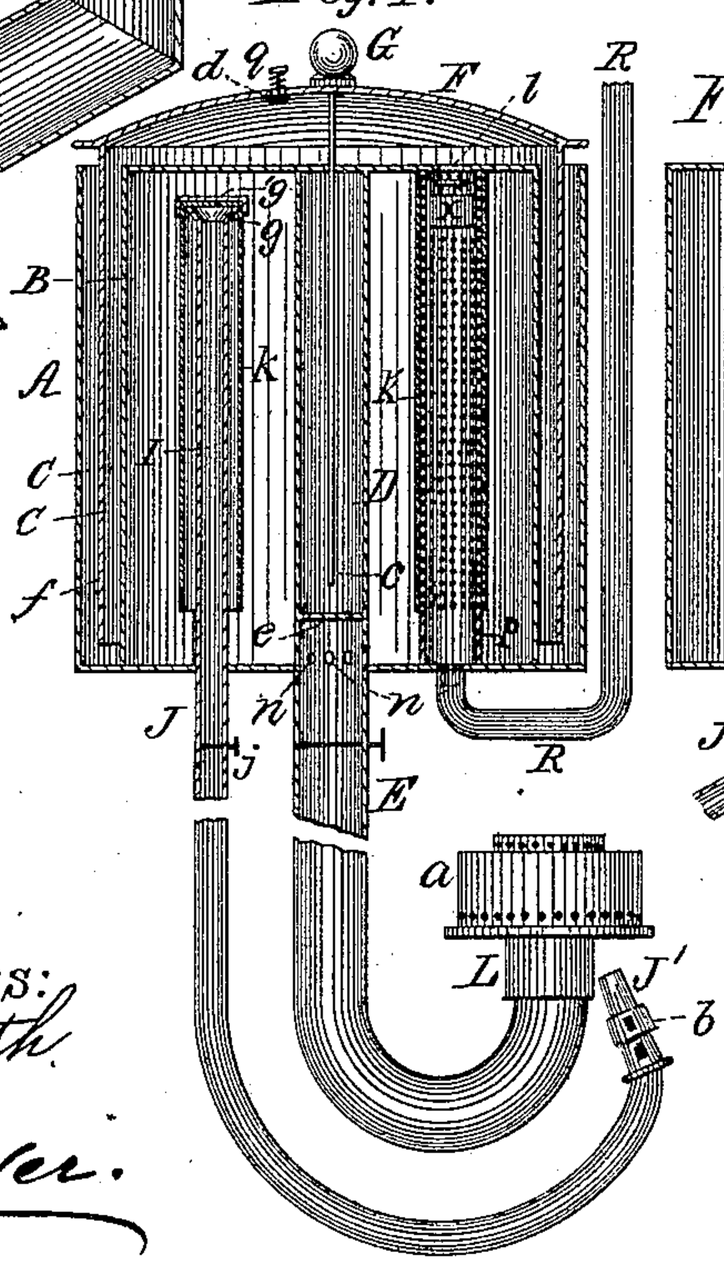


Fig. 2.

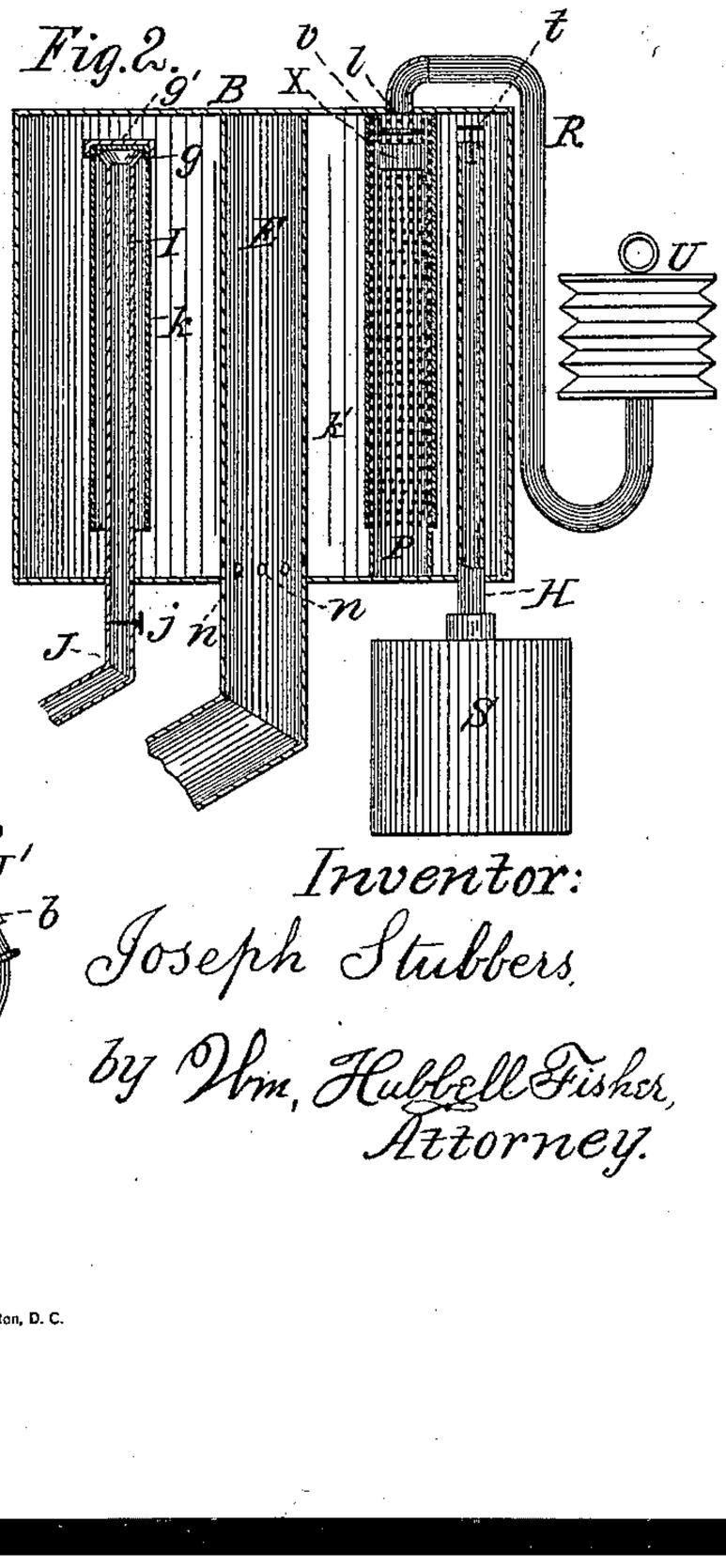
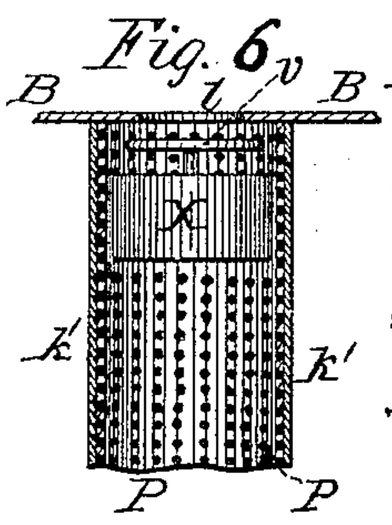


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH STUBBERS, OF CINCINNATI, OHIO.

GASOLINE APPARATUS FOR ILLUMINATING AND HEATING PURPOSES.

SPECIFICATION forming part of Letters Patent No. 397,255, dated February 5, 1889.

Application filed May 25, 1887. Serial No. 239,338. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH STUBBERS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Gasoline Apparatus for Illuminating and Heating Purposes, of which the following is a specification.

My invention relates to portable gasoline apparatus used for lighting and heating purposes. Heretofore such apparatus consisted, essentially, in a feed-reservoir for gasoline, to which is attached a pipe leading to the burner, the latter being provided with a retort by which the gasoline is vaporized and delivered to the burner proper in the form of inflammable gas.

The apparatus thus outlined and as heretofore used is subject to certain disadvantages. Among these disadvantages are, first, that in filling the exhausted reservoir in the ordinary manner by pouring gasoline into it from another receptacle the gasoline vapor contained in the reservoir is forced out of the vent of said reservoir and is liable to be ignited and produce disastrous results, and, furthermore, by careless filling of the reservoir the gasoline is liable to overflow, and the portion thus spilled is easily ignited, and thus the chances of danger are increased; secondly, the common mode of furnishing and holding the gasoline for the initial heating of the retort and the manner of heating it—to wit, by admitting liquid gasoline into a shallow cup below the retort and igniting it—is a dangerous operation, requiring special skill to accomplish, besides resulting in coating the retort and burner with a sooty deposit, which latter, being a non-conductor of heat, interferes seriously with the accomplishment of the end in view. This construction, moreover, by expansion and contraction of the metallic parts, is subject to undue wear and frequent breakage.

It is the object of my invention to obviate these disadvantages.

My invention consists, generally, in a construction in which the filling of the reservoir and the heating of the vaporizing-retort may be accomplished safely and conveniently without the aforementioned danger. In this construction are included, first, the combination, with the gasoline-reservoir, of an expansible and contractible air-chamber which may be expanded to produce a temporary vacuum in the reservoir utilized to fill the same with gasoline by siphonage or external air-pressure. This air-chamber may also, by its contraction, automatically force a current of air through the gasoline-reservoir, to be thus carbureted and utilized in a suitable auxiliary burner for heating the vaporizing-retort of the main burner.

An important feature of my invention consists in the construction and arrangement of a valve automatically actuated to seat and prevent further flow of the gasoline into the tank in filling the latter when a proper quantity of gasoline has passed into the said tank.

Further details of my invention will appear in the following description and claims.

Figure 1 is a vertical sectional view of my apparatus in its preferred form complete, except that the burners and retort are here omitted for lack of space, but are fully shown in Fig. 4. Fig. 2 is a vertical sectional view of a variation in the mode of construction, in which an expansible air-chamber wholly separate from the main tank is employed. Fig. 3 is a detached view of the upper part of the carbureted-air tube with its attachment of textile or other absorbent material for carbureting the air as it passes into the tube; and Fig. 4 is a partial view of the apparatus, showing a modification in the arrangement of the valves. Fig. 5 is a vertical central section of a part of the upper portion of the gasoline reservoir or tank B, and shows the opening into the said tank for admitting air to the tank B to pass through the absorbent material therein charged with gasoline, substantially as herein specified. Fig. 6 is a vertical central section of a part of the tank B, showing this opening for admitting air to pass through said absorbent material charged with gasoline, and also shows in section the perforated pipe or tube P and the absorbent material, *k'*, and shows in elevation the float and valve for automatically closing the opening *l*. This section is taken from the device shown in Fig. 4, while the section in Fig. 5 is taken from the device shown in Fig. 1.

Referring now to the preferred and complete form of my invention shown in the drawings,

A represents a metallic vessel or tank open at the top, preferably cylindrical, within which, and preferably secured to the same bottom, is a second tank, B, leaving a space, C, between the two, the tank B being entirely closed at the top, bottom, and sides, except as hereinafter described. The inner tank, B, is intended to contain gasoline, and the space C, which surrounds said tank, should in operation be filled to or nearly to the top with water. A hollow tube, D, is preferably present in the gasoline-tank B, and extends vertically downward through or near the center of the said tank B, and is secured to the top of said tank. At its top this tube opens into the space above the tank B and below the cover F. The bottom of this tube opens into and is connected with the gasoline-pipe E. This latter pipe E opens into the tank B, near the bottom of said tank, by one or more small orifices, as *n*, which latter permit the gasoline from the tank B to flow into the pipe E to feed the main burner *a*.

F is a metallic cover including and provided with a depending flange, *f*, fitting loosely within the space C. At the central point of the cover F, upon the inner side of the latter, a metallic rod, *c*, is preferably present, said rod being firmly attached to the cover. This rod is of a diameter less than that of the tube D, within which latter it passes sufficiently far to form a guide for the vertical movements of the cover F. The object of the tube D is to form a guide for the rod *c*. Both the rod and the tube D may be dispensed with in cases where the cover F has been fitted accurately and properly to the tank B and to tank A, so that the walls of said tanks form a sufficient guide for the cover as it rises and falls.

Attached to the cover F, upon the upper side, is a suitable handle, as G, to be used in lifting or removing the cover. At the side of this handle, opening downward through the cover F, is a valve, *d*, held in a closed position by suitable means, so that it will not open unless pressed down by hand, to which end its stem may terminate above in a button, *q*. In the present illustrative instance a coiled spring, *d'*, is shown employed to hold the valve in the closed position.

I is a hollow tube opening through the bottom of the tank B, and firmly attached thereto, and extending within and nearly to the top of the tank. Below the bottom of the tank it connects with the carbureted-air pipe J. The upper end of the tube I terminates in a cup-shaped mouth, *g*, with a flange-cover, *g'*, fitting loosely thereto. Held upon the cup *g* by its cover *g'* is a shield or screen of some absorbent material, *k*, extending downward around the tube I to the bottom of the tank B.

Within the tank B and secured, preferably, to the top and bottom of said tank, as shown, extends a perforated tube or skeleton frame, P, surrounding an opening, *l*, through the top of the tank B. Into this tube P, through the bottom of the tank, may open the filling-siphon R. Arranged within the perforated tube P is a float, *x*, (for which the tube conveniently serves as a vertical guide,) carrying a depending wire or stem, *w*, attached below to a valve, *v*, seated upward against the orifice *z* of the tank B, this orifice *z* being connected with the siphon-tube R, the function of the float and valve being to check the further inflow of gasoline in filling when the desired height has been reached. The tube or screen P is surrounded by a covering or shield, *k'*, of absorbent material, whose capillary action keeps it constantly moistened with gasoline to the top whatever may be the level of gasoline in the tank, so that any air drawn into the tank B through the aperture I and through the capillary covering *k'* will become carbureted. The float *x* is not necessarily arranged within the tube P, but may be placed at any other convenient point and guided in any convenient manner; nor is the tube P necessary, its main function being merely to furnish a support for the attachment of the capillary covering *k'* in proper relation to the orifice *l*. This covering may be arranged in any other convenient manner.

The siphon-tube R extends outside and above the tank, bending downward outwardly to about the same level as that of the upper surface of the gasoline within the filled tank. The outer mouth of this tube R is preferably serrated or cut at an angle, that it may not seat too closely against the bottom of a filling-vessel when the latter is brought into position for filling.

The carbureted-air pipe J extends to a point below and conveniently near the burner *a* or the retort L of said burner, and at such point it is terminated by the ordinary "Bunsen" burner, J', arranged to project its flame against and around the retort.

The Bunsen burner is provided with the ordinary adjustable perforated shield or sleeve, *b*, as a valve or register for regulating the quantity of air supplied through this burner to the flame.

The mode of operation is as follows: To replenish the tank B with gasoline, the filling-vessel S is brought to the position shown in the drawings, with the shorter leg of the siphon R extending into it to or near the bottom. The cover F is then slightly raised to start the siphon in operation. As the gasoline flows from the filling-vessel S into the tank B the displaced air is forced from the latter through the orifice *l* into the cover F, raising the latter. The flow continues until the vessel S is exhausted, or until the float *x* is carried upward to its limit and seats the valve *v*, which prevents its further flow. As the annular space C is filled with water, the cover F acts as a reservoir, and by its weight tends to force the contained air out again. If, now, it is desired to start the main burner *a* into action, the operation is as follows:

The force of gravity, tending to gradually draw the cover F downward, forces the contained air back through the perforation *l* into the upper part of the tube P, and thence outward through the absorbent or capillary material *k'* into the tank B, and thence through the capillary or absorbent material *k* into the tube I, and thence downward through the pipe J to the burner J'. The absorbent material, *k* and *k'*, being saturated by capillary attraction with gasoline from the liquid contents of the tank B, the air passing through them becomes carbureted to a highly-inflammable vapor. Thus the moment the cover F begins its descent the formation of carbureted vapor commences, which flows through the tube I and the pipe J, and it may be lighted at the burner J', and a blue heating-flame produced by properly regulating the additional air-supply by the shield or valve *b*. The carbureted vapor will continue to burn at a high degree of temperature during the descent of the cover F *f*, and thus heat the retort L. When the retort L is heated, the burner *a* is ready for operation. The gasoline is now admitted through the pipe E into the retort L and becomes vaporized, passes out of burner *a*, and is lighted from the burner J', and continues to burn as in ordinary gasoline-burners. When the cover F has completed its descent, no more carbureted air flows through the pipe J, and the retort-heating flame ceases, after which the burner *a* continues to act in the same manner.

Among the advantages of this method of construction and operation over the old way of obtaining a preliminary heating of the retort by admitting gasoline and igniting the same in the open cup surrounding the retort are that the sooty deposit is entirely avoided and the dangers from overflow are obviated. The operation thus described refers to the air forced into the cover F by the rise of the gasoline in the tank B; but this occurs only in the process of filling. At other times the cover may be filled with air by depressing the valve *d* and at the same time raising the cover F by the knob G. By the descent of the cover the auxiliary burner J will be duly supplied with air carbureted as aforementioned.

The modification of the apparatus shown in Fig. 4 differs only in the following particulars: In this the float *x* carries the closing-valve *v* above instead of below, seated across the orifice *l* at the under side of the latter to prevent the further exclusion of air when the desired level of gasoline is reached, thereby preventing an excessive supply of gasoline in filling. As this arrangement might in some cases cause the gasoline to be forced upward in the tube D and overflow, in such cases a separating-partition, *e*, should be in the tube D near the bottom, just above the orifices *n*, whereby the tube may be used as a guide for the stem C, yet prevent the entrance of gasoline thereto and avoid danger of the overflow just mentioned.

A modification of my device somewhat similar to Fig. 4 is shown in Fig. 2. In this the cover F and the outside tank, A, are dispensed with, leaving only the tank B. In this arrangement the air is forced into the tank B by means of a detached bellows, U, connected with the tank B by the pipe R, which enters the top of the tank B at the opening *l*, and the valve *v* will, when the gasoline rises to the proper point, fit against and close the opening *l*, as shown in Fig. 4. For the purpose of filling in this modified form the siphon may be dispensed with, and in its place a straight pipe, H, is provided, entering the tank B from below through the bottom. The pipe H extends within the tank B nearly to the top of the tank, and is provided at its upper extremity with a lift-valve, *t*. The lower portion of the pipe H extends a suitable distance below the tank, and may be inserted into any can or vessel containing gasoline. To fill the tank, air is then pumped from the tank B by means of the bellows U, and to fill the vacuum thus created gasoline will flow into the tank B through the pipe H so long as the bellows is worked until a sufficient height of gasoline is reached in the tank to press the valve *v* against the opening *l*, and thus further exhaustion of air is prevented, and the filling consequently ceases. In this form of the apparatus a stop-cock, *j*, in the tube J is essential in order that a partial vacuum in the tank B may not be supplied by reverse air-flow through the tube J.

It will be obvious that these various features of my invention may be used separately, thereby attaining in some degree the individual benefits intended.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a gasoline apparatus, the combination of the storage or gasoline reservoir, tube or conduit *l*, and expansible gas-storage chamber connected to the gas-space of the storage-tank B by said intervening tube or conduit *l* and receiving the gas in the storage-chamber while the latter is filling, substantially as and for the purposes specified.

2. In a gasoline apparatus, the combination of the storage gasoline and gas reservoir and an automatic expansible receiving-chamber connected to the gas-space of the storage-reservoir for receiving the gas of the storage-chamber while the latter is filling, substantially as and for the purposes specified.

3. In a gasoline apparatus, the combination of the siphon-tube R, and the storage-chamber B, provided with expansible chamber formed by the cover F of the tank, having downwardly-extended sides within the vessel A and outside of the tank B and connected the tank B by conduit *l*, substantially as and for the purposes specified.

4. In a gasoline apparatus, the combination

of the storage gasoline and gas reservoir and an expansible gas-receiving chamber connected thereto by tube *l*, and oil-delivery pipe E, connected to the fluid-space of said reservoir and to a burner, and gas-delivery pipe J, communicating with the gas-space of said reservoir and with an auxiliary burner, and a gas-tight conduit connecting the reservoir with a vessel from which the supply of gasoline is drawn, substantially as and for the purposes specified.

5. In a gasoline apparatus, the combination of the siphon-tube R, one end of which is adapted to be inserted into an oil-supply receptacle, as S, and the other end connected to the storage-chamber B, provided with expansible storage-chamber formed by the cover F of the tank, having downwardly-extended sides within the vessel A and outside of the tank B, and connected to the tank B by conduit *l*, and oil-delivery pipe E, connected to the said fluid-space of said reservoir and to a burner, and gas-delivery pipe J, communicating with the gas-space of said reservoir and with an auxiliary burner, substantially as and for the purposes specified.

6. In a gasoline apparatus, the combination of the reservoir and the feed pipe or siphon, vertical tube P, and its valve and float for controlling the flow of gasoline into the reservoir, and an expansible air-chamber located in conjunction with tube P, and the said reservoir adapted to draw oil from the siphon into the tube P, and the reservoir A, substantially as and for the purposes specified.

7. In combination with a gasoline-reservoir, vaporizing-burner, and an expansible air-chamber connected with said reservoir, an auxiliary heating burner arranged in suitable relation to the main burner, and a pipe connecting the auxiliary burner to the air-space of the reservoir and provided with capillary material holding gasoline, and through which the air is forced on its way from the air-chamber to the auxiliary burner, substantially as and for the purposes specified.

8. In a gasoline apparatus, the combination of an expansible air-chamber and connections, the reservoir B, lying beneath said expansible chamber and directly connected therewith, capillary material, *k'*, and vertical tube I, likewise located in said reservoir, provided with auxiliary burner J', located below said reservoir, substantially as and for the purposes specified.

9. The construction and arrangement of the reservoir B, provided with outlying wall or casing A, cover F, having wall C, stem *c*, for guiding the cover in its vertical movement, vertical tube D, located in the said reservoir, provided with aperture *n*, and extending below into the reservoir-pipe E and connected to the burner lying below the reservoir, substantially as and for the purposes specified.

10. In a gasoline-reservoir, the combination of an oil-inlet pipe located at the bottom of the reservoir, inlet-valve opening into the said bottom of the reservoir and affording means of communication between said inlet-pipe and reservoir, valve *v*, located in said pipe and preventing the reservoir from overfilling and connected to the vertical rod passing up and connected to the vertically-movable float, substantially as and for the purposes specified.

11. In combination with a reservoir, B, the upright casing P, orifice *l*, inlet-pipe located at the bottom of said casing, valve-opening located at or near the bottom of said casing and forming the means of communication between the said inlet-pipe R and said casing, and valve *v*, for regulating the inflow of oil through said valve-opening, and connected to a vertical stem provided at its top with float *x*, moving vertically in said casing and guided thereby, the said reservoir surrounding and inclosing said casing P, valve *v*, float *x*, the space of said reservoir being connected with the casing P and delivery-pipe E, communication in said reservoir being established between the reservoir and perforations of casing P and the delivery-pipe E, substantially as and for the purposes specified.

12. In a gasoline-reservoir, capillary covering *k'*, located in said reservoir, vertically-moving float *x*, and valve *v*, located at the lower end of the tube P and, in conjunction with said float, preventing the said reservoir from being overflowed with gasoline, substantially as and for the purposes specified.

13. The combination of the reservoir B, provided with aperture *l*, located above the capillary material *k'*, inclosing float *x* and valve *v*, said capillary material being located within said reservoir, vertically-moving cover F, forming roof of said reservoir, and siphon R, forming the connection between the filling-reservoir and the storage-reservoir, substantially as and for the purposes specified.

14. In a gasoline apparatus, the construction and arrangement of the vertical tube I, located in the reservoir and having its sides and inlet covered with capillary covering *k'*, the other end of said tube communicating with the auxiliary burner, and an expansible chamber opening directly onto the surface of the gasoline in said reservoir, substantially as and for the purposes specified.

15. In a gasoline apparatus, the construction and arrangement of the vertical tube I, located in the gasoline-reservoir, having its side and flared inlet *n* covered with capillary covering *k'*, the other end of said tube communicating with the burner, and an expansible air-chamber opening directly onto the surface of the fluid which surrounds said tube I, substantially as and for the purposes specified.

16. In a gasoline apparatus, the oil-reservoir, conduit E, conveying the oil from the reservoir to the vaporizing-burner, outlet-tube I, located in said reservoir, and projecting in part above the surface of the oil therein, and provided with capillary covering *k'*, covering the inlet end of said tube and extending

down the sides of said tube into the oil and terminating in the pipe J, connected with the auxiliary burner arranged to heat the vaporizing-burner, and expansible air-chamber for forcing air through the capillary covering *k'* over the mouth of said tube I on through said tube to the auxiliary burner, substantially as and for the purposes specified.

17. In a gasoline apparatus, the oil-reservoir, conduit E, conveying the oil from the reservoir to the vaporizing-burner, outlet-tube I, located in said reservoir and projecting in part above the surface of the oil therein, provided with capillary covering *k'*, covering the inlet end of said tube and extending down the sides of said tube into the oil and terminating in the pipe J, and cover *g'*, for holding the covering *k'* in place over the opening *g*, connected with the auxiliary burner arranged to heat the vaporizing-burner, and expansible air-chamber for forcing air through the capillary covering *k'* over the mouth of said tube I on through said tube to the auxiliary burner, substantially as and for the purposes specified.

18. In a gasoline apparatus, the oil-reservoir, conduit E, conveying the oil from the reservoir to the vaporizing-burner, outlet-tube I, located in said reservoir and projecting in part above the surface of the oil therein, and provided with capillary covering *k'*, covering the inlet end of said tube and extending down the sides of said tube into the oil and terminating in the pipe J, connected with the auxiliary burner arranged to heat the vaporizing-burner, and expansible air-chamber for forcing air through the capillary covering *k'* over the mouth of said tube I on through the said tube to the auxiliary burner, and inlet oil-controlling valve *v* and float *x*, substantially as and for the purposes specified.

19. In a gasoline apparatus, the combination of the reservoir B, expansible air-chamber F, oil-inlet valve *v*, float *x*, controlling the passage-way between the inlet-pipe and the reservoir, casing P, with capillary covering *k'*, and having orifice *l*, opening into the air-chamber F, tube I, having capillary skirt *k'* on its sides and over its open inlet end, the latter communicating with the air-space of the reservoir, the other end of tube I communicating with the auxiliary burner, and tube E, connected at one end with the oil-space of the reservoir and at the other end with the vaporizing-burner, substantially as and for the purposes specified.

20. In a gasoline apparatus, the combination of the reservoir for oil, expansible air-chamber, opening *l* at the upper end of tube or casing P, the siphon-pipe connected with the lower end of said tube or casing, and the passage-way between said tube and said pipe being controlled by a valve, the said orifice or opening *l* connecting with the expansible air-chamber, substantially as and for the purposes specified.

21. The combination of a gasoline-reservoir provided with opening *l* to receive the air and pipe leading from the gasoline-space of the reservoir to the vaporizing-burner located at a lower level, textile material, tube I, and pipe J, to convey the gas to the auxiliary gas-burner, suitably arranged to heat the vaporizing-burner, substantially as and for the purposes specified.

22. In a gasoline apparatus, the combination of the reservoir B, and cylindrical vertical perforated casing P, inlet feed-pipe R, connected to the interior of the casing at the bottom of the latter, and valve *v*, located between the feed-pipe R and the interior of said casing and controlling the communication between said feed-pipe and the interior of said casing, float *x*, located within said casing, and rod connecting valve *v* and float *x* and capillary material *k'* against the sides of the casing P, said casing P being at the same time a support for the capillary material and a guide for the float, substantially as and for the purposes specified.

23. In a gasoline apparatus, the combination of the liquid-supply pipe E, connecting the liquid-space of the reservoir with a vaporizing-burner located at a lower level, the air or gas supply pipe J, and tube I, connecting the air or gas space of the reservoir with an auxiliary heating-burner suitably arranged to heat the vaporizing-burner, the conduit *l*, connecting the air or gas space of the reservoir with the expansible chamber, and capillary material suitably arranged between tube I and conduit J, substantially as and for the purposes specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH STUBBERS.

Witnesses:
E. L. KERR,
WM. LITTLEFORD.