(No Model.)

3 Sheets—Sheet 1.

S. DANIELS.

VAPOR STOVE.

No. 568,311. Patented Sept. 22, 1896.

Fig. 4

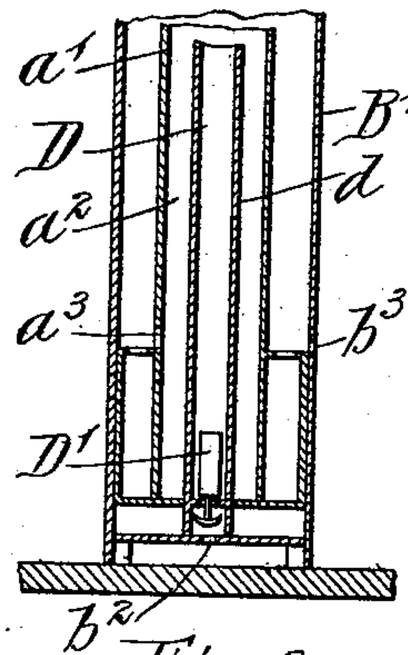


Fig. 3.

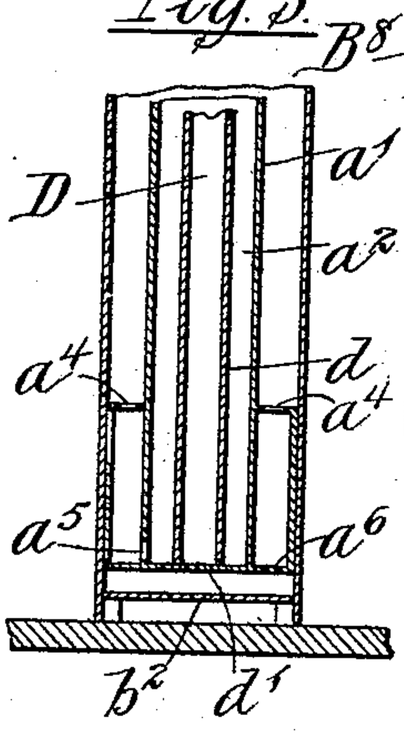


Fig. 1.

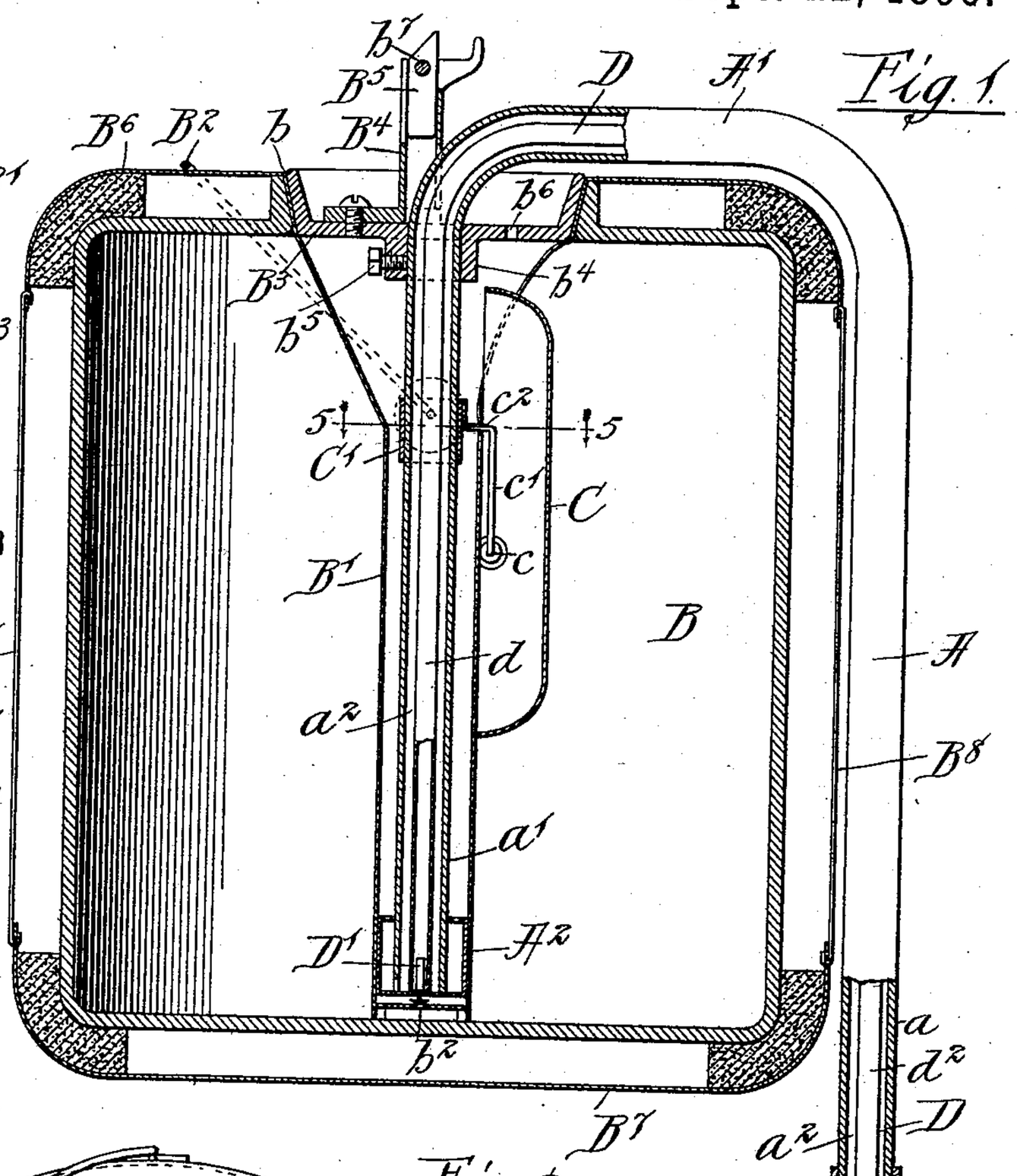


Fig. 2

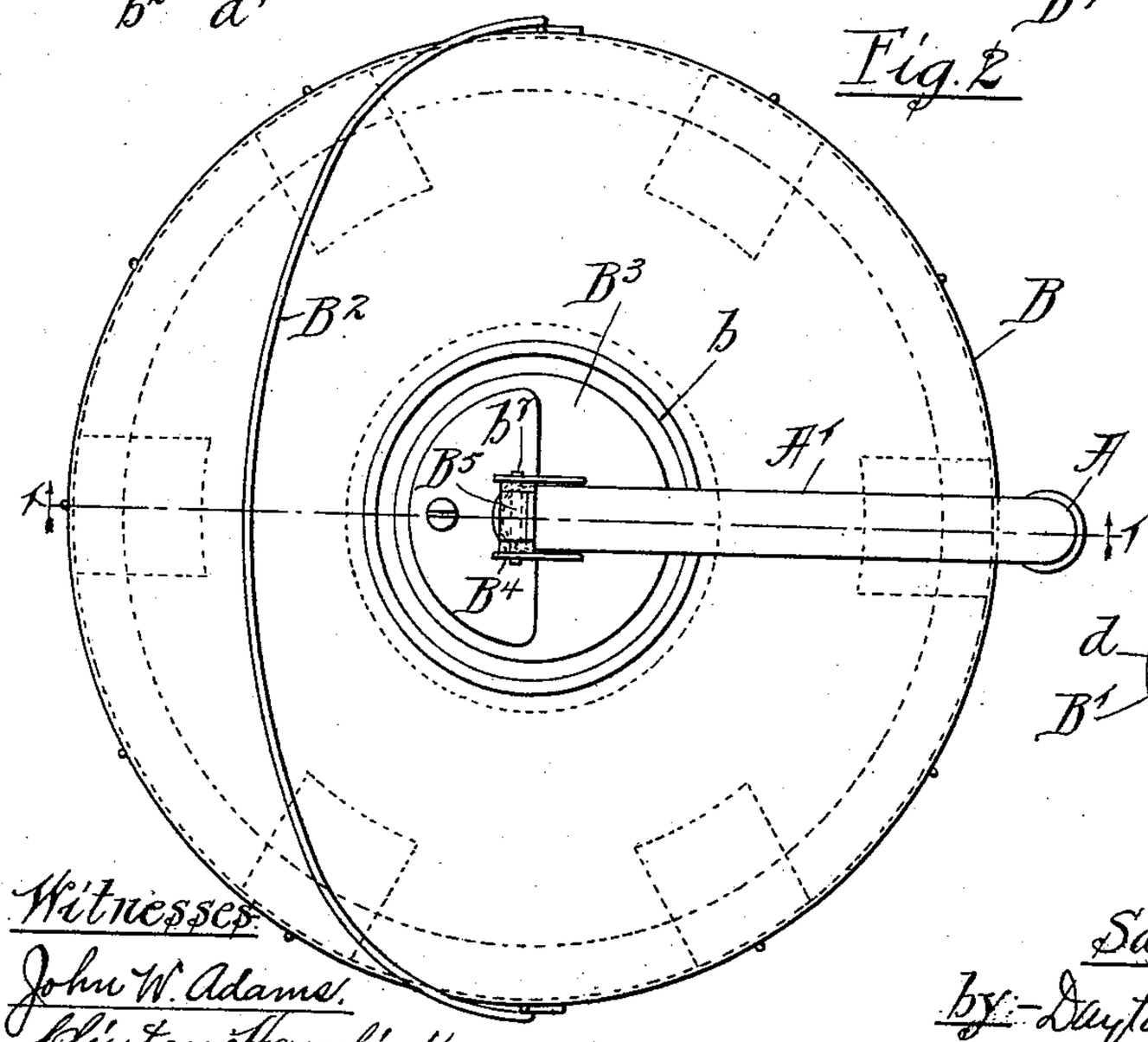
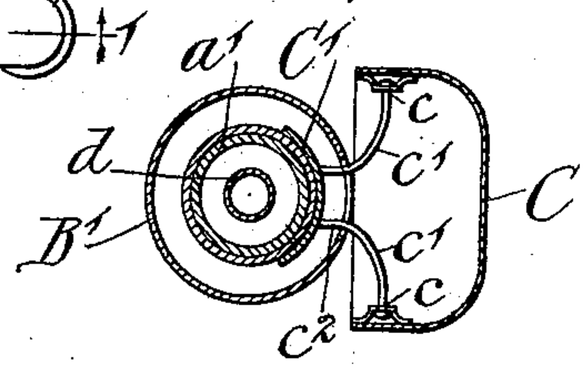


Fig. 5.



Witnesses:
John W. Adams.
Clinton Hamlink

Inventor:-
Samuel Daniels.
by:- Dayton, Poole & Brown
his Attorneys

(No Model.)

3 Sheets—Sheet 2.

S. DANIELS.

VAPOR STOVE.

No. 568,311. Patented Sept. 22, 1896.

Fig. 1.

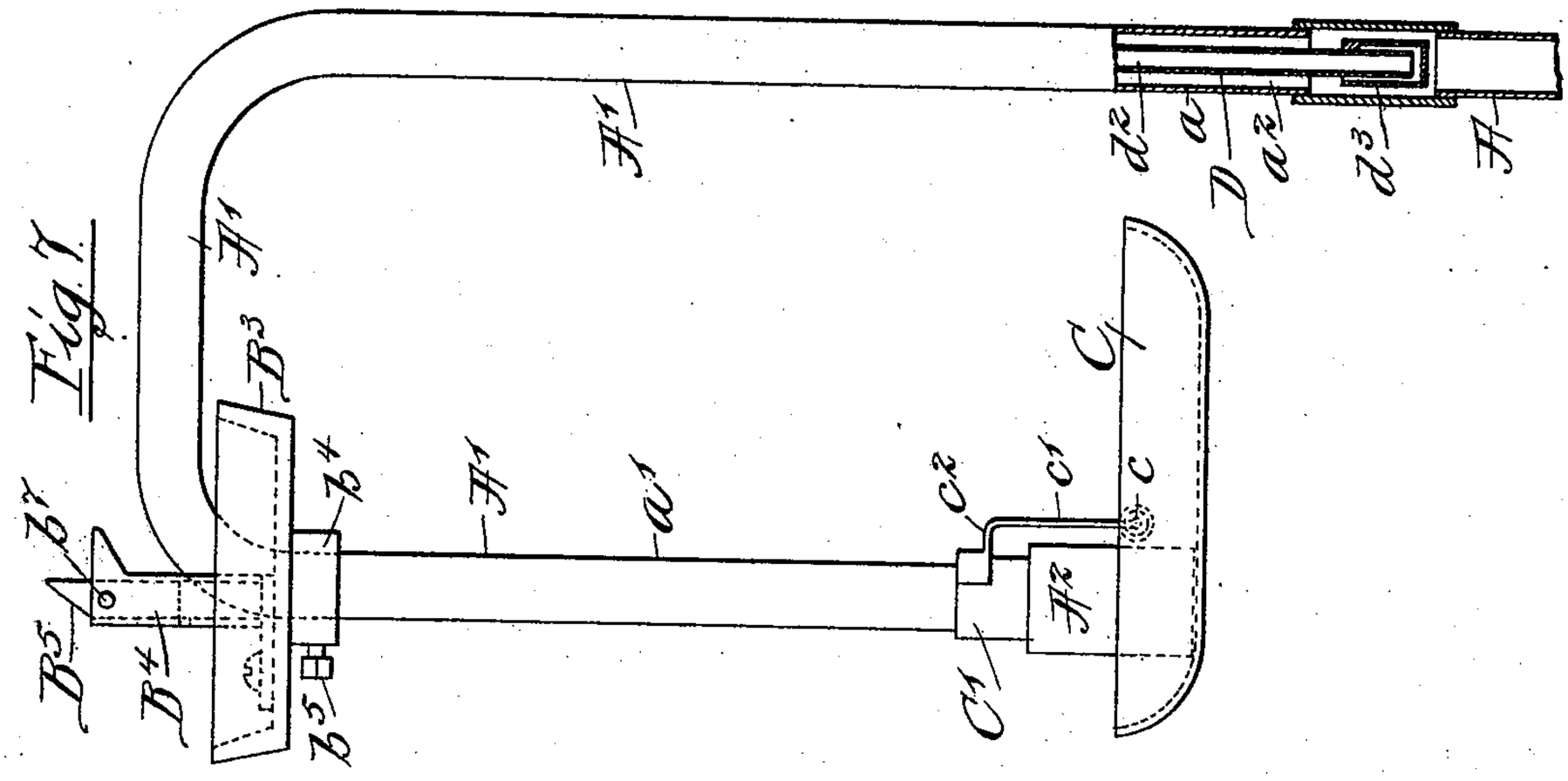


Fig. 6.

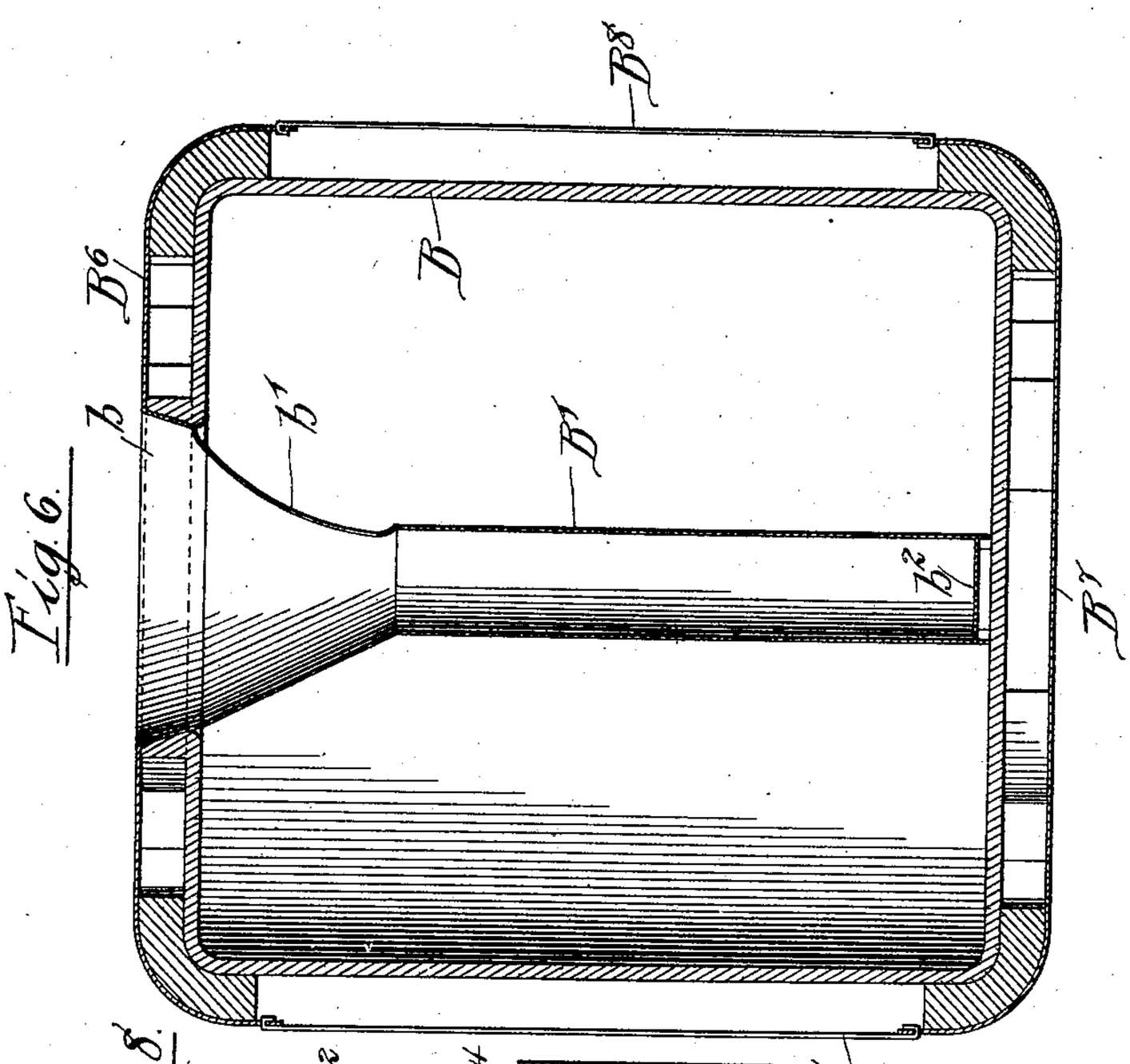
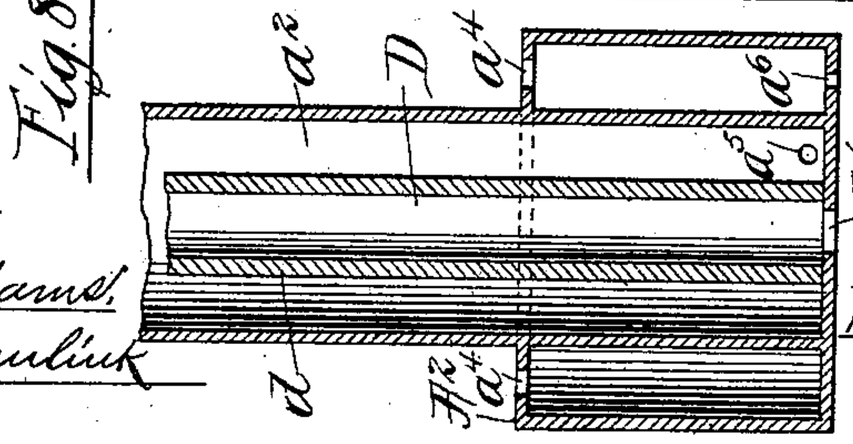


Fig. 8.



Witnesses:-
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Samuel Daniels.
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his Attys.

(No Model.)

3 Sheets—Sheet 3.

S. DANIELS.

VAPOR STOVE.

No. 568,311. Patented Sept. 22, 1896.

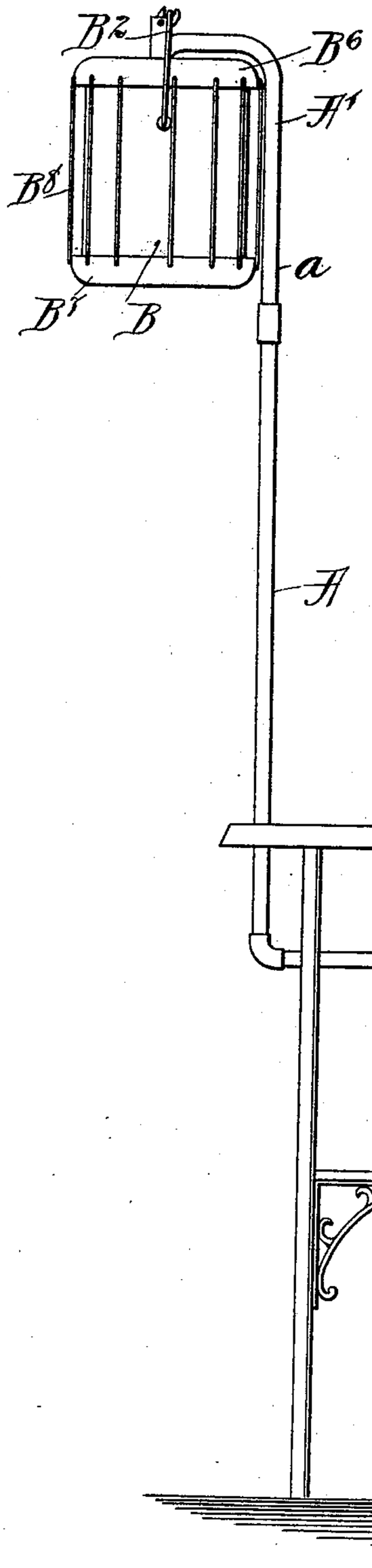
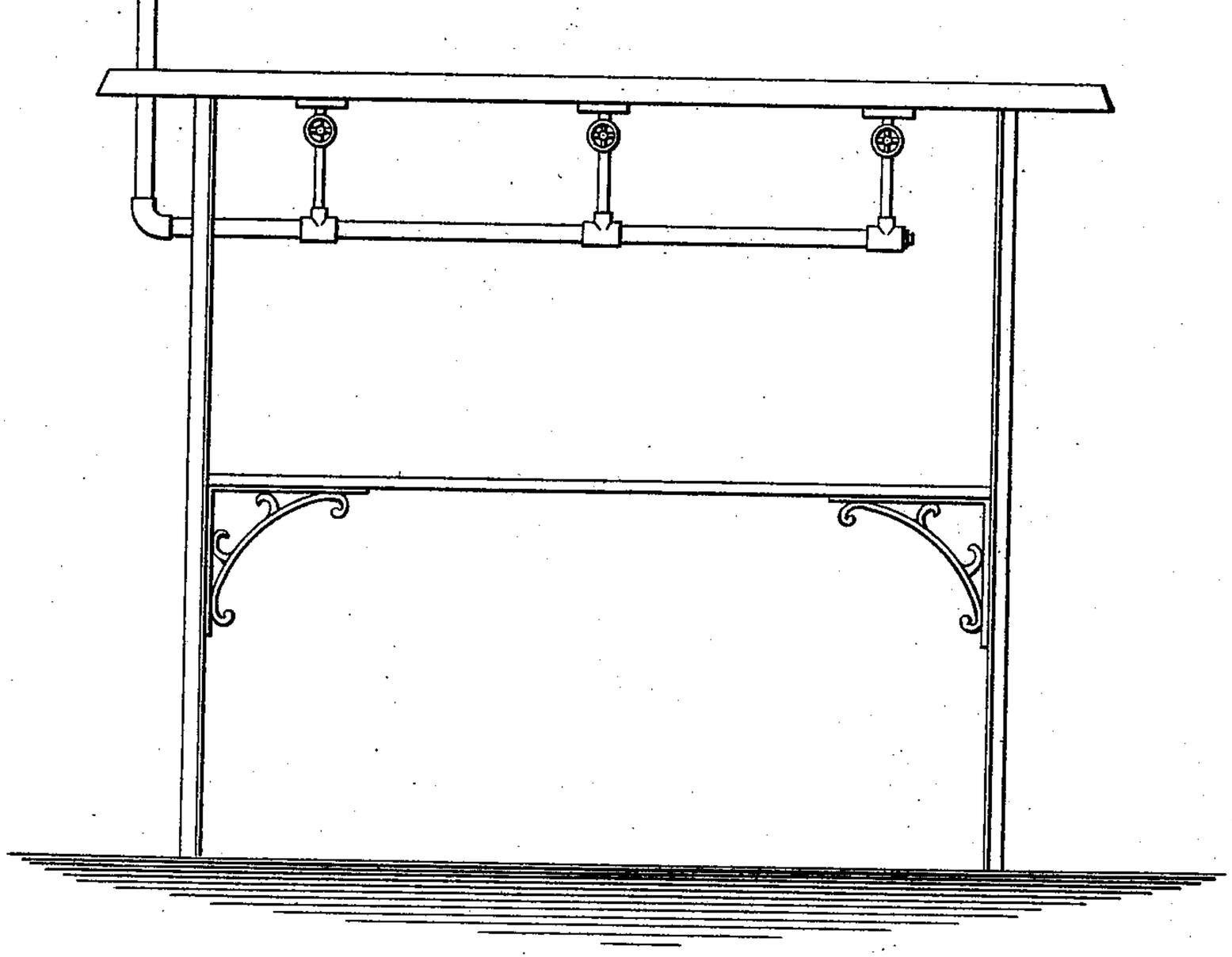


Fig. 9.



Witnesses:-
John W. Adams.
Clinton Hamlink

Inventor:-
Samuel Daniels.
by- Dayton, Pool & Brown.
his Attorneys

UNITED STATES PATENT OFFICE.

SAMUEL DANIELS, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO MELVILLE E. DAYTON, OF SAME PLACE.

VAPOR-STOVE.

SPECIFICATION forming part of Letters Patent No. 568,311, dated September 22, 1896.

Application filed July 15, 1895. Serial No. 556,032. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL DANIELS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vapor-Stoves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to gasolene or vapor stoves of the class in which the generator or generating-burners are supplied from an elevated tank through a stand-pipe, the stand-pipe being of suitable length to insure the necessary hydraulic head for giving a desired pressure at the burners. Still more specifically the invention may be said to relate to the subclass of such vapor-stoves in which the stand-pipe takes its supply from an elevated tank through the medium of a siphon, this particular kind or subclass of vapor-stoves being set forth in my application for Letters Patent, Serial No. 512,462, filed May 25, 1894.

In the construction shown in my above-mentioned prior application for patent the siphon action by which the tank is made to supply the stand-pipe is inaugurated by means of a pump or equivalent device. The tank is also, in said prior application, shown as being removable from the stand-pipe in order that it may be taken to a distance for refilling, but, a pump or equivalent device being used to charge the siphon, the movement of the tank in applying it to the stand-pipe is not concerned in the inauguration of the siphon action. In the present invention, however, I have provided a construction by which the siphon may be charged and its action inaugurated in and by the application of the filled tank to the stand-pipe, and the pump or its equivalent is dispensed with. It may therefore be said to be a primary object of the present invention to provide a construction in which a movement of the tank, as in its reapplication to the stand-pipe, often being filled, charges the siphon and inaugurates the desired siphon action between the tank and the stand-pipe. In the accompanying drawings I have shown not only this general and primary feature of my invention, but also additional features of improvement and certain specific forms of construction which are practical and desirable.

In the drawings, Figure 1 is a vertical section on line 1 1 of Fig. 2 of a gasolene-tank applied to the upper U-shaped and downwardly-bent end of a stand-pipe, showing a siphon within the bent extension of said stand-pipe in accordance with my present invention. Fig. 2 is a top view of the parts shown in Fig. 1. Fig. 3 is a vertical section, enlarged, of the lower end of a tube which is fixed in the tank and also the free end of the stand-pipe extension and the plunger attached thereto and the adjacent end of the interior siphon in the positions they occupy when the tank is applied to the stand-pipe, as shown in Fig. 1. Fig. 4 is a vertical section of the parts generally corresponding to those shown in Fig. 3 with certain modifications. Fig. 5 is a horizontal section in the line 5 5 of Fig. 1, somewhat enlarged and looking downward. Fig. 6 is a vertical central section of the tank and its contained tube or barrel detached. Fig. 7 is a side elevation of the upper inverted-U-shaped end or extension of the stand-pipe with its attachments, a part of the stand-pipe proper being broken away to show in vertical section the lower end of the longer leg of the interior siphon, which is also shown in vertical section. Fig. 8 is a very considerably-enlarged vertical section of the free end of the stand-pipe extension together with the plunger or enlargement thereon and the adjacent end of the interior siphon, this figure being intended to more clearly show the orifices for gasolene and air in the various parts when constructed as shown on a smaller scale in Figs. 1 and 3. Fig 9 is an elevation of a part of a gasolene-stove having one or more generating-burners, the stand-pipe for the supply of the generator of the burner, and the gasolene-tank removably applied to the stand-pipe in accordance with this invention.

First pointing out the features of the construction shown that are concerned in the attainment of the primary object of charg-

ing the siphon by an upward movement of the tank to its final position on the stand-pipe, A represents a stand-pipe of a gasolene-stove, which from the point, say at *a*, downward is of suitable height above the generator or generating-burner of the stove to give the hydraulic head necessary to a proper pressure at the stove-burner. Above the point *a* the stand-pipe rises, proceeds laterally, and descends, as indicated in Figs. 1, 2, 7, and 9, to form an inverted-U-shaped extension A′ of the stand-pipe, of which *a′* is a depending leg having its extreme free end closed.

B is a tank having an opening *b* in its top to receive the leg *a′* of the stand-pipe extension.

B′ is a vertical tube or barrel secured in the tank in vertical line with the top opening *b* thereof, the interior of said barrel B′ being shown as having free communication at its upper end with the interior of the tank by a lateral opening *b′*, and as having at its lower and otherwise closed end a small orifice b^2, through which gasolene may enter the bottom of the tube in the regular operation of the apparatus.

A^2 is a cylindric enlargement or a plunger which I prefer to provide on the lower and free end of the leg *a′* of the stand-pipe extension, said plunger being adapted to freely enter through, nearly or quite filling the barrel B′.

D is a siphon within the inverted-U-shaped extension A′ of the stand-pipe, said siphon D having an exterior diameter less than the interior diameter of the stand-pipe extension, so as to afford a free passage a^2 within the extension and around said siphon. The shorter leg *d* of the siphon D, which desirably extends to the lower end of the leg *a′*, is freely open to receive gasolene from the lower interior of the barrel B′, as by an opening *d′* in the plate, which closes the lower end of the leg *a′*, said opening *d′* being larger than the orifice b^2, which admits gasolene into barrel B′. The longer leg d^2 of the siphon D opens within the stand-pipe A below the point *a*. Communication is afforded between the interior of the barrel B′ above the plunger A^2 and the interior of the depending leg *a′* of the stand-pipe extension by means of an orifice a^3, Fig. 4, or preferably by means of orifices a^4 and a^5, as indicated in Figs. 3 and 8. The tank B may be upheld in its working position (shown in Fig. 1) by any suitable means, a bale B^2 being in this instance shown for that purpose.

With a construction substantially as above set forth, the operation of the apparatus will be inaugurated and continued as follows: The tank B having been detached from the stand-pipe and filled, it is raised vertically to its place on the stand-pipe, (shown in Fig. 1,) and in such elevation of the tank the leg *a′* of the stand-pipe extension enters the barrel B′ within the tank. Said barrel being full of gasolene to the same depth as the general interior of the tank, the plunger A^2 forces the liquid in the barrel downward before it and causes it to rise into and to fill or charge the small siphon D. The air that in this act is forced from the siphon D downward through its longer leg d^2 into the stand-pipe rises within the latter around the siphon D and emerges into the top of the tank through the lateral opening or openings in the leg *a′*. The siphon being thus charged, it continues to take liquid from the tank into the stand-pipe, and the air that is displaced from the stand-pipe in being in this manner filled with liquid finds egress from the latter to the top of the tank in the same way that has just been pointed out. The stand-pipe is thus rapidly filled to the level of the liquid in the tank, and it continues to supply the burners of the stove and to be supplied by the siphon until the tank is drained. By the described construction, therefore, the charging of the siphon and stand-pipe becomes automatic and a pump or other special charging device becomes unnecessary.

Describing other and adjunctive features shown in the drawings, b^3 represents a trap of familiar construction applied to the delivery end of the siphon D to afford a liquid seal to the siphon. It is believed that this may be sometimes desirable to possibly prevent the breaking of the column within the siphon, when, as sometimes happens in vapor-stoves, the puffing or blowing back of the liquid from the burner takes place within the supply-pipe. In Figs. 1 and 4 I have shown also an interior valve D′, applied to the receiving-orifice, open in the filling and subsequent operation of the siphon, but also adapted to drop and close upon a regurgitation of liquid within the siphon to prevent the breaking of the liquid-column in said siphon and the consequent interruption of its action. This valve D′ is essentially alternative to the liquid-seal cup or trap d^3, although it is not certain from any of the careful observations so far made by me of the structure in glass that either is necessary. In this connection I remark that such regurgitation may bring the U-shaped extension A′ of the stand-pipe itself into action as a siphon, and this sometimes occurs, although uselessly, of course, in the presence of the siphon proper, D. It has been impossible to determine that when the stand-pipe extension is thus brought into action as a siphon the siphon D, even in the absence of the trap d^3 or the valve D′, ceases to act, and it is probably immaterial, since, so far as experience has shown, under no circumstances is the continuous flow of liquid from the tank to the stand-pipe interrupted by such regurgitation or otherwise.

While there is little tendency to dripping from the siphon when the tank is removed for refilling, I have nevertheless guarded

against any consequences of such dripping by the application to the depending leg a' of the stand-pipe of a folding drip-cup C, which assumes a horizontal position when the tank is withdrawn and a vertical position when the tank is reapplied. To this end the drip-cup C is made relatively long, as shown in side view in Fig. 7, and narrow, as indicated in Fig. 5. It is hung on pivots c at one side of its middle to arms c', which depend from a sleeve C', that slides freely up and down upon the leg a' of the stand-pipe extension. When the tank is applied, the edge of the hole b in the top of the tank strikes against the protruding end of the drip-cup C and tilts it into a vertical position, so that its contents, if any, are emptied into the tank, and so also that in the ascent of the tank said drip-cup is passed directly downwardly (with reference to the tank) exteriorly to the barrel B', as shown in Fig. 1. To this end the arms c' are provided with laterally-projecting portions at c^2, adjacent to the sleeve, which overhang the side of the barrel B' and, by striking upon the upper edge of the cut-away portion of said barrel, arrest the drip-cup sleeve C' and cause the latter to slide up the leg a' as the tank ascends to its place. While the tank is in position on the stand-pipe, the drip-cup and its sleeve C' are therefore hung upon the edge of the barrel B', as clearly shown in said Fig. 1, but as the tank is withdrawn said drip-cup and its sleeve descend until the latter strikes the top of the plunger A^2, and as the tank is still farther withdrawn the the drip-cup, by reason of the eccentric arrangement of its pivots c with reference to its center of gravity, drops automatically beneath the end of the plunger and the siphon to the horizontal position shown in Fig. 7.

I have invariably shown the plunger A^2 applied to the free end of the stand-pipe extension a' as being made of sheet metal and hollow. This is a desirable construction, especially with reference to the cheap production of the passages a^4 and a^5, (shown in Figs. 3 and 8,) but, if desired, said plunger may be made solid in the form of a casting, in an obvious manner, to form the terminal of both the siphon and of the pipe extension. I have also in Figs. 3 and 8 shown a small hole a^6 in the bottom of the hollow plunger exterior to the stand-pipe extension, which, with the passage or passages a^4, gives a vertical passage through the plunger and communication between the space below it and the space above it. Such communication is desirable to insure continuously a body of the liquid in the barrel B' extending to or near the level of the liquid in the general interior of the tank. Such a passage will have its equivalent in a loose fit of the plunger within the barrel, albeit the better construction is that in which the plunger rather closely fits within the barrel and is provided with an independent vertical passage through it, as, for example, by the orifice a^6 and orifice or orifices a^4. Another provision for the same purpose is seen in Fig. 4, where the barrel B' is provided with a small lateral orifice b^3, just above the plunger A^2, when the latter is in its lowermost position within the barrel.

The holes a^6, b^2, and b^3, or such of them as are present, are made small, in order that in the forcing of the plunger A^2 downwardly in the barrel with reasonable and natural rapidity the liquid shall rise into the siphon in sufficient quantity to fill it, instead of being merely expelled into the tank through said orifice b^2 or orifices b^2 and b^3, or instead of passing from beneath the plunger to the space above it in the barrel by the passage a^6. Very minute orifices will be sufficient to afford the necessary flow of liquid to the siphon from the tank in the regular operation of the apparatus, or from the tank into the barrel, and orifices of such size as are suitable for these purposes are found in practice to offer no obstacles to the charging of the siphon D in applying the tank in the manner set forth.

The opening b in the top of the tank is made large in the present instance both to facilitate filling and to accommodate the admission of the folding drip-cup C'. It is stopped sufficiently tightly by the plug B^3, permanently secured to the upper end of the leg a' of the stand-pipe extension, as shown in Figs. 1 and 7. The said plug B^3 is shown to be secured adjustably to the leg a' by means of a sleeve b^4 and a set-screw b^5, and it may have a hole b^6 through it to admit air freely to the tank. In this instance said plug is made to sustain the standard B^4, over which the bale B^2, belonging to the tank, is hooked to hold said bale in its elevated position. The trip B^5, pivoted at b^7 to the standard B^4, moves back as the bale is pushed over the top of the standard and resumes its upright position after the bale is moved past it, in which position it serves as a stop to prevent the accidental displacement of the bale and the dropping of the tank. This catch device is fully shown in my aforesaid prior application, and is not claimed herein.

The tank B is shown to be of glass protected in a novel way. The protecting devices consist of a top plate B^6, a bottom plate B^7, vertical wires B^8, connecting these plates, and bodies of felt or equivalent yielding substance interposed between the plates B^6 and B^7, respectively, and the angles of the glass vessel. By this construction the depth of the liquid in the tank is always readily observable, while the tank is adapted to be handled freely without danger of breaking it.

It will be understood that but for the regurgitation or backflow of liquid in the stand-pipe that occasionally takes place the stand-pipe might terminate in an open top at or somewhat above the highest level of the liquid in the tank, and, as such backflow may be

obviated by some invention or construction not yet made or now known to me, I desire that such construction of the stand-pipe shall be included in those of the appended claims, the terms of which are applicable to it.

It will also be understood that in the construction shown, to wit, those having the inverted-U-shaped extension of the stand-pipe, the air-escape orifice a^3 may allowably be situated at any point in the transverse or depending part of said extension from which any liquid escaping from said orifice will pass to the interior of the tank; as, for example, if such orifice be situated in the transverse part of the extension it may first drip into the cupped plug or other cup in the top of the tank and thence drop into the tank through an opening, as b^6. Such allowable location of the orifice a^3 is intended to be included in the apended claims.

Finally, it is obvious that various mechanical changes may be made in the construction set forth without departure from the invention as pointed out in the appended claims.

I claim as my invention—

1. In combination with the stand-pipe of a vapor-stove, a siphon having its longer leg communicating with the upper interior of the stand-pipe, a liquid-tank having an opening in its top and a vertical tube within and communicating with the interior of the tank, and in line with said opening, which, upon the elevation of the tank and an accompanying descent of the siphon in the tube, the siphon is automatically charged, substantially as described.

2. In combination with the stand-pipe of a vapor-stove, a tubular, inverted-U-shaped top extension of the stand-pipe, the depending free leg of which is closed at its lower end, said extension being provided with a lateral opening in its transverse or depending portion; a siphon within and of less diameter than said stand-pipe extension; a liquid-tank having an opening in its top, and a vertical tube within the tank in line with said opening adapted to admit the depending leg of the stand-pipe extension and having an orifice at or near its lower end for admission of liquid to the siphon, substantially as described.

3. In combination with the stand-pipe of a vapor-stove, a tubular, inverted-U-shaped top extension of the stand-pipe, the depending free leg of which is closed, and is provided with a lateral enlargement at its lower end and also with a lateral opening near its lower end; a siphon within and of less diameter than the stand-pipe extension; a liquid-tank having an opening in its top, and a vertical tube within the tank in line with said top opening and suited to admit the enlargement on the leg of the stand-pipe extension, said tube being provided with an orifice at its lower end for the admission of liquid to the siphon, substantially as described.

4. In combination with the stand-pipe of a vapor-stove, having an inverted-U-shaped top extension, a siphon within said extension of the stand-pipe for insertion in an elevated supply-tank, and means applied to the siphon for preventing the breaking of the column therein, substantially as described.

5. In combination with the stand-pipe, a supply-tank and a siphon D terminating in the stand-pipe, a trap d^3 applied to the delivery end of the siphon, substantially as described.

6. In the apparatus essentially as set forth, the combination with the tank-tube B′ and a siphon connecting the tank-tube with the stand-pipe, a plunger A^2 having a vertical passage through it, giving communication between the spaces beneath and above the plunger within the tank-tube, substantially as described.

7. In combination with the stand-pipe of a vapor-stove, with a removable, elevated supply-tank, and with a siphon connected with the stand-pipe and removably entering the tank, a movable drip-cup adapted to be moved into position beneath the free end of the siphon when the tank is removed and to be displaced from this position when the tank is returned.

8. In combination with the stand-pipe of a vapor-stove, with a removable, elevated supply-tank, and with a siphon connected with the stand-pipe and removably entering the tank, a drip-cup pivoted to a vertically-sliding connection with the siphon, whereby the said drip-cup may be tipped to a vertical position, and may rise as the siphon enters the tank, and may descend and swing to a horizontal position beneath the siphon on the removal of the tank.

9. In combination with the stand-pipe of a vapor-stove, with a removable, elevated supply-tank and with a siphon connected with the stand-pipe and removably entering the tank, a drip-cup pivoted eccentrically to a vertically-sliding connection with the siphon, whereby said drip-cup may be tipped to a vertical position and may rise as the siphon enters the tank and may descend and automatically swing to a horizontal position beneath the siphon on the removal of the tank, substantially as described.

10. In combination with the stand-pipe of a vapor-stove and a siphon delivering into its upper end, a liquid-supply tank provided with an interior, vertical tube cut away at one side near its upper end, and also provided with an opening in its top extending laterally beyond the said interior tube at the cut-away side thereof; a sleeve or sliding part adapted to rise and fall about the siphon; an arm or arms projecting laterally from said sleeve beyond the wall of the interior tank-tube and thence downwardly, and a drip-cup pivoted eccentrically to the lower end of said arm or arms, substantially as and for the purposes set forth.

11. A glass vapor-stove tank provided with exterior top and bottom guard-plates of suitable material and covering the ends of the tank, said plates being separated from the glass by a suitable interposed yielding substance, and being tied to each other by metal rods or wires, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

SAMUEL DANIELS.

Witnesses:
M. E. DAYTON,
WILLIS D. SHAFER.