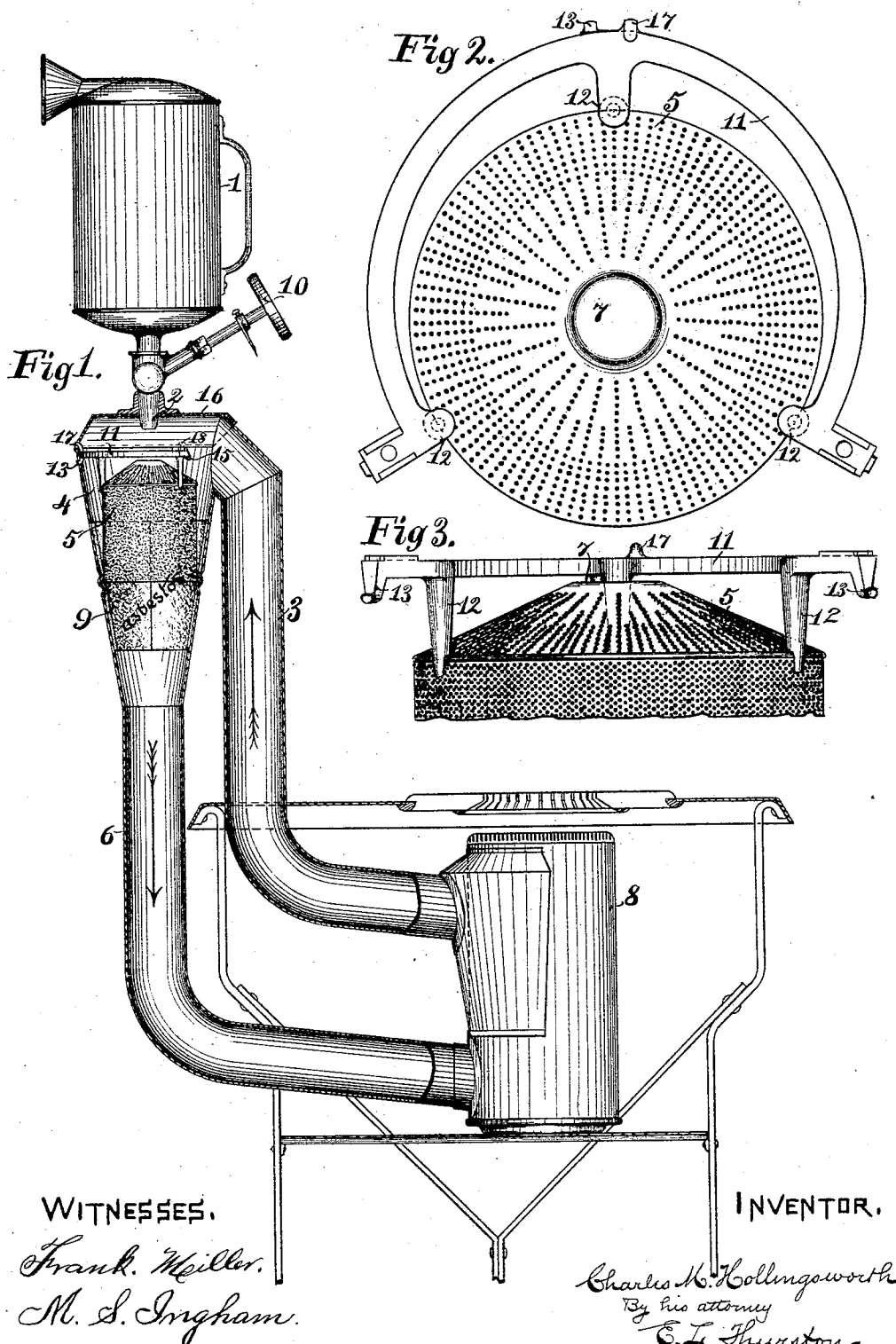


(No Model.)

C. M. HOLLINGSWORTH.
VAPOR STOVE.

No. 489,477.

Patented Jan. 10, 1893.



UNITED STATES PATENT OFFICE.

CHARLES M. HOLLINGSWORTH, OF CLEVELAND, OHIO.

VAPOR-STOVE.

SPECIFICATION forming part of Letters Patent No. 489,477, dated January 10, 1893.

Application filed September 30, 1891. Serial No. 407,352. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. HOLLINGSWORTH, a citizen of the United States, residing in the city of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Vapor-Stoves, of which the following is a specification.

My invention relates to the class of vapor stoves, now commonly known as evaporating stoves, which are first shown and described in my prior patent No. 420,797, granted February 4, 1890, and also shown in my numerous patents of later dates. In stoves of this character, the liquid hydro-carbon (usually gasoline) is fed in a regulated feed onto suitable evaporating surfaces in a vaporizing chamber, where it evaporates and mixes with air admitted to said chamber; and the mingled vapor and air flows by gravity downward through a closed conduit to the burner cap. A "normal feed" of liquid to such a stove, as the term is commonly used, is an amount of liquid which, if admitted to the vaporizing chamber where the parts of the stove have become warmed, and the air which is admitted to said chamber has also been warmed by the heat from the burner or otherwise, will all be evaporated in said chamber or in the tube which connects the same with the burner shell. In a cold atmosphere, or before the parts of the stove and the surrounding air have become heated from the burner, or to more definitely specify the occasion when the difficulty most commonly occurs, at the starting of the stove in a cold atmosphere, this normal feed will be excessive. The evaporation of the liquid will not be complete, and some of it will, unless prevented, flow into the burner shell. For many reasons it is desirable to prevent this action.

In my prior patent No. 471,289 granted March 22 1892 I have explained at length the unpleasant consequences which would follow from accumulation of liquid upon the bottom of the burner shell, and I have, in said patent, shown, described and generically claimed means for preventing such accumulation.

My present invention, in part, is an improvement on the specific form of the invention shown in said patent.

The object of this part of the invention is

to provide means for absorbing the starting excess of liquid, and for holding it at a point where, as the stove and the air entering the vaporizing chamber become heated, it will be gradually evaporated, and mixed with the air, and will fall by its own weight down through the closed conduit with sufficient force to carry it to and through the burner cap.

Another object of my invention is to provide an improved evaporator upon which the liquid will spread itself more evenly than with prior constructions, and from which the evaporation will take place with greater rapidity.

Another object of my invention is to provide novel means for holding the evaporator in the proper position beneath the nozzle from which the liquid is delivered into the vaporizing chamber.

My invention will be clearly understood from the following description, reference being had to the accompanying drawings, and will be definitely pointed out in the claims.

In the drawings Figure 1 is a side elevation, partly in section, of a stove containing my invention; Fig. 2 is a top view of the evaporator and the centering frame; and Fig. 3 is a side view of the upper part of the evaporator and said frame.

A reservoir 1 is suitably supported above a funnel-shaped vaporizing chamber 4. The lower end of the vaporizing chamber is connected with the upper end of the conducting pipe 6. The lower end of the pipe 6 is connected with the burner shell 8. The vaporizing chamber 4, the conducting pipe and the burner shell form, together, a closed conduit, through which the vapor falls by gravity to and through the perforated burner cap.

3 represents a pipe which is connected at its upper end with the upper part of the vaporizing chamber, and through which said chamber is supplied with air. The lower end of the pipe is suitably placed with reference to the burner, whereby the air, which enters the said lower end, will have been heated by the burner after the stove has been started.

9 represents a sheet of absorbent material, preferably asbestos paper, which is placed in the vaporizing chamber in contact with its walls, as shown in Fig. 1.

5 represents the evaporator consisting of a perforated cylindrical body, and a top in the form of a truncated cone. The flat part 7 of the top is imperforate and serves as a drip spot onto which the liquid drops. The slanting part of the top is also imperforate for a short distance below said top; but, below this imperforate part, radial rows of perforation, extending to the edge thereof, are formed. These rows of perforations increase in number as they approach the lower edge of the top, thereby radially subdividing the spaces between them. This leaves a series of straight unbroken surfaces or channels, on which the liquid may flow from the points where it overruns the flat part 7 to the lower edge of said top. The advantage of this construction arises from the fact that it is desirable that the liquid, as it flows from the drip spot, shall quickly spread itself over as large a surface as possible, so the evaporation may be rapid. The perforations act as obstructions to this rapid and regular spreading, because they cause the liquid to accumulate in small drops on their edges, until the increasing weight of said drops carry them along. The perforations are, however, necessary in order that the air and vapor may pass through them, and thence through the closed conduit to the burner cap. It is believed that the arrangement of the perforations in radial rows, increasing in number as they approach the lower edge, is the best arrangement, because, while it provides the necessary passage for the vapor and air, it leaves straight plane surfaces or channels, over which the liquid may spread with the least resistance and fewest obstructions.

The base of the evaporator rests against the absorbent strip 9, at or about the middle thereof, whereby any unvolatilized liquid (starting excess) which may flow to said lower edge will flow onto and be absorbed by said strip.

I have found that if the starting excess of liquid be arrested and held in the vaporizing chamber, as shown, above the level of the final outlet of the apparatus at the burner cap, (instead of being allowed to run down as a liquid into the lower part of the closed conduit, as shown in my prior patent above referred to) this excess, when gradually vaporized after the apparatus gets warmed up, instead of having to be lifted as a dead weight from the lowest part of said conduit, will have a fall from the upper part thereof. Thus by adding its gravity effect to that of the vapor formed from the running feed, it will accelerate the current and draw in the additional air required for its own combustion without producing a yellow flame at the burner,—this additional vapor being at the same time more evenly mixed with the general current. An advantage also arises from having the absorbent strip 9 extended above the base of the evaporator, because this part of the absorbent is exposed to air that is fresh,—that

is, practically uncharged with vapor, which facilitates the rapid evaporation of the liquid from this part of the absorbent. Moreover, if the burner should be run at a normal feed for only a short time, and the burner flame extinguished before the starting excess was evaporated, said starting excess will, when the absorbent is placed as herein described, gradually evaporate and thereby produce a downward current of mixed air and vapor, which, by drawing fresh air into the vaporizing chamber, will gradually effect the automatic unloading of the absorbent, independent of any special application of heat, or heating of the air entering the vaporizing chamber. And this unloading of the absorbent by the complete vaporizing of the absorbed liquid, will take place in the interval before the stove is again used. The absorbent will, therefore, always be in a condition to receive the starting excess at each time of lighting, whether it had been dried out by heat at the previous time of using or not.

When the base of the evaporator rests against the absorbent material, as shown, it is impossible to make the common soldered connection between the evaporator and wall of the vaporizing chamber. Other means are, therefore, necessary to hold the evaporator in a fixed position relative to the nozzle 2, through which the liquid flows in a feed which is regulated by a suitable valve 10. I have, therefore, provided the frame 11 which is held in fixed position by its engagement with the walls of the vaporizing chamber, and which, in turn, engages with the evaporator and holds it in fixed position. While such a frame is of greatest value in a stove wherein the evaporator cannot be soldered to the walls of the vaporizing chamber, it may also be used in preference to such soldered connection in stoves otherwise constructed.

The special form of frame shown in the drawings is provided with three shouldered legs 12 which engage the top of the cylindrical body of the evaporator. The frame itself is crescent shaped, which shape, however, is of no consequence. Projecting from the frame are three legs 13, which, by entering holes 15 in the wall of the vaporizing chamber, serve to connect the two together. Either the wall of the vaporizing chamber, or the frame, may be sprung slightly to permit this connection to be formed. The top or cover 16 of the vaporizing chamber is removable. It is secured to the frame 11 by means of a lug 17 projecting from the frame which enters a hole in the cover, and two or more screws 18, which pass through said cover and screw into the frame 11, or by any other suitable means.

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

1. In a vapor stove, the combination of a vaporizing chamber having an air inlet in its upper end, evaporating surfaces inclosed

within said chamber means for admitting a volatile hydrocarbon liquid to said chamber and causing the same to spread itself on said evaporating surfaces, a downwardly extended
5 conducting pipe connected with the lower end of said chamber, and a burner shell having a perforated cap connected with the lower end of said pipe,—said chamber, conducting pipe and burner shell forming a closed conduit
10 through which the vapor flows from the point where it is formed to the burner cap, with an absorbent material placed in said conduit in contact with the evaporating surface therein, and above the level of the final outlet at the
15 burner cap, as and for the purpose specified.

2. In a vapor stove, the combination of a vaporizing chamber having an air inlet in its upper end, a nozzle through which a regulated feed of liquid hydrocarbon is delivered there-
20 to, a downwardly extended conducting pipe and a burner connected therewith, with an absorbent material in said vaporizing chamber in contact with the wall thereof, and an evaporator having its base in contact with
25 said absorbent material and its receiving end

beneath said nozzle, substantially as and for the purpose specified.

3. In a vapor stove of the described character, the combination of a vaporizing chamber having holes 15 in the upper part of its
30 walls, and an evaporator supported in said chamber, with a frame which engages with said evaporator, and has the lugs 13 which enter the holes 15, thereby connecting said
35 frame with the wall of the vaporizing chamber, substantially as and for the purpose specified.

4. In a vapor stove of the described character, the combination of a vaporizing chamber, an evaporator supported therein and a
40 frame secured to the walls of said vaporizing chamber and engaging with said evaporator, with a removable cover to said chamber and means for securing said cover to said frame,
45 substantially as and for the purpose specified.

CHARLES M. HOLLINGSWORTH.

Witnesses:

E. L. THURSTON,
FRANK. MILLER.