(No Model.) 2 Sheets—Sheet 1.

E. B. BADLAM.

CARBURETOR.

No. 475,972. Patented May 31, 1892.

Fig. 1.

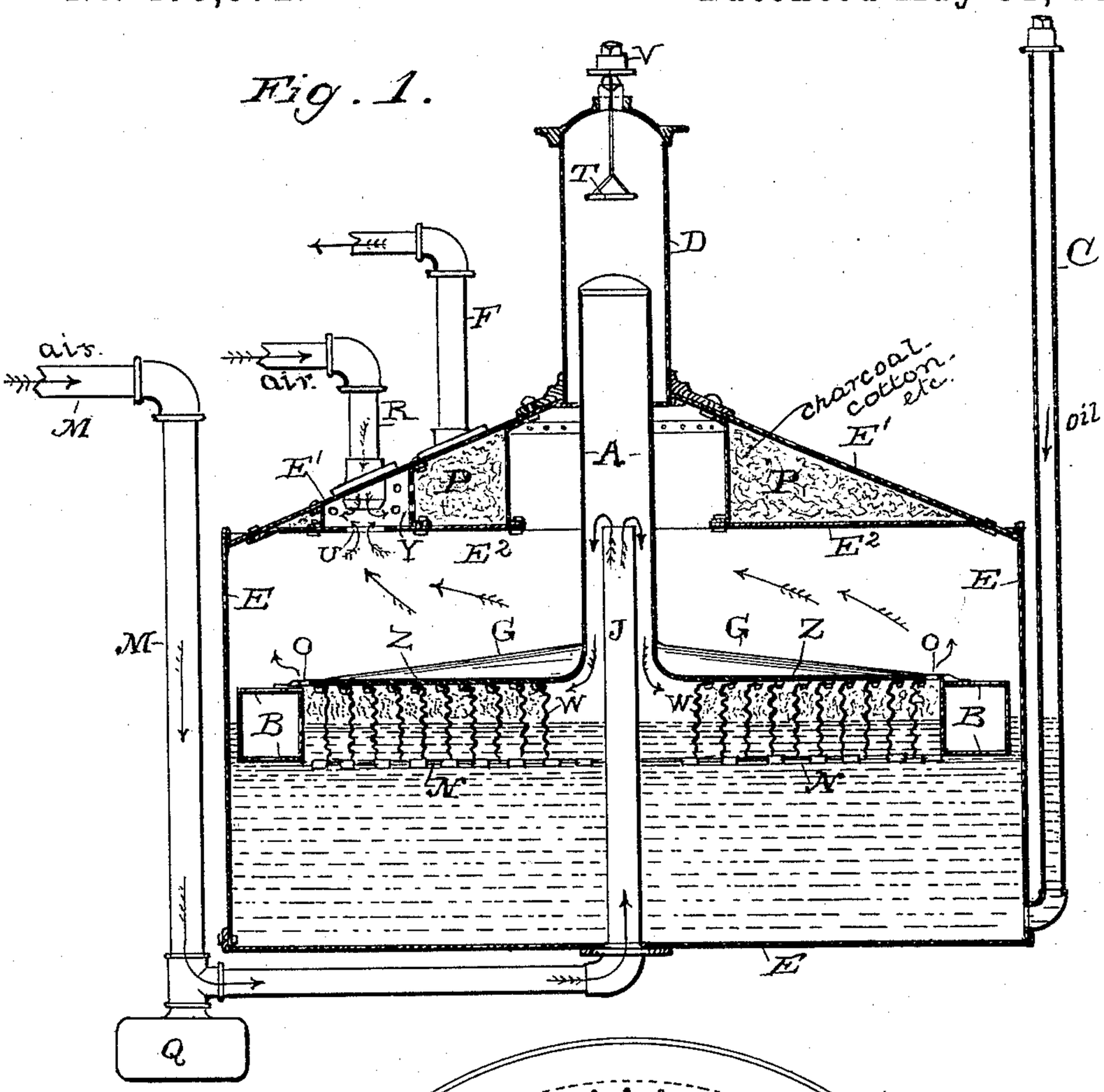
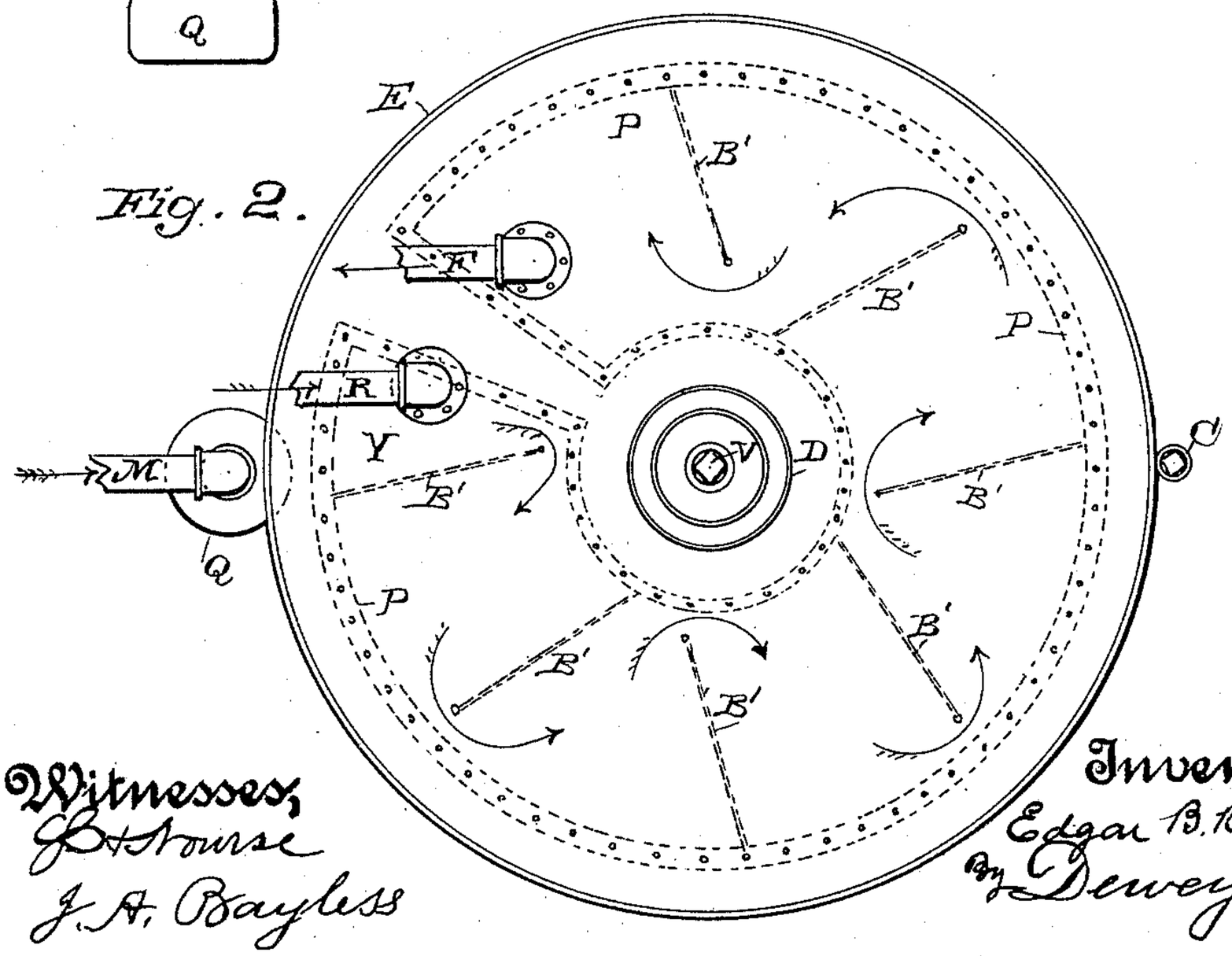


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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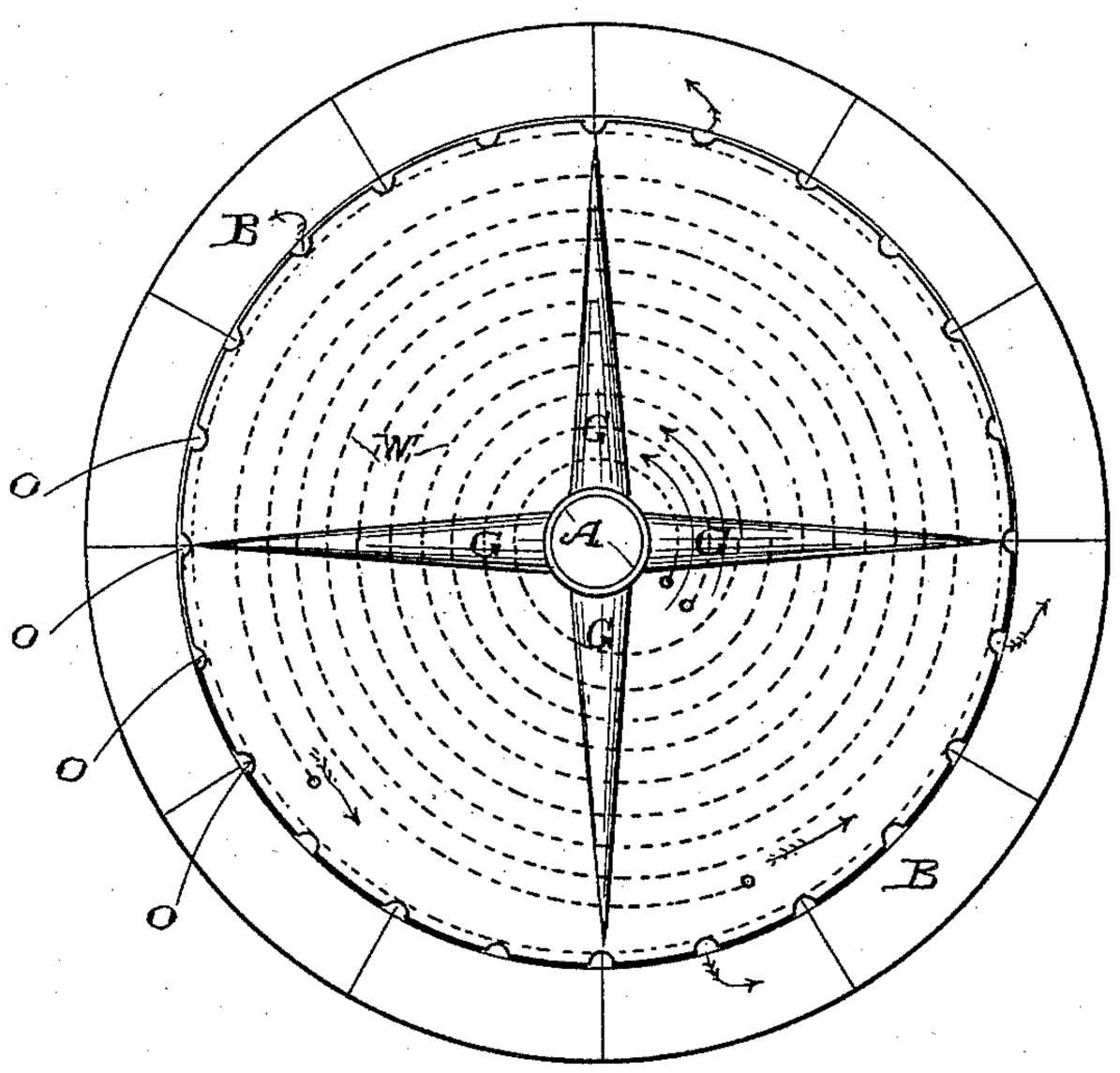
Fig. 3.



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UNITED STATES PATENT OFFICE.

EDGAR B. BADLAM, OF SAN FRANCISCO, CALIFORNIA.

CARBURETOR.

SPECIFICATION forming part of Letters Patent No. 475,972, dated May 31, 1892.

Application filed November 9, 1891. Serial No. 411,389. (No model.)

To all whom it may concern:

Be it known that I, EDGAR B. BADLAM, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Carburetors; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to carburetors; and it consists in certain details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical half-section of the apparatus. Fig. 2 is a plan view with the mixing and drying compartment shown in dotted lines. Fig. 3 is a plan view of the float, showing the wicks in dotted lines.

In the present case I have shown my apparatus as cylindrical in form with a conically-shaped roof or cover and flat bottom. All interior parts are consequently shown as adapted to this construction; but the whole apparatus may be made of any other geometrical conformation and give practically the same results, the shape depending upon peculiar localities and specific duties.

E is an exterior containing tank or vessel, into which hydrocarbon liquid is introduced through the charging or filling pipe C.

B is a float, which in the present case is shown in the form of an annular closed case having a supporting-plate for wicks extending across the top of the central portion, and from the top of this plate a cylindrical air-column A extends upwardly. The plate Z and the column A are braced and strengthened by ribs G, which extend radially outward over the plate Z from the column A.

Wicks W are secured to and supported from the plate Z, and their lower edges extend down from this plate and dip into the liquid. They may be arranged in any helical form, either singly, forming one continuous passage for air over the surface of the oil, or arranged in two or more helices, one laid between the convolutions of another, thus dividing the current of air into two or more courses, so that the total body of air will have double, treble, or more times to come in contact with the saturated wicks.

J is a centrally-disposed air-pipe, the upper end of which extends upward into the column A to a point higher than the highest point reached by the liquid. Air is admitted into this pipe through the conducting-pipe M and may be introduced either by pressure from the outside or by a partial vacuum produced through the discharge-pipe F, the operation being in either case to cause the air to move through the pipe J upward into the column A and thence down into the central space beneath the plate Z, where it is distributed and passes around through the helical passages formed by the wicks W. These wicks are suitably suspended from the plate Z and dip into the liquid, the float B being of such proportionate dimensions that these wicks will always be submerged to about the same depth from their lower edges and present a suitable surface above the liquid. The liquid is drawn upward by the wicks by reason of capillary attraction, and the air passing around and through these wicks becomes saturated with the carbureted air before it reaches the points of discharge, which consist of perforations O around the periphery of the wick-chamber. It will be manifest that by this construction the float will always rise and fall with the liquid in the tank, and consequently the wicks will always remain submerged to a certain depth and will expose a constant amount above the surface of the liquid.

I have found by experiment that the best wicking will not draw more than about two inches high on the wicks to supply the amount evaporated, and if the wicks are exposed to a greater height above the surface of the fluid they will soon dry out after the operation commences by reason of the capillary attraction within the wicking not being sufficient to replace the amount evaporated, and the quality of the gas or carbureted air soon deteriorates after the operation commences. This difficulty is entirely overcome by my mechanism, which keeps the wicks always exposed to the same depth. The wicks are kept at a uniform distance apart by inserting between their folds a loose packing of some light absorbent material, such as excelsior, shavings, or cotton waste. This packing is held in place by means of a perforated netting or other open-work support N, fixed across the lower part of the open space containing the wicks,

which allows the free circulation of the fluid to the wicks and at the same time holds the packing material up, as before stated.

The top of the tank or chamber E has a conical or other suitably-shaped roof E′, and a horizontal diaphragm or partition E^2, extending across the lower part of it, forms in it a chamber P, separate from the chamber above the float B. This chamber I call the "mixing," "proportion," and "drying" compartment. Within it are fixed baffle-plates or deflectors B′, arranged in vertical planes, and at one side is a cylindrical chamber Y, opening into the space above the float, having its sides perforated and opening into the mixing-chamber P.

R is an air-supply pipe opening from above into the cylindrical chamber Y, and air which is admitted through this pipe is mixed with the carbureted air arising from below, and the two together are discharged through the perforations into the chamber P, passing around through the passages formed by the baffle-plates until it arrives at the outlet F.

D is a cylindrical dome extending upwardly from the roof above the air-column A and having a vent-passage and cap V at the top, through which air or carbureted air may escape as the charge of liquid is being introduced into the apparatus.

T is a check or stop against which the upper part of the column A may strike and which serves as a guide to know when the chamber is sufficiently filled.

The operation is as follows: A current of atmospheric air may be either forced into the main air-pipe M by any suitable air-forcing mechanism, or it may be drawn in by producing a partial vacuum at the gas-outlet F by any means, the same result being produced in either case. The apparatus, as shown, is charged through the passage C with the hydrocarbon to about one-half of its capacity, and the float B will rise with the surface of the fluid, always maintaining its relative position and that of the wicks, no matter how nearly full or empty the tank may be. The air-column A telescopes freely over the central air or stand pipe J, so that in any position of the float, vertically considered, the air from M will pass upward through pipe J to its open end above the highest possible level of the fluid, passing thence into the column A downward to the surface of the fluid in the space at the center of the helix of wicks beneath the plate Z. This air then finds its only free passage through the helical path or paths around among the saturated wicks and the absorbent material packed between them until it reaches the discharge-openings O. In some instances the crude carbureted air as it leaves these openings is discharged into the open space, and for certain purposes—such as for fuel, or for the motive agent in gas or vapor engines, or in an inferior method of illuminating—this carbureted air may be taken to the place of consumption without further treatment by allowing it to pass directly out the top of the evaporator without passing it through the proportioning and mixing chamber. When it is to be diluted for lighting purposes, however, it is allowed to pass into the chamber Y through the passage U, where it meets air from the pipe R and is there mixed, as previously described. The amount of air admitted to mix with the carbureted air may be regulated by suitable means from without, and it may be entirely cut off if necessary. The action in the chamber P may be simply a drying action while passing the carbureted air through some absorbent, such as charcoal, pumice, excelsior, cotton waste, fibrous cloth, or other suitable material, in which case no other rectification of this carbureted air beyond the drying action will take place. When a uniform quality or strength of gas is required, as for illuminating purposes, the carbureted air is mixed with the air admitted through the pipe R and percolates through the sides of the cylindrical chamber Y, which process subdivides it into a great number of small currents, and is then passed through the chamber P, as above described. This mixture passes around through the tortuous channel formed by the diaphragms B′ until it reaches the outlet F, where it passes to the point of consumption. The relative amount of the reducing-air may be regulated by suitable means, so as to reduce any grade of crude vapor that may come from any gravity of fluid used. The more volatile the fluid the more reducing-air will be needed to dilute it to a proper standard of strength for any specific use. When the evaporator is nearly empty, more air must be sent through the wicks by the pipes M and J, and a correspondingly less amount of reducing-air through the pipe R, and in this way a suitable proportion may be readily found to suit any grade of fluid intervening between the extremes.

Q is a receptacle at the bottom of the pipe M to receive any moisture that would otherwise collect in the pipe.

The proportioning or mixing chamber is here shown in convenient form and relation with the other parts of the apparatus; but it will be manifest that it may be changed in form and position and produce the same results. It may serve as a compartment for proportioning of air and vapor, a compartment for the thorough mixing of air and vapor already proportioned, or for the purpose of thoroughly drying all moisture from a gas or vapor that would otherwise pass through service-pipes and cause annoyance from condensation. Any condensation taking place in this chamber will return by gravitation through the opening U to the chamber below.

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

1. In a carbureting and air-mixing apparatus, a chamber constructed to contain gasoline and having a central air-inlet pipe ex-

tending above the surface of the liquid, an annular float constructed to rise and fall within the chamber, having the top portion closed and a vertical closed tube loosely inclosing the air-inlet pipe, continuous wicks suspended from the top plate and forming spiral channels from the center to the outside of the space within the float, a foraminous bottom through which the liquid enters the space containing the wicks, a packing of porous material supported by said plate between the wicks, and openings around the outer periphery of the wick-space for the escape of carbureted air, in combination with a supplemental chamber having perforated sides, containing an absorbent material and situated in the top of the carbureting-chamber, an opening through which the gas from below is admitted thereto, and a pipe through which air is delivered into the supplemental chamber to be mixed with the gas from below, substantially as herein described.

2. In a carbureting and air-mixing apparatus, a chamber constructed to contain gasoline, a central vertical air-admission pipe, and a float provided with a column A and constructed to rise and fall, the spirally-disposed wicks, the intermediate porous packing, and the foraminous supporting-plate, in combination with a chamber P, situated in the top of the carbureting-chamber and having plates B′ fixed therein to form tortuous horizontal passages around the interior of the chamber, a chamber Y in the second chamber, having perforated sides and an absorbent filling, a passage by which gas is admitted thereto from the carbureting-chamber, a pipe R for supplying air to be mixed with the carbureted air in the chamber Y before it escapes into the carbureted-air chamber P, and an outlet F, by which the completed product is discharged from the chamber P, substantially as herein described.

In witness whereof I have hereunto set my hand.

EDGAR B. BADLAM.

Witnesses:
S. H. NOURSE,
J. A. BAYLESS.