No. 708,826. Patented Sept. 9, 1902.

F. PAUL, JR. & A. F. GUNDLACK.

CARBURETER.

(Application filed Oct. 28, 1901.)

(No Model.) 2 Sheets—Sheet 1.

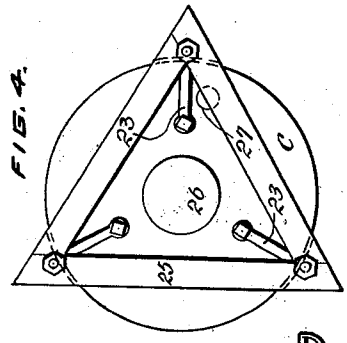


FIG. 4.

FIG. 1.

FIG. 5.

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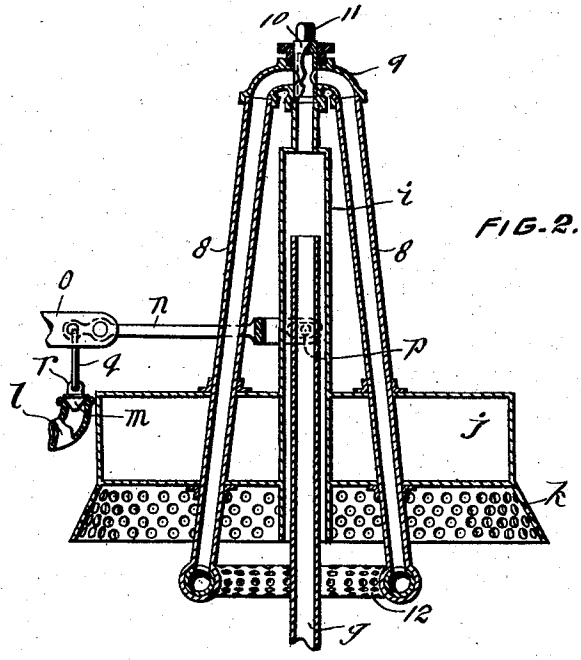


FIG. 2.

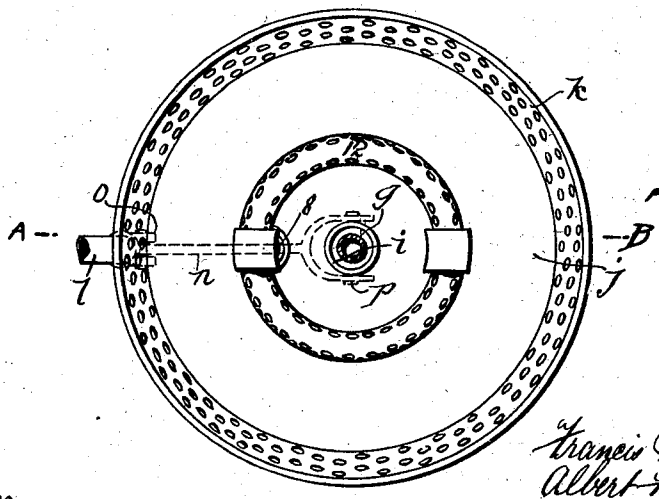


FIG. 3.

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UNITED STATES PATENT OFFICE.

FRANCIS PAUL, JR., AND ALBERT FREDERICK GUNDLACK, OF SOREL, CANADA, ASSIGNORS OF ONE-HALF TO WALTER TYLEE ROSS, OF MONTREAL, CANADA.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 708,826, dated September 9, 1902.

Application filed October 28, 1901. Serial No. 80,309. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS PAUL, Jr., and ALBERT FREDERICK GUNDLACK, of the city of Sorel, Province of Quebec, Dominion of Canada, have invented certain new and useful Improvements in Carbureters; and we do hereby declare that the following is a full, clear, and exact description of the same.

Our invention relates particularly to the generation of a burning gas suitable for illuminating and heating; and it has for its object to produce gas more economically and a gas varying in density according to requirements.

The invention may be said briefly to consist in causing air in variable quantity to pass through a variable proportion of a liquid hydrocarbon or a substance containing hydrocarbon in a state having an affinity for air. To this end we supply air or any other gas to be enriched to the lower end of a carbureter charged at its lower end with a substance adapted to impregnate said air or other gas with volatilized hydrocarbons when it passes therethrough, which it is caused to do by being fed under a slight pressure to said substance, (usually in liquid form,) at variable distances below the surface thereof, and allowed to rise through said substance, while a valve-controlled branch is provided to cause at will a portion of said air or gas to be deflected from said supply and caused to mix with the carburized air or other gas before it flows to its point of consumption.

More specifically speaking, our invention consists in furnishing a carbureter with means for feeding preferably dry air or other gas into a subchamber or carburizing-chamber proper within the carbureter and flooded with a liquid hydrocarbon, from which it is allowed to slowly find its way to the gas-storage portion of the carbureter. A branch from said air or other gas supply leads to a perforated hollow annulus, from which said air or other gas flows in minute bubbles to the interior of said carburizing-chamber proper through the carburizing substance and thence to the storage portion of the carbureter, this branch being preferably under control of a valve to regulate the proportion caused to be deflected to be carburized more thoroughly.

Our improved apparatus is caused to run without attention for a considerable time by providing an independent supply of the carburizing substance and adapting a means controlling said independent supply to automatically cause same to flow into the carbureter and replace the carburizing substance depleted during the operation of the plant.

For full comprehension, however, of our invention reference must be had to the accompanying drawings, forming a part of this specification, in which like symbols indicate the same parts, and wherein—

Figure 1 is a longitudinal vertical section, partly in side elevation. Fig. 2 is an enlarged longitudinal vertical sectional view of our improved carbureter removed from its tank, taken on line A B, Fig. 3. Fig. 3 is a plan view thereof. Fig. 4 is a plan view of our improved collapsible tank, and Fig. 5 is a side elevation of the clockwork for driving the blower.

Our improved carbureter proper comprises a tank *b*, beneath which a pipe extends horizontally, as at *f*, and has its end bent to project vertically, as at *g*, into the center of the interior of said tank, while an air-conducting pipe *h* leads from a branch *h'* from the air-supply tank *c* and is connected to the outer end of said pipe *f*. A tubular cap *i* fits loosely over the vertical portion *g* of the air-conducting pipe and is carried by a float, consisting of a hermetically-sealed box *j*, encircling the said cap, adjacent to the lower end thereof, and provided with a perforated flared depending plate *k*, of umbrella form, the peripheral edge whereof is sufficiently less in length than the interior measurement of the tank to allow of an easy vertical movement of the float. The carburizing substance we prefer to use is any hydrocarbonaceous oil, with which we charge the supply-tank *d* and draw it therefrom automatically and conduct it to the carbureter by means of a pipe *l*, leading from within a short distance of the bottom of said supply-tank to the carburizing-chamber of said carbureter, within a short distance of the bottom thereof. This pipe *l* is controlled by a valve *m*, automatically actuated by the float through the medium of a lever *n*, fulcrumed to a bracket *o* upon the inside of the carbureter-tank and having one

end bifurcated to straddle the tubular cap, to which it is pivotally connected, as at *p*, while its other end is connected by a link *q* to valve-stem *r*. This connection has the effect of automatically causing the valve *m* to be opened when the oil in the carbureter, and with it the float, sinks below the required level, thereby replenishing said carbureter and automatically shutting off the supply when the required level has been again attained. The supply-tank is filled through a pipe *s*, for which purpose a branch *t* extends laterally therefrom and is furnished with a flared mouth *u*, normally held closed by a valve *v*, seated therein and connected to a lever *w*, fulcrumed at one end to a bracket *x* and having the portion thereof adjacent to the other end graduated, with a counterpoise slidable thereon, which is moved toward or from the end of said graduated portion to allow said valve to open and exhaust the space above the oil in the supply-tank when the pressure in said space exceeds any given point. The upper end of this vertical pipe has an elongated transparent graduated tube 2 thereon with its upper end closed, this tube receiving the upper end of a rod 3, the lower end whereof is supported upon a block 4, floating on the surface of the oil in the supply-tank, the function of this rod being to indicate in conjunction with the graduations of said glass tube the depth of oil in said supply-tank. The carbureted gas is drawn from the carbureter through a pipe 6 and taken therefrom through any suitable pipes (not shown) to the point of consumption, while a safety blow-off is provided for said carbureter by connecting said pipe 6 by a branch pipe 7 to the blow-off pipe S.

In order to enrich the gas being produced—as may be necessary, for instance, if a poorer grade of oil is being used—we provide means for causing a portion of the air being supplied to be subjected to a greater proportion of oil, and therefore absorb more hydrocarbon. To this end a pair of branch pipes 8, arranged in the form of a V, are connected at their apex to the valve-chamber 9 of a plug-valve 10, having a squared top 11, the valve-chamber also communicating with the interior of the cap *i* and the valve 10 being operated from outside of the tank by a rod *e*. The lower ends of these branch pipes project downwardly through the float *j* and umbrella-section *k* and are connected with and carry a perforated hollow annular distributer 12, located a short distance below the lower end of the cap *i*. To reduce the density of the gas being supplied from the carbureter, we cause air to be mixed therewith in the following manner: A branch pipe 14 is taken from the air-supply pipe through the wall of the carbureter at a point above the highest level of the oil therein. A valve 15 controls this branch pipe, and an atomizer 16, of any approved type, is fitted upon the inner end of this pipe and causes the air admitted into this branch pipe by the opening of valve 15 to be discharged into the gas-chamber of the carbureter in spray form, thereby increasing the proportion of oxygen to the carbon absorbed from the oil and rendering the gas more easily burned and of greater volume.

Our improved air-tank consists, preferably, of a jacket 20, of material impervious to air, stayed by a series of hoops 21 and a solid top 22, which carries a series of perforated arms 23, the perforations whereof take loosely over and slide upon a series of vertical guide-rods 24, mounted rigidly in a frame 25, while a weight 26 is carried upon the top of this collapsible tank, which is charged through a port 27.

The operation of our improved plant is as follows: The air-tank is first charged with air by opening the air-intake valve 27, raising said tank to its full height, and then closing said air-intake valve. The air is then caused by the pressure of weight 26 to flow through pipe *h*, *f*, and *g* and between cap *i* and the vertical portion *g* of the supply-pipe to the under side of the umbrella-section *k*, which is, as shown, flooded with the oil through the perforation in said umbrella-section and the body of oil above the level thereof to the upper portion of the carbureter, where it is held in a carburized state until drawn therefrom for use. If it is found that the gas is too rich and that it can be economized while yet supplying the demand for consumption, atomized air is mixed with the gas, as hereinbefore described, while to enrich the gas a portion of the air is defluted from the supply thereof first described and caused to be subjected to a greater quantity of the oil by entering same at a lower level.

If desired, the connection between the float in the carbureter and the oil-supply valve can be, together with said valve, dispensed with, in which case with the constantly open communication between the supply-tank and the carbureter the levels in both will equalize, and as the oil in the carbureter is consumed it will be of course to a reduced extent replaced with fresh oil from the oil-tank; or, furthermore, if desired the oil can be fed at intervals direct to the carbureter and the supply-tank be dispensed with.

Our improved air-supplying mechanism is automatically actuated as follows: A blower 50 is actuated by a clockwork mechanism (indicated at 51) adapted to be wound up by a crank-actuated drum 52, this blower being connected by a pipe 53 to the beforementioned branch *h'*, and the point of communication thereof with said branch *h'* is controlled by a one-way valve 54, while the point of communication between said branch *h'* and the collapsible tank is controlled by a one-way valve 55. The point at which the branch air-pipe 14 is connected to this branch *h'* is intermediate the said points of communication between the branch *h'* and the pipe 53 and the collapsible air-tank, respec-

tively. The operation of this air-supplying device is as follows: The drum having been wound, it will impart through the clockwork mechanism 51 a rotary motion to the blower 50, with the result that air will be forced as long as the clockwork mechanism runs through pipe 53 and pipe *h f g* to the carbureter. This pressure being slightly greater than the pressure in the collapsible tank will force the valve 54 open and close the valve 55. When the clockwork mechanism runs down and the air-pressure in pipe 53 consequently falls below that in the collapsible tank, the pressure in the latter will open the valve 55 and close 54, thus continuing the supply until the clockwork mechanism can be again wound up.

What we claim is as follows:

1. A gas-generator comprising a carbureter containing a body of hydrocarbonaceous substance; a main air-supply and branch supplies leading therefrom, said branch supplies being immersed at different levels in said hydrocarbonaceous substance for supplying air thereto below the surface thereof; a float supporting said branches; and valvular means for varying said supply to flow through one or all of said branches; and means for collecting the carbonized air, for the purpose set forth.

2. A gas-generator comprising a carbureter containing a body of hydrocarbonaceous substance; a main air-supply and branch supplies leading therefrom said branch supplies being immersed at different levels in said hydrocarbonaceous substance for supplying air thereto below the surface thereof, a float supporting said branches; and valvular means for varying said supply to flow through one or all of said branches; means for collecting the carburized air, and means for varying the density of said carburized air, for the purpose set forth.

3. A carbureter comprising a tank containing a body of carburizing liquid; a pipe projecting upwardly through said carburizing liquid for conducting the fluid to be carburized; a tubular cap fitting loosely over said pipe; and a float supporting said cap with its lower end a short distance below the surface of said liquid; substantially as described and for the purpose set forth.

4. A carbureter comprising a tank containing a body of carburizing liquid; a pipe projecting upwardly through said carburizing liquid for conducting the fluid to be carburized; a tubular cap fitting loosely over said pipe; a float supporting said cap with its lower end a short distance below the surface of said liquid; and a perforated flared plate depending from and extending around the periphery of the under side of said float with its lower edge as low as the lower edge of said cap, substantially as described and for the purpose set forth.

5. A carbureter comprising a tank containing a body of carburizing liquid; a pipe projecting upwardly through said carburizing liquid for conducting the fluid to be carburized; a tubular cap fitting loosely over said pipe; a float supporting said cap with its lower end a short distance below the surface of said liquid; and a perforated flared plate depending from and extending around the periphery of the under side of said float with its lower edge as low as the lower edge of said cap; a fluid-distributer located below the level of the lower end of said cap; a fluid-conductor communicating at its upper end with the interior of said cap, and at its other end with said distributer; and a valve controlling the communication between the upper end of said conductor and the interior of said cap, substantially as described and for the purpose set forth.

6. A carbureter comprising a tank containing a body of carburizing liquid; a pipe projecting upwardly through said carburizing liquid for conducting the fluid to be carburized; a tubular cap fitting loosely over said pipe; a float supporting said cap with its lower end a short distance below the surface of said liquid; and a perforated flared plate depending from and extending around the periphery of the under side of said float with its lower edge as low as the lower edge of said cap, a branch pipe leading from first-mentioned pipe to a point within the carbureter above the level of said carburizing liquid; an atomizer upon the inner end of said branch pipe; and a valve for controlling said branch pipe, substantially as described, and for the purpose set forth.

7. A carbureter comprising a tank containing a body of carburizing liquid; a pipe projecting upwardly through said carburizing liquid for conducting the fluid to be carburized; a tubular cap fitting loosely over said pipe; a float supporting said cap with its lower end a short distance below the surface of said liquid; and a perforated flared plate depending from and extending around the periphery of the under side of said float with its lower edge as low as the lower edge of said cap; a fluid-distributer located below the level of the lower end of said cap; a fluid-conductor communicating at its upper end with the interior of said cap, and at its other end with said distributer; and a valve controlling the communication between the upper end of said conductor and the interior of said cap; and a valve-operating device extending from the outside of said carbureter to the inside thereof and adapted to be moved into engagement with said last-mentioned valves, substantially as described, and for the purpose set forth.

8. A gas-generating plant comprising a carbureter; a tank containing a hydrocarbonaceous fluid; a pipe leading from said tank to said carbureter; a valve controlling said pipe; a part moving with said fluid as the level thereof changes within said carbureter; means actuated by said movable part for opening and closing said valve; and a gas-

exhaust from said carbureter, substantially as described and for the purpose set forth.

9. The combination with a carbureter containing a body of hydrocarbonaceous liquid means for supplying thereto the fluid to be carburized consisting of a tank having a rigid top and collapsible walls; a weight supported upon said top; a fluid-conductor leading from said tank to a point within said carbureter below the level of said hydrocarbonaceous liquid; and a gas-exhaust from said carbureter, substantially as described and for the purpose set forth.

10. The combination with a carbureter containing a body of hydrocarbonaceous liquid means for supplying thereto the fluid to be carburized consisting of a tank having a rigid top and collapsible walls; a weight supported upon said top; a fluid-conductor leading from said tank to a point within said carbureter below the level of said hydrocarbonaceous liquid; a gas-exhaust from said carbureter, a branch pipe leading from said conductor to a point within the carbureter above the level of the hydrocarbonaceous liquid therein, substantially as described and for the purpose set forth.

11. The combination with a carbureter of a tank containing a hydrocarbonaceous liquid; a pipe leading from said tank to said carbureter; a vertical pipe communicating at its lower end with said tank; a transparent elongated tubular cap upon the upper end of and communicating with said pipe; a branch pipe communicating at one end with said pipe; a blow-off valve upon the other end of said branch pipe; a float within said tank; and an indicator-rod resting upon said float and projecting through said vertical pipe into said transparent elongated cap, substantially as described and for the purpose set forth.

12. The combination with a carbureter of a tank containing a hydrocarbonaceous liquid; a pipe leading from said tank to said carbureter; a vertical pipe communicating at its lower end with said tank; a transparent elongated tubular cap upon the upper end of and communicating with said pipe; a branch pipe communicating at one end with said pipe; a blow-off valve upon the other end of said branch pipe; a float within said tank; an indicator-rod resting upon said float and projecting through said vertical pipe into said transparent elongated cap, a residuum-pan upon the bottom of said tank, and means for removing said pan, substantially as described and for the purpose set forth.

13. The combination with a gas-generating plant of an automatic air-supplying device consisting of an air-blower, a collapsible tank, a pipe communicating at one end with the generator of said gas-generating plant, a branch pipe communicating at one end with said first-mentioned pipe and at its other end with said collapsible tank, a one-way valve controlling the communication between said branch pipe and collapsible tank, a pipe leading from said blower to said branch pipe, a one-way valve controlling said last-mentioned pipe, substantially as and for the purpose set forth.

In testimony whereof we have affixed our signatures in presence of two witnesses.

FRANCIS PAUL, JR.
ALBERT FREDERICK GUNDLACK.

Witnesses:
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