No. 618,108. Patented Jan. 24, 1899.

A. G. LAMB.

CARBURETER.

(Application filed Jan. 29, 1898.)

(No Model.)

Fig. 1.

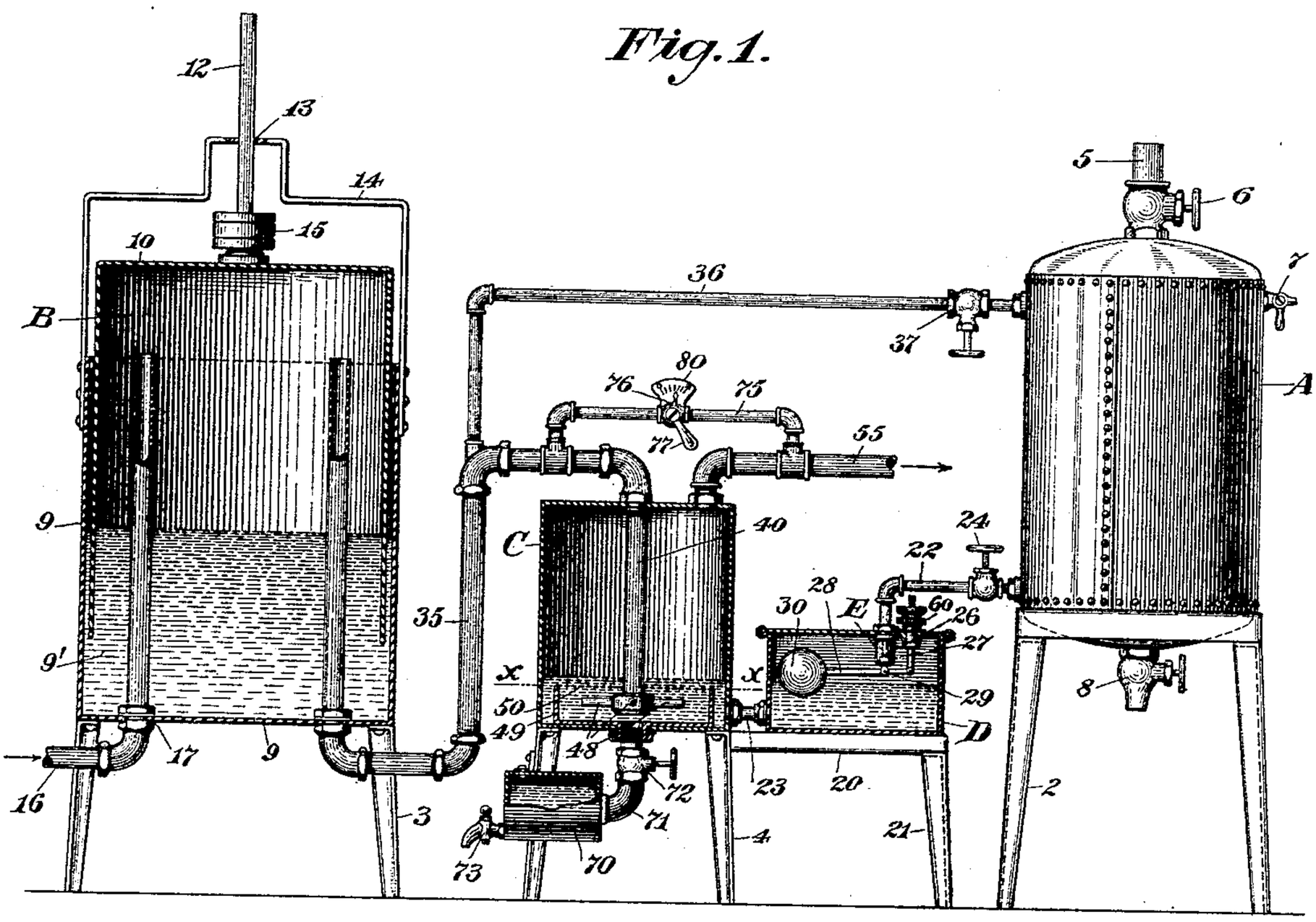


Fig. 4.

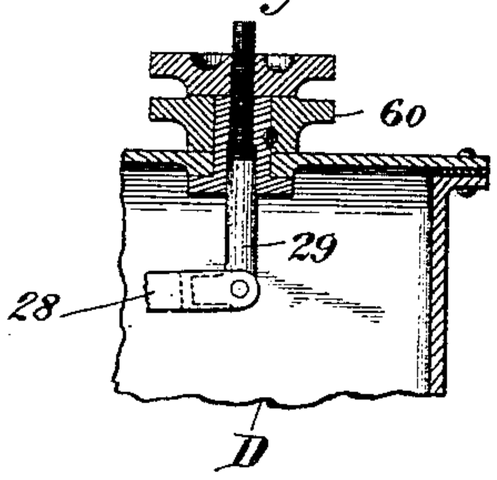


Fig. 2.

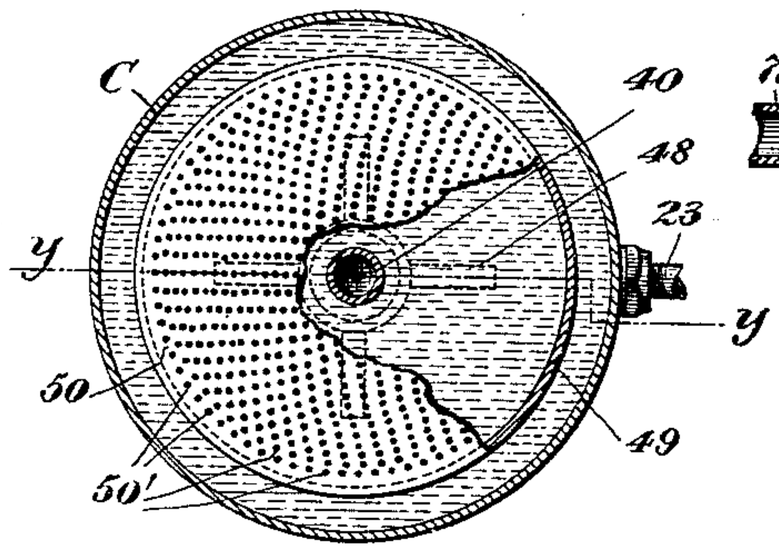


Fig. 5.

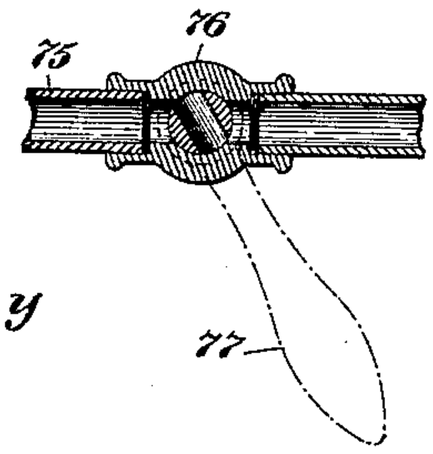
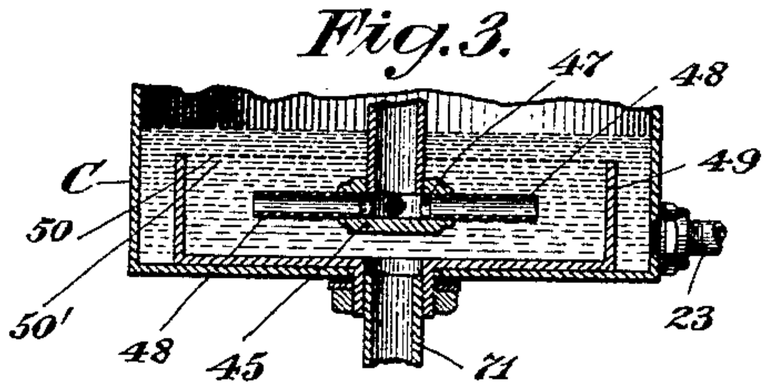


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

SPECIFICATION forming part of Letters Patent No. 618,108, dated January 24, 1899.

Application filed January 29, 1898. Serial No. 668,398. (No model.)

To all whom it may concern:

Be it known that I, AMHERST G. LAMB, a citizen of the United States, residing in Torrington, in the county of Litchfield and State of Connecticut, have invented certain new and useful Improvements in Gas and Air Mixing Apparatus, of which the following is a specification.

This invention relates to a gas and air mixing apparatus, the object being to provide an improved organization of parts which serve thoroughly to intermingle the atmospheric air with the gaseous products given off by a hydrocarbonaceous liquid, such as gasolene, naphtha, benzin, &c.; and the improved apparatus involves air and oil tanks and a communicating or intermediate carbureting-tank in which the elements from the other two tanks are commingled, the resultant mixture being conducted by piping or otherwise from said mixing tank or chamber for use, and in connection with said carbureting tank or chamber I provide a foraminous plate located between the discharge or delivery ends of supply-pipes leading into said carbureting-tank from the oil and air tanks, respectively, and through which the air and liquid may freely circulate, thereby to secure a complete charging of the air with the vapor from the fluid, and I also provide means for regulating, automatically, the amount of liquid supplied to the carbureting-tank and also the quantity of air to a burner or burners supplied by the gaseous mixture, thereby to regulate the character of the flame.

In the drawings accompanying and forming part of this specification, Figure 1 is a sectional front elevation of my improved apparatus. Fig. 2 is a sectional plan view of the carbureting-tank, the section being taken in the line $x\,x$, Fig. 1. Fig. 3 is a detail view, in section, taken in the line $y\,y$, Fig. 2, of the lower end of the carbureting-tank. Fig. 4 is a detail view of part of the regulating apparatus, and Fig. 5 is a detail of a means for regulating the air supplied to the flame.

Similar characters designate like parts in all the figures of the drawings.

My improved apparatus includes as a part thereof three main tanks—an oil-tank, as A, an air-tank, as B, and a carbureting-tank, as C—pipes leading from the two first-mentioned into the latter, in which the air and gaseous vapors are united, and these tanks may be supported by legs (designated, respectively, by 2, 3, and 4) adapted to rest upon a floor or other foundation, and said tanks as air-tight.

The hydrocarbon-tank A may contain gasolene, benzin, naphtha, or other gaseous liquid, which may be supplied thereto in some convenient manner, as by the pipe 5, connected with the top of said tank and leading from a larger vessel or other source of supply, (not shown,) and said pipe 5 is provided with a valve, as 6, by opening which the tank may be charged. Said tank is provided, preferably near its upper side, with a blow-off cock, as 7, and in its bottom with a draw-off cock 8, by manipulating which latter the contents of the chamber may be removed when desired to facilitate cleansing of the tank.

The air-supply tank B consists of two sections 9 and 10 and is of a construction similar to the familiar gasometers, the section 9 being stationary or fixed, while the complemental section 10 is in the nature of a rising-and-falling dome, which reciprocates back and forth with variations in the quantity of air in the chamber, thereby to maintain a uniform steady air-supply in the carbureting-chamber, and said stationary section of the tank contains a body of water serving as a seal, in which the lower end of the dome or section 10 of the tank is immersed. The dome or upper section of the tank is provided centrally thereof with a vertical guide-bar 12, passing through a slot 13 in the guide-frame 14, secured in some convenient manner to the opposite sides of the stationary tank-section and which is provided with a weight 15, serving its usual purpose.

The tank or chamber B is supplied with air in some suitable manner, as by one or a series of pumps, (not shown,) a portion of a pipe being shown at 16, leading from the compressed-air-supply apparatus and into the tank B, the outlet or discharge end of said pipe being at a point above the water seal 9′ and substantially on a level with the upper end of the stationary tank-section 9, and said pipe passes through a stuffing-box 17 in the floor or bottom of the tank.

The hydrocarbon liquid is conducted from

the gas-chamber A to the carbureting-chamber C by suitable piping, the fluid, however, first passing through a regulating device of suitable character, which serves automatically to control the amount of liquid supplied to said mixing-chamber.

The regulating means includes, preferably, a tank, as D, a suitable valve, and valve-operating mechanism, as E, therein, the valve being automatically operated by the rise and fall of a float of ordinary construction situated in the regulator-tank, which latter is mounted on a shelf 20, fixed to the legs 4 and provided with legs, as 21, resting on the floor.

A short pipe is illustrated at 22, communicating with and leading from the oil-tank A to the regulator-tank D, a pipe 23 connecting the latter and the carbureting-chamber C, and the pipe 22 is provided with a suitable hand-valve, as 24, by which the supply of liquid to the regulator-tank A, and consequently to the carbureting-tank C, can be shut off. The pipe 23 leads into the tank C near the bottom of the same. The pipe 22 passes through a stuffing-box, as 25, in the top of the regulator-tank and terminates in a conical valve-seat 26, with which the needle-valve 27 coöperates, the stem 27′ of said valve being pivoted to the lever 28 at a point intermediate the ends thereof, and said lever is pivoted to the carrier or bar 29, vertically adjustable for a purpose hereinafter specified, and carries at its free end a spherical or ball float which rises and falls with the liquid in the regulator-tank, whereby such fluid is maintained at a predetermined level.

The air and carbureting tanks B and C, respectively, are connected by the longitudinal pipe 35, the inlet end of which is substantially in alinement with the outlet end of the main air-supply pipe 16 and the opposite end of which is located near the bottom of the tank C, said pipe passing through stuffing-boxes in the two tanks.

For the purpose of promoting the feed of the liquid from the tank A, I divert a small stream of air from the air-tank B to the hydrocarbon-tank A, which may pass through a pipe 36, connected, respectively, with the main air-pipe 35 and the top of the tank A, the compressed air thus introduced into said tank preventing the formation of a vacuum in the upper side thereof and assisting the flow of the liquid toward the carbureting tank C, and said pipe is provided with a hand-valve, as 37, by which the quantity of air can be varied or entirely cut off.

From the carbureting-chamber the liquid is admitted above a finely-foraminous plate, through which the liquid percolates downward into a space into which the air is supplied, and on the passage of the air therethrough the latter ascends in small bubbles through the fluid and through the perforations or openings in said plate and then bubbles up through a comparatively-shallow depth of fluid above the plate, whereby the air and vapor are intermediately associated and commingled or broken up as they ascend, so as to thoroughly saturate the air with the vapor, the resultant mixture being conducted from the carbureting-chamber for subsequent use or being stored in a tank, from which it may be drawn as necessary.

My improved apparatus therefore comprehends communicating air, oil, and carbureting tanks, supply-pipes leading from the air and oil tanks to the carbureting-tank, and a foraminous or perforated plate situated between the discharge or delivery ends of the two supply-pipes and through which the air and liquid may freely pass and repass, thereby to fully impregnate the air with the gas.

That portion 40 of the main air-pipe 35 which is located in the carbureting-tank C is closed at its lower end, and it is provided at said end with a tip or closer 45, having a series of four equidistantly-disposed air-escape openings, as 47, in which a corresponding number of radially-disposed horizontal nozzles or short pipes 48 are seated. These nozzles or pipes and the lower end of the main air-pipe 35 are situated in the pan 49, resting on the bottom of the tank C, and which serves as a convenient support for the foraminous plate 50, which may consist of a disk having a multiplicity of perforations 50′, capable of permitting the free circulation of the air and fluid in the manner aforesaid.

The bottom of the pan 49 of course can be dispensed with, in which case the bottom of the tank C would form part of the compartment in which the air is first admitted from the pipe 35.

The pan 49 is of less width or diameter than the tank C, so as to leave a space between said parts into which the fluid from the tank A can flow and over and into the pan, whereby the action hereinbefore described may take place.

The bubbles of air which pass through the perforations 50′ on the plate 50 thoroughly churn the fluid above said plate, so as to saturate the air at or immediately adjacent to the foraminous plate, the united air and hydrocarbonaceous vapor rising and passing into the gas-discharge pipe for use.

For the purpose of varying the level of the fluid in the regulator-tank D the support 29, to which the lever is fulcrumed, is made vertically adjustable. (See Fig. 4.) Said support consists of a threaded rod passing through the two-part thumb-nut 60, the latter being shouldered above and below the top of the tank to hold it in place. When the thumb-nut is turned, the rod will be moved up or down either to elevate or lower the fulcrum of the lever, and consequently to cause a corresponding variation in the level of the fluid in the tank D, so that the sheet of fluid above the foraminous disk 50 may be increased or diminished to change the character of the gaseous mixture, as is obvious.

The heavy oil in the chamber C flows into

the auxiliary tank 70 through the pipe 71, intersected by a valve 72, the auxiliary tank having a cock 73, by which the contents of the auxiliary tank can be removed.

For the purpose of regulating the intensity of the heat generated by a flame of ignited gas mixed as aforesaid I provide means for supplying air to the gas after it leaves the carbureting-tank C, the means consisting in the present case of a pipe 75, connecting the main air-pipe 35 and the gas-discharge pipe 55, the amount of air supplied being governed by a valve 76, (see Fig. 5,) operated by the handle 77, and being indicated by a suitable gage, as 80.

As a convenient means for sustaining the several tanks they are shown mounted upon a series of legs; but of course these legs may be dispensed with, in which case the tanks are mounted directly upon the floor or other foundation.

Having described my invention, I claim—

1. The combination, with oil and air tanks, of a carbureting-tank; a pan located in the carbureting-tank; a foraminous plate supported by said pan; a pipe leading from the air-tank into the carbureting-tank, the delivery end of said pipe being situated in said pan; and a pipe connecting the oil and the carbureting tanks.

2. The combination, with oil and air tanks, of a carbureting-tank; pipes leading from the oil and air tanks; a pan located in the carbureting-tank; a foraminous plate on said pan; a pipe leading from the air-tank into the carbureting-tank, the delivery end of said pipe being situated in the pan; and means for conducting, and for automatically regulating the quantity of, fluid from the oil-tank to the carbureting-tank.

3. The combination, with oil and air tanks, of a carbureting-tank; a pan located in said carbureting-tank; a foraminous plate on said pan; a pipe leading from the air-tank into the carbureting-tank, the delivery end of said pipe being situated in said pan; and means for supplying the carbureting-tank with fluid, said means involving a regulating-tank, valve mechanism for controlling the supply of oil to the regulating-tank, and a float disposed in the latter and connected with the valve for operating the same.

4. The combination, with oil and air tanks, of a carbureting-tank; a pan located in the carbureting-tank; a foraminous plate on said pan; an air-pipe leading from the air-tank and into the carbureting-tank, said pipe being closed at its ends and provided with a series of nozzles; and means connecting the oil-tank with the carbureting-tank, for supplying the latter with fluid.

5. The combination, with oil and air tanks, of a carbureting-tank; a pan resting on the bottom of, and of less diameter than, the carbureting-tank; an air-pipe connecting the air and carbureting tanks and having its lower end disposed in said pan; a foramnious plate supported upon the pan; and a fluid-supply pipe connected with the carbureting-tank near the bottom thereof and communicating with the oil-tank.

6. The combination, with oil and air tanks, of a carbureting-tank; pipes leading from the oil and air tanks into the carbureting-tank; a foraminous plate located in the carbureting-tank between the delivery ends of the pipes adapted to be submerged in the oil; and automatic means adjustably supported for regulating the supply of fluid from the oil-tank to the carbureting-tank.

7. The combination, with oil and air tanks, of a carbureting-tank; a pan in said carbureting-tank; a foraminous plate covering the pan; an air-supply pipe leading from the air-tank and into the carbureting-tank, the discharge end of said air-supply pipe being located in said pan; and means for supplying oil to the carbureting-tank at a point below the upper edge of said pan.

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