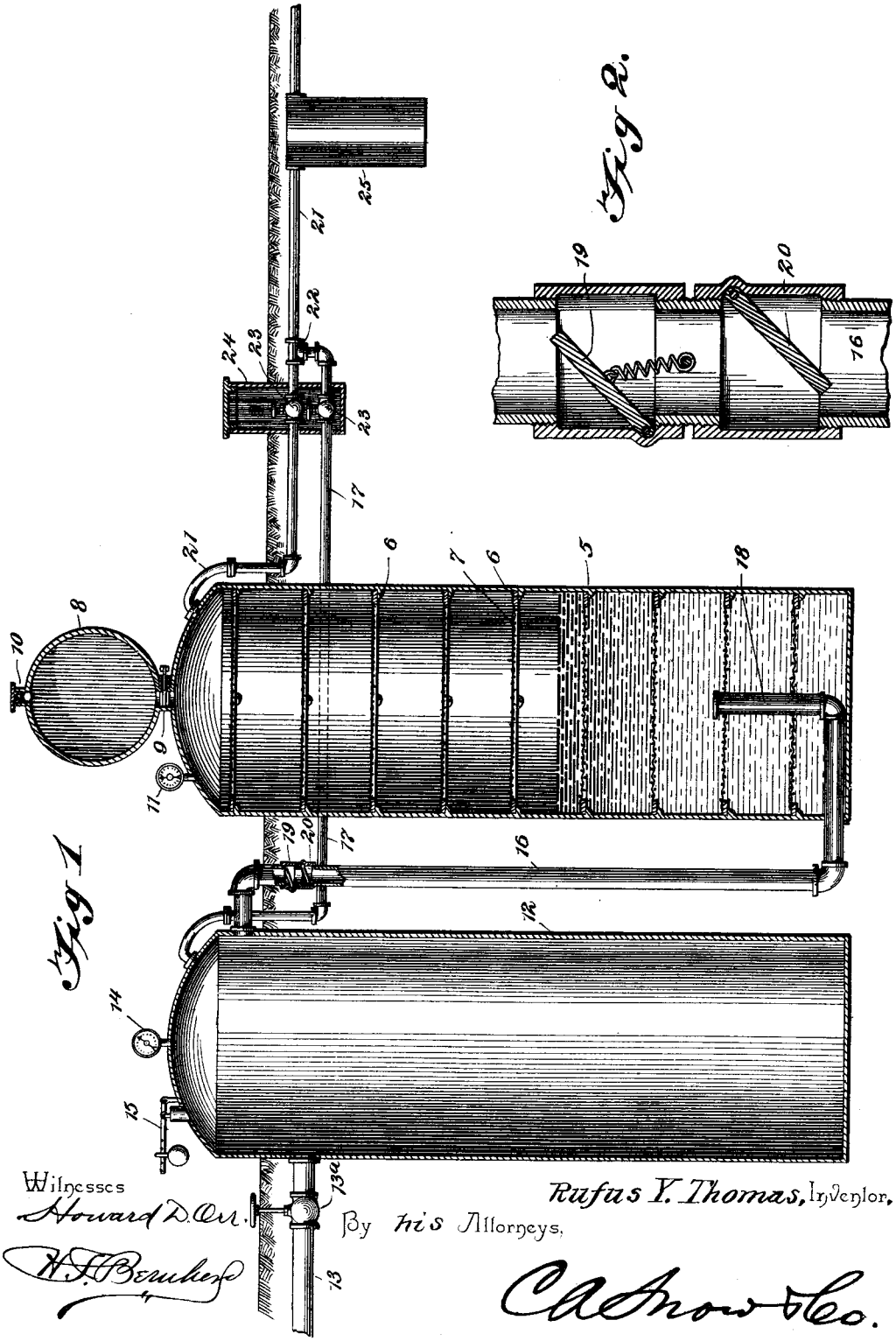
No. 676,054. Patented June 11, 1901.

R. Y. THOMAS.

CARBURETER.

(Application filed July 25, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

RUFUS YOUNG THOMAS, OF WINSLOW, INDIANA, ASSIGNOR OF THREE-FIFTHS TO DAVID DE TAR, OF SAME PLACE, AND GEORGE B. ASHBY, OF PETERSBURG, INDIANA.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 676,054, dated June 11, 1901.

Application filed July 25, 1899. Serial No. 725,112. (No model.)

To all whom it may concern:

Be it known that I, RUFUS YOUNG THOMAS, a citizen of the United States, residing at Winslow, in the county of Pike and State of Indiana, have invented a new and useful Apparatus for Carbureting Air, of which the following is a specification.

My invention relates to improvements in apparatus for carbureting air to produce an illuminating-gas; and the primary object in view is to provide a simple apparatus by which a current of atmospheric air may be combined intimately with a current of carbureted air to increase the volume of oxygen in the gas produced by carburization of air.

With these ends in view the invention consists in the novel combination, construction, and arrangement of parts which will be hereinafter fully described and claimed.

To enable others to understand the invention, I have illustrated a preferred embodiment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a vertical sectional elevation of an apparatus for carbureting air constructed in accordance with this invention. Fig. 2 is a detail sectional view, on an enlarged scale, of a portion of the pipe between the air and hydrocarbon tanks, showing the valves therein.

My carbureter has its elements buried below the ground-line, as represented by the drawings. One element of this apparatus is the carbureting-tank 5, which may be of cylindrical form and which has its upper end projected above the ground-line for obtaining ready access to said tank in charging the same with a liquid hydrocarbon—such, for example, as naphthalene, gasolene, or other equivalent. The tank is provided interiorly with a series of ledges 6, arranged in different horizontal planes throughout the depth of said tank. On these ledges rest the series of screens 7, which may be of wire-gauze or other appropriate foraminous material and which are spaced apart at suitable distances to break up the current of atmospheric air which is forced or injected under pressure into the liquid contents of the tank.

One of the important features of my apparatus resides in the employment of a pressure-reservoir 12, to which is connected an air-charging main 13 and two off-bearing air-pipes 16 17, which are of different diameters, one of said air-pipes leading into the liquid contents of the carbureting-tank for discharging a current of atmospheric air therein, while the other off-bearing air-pipe is connected with a gas-pipe 21, whereby atmospheric air may be injected into the current of carbureted air to increase the volume of oxygen in the gas adapted to be conveyed to the burners.

The carbureting-tank 5 and the pressure-reservoir 12 are furnished with the usual accessories to indicate the pressure of the gaseous contents thereof. Said carbureting-tank has its upper exposed end furnished with a charging vessel 8, which is coupled to the head of said tank in any suitable way, and communication between this vessel and the tank may be cut off by a valve 9 of any suitable construction, but preferably of the gate-valve variety. The charging vessel is also provided with a removable cap 10, adapted to be displaced when the liquid hydrocarbon is introduced through the charging vessel into the carbureting-tank, the valve 9 being open.

The air-charging main 13 is connected with the pressure-reservoir and with a compressor or forcing apparatus of any suitable character having a suitable stop-cock 13^a. The pressure-reservoir has a suitable gage 14, and it is also equipped with a safety-valve 15 of any suitable pattern.

The air-pipe 16 is considerably larger in diameter than the pipe 17, and both of these pipes are united or coupled in any suitable way to the upper part of the pressure-reservoir, whereby air under uniform pressure may be supplied by the reservoir to both of the pipes. The larger pipe 16 extends in a downward direction toward the bottom part of the carbureting-tank 5, said pipe terminating in an upwardly-facing discharge-nozzle 18, which is situated centrally in the lower part of the tank. This pipe 16 is furnished with a downwardly-closing pressure-regulating valve, the position of which is indicated at 19, and which valve may be of any suit-

able pattern, said valve adapted to close automatically when the air in the forcing or pressure reservoir 12 reaches a certain predetermined pressure. The pipe 16 is furthermore equipped with a check-valve 20, adapted to close in an upward direction and prevent back pressure from the charging or carbureting tank from entering the pressure-reservoir.

The valve 19 is held open by a tension-spring or a counterbalancing-weight, as may be preferred, the former being indicated for the purposes of illustration in Fig. 2, and the downwardly-opening valve 20 remains open normally by gravity. Both valves being normally open, as shown, compressed air is free to pass them in the pipe 16 as it proceeds from the air-tank to the hydrocarbon-tank. In the event that the air-pressure exceeds the predetermined degree the valve 19 closes in its seat and remains closed until the pressure is relieved through the pipe 17. In the event of back pressure from the hydrocarbon-tank to the air-tank the same is checked by the valve 20, as will be understood.

The gas-pipe 21 is coupled to the head of the carbureting-tank at a point above the uppermost screen 7 therein, and, as is usual in the art, this gas-pipe is carried underground. The air-pipe 17 of small diameter is led underground around the carbureting-tank and the pipes 17 21 are coupled together by a union 22. Said pipes 17 21 are also provided with stop-cocks 23, adapted to be operated independently, and both of said cocks are housed or contained within a single street-box 24. The gas-pipe 21 is connected with a pressure-regulator 25 of any suitable pattern.

The operation is as follows: The carbureting-tank having been charged with a liquid hydrocarbon, the valve 9 is closed and the cocks 23 are opened. The current of compressed air from a suitable forcing apparatus is admitted to the pressure-reservoir by opening the valve 13^a, and the air under pressure is admitted to both the pipes 16 17, the pressure in said pipes being uniform. The pipe 16 conveys a larger volume of air to the carbureting-tank than the volume of air flowing through the pipe 17, because of the difference in the diameters of the pipes. The air supplied by the large pipe 16 is forced through the liquid contents of the tank 5 and strikes against the screens 7 therein, whereby the air-current is broken up by the liquid and the screen. The air from the pipe 16 absorbs or takes up the liquid hydrocarbon, so that it is carbureted in a well-known way, and the carbureted air accumulates in the upper part of the tank 5, so as to flow under pressure through the pipe 21, the diameter of which is less than the diameter of the pipe 16. From this description it will be seen that the pressure of the air-current supplied by the pipe 16 to the carbureting-tank is reduced by expansion of the air during the process of carbureting the same in the tank 5, whereas the pressure of the air flowing through the pipe 17 is the same as the pressure in the reservoir 12. The carbureted air, however, is of greater specific gravity than the current of atmospheric air in the pipe 17, because the air supplied by the pipe 16 to the tank has fine particles of liquid hydrocarbon combined or suspended mechanically therein. My apparatus thus provides for carbureting a current of large volume by passing it through a liquid-hydrocarbon bath and mechanically combining with the carbureted air a current of atmospheric air, the two currents of atmospheric air being supplied to different pipes and under equal pressure from a common source of supply. I am thus able to produce a superior quality of gas in which the volume of oxygen is augmented by injecting a current of atmospheric air into a current of carbureted air, the atmospheric-air current being of higher pressure and lower specific gravity than the current of carbureted air.

The stop-cocks 23 in the service-pipe and in the surcharging air-pipe 17 are opened normally to their full limits. The functions of these stop-cocks are to close said pipes; but the cocks are not designed to regulate the flow of vapor or air through the service and surcharging pipes. It is therefore to be understood that in the operation of the carbureter the cocks in the pipes 21 17 are opened to their full limits, so that the carbureting vapor may pass through the pipe 21 and the necessary volume of air may pass through the pipe 17 for the purpose of surcharging the carbureted vapor in said pipe 21.

It is well-known that the carbureted vapor is of greater specific gravity than atmospheric air by reason of the fact that the vapor has fine particles of oil suspended mechanically therein. Although the air in the pipes 16 17 is drawn from the same source of supply, the air in passing through the hydrocarbon-tank becomes expanded therein, so that the carbureted vapor issues from the hydrocarbon-tank under a lower pressure than the air supplied by the charging-tank to the pipe 16. The atmospheric air employed by the means for surcharging the carbureted vapor is admitted to the service-pipe 21 under higher pressure than the pressure of the vapor in said service-pipe, and thus the current of atmospheric air is made to combine intimately with the carbureted vapor.

It is of course evident that the stop-cock in the pipe 17 may be closed when it is desired to utilize the carbureted air from the tank 5 without surcharging the same with atmospheric air, or the valve 23 may be opened more or less to regulate the volume of atmospheric air flowing through the pipe 17.

Changes may be made in the form and proportion of some of the parts while their essential features are retained and the spirit of the invention embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described the invention, what I claim is—

In a carbureting apparatus, the combination of a hydrocarbon-tank, a compressed-air tank, a pipe leading from said compressed-air tank, and discharging into the lower portion of the hydrocarbon-tank, the downwardly-closing valve 19 in said pipe, to permit the passage of air from the air-tank to the hydrocarbon-tank, a tension device to resist the closing of said valve and thereby predetermine the pressure of the air in the hydrocarbon-tank, a check-valve 20 in said pipe, to prevent back pressure of carbureted air from the hydrocarbon-tank to the air-tank, a service-pipe, valved pipes leading directly from said hydrocarbon and compressed-air tanks to said service-pipe and a pressure-regulator connected to the latter, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

RUFUS YOUNG THOMAS.

Witnesses:
E. R. KING,
J. S. NEWKIRK.