M. D. COLBATH.

CARBURETER.

APPLICATION FILED JULY 31, 1908.

931,386. Patented Aug. 17, 1909.

Fig. 1.

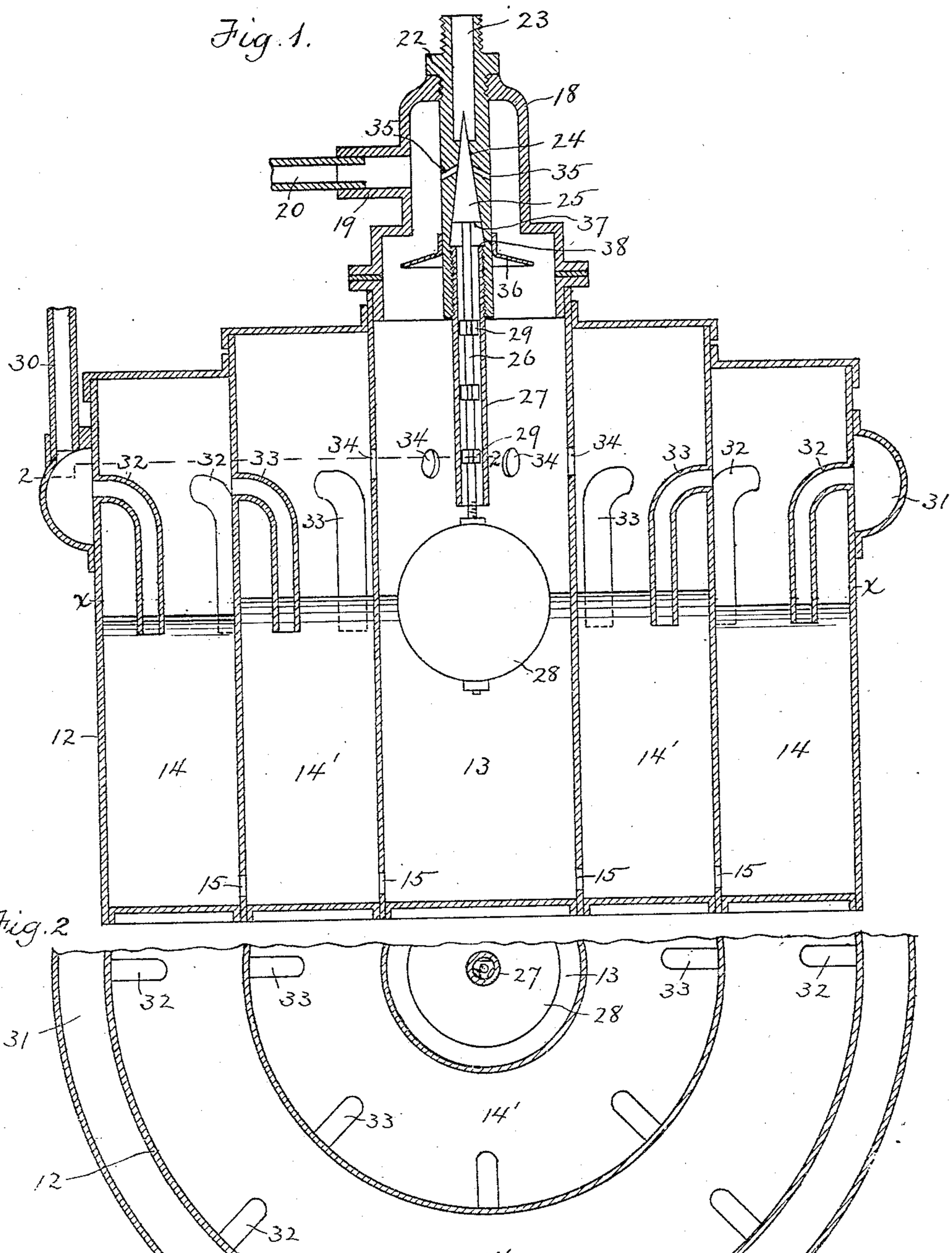

Fig. 2

Witnesses.
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UNITED STATES PATENT OFFICE.

MONROE D. COLBATH, OF HAMPDEN, MAINE.

CARBURETER.

No. 931,386. Specification of Letters Patent. Patented Aug. 17, 1909.

Application filed July 31, 1908. Serial No. 446,267.

To all whom it may concern:

Be it known that I, MONROE D. COLBATH, of Hampden, in the county of Penobscot and State of Maine, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention has for its object to provide a simple and effective carbureter adapted to insure sufficient contact between the air which is admitted to the hydrocarbon liquid to thoroughly carburet the air and produce a combustible mixture of the desired richness.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents a vertical central section of a carbureter embodying my invention. Fig. 2 represents a horizontal section on line 2—2 of Fig. 1.

The same reference characters indicate the same parts in both the figures.

The casing 12 of my improved carbureter is preferably of circular form, and is subdivided internally to form an inner chamber 13, and one or more outer chambers 14, which are preferably annular and surround the inner chamber 13. The lower portions of the chambers are connected by passages or orifices 15 so that the hydrocarbon liquid introduced into the inner chamber will flow therefrom to the outer chambers, a uniform liquid level in the several chambers being thus insured. The inner chamber is provided at its upper end portion with a conduit for the escape of gas accumulating therein. I use the term gas for convenience to designate the mixture of air and hydrocarbon vapor formed by the action of the apparatus, as hereinafter described. The said gas conduit is here shown as a dome-shaped fitting 18 secured to the casing, and forming a cap or cover for the inner chamber 13, said fitting having a branch 19 to which is connected a service pipe which conducts the gas to the burner.

The upper end of the fitting 18 is internally threaded to engage an externally threaded plug 22, said plug having an inlet 23 for liquid hydrocarbon, and being formed externally at its upper portion to be connected with a liquid supply pipe. A portion of the liquid inlet 23 is tapered to form a seat 24 for a tapered or needle valve 25. Said valve is affixed to a vertical stem 26 which extends downwardly into the inner chamber 13 through a tubular guide 27 which forms an extension of the plug 22, and projects downwardly into the upper portion of the inner chamber 13, the diameter of the tubular guide 27 being less than that of the interior of the fitting 18, so that an annular liquid passage is formed by said fitting around the tubular guide.

28 represents a float which is adapted to be supported by the liquid in the inner chamber, and to rise and fall with said liquid, said float being attached to the valve stem 26. When the liquid falls in the chamber below the predetermined level, which is indicated by dotted line *x*—*x* in Fig. 1, the float falling with the liquid opens the valve 25 so that liquid flows into the chamber 13 until the float is raised sufficiently to close the valve. The valve stem is of less diameter than the interior of the guide 27, so that liquid is permitted to flow through the guide, the stem being provided with lateral wings 29 which are in sliding contact with the interior of the guide 27, and are formed to permit the liquid to flow between them.

30 represents an air inlet, here shown as a pipe which may be connected with any suitable air forcing means. The air supplied by the inlet 30 is distributed by an annular chamber 31 formed on the exterior of the casing 12, and preferably surrounding the same, to a series of nozzles 32 which are attached to the wall of the casing, and extend downwardly into the same below the liquid level. The air passing through said nozzle is discharged into the body of the liquid in the outer chamber 14, and rises, partially carbureted, into the upper portion of said chamber. The annular partition separating the outer chamber 14 from the intermediate chamber 14′ is provided with downwardly projecting nozzles 33 which are similar to the nozzles 32, and deliver the partially carbureted air below the liquid level, so that it is again enriched and rises above the liquid in the chamber 14′. Any desired number of annular chambers surrounding the inner chamber may be employed, each having downwardly extending nozzles in its outer wall. The mixture accumulating in the upper portion of the inner annular chamber passes to the central chamber 13 through passages 34, and passes from the inner chamber to the outlet 20 through the fitting 18.

It will be seen that the air entering the hydrocarbon liquid under pressure through the nozzles 32 and 33 takes up the hydrocarbon vapor, and causes the accumulation of hydrocarbon liquid in the several chambers to subside. The float 28 falling with the liquid opens the valve 25 so that a fresh supply of liquid is admitted.

I have provided means whereby a part of the hydrocarbon liquid on its way to the inner chamber 13 is distributed so that the escaping gas or carbureted air passing from the inner chamber 13 to the gas outlet comes in contact with the entering liquid and is further enriched thereby. To this end, the plug 22 is provided with oil outlets 35 which are inclined downwardly from the valve seat 24 to the exterior of the plug, so that when the valve is opened, oil is permitted to escape through the outlets 35 and flow down the outer surface of the plug. I also provide an oil distributer 36 below the outlets 35, said distributer being preferably an inclined annular plate or flange attached to the plug, and arranged to deflect the downwardly flowing oil outwardly, and cause it to drip in an annular stream into the inner chamber 13. By reference to Fig. 1, it will be seen that the out-flowing gas on its way from the inner chamber 13 to the gas outlet, encounters the annular stream of liquid dripping from the distributer 36, and also the liquid that flows along the outer surface of the plug below the outlets 35.

The lower end of the valve 25 is preferably of considerably greater diameter than the valve stem 26, so that it forms a shoulder 37. Within the plug is a seat or stop 38 which is preferably formed by the upper end of the tubular guide 27, and is adapted to form a bearing for the shoulder 37 of the valve when the latter descends. Provision is thus made for limiting the descent of the valve and the float. The shoulders 37 and 38 may be utilized for closing the oil passage through the guide 27, so that when the valve is fully open, all the oil admitted will pass through the outlets 35 to act on the escaping gas, as above described.

It will be seen that provision is made by the above described construction for an extended contact between the air forced into the apparatus and the hydrocarbon liquid therein, and for a corresponding enrichment of the air by the hydrocarbon vapor.

An important characteristic of my invention is the provision of means for maintaining uniform liquid level in all the chambers, and air-conducting nozzles extending into all the chambers, excepting the one which contains the float, said nozzles terminating below the liquid level in the chambers and being adapted to discharge air into the liquid in said chambers, so that the air is carbureted by contact with the liquid, and rises through the liquid into the upper portion of each chamber, and passes therefrom into the next chamber, and through portions of the liquid therein.

The invention is further characterized by means for admitting hydrocarbon liquid into the upper portion of a conduit in which gas ascends in the carbureter casing on its way to the gas outlet, the liquid admitted to said conduit being so distributed that it has an extended contact with the ascending gas and enriches the same before it reaches the gas outlet. At the commencement of the operation of the carbureter, the body of liquid therein is at its maximum height, the valve being closed so that for the time being no liquid is admitted. The evaporation caused by the passage of air through the body of liquid in the carbureter causes a reduction of temperature within the carbureter, the result being that the volume of hydrocarbon vapor taken up by the air gradually decreases, the gas therefore gradually becoming poorer. This change in the quality of the gas is compensated for by the contact of the escaping gas with the liquid admitted to and distributed in the ascending conduit 18, which admission and distribution takes place as soon as the liquid level in the carbureter has been lowered by evaporation enough to cause the opening of the valve. The contact between the ascending gas and the entering liquid in the conduit 18 compensates for the decrease in temperature in the carbureter which takes place during the initial stage of the operation.

I claim:

1. A carbureter having a conduit for the upward passage of gas from its upper portion, said conduit having a gas outlet from the upper portion, a liquid inlet adapted to deliver hydrocarbon liquid into the upper portion of said conduit to meet the ascending gas the said conduit being restricted relatively to the area of the carbureter, and a float valve controlled by the accumulation of liquid in the carbureter and adapted to open and close the liquid inlet, the contact between the entering liquid and the escaping gas compensating for the reduction of temperature of the gas which takes place during the initial stage of the operation.

2. A carbureter having a conduit for the upward passage of gas from its upper portion, said conduit having a gas outlet from the upper portion, a liquid inlet adapted to deliver hydrocarbon liquid into the upper portion of said conduit to meet the ascending gas the said conduit being restricted relatively to the area of the carbureter, a distributer located below the valve seat and in the path of the ascending gas, and a float valve controlled by the accumulation of liquid in the carbureter and adapted to open and close the liquid inlet, the contact be-

tween the entering liquid and the escaping gas compensating for the reduction of temperature of the gas which takes place during the initial stage of the operation.

3. A carbureter comprising a chamber having a conduit for the upward passage of gas from its upper portion, a lateral gas outlet communicating with the upper portion of said conduit, a liquid inlet at the upper portion of said conduit having a valve seat the said conduit being restricted relatively to the area of the carbureter, a fixed guide below the said inlet, and a liquid distributer located below the valve seat and in the path of the gas passing through the conduit on its way to the gas outlet, a float supported by liquid in the chamber, and a valve stem attached to the float and extending upwardly therefrom, said stem terminating in a valve adapted to close the liquid inlet.

4. A carbureter comprising a chamber having a conduit for the passage of gas from its upper portion, a lateral gas outlet communicating with said conduit, a plug at the upper end of said conduit containing a liquid inlet having a valve seat, and a tubular guide projecting downwardly into the chamber, said plug having also a lateral liquid outlet connecting the valve seat with the gas conduit, and a liquid distributer located below said outlet, and in the path of the gas passing through the conduit on its way to the gas outlet, a float supported by liquid in the chamber, and a valve stem attached to the float and extending upwardly therefrom through the guide, said stem terminating in a valve adapted to close the liquid inlet.

5. A carbureter comprising a chamber having a conduit for the passage of gas from its upper portion, a lateral gas outlet communicating with said conduit, a plug at the upper end of said conduit containing a liquid inlet having a valve seat, and a tubular guide projecting downwardly into the chamber, said plug having also a lateral liquid outlet connecting the valve seat with the gas conduit, and a liquid distributer located below said outlet, and in the path of the gas passing through the conduit on its way to the gas outlet, a float supported by liquid in the chamber, and a valve stem attached to the float and extending upwardly therefrom through the guide, said stem terminating in a valve adapted to close the liquid inlet, the valve having a shoulder at its lower end adapted to be seated on a shoulder in the tubular guide below the said lateral outlet.

In testimony whereof I have affixed my signature, in presence of two witnesses.

MONROE D. COLBATH.

Witnesses:

JOSEPH T. KENNEY,

ARTHUR A. COLLINS.