No. 844,996. PATENTED FEB. 19, 1907.

M. D. COLBATH.

CARBURETER.

APPLICATION FILED MAY 18, 1906.

2 SHEETS—SHEET 1.

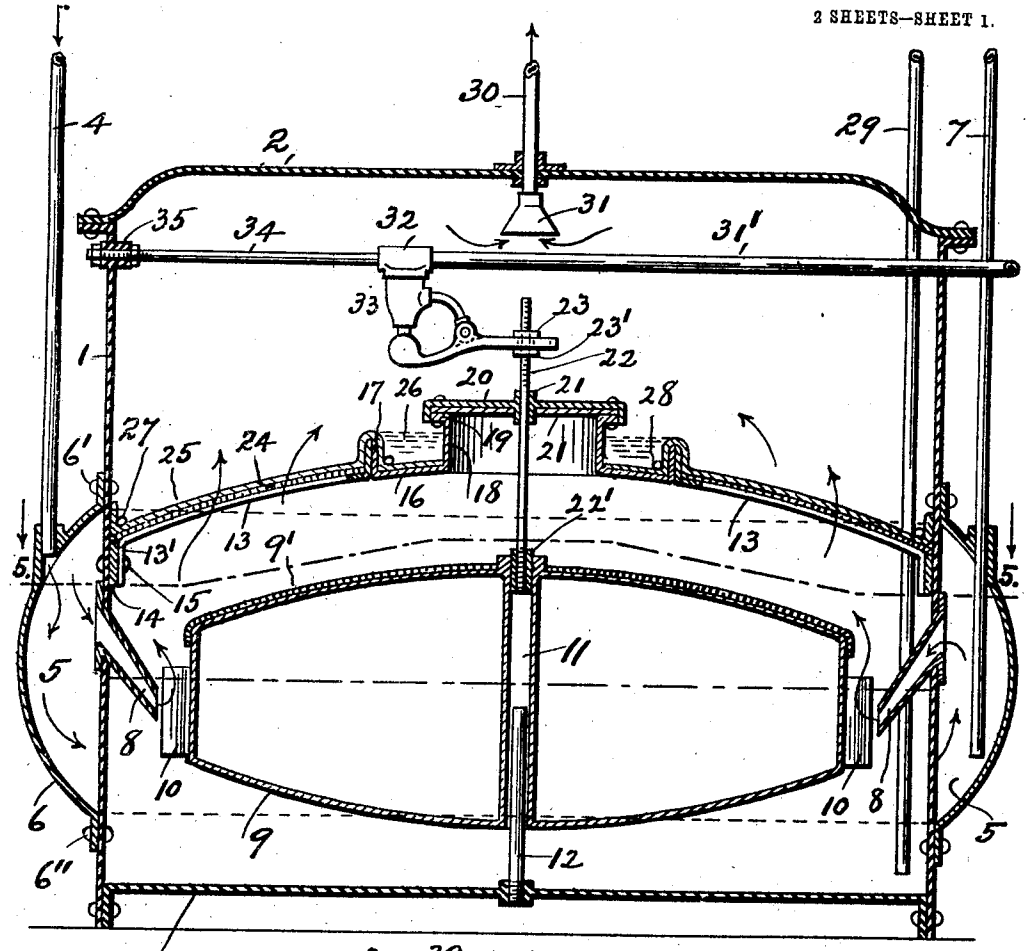

FIG. 1.

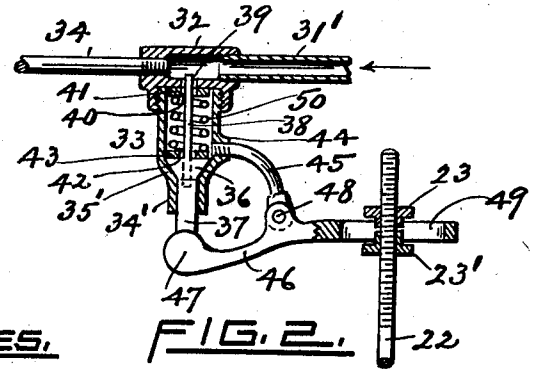

FIG. 2.

WITNESSES.

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2 SHEETS—SHEET 2.

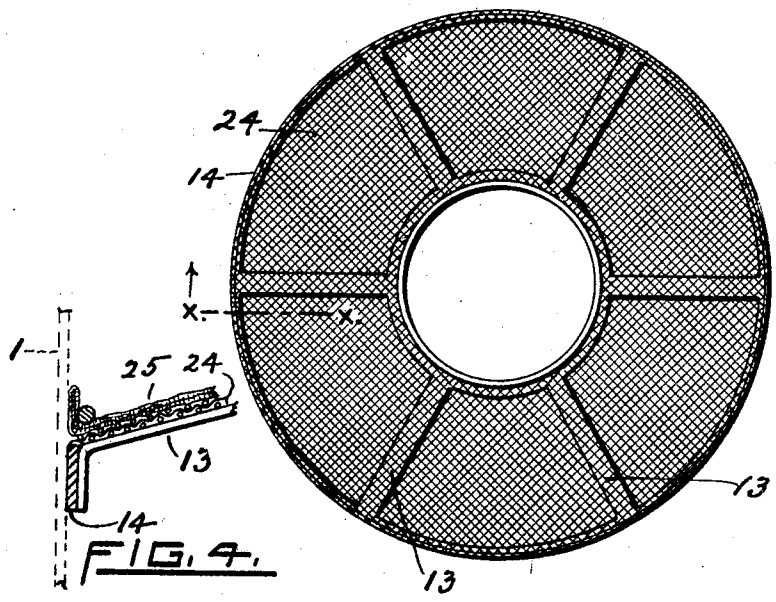

FIG. 3.

FIG. 4.

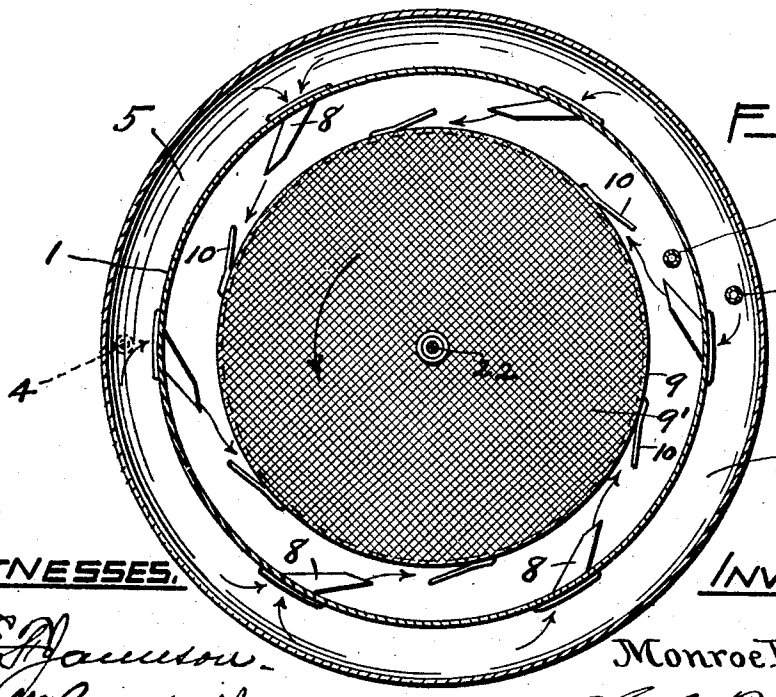

FIG. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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CARBURETER.

No. 844,996. Specification of Letters Patent. Patented Feb. 19, 1907.

Application filed May 18, 1906. Serial No. 317,645.

To all whom it may concern:

Be it known that I, MONROE D. COLBATH, a citizen of the United States, residing at 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 relation to carbureters, and relates in particular to carbureters of that class in which a gas is produced by what is known as the "cold process."

In carbureters of this class as ordinarily constructed it has heretofore been found difficult to deliver the hydrocarbon liquid to the carbureter automatically, and when so delivered to hold the hydrocarbon liquid suspended in a partially-divided state in a position above the level of the body of liquid hydrocarbon in the carbureter long enough for the incoming air to engage and become saturated with the divided hydrocarbon.

Another difficulty that has been encountered in cold-process carbureters of the ordinary construction is in storing a sufficient quantity of air for a sufficient period of time to equalize the temperature between the air and the hydrocarbon.

A still further difficulty encountered in carbureters as heretofore constructed is that the rapid evaporation of the hydrocarbon liquid has the effect of greatly lowering the temperature of such liquid, and hence has produced a very considerable difference in temperature between the liquid and the air supplied to the carbureter.

Having in view the obviating of the above-mentioned difficulties encountered in the practicing of the cold-process method of carbureting by the apparatus ordinarily employed, my invention has for its object, first, the provision of novel automatic feeding devices; secondly, the provision of novel means for holding the hydrocarbon liquid in suspension so as to facilitate the saturation of the air; thirdly, the provision of novel means for agitating the liquid hydrocarbon contained in the carbureter, so as to facilitate the absorption of a relatively large amount of hydrocarbon vapor by the air supplied to the apparatus, and, fourthly, the provision of novel means for constantly maintaining the air supplied to the apparatus and the hydrocarbon at substantially the same temperature during the operation of the apparatus.

Other objects of the invention will be developed during the course of the specific description of the construction of my improvement.

My invention, having the above objects in view, consists in the novel constructions, combinations, and arrangements of parts hereinafter described and claimed.

In the accompanying drawings, illustrating my improvements, and in the several views of which like numerals designate corresponding parts, Figure 1 is a vertical sectional view of a carbureting apparatus constructed in accordance with my invention. Fig. 2 is a vertical sectional view, on an enlarged scale, of an automatically-operated valve which I employ for governing the supply of hydrocarbon liquid to the apparatus shown in Fig. 1. Fig. 3 is a top plan view of a carbureting-screen employed in the carbureter shown in Fig. 1. Fig. 4 is a fragmentary detail sectional view of a portion of the carbureting-screen on an enlarged scale, and Fig. 5 is a horizontal sectional view taken on the line 5.—5. of Fig. 1.

The outer casing of the carbureter is preferably in the form of a circular tank 1, which is provided with a top 2 and bottom 3, this tank being adapted to be buried in the ground, as is customary, and being provided with an air-inlet pipe 4, which extends above the surface of the ground and is adapted to be connected to any suitable air-forcing apparatus. The pipe 4 leads into a chamber 5, which is formed by a concavo-convex band or ring of sheet metal 6, that completely surrounds the tank 1 and is riveted thereto at its upper and lower edges, as shown at 6′ 6″. An exhaust-pipe 7 leads from the air-chamber 5 to a point above the surface of the ground, said exhaust-pipe being provided for the purpose of exhausting any water that may be lodged in the chamber 5 as the result of condensation of moisture from the air brought into the chamber 5 through the air-inlet pipe 4.

A plurality of air-nozzles 8 8 are arranged in the wall of the tank 1 and serve to convey air from the chamber 5 to within the tank, these nozzles being of tapering form and extending downwardly and tangentially to the side wall of the tank, so that the air coming therethrough will be directed in a downward direction and tangentially to the inner wall of the tank, as clearly illustrated by the arrows in Figs. 1 and 5 of the drawings.

Within the tank 1 and centrally thereof is located a float 9, this float being preferably

formed with a vertical peripheral wall and concavo-convex top and bottom, the top being covered with wire-gauze 9' and being provided with a plurality of tangential wings or vanes 10, which serve, as will be presently described, to impart rotary movement to the float 9 by the impact of the incoming air through the nozzles 8. The float 9 is provided with a central tube 11 and a post 12, which is screwed into the bottom 3 of the tank 1, extends upwardly into the tube 11, and serves to maintain the float centrally in the tank and to guide the float in its vertical movements, the post being of such size relatively to the tube 11 as to permit of free longitudinal movement of the tube upon the post.

Within the case 1 and above the float 9 is arranged a concavo-convex porous diaphragm or partition, which serves to temporarily suspend the incoming hydrocarbon above the level of the liquid hydrocarbon in the tank. This diaphragm or partition is of concavo-convex form and is constructed as follows:

A plurality of radially-disposed arms 13 are formed with depending outer ends 13', and these depending outer ends bear against the inner surface of a ring 14 and are riveted thereto and to the wall of the tank 1 by rivets 15, which pass through the depending ends of the arms and through the ring and the wall of the tank. The inner ends of the arms 13 are connected to a metallic ring 16, which has a flange 17 around its outer edge and a somewhat higher flange 18 around its inner edge, the latter flange being formed with a laterally-extending flange 19 at its upper edge that serves as a seat for a cap or cover 20, that is bolted to said flange 19, a disk 21 of burlap being disposed below the cover 20 and interposed between the end of the cover and the flange 19. The cover 20 is formed with an integral sleeve 21 at its center, which serves to guide a rod 22, that is screw-threaded at its lower end and screws into a plug 22', which is in turn screwed into the tube 11 in the center of the float 9.

The upper end of the rod 22 is provided with a screw-thread and carries two threaded sleeves, (designated, respectively, 23 23',) these sleeves being adjustable on the rod for the purpose hereinbelow described.

The arms 13 are curved, as shown, and serve to support a section of foraminous metallic material 24, preferably brass wire-gauze of fine mesh, and on top of said foraminous material is arranged a sheet of porous material 25 of suitable texture, preferably burlap. The inner edge of the wire-gauze section 24 extends upwardly and alongside the outer wall 17 of the ring 16, and the inner edge of the burlap 25 extends over and down on the inside of the outer wall 17 of said ring 16, the outer wall 17 and the inner wall 18 of the ring 16 forming a canal 26, which serves, as will be presently described, to receive and temporarily retain the incoming liquid hydrocarbon supplied to the apparatus.

The burlap 25 is turned upwardly at its outer edge against the inner surface of the side wall of the tank 1 and is retained in position at its outer edge by a ring 27, of wire or ratan, and is retained in position at its inner edge within the canal 26 by a similar but smaller ring of wire or ratan 28.

The tank 1 is provided with an exhaust-pipe 29, which extends through the top of the tank and above the surface of the ground and extends to near the bottom 3 of the tank, this pipe being provided for the purpose of exhausting the liquid hydrocarbon from the tank when desired or for exhausting any water that might accumulate in the bottom of the tank, and the tank is also provided with a centrally-disposed pipe 30, which has a bell-mouth 31 on its lower end, this latter pipe 30 being provided for the purpose of conveying away the gas or ignitible vapor formed by the union of the air with the vapor of the hydrocarbon, said pipe 30 leading to points of consumption and being of the usual construction.

Liquid hydrocarbon is supplied to the tank 1 by means of a hydrocarbon-inlet pipe 31', which extends through the wall of the tank 1 and is connected at its inner end to a head 32, this head forming a portion of a valve-casing 33, and the head also receiving a rod 34, that serves in connection with the pipe 31' to maintain the head in fixed position, the rod 34 being preferably attached at its outer end and, as shown at 35, to the wall of the tank 1.

The construction of the valve will be best understood by an examination of Fig. 2 of the drawings, to which figure I will now refer. The casing 33 of the valve screws into the head 32 and terminates in a diminished lower end 34', the juncture of the diminished end 34' and the casing 33 forming a cone-shaped seat 35' for a valve 36, which has a depending stem 37 and an upwardly-extending spindle 38, which spindle works freely in an opening 39 in the lower wall of the head 32 and passes through an opening 40 in a disk 41, mounted in the casing 33, and also passes through an opening 42 in a disk 43, also located in the casing 33. The casing 33 is provided with a boss 44, into which is screwed a curved arm 45, that serves to support a lever 46, having a weight 47 at its end that bears against the lower end of the depending stem 37 of the valve 36 and is pivoted at 48 to the said arm 45. The opposite end of the lever 46 is slotted, as shown at 49, and constitutes a yoke through which the rod 22 passes, the threaded sleeves 23 23' bearing, respectively, on the top and bottom of this yoke and serving as a means for connecting the rod 22 to the lever 46. The

sleeves 23 23′ are when in proper position spaced a slight distance apart, so as to permit of a slight movement of the yoke of the lever 46 between these sleeves and so that the lever can be swung on its pivotal point by the upward-and-downward movement of the rod 22. A spiral spring 50 is arranged between the disks 41 and 43 and is secured at its ends to these disks, this spring serving to normally close the valve 36.

The parts constructed and arranged as above described are operated in the following manner: When the apparatus is first placed in use, sufficient quantity of hydrocarbon liquid is supplied through the pipe 31′ and the valve-casing 33 (the valve 36 being at this time opened by the weight of the float 9) to prime the apparatus. When a sufficient quantity of hydrocarbon has been supplied to partly fill the tank, air is forced in through the pipe 4 and is injected into the tank below the level of the hydrocarbon liquid and through the nozzles 8. The air coming into the tank through the nozzles 8 imparts a rotary movement to the float 9, which has the effect of agitating the liquid hydrocarbon surrounding the float and of dispersing the incoming air throughout the liquid hydrocarbon. The hydrocarbon coming in through pipe 31, and the valve-casing 33 falls into the canal 26 and is carried over the outer wall of the canal by the capillary action of the burlap 25 and is held in suspension by the burlap and by the wire-gauze cover 24 for a considerable period of time. The air after passing through the liquid hydrocarbon in the bottom of the tank passes upwardly through the wire-gauze 24 and the burlap 25 and causes a rapid evaporation of the hydrocarbon which is held in suspension and a thorough saturation of the air with hydrocarbon vapor, and the resulting vapor or gas escapes through the pipe 30 and is conveyed by means of said pipe, to points of consumption. When the liquid hydrocarbon in the tank has acquired a predetermined level, which is regulated by the adjustment of the sleeves 23 23′, the rising of the float 9 allows the valve 36 to descend and rest on its seat 35′ under the action of the spring 50, thus closing off the supply of hydrocarbon to the tank. As the hydrocarbon becomes exhausted by the continuation of the carbureting process the float falls, and the falling of the float operates, through the lever 46, to open the valve, and thus provides a renewal of the supply of hydrocarbon, and this automatic operation is continued indefinitely.

The storage of air in air-chamber 5 produces an equalization of temperature between the incoming air and the hydrocarbon liquid contained in the tank, and the rotation of the float in the manner hereinbefore described has the effect of spraying the liquid hydrocarbon, which drips from the wire-gauze 24 on top of the float, and thus causes a commingling of the air with a portion of hydrocarbon vapor before the air reaches the foraminous partition formed by the wire-gauze 24 and the burlap 25 and also serves to equalize the temperature of the air and the hydrocarbon vapor, so that the evil effects which would be produced by the lowering of temperature due to evaporation are obviated.

I claim—

1. In carbureting apparatus the combination of a tank, a foraminous partition disposed in the tank above the bottom thereof, a rotary float arranged in the tank below said partition, a hydrocarbon-inlet pipe, a valve on said pipe operatively connected to said float, an air-inlet pipe and means whereby the float will be rotated by air entering the tank through said air-inlet pipe.

2. In a carbureter, the combination with a tank having an air-chamber surrounding the same, of a foraminous partition arranged in said tank and a canal arranged above said partition, a rotary float arranged in the tank below said partition and said float having wings on its periphery, a hydrocarbon-inlet pipe, a valve on said pipe located above the canal on said partition and operatively connected to said float, and a series of nozzles leading downwardly from the air-chamber of the tank and tangentially to the axial center of said float.

3. In a carbureter, the combination with a tank, and a hydrocarbon-inlet pipe leading into said tank, of a foraminous partition arranged in the tank, a valve on said inlet-pipe, a rotary float arranged in the tank below said partition, and adapted to operate said valve, and means for rotating said float.

4. In a carbureter the combination with a tank, of a foraminous partition arranged in the tank and having a canal on its upper surface, a hydrocarbon-supply pipe leading into the tank and discharging into said canal, fibrous material covering said partition and dipping into said canal and an air-inlet leading into the tank below said partition.

5. In a carbureter the combination with a tank, a hydrocarbon-inlet pipe leading into said tank, an outlet-pipe leading from the tank, an air-chamber surrounding a portion of the tank, of a foraminous partition arranged in the tank, an air-inlet pipe leading into said air-chamber, nozzles leading downwardly from the air-chamber into the tank, a rotary float having wings on its periphery, and a valve carried by the hydrocarbon-inlet pipe and operably connected to said float.

In testimony whereof I affix my signature in presence of two witnesses.

MONROE D. COLBATH.

Witnesses:
MABEL A. COOK,
TERENCE B. TOWLE.