Jan. 9, 1923. 1,441,277.

V. E. HAAS.

DEVICE FOR CARBURETING AIR.

FILED JUNE 21, 1919. 2 SHEETS—SHEET 1.

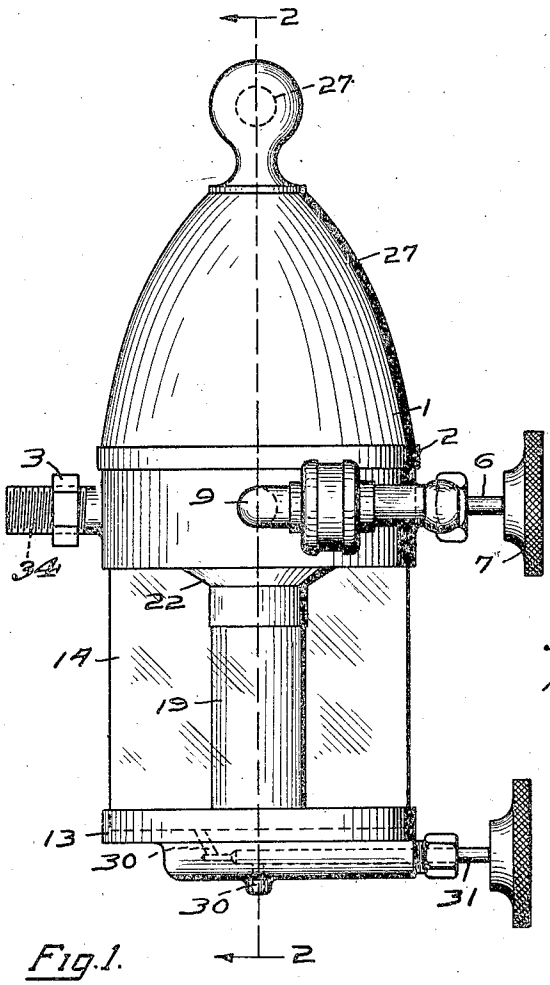


Fig. 1.

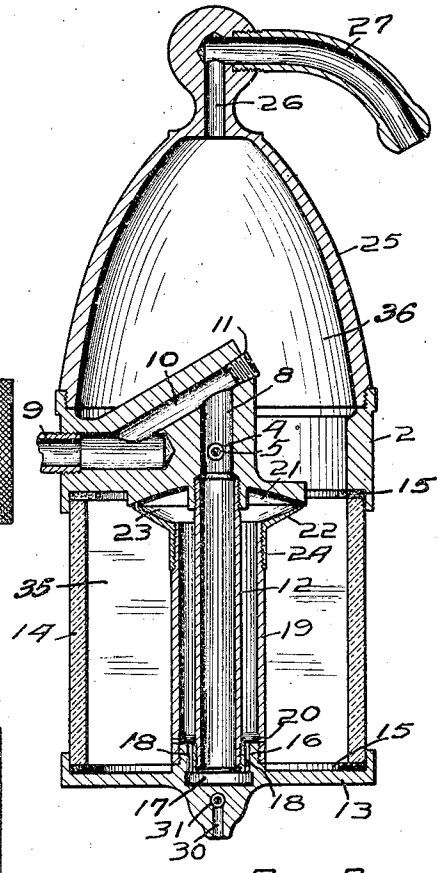


Fig. 2.

INVENTOR

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Owen, Owen & Crampton

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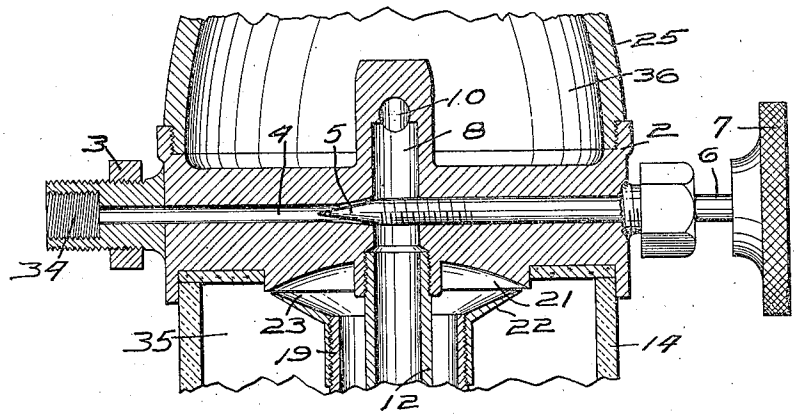


Fig 3.

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Patented Jan. 9, 1923. 1,441,277

UNITED STATES PATENT OFFICE.

VICTOR E. HAAS, OF SYLVANIA TOWNSHIP, LUCAS COUNTY, OHIO, ASSIGNOR OF ONE-HALF TO SAMUEL E. STARR AND ONE-HALF TO WILLIAM E. WALDO, BOTH OF TOLEDO, OHIO.

DEVICE FOR CARBURETING AIR.

Application filed June 21, 1919. Serial No. 305,926.

To all whom it may concern:

Be it known that I, VICTOR E. HAAS, a citizen of the United States, and a resident of Sylvania Township, in the county of Lucas and State of Ohio, have invented a certain new and useful Device for Carbureting Air; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings and to the characters of reference marked thereon, which form a part of this specification.

My invention has for its object to provide a liquid fuel carbureting device that will cause substantially all of the liquid to be atomized, and thus completely separate the liquid that will atomize at ordinary temperatures from the heavier hydrocarbon materials. It also has for its object to provide a means for thoroughly mixing the liquid at ordinary temperatures with air and at the same time giving full opportunity for the heavier liquids or material contained in the fuel to be separated out.

The invention may be contained in constructions of different forms that are within the scope of my claims. To show the practicability of my invention I have selected a construction as an example of constructions containing my invention and shall describe it hereinafter. The construction selected is illustrated in the accompanying drawings.

Figure 1 of the drawings is a side view of the carbureting device selected and Fig. 2 is a vertical sectional view taken through the axis of the carbureting device along the line 2, 2 indicated in Fig. 1.

The carbureting device 1 is provided with a cylindrical frame 2 to which the other parts are directly or indirectly connected. The cylindrical frame 2 is provided with a connector 3 to which a source of liquid fuel supply may be connected. The fuel passageway 34 communicating with the connector 3 terminates in a contracted area 4 that is controlled by the end 5 of the needle valve 6 which is operated by means of the head 7 to control the flow of the fuel into the carbureting device and also to shut off the fuel from the carbureting device. The fuel passageway 34 terminates in a vertical passageway 8 located in the frame 2. A source of air supply under pressure is also connected to the frame 2 by means of the pipe 9. The pipe 9 communicates with a passageway 10 that extends diagonally through the frame 2 and communicates with the vertical passageway 8. The upper end of the passageway 10 may be closed by means of a threaded plug 11. By this arrangement the air enters the carbureting device and passes to a point above the end 4 of the fuel passageway and thus moves downward by the end of the fuel passageway and carries with it the liquid fuel. This prevents the fuel from working back into the pipe 9 which might cause leakage from the carbureting device.

A pipe 12 is connected to the frame 2 and communicates with the lower end of the passageway 8. The lower end of the pipe 12 is connected to bottom 13 of the carbureting device. A cylindrical shell 14 is located intermediate the bottom 13 and the frame 2. The shell 14 may be connected to the frame 2 and the bottom 13 in any suitable way, but in the construction shown, the shell 14 is clamped between the frame 2 and the bottom 13 by means of the pipe 12 which threads into the frame 2 and the bottom 13. The shell 14 is preferably formed of glass and annular washers, preferably of cork, 15 are located intermediate the shell 14 and the frame 2 and bottom 13.

The pipe 12 is threaded into a boss 16 formed on the bottom 13. The lower end of the recess in the boss 16 is cut back to form an enlarged portion 17 that is located below the pipe 12. The boss 16 is also provided with a plurality of passageways 18 that extend upwards from the enlarged portion 17 of the recess formed in the boss 16. A shell or sleeve 19 is threaded onto the boss 16 and forms an annular chamber around the pipe 12. The lower end of the sleeve 19 is provided with a plurality of openings 20, that are located at the upper end of the boss 16. The chamber 35 formed within the shell 14 is filled or partially filled with the liquid fuel, the gasolene passing from the passage-

way 4 down through the pipe 12 up through the passageways 18 and out through the openings 20. The passageway 4 may then be closed by the operation of the pin valve 5 and the air allowed to enter the carbureting device. The air passes through the passageway 8 down through the pipe 12 and upward through the passageways 18. The liquid at the start is forced down through the pipe 12 and up through the passageways 18 and then as the liquid is utilized or is carried upward and out between the frame 2 and the flange 22 it enters the space between the sleeve 19 and the tube 12 through the openings 20 formed in the lower end of the sleeve 19.

The frame 2 is provided with a concave lens shaped surface 21 while the sleeve 19 is provided with a saucer shaped flange 22 whose edge is located within the edge of the concave surface 21. The concave surface 23 of the flange 22 faces the concave surface of the frame 2. The flange 22 may be connected to a threaded sleeve 24 that threads upon the upper end of the shell or sleeve 19 and thus the flange 22 may be adjusted with reference to the concave surface 21 of the frame 2. The mixture of air and gasolene which is carried upward through the sleeve 19 strikes the concave surface 21 and is directed downwardly by reason of the fact that the edge of the flange 22 is located within the edge of the concave surface 21. The air and gasoline form a downwardly directed cone of moving gasoline and air. The larger and heavier particles of fuel strike against the interior wall of the shell 14 and passes down the wall into the liquid in the lower part of the carbureting device.

The carbureting device is provided with an enlarged cap that provides a suitable volume or space within the carbureting device above the surface of the liquid fuel. The cap is preferably in the form of a dome 25. The dome 25 terminates in a passageway 26. A suitable nozzle or connector 27 communicates with the passageway 26 and a flexible pipe of suitable form may be connected to the connector 27. A blow pipe or other instrument requiring the supply of vaporized and air mixed fuel may be connected through the pipe to the carbureting device.

In the operation of the carbureting device, the air under pressure will thus be confined for a short period of time within the sleeve 19 and thoroughly mixed with the fuel contained in the sleeve 19 while it is forcing it up through the sleeve 19 and impinging itself and the fuel against the concave surface 21 and also impinging itself and the fuel against the cylindrical surface of the shell 14, meanwhile thoroughly mixing and atomizing practically all of the liquid material and filling the carbureting device above the surface of the liquid fuel with the atomized fuel and air, and as the air is forced into the carbureting device, the mixture passes up through the chamber 36 of the dome 25 and out through the passageway 26 to the consuming instrument. While the mixture is within the dome 25 full opportunity is given for the heavier portions of a hydrocarbon fuel to fall and drain themselves or be drained back into the lower chamber of the carbureting device and thus nothing but the mixture of vapor and air, or of the fuel in a finely divided state and uncharged with drops of gasoline and air, will pass out through the passageway 26. Since the concave surfaces 21 and 23 particularly, because of the relative location of their edges, produce a downwardly directed spray the less volatile portions of the hydrocarbon fuel will be directed back into the chamber 35 and prevent any unvaporized fuel or any but the liquid fuel in a very finely divided state, from passing up into the dome 25. Furthermore, the mixture of air and fuel, finely divided or vaporized, entering the dome-shaped chamber before finding its exit through the small opening 26, gives ample opportunity for the return of the heavier portions, or unvaporized fuel or fuel which is not in a finely divided state, back into the chamber 35. In the continued operation, the fuel, that is thus returned to the chamber 35, subsequently enters through the openings 20 and is again subjected to the moving current of air to form a mixture of fuel and air which is sprayed from between the surfaces 21 and 23 as previously set forth. Probably most of the air together with the finely divided fuel or vapor will pass immediately from the cone-shaped spray through the dome. The surfaces 21 and 23 being so arranged as to direct the spray diagonally downward as distinct from laterally assists in the separation of less volatile particles and prevents the collection of liquid gasoline in the tubing that leads from the pipe 27. This prevents a sudden spurt of flame from a burner that may be connected to the carbureting device since only vapor or finely divided fuel thoroughly mixed with air will pass to the burner. The coaction of the concave surfaces to direct the unvaporized or the non-finely divided fuel downward and the large transverse area afforded by the dome prevents any disastrous discharge of unvaporized or non-finely divided fuel from the air carbureting device.

When all of the liquid material removable by atomization has been separated from the liquid fuel that is allowed to enter the chamber formed by the shell 14, the residue, the heavy liquid or material, is drawn off. The bottom 13 is provided with an outlet

30 which is controlled by the valve 31 that when opened, allows the heavier liquid to pass through the outlet 30.

I claim:—

1. In an air carbureting device having a chamber for containing liquid fuel, a member having an inverted concave surface located in the upper part of the chamber, a tubular member located substantially in axial alignment with the concave surface, the tubular member having openings near its lower end, means for supplying air under pressure and means for conducting the air to the bottom of the tubular member and in close proximity to the openings and for directing and forcing the liquid air up through the tubular member, the fuel located in the tubular member against the concave surface.

2. In an air carbureting device having a chamber for containing liquid fuel, a pair of substantially concentric tubular members, a member having a concave surface located substantially in axial alignment with the tubular members, the carbureting device having openings extending upward and connecting the inner tubular member with the outer tubular member, the outer tubular member having openings located in proximity to the said openings of the carbureting device, a source of fuel supply, the carbureting device having an opening for supplying the fuel to the chamber through the inner of the said tubular members, means for supplying air under pressure, means for conducting the air above the said fuel opening into the inner tubular member and through the openings of the carbureting device and by the openings of the tubular member and against the concave surface.

3. In an air carbureting device having a chamber for containing liquid fuel, a tubular member having a saucer shaped flange, a member having a concave lens shaped surface extending over the edge of the said lens, means for supplying air under pressure, means for conducting air to the bottom of the tubular member up through the tubular member and through the liquid contained in the tubular member and into the chamber formed by the flange and the lens shaped surface.

4. In a carbureting device having a chamber for containing liquid fuel, a concave member, a tubular member extending to within the cavity of the concave member, means for supplying air under pressure, means for conducting air to the bottom of the tubular member up through the tubular member and through the liquid contained in the tubular member, and thus causing air and gasoline to impinge against the concave surface of the concave member.

5. In a carbureting device having a chamber for containing liquid fuel, a concave member, a member closing the cavity of the concave member except for narrow slit formed between the edges of the members, a tubular member extending to the cavity of the concave member, means for supplying air under pressure, means for conducting air to the bottom of the tubular member up through the tubular member and through the liquid contained in the tubular member, and thus causing air and gasoline to impinge against the concave surface of the concave member.

6. In a carbureting device having a chamber for containing liquid fuel, a concave member, a second concave member, the concave surfaces of said members facing each other and closing the cavity of the concave member except for narrow slit formed between the edges of the members, a tubular member extending to the cavity of the concave member, means for supplying air under pressure, means for conducting air to the bottom of the tubular member up through the tubular member and through the liquid contained in the tubular member, and thus causing air and gasoline to impinge against the concave surface of the first named concave member.

In testimony whereof I have hereunto signed my name to this specification.

VICTOR E. HAAS.