March 1, 1938. E. BURRELL 2,109,878

CARBURETOR SYSTEM

Filed Jan. 30, 1937

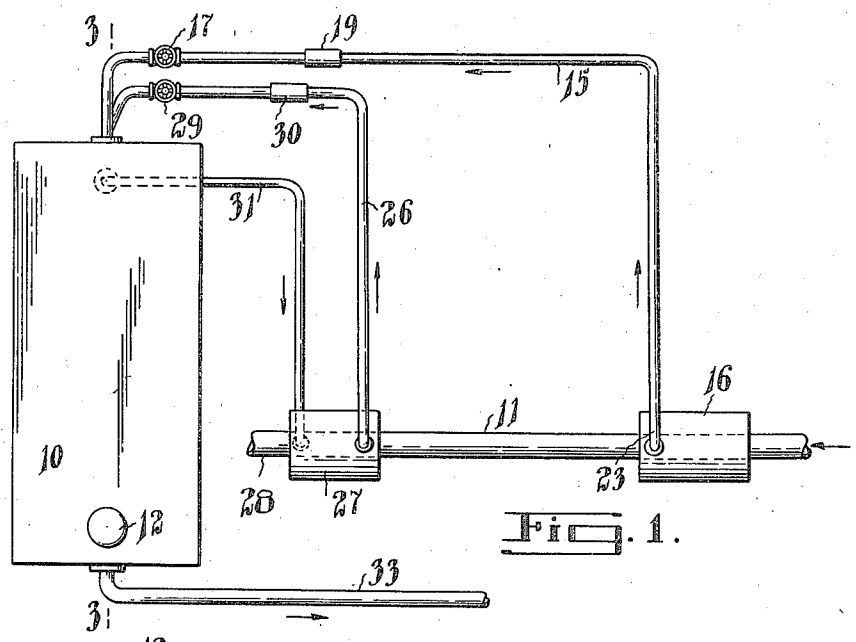


Fig. 1.

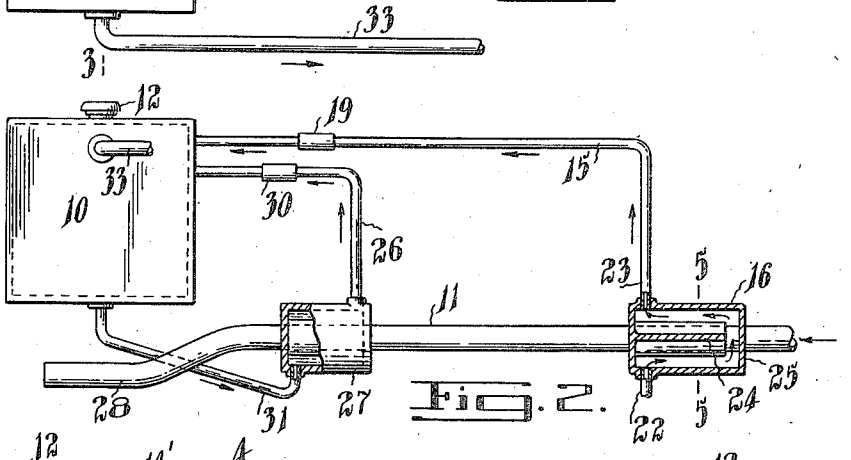


Fig. 2.

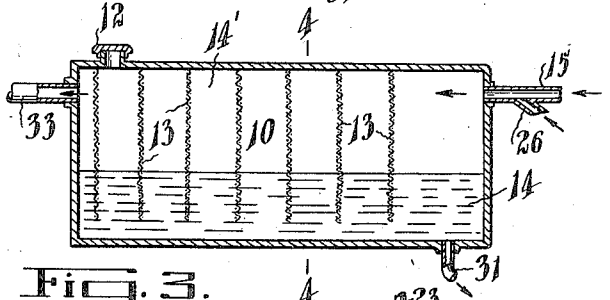


Fig. 3.

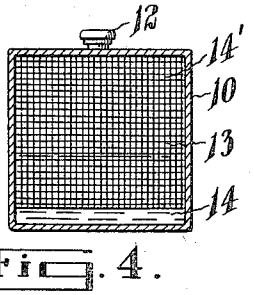


Fig. 4.

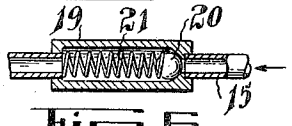


Fig. 6.

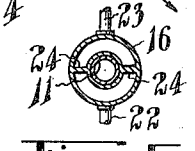


Fig. 5.

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CARBURETOR SYSTEM

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5 Claims. (Cl. 261—15)

The invention relates to carburetors for internal combustion engines, and more particularly to a carburetor system incorporating means for preheating the air and the liquid fuel.

The salient object of the invention is to produce a carburetor structure whereby a more efficient mixture is obtained, resulting in a substantial saving of fuel in the operation of an internal combustion engine.

It has been ascertained that a decided increase in mileage for a given quantity of gasoline is obtainable from an automobile equipped with the present invention over one employing a conventional carburetor.

The invention comprehends the preheating of air preferably by means of circulating it about a hot zone of the exhaust of the engine, and the preheating of the liquid fuel preferably by circulating it about a zone of the exhaust having a more moderate degree of heat, whereby heating of the fuel ensues without appreciable vaporization. The heated air and fuel are introduced into a mixing chamber and drawn through carbureting baffles or screens to effect complete vaporization and commingling of the air and fuel to compose a highly efficient charge.

An outstanding feature of the present invention is that the gasoline supply tank is used as the mixing chamber. This dispenses with the ordinary carburetor on the engine. It is not essential however that such tank be employed in this capacity since a separate chamber might conceivably be used without departing from the spirit and scope of the invention.

Having described the main objects of the invention, subsidiary objects and advantages will be evident as the invention is recounted in greater detail.

Referring to the accompanying drawing,

Figure 1 is a plan view of the invention.

Figure 2 is a side elevation thereof.

Figure 3 is a vertical section of the mixing chamber taken on line 3—3 of Figure 1.

Figure 4 is a cross section thereof taken on line 4—4 of Figure 3.

Figure 5 is a cross section of the air heating chamber taken on line 5—5 of Figure 2.

Figure 6 is a longitudinal sectional detail of a check valve employed in the air and fuel lines.

Like numerals of reference indicate corresponding parts in each figure of the drawing.

The drawing is illustrative of the preferred construction of the invention and depicts a main gasoline supply tank 10 that usually extends crosswise of the rear of a motor car. The tank is ordinarily disposed at a slightly higher elevation than the rear extent 11 of the exhaust pipe of the engine. The tank has the usual fill cap 12.

In performing the invention, a longitudinal series of carbureting screens or baffles 13 are arranged in the tank in the transverse manner shown in Figures 3 and 4. These carbureting elements may depend from the top of the tank and terminate short of the bottom. Wire mesh screens may be used or other material with or without capillary attraction.

The tank will be partially filled with the liquid fuel so as to have a body thereof as at 14 and a vapor space 14' thereover. Conventional means may be employed to regulate the amount of fuel admitted through the fill cap so that the level will not rise beyond a predetermined point in filling the tank. A ball-cock would serve this purpose.

At one end of the tank an air line 15 communicates with the interior and leads off to a preheating chamber 16. The conduit 15 may and will be valve controlled as at 17 and supplied with a check valve 19, which, as detailed in Figure 6, may consist of a ball 20 urged against a seat by a spring 21.

The air preheating chamber preferably comprises a member contiguously mounted on a hot zone of the exhaust pipe 11, which naturally will be a portion in the vicinity of the engine. Said member is shown as of a cylindrical shape having an air inlet nipple 22 diametrically opposed to the outlet 23. It is suggested that diametrically disposed baffles 24 be arranged in the member so as to terminate short of the end 25 in order that air be caused to travel in a circuitous passage before leaving the heating chamber.

A gasoline line 26 is branched off the air line at a point adjoining the tank and conducted downwardly to a fluid heating chamber 27 encircling the cooler zone of the exhaust pipe near its discharge terminus 28. The line 26 is valve controlled at 29 and may or may not be equipped with a check valve, indicated at 30, for the purpose of regulating and precluding back flow. If such a valve is used, it must necessarily be an exceedingly sensitive one in order not to present any appreciable resistance. In actual practice, a ball-check valve has been employed without spring pressure.

The fluid heating chamber forms a receptacle contiguously mounted on the exhaust pipe for the purpose of containing a comparatively small quantity of fuel fed to it by gravity flow from the tank 10 by means of the conduit 31.

The end 32 of the tank opposite the feed lines 15 and 26 has an outlet in the vapor space from which a conduit 33 leads off to the intake manifold of the engine (not shown).

It will be manifest that, according to the preceding system, the operation of the engine will heat air in the chamber 16 and gasoline in the chamber 27, and that due to engine suction these fluids will be drawn into the tank and there mixed and thoroughly carbureted by passage through the screens or baffles; additional vapor is picked up in the tank from the fluid body therein.

It will be observed that an important feature resides in locating the fluid heating chamber at a zone of moderate heat with respect to the exhaust pipe whereby the fluid is heated or partially vaporized, the supply being taken from the main body in the tank and re-admitted thereto in a more volatile condition, which together with the heated air completes the carburetion in the tank.

It will be gathered that while reduction of pressure due to engine suction is equal on the pipe 26 and the pipe 31, the fluid in the pipe 26 is heated by its passage through the heating chamber 27 and therefore its specific gravity or density is reduced. Due to expansion and the vaporized condition of the fuel in the small bore of the pipe 26, the resultant differential is sufficient to enable the fuel to be entrained in the heated air stream by reason of the Y-connection of the pipes 15 and 26. Accordingly, both heated air and fuel are admitted to the tank under engine suction.

What I claim is:—

1. In a carbureting system of the class described, a mixing chamber adapted to contain a main body of liquid fuel with a vapor space thereover, carbureting means therein, an air inlet in advance thereof in communication with the vapor space aforementioned, a heating chamber, means forming a delivery passage between the mixing chamber and the heating chamber below the level of the liquid fuel in the mixing chamber, means forming a return communication between the heating chamber and the vapor space of the mixing chamber in advance of the carbureting means, and a suction outlet communicating with the vapor space of the mixing chamber rearwardly of the carbureting means.

2. In a carbureting system of the class described, a mixing chamber adapted to contain a main body of liquid fuel with a vapor space thereover, means for heating air exteriorly thereof and conducting it to the vapor space thereof, an external heating chamber, conduit means therefor such as to deliver liquid fuel from the mixing chamber and return it thereto concurrently with the ingress of the heated air, and a suction outlet in the vapor space of the mixing chamber and so located as to cause the heated air and fuel to traverse the main body of liquid fuel aforesaid.

3. The combination in a carbureting system of the class described, of a mixing chamber adapted to contain a main body of liquid fuel with a vapor space thereover, a hot-air heating chamber heated by the exhaust passage, an inlet therefor, a conduit leading from the hot air chamber to the vapor space of the mixing chamber, a second heating chamber, conduit means therefor such as to deliver liquid fuel from the mixing chamber and return it thereto concurrently with the ingress of heated air, and a suction outlet in the vapor space of the mixing chamber and so located as to cause heated air and fuel to traverse the main body of fuel aforesaid.

4. The combination in a carbureting system of the class described, of an internally heated pipe, a mixing chamber disposed above the pipe and adapted to contain a main body of liquid fuel with a vapor space thereover, a hot air chamber encircling the pipe, an inlet therefor, a conduit leading from the hot air chamber to the mixing chamber and communicating with the vapor space thereof, a fuel heating chamber contiguously encircling the pipe, a conduit extending from the bottom of the mixing chamber to the fuel heating chamber, a conduit extending from the fuel heating chamber and communicating with the conduit of the hot air chamber in juxtaposition to its entrance to the mixing chamber, and a suction outlet extending from the mixing chamber and communicating with the vapor space thereof oppositely to the conduit of the hot air chamber.

5. The combination in a carbureting system of the class described, of an internally heated pipe substantially horizontally arranged, a mixing chamber disposed above the heated pipe and adapted to contain a main body of liquid fuel with a vapor space thereover, a series of carbureting screens transversely arranged in the mixing chamber and depending from the top thereof and disposed to have their bottom portions immersed in fuel therein, a hot air chamber encircling the heated pipe, an inlet therefor, a conduit leading from the hot air chamber to the mixing chamber and communicating with the vapor space thereof, a fuel heating chamber contiguously encircling the heated pipe, a conduit extending from the bottom of the mixing chamber to the fuel heating chamber, a conduit extending from the fuel heating chamber and communicating with the conduit of the hot air chamber in juxtaposition to its entrance to the mixing chamber, and a suction outlet extending from the mixing chamber and communicating with the vapor space thereof oppositely to the conduit of the hot air chamber.

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