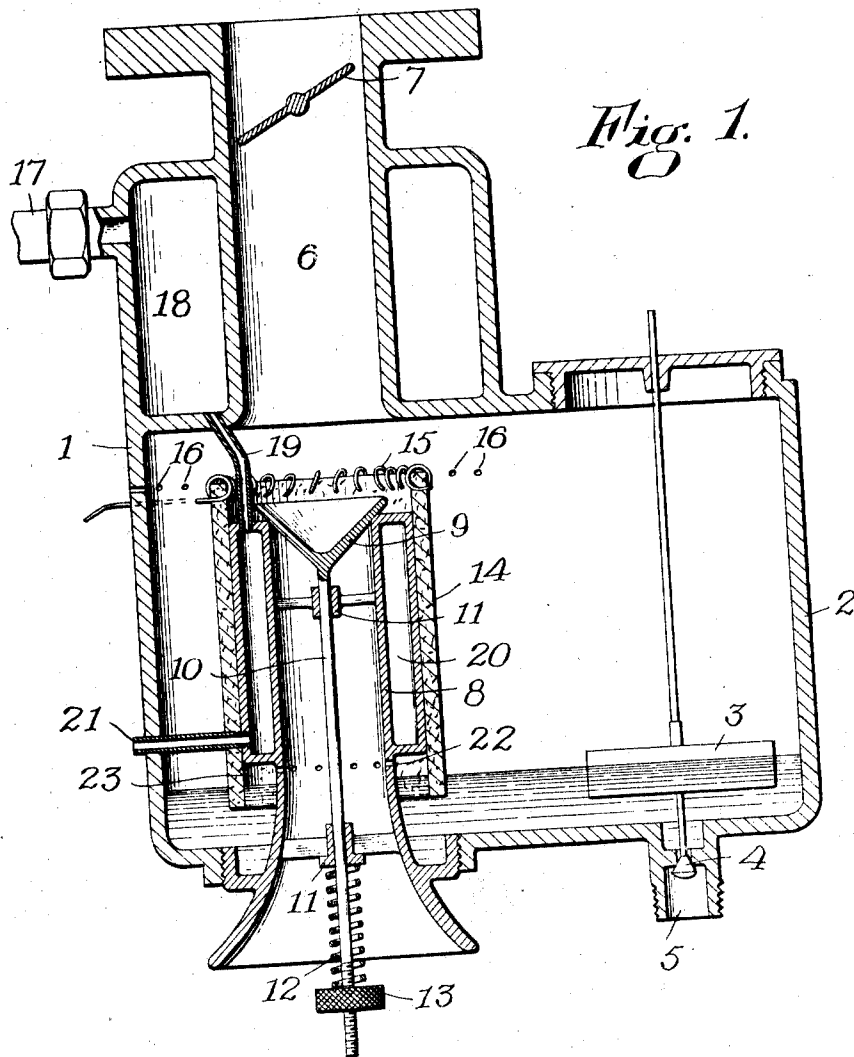


J. F. BEAUMONT AND G. D. MOORE.
 COMBINED VAPORIZER AND CARBURETER FOR LIQUID FUEL.
 APPLICATION FILED SEPT. 1, 1916.

Patented Jan. 18, 1921.
 2 SHEETS—SHEET 1.

1,365,651.



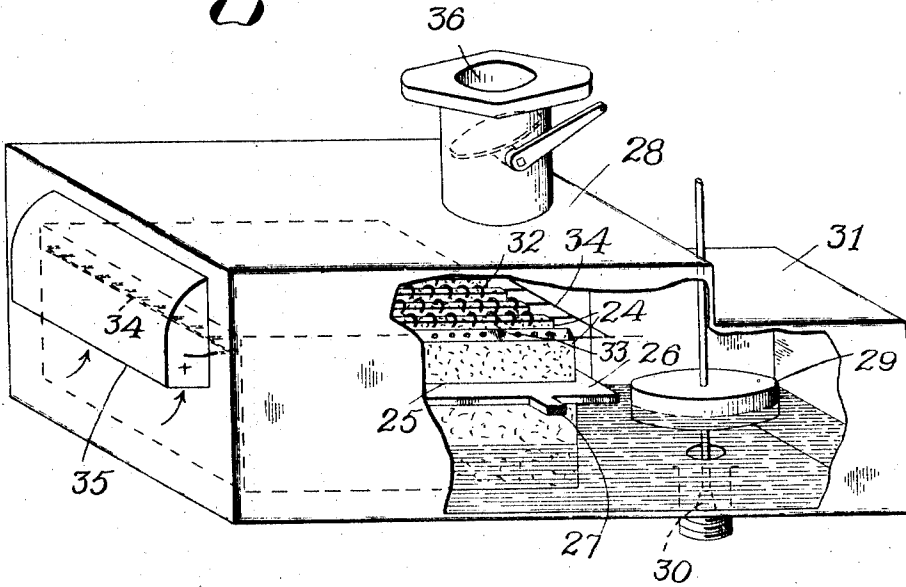
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2 SHEETS—SHEET 2.

Fig. 2.



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JAMES F. BEAUMONT AND GEORGE D. MOORE, OF WORCESTER, MASSACHUSETTS.

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Specification of Letters Patent.

Patented Jan. 18, 1921.

Application filed September 1, 1916. Serial No. 118,597.

To all whom it may concern:

Be it known that we, JAMES F. BEAUMONT and GEORGE D. MOORE, both citizens of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Combined Vaporizers and Carbureters for Liquid Fuel, of which the following, together with the accompanying drawings, is a specification.

The present invention relates to devices for forming a combustible charge, by a mixture of hydrocarbon and air, for use in internal combustion engines and the like. More particularly, the invention is concerned with the vaporization, as distinguished from the aspiration, of the liquid fuel, such as gasoline, kerosene, or other hydrocarbon, whereby the mixture of the same with the air is facilitated and rendered more intimate, and whereby the explosive charge formed by said mixture is capable of complete combustion, to deliver the maximum amount of power, because of the presence of the hydrocarbon in gaseous form, instead of in the form of a more or less finely divided mist.

The invention resides primarily in the embodiment of a principle not heretofore employed in devices of this class, whereby the liquid fuel is subjected in successive small portions to the action of heat, in order to insure its vaporization.

In the accompanying drawings, Figure 1 is a view in section of one such embodiment, illustrating the adaptation of the foregoing principle, and Fig. 2 is a perspective view of a modified form of the invention; but it is to be understood that these constructions which are fully described hereinafter, are illustrative merely, and that the improvements are susceptible of wide variation therefrom, both as regards the instrumentalities employed to carry on the vaporization, and the methods by which the explosive mixture is formed, without departing from the spirit of the invention, as set forth in the appended claims.

Referring by way of example to Fig. 1, 1 indicates a shell, here shown as of general cylindrical form, and having on one side an extension 2 to accommodate a float 3, which may be of the type ordinarily employed in carbureters at the present time in use. This float controls the flow of liquid

hydrocarbon to the shell 1, by means of a valve 4 in a fuel inlet passage 5, it being understood that the level of the liquid in the shell 1 is maintained constant by the action of said float and valve.

The shell 1 provides a passage 6 and a butterfly valve 7 in said passage controls the flow of explosive mixture to the intake manifold of the engine. Preferably in alignment with the passage 6 is an air intake member 8, opening through the bottom of the shell and having a valve 9 seating lightly at its upper end to control the passage of air into the shell. The stem of said valve passes through bearings 11, 11, and carries on its lower end a spring 12 and an adjusting nut 13, by which the force with which the valve 9 is held seated, in opposition to the suction created by the engine cylinders, may be varied at will, in the manner ordinarily adopted in carbureters now in use. The air intake mechanism, so far described, of itself, forms no part of the present invention, except in so far as it offers an advantageous arrangement for the disposition of the fuel vaporizing instrumentalities within the shell 1, both as regards the vaporization of the fuel and the admixture therewith of air, as hereinafter described; but it is to be understood that any other arrangement of air intake devices may be employed, the member 8, in the form shown, being illustrative merely of an expedient adopted to provide support for the vaporizing instrumentalities, as hereinafter described; obviously, any other means of support or suspension may be employed.

To the above ends, the member 8 is made of sufficient diameter to fit snugly within and support a tubular wick 14, whose lower end, as shown, projects below the level of the liquid fuel in shell 1, as maintained therein by the float 3. The upper end of said wick preferably extends above, and surrounds the valve controlled outlet of member 8. The invention contemplates the application of heat, in order to vaporize the liquid fuel, with which the wick 14 becomes saturated, and to this end an electric resistance element, preferably a wire 15, as shown, is employed, the ends thereof being connected to a battery or other source of electrical supply. The wire 15 may with advantage be sewed or otherwise drawn through the fabric of the wick, near the upper edge thereof,

in successive loops, as shown in the drawing, it being obvious that this disposition of the heating element enables a wire of considerable length to be employed and brings
5 a considerable portion of its surface into actual direct contact with the liquid to be evaporated.

The action which occurs when a current is passed through the wire 15 is closely akin
10 to what takes place in an ordinary oil burning lamp, using a wick; in the lamp the fuel is consumed at the top of the wick, while in the present instance, there is no combustion of the fuel, but enough heat is supplied, at
15 a proper temperature, to vaporize the liquid, and thereby to promote precisely the same capillary movement of the liquid upward through the wick, as occurs in the case of the lamp. The vapor thus driven off by heat
20 from the liquid with which the top of the wick is continually replenished, mixes with air drawn by suction of the cylinders past the valve 9, and also, if desired, with air entering shell 1 through a series of permanent apertures 16, 16, preferably surrounding the wick in the zone where vapor is thus
25 formed, the mixture passing to the engine as a dry gas, free from the mist or moisture characterizing the mixture in devices where the liquid fuel is aspirated.
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With the engine running, a portion of the hot exhaust gases therefrom may, if desired, be led by a pipe 17 into a jacket 18 surrounding the passage 6, in order to heat the mixture; moreover, these exhaust gases may be
35 led by a pipe 19 into a jacket 20, with the wall of which the wick 14 is in contact for practically its entire length, said gases discharging through a pipe 21 to the atmosphere. The heat radiated by jacket 20
40 through the wick not only promotes the capillary action above referred to, but causes rapid evaporation of the liquid over the entire outside surface of the wick, and thereby, once the engine has been started, may,
45 in many cases, dispense with the necessity of continuing the electric current through the wire 15. The vapor thus produced mixes with the air to form the combustible charge
50 for the engine; if desired, additional air may be supplied through openings 22 in member 8, said air passing into a space 23 inclosed by wick 14, and becoming thoroughly impregnated with vapor in passing through
55 the porous material of the wick, or through the liquid into which said wick dips.

It will be clear that the term "wick" as used herein and in the appended claims is in no sense to be construed as a limitation,
60 but that it contemplates any element or material, of a fibrous nature or otherwise, which is capable of adaptation to the broad principle which constitutes the essence of the present invention, namely the application of heat to evaporate liquid fuel sup-
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plied by capillary action. Moreover, it is obvious that the form, configuration, number and arrangement of "wicks" used to carry out the invention is immaterial.

For example, in the form of the invention
70 illustrated in Fig. 2, a plurality of longitudinally elongated wicks 24 are provided, the same, for convenience of support, being disposed upright in longitudinal slots 25 of a frame 26. The latter is supported in any
75 suitable manner, as by lugs 27 within a shell or casing 28, so that the lower edges of the wicks 24 are submerged in the liquid fuel contained in the bottom of said casing. The level of liquid fuel may be maintained constant by a float 29 and valve 30, as in the
80 previously described form, these parts being disposed, if desired, in an extension 31 of the casing 28.

The same method of applying heat to the
85 wicks 24 may be employed, as in the previously described form, namely by looping a wire 32, or other resistance element, through the fabric of each wick, or, if desired, a resistance element in the form of a
90 metallic strip 33, perforated, if desired, as shown on one of the wicks 24 in Fig. 2, may be doubled over to embrace the edge of the wick. At each end, each of the resistance elements may be connected to a bar or lead
95 34, and the two bars 34 placed in circuit with a source of electrical supply. Air entering through an opening 35 at one end of the shell passes over the wicks 24 and mixes
100 with the fuel, driven off by heat, in the form of vapor, therefrom, as in the previously described form. The combustible mixture thus formed is drawn from the opposite end of casing 28 through the usual valved passage 36 which is connected with the mani-
105 fold of the engine.

We claim,

1. In a carbureter for an internal combustion engine, the combination with a vertical support for a capillary wick, a capillary wick extending above said support and having its lower end immersed in a liquid fuel, of an electric heating element engaging the upper and exposed edge of said wick, consisting of a spiral coil of wire with each
115 convolution passing through the edge of the wick.

2. In a carbureter for an internal combustion engine, the combination with a vertical support for a capillary wick, and a capillary
120 wick exposed above said support and having its lower end immersed in a liquid fuel, of an electric heating element engaging the upper and exposed edge of said wick, with portions of said heating element extending
125 into the atmosphere above the edge of the wick.

3. In a carbureter for an internal combustion engine, a framework provided with longitudinal slots, capillary wicks held in
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said slots, with their lower ends immersed in a liquid fuel and with their upper ends exposed, and an electric heating element engaging the upper exposed edges of said wicks, consisting of a spiral coil of wire, with each convolution passing through the edge of the wick.

4. In a carbureter for an internal combustion engine, comprising a support for a capillary wick having its upper end exposed above said support with its lower end immersed in a liquid fuel, of an electric heating element embracing the upper and exposed end of said wick.

5. In a carbureter for an internal com-

bustion engine, comprising a support for a capillary wick having its upper end exposed above said support, with its lower end immersed in a liquid fuel, of an electric heating element in direct contact with the upper and exposed edge of said wick wholly above said support, with a portion of said heating element exposed to the atmosphere above said support.

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Witnesses:

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NELLE WHALEN.