J. N. LEACH.

HYDROCARBON BURNER FOR AUTOMOBILES.

APPLICATION FILED MAY 8, 1907.

946,605. Patented Jan. 18, 1910.

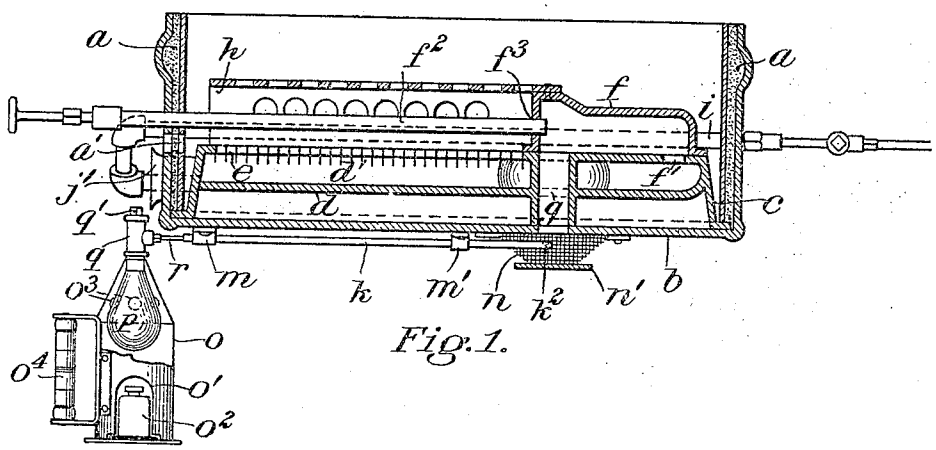

Fig. 1.

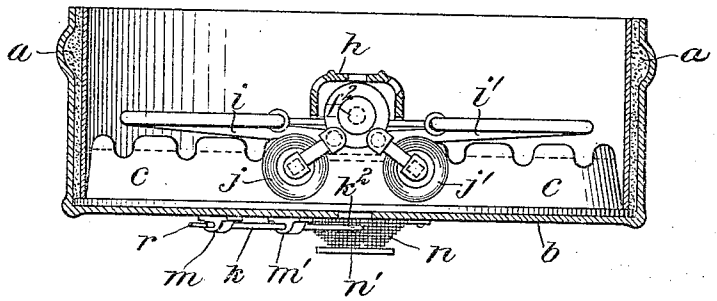

Fig. 2.

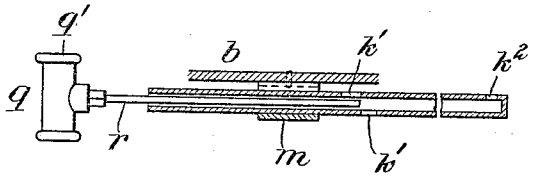

Fig. 3.

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UNITED STATES PATENT OFFICE.

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HYDROCARBON-BURNER FOR AUTOMOBILES.

946,605. Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed May 8, 1907. Serial No. 372,560.

To all whom it may concern:

Be it known that I, JOHN N. LEACH, a citizen of the United States, residing at Melrose, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Hydrocarbon-Burners for Automobiles, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to hydrocarbon burners for automobiles and more particularly to improvements therein for facilitating the production of the initial charge of vapors to start same.

The main object of the invention is to provide an automobile burner wherein the vaporizer for the pilot burner will be subjected to the action of a flame from the burner plate of said burner, sustained by gases or vapors discharged into the mixing chamber of said burner from an independent vaporizer disposed exteriorly of the burner casing, thus permitting the maintenance of a continuous flame without the necessity of introducing volatile fluids within the burner or providing openings in the casing for the purpose of causing flames from a hand burner disposed exteriorly thereof to impinge upon the said torch vaporizer, or the vaporizer of the main burner.

A further object is to provide an automobile burner wherein the auxiliary vaporizer may be readily attached to and detached from other parts of the initial lighter forming permanent parts of the burner structure, in a manner to permit a convenient starting of the main burner, while insuring such a positioning of the vaporizer as to insure the proper mixture of air and vapors prior to their discharge into the torch mixing chamber.

A still further object is to provide a duct transmitting the gases from the auxiliary vaporizer to the said mixing chamber, in a manner which will leave no openings or vents to the said mixing chamber which, when the burner has been ignited, will admit air thereto in a manner to reduce the quality of the mixture of gases in the said mixing chamber.

A still further object is to provide such shields or guards for the mixing tube of the torch or primary burner as will cause the gases from the initial lighter vaporizer to pass through the said mixing tube to the torch mixing chamber and prevent their passing from said tube to the open air.

A still further object is to provide a combination of parts which will permit the use of the torch mixing chamber and burner plate to produce the initial charge of vapors for the ignition of gases generated in the torch vaporizer. And a still further object is to provide a compact auxiliary vaporizer which will generate vapors from alcohol, or other volatile fluids, and mix and discharge same constantly into the torch or primary burner mixing chamber, thus avoiding the inconvenience incidental to the use of a hand torch, or the exposure of parts of the torch vaporizer exteriorly of the burner casing when it will be subjected to the air while the burner is in operation.

The invention consists primarily in the combination with a hydrocarbon burner embodying therein a burner casing, a torch or primary burner plate, means forming a mixing chamber therefor, a mixing tube open exteriorly of said casing and discharging into said mixing chamber and a vaporizer heated by the flame from said burner plate, of an auxiliary mixing tube discharging into said mixing chamber, and a vaporizer inlet or inlets adjacent to its outer end, an auxiliary vaporizer, means whereby hydrocarbon may be supplied thereto, a discharge nozzle therefor, adapted to discharge vapors into said auxiliary tube adjacent to said air inlet or inlets and means subjecting said auxiliary vaporizer to heat, to volatilize the fluids therein; and in such other novel features of construction and combination of parts as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings: Figure 1, is a longitudinal section of a hydrocarbon burner embodying my invention; Fig. 2, is a cross section through the burner casing showing the various burner plates and the parts of the initial lighter forming per-

manent parts of the burner in elevation, and Fig. 3, is a view of the end of the auxiliary mixing tube in section, and the discharge nozzle of the auxiliary vaporizer positioned relative thereto, on a larger scale.

Like letters refer to like parts throughout the several views.

In the embodiment of my invention shown in the drawings, I have illustrated it as being applied to a type of burner already patented to me in and by Letters Patent No. 783,727 of Feb. 28, 1905; and as such is the preferred form of the invention, I will describe it more particularly in connection with such detailed form of burner although such is merely illustrative of a type.

In the drawings, I have indicated at *a*, an ordinary burner casing having a bottom closed by means of a bottom plate *b*. Within said casing *a* is a main burner casting *c* the upper plate of which has a plurality of burner openings therein and is so spaced away from the bottom plate *b* as to form a main burner mixing chamber under said plate. Extending diametrically across the casting *c* is a horizontal transversely dished partition *d* forming the bottom of a trough constituting a mixing chamber below and for the primary or torch burner plate *e*. Disposed above said plate at one end thereof and within the casing *a*, is a mixing tube *f* communicating with the primary or torch mixing chamber, which for convenience of description I have marked *d'*, by means of an opening *f'*, and which is adapted to receive the discharge nozzle of the primary burner vaporizer f^2 by having same inserted in an opening f^3 in the forward perpendicular wall thereof. Extending through both the primary and the main burner mixing chambers, and opening outwardly and downwardly through the bottom plate *b*, is an air inlet tube *g* opening into the mixing tube *f* immediately inside of, and below, the opening f^3, so that as the vapors are discharged from the nozzle of the vaporizer f^2 they will by an inspirative action draw in sufficient air to secure the proper mixture of vapors and air.

The burner plate *e* is inclosed by the usual hood *h* and the main burner plate *c* has positioned above it in the usual and well known manner, vaporizers *i i'* discharging through the tubes *j j'* into the burner mixing chamber, a portion of each said vaporizer *i i'* adjacent to the discharge end thereof being disposed above the burner plate *e* in a manner to cause said vaporizer or vaporizers to be subjected to the flames from both said burner plates. I provide the casing *a* with a small opening *a'* adjacent to the burner plate *e* to permit the insertion of a match or other device for ignition purposes.

The construction of the vaporizer f^2 forming no part of this invention will not be described in detail.

Heretofore it has been the general practice to start automobile burners in one of three ways. The first of these ways has been by providing a suitable opening in the casing adjacent to the point of entrance of the vaporizer, and using an ordinary plumber's torch to heat the vaporizer through this opening, a practice which by reason of the necessity for the judging of the proper temperature of the vaporizer so as to volatilize the first oils permitted to flow thereinto, frequently resulted in the flooding of the burner with a resultant fire, not under control, or the fouling of the boiler tubes. The second of these practices has been to provide a trough below the vaporizer and either pour the alcohol or gasolene thereinto and ignite same, or saturate a wick therewith and after igniting it allow it to rest therein. This practice has proved unsatisfactory owing to the difficulty of securing the maintenance of the flame for a sufficient period to bring the parts within the casing to the desired high temperature, and also because of the difficulties and inconvenience of placing the alcohol within the closed casing, and the creation of objectionable fumes and smoke through the imperfect combustion thereof and the resultant annoying odors and fouling of the boiler tubes. The third practice has been to expose a portion of the vaporizers exteriorly of the burner casing, and arrange a burner or trough thereunder so that the said exposed portion will have the flames from the fluid or from the wick impinge directly thereon. This practice is objectionable in that, necessarily, but a small portion of the vaporizer can be subjected to the action of the said flame, and any vapors generated are ordinarily compelled to travel through cold pipes; thus tending to condense the vapor being discharged into the mixing tube. Inasmuch as the presence of oil within the burner will always cause objectionable fumes to be thrown off, it is desirable in starting the burner to have conditions as near as possible like those present when the burner is running to capacity. It will be observed that all of these practices referred to are mere make-shifts and do not establish such conditions.

I aim to produce an initial lighter which will utilize the ordinary active elements of the burner in a manner practically identical with their ordinary functions, and to thus generate the vapors or gases in the torch vaporizer with the initial torch, in practically the same manner as when said torch is acting to produce a permanent flame in the usual and well known manner. With this aim in view I provide a tube *k* positioned beneath the bottom plate *b* by means of the straps *m m'*, the outer end of which

is open and the inner end closed, the said tube being provided with an opening k^2 adjacent to its closed end. The outer end of this tube is positioned contiguous to the perimeter of the burner casing to one side of the main burner and the inner end discharges through the opening k^2 into the tube g or below same in a manner to cause the vapors passing through said tube k, which for convenience of expression I term the auxiliary or initial lighter mixing tube, to be forced by the pressure from the initial torch into the mixing chamber. This tube adjacent to the outer end thereof has a plurality of air inlets k' through which air is drawn and mixed with the incoming vapors passing through the said auxiliary mixing tube.

Owing to the tendency of any air currents beneath the burner, creating a back draft such as will tend to reverse the draft and prevent the said vapors flowing into the mixing chamber d' I inclose the mouth of the tube g and the discharge end of the auxiliary tube k by a reticulated or foraminated shield n, having a similarly constructed bottom plate n' secured to the bottom thereof, in a manner to divert the air through the openings in the said shield. This construction will also serve to overcome the whistling effect produced by the burner when in rapid motion.

To supply the vapors necessary to secure the combustible mixture introduced to the chamber d' through the auxiliary tube k, the tube g, and the mixing tube f, I provide an auxiliary generator adapted to be removably attached relative to the burner in a manner to discharge the vapors produced therein into the said tube k adjacent to the air inlet openings k' therein. This generator comprises a casing o having an opening o' therein through which an ordinary wick burner lamp is adapted to be inserted into the said casing o. The upper part of said casing is reduced as shown and has a plurality of draft openings o^3 therein. For the convenient handling of the said auxiliary generator, I provide it with a handle o^4 pivotally connected thereto. Mounted in the upper part of said casing o is a retort p having an enlarged base or lower part, and a constricted mouth near the top of said casing. Closing said mouth is an ordinary T-fitting q, having its upper lead closed by means of a screw plug q'. Extending from the other end of said fitting and secured thereto by a proper union is a rigid pipe r, the free end of which is reduced to form a discharge nozzle. The diameter of this pipe r is such as to fit within the auxiliary mixing tube k and its length is such as, when placed therein, to bring the discharge nozzle of the said pipe between and forwardly of some part of the opening k' in a manner to cause the jet discharged from said nozzle to draw atmospheric air through said openings and mix it with the vapors in said jet in a manner to make the mixture highly combustible.

The retort p is so constructed as to present a large area to action of the flame from the burner o^2, and to constrict the upper portion thereof wherein the gases must accumulate in order to develop such pressure as to insure sufficient velocity of the flow of gas from the nozzle of the pipe r; thus insuring the proper inspirator action of said jet to secure the desired mixture with atmospheric air. The arrangement of the auxiliary vaporizer shown in the drawings is especially designed for use with alcohol, such being found to be particularly adapted for use in an initial lighter of this character.

The operation of the burner proper being immaterial to this invention, will not be described except insofar as may be necessary to understand the purpose and mode of operation of the initial lighter, and those parts having a function common to both the initial lighter and the main burner. To start the burner, the retort p having been partially filled with alcohol, by the removal of the plug q' which is afterward replaced, the lamp or burner o^2 is ignited and positioned within the casing o as is shown in the drawings, the auxiliary generator being as a matter of convenience detached from the burner proper. As the alcohol within the retort becomes heated and vapors are discharged from the pipe r, the said generator by means of the handle o^3 is attached to the burner proper by inserting the pipe r within the auxiliary mixing tube k with the discharge nozzle thereof positioned as shown in Fig. 3. As the vapors are discharged from said pipe, the jet passing the said openings k' draws air into said tube and mixes it with the vapors in a manner to produce combustible gas which is discharged within the reticulated or foraminated casing n below the tube g. From this point of discharge it passes through the said tube to the mixing tube f and through the opening or port f' thereof into the mixing chamber d' passing about said tube in such a manner as to become thoroughly diffused about said chamber, from which it passes through the openings in the burner plate e in the primary burner or torch. The gases passing through said openings are ignited by any desired means inserted through the opening a' in the casing a, and as the generator o acts continuously to supply gases to said mixing chamber, said flame may be maintained as long as desired to raise the temperature of the vaporizer f^2 to a point where it will volatilize the oils therein, said vaporizer being subjected to substantially the same volume of flame as when the burner proper is in full operation. It will thus be seen that in pro-

ducing the initial charge of vapors for the primary burner or torch, the same conditions exist as in running the burner, thus insuring the production of the initial charge without liability of flooding the burner. When the said vaporizer has reached a red heat, oil may be introduced thereto slowly until the full initial charge of vapors has been developed and generated, and then the full volume of oil may be turned on, the vapors generated being expelled from the said vaporizer through the discharge nozzle thereof, to the mixing tube f, and the mixing chamber d' in the usual and well known manner. The flame from the burner plate e will thereafter be sustained by the gases generated in the vaporizer f^2, and the auxiliary generator may be detached from the burner proper and the flame of the burner o^2 extinguished.

It will be observed that the casing n and the cap or plate n' thereof serve to confine the gases discharged into the said casing and prevent their being drawn away by drafts or air currents beneath the bottom plate b. This casing also serves to prevent said current reversing the direction of the flow through the tube g in a manner to draw the gases from the mixing chamber d' both during the period while the initial lighter is being operated, and while the burner itself is in operation. It will also be observed that the mixing tube f and tube g while having the useful function as to the burner proper, serve merely as conduits relative to the initial lighter.

It is not my intention in this application, to claim the construction of the burner proper either broadly, or in combination, except as to those parts thereof which enter into the combination necessary for the successful operation of the initial lighter. I believe, however, that it is broadly new to provide a construction of automobile burner wherein the initial lighting is accomplished by the discharge of vapors or gases into the primary burner or torch mixing chamber from an auxiliary generator the vapors from which burn at the primary burner orifices and heat the primary vaporizer and the primary vaporizer being arranged to heat the vaporizer of the main burner. It is not my intention, therefore, to limit the claims to the details of construction shown in the accompanying drawings, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent is:—

1. In a hydrocarbon burning apparatus, the combination with a burner casing, means forming a primary burner mixing chamber having a burner orifice, a mixing tube open exteriorly of said casing and discharging into said mixing chamber and a vaporizer heated by the flame from said burner orifice discharging into said mixing tube; of an auxiliary mixing tube discharging into said auxiliary mixing tube adjacent having an air inlet, an auxiliary vaporizer having a nozzle adapted to discharge vapors into said auxiliary mixing tube adjacent to said air inlet, and means whereby said auxiliary vaporizer may be subjected to heat to volatilize the hydrocarbon therein.

2. In a hydrocarbon burning apparatus, the combination with a burner casing, means forming a primary burner mixing chamber having a burner orifice, a mixing tube discharging into said mixing chamber, a tube leading from said mixing tube and open exteriorly of the bottom of said casing and a vaporizer heated by the flame from said burner orifice and discharging into said mixing tube; of an auxiliary mixing tube attached to the bottom of said casing and discharging below and into the open end of said second-mentioned tube and having an air inlet, an auxiliary vaporizer having a nozzle adapted to discharge vapors into said auxiliary mixing tube adjacent to said air inlet, and means whereby said auxiliary vaporizer may be subjected to heat to volatilize the hydrocarbon therein.

3. In a hydrocarbon burning apparatus, the combination with a burner casing, means forming a primary burner mixing chamber having a burner orifice, a mixing tube discharging into said mixing chamber, a tube leading from said mixing tube and open exteriorly of the bottom of said casing and a vaporizer heated by the flame from said burner orifice and discharging into said mixing tube; of an auxiliary mixing tube attached to the bottom of said casing and discharging below and into the open end of said second-mentioned tube and having an air inlet, a reticulated or foraminated shield inclosing the open end of said second-mentioned tube and of said auxiliary mixing tube, an auxiliary vaporizer having a nozzle to discharge vapors into said auxiliary mixing tube adjacent to said air inlet, and means whereby said auxiliary vaporizer may be subjected to heat to volatilize the hydrocarbon therein.

4. In a hydrocarbon burning apparatus, the combination with a burner casing, means forming a primary burner mixing chamber having a burner orifice, a mixing tube discharging into said mixing chamber, a tube leading from said mixing tube and open exteriorly of the bottom of said casing, and a vaporizer heated by the flame from said burner orifice and discharging into said mixing tube; of an auxiliary mixing tube attached to the bottom of said casing and

discharging below and into the open end of said second-mentioned tube and having an air inlet, a reticulated or foraminated shield inclosing the open end of said second-mentioned tube and of said auxiliary mixing tube and having a cap or base below the same, an auxiliary vaporizer having a nozzle adapted to discharge into said auxiliary mixing tube adjacent to said air inlet, and means whereby said auxiliary vaporizer may be subjected to heat to volatilize the hydrocarbon therein.

In witness whereof I have hereunto affixed my signature this twenty-fifth day of April, 1907, in the presence of two witnesses.

JOHN N. LEACH.

Witnesses:
N. L. FROTHINGHAM,
A. A. ASHMAN.