L. L. YODER & F. A. VICKERY.

AUTOMATIC FUEL VAPORIZER.

APPLICATION FILED JUNE 28, 1917.

1,273,565.

Patented July 23, 1918.

2 SHEETS—SHEET 1.

Fig. 1

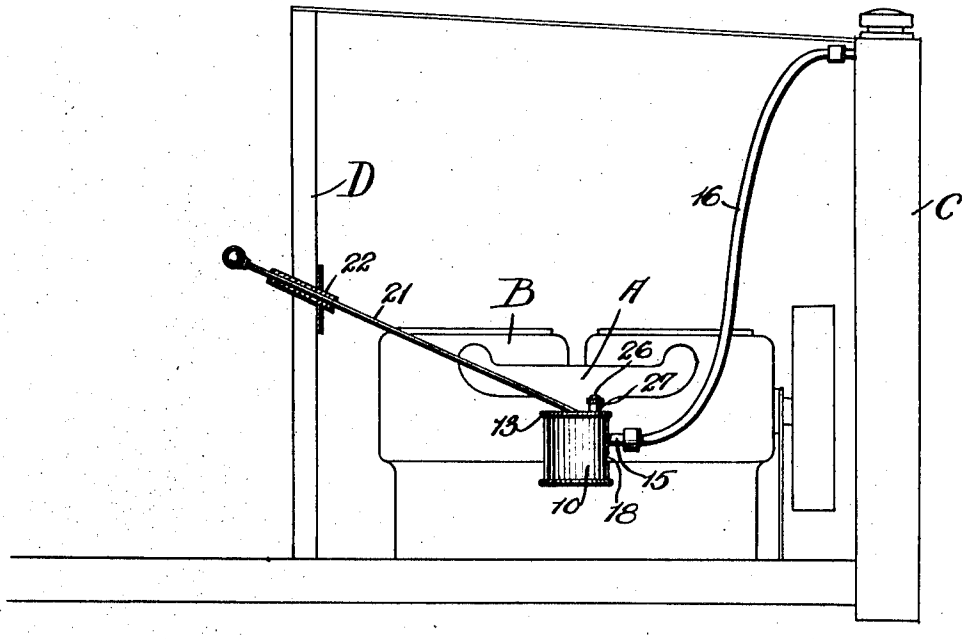
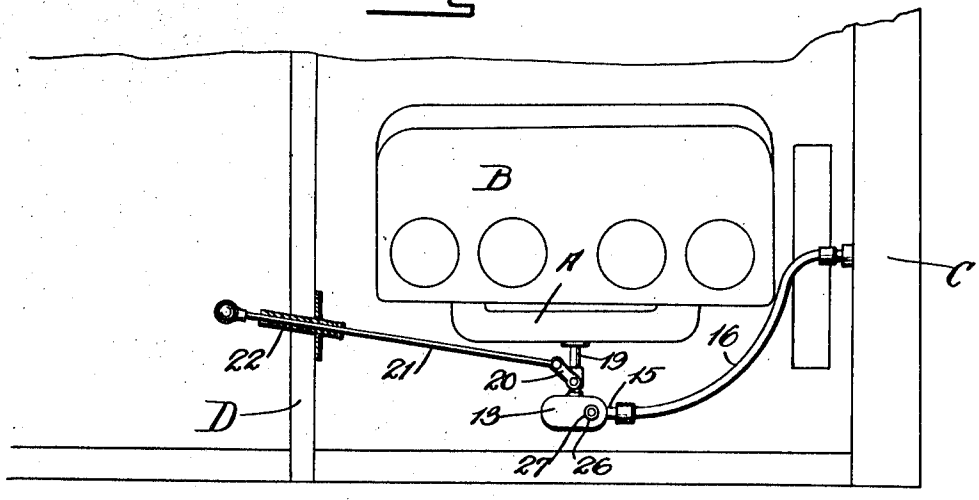


Fig. 2



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2 SHEETS—SHEET 2.

Fig. 3.

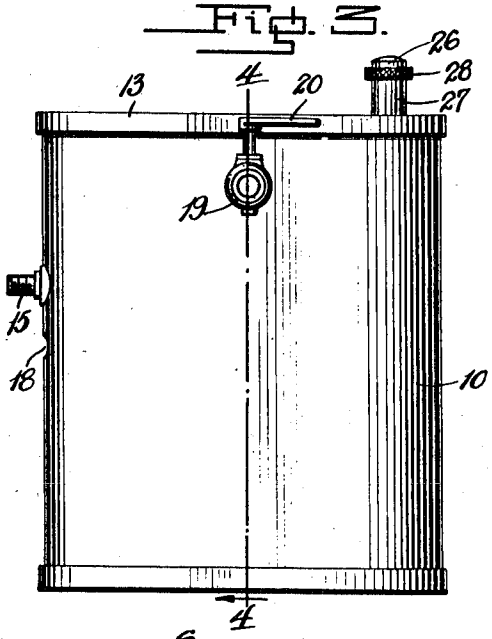


Fig. 4.

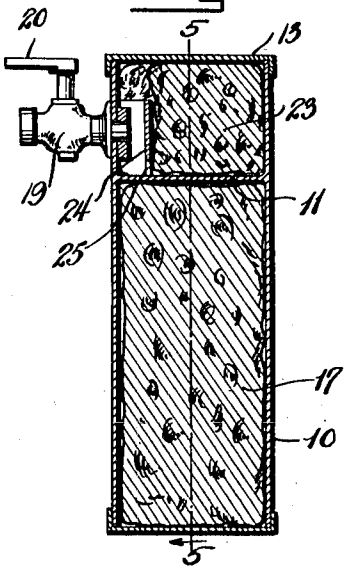


Fig. 5.

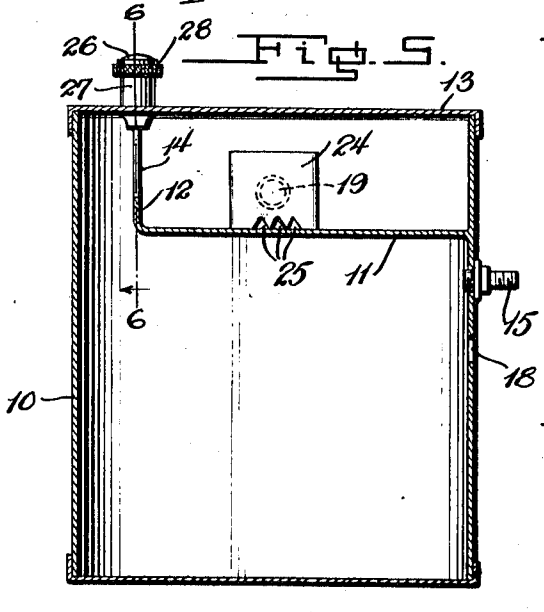


Fig. 6.

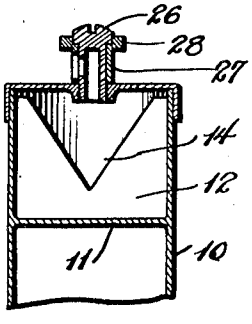
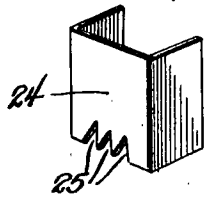


Fig. 7.



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UNITED STATES PATENT OFFICE.

LEVI L. YODER AND FRANK A. VICKERY, OF PORTLAND, OREGON.

AUTOMATIC FUEL-VAPORIZER.

1,273,565. Specification of Letters Patent. Patented July 23, 1918.

Application filed June 28, 1917. Serial No. 177,601.

To all whom it may concern:

Be it known that we, LEVI L. YODER and FRANK A. VICKERY, citizens of the United States, and residents of Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Automatic Fuel-Vaporizers, of which the following is a specification.

The present invention relates to internal combustion engines, and more particularly to an attachment to be applied to the intake manifold for supplying moistened air to the charge as the latter is delivered into the engine.

An object of the present invention is to provide a device for drawing heated vapor from a suitable source of heated water supply, such as the radiator of a water-cooled internal combustion engine, to admix with the vapor a quantity of air, and to then deliver the admixture to the manifold to commingle with the charge and thoroughly break up and vaporize the particles thereof which usually burn when delivered to the cylinder and form carbon deposits therein; thus not only effectively preventing the formation of carbon in the engine, but also insuring and increasing the efficiency of the engine, and economizing in the consumption of the fuel.

The invention further aims at the provision of a device of this character which is automatic in action without the provision of any adjusting means or other devices which must be operated and fixed for engines varying in size, and for various speeds of the engine. The device of this invention is so constructed as to automatically feed the desired proportions of air and vaporized water to the charge as it enters the cylinders of the engine, so that the device may be readily installed on various types of gas engines, and will automatically adapt itself to varying speed conditions, or the suction of the engine.

The above, and various other objects and advantages of this invention will be in part described, and in part understood, from the following detailed description of the present preferred embodiment, the same being illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevation of a fuel vaporizer constructed according to the present invention and as applied to an internal combustion engine for automobiles.

Fig. 2 is a top plan view of the same.

Fig. 3 is a detail side elevation of the body part of the fuel vaporizer, enlarged, and the inner side of the same being shown.

Fig. 4 is a vertical section taken substantially centrally through the same on the line 4—4 of Fig. 3.

Fig. 5 is a longitudinal section taken in an edgewise direction on the line 5—5 of Fig. 4.

Fig. 6 is a fragmentary sectional view of the upper end of the body part taken on the line 6—6 of Fig. 5 and looking in the direction of the arrow.

Fig. 7 is a detail perspective view of a shield employed in the body part.

Referring to these drawings, 10 designates the casing or body of the fuel vaporizer which is of relatively flat formation, and which is adapted to be connected to one side of the intake manifold A of the internal combustion engine B.

The casing 10 is divided into upper and lower compartments by the provision of a horizontally extending partition 11 which extends substantially the entire length of the body 10, and which is upturned at one end to provide a vertical wall 12 forming, together with the adjacent end of the casing 10, a restricted passage or neck portion leading from the lower compartment. The partition wall 11 is preferably arranged near the upper end or top 13 of the body 10 to form a relatively large lower compartment, and a relatively small upper compartment. The wall 12 extends at its lateral edges to the top or cover 13, and is provided intermediate its lateral edges with a substantially V-shaped opening or port 14 intercommunicating the upper and lower compartments.

An attaching nipple 15 is secured through one end of the body 10 below the partition wall 11, and is adapted to be connected to a vapor supply tube 16 which may be flexi-

ble or otherwise, and which is connected at its opposite end to the upper portion of the radiator C of the internal combustion engine B. The tube 16 is adapted to withdraw heated air and vapor from the top of the radiator C and deliver the same into the lower compartment of the body 10. The lower compartment of the body 10 is substantially filled with an absorbent body or mass 17, preferably of sponge adapted to absorb and retain the vapor delivered to the lower compartment through the pipe 16. The body 10 is also provided, preferably at a point below the nipple 15, with an overflow opening 18, through which may be drained water accumulating in the lower end of the body 10. This latter condition may arise when the water in the radiator C reaches the boiling point, and the heavy vapor or boiling water is drawn into the pipe 16 and delivered into the body 10.

The body 10 is further provided, upon its inner side, or the side adjacent the intake manifold A, with an outlet nipple 19, in the form of a valve adapted to be attached to the manifold A for delivering vaporized air and water from the body 10 to the manifold. The valve is provided with an operating arm 20, connected to a rod 21 extending rearwardly and through the dash or instrument board D of the automobile. The rod 21 may be provided with a suitable hand portion by means of which the rod may be moved longitudinally through a friction bushing 22, the latter retaining the rod 21 in an adjusted position so as to hold the valve 19 open to the desired extent. A second mass of absorbent material 23, such as sponge, is placed in the upper compartment upon the partition 11, for the purpose of absorbing and holding moisture which passes from the lower compartment over the upper edge of the wall 12 into the upper compartment. A shield 24, preferably in the form of a metallic sheet blank bent substantially U-shaped is placed in the upper compartment upon the partition 11 and about the outlet opening of the nipple 19. From Fig. 4, it will be noted that the intermediate portion of the shield 24 is spaced from the inner end of the nipple 19, and that it retains the absorbent body 23 out of contact with the nipple and thus prevents the clogging of the passage through the nipple. Preferably, a number of notches or openings 25 is formed in the lower edge of the shield 24 to intercommunicate the inclosed portion within the shield 24 with the remaining portion of the upper compartment so that the absorbent 23 may absorb any liquid which flows into the shield 24, and thus prevents the locking of the outlet nipple 19 by water or the like. The top 13 of the body 10 is provided with a valve of any suitable type, and which communicates with the upper compartment and may be located immediately above the vertical wall 12 and over the opening 14 therethrough. The valve may be used for introducing gasolene into the upper compartment for passage into the manifold through the nipple 19 to prime the motor. In the present instance, the valve is in the form of a riser 26, which opens downwardly through the top 13, and which is provided with a sleeve 27 thereabout apertured at one side. The riser 26 is closed at its top and provided with a lateral opening adapted to register with the lateral opening in the sleeve 27, the riser 26 is threaded at its lower end for engagement with the top 13, and is provided with an enlarged head or shoulder at its upper end for engaging with the top of the sleeve 27 to hold the latter in place. The sleeve 27 is preferably provided with a milled flange outstanding from the upper end thereof, as shown at 28, by means of which the sleeve 27 may be turned into various positions for moving the opening, riser, and sleeve into and out of register to the desired extent.

In use, the body 10 is connected at its upper er 1 by means of the nipple 19 to the intake manifold A of the internal combustion engine. When the engine B is in operation, the suction through the intake manifold is communicated to the interior of the body 10 and through the pipe 15. Air and vapor are drawn from the top of the radiator C into the lower compartment of the body 10, and upwardly through the neck and over the wall 12 into the upper compartment. The absorbent material 17 and 23 maintains the air in each compartment thoroughly saturated with water, so that a vapor heavily laden with moisture is delivered to the upper compartment. The air valve in the top of the body 10 is suitably adjusted for delivering the desired quantity of air into the upper compartment, the air being delivered at that point within the body 10 over which the vapor from the lower compartment passes into the upper compartment. The air is thus thoroughly admixed with the vapor, and the air is thoroughly saturated by its passage through the upper compartment and out through the nipple 19 leading therefrom.

When this heavily saturated vapor or air passes in through the manifold A, it completely breaks up and vaporizes the fuel charge which is passing into the engine. Thus, the fine particles of the fuel which are usually not vaporized, and which burn and deposit carbon in the engine, are thoroughly broken up and vaporized and caused to explode rather than burn when ignited in the cylinders of the engine. The

fuel thus thoroughly vaporized increases the efficiency of the engine, prevents the deposit of carbon in the engine, and effectually completes consumption of the fuel in the engine so as to economize in the use of the fuel.

The device is automatic in adjustment in that the greater the suction from the engine, the more vapor will be raised from the lower compartment in the body 10, and the absorbent material 17 and 23 will raise by capillary action, the water from the bottoms of the upper and lower compartments, and thus insure the saturation of the air which passes through the body 10.

When starting the engine, the rod 21 may be manipulated to entirely close the nipple 19 and thus shut off the body 10 from the intake manifold A. The valve or nipple 19 may be adjusted by the rod 21 during the operation of the engine so as to produce the best results without the necessity of raising the hood and adjusting the parts under conditions which are not the normal working conditions of the engine.

It is readily noted that the device occupies but relatively small space, may be easily attached to the manifold, and comprises but relatively few parts which may be easily and economically manufactured and assembled.

It is of course understood that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of the invention without departing from the spirit thereof, and being restricted only by the scope of the following claims.

We claim:—

1. A fuel vaporizer for internal combustion engines, comprising a casing adapted to be connected at its upper end to the intake manifold of the engine, and adapted to contain moisture in its lower end, the casing having a horizontal partition dividing the casing into upper and lower compartments, the partition having an opening therethrough intercommunicating the compartments, the suction of the engine being adapted to raise moisture from the lower into the upper compartment, and means opening into the casing near said opening in the partition for admitting air to the moisture as the latter enters the upper compartment.

2. In a fuel vaporizer, the combination of a casing adapted for communication at its lower end with the radiator of an internal combustion engine, an outlet nipple connected to the upper end of the casing and adapted for attachment to the intake manifold of the internal combustion engine, said casing being provided therein with a relatively narrow passage between its upper and lower portions through which the vapor delivered to the casing from the radiator is adapted to turn, and means for introducing air into the casing at said narrow portion thereof for admixing the air with the vapor prior to its delivery to said manifold.

3. A fuel vaporizer attachment for the intake manifold of an internal combustion engine, comprising a casing connected at its upper end to the manifold and adapted to be exhausted thereby, said casing having a partition therein dividing the casing into upper and lower compartments and with a restricted passage between the compartments, an absorbent filling the lower compartment, means operated by suction in the casing for feeding moisture to the absorbent, and means for admitting air to the casing in said restricted passage for admixing air with the moisture passing into the upper compartment.

4. In a fuel vaporizer, the combination of a casing having a partition therein dividing the casing into upper and lower compartments, a pipe leading from the lower compartment and adapted for attachment to the upper end of the radiator of an internal combustion engine, an attaching nipple connected to the upper end of the casing and communicating with the upper compartment, and adapted for connection with the intake manifold of the engine, said casing being provided with a restricted passage between the upper and lower compartments through which the vapor from the lower compartment is adapted to pass into the upper compartment, and an adjustable valve opening through the casing and adapted to deliver air to said restricted portion of the casing, for admixing air with the vapor in its passage from the lower to the upper compartment.

5. In a fuel vaporizer, the combination of a casing, a partition arranged in the upper end of the casing providing upper and lower compartments therein and having one end upturned and forming between said end and the adjacent portion of the casing, a relatively narrow neck, said upturned end of the partition having a relatively small opening therethrough intercommunicating the compartments, absorbent fillers arranged in said upper and lower compartments, a pipe leading from the lower compartment adapted for connection with the upper end of the radiator of an internal combustion engine to receive vapor therefrom, and an air valve opening through the casing opposite the opening in said upturned portion of the partition, adapted to deliver air to the vapor as the latter flows from said narrow neck into the upper compartment.

6. In a fuel vaporizer, the combination of a casing provided with a partition arranged horizontally therein forming upper and lower compartments, bodies of absorbent

material arranged in the upper and lower compartments, a pipe leading from the upper end of the lower compartment and adapted for connection with the upper end of the radiator of an internal combustion engine, an outlet nipple leading from the upper compartment and adapted for attachment to the intake manifold of the engine, a valve in said outlet nipple for controlling the suction in the casing, and an air valve opening through the casing between said compartments to admix air with the vapor when the latter is drawn from the upper to the lower compartment, said lower compartment being provided with an opening in the wall thereof for draining water collecting in the bottom of the casing to prevent ingress of water into the intake manifold of the engine.

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