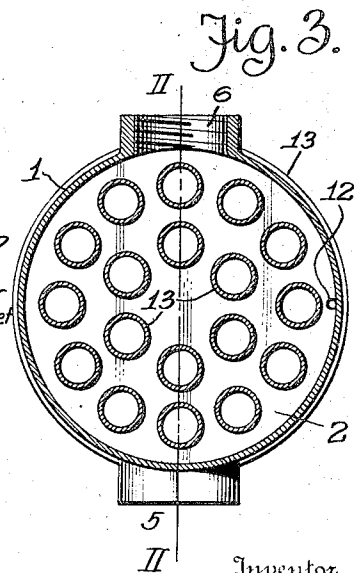
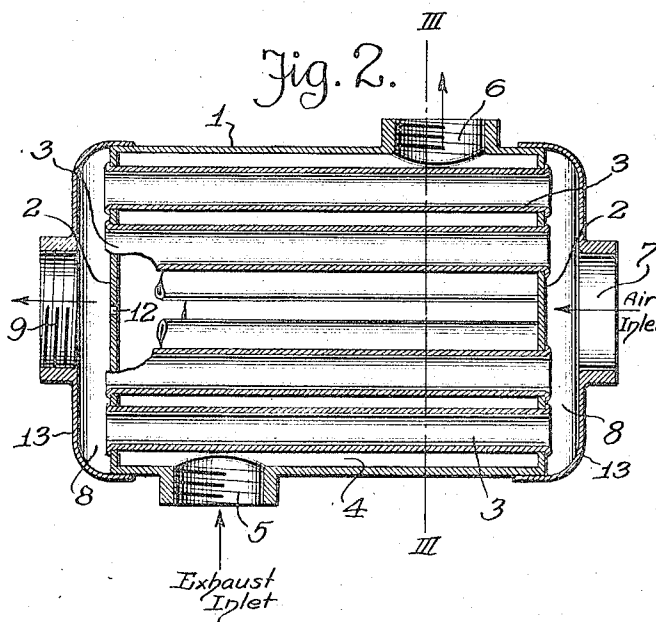


1,419,239.



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Abstract

UNITED STATES PATENT OFFICE.

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AIR HEATER AND MOISTURE SUPPLY FOR CARBURETORS.

1,419,239.

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To all whom it may concern:

Be it known that I, STANLEY R. DU BRIE, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Air Heaters and Moisture Supplies for Carburetors, of which the following is a specification, reference being had therein to the accompanying drawings.

It is well known that the introduction of small quantities of water or steam into an internal combustion engine along with the ingoing explosive charges, aids in preventing the accumulation of carbon in the engine cylinders, but difficulty has been experienced in introducing the proper amount under varying conditions. Heating of the ingoing air for admixture with the fuel has also been practiced to aid in vaporization of the fuel, and the introduction of small portions of the hot products of combustion along with the charges has also been tried to effect vaporization of the fuel and give a better explosive mixture.

An object of this invention is to secure the several advantages of all of these methods of supplying combustible charges to internal combustion engines and further to provide means for automatically introducing into the engine the amount of moisture necessary to secure best results under the variations in running conditions. It is also an object to effect a saving of fuel and increase the explosive power of the charges.

With the above and other ends in view the invention consists in heating air supplied to the carburetor by means of the hot products of combustion and utilizing the cooling effect of the cold ingoing air on these hot gases, to condense from the gases thus utilized, the moisture carried thereby, and in introducing this condensation into the heated air passing to the carburetor. A further object is to provide simple and efficient means for the purpose, which may be cheaply manufactured and readily installed, and which has certain other new and useful features, all as hereinafter more fully described.

With the above and other ends in view the invention consists in the matters hereinafter set forth and more particularly

pointed out in the appended claims, reference being had to the accompanying drawing, in which—

Figure 1 is a partial side elevation of an engine showing intake and exhaust manifolds and a carburetor, with a device illustrative of the invention in operative position relative thereto;

Fig. 2 is a longitudinal vertical section substantially upon the line II—II of Fig. 3 of a device adapted to carry out the invention, and

Fig. 3 is a transverse vertical section of the same substantially upon the line III—III of Fig. 2.

In Fig. 1, the engine cylinders are indicated at A with an exhaust manifold B and an inlet manifold C. The carburetor which is indicated as a whole at D is connected to the lower end of the manifold C and applied to the air inlet pipe E of the carburetor, is a device embodying the invention. This device may be connected to the air inlet of a carburetor in a horizontal position as shown or it may be set in a vertical position where the carburetor construction is such that it may be more easily applied in that manner.

The device comprises a cylindrical casing 1 having headers 2 between which extend a series of tubes 3, the tubes being welded or otherwise secured at their ends within openings in the headers 2. Caps 13 secured to the ends of the body 1 form chambers at the ends of the body into which chambers the tubes 3 open and the space 4 within the body between the headers forms a heating chamber, the body being provided at one side with an inlet 5 and at the opposite side and preferably near the opposite end with an outlet 6. The caps 13 for the body are provided with flanged axial openings for the attachment of the body to the air inlet pipe E of the carburetor so that the air passing to the carburetor is first drawn in through the air inlet opening 7 at one end of the body into the air chamber 8 then passes through the tubes 3 into the air chamber at the opposite end of the body and then out through the outlet 9 into the carburetor. The inlet 5 of the body is connected preferably by a pipe 10 with the exhaust manifold B so that a part of the hot

products of combustion will be diverted through the pipe 10 into the body 1 and pass across the body around the several tubes 3 and finally find its way through the outlet 6 to the atmosphere, said outlet being provided with a pipe 11 to conduct the gases away from the body if found desirable. The hot exhaust gases are thus caused to pass around the tubes 3 through which the cold air is being drawn to the inlet of the carburetor and this cold air is therefore heated so that upon admixture with the fuel in the carburetor, better volatilization will be secured. The suction of the engine in drawing in the air will cause a partial vacuum in the chamber 8 in the ends of the body and the cold air passing in through the tubes 3 opening into this chamber will keep the tubes comparatively cool at that end, but the hot exhaust gases entering the body through the inlet 5 which is located adjacent the opposite end of the body will come into contact with these tubes and in flowing across the body will heat the tubes so that one end of the tubes will at all times be comparatively cool while the other ends of the tubes will be heated to quite a high degree. The hot exhaust gas coming into contact with the comparatively cool portion of the tubes as it passes toward the outlet 6, will be cooled and the moisture contained therein will be condensed. This moisture is usually a residue of the fuel or partially burned fuel and when brought into proper admixture with air is combustible.

In the header 2 at the outer end of the body is a small opening 12, this opening being provided to permit the condensation from the exhaust gases to pass out of the chamber 4 into the chamber 8, at the end of the body and thus into the current of heated air passing to the carburetor. It has been found that this condensation from the exhaust gases will be just sufficient to provide the proper amount of moisture to the ingoing charges, at all speeds of the engine and this moisture, taken in with the charges into the engine cylinders will prevent the accumulation of carbon, thus keeping the cylinders and spark plugs clean at all times. This moisture which is condensed from the exhaust also has fuel qualities and adds to the fuel which is drawn in and mixed with air to form the explosive charges, this condensation being drawn in along with the heated air and mixed with the fuel in the mixing chamber of the carburetor.

By properly proportioning the amount of exhaust gases which are passed through the body 1, according to the size of the engine, it is found that the desired amount of moisture will be supplied to the ingoing charges and that this moisture, being in the form of a combustible fluid, will add

to the fuel supplied by the carburetor and thus increase the power and speed of the engine, at the same time preventing the accumulation of carbon in the cylinders. The amount of this moisture will vary according to the varying conditions of operation of the engine so that there will never be too great an amount of moisture supplied for proper admixture with the fuel charges.

The tubular form of heater shown in the drawings is merely illustrative of one form of device for heating the air going to the carburetor, and at the same time supplying to the ingoing charges moisture condensed from the gases which are used to heat this air, but it will be understood that any suitable form of device may be employed for this purpose, the one shown being simple and cheap to manufacture and readily applicable to the usual form of carburetors, making the device very simple to install. Obviously other forms may be employed to provide air passages for the ingoing air and means for conducting the hot gases into contact with these passages thereby condensing from the gases certain moisture which moisture falls to the bottom and is then conducted directly into the ingoing air while the uncondensed portions of the exhaust pass out to the atmosphere. I do not therefore, desire to limit myself to the particular construction of device shown and wish to include such changes or modifications as fall within the scope of the appended claims.

What I claim is:—

1. A device of the character described including a conduit through which air is drawn by engine inspiration, means for conducting exhaust gases from an engine into external contact with said conduit to condense moisture contained in said gases and means for delivering said condensation to the ingoing air for admixture therewith.

2. In a device of the character described, means for conducting air to an engine intake, means for conducting exhaust gases from an engine and cooling the gases by said ingoing air to condense from said gases any moisture contained therein, said second mentioned means being in communication with said first mentioned means to deliver said condensation to the air passing to the engine intake.

3. A device of the character described, the combination of a tubular passage for conducting air to an engine intake, a chamber surrounding said conduit, means for conducting engine exhaust gases to said chamber to heat the air passing through said conduit and to be cooled thereby to condense moisture contained therein, said chamber having an opening in a wall there-

of to permit the escape of said condensation into the ingoing air for admixture therewith.

4. A device of the character described
 5 comprising a casing having an inlet and an outlet, tubular passages in the casing having restricted communication with the interior of the casing and communicating at
 10 opposite end with the atmosphere and at their means for conducting engine exhaust gases to the inlet of the casing for circulation through said casing around said tubular
 15 passages, whereby the condensation from the exhaust gases accumulating in said casing is delivered to the ingoing air for admixture therewith.

5. A device of the character described comprising a casing having an inlet and an
 20 outlet and a header at each end of said casing forming end chambers, tubular members in the casing secured at their ends to

said headers and connecting said end chambers, means connected to one of said chambers for conducting air passing through the
 25 tubular members, to an engine, means for conducting exhaust gases from an engine to the inlet of said casing to pass there-through around said tubular members to be cooled thereby for condensing moisture
 30 contained in the gases within the casing, one of said headers being provided with an opening to provide communication between the interior of the casing through which said tubular members extend, and an
 35 end chamber and permit the condensation to pass into the air flowing to the engine for admixture therewith.

In testimony whereof I affix my signature in presence of two witnesses.

STANLEY R. DUBRIE.

Witnesses:

LEWIS E. FLANDERS,
 ANNA M. DORR.