Oct. 5, 1926. 1,602,098

G. J. BURNS

THERMAL GASIFYING MANIFOLD CONSTRUCTION

Filed Jan. 30, 1922 2 Sheets-Sheet 1

Fig. 1.

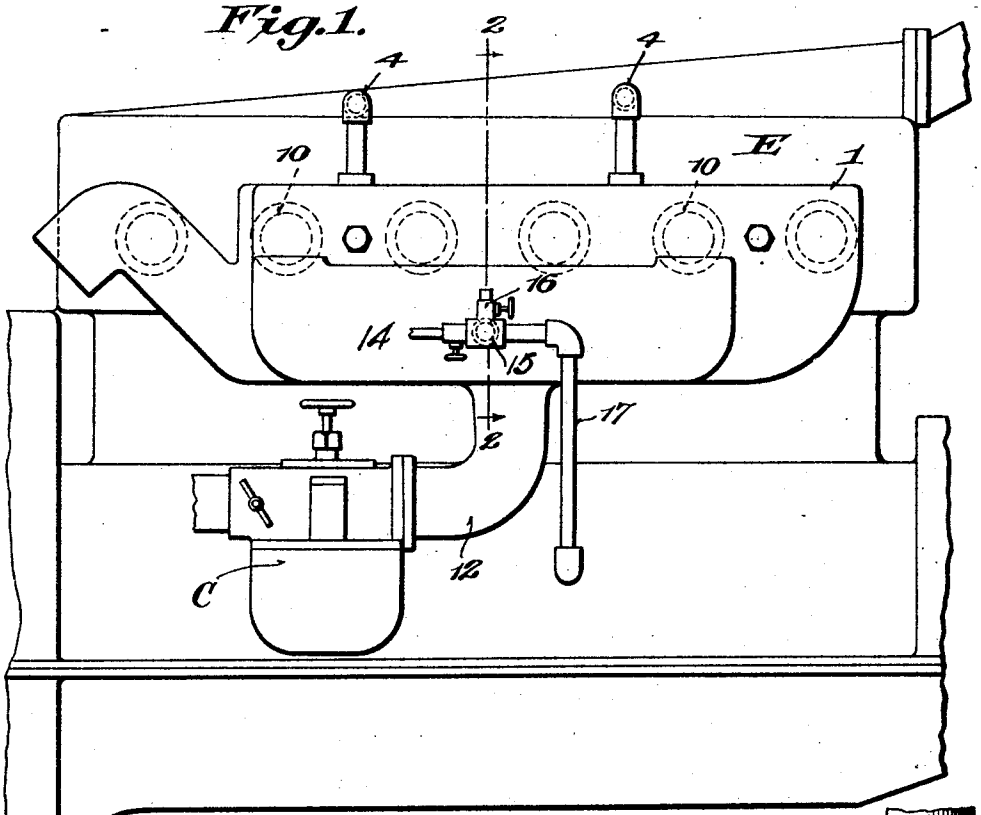


Fig. 2.

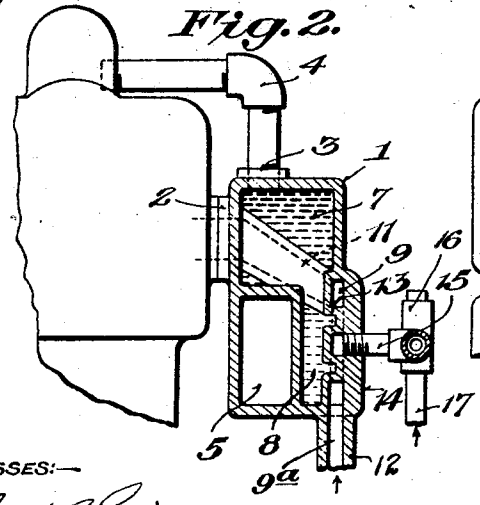
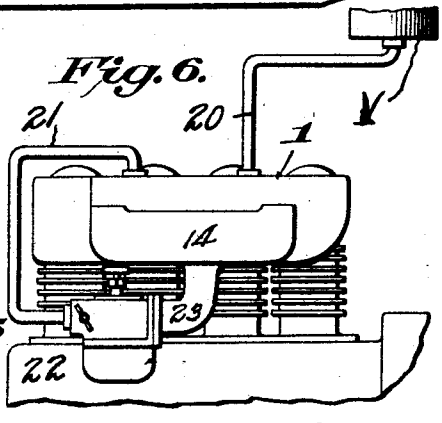


Fig. 6.



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Fig. 3.

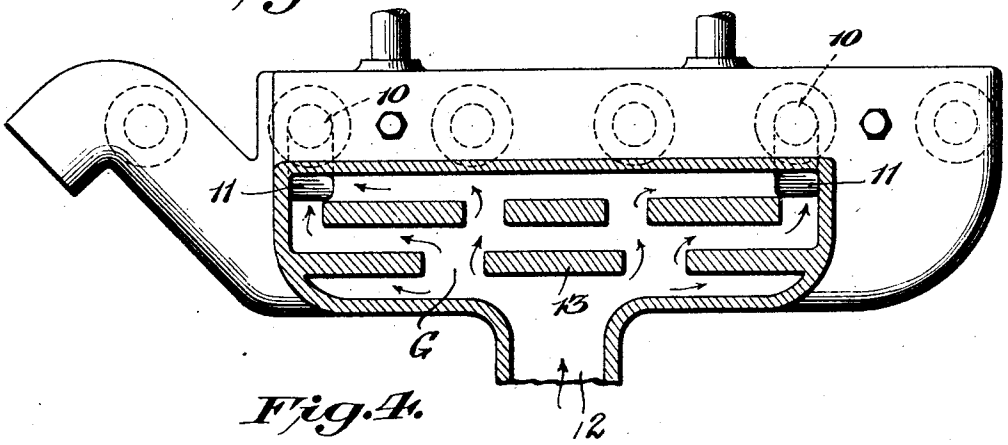


Fig. 4.

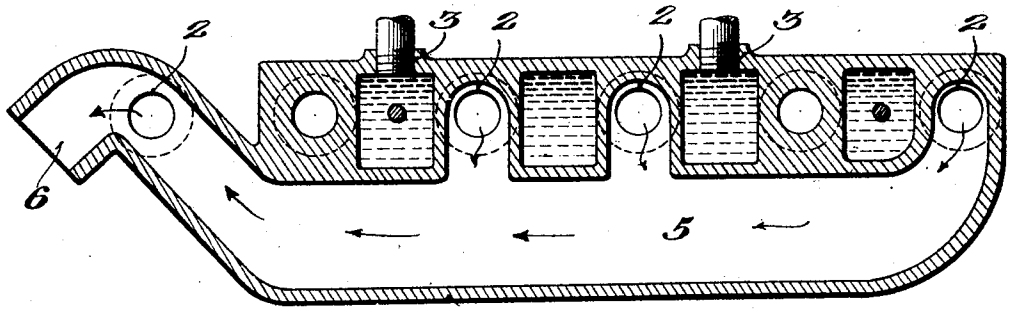
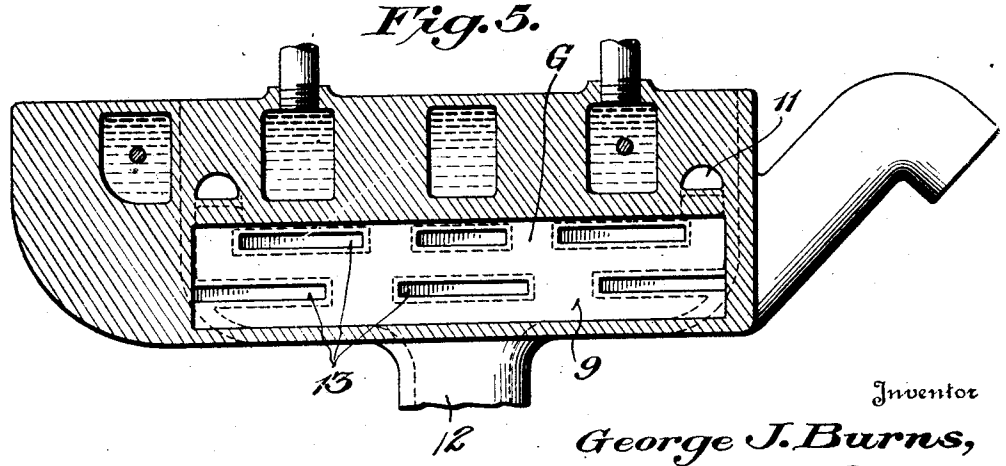


Fig. 5.



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UNITED STATES PATENT OFFICE.

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THERMAL GASIFYING MANIFOLD CONSTRUCTION.

Application filed January 30, 1922. Serial No. 532,924.

This invention relates to a new manifold construction for internal combustion engines embodying means for obtaining a more adequate cooling of the motor and increasing the efficiency of the fuel charge, while at the same time preserving the lubricating qualities of the oil in the crank case.

One of the primary objects of the invention is to provide a manifold construction which effectually cools the engine, reduces the temperature in the crank case, and at the same time supplies heat and moisture for the purpose of obtaining the increased efficiency of the fuel charge. To that end the invention is based on certain fundamental factors that enter into the successful operation of the device. In explanation of those fundamentals the following observations are to be noted, to wit: The action of heat alone on fuel to be used for combustion purposes is not adequate in the process of breaking up the molecular construction of the fuel. Therefore, the present invention involves the incorporation of moisture with the fuel charge whereby the skin of the molecules will be caused to swell rendering the same susceptible to air friction and to breaking up, making a true gas for the combustion. In that connection it is well known that the ordinary mixing devices and carburetors in general use supply the fuel in atomized particles, as a mist, as distinguished from a liquid completely broken up into a true gas as is provided for by the present invention. In its application to air cooled motors the invention possesses special utility inasmuch as it presents a construction which permits the use of the fuel as a cooling medium for the motor and at the same time operates to heat the fuel for use in the process of generating the gas for explosion, thus obviating the serious defects incident to the operation of the ordinary air cooled motors. Thus it will be seen that it is the intent and object of the present invention to provide an improved manifold construction involving the carrying out of a process of making a true gas and lowering the heat in the motor cylinder where the friction heat is usually excessively developed, thus preventing the oil in the crank case from becoming unduly thinned from unexploded gas and by the excessive frictional heat. Carbon deposits will therefore be eliminated and the so-called pre-ignition will be prevented.

In carrying forward the foregoing general objects, the present invention contemplates embodying the invention in a new manifold construction which can be used as an attachment for motors in use, as well as to new motors, said manifold construction including a gasifying chamber for receiving the fuel from the carburetor as well as atmospheric air employed for developing the moisture, and also the gases from the crank case of the motor.

In carrying out the invention the same is necessarily susceptible of embodiment in various forms of construction without departing from the spirit or principle thereof, but in order to illustrate the particular features claimed, a practical embodiment is shown in the accompanying drawings in which—

Figure 1 is a side elevation of a motor showing the improved gasifying manifold attached thereto.

Figure 2 is a vertical sectional view taken on the line 2—2 of Figure 1.

Figure 3 is an enlarged detail view of the manifold, partly in section.

Figure 4 is a vertical longitudinal sectional view taken through the exhaust passage.

Figure 5 is a vertical longitudinal sectional view taken through the gasifying chamber.

Figure 6 is a diagram showing the application of the invention to an air cooled motor.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

In carrying the present invention into effect it is proposed to provide a manifold construction combining means for handling both the intake and exhaust gases of the motor, and having as its distinctive characteristic a gasifying chamber for receiving the atomized fuel from the carburetor, the crank case gases and atmospheric air. The atmospheric air enters into the gasifying chamber together the fresh fuel vapor and the crank case gases, and the heat developed in the gasifying chamber serves to thoroughly gasify the charge before it passes to the intake ports of the motor. The complete gasification of the hydro-carbon liquid is facilitated by the moisture swelling the molecular particles, thereby rendering them more susceptible to breaking down under impact

against suitable baffles provided within the gasifying chamber and under the influence of the heat and air friction.

While the invention may take various structural embodiments a simple and practical form thereof is illustrated in the accompanying drawings from which it will be observed that the device is primarily intended to be used as an attachment or accessory for an internal combustion engine E, in place of the usual separate intake and exhaust manifolds.

In consolidating the intake and exhaust manifolds into a single unit, considerable advantage is gained in having only one member to handle, while at the same time the gasifying chamber G of the device may have the benefit of the heat of the liquid circulating in the jacket of the motor, and yet at the same time the liquid may also be cooled by the cooler atmospheric air and fuel vapor which enters the gasifying chamber.

As will be observed from Figure 1 of the drawings, the present device preferably consists of a body 1, which may be a casting, provided at one side thereof with suitable openings or ports 2 for registering with the exhaust ports of the motor bloc and also with the inlets 3 for receiving the pipe connections 4 that may be tapped into the liquid circulating jacket of the motor at any suitable and convenient point. As will be observed from Figure 2 the interior of the body 1 is provided with the exhaust passages 5 which communicate with the exhaust intake ports 2 and receive the usual exhaust pipe at the end 6. The greater portion of the remaining interior area of the body constitutes a liquid circulating chamber 7 in communication with the circulating pipes 4 and having the lower portion 8 lying at one side of the gasifying chamber G formed adjacent the outer face of the body 1 and adapted to communicate with the intake ports 10 of the motor bloc by the feed passages 11 extending through the chamber 7.

The said gasifying chamber G is in direct communication with the intake passage 9 of the neck 12 that connects directly with the carbureter C; and, for the purpose of providing a maximum surface area over which the fuel gases must pass on their way to the cylinders, and at the same time insure their thorough breaking up and gasification, the interior of the gasifying chamber is provided with a plurality of baffle webs 13 preferably so arranged that direct communication between the inlet passage 9 and feed passages 11 is obstructed thereby compelling the vapors to impinge against the walls of the baffles to thus assist in complete gasification.

For the purpose of conveying outside air as well as the gases collected within the crank case of the motor into the gasifying chamber, the outside wall 14 of the gasifying chamber may be tapped by a suitable pipe connection 15 having an air intake valve 16 at any suitable and convenient point, while the pipe 17 leads to the crank case. Through this pipe 17 the gases collecting in the crank case are drawn into the gasifying chamber G and reconstructed by the outside air admitted through the valve 16 and the fresh fuel vapor from the carbureter.

When the present attachment is applied to a motor and connected with the liquid circulating system thereof, the gasifying chamber receives the vaporized liquid fuel from the carbureter as well as gases from the crank case, and by reason of the relatively cool condition of the outside air the moisture therein is condensed and when encountered by the fuel molecules causes the latter to expand or swell so that the heat and air friction readily cause them to break into a true gaseous state before reaching the cylinders. When the device is in operation, fuel from the carbureter C will pass through the passage 9 of the neck 12 into the gasifying chamber G where it will be compelled to follow a more or less circuitous path on account of the webs 13 before it makes its way to the feed passages 11. In the meantime it will thoroughly intermingle with the gases extracted from the crank case and the atmospheric air drawn through the valve 16. Thus, the vapors from the three sources are mixed or intermingled in the gasifying chamber to form a truly gaseous combustion charge prior to being conducted to their point of use.

By reason of the extraction of the gases from the crank case through the pipe 17 circulation of cooling air is maintained in the crank case which keeps the lubricating oil in a maximum state of efficiency since it is prevented from thinning out and breaking down under the frictional and explosive heat of the motor, as well as from dilution by the gases which pass the piston rings on the compression stroke of the pistons.

When the device is used in connection with a motor for burning kerosene or other heavy hydro-carbon as indicated by the diagram in Figure 6, the liquid circulating chamber of the manifold is connected directly with the source of fuel supply and also with the carbureter. As will be seen from the diagram the kerosene or other fuel may be fed from the vacuum supply tank V through the pipe line 20 to the liquid receiving chamber of the manifold where it will be pre-heated by the exhaust gases from the motor and also at the same time prevent the gasification chamber from becoming excessively hot. From the liquid chamber of the manifold the pre-heated fuel passes through the pipe 21 to the carbureting device 22 where it is vaporized

and released into the neck 23 of the manifold which communicates with the gasifying chamber leading to the intake valves of the motor. Thus, the novel manifold device, in this adaptation of the invention, constitutes a means for preliminarily heating the hydrocarbon fuel, and subsequently after the fuel has been carbureted, the vapor released by the carbureter is further treated in the gasifying chamber of the device. In this embodiment, as in the other form of the invention, outside air as well as gases from the crank case of the motor may be admitted to the gasification chamber for the purpose of supplying the necessary moisture to expand the molecules of fuel in the carbureted vapor and also removing the gases from the crank case to keep the lubricating oil in condition to pack the rings.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention or scope of the appended claims.

I claim:

1. A combined fuel gasifying manifold and engine cooling construction for internal combustion engines including a body formed with passages constituting a water jacket and having an internal conduit for exhaust gases surrounded by said water jacket, the side of said body being provided with a wall spaced from said exhaust passage and exposed to the water in said jacket, and an outer wall cooperating with said first mentioned wall to provide a gasifying chamber, means forming passages for establishing communication between said chamber and the opposite side of said body, a vaporizing fuel conduit connected to said chamber, a three-way fitting carried by said outer wall, a pipe connection between one portion of said fitting and the crank case of the motor, a valve for controlling the admission of air to another part of said fitting, and a valved water supply line connected with the third part of said fitting.

2. A combined fuel gasifying manifold and engine cooling construction for internal combustion engines including a body provided at one side with suitable ports to register with the exhaust ports of the motor bloc and also with inlets for receiving pipe connections for supplying liquid to said body, the interior of the body being provided with exhaust passages communicating with the exhaust intake ports, a liquid circulating chamber in said body communicating with the opening for the circulating pipe, a gasifying chamber formed adjacent the outer face of the body and adapted to communicate with the intake ports of the motor bloc, said chamber having feed passages to effect said communication, a conduit for supplying vaporized fuel to the gasifying chamber, a three way fitting carried by the outer wall of the manifold and communicating with the gasifying chamber and means connected with said three way fitting for respectively establishing communication between the crank case of the engine, the atmospheric air and the source of water supply.

In testimony whereof I hereunto affix my signature.

GEORGE J. BURNS