March 11, 1941. N. M. JONES 2,234,901

ATTACHMENT FOR INTERNAL COMBUSTION ENGINES

Filed Aug. 1, 1940

Fig. 1.

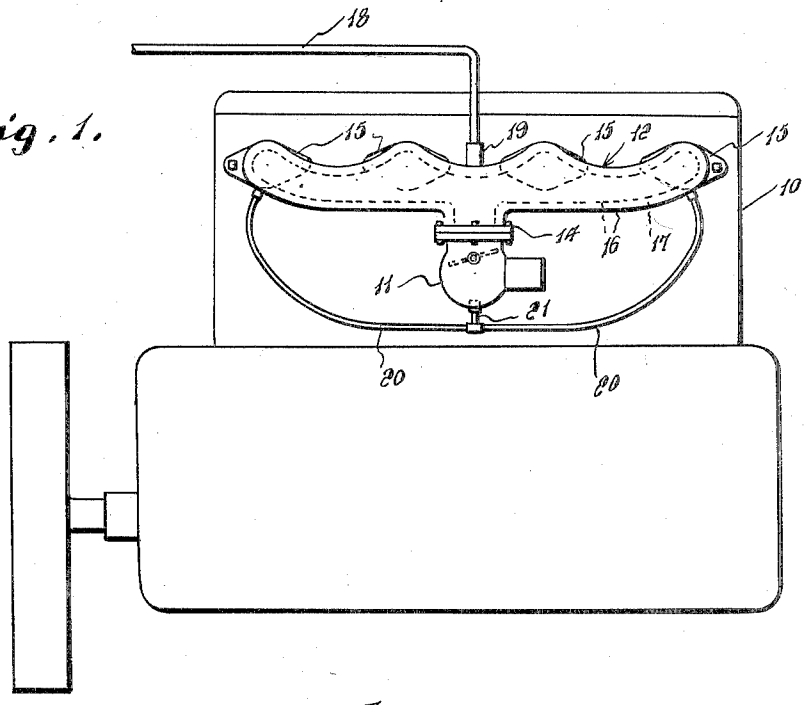


Fig. 2.

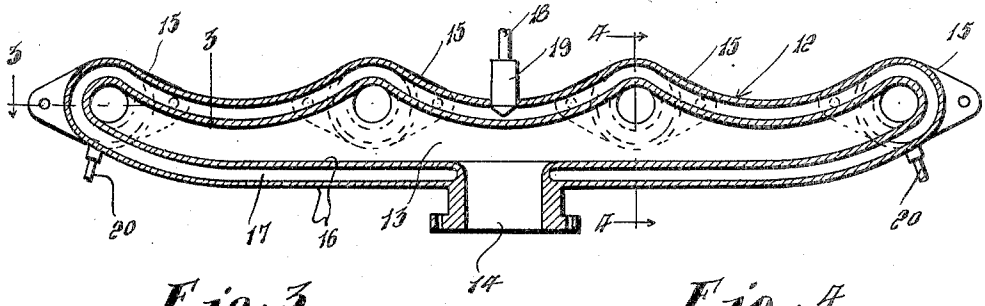


Fig. 3.

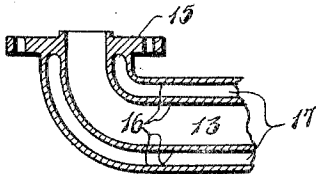
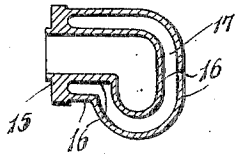


Fig. 4



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Patented Mar. 11, 1941 2,234,901

UNITED STATES PATENT OFFICE

2,234,901

ATTACHMENT FOR INTERNAL COMBUSTION ENGINES

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Application August 1, 1940, Serial No. 349,081

5 Claims. (Cl. 123—133)

This invention relates to a device for the use of a liquid hydrocarbon such as butane or propane and more particularly to a device having means whereby a hydrocarbon may be changed from a liquid to a gaseous state before entering the carbureter, and the refrigerating action created by the change in the hydrocarbon used as a cooling medium for cooling the mixture of the gaseous hydrocarbon and air during its passage from the carbureter or mixing valve to the cylinders of the engine.

A primary purpose of the invention is to provide a device for producing an extremely cold intake manifolding to increase the volumetric efficiency of the engine and thus increase its horse-power, when said engine is fueled with a liquid petroleum gas of the type of the hydrocarbons heretofore mentioned.

More particularly, it is an aim of the invention to provide an intake manifold provided with spaced walls forming a jacket surrounding the intake manifold chamber and through which the hydrocarbon is conveyed after being converted into a vaporous state so that the hydrocarbon will form a cooling medium for the jacket which will in turn cool the mixture of the vaporized hydrocarbon and air passing from the carbureter through the intake manifold to the cylinders of the engine.

Still another aim of the invention is to provide an expansion valve through which the liquid is conveyed from a source of supply to the jacket surrounding the intake manifold and by means of which the liquid is expanded and converted into a vapor.

Other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, which illustrates a preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view showing the device attached to an internal combustion engine and connected to a conventional carbureter or mixing valve,

Figure 2 is a longiitudinal central vertical sectional view of the intake manifold,

Figure 3 is a longitudinal horizontal sectional view taken substantially along the plane of the line 3—3 of Figure 2, and

Figure 4 is a transverse vertical sectional view taken substantially along the plane of the line 4—4 of Figure 2.

Referring more particularly to the drawing, wherein like reference characters designate like or corresponding parts throughout the different views, 10 designates generally an internal combustion engine and 11 designates generally a conventional mixing valve or carbureter associated therewith for mixing the fuel for the engine with air before the fuel is admitted to the cylinders of the engine, not shown. These parts are of conventional construction and are shown merely to illustrate the application of the invention which will hereinafter be described.

The invention includes an improved construction of intake manifold, designated generally 12 which, as best seen in Figure 2, is provided with an inner chamber 13 having a downwardly opening intake port 14, intermediate of its ends, which is attached to the carbureter 11 and through which the mixture of the fuel and air from the carbureter 11 is admitted to the chamber 13. Chamber 13 is also provided with a plurality of flanged outlet ports 15 which are connected to the cylinder block of the engine 10, in a conventional manner, to provide means whereby the mixture can be conveyed to the engine cylinders. The intake manifold 12 is provided with spaced walls 16 forming a jacket 17 which surrounds the chamber 13. A pipe or conduit 18 leads from a source of supply of the liquefied petroleum gas such as butane or propane and is connected at its opposite end to an expansion refrigeration valve 19 which, in turn, is connected to the intake manifold 12, intermediate of its ends, and in communication with the jacket 17 thereof. A pipe 20 is connected at its ends to the underside of the manifold 12, adjacent the ends thereof, the ends of the pipe 20 communicating with the jacket 17. A mixer jet 21 is connected to the intermediate portion of the pipe 20 and opens into the carbureter 11.

From the foregoing it will be obvious, that a liquefied petroleum gas such as butane or propane may be conveyed through the pipe or conduit 18 from a source of supply of said liquid hydrocarbon, not shown, to the expansion valve 19, which is connected to the pipe 18 and the jacket 17. The liquefied petroleum gas will be transformed into a gas or vapor in the valve 19 and in such state discharged into the jacket 17, of the intake manifold 12 which surrounds the chamber 13 thereof. The expansion resulting from the change of the hydrocarbon from a liquid to a gaseous state will produce a substantial cooling effect upon the hydrocarbon which, in passing through the jacket 17 will act as a refrigerant or cooling medium for materially cooling said jacket and the chamber 13 disposed therewithin. The vaporized hydrocarbon will then pass from

the jacket 17 into the ends of the pipe 20 and drawn by suction to the intermediate portion of the pipe 20 and into the mixer jet 21 from which it will be discharged into the mixing valve 11 at which time it will be mixed in proper proportions with air. This mixture will then be drawn into the chamber 13 where it will be cooled by the jacket 17 before being drawn therefrom through the ports 15 and into the cylinders of the engine 10 to be used as the fuel for said engine. It will thus be seen that the hydrocarbon is first employed as a cooling medium for the fuel mixture after which it is used as a fuel, after being mixed with air. By thus chilling the mixture before it is admitted to the cylinders of the engine the volumetric efficiency of the engine is increased to thereby increase the engine's horse-power when employing a fuel such as butane or propane.

Various modifications and changes in the invention as disclosed are contemplated and may obviously be resorted to as only a preferred embodiment thereof has been illustrated and described.

I claim as my invention:

1. In an internal combustion engine, an intake manifold for connecting the cylinders of the engine to a carbureter, said intake manifold having spaced walls forming a jacket surrounding the interior thereof, means for conveying a liquefied petroleum gas to the jacket, means for expanding the liquid to vaporize it upon entering the jacket for cooling the interior chamber of the intake manifold, and means for conveying the vapor, after passage through the jacket to the carbureter to be mixed with air, the mixture being cooled in passage through the intake manifold to the cylinders of the engine.

2. In an internal combustion engine employing a liquefied petroleum gas fuel, means for expanding the liquid fuel into a gaseous state, a chamber for receiving the expanded gas, the gas acting as a cooling medium for the chamber, the gas being thereafter mixed with air, and means for subjecting the mixture to the cooling action of the chamber for cooling the mixture before it is admitted to the engine.

3. In an internal combustion engine employing a liquefied petroleum gas fuel, a conduit leading from a source of supply of the liquid fuel to a carbureter, said conduit being provided with means for expanding the liquid for converting it into a gas, and means whereby the gas after being mixed with air in the carbureter is cooled by the action of the liquid fuel being converted into a gas.

4. In an internal combustion engine provided with a mixing valve, means for conveying a liquid fuel for the engine to the mixing valve to be mixed with air thereby, means for expanding the liquid fuel for vaporizing it before it reaches the mixing valve, and means for employing the expansion of the vaporizing of the fuel as a refrigerant for cooling the mixture of the vapor and air before the mixture is admitted to the cylinders of the engine.

5. In an internal combustion engine provided with a mixing valve or carbureter, an intake manifold connecting said mixing valve to the cylinders of the engine, a jacket surrounding the interior of said manifold, a conduit leading from a source of supply of a liquefied petroleum gas such as butane or propane to said jacket, an expansion valve connecting said jacket and conduit for converting the liquid into a vapor, said vapor forming a cooling medium for said jacket, and a conduit for conveying the vapor from the jacket to the carbureter to be mixed therein with air, said mixture being cooled by said jacket in passing through the intake manifold to the engine.

NELSON M. JONES.