Aug. 26, 1924. 1,506,548

S. J. PINGREE

APPARATUS FOR SUPPLYING FUEL TO INTERNAL COMBUSTION ENGINES

Filed Nov. 25, 1921 2 Sheets-Sheet 1

Fig. 1.

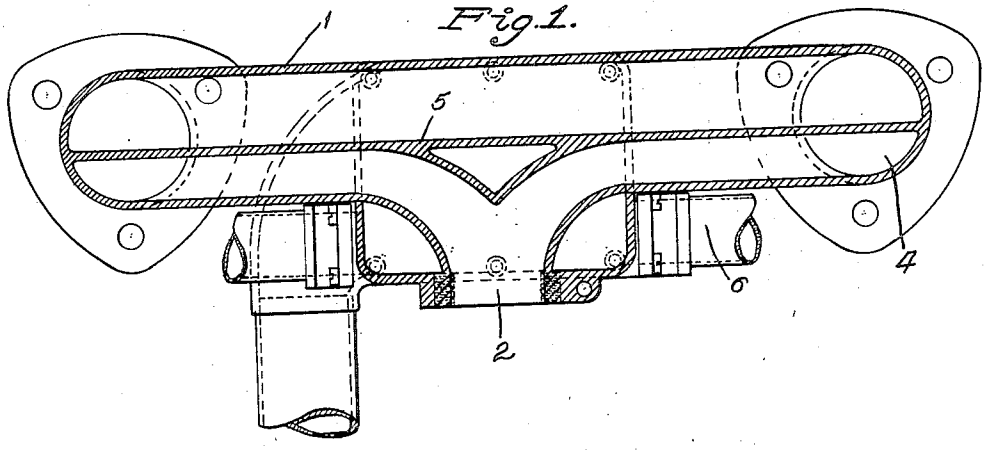


Fig. 2.

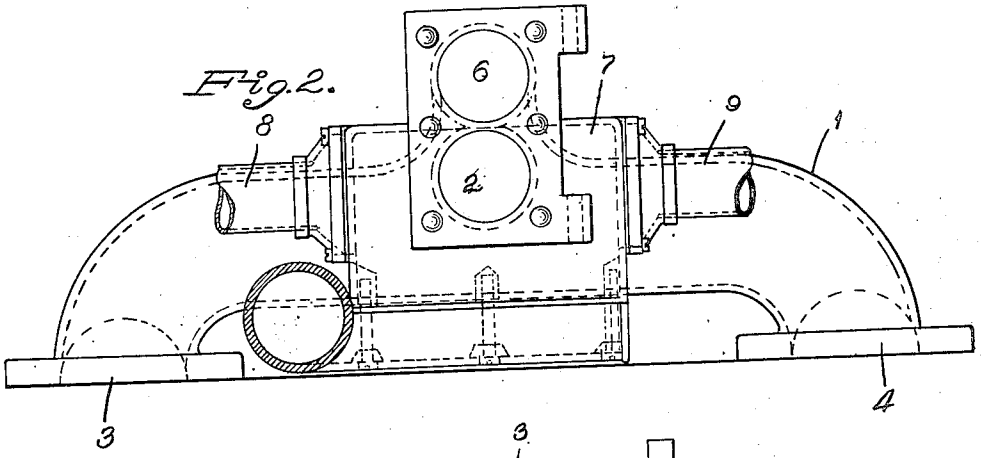
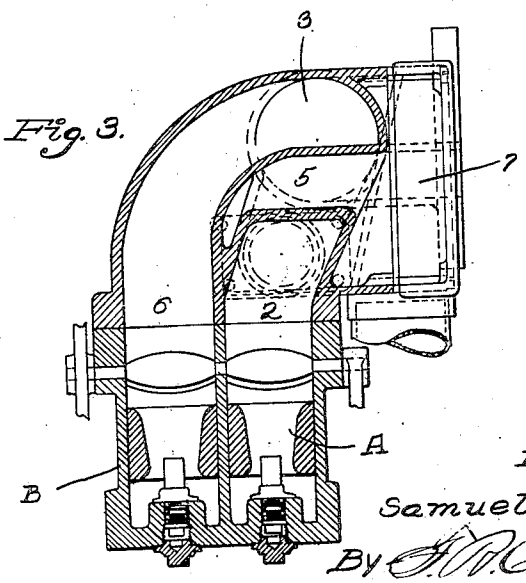


Fig. 3.



Inventor
Samuel J. Pingree.
By F. W. Arnwald Atty

Aug. 26, 1924. 1,506,548

S. J. PINGREE

APPARATUS FOR SUPPLYING FUEL TO INTERNAL COMBUSTION ENGINES

Filed Nov. 25, 1921 2 Sheets-Sheet 2

Fig. 4.

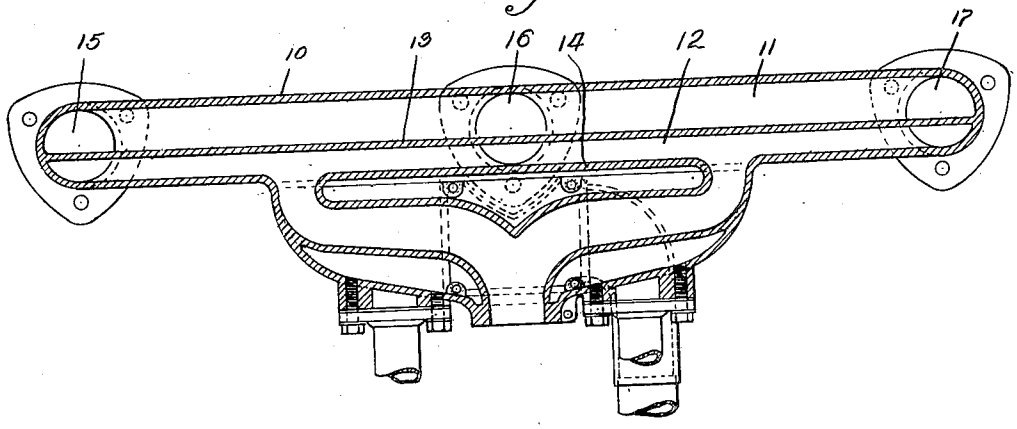


Fig. 5.

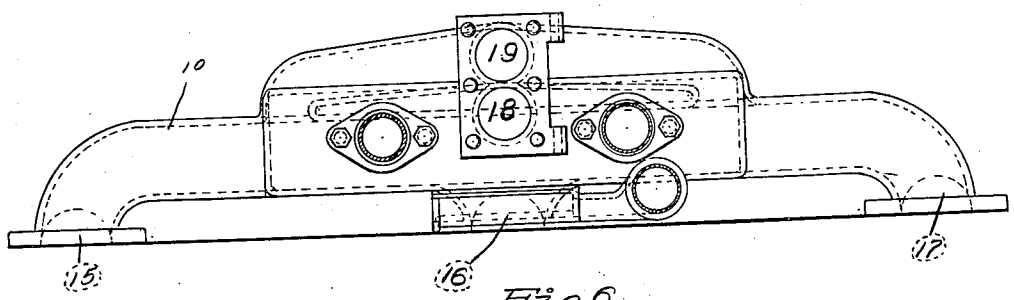
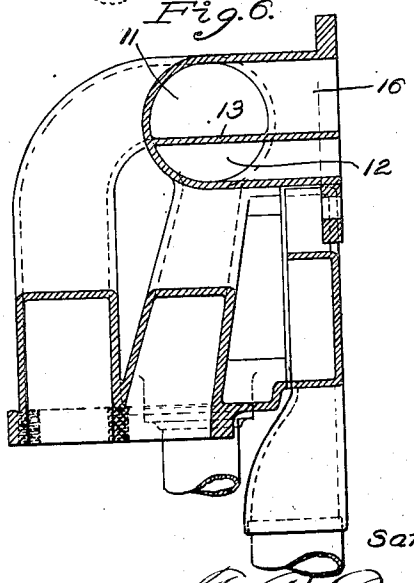


Fig. 6.



Inventor

Samuel J. Pingree

By F. A. Cornwall Atty.

Patented Aug. 26, 1924. 1,506,548

UNITED STATES PATENT OFFICE.

SAMUEL J. PINGREE, OF ST. LOUIS, MISSOURI, ASSIGNOR TO PINGREE PATENTS, INCORPORATED, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

APPARATUS FOR SUPPLYING FUEL TO INTERNAL-COMBUSTION ENGINES.

Application filed November 25, 1921. Serial No. 517,649.

To all whom it may concern:

Be it known that I, SAMUEL J. PINGREE, a citizen of the United States, residing at the city of St. Louis and State of Missouri, have invented a certain new and useful Improvement in Apparatus for Supplying Fuel to Internal-Combustion Engines, of which the following is a full, clear, and exact description, such as will enable others, skilled in the art to which it appertains, to make and use the same, reference being had to the accompanying drawings, forming part of this application, in which—

Figure 1 is a longitudinal sectional view of my improved apparatus.

Figure 2 is a top plan view of the same.

Figure 3 is a vertical cross-sectional view of the same.

Figure 4 is a longitudinal sectional view of a modified form.

Figure 5 is a top plan view of the modification shown in Figure 4.

Figure 6 is a vertical sectional view of the modification shown in Figure 4.

This invention relates to a new and useful improvement in apparatus for supplying fuel to internal combustion engines, and is designed particularly for use in connection with and as an improvement upon the apparatus disclosed in an application filed by me February 19, 1921, Serial No. 446,333.

My present invention relates particularly to the intake manifold of an internal combustion engine such as is commonly used in automotive units such as automobiles, aeroplanes, motor boats, and the like, and consists in dividing the manifold into chambers so arranged relative to each other as to prevent or minimize the surging action of the fuelized gases as they are drawn into the engine cylinders from different portions of the manifold.

One object of my invention is to arrange the chambers in the manifold in such a way as to prevent or minimize inactive spaces, and hence when the fuelized air passing through the manifold is augmented, there will not be a temporary dead cylinder incident to the displacement of air in a "dead" or inactive air space. Another object is to construct a manifold in which desired velocities may be created and maintained; and also to construct a manifold in which varying capacities may be readily provided for.

In the drawings, 1 indicates an intake manifold which is secured to an engine casing and through which the fuelized air is drawn into the engine cylinders, two, four, six or more, in number, as the case may be, from two or more carbureters. These carbureters and their control may be similar to those disclosed in my aforesaid application. In any event, a carbureter A supplies fuelized air into the manifold through an opening or port indicated at 2 and from this point it is drawn in opposite directions to the cylinders of the engine through ports 3 and 4 located at opposite ends of the manifold. 5 indicates a partition wall dividing the manifold horizontally, this partition wall terminating at or short of the ports 3 and 4 and approximately at the ends of the manifold.

6 indicates a port which may communicate with a second carbureter B, and from which fuelized air is delivered into the manifold above the partition wall 5, and which upper chamber or space is likewise in communication with the ports 3 and 4 before mentioned.

In operation, the carbureter A in communication with port 2, is used to supply fuelized air to the engine cylinders. This fuelized air is drawn through the ports 3 and 4 alternately and as these ports 3 and 4 are connected by the chamber above the partition wall 5, constituting a by-pass, it is obvious that a partial vacuum created by the suction of the engine cylinders and which tends to produce a surging or pulsating action of the fuelized air, is minimized or prevented by the by-pass, which acts in effect as an expansion chamber or reservoir. The ports 3 and 4 through which the fuelized air is drawn from port 2 are connected by the bypass chamber and consequently the gas in the by-pass chamber is kept active and fuelized and can not become "dead"; nor can it remain inactive for such a period of time as would cause the vaporized fuel to condense on its walls.

To facilitate the vaporization of the fuel, which might have a tendency to condense on the walls of the intake manifold, I may

employ a stove, indicated at 7, through which the exhaust may enter through pipe 8 and be discharged through pipe 9. This stove for heating the manifold is not absolutely essential, especially in warm climates, but is desirable in colder climates and winter weather.

As disclosed in my aforesaid application, the battery of carbureters is designed to be operated in such manner that but one carbureter is brought into action in starting the engine. Such a carbureter would supply fuelized air to the port 2. Then as conditions require, a second carbureter (or a second and third, etc.) would be brought into action to supply fuelized air through the port 6.

In Figures 4, 5 and 6, I have shown a modified form of my invention in which the manifold is designed for a three cylinder engine or a six cylinder engine. In this form, the manifold 10 is provided with two by-passes 11 and 12 formed by the walls 13 and 14. The outlet portions leading to the engine cylinders are indicated at 15, 16 and 17 and the inlet ports from the battery of carbureters are indicated by the numerals 18 and 19.

The operation of this modification is substantially the same as the one shown in Figures 1 to 3, except that, by the provision of the central outlet port, the fuelized air is drawn in opposite directions from the ends of the manifold toward the center, when certain cylinders are being fuelized, and in this manner the inactive or "dead" air spaces are avoided.

It will be readily understood that minor changes in the size, form and construction of the various parts of my improved apparatus for supplying fuel to internal combustion engines can be made and substituted for those herein shown and described, without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

What I claim is:

1. An intake manifold comprising a single piece tubular member having a partition wall arranged therein for dividing the interior of said member into two compartments, said compartments having inter-communicating exit ports adapted to communicate with the combustion chambers of an engine and said member having independent inlet ports for said compartments and adapted to be connected to corresponding carbureters.

2. An intake manifold provided with a plurality of inlet ports and separate passages communicating with said ports, and having exit ports which connect the extremities of said passages, and an independently operable carbureter in operative relation to each inlet port, whereby when a single carbureter is in operation, the passage identified with the other carbureter serves as a by-pass to prevent surging of fuelized air in the active passageway.

3. An intake manifold comprising a single piece casting provided with an integral partition wall which divides the interior of said casting in two separate passageways, said partition wall terminating short of the exit ports of said passageways thereby establishing communication therebetween independently of the cylinder chamber and said manifold being provided with inlet ports adapted to connect said passageways to the respective carbureters.

4. The combination with a battery of carbureters adapted to be successively brought into action, an internal combustion engine and its cylinders, a single piece member having individual ducts leading from said carbureters to the chambers in the cylinders of said engine, said ducts having a point of confluence adjacent to their point of connection to said chambers.

In testimony whereof I hereunto affix my signature this 22nd day of November, 1921.

SAMUEL J. PINGREE.