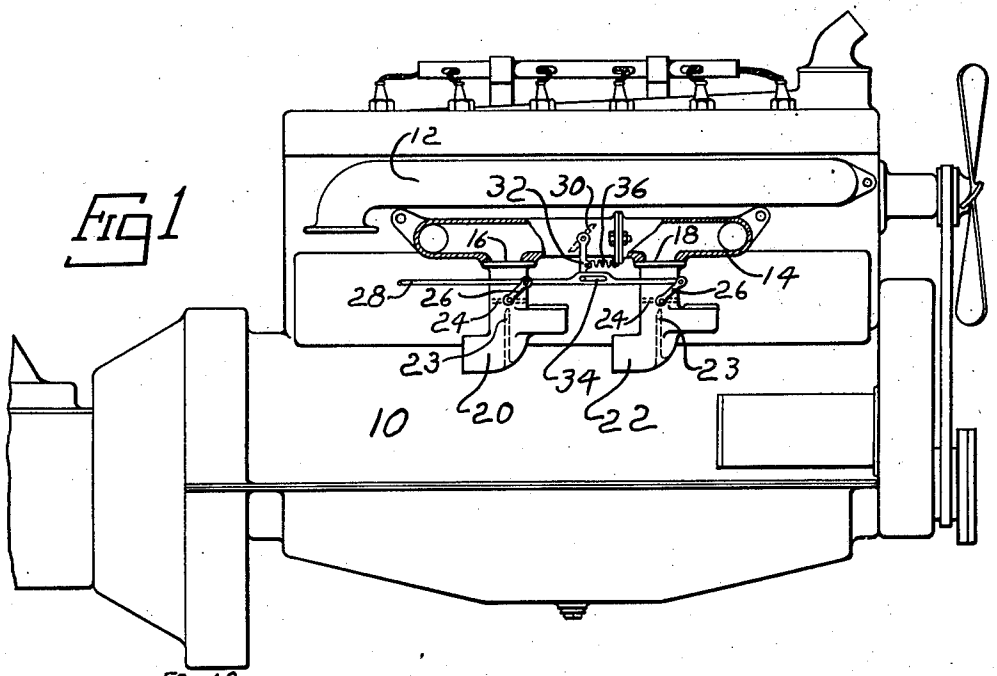
Aug. 23, 1932. R. W. PATON 1,872,800

INTERNAL COMBUSTION ENGINE

Filed July 28, 1927

Fig 1



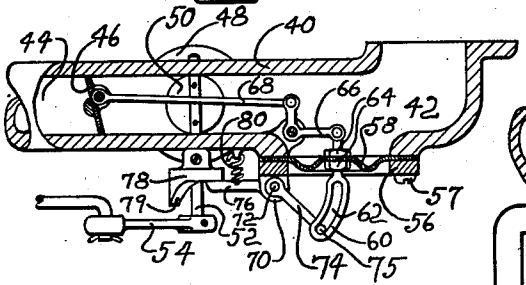


Fig 2

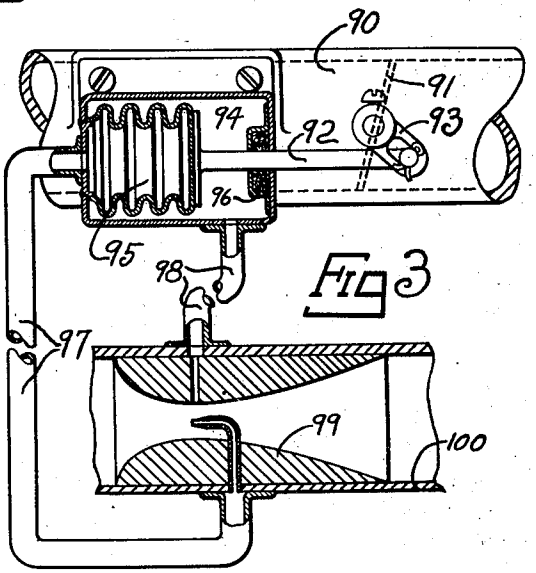


Fig 3

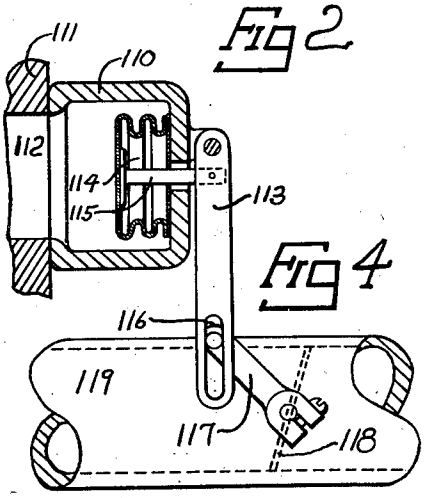


Fig 4

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INTERNAL COMBUSTION ENGINE

Application filed July 28, 1927. Serial No. 208,904.

This invention relates to an internal combustion engine and more particularly to a novel means for supplying fuel thereto. More specifically stated the invention consists in supplying fuel to the engine through two sources, such as two carburetors arranged to deliver combustible gases to the engine, either by intermixing the gases from the two sources and distributing the gas equally to the combustion chambers, or to supply the gas from one carburetor to certain combustion chambers and the gas from the other carburetor to the other combustion chambers.

It is an important object of this invention to provide means for accomplishing the above and in carrying out the invention I have provided means for distributing the gases separately at the lower engine speeds and for supplying intermixed gases at the higher speeds.

Another object of the invention is to automatically control the mixture and distribution of the gas dependent upon the speed of the engine.

These and other objects of the invention will more fully appear from the following description taken in connection with the accompanying drawing in which:

Fig. 1 is a side elevation of an internal combustion engine showing an adaptation of my invention.

Fig. 2 is a sectional view of a portion of an intake manifold showing a modification of my invention.

Fig. 3 is another modification, showing in side elevation and partly in section a control mechanism.

Fig. 4 shows a further modification.

Referring to the drawing and particularly to Fig. 1, an internal combustion engine 10 is shown provided with an exhaust manifold 12 and an intake manifold 14. The intake manifold 14 is provided with openings 16 and 18 adapted to form a communication between the manifold and carburetors 20 and 22. Two carburetors have been shown adapted to supply combustible gases to the manifold. These carburetors may be made integral having separate fuel distributing means but for the purpose of illustration, two have been shown, each provided with separate fuel distributing means such as nozzles 23.

Conventional butterfly valves 24 are controlled by lever arms 26. These two control levers 26 are connected by a rod 28 which is part of the accelerator mechanism forming a means for controlling the speed of the motor.

Pivoted within the intake manifold 14 between the openings 16 and 18 is a valve 30 operated by an arm 32. The free end of the arm 32 rides in a slot 34 formed in the throttle rod 28 and the slot is so positioned as to permit the rod 28 to open the valves 24 approximately three quarters of the way without causing the valve 30 to move. The valve 30 is opened only on the last quarter opening of the valves 24 or only when the motor 10 is running at high speed. At slow speeds the suction in the intake manifold is localized alternately at different cylinder parts which makes it desirable to place the carburetor as near the cylinder as possible. The ideal arrangement for slow speed engine operation would be to connect a carburetor to each cylinder but this practice is commercially impracticable,

In my construction I have placed two carburetors 20 and 22 on a single intake manifold 14 with a valve 30 between which is automatically closed at slow speeds, so as to divide the manifold up into two chambers with a carburetor supplying gas to each chamber from which it is delivered to certain of the engine cylinders, giving better distribution at low speeds. At high speed operation the suction is more evenly distributed throughout the manifold. Therefore it is desirable to automatically open the valve 30 allowing the gas from each of the carburetor jets 23 to intermix and become well distributed throughout the entire manifold before entering the cylinders.

In Fig. 2 I have shown an alternative method of control for the manifold valve. An intake manifold 40 is divided into two chambers 42 and 44 by a valve 46. A carburetor 48 supplies explosive gases to the intake manifold 40 at the right hand side of the valve 46 and it is to be understood that an-

other carburetor communicates to that part of the intake manifold 40 designated 44. A valve 50 is secured to a shaft 52 and operated by an arm 54 which controls the amount of explosive gas admitted into the manifold 40 from the carburetor 48.

Clamped over an opening in the manifold 40 by a ring 56 secured to the manifold 40 by screws 57, is a flexible diaphragm 58. Secured to the diaphragm 58 by nuts 64 is a small arc shaped flat member 60 having an arc shaped slot 62. The inner end of the member 60 is provided with a bell crank 66 which in turn is connected to the valve 46 by a rod 68. It will be readily seen that movement of the diaphragm 58 will cause movement of the valve 46. A boss 70 on the ring 56 serves as a bearing for a vertical rod 72 at the upper end of which is secured an arm 74 having one end 75 in the slot 62 of the member 60. An arm 76 attached to the lower end of the rod 72 rides on a cam 78 which is secured to the valve shaft 52 of the carburetor 48. The cam 78 has a raised face 79 which does not act upon the arm 76 until the valve 50 has been opened approximately three-fourths of the way.

The normal position is the one shown wherein the valve 46 divides the intake manifold 40 into two chambers 42 and 44. At high speeds, however, it is desirable to have the valve 46 open, therefore the cam 70 is so positioned on the shaft 52 that the high point 79 will move the arm 76 as the valve 50 is being opened the last quarter turn. Movement of the arm 76 also causes the arm 76 and lug 75 to move in the slot 62 of the member 60 and in so doing releases the diaphragm 58. The suction in the manifold chamber 42 will cause the diaphragm 58 to move inwardly moving the bell crank causing the rod 68 to be moved to the left and opening the manifold valve 46.

A spring 80 attached to the arm 76 will return the diaphragm to the normal position when the engine speed has been reduced. It will be readily seen that the valve 46 is opened by the suction in the chamber 42 and that the cam 78 and spring 80 acts only as means for restricting or permitting movement thereof.

In Fig. 3 I have shown another alternative method of operating a valve in an intake manifold. The manifold 90 has journaled within it a valve 91 which is operated by a rod 92 acting on a lever 93. A chamber 94 is secured to the manifold 90 and within this chamber is a bellows 95 which is secured to the rod 92. The rod 92 enters the chamber 94 thru a packing gland 96. Both the bellows 95 and the chamber 94 are connected to a venturi 99 by pipes 97 and 98 respectively. The venturi, in the air inlet pipe 100 of the carburetor, causes an air pressure on one side of a bellows 95 in the chamber 94 and causes a suction of the bellows 95 actuating the rod 92 causing movement of the valve 91.

In the form of valve operating mechanism shown in Fig. 4 the exhaust gases are used to operate the valve. An exhaust manifold 110 is secured to the cylinder block adjacent an exhaust port 112. A lever 113 is pivoted on the manifold 110 and actuated by a bellows 114 connected to the lever 113 by a rod 115. The lower end of the lever 113 has a slot 116 in which is received the free end of a lever 117. The lever 117 actuates a valve 118 in the intake manifold 119. At high engine speeds the pressure in the exhaust manifold is high, causing the bellows to compress and open the valve 118 in the intake manifold 119. In all the forms shown, it will be seen that I have accomplished the desired result of automatically dividing the intake manifold and its intercommunicating carburetors into two separated intake systems at slow engine speeds and automatically allowing the two systems to intermix with each other at high engine speeds.

It will be obvious that various changes may be made in the arrangement, combination and construction of the various parts of my improved device without departing from the spirit of my invention and it is my intention to cover by my claims such changes as may be reasonably included within the scope thereof.

What I claim is:

1. In a multicylinder engine, the combination of an intake manifold having two spaced inlet passages, a carburetor for each of said passages, a valve for each of said carburetors, means for operating said valves, a valve in said manifold positioned to segregate said inlet passages, and means independently of said first named operating means dependent on the position of said first named valves for opening or closing said last named valve.

2. In a multicylinder engine, the combination of an intake manifold having two spaced inlet passages, a carburetor for each of said passages, a valve for each of said carburetors, means for controlling said valves, a valve in said manifold between said passages, and means for operating said valve after said first mentioned valves have been opened a predetermined distance.

3. In a multicylinder engine, the combination of an intake manifold having a passage for communicating with only a portion of the engine cylinders and a passage for communicating with other cylinders of the engine, two spaced carburetors secured to inlet passages in said manifold, means for supplying combustible gases from one carburetor to only a portion of the engine cylinders and from the other carburetor to the other cylinders at the lower engine speeds, and means for permitting a communication between said passages and said carburetors to supply com-

bustible gases to any of the engine cylinders from both carburetors at the higher engine speeds only.

4. In a multicylinder engine, the combination of an intake manifold having two spaced inlet passages, a carburetor for each of said passages, a valve for each of said carburetors, a connection between said valves for controlling them simultaneously, a valve in said manifold between said carburetors held normally in closed position, said connection opening said valve after said carburetor valves have been opened a predetermined distance.

5. In a multicylinder engine, the combination of an intake manifold having two passages each provided with inlet and outlet openings, a carburetor for each of said passages, a valve for each carburetor, a passage between the inlet and outlet openings of each passage forming a communication between said first named passages, a valve in said last named passage, and means for opening said last named valve after the opening of said carburetor valves and for closing the last named valve after the closing of said carburetor valves.

6. In a multicylinder engine, the combination of an intake manifold having two spaced inlet passages, a carburetor for each of said passages, a valve for each of said carburetors, a connection between certain valves for controlling them simultaneously, a valve in said manifold between said carburetors, means for holding said valve in closed position and means for releasing said holding means when the carburetor valves have opened a predetermined distance whereupon the suction in said manifold opens said valve.

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