

July 19, 1938.

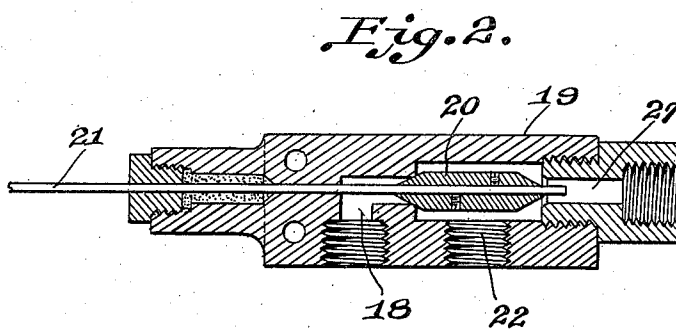
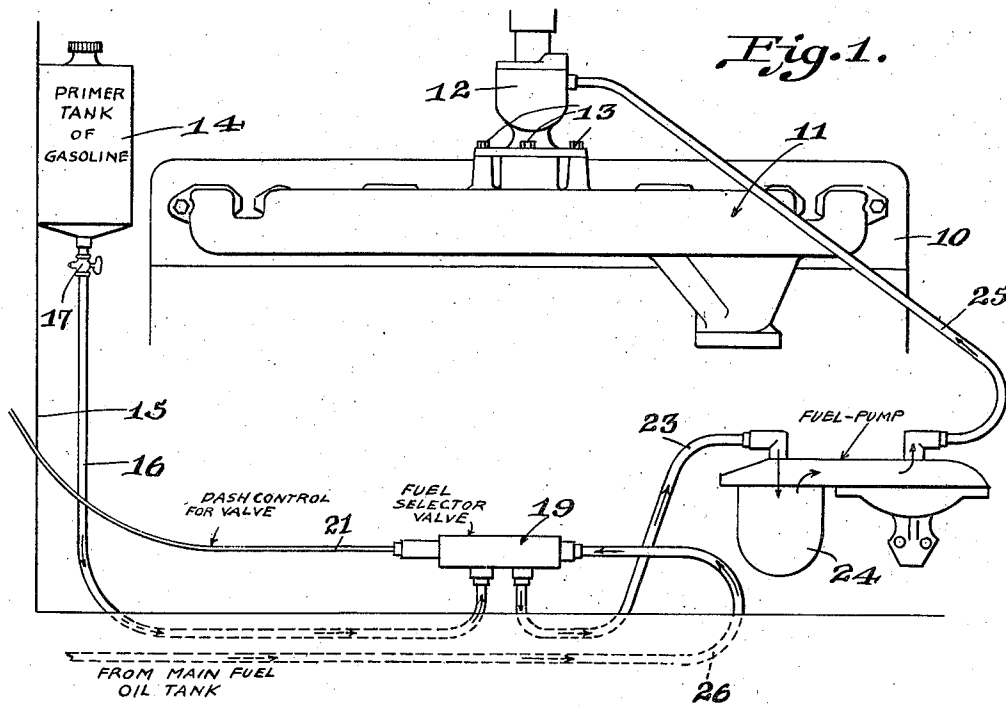
M. E. CARROLL

2,124,365

INTERNAL COMBUSTION ENGINE

Filed July 27, 1936

3 Sheets-Sheet 1



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Fig. 3.

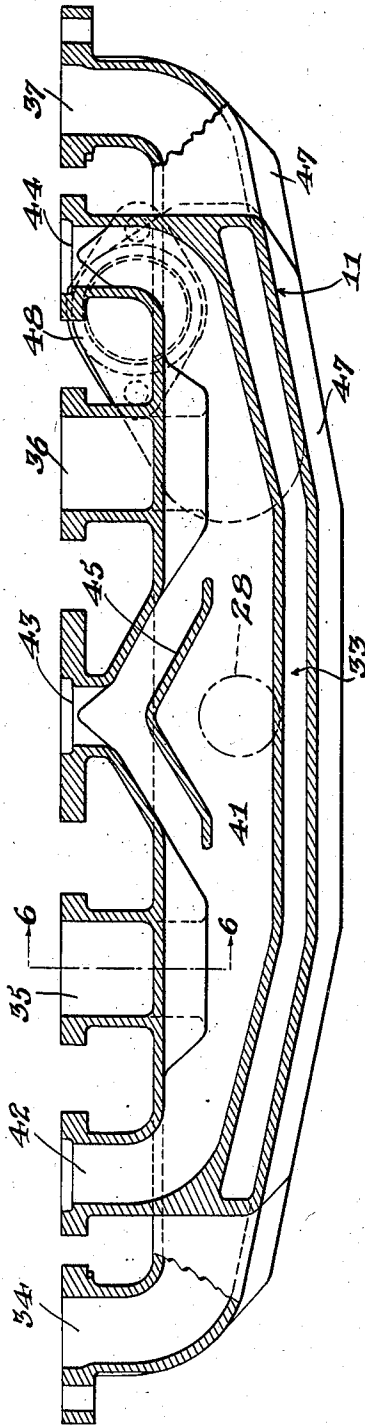
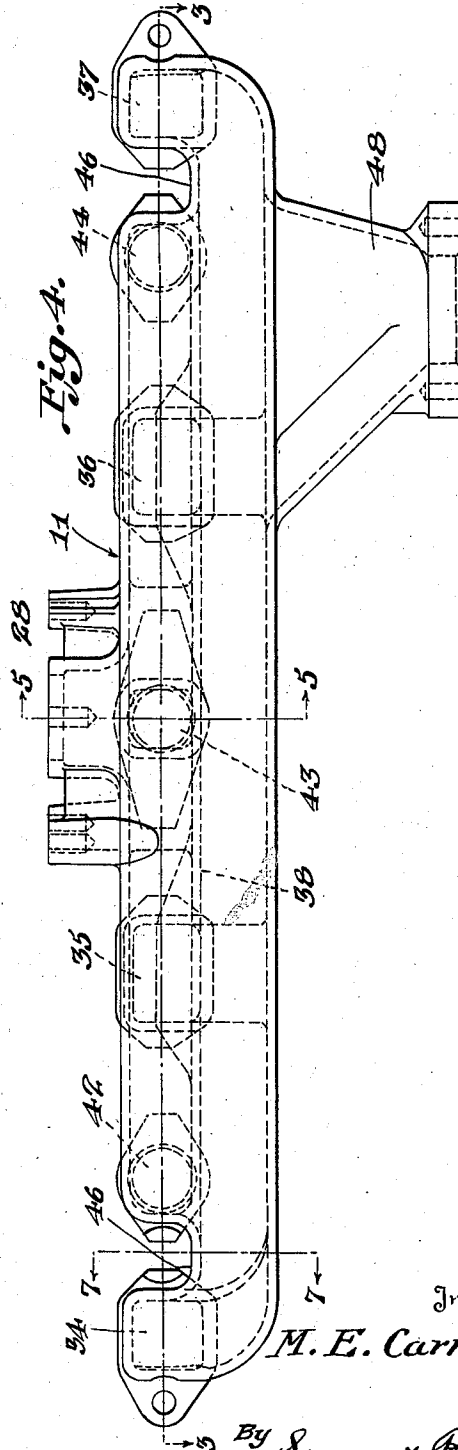


Fig. 4.



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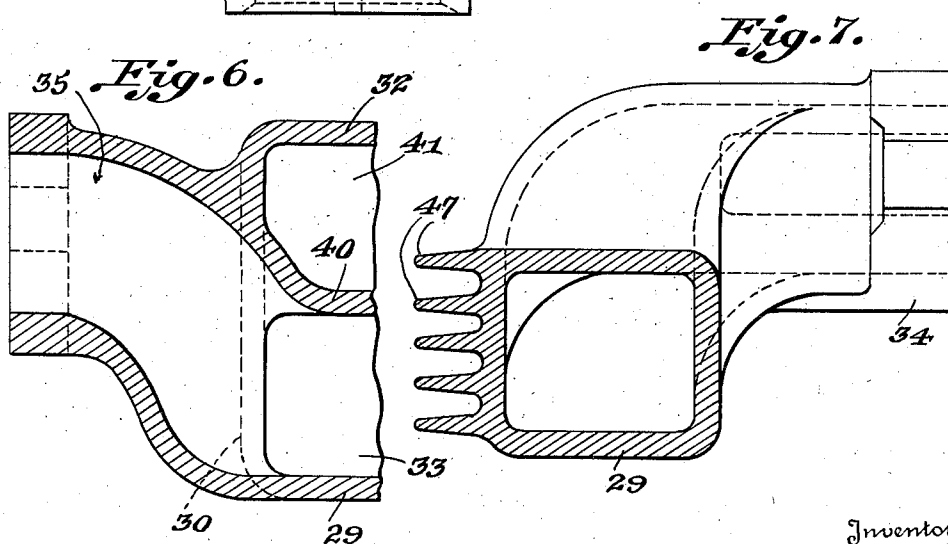
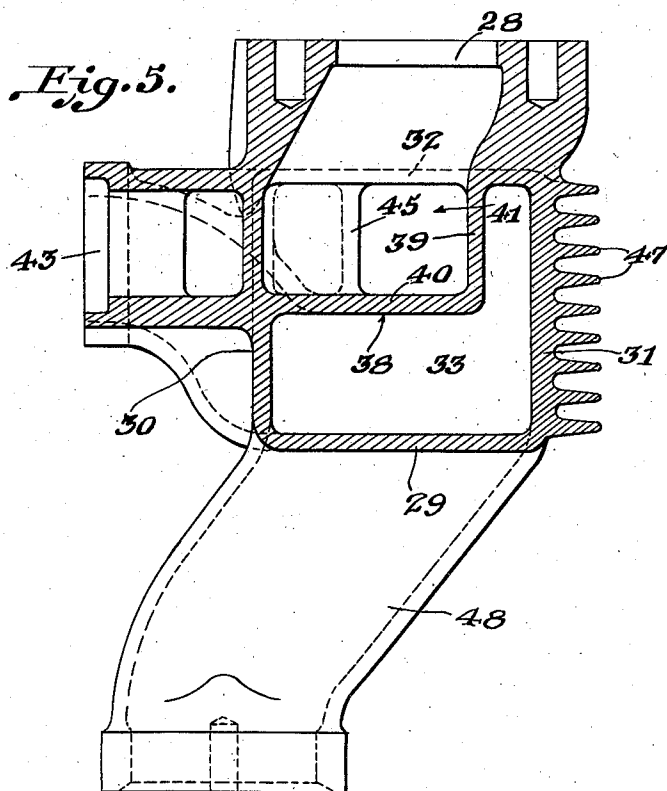
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,124,365

INTERNAL COMBUSTION ENGINE

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Application July 27, 1936, Serial No. 92,870

4 Claims. (Cl. 123—122)

This invention relates to improvements in internal combustion engines and more particularly to improved means for furnishing fuels to said engines.

5 One of the objects of the invention is to provide novel means for feeding different types of fuels to explosive engines so that the engine may be started with a relatively volatile fuel, such as gasoline, and may then be continued in operation
10 with relatively non-volatile fuels, such as fuel oils or kerosene.

Another object is to supply such a system with novel means for selectively controlling the feed of both fuels from the supply tanks to the manifold of the engine.

15 A still further object is to furnish improved means for forcing either fuel from a selector valve to the carburetor of the engine.

A further and important object is to provide a
20 combination intake and exhaust manifold so constructed that either fuel fed to the cylinders of the engine will be equally heated in travelling from the intake port of the manifold to any one of the cylinders of the engine so as to eliminate
25 unequal heating such as has been accomplished in the devices heretofore known.

Another object is to supply a combination manifold in which the exhaust gases introduced into the same from the engine will act to heat the
30 opposite sides and the bottom of the intake passageway so as to uniformly heat the explosive mixture on its way to any one of the engine cylinders.

Another object is to provide a combination
35 manifold having the above characteristics and provided with heat dissipating fins to extract heat from the outer wall of the exhaust gas passageway of the manifold.

40 A further object is to supply a combination manifold of simple, inexpensive and practical construction and one which may be readily manufactured by a metal casting operation.

With the foregoing objects outlined, and with other objects in view which will appear as the
45 description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

50 In the drawings:

Fig. 1 is a side elevation of a portion of an engine with my improvements incorporated therein.

Fig. 2 is a longitudinal vertical sectional view of a fuel selector valve which I employ to control
55 the feed of two different fuels to the engine.

Fig. 3 is an enlarged horizontal sectional view of the improved combination manifold taken on the line 3—3 of Fig. 4.

Fig. 4 is a side elevation of the manifold.

Fig. 5 is a transverse vertical sectional view
5 taken on the line 5—5 of Fig. 4.

Fig. 6 is a similar view of a detail on the line 6—6 of Fig. 3.

Fig. 7 is a transverse sectional view on the line 7—7 of Fig. 4.

Referring to the drawings, 10 designates the cylinder block of an internal combustion engine, which for the purpose of disclosing the present invention is assumed to be a six-cylinder block.

At one side of the block I secure my improved
15 combination manifold 11, which is supplied with a fuel mixture by a carburetor 12, that is mounted on the manifold and is secured in place by any suitable means, such as screws 13.

As heretofore stated, I propose to supply the
20 carburetor with fuels of different types. For example, gasoline may be used for starting purposes, and it may be contained in a tank 14 mounted on the dash 15 of the motor vehicle which is driven by the engine. Gasoline is dis-
25 charged from the tank through a pipe 16 having a control valve 17, and is fed into the port 18 (Fig. 2) of the selector valve 19, which port is controlled by a duplex valve member 20 that may be actuated by the operator through the instru-
30 mentality of a flexible rod 21. Gasoline is discharged from the valve through a port 22, and is conveyed by a pipe 23 to a fuel pump 24 which functions to force the same through a pipe 25
35 into the carburetor 12.

After the engine has been started, the operator will shift the valve member 20 into the position shown in Fig. 2, and then a heavier fuel, such as fuel oil, can be fed into the selector valve by means of a pipe 26 which discharges into a port
40 27 of the valve. Of course, the fuel oil introduced into the valve in this way travels through the pipe 23 under the influence of the pump 24 and is forced through pipe 25 into the carburetor.

As the tank 14 is arranged above the valve 19,
45 it will be understood that when the motor is idle, the valve member 22 will occupy the position shown in Fig. 2 to prevent the loss of gasoline from the tank.

In the carburetor 12 the fuel will be mixed with
50 air in the conventional way, and then this mixture will enter the top of the manifold 11 through a port 28.

Referring to the manifold, it will be noted that it consists of an elongated metallic casting having
55

a bottom 29, an inner side wall 30, an outer side wall 31, and a top 32 forming an exhaust passageway 33 which extends the full length of the manifold.

Exhaust gases from the cylinders of the engine are introduced into the passageway 33 through upwardly and outwardly curved nipples 34, 35, 36 and 37, and it will be noted that the nipples 37 discharge into the ends of the passageway 33 while the nipples 35 and 36 discharge into one side of the passageway as will be clear from the drawings.

A web 38, preferably consisting of a vertical wall 39 and a horizontal portion 40 is arranged within the casting for the purpose of forming an intake passageway 41. It will be noted that the web is of substantially L shape and merges into the top 32 and the inner wall 30 so as to segregate the intake passageway from the exhaust passageway.

As best shown in Fig. 3, it may be seen that the design of the manifold is such that the medial portion of the two passageways is wider than the end portions of the same, and this design facilitates equal heating of the explosive mixture which enters the port 28 before the mixture is fed to any one of the engine cylinders through ports 42, 43 and 44. The ports 42 and 44 lead from the ends of the passageway 41 while the port 43 leads from the middle portion of the passageway.

A substantially V-shaped baffle 45 is positioned within the passageway 41, and merges into the top 32 and false bottom 38, and this baffle spaces the intake port 28 from the port 43 so that the explosive mixture entering through 28 will have to travel substantially the same distance to reach port 43 as in reaching either one of the ports 42 or 44. Consequently, there will be no tendency in this construction for gases to move at different velocities from the intake 28 to any one of the ports 42, 43 or 44, and as the explosive mixture will have to travel substantially the same distance from the port 28 to any one of these ports, the mixture will be at substantially the same temperature when it reaches any one of the ports 42, 43 or 44.

It has been found in actual practice that the use of a wider medial portion in the manifold and the baffle 45 makes the engine operate more smoothly, and increases the efficiency of the engine, as it is obvious that an engine will not work as smoothly if some of the explosive mixture is going into some cylinders of the engine in a less gasified condition than in other cylinders.

It may be seen from Figs. 3, 4 and 7 that notches or gaps 46 are provided in the top portion of the manifold between the ports 34 and 42 and the ports 44 and 37. This construction allows dissipation of heat from the exhaust gases discharged from the end cylinders of the engine, and to further insure the proper dissipation of heat, I provide the outer wall of the casting with fins 47 which are eliminated from Figs. 1 and 3 to facilitate illustration.

After the exhaust gases have been utilized in the manifold to impart the proper temperature to the explosive mixture, they are discharged through an outlet 48 which is connected to the muffler pipe (not shown).

In operation, it will be understood that exhaust gases entering the passageway 33 through the ports 34, 35, 36 and 37, will heat the walls of the intake passageway before discharging through the outlet 48, and as the baffle 45 merges into the false bottom 38, some of the heat will be imparted

to the baffle so that it in turn will function to heat the explosive mixture as it passes from the port 28 to the port 43. Of course, the explosive mixture travelling from the port 28 to either one of the ports 42 or 44 will be effectively heated by contacting it with the internal wall 39 and the false bottom 38.

The herein described and illustrated embodiments of my invention have given satisfactory results in practice, and it will be obvious to those skilled in the art, after an understanding of my invention, that changes may be made in the details disclosed without departing from the spirit and scope of the invention, and it is intended that all matters contained in the above description, or shown in the drawings, shall be interpreted as illustrative and not in a limiting sense.

What I claim and desire to secure by Letters Patent is:

1. A combination manifold for internal combustion engines comprising an elongated hollow casting having a top and bottom and inner and outer walls, a substantially L-shaped web arranged within the casting and merging into the inner wall and top and dividing the interior of the casting into an intake passageway and an exhaust gas passageway, ported nipples for introducing exhaust gases into the exhaust gas passageway, medial and end ports for discharging heated explosive gases from the intake passageway, a port for introducing an explosive mixture into the medial portion of the top of the casting, and means within the intake passageway for causing the mixture introduced through the last mentioned port to travel substantially the same distance in reaching any one of said medial or end ports, said last mentioned means including a substantially V-shaped baffle arranged vertically within the intake passageway between the explosive mixture intake port and said medial port, said baffle having its upper portion merging into said top and its lower portion merging into said web.

2. A combination manifold for internal combustion engines comprising an elongated hollow casting having a top and bottom and inner and outer walls, a substantially L-shaped web arranged within the casting and merging into the inner wall and top and dividing the interior of the casting into an intake passageway and an exhaust gas passageway, ported nipples for introducing exhaust gases into the exhaust gas passageway, medial and end ports for discharging heated explosive gases from the intake passageway, a port for introducing an explosive mixture into the medial portion of the top of the casting, and means within the intake passageway for causing the mixture introduced through the last mentioned port to travel substantially the same distance in reaching any one of said medial or end ports, the medial portions of the intake and exhaust passageways being materially wider than the end portions of the same.

3. A combination manifold for internal combustion engines comprising an elongated hollow casting having a top and bottom and inner and outer side walls, a substantially L-shaped partition web arranged in the casting and merging into the top and inner side wall and dividing the interior of the casting into an exhaust gas passageway and an intake passageway, exhaust gas nipples united with the ends of the casting and with the inner side wall of the same for introducing exhaust gases into the exhaust gas passageway, an outlet for discharging exhaust gases from the

last mentioned passageway, medial and end intake nipples communicating with the intake passageway and projecting from the inner wall of the casting, the medial portion of both passageways being wider than the end portions of the same, an intake port in the top of the casting, and a substantially V-shaped baffle arranged in the intake passageway between the last mentioned port and the medial port, said baffle having its upper portion merging into said top and its lower portion merging into said web.

4. A combination manifold for internal combustion engines comprising an elongated hollow casting having a top and bottom and inner and outer side walls, a substantially L-shaped partition web arranged in the casting and merging into the top and inner side wall and dividing the interior of the casting into an exhaust gas passageway and an intake passageway, exhaust gas nipples united with the ends of the casting and with the

inner side wall of the same for introducing exhaust gases into the exhaust gas passageway, an outlet for discharging exhaust gases from the last mentioned passageway, medial and end intake nipples communicating with the intake passageway and projecting from the inner wall of the casting, the medial portion of both passageways being wider than the end portions of the same, an intake port in the top of the casting, and a substantially V-shaped baffle arranged in the intake passageway between the last mentioned port and the medial port, said baffle being of such length relatively to the intake passageway as to cause an explosive mixture entering through the top intake port to travel substantially the same distance in reaching the medial port or either one of said end ports, said baffle having its upper portion merging into said top and its lower portion merging into said web.

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