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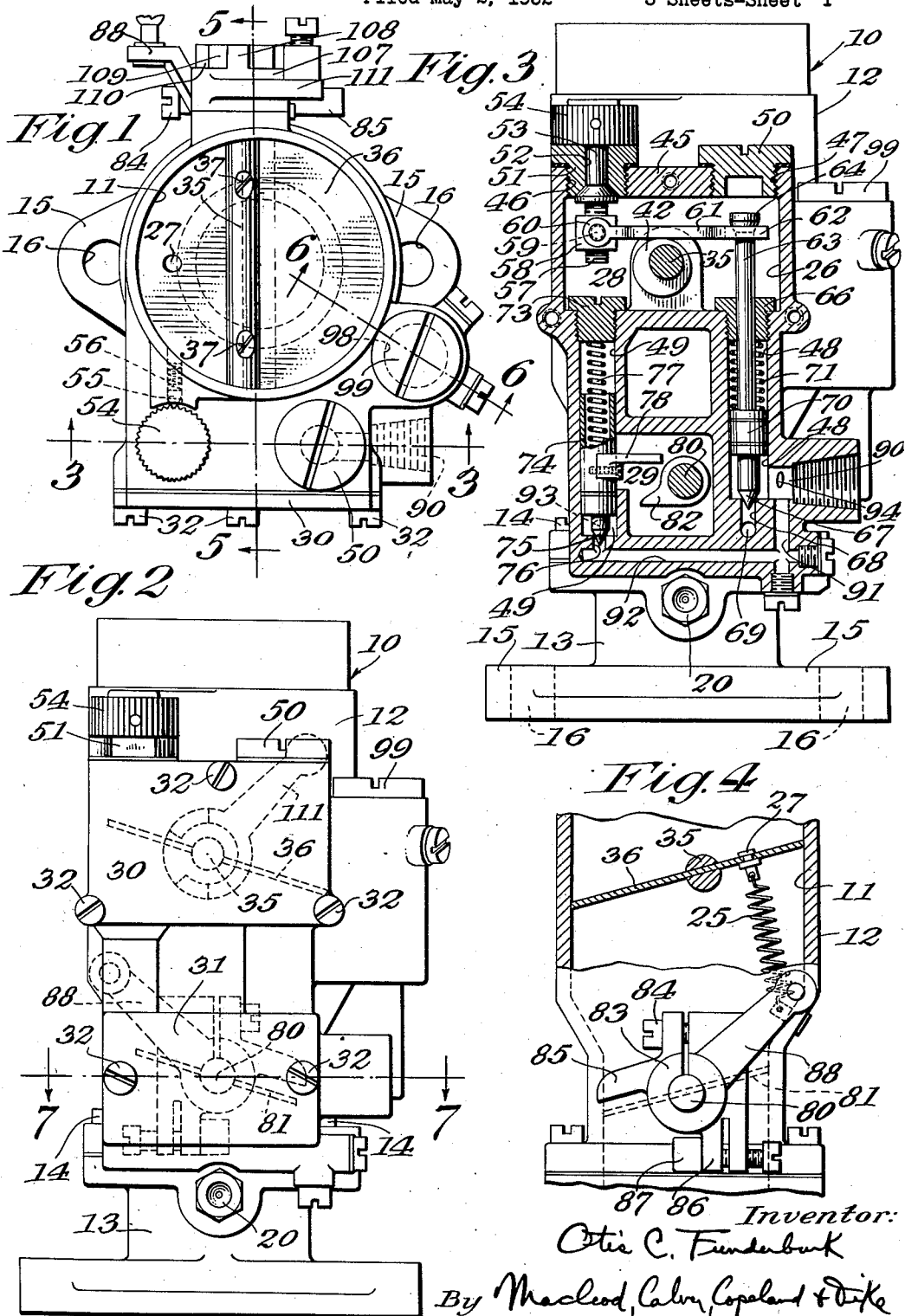
O. C. FUNDERBURK

1,970,601

CARBURETOR

Filed May 2, 1932

3 Sheets-Sheet 1



Inventor:  
Otis C. Funderburk  
By Macleod, Calver, Copeland & Dike  
Attorneys.



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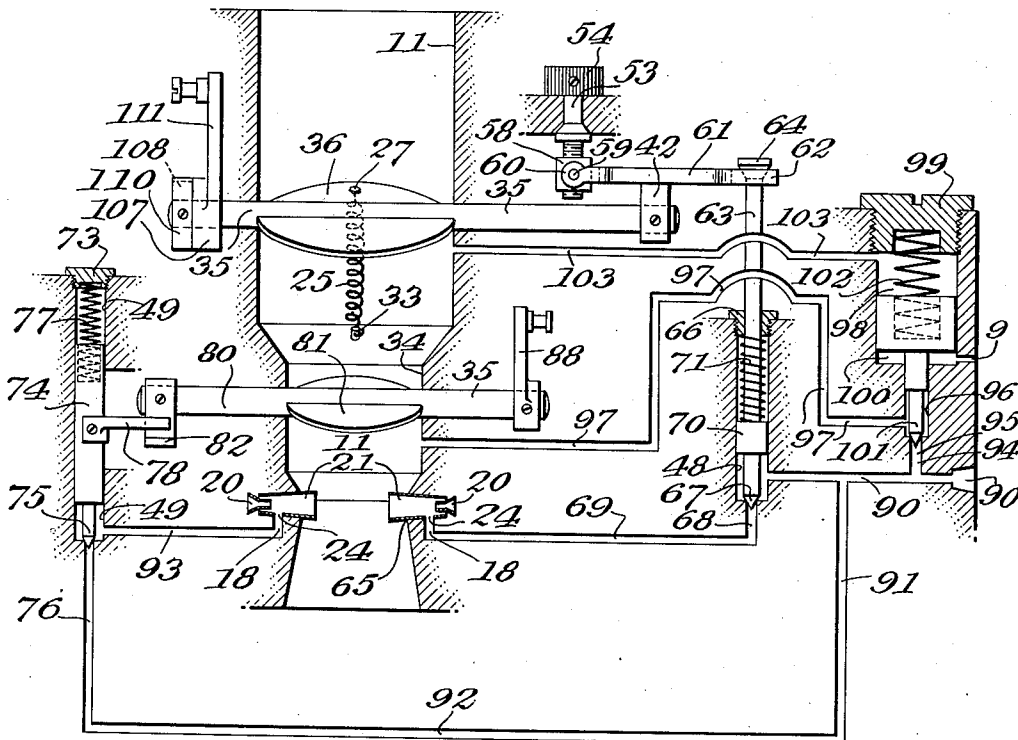


Fig. 9

Inventor:  
Otho C. Funderburk  
By Macleod, Colver, Copeland & Dike  
Attorneys.

## UNITED STATES PATENT OFFICE

1,970,601

## CARBURETOR

Otis C. Funderburk, Weston, Mass., assignor to  
Self Feeding Carburetor Company, Inc., Boston,  
Mass., a corporation of Massachusetts

Application May 2, 1932, Serial No. 608,654

2 Claims. (Cl. 261—58)

This invention relates to fuel supply systems for internal combustion engines and more particularly to systems wherein the fuel is caused to flow in an unbroken and uninterrupted stream directly from the main supply tank to the engine cylinders.

It is an object of the present invention to provide an efficient fuel supply system for internal combustion engines and which can be manufactured economically.

Before explaining in detail the present invention, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention beyond the terms of the several claims hereto appended as considered in view of the prior art and the requirements thereof.

The invention will be more clearly understood from the following description in conjunction with the accompanying drawings, in which,

Fig. 1 is a plan view of a carburetor embodying the invention;

Fig. 2 is an elevational view of the same;

Fig. 3 is a sectional view taken upon the line 3—3 of Fig. 1;

Fig. 4 is a detail view, partly in section, of a portion of the carburetor;

Fig. 5 is a sectional view taken upon the line 5—5 of Fig. 1;

Fig. 6 is a sectional view taken upon the line 6—6 of Fig. 1;

Fig. 7 is a sectional view taken upon the line 7—7 of Fig. 2;

Fig. 8 is a sectional view taken upon the line 8—8 of Fig. 5; and

Fig. 9 is a diagrammatic view showing the fuel passages and valves of the carburetor.

One embodiment of the invention is illustrated in the accompanying drawings and comprises a casing 10 having a passage 11 therethrough for the flow of air. As illustrated, the casing 10 is composed of an upper or main body portion 12 and a lower portion 13 suitably secured to the portion 12, as by screws 14. The casing portion 13 may be made of the same material as the portion 12 or it may be made of the same material as the engine manifold, namely, cast iron. The casing portion 13 is provided with flanges 15 each

having an opening 16 to receive a bolt by which the casing may be secured to the engine manifold. A gasket 17 preferably is interposed between the casing portions 12 and 13. The bottom surface of the casing portion 12 and top surface of the casing portion 13 are each provided with cooperating annular grooves providing an annular fuel passage 18.

In the embodiment of the invention illustrated, the casing portion 13 is provided with a pair of openings 19 through its wall in each of which a Venturi tube 20 is suitably secured. The venturies 20, preferably, are constructed as described in my copending application Serial No. 629,473 filed August 19, 1932 comprising a nozzle portion 21 projecting into the passage 11 and in threaded engagement with the casing 13 and a portion 22 threaded in the casing 13 and projecting into the throat of the portion 21 in spaced relation thereto. The portions 21 and 22 of the venturies 20 are so arranged as to provide an annular passage 23 therebetween having communication with the portion 21. Passages 24 connect the annular passage 18 with the annular passages 23.

The casing 10 is provided with a lateral projection 26 having cavities 28 and 29 which are closed by covers 30 and 31 suitably secured to the projection 26, as by screws 32. A shaft 35 extends across the passage 11 and into the cavity 28 and is rotatably mounted in the casing portion 12 with its axis, preferably, at one side of the center of the passage 11. A flap valve 36 is suitably secured upon the shaft 35, as by set screws 37; and is adapted to control the flow of air through the passage 11. The air valve 36 normally is maintained closed by a spring 25 extending between a lug 27 carried by the valve 36 and a lug 33 on the casing portion 12. A collar 38 is carried by the shaft 35 and is provided with a ground surface 39, preferably, of conical shape, adapted to engage a seat 40 formed in the bottom of the cavity 28 so as to form a fluid-tight seal preventing the entrance of air into the passage 11. A cam 42 is suitably mounted upon the shaft 35 within the cavity 28 adjacent the collar 38. The surface 39 upon the collar 38 is held against its seat 40 by a spring 43 surrounding the end of the shaft 35 with one end in engagement with the side of the cam 42 and its other end engaging a socket 44 formed in the cover 30. The top wall 45 of the cavity 28 is provided with openings 46 and 47 to provide access during manufacture for a tool adapted to finish passages 48 and 49 in the projection 26 of the wall of

the casing portion 12. The opening 47 is threaded to receive a closure plug 50. The opening 46 is also threaded to receive a closure plug 51 which is provided with a passage 52 for a shaft 53 to the upper end of which is secured a knurled collar 54 adapted to be engaged by a plunger 55 urged thereagainst by a spring 56. The shaft 53 is provided with a threaded portion 57 within the cavity 28. A nut 58 is mounted upon the threaded portion 57 and is provided with projecting pins 59 adapted to provide bearings for trunnions 60 formed upon one end of a lever 61. The lever 61 at an intermediate point engages the cam 42 and is provided at its other end with a fork 62 surrounding a shaft 63 and engaging a collar 64 upon the upper end of the shaft 63. The upper end of the passage 48 is threaded to receive a hollow closure plug 66 providing a bearing for slidably receiving the shaft 63. The other end of the shaft 63 is provided with a tapered surface 67 providing a metering pin extending into the upper end of a passage 68. The shaft 63 is provided intermediate its ends with a collar or piston 70 adapted to slidably engage the wall of the passage 48. A spring 71 surrounds the shaft 63 with one end in engagement with the upper surface of the piston 70 and its other end in engagement with the lower surface of the plug 66 and serves to hold the lever 61 snugly in engagement with the surface of the cam 42.

The upper end of the passage 49 is threaded to receive a closure plug 73. A cup-shaped piston 74 is slidably mounted within the passage 49 and is provided at its lower end with a conical shaped valve 75 adapted to seat in the upper end of a passage 76 communicating with the passage 49. The valve 75 normally is maintained in closed position by a spring 77 extending between the piston 74 and the closure plug 73.

An arm 78 is secured to the piston 74 so as to extend laterally therefrom. A shaft 80 extends across the passage 11 and carries a throttle valve 81 positioned between the venturies 20 and the air valve 36. One end of the shaft 80 extends into the cavity 29 and carries a cam 82 adapted to engage the arm 78 after the throttle valve 81 is opened a predetermined amount. The other end of the shaft 80 has a split collar 83 suitably clamped thereon, as by a screw 84. The collar 83 is provided with stops 85 and 86 adapted to engage a stop 87 to limit the opening and closing movement of the throttle valve. The collar 83 also is provided with an arm 88 which is suitably connected in any usual manner to an accelerator lever.

The casing portion 12 is provided with a fuel inlet opening 90 communicating with the passage 48. The opening 90 is provided with threads for securing therein a fuel conduit (not shown). A passage 91 connects the inlet passage 90 with a passage 92 which communicates with the lower end of the passage 76. A passage 93 extends from the annular passage 18 to near the lower end of the passage 49. A passage 94 connects the passage 90 with a passage 95 which communicates with a passage 96. A passage 97 connects the passage 96 with the passage 11. If desired, the passage 97 may connect directly with passage 18 instead of discharging into passage 11. A passage 99 connects the lower end of the passage 68 with the annular passage 18.

The wall of the casing portion 12 is provided with a cavity 98 communicating with the passage 96. The upper end of the cavity 98 is

threaded to receive a closure plug 99. A hollow piston 100 is slidably mounted within the cavity 98 and is provided with a projection carrying a valve 101 adapted to seat in the upper end of the passage 95. The valve 101 normally is maintained closed by a spring 102 extending between the piston 100 and the closure cap 99. A vent 9 extends through the wall of the casing portion 12 into the cavity 98 below the piston 100. A passage 103 connects the passage 11 with the cavity 98 above the piston 100.

Preferably, the carburetor casing portion 12 is provided with a restricted portion 34 to provide a venturi effect adjacent the entrance of the passage 97 in the passage 11 and the carburetor casing portion 13 is provided with a still greater restricted portion 65 adjacent the venturies 20 to provide a venturi effect increasing the action of suction upon the venturies. The venturi 65 is effective, when a predetermined speed of the engine is reached, to accelerate the flow of fuel through the main supply line controlled by the metering pin 67 and through the auxiliary supply line controlled by the valve 75. The venturi 34 tends to accelerate the flow of fuel through the supply line controlled by the valve 101.

A ring 107 is rotatably mounted upon a suitable bearing formed in the casing portion 12 surrounding the shaft 35 and is provided with a projection 108 adapted to move in a slot 109 formed in a ring 110 suitably fixed upon the shaft 35. The ring 107 is provided with an arm 111 which is suitably connected with a choke button upon the vehicle dash. One end of the slot 109 serves as a stop adapted to be engaged by the projection 108 to limit the movement of the ring 107 and lock the air valve 36 closed when it is desired to choke the engine.

When it is desired to start the engine, the choke button is pulled out to bring the projection 108 against the end of the slot 109 so as to lock the air valve 36 closed. The throttle valve is then opened and the motor started by actuating the self-starter. A small quantity of air is admitted through the passage in the venturies 20 as well as a small amount of fuel which enters the same by passage from the inlet opening 90, passages 68, 69, 18 and 24. At the same time the action of suction from the engine creates a depression in the passage 103 and cavity 98 which raises the piston 100 and lifts the valve 101 off its seat thereby permitting sufficient fuel for starting purposes to be conveyed from the inlet opening 90 through the passages 94, 95 and 97 to the passage 11 and thence to the engine cylinders. During idling of the motor, the air valve 36 is maintained closed by the spring 25 and sufficient air is supplied to the engine cylinders through the venturies 20 and likewise sufficient fuel is supplied through the venturies 20 by flow thereto from the passage 90 through the passages 68, 69 and 18, the cam 42 being so arranged as to leave the metering pin slightly open during idling.

The relative quantity of air and fuel supplied to the engine cylinders to maintain the proper mixture may be adjusted by turning the knurled collar 54 to move the lever 61 and consequently change the adjustment of the metering pin 67.

When the engine is running at moderate speeds, the throttle valve 81 is partly open and consequently the air valve 36 is partly open. Hence, air is supplied to the engine cylinders through the passage 11 as well as through the venturies 20. The entire fuel supply, however, when running at moderate speeds is supplied from the

passage 90 through the passages 68, 69, 18 and 24 to the venturies. If it is desired to accelerate the speed of the motor, the throttle valve 81 is opened suddenly with the results that there is a sudden lowering of the depression in the passage 103 and cavity 98 causing the piston 100 and consequently the valve 101 to rise thereby permitting additional fuel to be supplied to the engine cylinders from the passage 90 through the passages 94, 95, 96, 97 and 11. When the throttle valve 81 is opened an amount corresponding to an engine speed, such as to propel a vehicle about fifty miles per hour, the cam 82 carried by the throttle valve shaft engages the arm 78 to lift the valve 75 and permit additional fuel to be supplied from the passage 90 through the passages 91, 92, 76, 49, 93, 18 and 24 and thence through the venturies 20 and passage 11 to the engine cylinders.

I claim:

1. In a fuel supply system for internal combustion engines, in combination, an air valve for controlling a supply of air to the engine cylinders,

means for supplying a mixture of air and fuel to the engine cylinders, a throttle valve positioned between said means and air valve, an auxiliary fuel passage for supplying fuel to the engine cylinders, a valve normally closing said passage, and means responsive to sudden changes in depression between said throttle valve and air valve for lifting said valve to open said passage and permit fuel to pass into the engine cylinders.

2. In a fuel supply system for internal combustion engines, in combination, an air valve, a venturi communicating with an air supply and a fuel supply and adapted to supply a mixture of the same to the engine cylinders, a throttle valve positioned between said venturi and air valve, an auxiliary fuel passage for supplying fuel to the engine cylinders, a valve normally closing said passage, and means responsive to sudden changes in depression between said throttle valve and air valve for lifting said valve to open said passage and permit fuel to pass into the engine cylinders.

OTIS C. FUNDERBURK.

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| 25 | 100 |
| 30 | 105 |
| 35 | 110 |
| 40 | 115 |
| 45 | 120 |
| 50 | 125 |
| 55 | 130 |
| 60 | 135 |
| 65 | 140 |
| 70 | 145 |
| 75 | 150 |