A. C. BENNETT.

CARBURETOR.

APPLICATION FILED MAR. 30, 1918.

1,430,001.

Patented Sept. 26, 1922.

2 SHEETS—SHEET 1.

Fig. 2

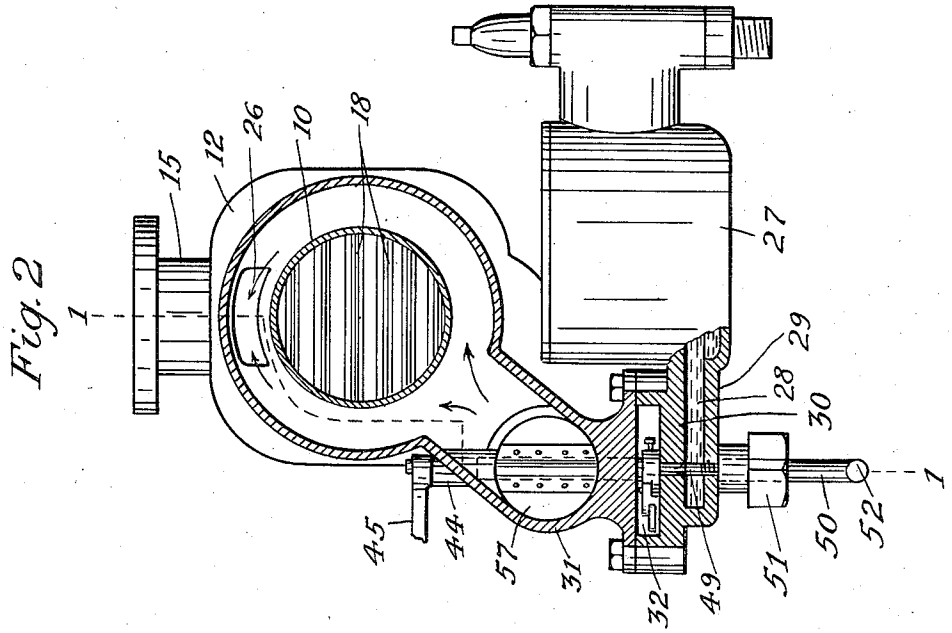
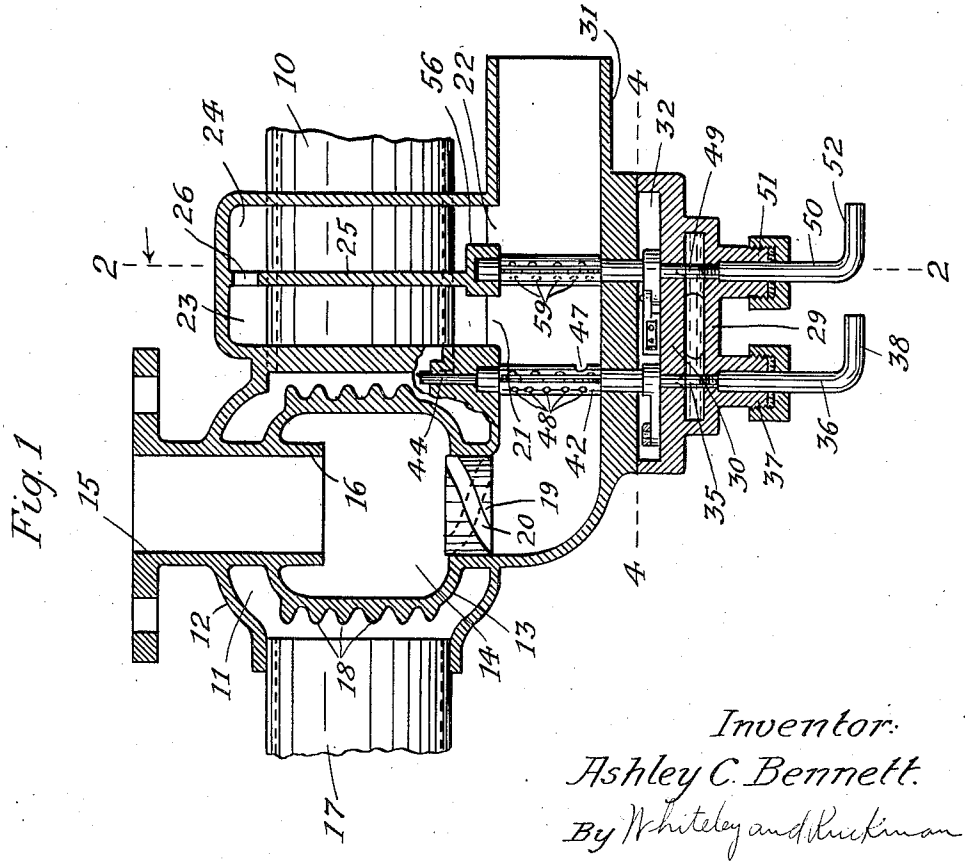


Fig. 1



Inventor:
Ashley C. Bennett.
By Whiteley and Ruckman
his Attorneys.

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2 SHEETS—SHEET 2.

Fig. 3

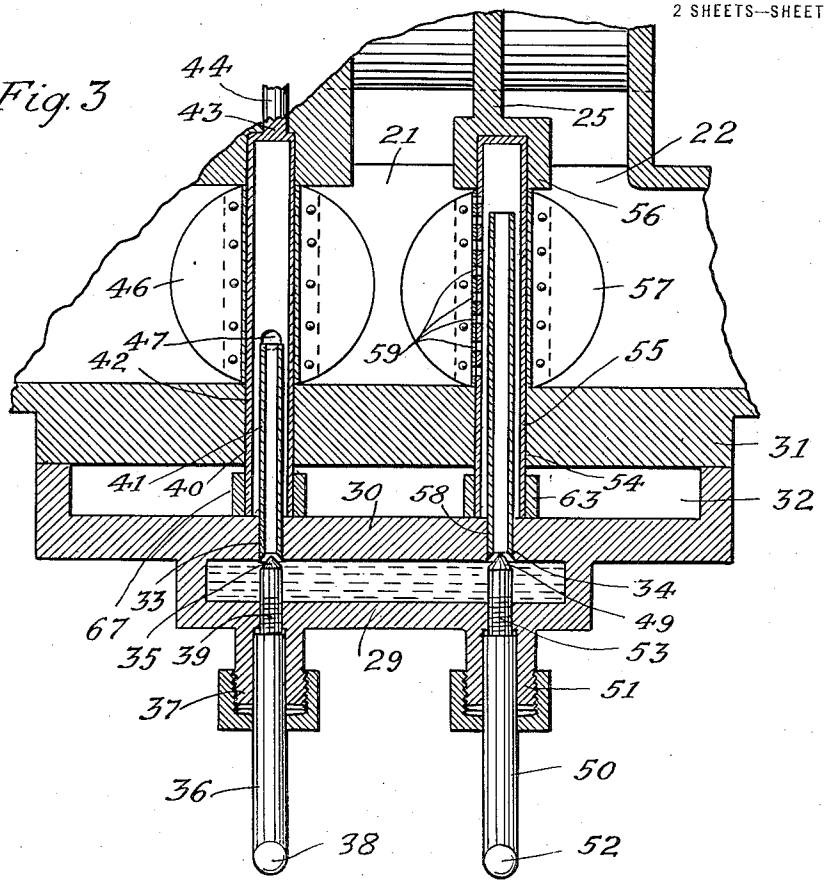


Fig. 4

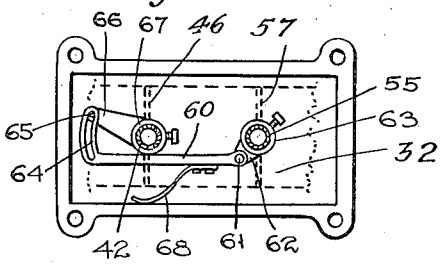


Fig. 5

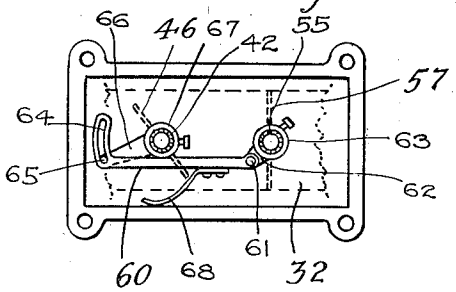
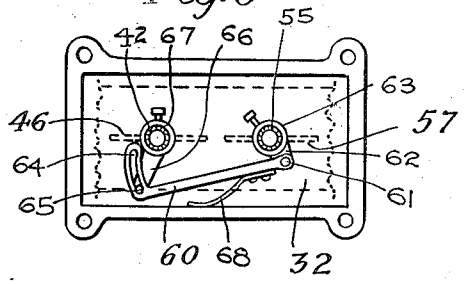


Fig. 6



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UNITED STATES PATENT OFFICE.

ASHLEY C. BENNETT, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO IRENE E. BENNETT, OF MINNEAPOLIS, MINNESOTA.

CARBURETOR.

Application filed March 30, 1918. Serial No. 225,843.

To all whom it may concern:

Be it known that I, ASHLEY C. BENNETT, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Carburetors, of which the following is a specification.

My invention relates to carburetors and has for its object to provide for taking the air into the carburetor through the same inlet at all speeds of the engine whether high or low. A further object is to provide for heating the air which is supplied to the carburetor when the engine is running at low speeds, and to deliver a large amount of unheated air to the carburetor when the engine is running at high speeds.

The full objects and advantages of my invention will appear in connection with the detailed description thereof and are particularly pointed out in the claims.

Referring to the drawings, illustrating the application of my invention in one form,—Fig. 1 is a view in vertical section of my carburetor taken on the irregular line 1—1 of Fig. 2 and showing the valves positioned for low speed. Fig. 2 is a view mostly in vertical section on line 2—2 of Fig. 1. Fig. 3 is an enlarged detail of a portion of a carburetor, as shown in Fig. 1 but showing the valves positioned for high speed. Fig. 4 is a view in horizontal section on line 4—4 of Fig. 1 showing the valves positioned for slow speed. Fig. 5 is a view similar to Fig. 4 but showing the position of the valves during the operation of changing from low to high speed. Fig. 6 is a view similar to Figs. 4 and 5 but showing the valves positioned for high speed.

As illustrated in the drawings, the exhaust pipe 10 from the engine opens into a chamber 11 formed by a casing 12. Within the chamber 11 is an extended member 13 forming a mixing chamber 14 of globular shape, into the upper portion of which depends the lower end of the delivery pipe 15 which delivers the carbureted fuel in the usual way from the chamber 14. The lower end of this pipe therefore constitutes an annular member 16 which is spaced from the curved wall of the chamber 14. The exhaust gases pass around and heat the chamber and escape through a pipe 17 and the member 13 is preferably formed with external ribs 18 in order to increase the heating surface. The lower end of the casing is contracted and contains a plug 19 having helical grooves 20 in its vertical surface which form passageways to give the fuel a whirling motion as it enters the chamber 14. On account of this whirling motion the heavier particles of fuel will be thrown into contact with the hot wall of the chamber and vaporized, while the annular member 16 acts as a trap to prevent unvaporized particles escaping into the delivery pipe. Below the plug 19 the casing is curved to form a horizontal pipe member 31 having two ports 21 and 22 in its upper side, the port 21 connecting with a chamber 23 and the port 22 connecting with a chamber 24. These two chambers extend around the exhaust pipe 10 and are separated from each other by the partition 25 having the port 26 at its upper portion to afford connection between the two chambers. A by-pass leading from the air inlet end of the pipe 31 and extending around the exhaust pipe 10 is thus provided. A suitable fuel reservoir 27 has connected with it a passageway 28 formed by a lower wall 29 and an upper wall 30, the latter being spaced from the bottom of the pipe 31 to form a chamber 32 for a purpose which will presently appear. Two openings 33 and 34, as best shown in Fig. 3, extend through the wall 30, the opening 33 being controlled by a needle valve 35, the stem 36 of which extends downwardly through a gland 37 and has its end bent to form an operating handle 38. The screw threaded portion 39 of the stem engages a screw threaded opening in the wall 29 whereby the valve may be adjusted by turning the handle 38 in order to control the fuel supply for low speed. The opening 33 is fitted with a stand pipe 41 which extends upwardly through an opening 40 in the bottom wall of the pipe 31 and terminates a short distance above the lower portion of the wall of said pipe. Rotatably mounted in opening 40 and concentric with the stand-pipe 41 is a tubular member 42, the upper end of which is closed at 43 and is provided with a stem 44 to which is secured a throttle lever 45 which may be operated in the usual manner to partially rotate the member 42. A butterfly valve 46 is secured to member 42 and this valve has

a diameter the same as the diameter of the pipe 31 so that it may be turned to entirely close the passageway in said pipe except for an opening 47 extending into one side of the tubular member and a plurality of perforations 48 extending through the other, or suction side, of the tubular member. The butterfly valve has its central vertical portion divided and curved to extend around the tubular member 42 and it is secured thereto in any desired manner for turning movement with said member. It will be understood that the hole 47 and the perforations 48 extend through the curved portion of the butterfly valve as well as through the tubular member. The opening 34 previously referred to is controlled by a needle valve 49, the stem 50 of which extends downwardly through a gland 51 and has its end bent to form an operating handle 52. A screw threaded portion 53 of the stem engages a screw threaded opening in the wall 29 whereby the valve may be adjusted by turning the handle 52 in order to control the fuel supply for high speeds. The opening 34 is fitted with a standpipe 58 which extends upwardly through an opening 54 in the bottom of the wall of the pipe 31 and terminates a short distance below the upper portion of the wall of said pipe. Rotatably mounted in the opening 34 and concentric with the standpipe 58 is a tubular member 55, the upper end of which is closed and rotatably mounted in a socket 56 provided in the upper portion of the wall of the pipe 31. The butterfly valve 57 is secured to the member 55 and this valve has a diameter the same as the diameter of the pipe 31 so that it may be turned to normally close the passageway in said pipe. When said valve is closed it is obvious that communication can be had from the inlet end of the pipe through the carburetor only through the by-pass constituted by the ports 21 and 22, the chambers 23 and 24 and the port 26. The butterfly valve 57 is secured to the tubular member 55 in the same manner that the butterfly valve 46 is secured to the tubular member 42, and in the wall of the tubular member 55 are a plurality of perforations 59 located in the suction wall.

As previously stated, the butterfly valve 46 and the tubular member 42 to which it is secured may be partially rotated by throttle lever 45. In order to also operate the tubular member 55 and the valve 57 carried thereby, I provide in the chamber 32 a connection between the two tubular members. This connection comprises a bar 60, one end of which is pivoted at 61 to an arm 62 which has a portion 63 extended around the tubular member 55 for securing it thereto. The curved end of the bar 60 is provided with a slot 64 which is concentric with the axis of the tubular member 42. In this slot is a pin 65 on the end of an arm 66 which has a portion 67 extending around the tubular member 42 for securing it thereto. Secured to the bar 60 is a leaf spring 68 which engages the wall of the chamber 32 and which when compressed, as shown in Fig. 6, tends to return the bar 60 to the position shown in Figs. 4 and 5.

The operation and advantages of my invention will be apparent from the foregoing description. In the low speed position shown in Fig. 4 both butterfly valves are closed and the air is drawn through the by-pass around the exhaust pipe which preheats it. The heated air passes through the opening 47 in the tubular member 42 and directly over the upper end of the standpipe 41. Fuel will be drawn up said standpipe into the current of air and the mixture will pass out through the perforations 48 toward the mixing chamber 14. The mixing and vaporizing are completed in said chamber and thus a thoroughly vaporized homogeneous mixture suitable for low speeds is supplied to the engine. However, in order to insure perfect carbureting for high speeds it is desirable to supply an amount of oxygen proportionally greater than is supplied at low speeds since the travel of the incoming air at high speeds is much greater and a greater amount of fuel is drawn into the air which would tend to increase the richness of the mixture. Therefore, I supply air at atmospheric temperature only at high speeds, this air being of greater density than the heated air and hence containing more oxygen per unit volume than is contained by the heated air. This result is obtained by operating the butterfly valves in the manner previously indicated. Upon operating the throttle lever the valve 46 is first opened and the supply of heated air is increased. This causes fuel to rise in the standpipe 58. Upon continuing to turn the throttle lever the valve 57 is opened and a large amount of air at atmospheric temperature is drawn through the inlet tube. Fuel is drawn through the perforations 59 and mixes with this air. With this construction, in addition to completely vaporizing gasoline, it is possible to satisfactorily vaporize heavy oils, such as kerosene, it being understood for heavy oils it is desirable to deflect more heat around the chamber 14. When the engine is running at low speed, the carbureting effect of the expanded chamber is increased by preheating the air. When, however, the engine is running at high speed and it is desirable to carry as large an amount of mixture through the carburetor as possible the opening of the valve 57 causes the by-pass to be put out of commission and the air passes directly through the air tube to the chamber 14. By taking all of the air regardless of the speed of the engine through

a single inlet opening, the attaching of means for filtering the air is greatly facilitated.

I claim:

1. A carburetor comprising a mixing chamber, means for supplying fuel to said mixing chamber, an air inlet tube leading to said chamber, a casing forming a by-pass for said tube around the exhaust pipe of the engine, a valve in said inlet tube for deflecting the incoming air through said bypass, a valve controlling the passage through said mixing chamber, means for first opening said last mentioned valve to increase the supply of heated air, and means for then opening said first mentioned valve to permit unheated air to pass directly through said inlet tube.

2. A carburetor comprising a mixing chamber, means for supplying fuel to said mixing chamber, an air inlet tube leading to said chamber, a casing forming a bypass for said inlet tube around the exhaust pipe of the engine, a valve in said inlet tube for deflecting the incoming air through said by-pass, a valve for controlling the passage through said mixing chamber, a throttle lever connected to said last mentioned valve for operating the same, an operating member connected with said first mentioned valve, and a lost motion device connecting said operating member and said last mentioned valve.

In testimony whereof I hereunto affix my signature.

ASHLEY C. BENNETT.