July 24, 1923.

1,463,034

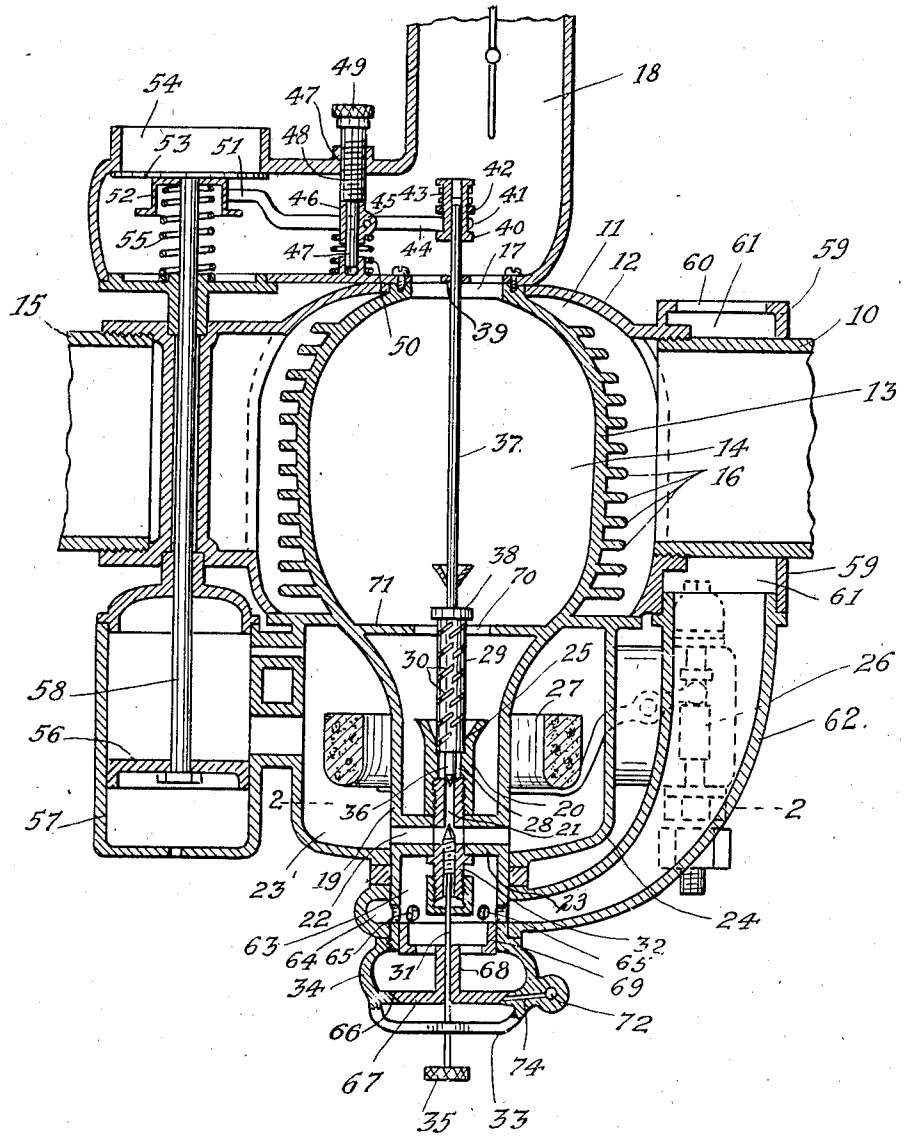
A. C. BENNETT

CARBURETOR

Filed Feb. 10, 1914

2 Sheets-Sheet 1

Fig. 1.



Witnesses:
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H. A. Bowman.

Inventor:
Ashley C. Bennett.
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2 Sheets-Sheet 2

Fig. 2.

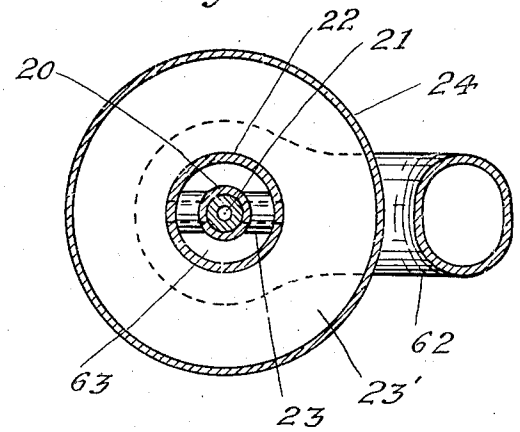


Fig. 3.

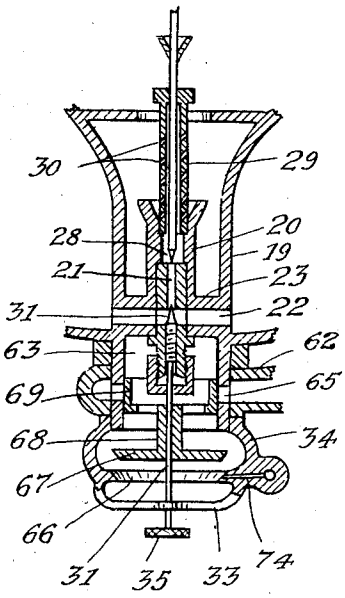
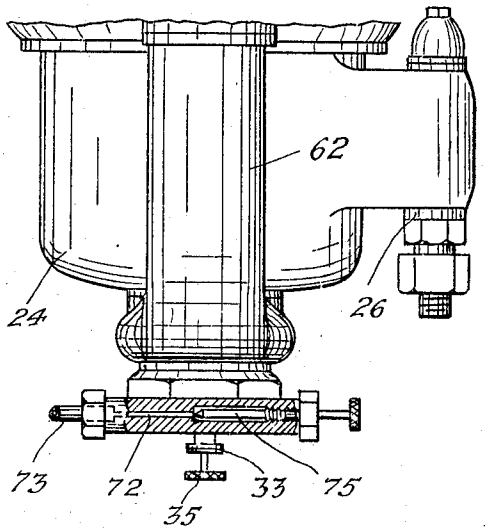


Fig. 4.



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Patented July 24, 1923. 1,463,034

UNITED STATES PATENT OFFICE.

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

CARBURETOR.

Application filed February 10, 1914. Serial No. 817,804.

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 improved means for admitting primary and secondary air to the carburetor, the primary air being preheated or not, according to whether the machine is running at high or low speeds, and improved means for carburetting air with heavy fuel oils.

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.

In the drawings, illustrating the application of my invention in one form,—

Fig. 1 is a sectional view of a carburetor having my improvements applied thereto. Fig. 2 is a sectional view on line 2—2 of Fig. 1. Fig. 3 is a sectional view of a part of the machine similar to that of Fig. 1, showing some parts in different positions. Fig. 4 is a view of the lower end of the carburetor taken at right angles to that of Fig. 1, with a water supply pipe in section.

As illustrated, the exhaust pipe 10 opens into a chamber 11 formed by a casing 12. Within the chamber 11 is an expanded member 13 forming a mixing chamber 14 which may approximate a spherical shape, the exhaust gases being led around said chamber and escaping through a pipe 15. The casing 13 is preferably formed with radiating ribs 16. The upper portion of chamber 14 communicates by a port 17 with the delivery pipe 18. The casing 13 has formed integrally therewith a contracted portion 19 on which is a feed cup 20 communicating through a bore 21 with a duct 22 formed in a pipe 23 extending across restricted portion 19 and opening into a fuel reservoir 23′ formed by a casing 24. The fuel level in chamber 23′ is maintained at the height of the bottom of an expanded portion 25 of fuel cup 20 by means of a valve 26 controlled by float 27 of well known construction.

The bore 21 opens into a chamber 28 which in turn is in communication with a feed pipe 29 preferably formed with a series of obliquely disposed slit-like apertures 30. The feed of oil into bore 21 is positively controlled by a needle valve 31 threaded into a depending plug 32 and having journaled support below the carburetor in a bridge 33 on a lower cap 34 and provided with a thumb piece 35. The flow of oil from bore 21 is positively and automatically controlled by means of a needle valve 36 on a rod 37 journaled or slidably mounted in the cap 38 of feed pipe 29 and in a bridge piece 39 across port 17. The stem 37 has fast thereon a double flanged sleeve 40. A yoke member 41 engages this sleeve between one of said flanges, and a sliding collar 42 held by a spring 43. The yoke member 41 is on an arm 44 pivoted at 45 to a collar 46 swiveled on a diminished shank 47 of an adjusting pin 48 threaded through the casing and provided with a thumb nut 49 by which the collar 46 is forced downward against the pressure of spring 50. The arm 44 has secured thereto at the opposite side of pivot 45 an additional yoke member 51 engaging a collar 52 on a valve member 53 normally held to close the secondary air port 54 by means of a spring 55. It will be apparent therefore that operation of the thumb nut 49 will oscillate arm 44 in the desired direction to operate needle valve 36 for positively regulating the flow of oil from bore 21. On the other hand, when the suction, induced by increase of speed in the engine, reaches a point to overcome the spring 55 the valve 53 will be moved to admit secondary air, at the same time rocking the arm 44, and drawing up the needle valve 36 to increase the supply of oil from bore 21 into chamber 28 and feed pipe 29. A piston 56 operating in a dash pot 57 and connected by a rod 58 with valve 53 tends to steady the action of said valve in a well known manner.

A casing 59 surrounds the exhaust pipe 10 where the same joins with casing 12, an air admission aperture 60 opening into the space 61 within said casing 59. A pipe 62 opens communication between the space 61 and a chamber 63 in the lower part of the contracted member 19, said pipe 62 being

flattened at its lower end and extending about the contracted portion 19 with an annular expanded passageway 64, as clearly shown, the pipe 62 and passageway 64 communicating with chamber 63 through apertures 65. The lower portion of the member 19 is closed by the cap 34, as before pointed out. This cap 34 is provided with a port 66 adapted to be closed by a valve 67 which, as shown, is a gravity valve, although a spring-actuated valve may be employed, if desired. The valve 67 is provided with a tubular stem 68 which slides upon the valve stem 31. At its upper end the stem 68 has connected therewith a sleeve 69 registering with the inner walls of chamber 63 and adapted to cover the apertures 65 when the valve is caused to assume its open position by increased suction of high speed, as indicated in Fig. 3.

It will be apparent that at moderate speeds, or unless valve 67 shall be opened, primary air for the carburetor will be brought through aperture 60 and within casing 59 where it must pass around the hot exhaust pipe 10 within chamber 61 and thence pass through pipe 62 and apertures 65 to the chamber 63 within extension 19 and then upwardly into chamber 14 within expanded casing 13. Such air will therefore be warmed to a considerable degree before entering the carburetor. If, however, the speed of the engine increases to a sufficient extent the suction will lift valve 67 admitting unwarmed air to chamber 63 and at the same time the sleeve 69 will close communication with pipe 62 and the unwarmed primary air will be taken into the carburetor. In either case the air will pass over the expanded lip 25 of the oil cup and the suction will induce oil to raise in the feed pipe 29 and flow out through the apertures 30 to be moved with the air in the expanded chamber 14. The aperture 17 will be of substantially the same area as the chamber 63 within contracted portion 19 or of a special passageway 70 formed in the center of a diaphragm 71 at the bottom of the expanded portion 14.

The effect of the sudden enlargement of the passageway through which the carburetted air is thus caused to flow will be to decrease the velocity of the body of air passing through the expanded portion. The result of this is that any particles of liquid fuel carried through the opening 70, being heavier than the air, will be sufficiently retarded so that they will spread outwardly from the aperture 70 and be thrown against the inside walls of casing 13. These walls will be very hot by reason of the exhaust gases passing around the casing 13 in chamber 11 and the particles of fuel thus thrown against the hot walls will be evaporated therefrom and become part of the perfectly carburetted mixture which finally passes through the aperture 17 into the delivery pipe 18.

With this construction it is possible to carburet air with very heavy oils, such as kerosene, completely and with the highest degree of efficiency. When the engine is running at low speed the carburetting effect of the expanded chamber 14 is aided by the pre-heating of the primary 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 operation of valve 67 shuts off this warm primary air and admits unwarmed air. When so running at high speed it is desirable to deliver a certain amount of moisture into the carburetted mixture. I accomplish this in my carburetor in a highly efficient manner by providing a water supply passageway 72 connected with a water pipe 73, the passageway 72 communicating through a duct 74 with the port 66 in such position as to be closed and opened by valve 67, as clearly indicated in Figs. 1 and 3. A hand operative needle valve 75 is provided to regulate the rate of admission of water when valve 67 is open, according to the requirements of fuel and service. By this arrangement the valve 67, controlled as it is by the suction within the carburetor induced by the speed of the engine, in turn controls the admission of warmed or unwarmed air to the carburetor and of moisture with the latter as the condition of operation of the engine may require.

I claim:

1. A carburetor comprising a casing forming a carbureting chamber, a contracted neck at the bottom of said chamber, means for delivering fuel in said neck, a series of circumferentially located holes in the lower portion of said neck for admitting heated air, an opening in the bottom of said neck for admitting normal air, said air being drawn through said chamber by the suction of the engine, a valve normally closing said bottom opening and uncovering said series of holes, said valve being adapted to open said lower opening and cover said series of holes when the degree of suction has reached a predetermined point.

2. A carburetor comprising a casing forming a vertical passageway, a contracted neck at the bottom of the passageway, means for delivering fuel oil to said passageway at the throat of the neck, said neck being formed with peripheral holes for delivering heated air, and an expanded annular chamber open to the atmosphere at the bottom, a valve comprising a head operating in said annular chamber and adapted to close said bottom opening, and a tubular portion slidable in said passageway and adapted

to cover or uncover said ports, said valve being adapted to be raised by the suction of the engine to admit normal air and to cut off heated air when the engine reaches a predetermined speed.

3. A carburetor comprising a casing forming a passageway, means for delivering fuel oil to said passageway, means for heating and delivering heated primary air through a port in said passageway, said casing having another port opening from the passageway directly to atmospheric air, a valve movable in said passageway and normally closing the last named port, said valve being movable by the suction induced by operation of the engine to open the last named port, and when so moved operating to close the first named port, and means controlled by the operation of said valve for injecting water into the current of air passing through said last named port when the same has been opened.

4. A carburetor comprising a casing forming a passageway, a feed pipe in said passageway, means for delivering fuel oil to said passageway, means for conducting the exhaust gases about a portion only of the walls of said passageway to heat the same, an air passageway surrounding a portion of said exhaust conducting means and opening into said first named passageway for admitting pre-heated primary air at low speeds, and means controlled by the speed of the air in the intake passageway for cutting off the supply of warmed air and admitting primary air at atmospheric temperature.

5. A carburetor comprising an outlet pipe and a carbureting chamber having a relatively contracted opening thereinto, means for admitting atmospheric primary air into said chamber, means for admitting heated primary air into said chamber, and a gravity valve normally closing said atmospheric air admitting means, and leaving open said heated air admitting means, said gravity valve being subject to the induced suction within the carbureting chamber and operated thereby when it reaches a predetermined degree.

In testimony whereof I affix by signature in presence of two witnesses.

ASHLEY C. BENNETT.

Witnesses:

H. A. BOWMAN,

F. A. WHITELEY.