March 15, 1932. J. W. PARKIN, SR 1,849,720

CARBURETOR

Filed July 28, 1928 2 Sheets-Sheet 1

Fig. 1.

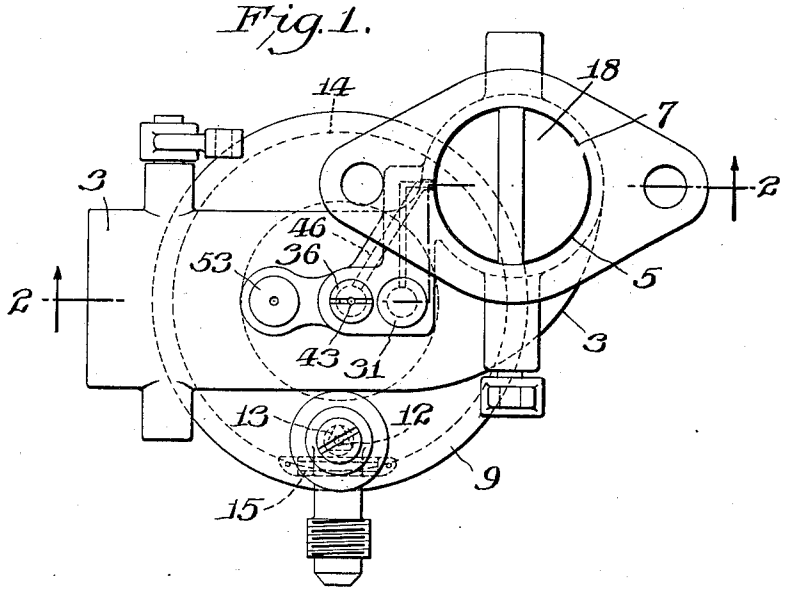
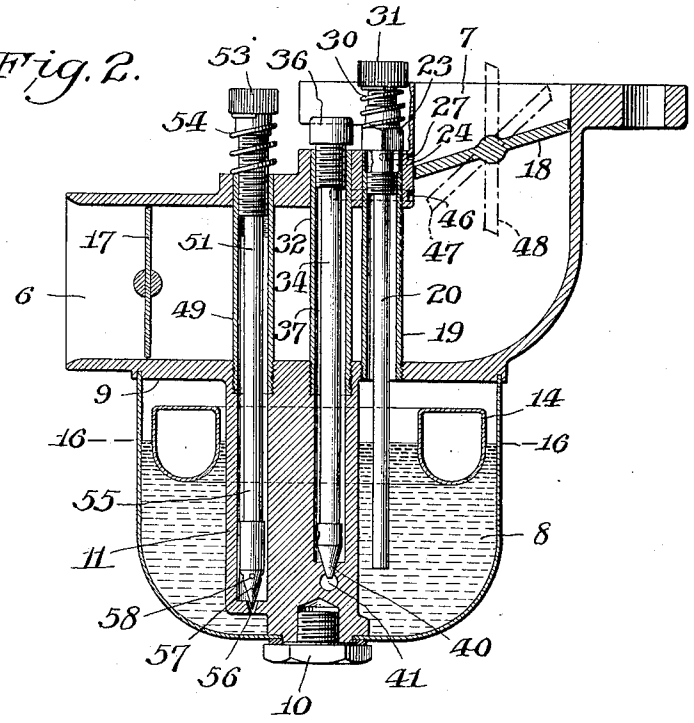


Fig. 2.



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Filed July 28, 1928 2 Sheets-Sheet 2

Fig. 3.

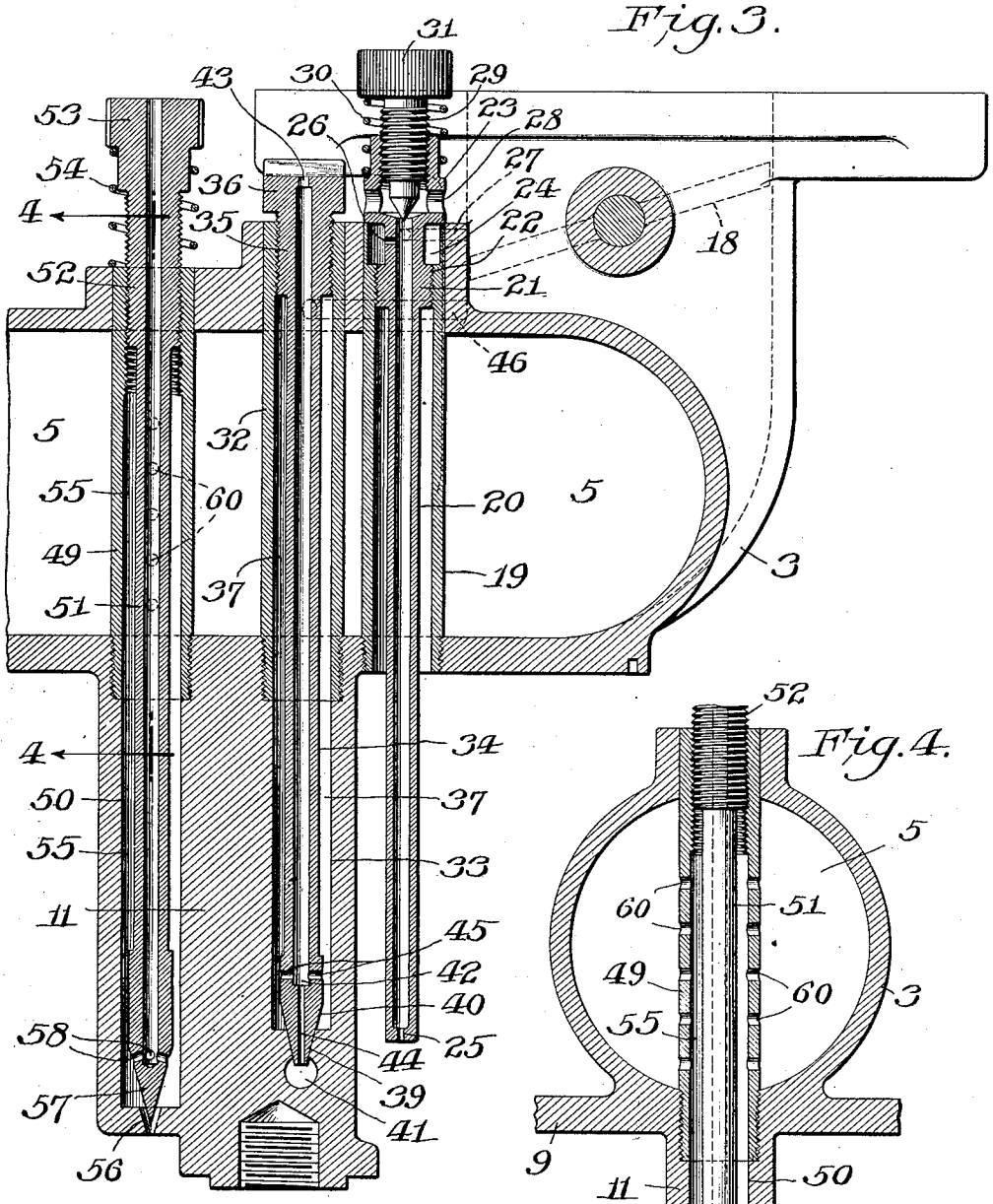


Fig. 4.

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CARBURETOR

Application filed July 28, 1928. Serial No. 295,846.

This invention relates to improvements in carburetors for internal combustion engines.

The object of the invention is to provide a carburetor with novel, simple and efficient devices for regulating the supply of gasoline or other liquid fuel to the carbureting passage for properly running the engine at low, high and intermediate speeds, and for temporarily enriching the fuel mixture for a quick pick up in passing from low to intermediate speeds, and also for temporarily enriching the fuel mixture for a quick pick up in passing from intermediate to high speed running.

With the foregoing object in view the invention consists of the elements and the combinations of them hereinafter described and claimed.

In the accompanying drawings illustrating the invention,

Figure 1 is a top view of a carburetor embodying my invention.

Figure 2 is a vertical section thereof, on line 2—2 of Fig. 1.

Figure 3 is an enlarged section through a portion of the casing of the carburetor and the liquid fuel or gasoline supplying devices therein.

Figure 4 is a sectional detail on line 4—4 of Fig. 3.

Referring to the drawings, 3 designates a casing forming the main body of the carburetor and having the carbureting passage 5 therein. This passage 5 has an air inlet end portion 6 and a mixture outlet end portion 7 which is adapted to be connected to the fuel intake passage or manifold of an internal combustion engine so that air will be drawn through the passage 5 by the engine during the operation thereof in the usual well known manner.

The lower portion of the casing 3 is provided with a well 8 for holding gasoline or other liquid fuel. This well 8 is closed at its top by a disc or flange 9 formed on the casing 3 and it is held in place, up against the flange 9 by a screw 10 which penetrates the bottom of the well and is screwed into a part 11 of the casing 3 which extends downwardly through the central portion of the well 8.

Liquid fuel is supplied to the well 8 through an inlet passage 12 leading to the well 8. The passage 12 is controlled by a valve 13 which is operated by an annular float 14 surrounding the casing part 11 and pivoted, at 15, to the casing flange 9. When the liquid within the well 8 falls below a predetermined level, indicated at 16, the float 14 is lowered and permits the valve 13 to open, thereby admitting gasoline to the well 8 until the float 14 is raised thereby sufficiently to cause it to close the valve 13 after the gasoline reaches the predetermined level within the well 8. Thus substantially a constant level of gasoline is maintained within the well 8 through the automatic action of the float 14 and valve 13 in accordance with the principles well known in this art.

The air inlet end portion 6 of the carbureting passage 5 is provided with a suitable choke valve 17 which may be operated in the usual manner for the usual purpose; and the passage 5 near the mixture outlet end portion 7 thereof, is provided with a throttle valve 18 for varying the degree of suction created within the carbureting passage 5 between the throttle valve and the air inlet end portion 6 of the passage 5 and between the throttle valve and the mixture outlet 7, during the operation of the engine.

I shall now describe the devices for supplying the gasoline from the well to the carbureting passage for the low speed running of the engine.

Secured within the casing and extending centrally through the carbureting passage 5 and having its lower end opening into the well 8 is a tubular guard 19; and extending through this guard 19 is a tube 20 having an enlarged upper end portion 21 the lower portion of which is threaded at 22, and screwed into the upper end portion of the tube 19. The upper end of the enlarged portion 21 of the tube 20 has a head 23 formed thereon constructed to engage the top of the tube 19 or the top of the casing 3 and close the upper end of an annular mixing chamber 24 formed by a bore in the tube 19 and surrounding the enlarged upper end portion thereof between the threaded portion 22 and the head 23. The tube 20 extends downwardly below the guard

19 and into the well 8 to a point below the gasoline level, indicated at 16, automatically maintained therein by the float 14, and the bottom of the tube 19 has an inlet orifice 25 therein for the admission of gasoline thereto. The enlarged upper end portion 21 of the tube 20 has an outlet orifice 26 therein which opens into the mixing chamber 24; and the casing 3 has a passage or orifice 27 therein which is in communication with the mixing chamber 24 and which opens into the carbureting passage 5 between the mixture outlet 7 thereof and the throttle valve 18 when the valve is in the closed position, as shown by full lines in Fig. 1, so that when the valve 18 is closed, or not quite closed, the orifice 27 will be exposed to the mixture outlet 7 of the passage 5 or to the strong suction or vacuum of the motor, due to the position of the valve 18.

The head 23 on the tube 20 has a transverse opening or passage 28 extending therethrough and the upper end of the tube 19 opens into the passage 28 through which outside or atmospheric air may be admitted to the tube 19. The quantity of outside air permitted to enter the tube 19 is regulated and controlled by an adjustable valve comprising a screw 29 screwed into the upper end portion of the head 23 in axial alinement with the tube 19 and having its lower end tapered and adapted to enter the upper end of the tube. A spring 30 encircling the screw 29 and the reduced upper end portion of the head 23 bears against the head 23 and a head 31 on the screw 29 and holds the screw 29 in different positions of adjustment relatively to the tube 19.

By turning the head 23 the threaded portion 22 of the tube 20 may be unscrewed from the tube 19 and the tube with its valve screw may be bodily removed for cleaning or other purposes.

I shall now describe the devices for supplying the gasoline from the well 8 to the carbureting passage 5 for the intermediate speed running of the engine.

Secured within the casing 3 and extending centrally through the carbureting passage 5 is a tube 32 the lower end of which opens into a bore 33 in the downwardly extending part 11 of the casing 3, the bore 33 forming, in effect, a continuation of the interior of the tube 32.

Extending through the tube 32 and down into the bore 33 is a tube 34 having an enlarged upper end portion 35 which is threaded and screwed into the upper end portion of the tube 32. The upper end of the threaded portion 35 of the tube 34 terminates in a suitable head 36 by means of which the tube 34 may be turned for the purpose of removing it from or applying it to the tube 32. An annular mixing chamber 37 for air and gasoline is provided between the tube 34 and the surrounding walls of the tube 32 and the bore 33, and the bottom wall of the bore has a tapered opening 39 therein within which is seated a tapered head 40 on the lower end of the tube 34. The lower end portion of this head 40 enters an opening or passage 41 which extends transversely through the casing part 11 and communicates at each end thereof with the well 8 below the gasoline level 16 therein.

The lower portion of the interior of the tube 34 provides a mixing chamber 42 for air and gasoline, and outside or atmospheric air is admitted to the tube 34 or chamber 42 through a contracted inlet port 43 in the upper end thereof. The head 40 on the lower end of the tube 34 has a gasoline inlet port or passage 44 connecting the bottom of the tube 34 or mixing chamber 42 and the gasoline passage 41. The mixing chamber 42 within the tube 34 and the mixing chamber 37 surrounding the tube 34 are connected by two orifices 45 near the port 44 and well below the gasoline level 16 in the well 8; and the upper portion of the outer mixing chamber 37 is connected to the carbureting passage 5 by an outlet port or passage 46 which is formed in the casing 3. The point of communication of the port or passage 46 with the main carbureting passage 5 is directly below one side of the throttle valve 18 and in such close proximity thereto that it will be exposed to the mixture outlet 7 of the passage 5 or to the strong suction or vacuum of the motor immediately following the initial opening movement of the valve 18 or when the valve 18 is moved to the position indicated at 47 by dot-and-dash lines in Fig. 2. The strength of this suction or vacuum on the port 46 lessens as the opening movement of the throttle valve continues from the position indicated at 47 to the full open position indicated at 48 by dot-and-dash lines in Fig. 2.

I shall now describe the devices for supplying the gasoline from the well 8 to the carbureting passage 5 for the high speed running of the engine.

Secured within the casing 3 and extending transversely through the carbureting passage 5 is a tube 49 having its lower end opening into a bore 50 in the downwardly extending part 11 of the casing 3, the bore 50 forming in effect, a continuation of the interior of the tube 49.

Extending through the tube 49 and bore 50 is a tube 51 having an enlarged upper end portion 52 which is threaded and screwed into the upper end portion of the tube 49. The upper end of the threaded portion 52 of the tube 51 terminates in a head 53 by means of which it may be turned to remove it from the tube 49 and bore 50 or to adjust it up and down therein. A spring 54 encircles the upper end portion of the tube 51 and bears against the head 53 and the top of the casing

3 and holds the tube 51 against accidental displacement from its positions of adjustment.

An annular mixing chamber 55 for air and gasoline is provided between the tube 51 and the surrounding walls of the tube 49 and the bore 50, and the bottom wall of the bore 50 has an opening or passage therein forming a port 56 for permitting gasoline to enter the mixing chamber 55. The lower end of the tube 51 terminates in a tapered valve head 57 which enters the port 56 and which may be adjusted up or down by turning the head 53 to vary the effective area of the port 56 and consequently regulate the quantity of gasoline permitted to enter the mixing chamber 55 from the well 8.

The upper end of the tube 51 is open for the admission of outside or atmospheric air, and the lower end of the tube 51 is closed by the valve head 57. The tube 51 is provided with a plurality of radially disposed air outlet ports 58 arranged in a circular series and disposed above and in close proximity to the gasoline inlet port 56.

The tube 49 is provided with two longitudinal rows or sets of outlet ports 60 for permitting mixed air and gasoline to pass from the mixing chamber 55 to the main carbureting passage 5.

Now, assuming that the mixture outlet 7 of the main carbureting passage 5 is connected to the fuel intake passage or manifold of an internal combustion engine, the operation of the carburetor during the running of the engine is as follows:

The suction or vacuum created within the main carbureting passage 5 by the operation of the engine draws gasoline and air into the passage 5 from the orifice 27 and ports 46 and 60 in accordance with the degrees of suction in the regions thereof, and the degrees of suction in such regions is governed and controlled by the position of the throttle valve 18.

It will be observed that the outlet orifice 27 and ports 46 and 60 open into the passage 5 well above the gasoline level 16 within the well 8, and that the orifice 25 and ports 44 and 56 open into the gasoline within the well 8 well below the level 16 thereof, and that these parts open into the lower central portion of the well 8 so that gasoline will be supplied thereto at all times irrespective of any tilting of the entire carburetor within reasonable limits when in service. It will also be observed that, normally, the gasoline will rise within the tubes 20, 34 and 51 and mixing chambers 37 and 55 to the level 16 of the gasoline within the well 8 as governed by the action of the float 14.

When the engine is idling or running at low speed with a light load, the choke valve 17 will be open and the throttle valve 18 will be at or near the closed position shown by full lines in Fig. 2. The suction or partial vacuum created within the passage 5 between the throttle valve 18 and the engine cylinders will draw outside air into the tube 20 through the passage 28, thence through the orifice 26 into the mixing chamber 24 and thence through the orifice 27 into the main carbureting passage 5, and the same suction will draw gasoline from the well 8 up through the tube 20 thence through the orifice 26 into the mixing chamber 24 and thence through the orifice 27 into the passage 5. As the air and gasoline is vaporized and commingled with the air as they meet within the tube 20 and expand within the mixing chamber 24 after passing through the orifice 26 and are delivered through the orifice 27 to the passage 5 with the gasoline in a high state of vaporization where it is mixed with such air as the throttle valve 18 permits to pass through the main carbureting passage 5, producing a highly satisfactory fuel mixture for the running of the engine at low speed.

The quantity of gasoline which is drawn through the orifice 27 for low speed running is governed by the size of the gasoline inlet orifice 25 by the quantity of outside air which is permitted to enter the tube 20 and by the position of the throttle valve 18 which must be nearly closed; and the quantity of gasoline or richness of the mixture may be adjusted and controlled by turning the head 31 to adjust the valve screw 29 to admit more or less outside air to the tube 20.

When the engine is idling or running at low speed, as just described, no gasoline is being drawn into the passage 5 through the ports 46 and 60 by reason of the low suction within the passage 5 between the throttle valve 18 and the air inlet 6.

When it is desired to increase the speed of the engine from the low speed running to a higher or the intermediate speed, the throttle valve 18 is opened to a position at or near that indicated at 48 in Fig. 2, thereby opening the port 46 to the strong suction or partial vacuum between the valve 18 and the engine cylinders. This brings the port or intermediate speed jet 46 into operation and the suction produced by the engine will first draw through the chamber 37 and port 46 the gasoline contained within the chambers 37 and 42, at the level 16, until the level of the gasoline therein reaches the top of the inlet port 44, and this gasoline will be vaporized and mixed with the air being drawn through the main carbureting passage 5 for the desired rich fuel mixture for the power for the quick increase of the engine speed for the quick pick up, and, thereafter, the same suction will then draw outside air into the tube 34 or mixing chamber 42 through the port 43, thence through the orifices 45 and mixing chamber 37 and thence through the port 46 into the passage 5, and also it will draw gasoline from the well 8 through the

inlet port 44 to the tube 34 or mixing chamber 42, thence through the orifices 45 and mixing chamber 37 to and through the port 46 and into the passage 5. As the air and gasoline are thus drawn into the passage 5 following the quick pick up to intermediate speed, the gasoline is vaporized and commingled with the air as they meet in the lower portion of the mixing chamber 42 and as they pass through the orifices 45 and mixing chamber 37 and expand within the chamber 37 and pass therefrom through the port or passage 46 to the main carbureting passage 5, with the gasoline in a high state of vaporization, where it is mixed with the air entering the passage 5 through the inlet 6 and passing through the passage 5 to the cylinders of the engine, producing a highly efficient fuel mixture for running the engine at intermediate speeds.

The effective cross sectional area of the gasoline inlet port 44 is less than that of the air inlet port 43 and less than the combined cross sectional areas of the orifices 45, the effective cross sectional area of the air inlet port 43 is less than the combined cross sectional areas of the orifices 45, and the combined cross sectional areas of the orifices 45 are the same as or equal to the combined cross sectional areas of the ports 43 and 44. I have discovered that this arrangement and proportioning of the ports 43 and 44 and orifices 45 provides for the supply of a highly efficient fuel mixture for the running of the engine at intermediate speeds. The richness of the mixture issuing from the port or jet 46 for intermediate speed running is governed and controlled by the position of the throttle valve 18 with relation to the port or jet 46, the richness growing less as the valve is moved from the position shown at 47 in Fig. 2 toward the full open position shown at 48.

When it is desired to increase the speed of the engine from the intermediate speed running to a higher speed, the throttle valve 18 is moved farther toward or to its full open position indicated at 48 in Fig. 2. When the throttle valve 18 is thus moved the suction on the high speed ports or jets 60 is increased while the suction on the intermediate port or jet 46 is decreased. This operation gradually reduces the quantity of gasoline drawn through the port 46 and causes the suction of the engine to first draw through the chamber 55 and ports 60 the gasoline contained within the chamber 55 and tube 51, at the level 16, until the level of the gasoline therein reaches the ports 58, and this gasoline will be vaporized and mixed with the air being drawn through the main carbureting passage 5 for the desired rich fuel mixture for the power for the quick increase of the engine speed for the quick pick up from intermediate to high speed, and, thereafter, the same suction will then draw outside air into and down through the tube 51, thence through the ports 58 and mixing chamber 55 and thence through the ports 60 into the passage 5, and also it will draw gasoline from the well 8 through the inlet port 56 to the mixing chamber 55 in an annular stream which passes the annular series of air outlet ports 58 and thence through the mixing chamber 55 to and through the ports 60 and into the passage 5. As the air and gasoline are thus drawn into the passage 5, the gasoline is vaporized and commingled with the air as they meet in the lower portion of the mixing chamber 55 and pass up through the same and out through the ports 60 to the main carbureting passage 5 with the gasoline in a high state of vaporization where it is mixed with the air entering the passage 5 through the inlet 6 and passing through the passage 5 to the cylinders of the engine, producing a highly efficient fuel mixture for running the engine at high speeds.

The richness of the fuel mixture issuing from the ports or jets 60 may be varied and controlled by turning the head 53 to adjust the valve head 57 to admit more or less gasoline to the mixing chamber 55 through the port 56 from the well 8.

I claim as my invention:

1. In a carburetor, a casing provided with a liquid fuel well and having a carbureting passage provided with an air inlet and a mixture outlet, a throttle valve controlling the mixture outlet, said casing having a mixing chamber provided with an outlet orifice opening into the carbureting passage adjacent to the throttle valve, a removable tube having a head on the upper end thereof exteriorly of the casing and extending downwardly from the head through the mixing chamber and into the fuel well and having a screw thread thereon screwed into the casing, said tube having an inlet orifice at its lower end portion opening into the fuel well below the liquid level therein and having an outlet orifice at its upper end portion opening into the mixing chamber, said head having an air inlet passage opening into the upper end portion of the tube, and an adjustable valve operable to regulate the quantity of air entering the mixing chamber through the air passage.

2. In a carburetor, a casing provided with a liquid fuel well and having a carbureting passage provided with an air inlet and a mixture outlet, a throttle valve controlling the mixture outlet, said casing having a part providing a mixing chamber provided with an outlet port opening into the carbureting passage, said casing having a part providing a chamber having an outlet orifice in the lower portion thereof connecting said chamber below the liquid level in the well, and the last named part having an air inlet port opening into the upper portion of the last named chamber and having a liquid fuel inlet port

connecting the last named chamber and the well and opening into the chamber below the liquid level in the well.

3. In a carburetor, a casing provided with a liquid fuel well and having a carbureting passage provided with an air inlet and a mixture outlet, a throttle valve controlling the mixture outlet, said casing having a part providing a mixing chamber provided with an outlet port opening into the carbureting passage, said casing having a tubular part extending through the mixing chamber and enclosing a chamber having an outlet orifice in the lower portion thereof connecting said chambers below the liquid level in the well, and said tubular part having an air inlet port opening into the upper portion of the chamber therein and having a liquid fuel inlet port connecting the last named chamber and the well and opening into the chamber below the liquid level in the well.

4. In a carburetor, a casing provided with a liquid fuel well and having a carbureting passage provided with an air inlet and a mixture outlet, a throttle valve controlling the mixture outlet, said casing having a part providing a mixing chamber provided with an outlet port opening into the carbureting passage, said casing having a part providing a chamber having outlet orifices in the lower portion thereof connecting said chambers below the liquid level in the well, the last named part having an air inlet port opening into the upper portion of the last named chamber and having a liquid fuel inlet port connecting the last named chamber and the well and opening into the chamber below the liquid level in the well, said air inlet port having a cross sectional area less than the combined cross sectional areas of said orifices and greater than the cross sectional area of the fuel inlet port, and the combined cross sectional areas of said orifices being equal to the combined cross sectional areas of said air inlet port and said fuel inlet port.

5. In a carburetor, a casing provided with a liquid fuel well and having a carbureting passage provided with an air inlet and a mixture outlet, a throttle valve controlling the mixture outlet, said casing having a part providing a mixing chamber provided with an outlet port opening into the carbureting passage, a removable tube provided with a screw threaded portion screwed into the casing above the mixing chamber and extending downwardly from its screw threaded portion through the mixing chamber in spaced relation to the surrounding wall thereof, said tube part having an outlet orifice in the lower portion thereof connecting said chambers below the liquid level in the well, and said tubular part having an air inlet port opening into the upper portion of the chamber therein and having a liquid fuel inlet port connecting the last named chamber and the well and opening into the chamber below the liquid level in the well.

6. In a carburetor, a casing provided with a liquid fuel well and having a carbureting passage provided with an air inlet and a mixture outlet, a throttle valve controlling the mixture outlet, a tube extending transversely through the carbureting passage and enclosing part of a mixing chamber which extends downwardly from the tube and is provided with a fuel inlet port in the bottom wall thereof connecting the mixing chamber and the well below the liquid level in the latter, said tube having a plurality of outlet ports opening into the carbureting passage, and a vertically adjustable tubular part provided with a screw threaded portion screwed into the casing above the mixing chamber and extending downwardly from its screw threaded portion through the mixing chamber in spaced relation to the surrounding wall thereof and having a tapered valve head on the lower end thereof extending into the fuel inlet port and providing an annular passage between the valve head and the wall of the fuel inlet port, said tubular part having an air inlet port in the upper portion thereof and an annular series of outlet ports in the lower portion thereof in close proximity to the fuel inlet port.

In testimony whereof I affix my signature.

JOSEPH W. PARKIN, SR.