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CARBURETOR

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2 Sheets-Sheet 1

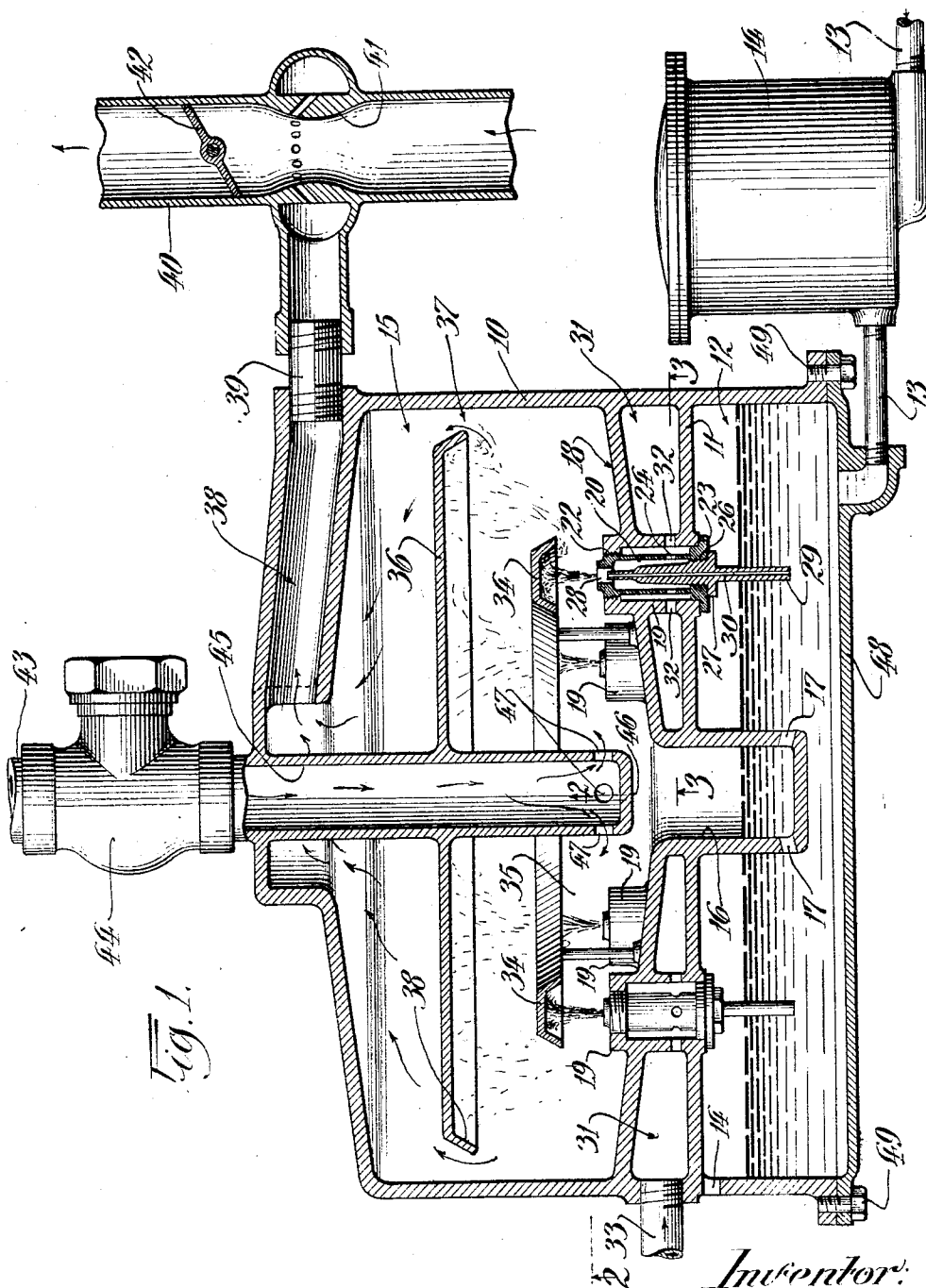


Fig. 1.

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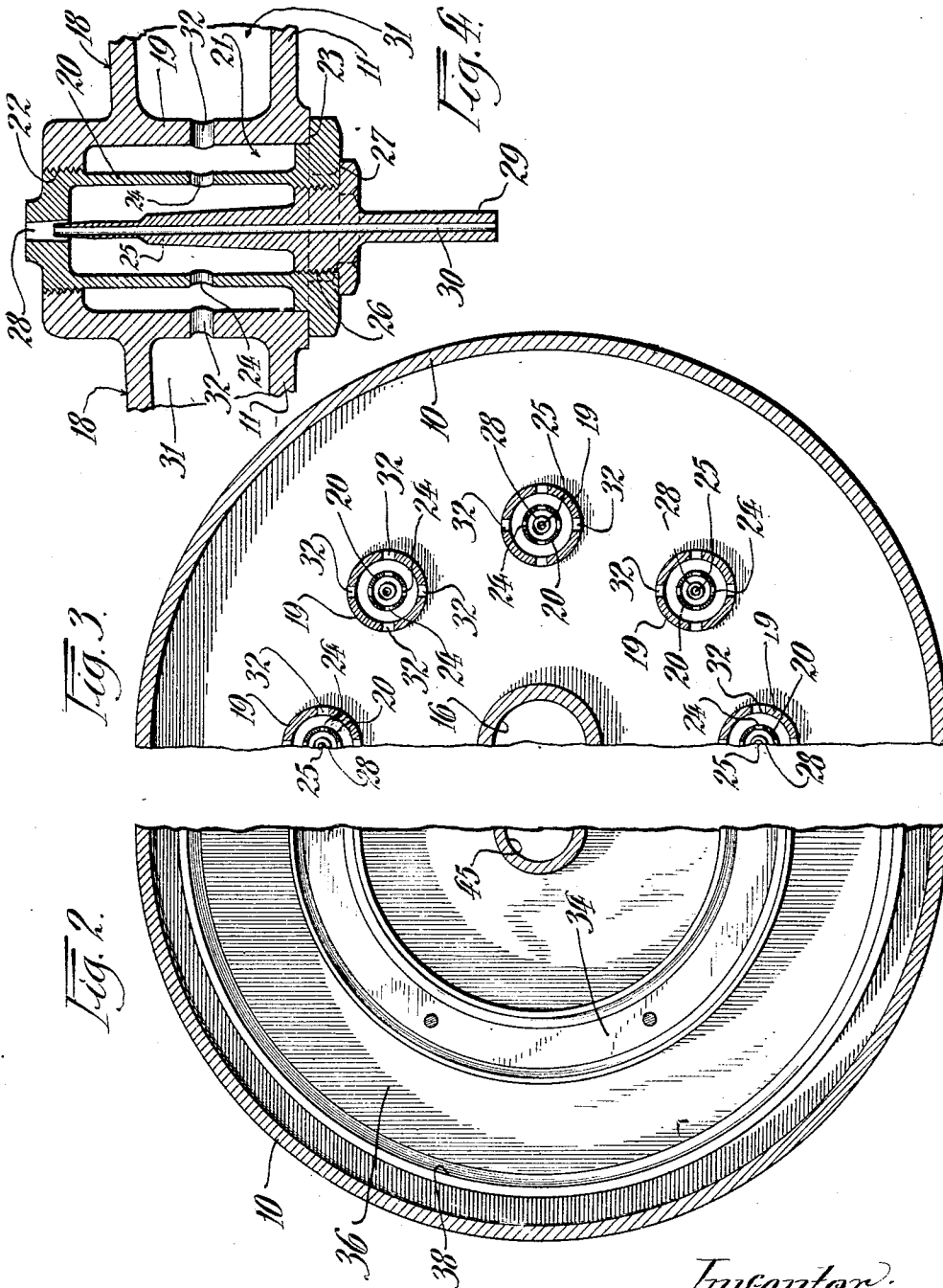
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## UNITED STATES PATENT OFFICE

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## CARBURETOR

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This invention relates to improvements in carburetors, particularly adapted, though not necessarily limited in its use, with internal combustion engines.

It has been found in carburetors of this character that as the fuel is being atomized it is formed into large globules and small globules such as mist. The mist or lighter particles will float in the air in the carburetor and will be thoroughly mixed with the air and delivered from the carburetor, while the larger globules will be of a size and weight too large for the purpose intended, with the result that the larger globules will be separated from the smaller particles and will be collected and returned or delivered back to the source of supply of the fuel in the fuel chamber of the carburetor.

It is one of the objects of the present invention to overcome these difficulties and objections and to provide in a carburetor of this character improved means for affecting a complete disintegration or atomization of all of the particles of the fuel by causing the globules or particles of gas to be broken up or disintegrated, and improved means for separating the larger particles or globules of fuel therefrom and for causing them to drop after they are out of the range of the atomizing air current to be delivered back to the supply tank or chamber.

A further object is to provide improved means for supplying a charge of fluid under pressure to effect atomization, and improved means for supplying outside air to mix with the disintegrated or smaller globules of fuel.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty, in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which

Figure 1 is a view partly in vertical section, partly in elevation, of a carburetor of this character constructed in accordance with the principles of this invention.

Figure 2 is a detail horizontal sectional view taken on line 2—2, Figure 1.

Figure 3 is a detail horizontal sectional view taken on line 3—3, Figure 1.

Figure 4 is a vertical sectional view, on an enlarged scale, of one of the atomizing nozzles.

Referring more particularly to the drawings the numeral 10 designates generally a chamber of any desired size and configuration which is provided with a partition 11 thereacross adjacent and spaced above the bottom of the chamber to form a compartment 12 which receives a supply of fuel from any suitable source through a supply pipe 13 and arranged within the pipe 13 is a float control 14, for maintaining the fuel level within the compartment 12 at a predetermined height.

This float control may be of any ordinary and well known construction and the compartment 12 is provided with a vent opening 14 through which the air may escape so as not to interfere with the supply of fuel to the compartment 12.

Arranged above the compartment 12 is a mixing chamber 15 and the partition 11, preferably at the central portion thereof, is provided with a depression or well 16 extending therebelow and into the compartment 12 terminating preferably in proximity to the bottom of the compartment 12 and the well or depression 16 is provided with openings 17, for a purpose to be set forth.

The top of the partition 11 which forms the bottom of the mixing chamber 15 is preferably inclined as at 18, and the well 16 opens through this partition so that any fuel which is deposited upon the partition 18 in the mixing chamber 15 will flow into the well 16 and will be delivered into the compartment 12 through the openings 17.

Extending through the partition 11—18 are any number of atomizing nozzles having a casing 19 and within the casing 19 is arranged a housing or cage 20 which is of an external diameter considerably less than the internal diameter of the casing 19 to form a space 21 about the cage 20.

This cage or housing is secured in any suit-

able manner preferably by means of a threaded engagement 22 between one end of the cage or housing 20 and a portion of the wall of the casing 19. Formed on the other end of the cage or housing is a shoulder 23 adapted to abut the bottom of the casing 19. The periphery of the portion forming the shoulder 23 is preferably angular to facilitate the manipulation of the cage or housing and by rotating the cage 20, the shoulder 23 will be drawn tightly against the bottom of the casing 19 through the medium of the threads 22.

The cage or housing 20 is provided with openings 24, any number of which may be provided which form communication between the space 21 in the casing and the interior of the cage or housing. Arranged within the cage or housing is a nozzle 25 of a tapered construction having a threaded portion 26 adapted to engage a similar threaded portion in the bottom of the cage or housing 20.

A shoulder 27 is formed on the nozzle which abuts the bottom of the cage or housing 20 and the periphery of the portion forming the shoulder 27 is preferably angular to facilitate in the adjustment of the nozzle. By screwing the nozzle 26 into the cage or housing 20, the shoulder 27 will abut the bottom of the cage. The nozzle is of such a length that the extremity thereof will enter and stand within an opening 28 forming the outlet of the cage or housing and which opening 28 may, if desired, be tapered or may be of uniform diameter throughout its length.

Depending below the nozzle 25 is an extension 29 and an opening 30 is provided in the extension 29 and extends through the end of the nozzle.

This extension 29 is of such a length that when the nozzle is in position as shown in Figure 1, the lower extremity of the extension 29 will terminate in proximity to the bottom of the compartment 12 in the chamber 10, so that the lower end of the extension 29 will always be submerged.

Arranged within the partition 11 is an air chamber 31 of any desired size and configuration and the chamber 31 has communication with the space 21 between the casing 19 and the cage or housing 20 by means of suitable openings 32, any number of which may be provided and these openings 32 are preferably in alinement with the openings 24 in the wall of the cage or housing 20, although they may be located out of alinement if desired.

Air under any desired pressure is supplied to the air chamber 31 from any suitable source through a delivery pipe 33 and the air thus supplied to the chamber 31 will be delivered therefrom into the mixing chamber 15 through the openings 32 in the wall

of the casing 19 into the space 21 between the casing 19 and the cage or housing 20, through the openings 24 in the cage or housing and out of the latter, through the delivery outlet 28. The passage of the air through the opening 28 will atomize the fuel from the compartment 12 through the nozzle and into the mixing chamber 15.

Arranged within the mixing chamber is a baffle 34 which is preferably of an inverted trough like configuration in cross section and is supported in any suitable manner preferably by means of supports 35. The baffle 34 is of a diameter considerably less than the internal diameter of the chamber 10 and the nozzles are so located that the discharge outlets 28 and the outlet of the passage 30 through the nozzle will be disposed in alinement with the baffle 34, the latter being supported a suitable distance above the nozzle, so that when the compressed air is admitted into the chamber 31 and is discharged therefrom through the nozzle to atomize the fuel from the compartment 12, the mixture will strike the baffle 34 and the heavier particles of fuel will be separated from the mixture in the form of globules and which globules will adhere to the baffle 34 to be collected thereby and directed and discharged back to the supply in the chamber 12 while the finer particles, as mist, will float with the air in the chamber 15 to become thoroughly mixed.

In the chamber 15 is another baffle 36 which is of a diameter considerably larger than the diameter of the baffle 34 and is spaced above the latter, the periphery of the baffle 36 terminating in close proximity to the wall of the chamber 10 so as to form a comparatively narrow passage 37 between the periphery of the baffle and the wall of the chamber thereby insuring a thorough mixture of the gas and air and at the same time the baffle 36 will prevent the air which enters through the openings 47 from taking a direct course to the outlet opening 38. The baffle 36 is provided with a downwardly projecting flange 38 and is preferably solid, so that when the mixture strikes the baffle 36, the smaller particles or globules of fuel will be carried by the air around the periphery of the baffle 36 through the opening or passage 37 while the larger globules or those which have not been so thoroughly disintegrated will drop back upon the inclined bottom 18 of the mixing chamber 15 when they are out of the range of the atomizing air current, and will flow into the well 16 to be delivered back into the fuel compartment 12 through the openings 17.

The chamber 10 is provided with an outlet opening 38 to which is connected a pipe 39 that delivers the fuel charge into a supply pipe 40 that conveys the charge to the point of use. A Venturi tube 41 may be provided in the pipe 40 and a butterfly valve 42 is also

provided for controlling the passage of the discharge through the pipe 40.

The baffle 34 is preferably annular in configuration so as to permit the mixture of air and gas to flow completely around the same while the baffle 36 is preferably solid so as to deflect the mixture towards the periphery thereof, thereby effecting a separation of the larger particles or globules of fuel which have not been disintegrated, from the finer or atomized quantity of fuel.

The mixture is drawn from the mixing chamber 10 through the outlet pipe 38 by suction created in the pipe 40 on the farther side of the butterfly valve 42.

Atmospheric air may be admitted into the mixing chamber 15 from a supply opening or pipe 43 through a check valve 44 and into a pipe or tube 45 which extends into the mixing chamber, and terminates in alignment with the well 16 and in proximity to the inclined bottom 18 of the mixing chamber 15. The bottom of the tube 45 is preferably closed as at 46 and outlet openings 47 are provided through which the atmospheric air is delivered.

The baffle 36 is preferably supported by the tube or pipe 45 and the check valve 44 is of the ordinary and well known construction which will permit the air to flow into the mixing chamber but will prevent the same from escaping therethrough.

In order to provide a means whereby access may be had to the nozzles, the bottom 48 of the chamber 10, forming the bottom of the compartment 12, may be removably secured in position by means of suitable fastening devices 49.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

1. A carburetor embodying a casing, a partition dividing the casing into a fuel compartment and a mixing chamber thereabove, means for supplying fuel to said compartment, a plurality of nozzles extending through the partition and through which nozzles the fuel is atomized into the mixing chamber, means for supplying fluid under pressure through the partition and to the nozzles, means for removing the mixture from the mixing chamber, a baffle in the mixing chamber in alignment with the nozzles and against which baffle the atomized fuel from the nozzles strikes for separating the large and small particles of the fuel, and a second baffle within the mixing chamber disposed above and spaced from the first said

baffle, the said second baffle being of a greater diameter than the first said baffle.

2. A carburetor embodying a casing, a partition dividing the casing into a fuel compartment and a mixing chamber thereabove, means for supplying fuel to said compartment, a plurality of nozzles extending through the partition and through which nozzles the fuel is atomized into the mixing chamber, means for supplying air under pressure through the partition and to the nozzles, means for removing the mixture from the mixing chamber, a baffle in the mixing chamber in alignment with the nozzles and against which baffle the atomized fuel from the nozzles strikes for separating the large and small particles of the fuel, and a second baffle within the mixing chamber disposed above and spaced from the first said baffle, the said second baffle being of a greater area than the first said baffle and serving to separate the unmixed particles of fuel from the mixed charge.

3. A carburetor embodying a fuel supply chamber, a mixing chamber, an air chamber interposed between the fuel and mixing chamber, nozzles extending through the air chamber and forming communication between the fuel and mixing chambers, said nozzles having communication with the air chamber, means for supplying air under pressure to the air chamber to atomize the fuel into the mixing chamber through said nozzles, a plurality of baffles disposed above the nozzles and at different distances from said nozzles and progressively increasing in area with the increase in distance to be successively engaged by the mixture of fuel and air, and means for removing the mixture from the mixing chamber by suction.

4. A carburetor embodying a fuel supply chamber, a mixing chamber, an air chamber interposed between the fuel and mixing chamber, nozzles extending through the air chamber and forming communication between the fuel and mixing chambers, said nozzles having communication with the air chamber, means for supplying air under pressure to the air chamber to atomize the fuel into the mixing chamber from the fuel chamber and through the nozzles, a plurality of baffles disposed above the nozzles to be successively engaged by the mixture of fuel and air, means for removing the mixture from the mixing chamber by suction, the bottom of said mixing chamber inclining towards the center thereof, and a well opening through said bottom and extending into and having communication with the fuel chamber for delivering unmixed fuel back into the fuel chamber.

5. A carburetor embodying a casing, a partition dividing the casing into a fuel compartment, a mixing chamber above the par-

tion, the bottom of the mixing chamber inclining downwardly towards the center thereof, an air chamber between the partition and the bottom of the mixing chamber, a well leading from the bottom of the mixing chamber and communicating with the fuel compartment, nozzles passing through said air chamber and communicating with the mixing chamber and fuel compartment, said nozzles having communication with the air chamber, means whereby said air chamber will supply air under pressure to the mixing chamber, said air discharging into the mixing chamber to atomize the fuel thereinto from the fuel chamber and through the said nozzles, a baffle above the nozzles against which the atomized fuel strikes, a second and larger baffle above the first said baffle, and means for drawing the mixture from the mixing chamber by suction.

6. A carburetor embodying a casing, a partition dividing the casing into a fuel compartment, a mixing chamber above the partition, the bottom of the mixing chamber inclining downwardly towards the center thereof, an air chamber between the partition and the bottom of the mixing chamber, a well leading from the bottom of the mixing chamber and communicating with the fuel compartment, nozzles passing through said air chamber forming communication between the mixing chamber and fuel compartment, said nozzles having communication with the air chamber, means whereby said air chamber will supply air under pressure to the mixing chamber, said air discharging into the mixing chamber to atomize the fuel thereinto from the fuel chamber and through the nozzles, a baffle above the nozzles against which the atomized fuel strikes, a second and larger baffle above the first said baffle, the second recited baffle having a downwardly extending peripheral flange in proximity to but spaced from the wall of the mixing chamber, and means for drawing the mixture from the mixing chamber by suction.

7. A carburetor embodying a casing, a partition dividing the casing into a fuel compartment, a mixing chamber above the partition, the bottom of the mixing chamber inclining downwardly towards the center thereof, an air chamber between the partition and the bottom of the mixing chamber, a well leading from the bottom of the mixing chamber and communicating with the fuel compartment, nozzles passing through said air chamber and forming communication between the mixing chamber and fuel compartment, said nozzles having communication with the air chamber, means whereby said air chamber will supply air under pressure to the mixing chamber from the fuel compartment and through the nozzles, said air discharging into the mixing chamber to

atomize the fuel thereinto, a baffle above the nozzles against which the atomized fuel strikes, a second and larger baffle above the first said baffle, means for drawing the mixture from the mixing chamber by suction, and means for supplying outside air into the mixing chamber adjacent the bottom of the latter.

8. A carburetor embodying a casing, a partition dividing the casing into a fuel compartment, a mixing chamber above the partition, the bottom of the mixing chamber inclining downwardly towards the center thereof, an air chamber between the partition and the bottom of the mixing chamber, a well leading from the bottom of the mixing chamber and communicating with the fuel compartment, nozzles passing through said air chamber and forming communication between the mixing chamber and fuel compartment, said nozzles having communication with the air chamber, means whereby said air chamber will supply air under pressure to the mixing chamber, said air discharging into the mixing chamber to atomize the fuel thereinto from the fuel compartment and through the nozzles, a baffle above the nozzles against which the atomized fuel strikes, a second and larger baffle above the first said baffle, means for drawing the mixture from the mixing chamber by suction, and a pipe leading into the mixing chamber in alinement with said well, terminating short of the bottom of the mixing chamber and discharging into the latter for delivering outside air into the mixing chamber.

9. A carburetor embodying a casing, a partition dividing the casing into a fuel compartment, a mixing chamber above the partition, the bottom of the mixing chamber inclining downwardly towards the center thereof, an air chamber between the partition and the bottom of the mixing chamber, a well leading from the bottom of the mixing chamber and communicating with the fuel compartment, nozzles passing through said air chamber and forming communication between the mixing chamber and fuel compartment, and nozzles having communication with the air chamber, means whereby said air chamber will supply air under pressure to the mixing chamber, said air discharging into the mixing chamber to atomize the fuel thereinto from the fuel compartment and through the nozzles, a baffle above the nozzles against which the atomized fuel strikes, a second and larger baffle above the first said baffle, means for drawing the mixture from the mixing chamber by suction, a pipe leading into the mixing chamber in alinement with said well, terminating short of the bottom of the mixing chamber and discharging into the latter for delivering outside air into the mixing chamber and a check valve in said pipe.

10. A carburetor embodying a casing, a

hollow partition dividing the same into a fuel compartment and a mixing chamber one above the other, nozzles extending through the partition and forming communication between the fuel compartment and mixing chamber, said nozzles having communication with the air chamber formed in said hollow partition, means for admitting air under pressure into the said hollow partition to atomize the fuel into the mixing chamber, a baffle above the nozzles, means for withdrawing the mixture from the mixing chamber by suction, means for admitting outside air into the mixing chamber, the top of said partition forming the bottom of the mixing chamber and inclining downwardly towards the center thereof, and a well opening through the partition and extending into and forming communication with the fuel compartment and the mixing chamber for delivering fuel from the latter into the former.

11. A carburetor embodying a casing, a hollow partition dividing the same into a fuel compartment and a mixing chamber one above the other, nozzles extending through the partition and forming communication between the fuel compartment and mixing chamber, said nozzles having communication with the air chamber formed in said hollow partition, means for admitting air under pressure into the said hollow partition to atomize the fuel into the mixing chamber, a baffle above the nozzles, means for withdrawing the mixture from the mixing chamber by suction, means for admitting outside air into the mixing chamber, the top of said partition forming the bottom of the mixing chamber and inclining downwardly towards the center thereof, a well opening through the partition and extending into and forming communication with the fuel compartment and the mixing chamber for delivering fuel from the latter into the former, and a second baffle above the first said baffle and of a greater diameter than the first said baffle.

12. A carburetor embodying a casing, a hollow partition dividing the same into a fuel compartment and a mixing chamber one above the other, nozzles extending through the partition and forming communication between the fuel compartment and mixing chamber, said nozzles forming communication with the air chamber formed in the hollow partition, means for admitting air under pressure into the said hollow partition to atomize the fuel into the mixing chamber, a baffle above the nozzles, means for withdrawing the mixture from the mixing chamber by suction, means for admitting outside air into the mixing chamber, the top of said partition forming the bottom of the mixing chamber and inclining downwardly towards the center thereof, a well opening through the partition and extending into and forming communication with the fuel compart-

ment and the mixing chamber for delivering fuel from the latter into the former, the said baffle being annular, a second and a fixed baffle above and spaced from the first said baffle and of a larger diameter than the first said baffle, and a depending circumferential flange on the second recited baffle.

In testimony whereof, I have signed my name to this specification, on this 26th day of February, 1929.

EMERY H. FAHRNEY.