C. F. SCHULZ.

CARBURETER.

APPLICATION FILED JULY 27, 1914. RENEWED FEB. 1, 1921.

1,393,044. **Patented Oct. 11, 1921.**

3 SHEETS—SHEET 1.

Fig. 1.

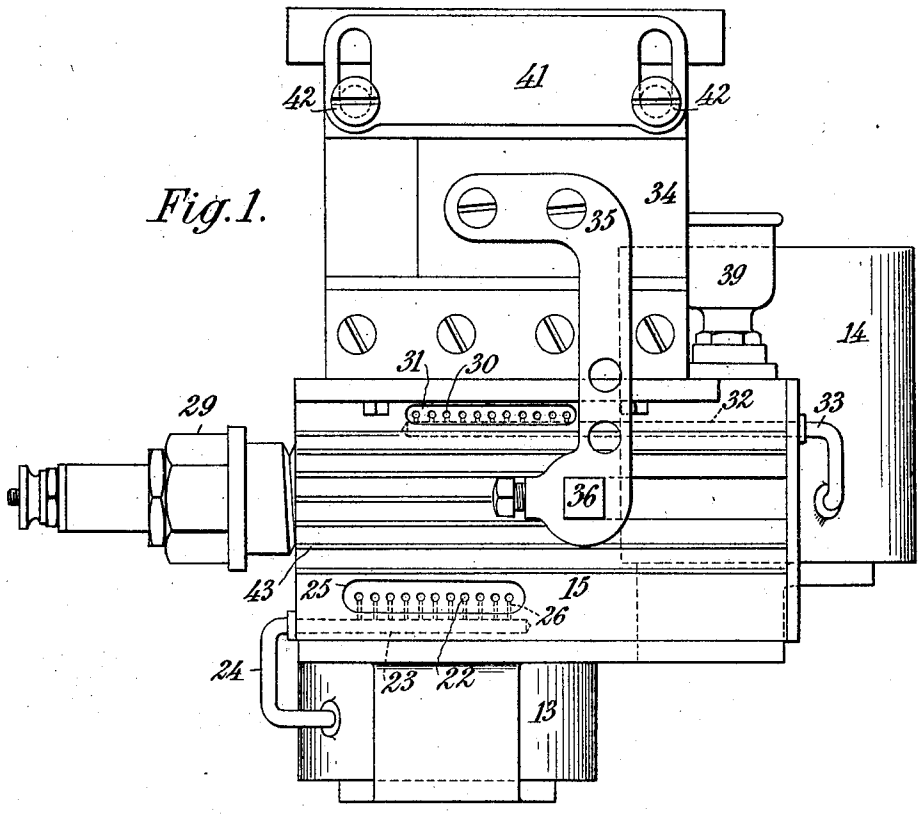
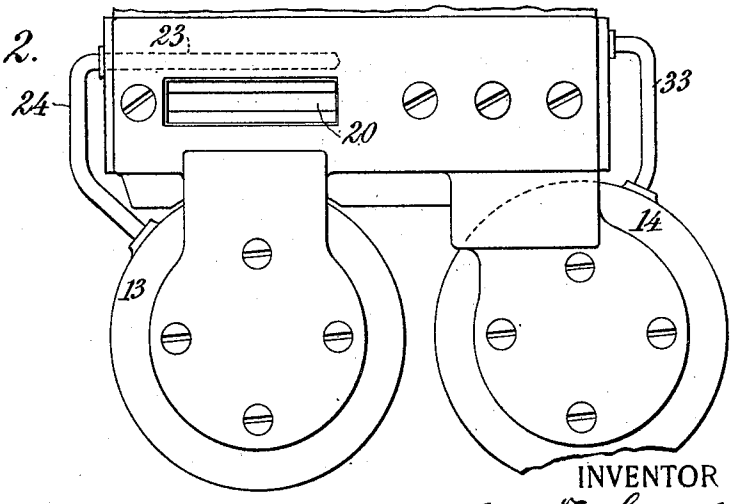


Fig. 2.



INVENTOR:

Carl F. Schulz

By Attorney,

Chas. Lyon Kennell

WITNESSES:

René Spuine

Fred Klitz

C. F. SCHULZ.

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3 SHEETS—SHEET 2.

Fig. 3.

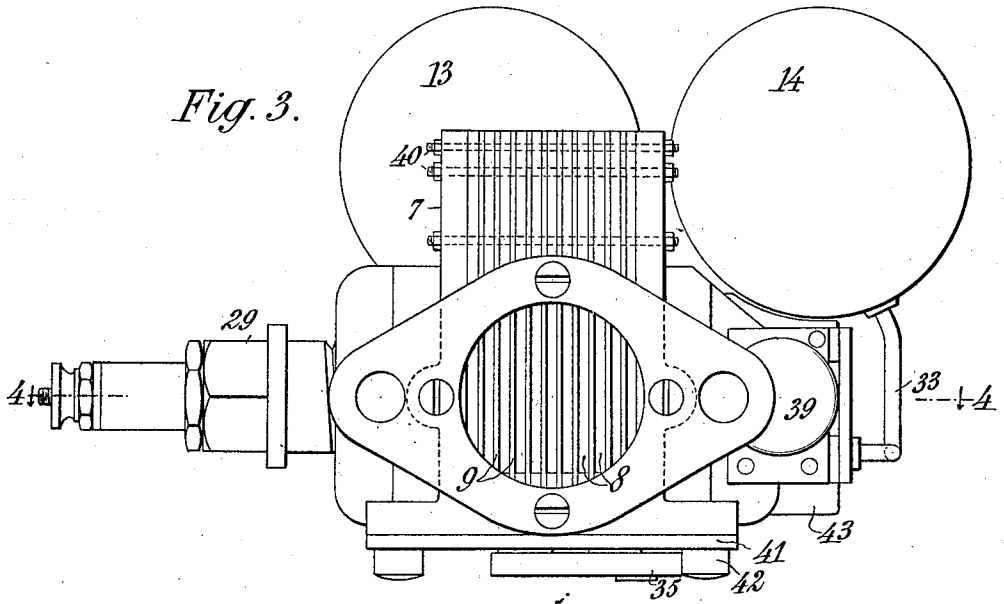
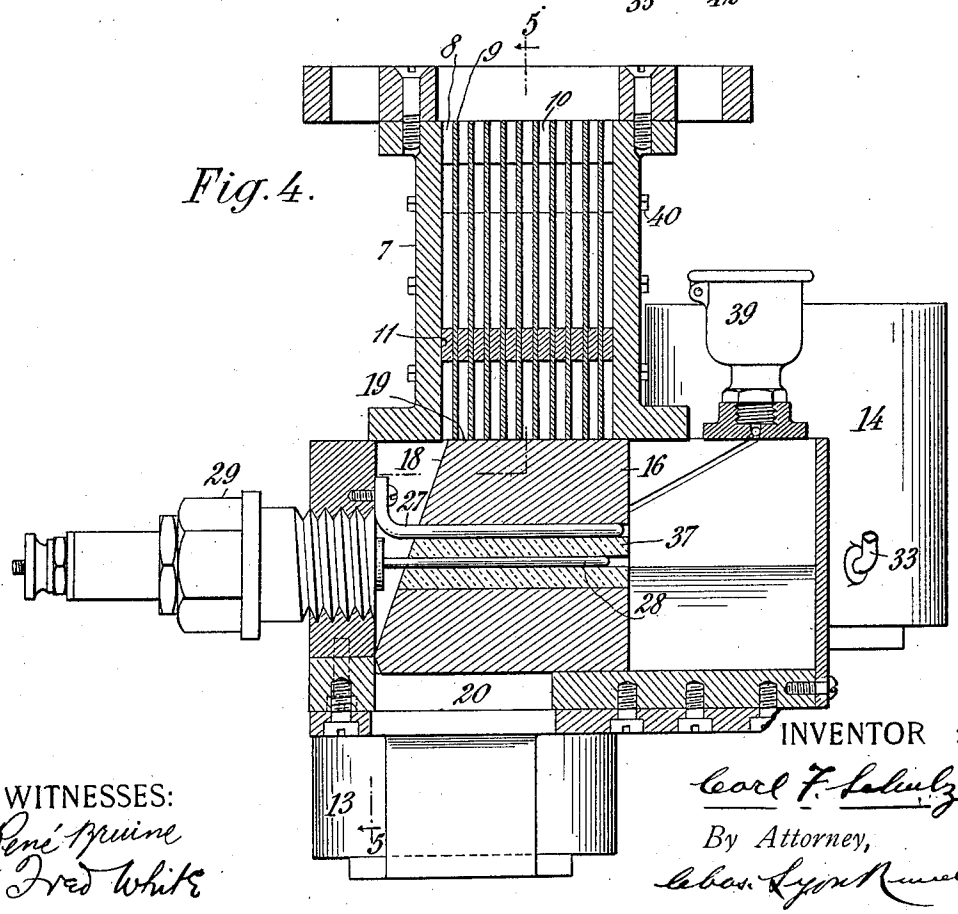


Fig. 4.



WITNESSES:

René Pruine

Fred White

INVENTOR:

Carl F. Schulz.

By Attorney,

Chas. Lyon Russell

C. F. SCHULZ.

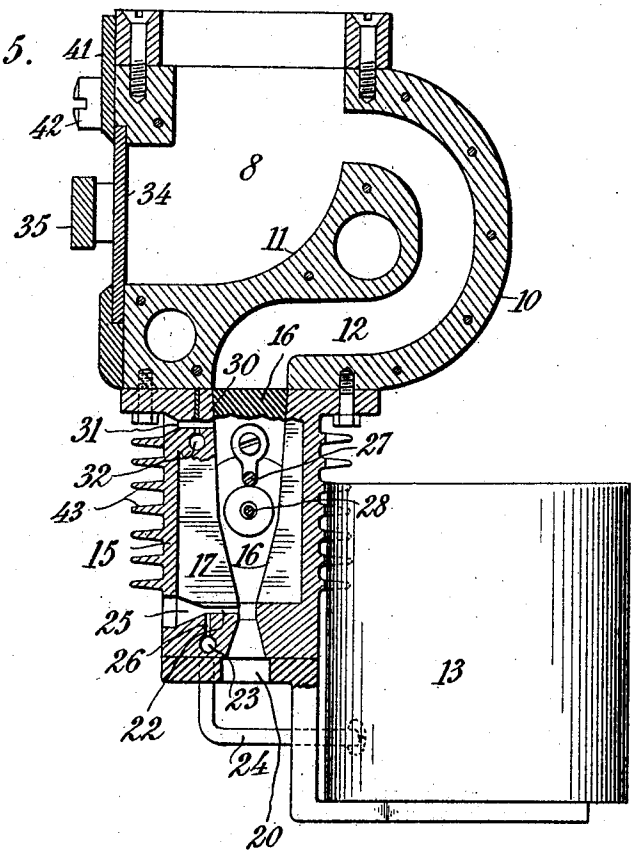
CARBURETER.

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3 SHEETS—SHEET 3.

Fig. 5.



WITNESSES:

Rene' Pruine

Fred White

INVENTOR :

Carl F. Schulz,

By Attorney

Chas. L. Lyon Russell.

UNITED STATES PATENT OFFICE.

CARL F. SCHULZ, OF NEW YORK, N. Y.

CARBURETER.

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To all whom it may concern:

Be it known that I, CARL F. SCHULZ, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to carbureters, and has for its object to provide an oil gasifier peculiarly adapted for use in connection with heavy oils, such, for instance, as kerosene; the object of the invention being to provide a mixing chamber of variable capacity embodying a plurality of compartments which are opened and closed for varying the capacity of the mixing chamber and in unison with the variable opening of the fuel admission. One of the objects of the invention is to obtain flexibility.

In the drawings accompanying this specification:

Figure 1 is an elevation of my improved carbureter;

Fig. 2 is an underside view thereof, that is, a view looking upwardly in Fig. 1; the spark plug, however, being omitted;

Fig. 3 is a plan view of the device shown in Fig. 1;

Fig. 4 is a vertical section taken on a plane at about the line 4—4 of Fig. 3, and

Fig. 5 is a vertical section transversely of the section of Fig. 4, and taken on a plane at about the line 5—5 of such figure.

For converting the heavier products of petroleum into combustible vapors, it has been proposed to support a naked flame in the path of fuel supply, and direct such flame into a cloud of vapor of water. The flame of course consumes but a small portion of the oil, the various ports being so regulated that insufficient oxygen is supplied to the flame to support complete combustion.

The products or bi-products of the partial combustion, upon being subjected to the vapor, become oxidized without impairing the essential elements of the oil. The products of partial combustion are subsequently mixed in proper proportion with air to make an explosive mixture for internal combustion engines. The gas or vapor produced under these conditions is found to possess no affinity whatever for metallic surfaces. Valves and cylinders on an engine used in connection with this gas or vapor are not clogged or fouled.

My improved device is designed for operation in connection with this improved method of carburation.

The delivery chamber or mixing chamber is shown formed between a pair of plates 7. This chamber is divided up into a plurality of chamber spaces 8 by means of a series of plates 9 having separators 10 and 11 between them, which separators also form the outer edges and the baffle plates, as it were, to the chamber spaces.

In Fig. 5 there is seen a larger mixing chamber 8, and the winding passage 12 which leads thereto. The admission ports and valve are so located and adjusted that the intake is always in proportion to the amount of mixing chamber space exposed and available for the reception of the same.

The fuel reservoir is illustrated at 13, and the water reservoir at 14. These are mounted upon a suitable support for supporting the entire instrument.

The valve chamber portion of the device is shown mounted upon this support and in turn having mounted upon it the mixing chamber portion. This valve chamber is illustrated at 15, and is shown carrying a horizontally reciprocable slide valve 16. There is provided a pair of blocks 17 for lining the valve chamber and supporting the valve. The front end 18 of the valve is shown slanted backwardly at the top. The top face 19 of the valve serves to control the openings in the various mixing chamber spaces 8 and the circuitous passages 12 leading thereto.

Air is admitted to the carbureter by means of a port 20 at the bottom, which port is opened or closed more or less by the horizontal position of the valve 16 and is controlled by the bottom of such valve. A series of fuel ports 22 is provided along the path of movement of the side of the valve 16 at the lower portion. These fuel ports are all in connection with a fuel duct 23 fed by means of a tube 24 from the kerosene reservoir or float chamber 13. A longitudinally

disposed slot 25 constitutes an air admission port for the several fuel ports 22. Each of such ports 22 passes over the mouth of a duct 26, leading from the fuel duct 23. As each of the ports 22 is uncovered in turn by means of the movement of the valve 16 toward the right hand in Fig. 4, air is permitted to enter by the port 20 in required quantity. Air is also permitted to enter the slot 25 and blow over one or more of the ducts 26 and suck up the oil and partially atomize the same, which atomization is further effected by a cross-current coming in by the bottom port 20. There is a mixing chamber space 8 provided for each of the fuel admission ports and the valve 16 is so constructed that for each mixing chamber space which is opened a fuel port will be opened.

A flame is supported in the path of movement of the atomized fuel in the present showing by means of a pair of electric conductors or spark points 27, 28. The conductor 27 is shown as a bar carried by the front end of the valve chamber, and the bar 28 as the extended point of a spark plug 29, the spark jumping from one of these bars to the other produces a flame in the fuel, but owing to the insufficiency of the oxidation furnished, the combustion is incomplete.

A series of ports is also provided at the upper side of the valve chamber and in position to be controlled by the side of the upper portion of such valve. Such ports, indicated by reference character 30, are shown in communication with a longitudinal air admission slot 31. Each of such ports 30 passes over a port in a water duct 32, which water duct is connected by means of a tube 33 with a water tank 14. These ports 30 are also located in such position that the valve upon opening each port 22 also opens a port 30, as well as uncovering entrance to the passage 12 of the mixing chamber space.

The air and water drawn into the port 30 form a vapor which is further vaporized by means of the heat of the flame. The oxygen thus supplied tends at first to enhance the flame; the water is decomposed and recombines with the bi-products of combustion and forms a highly efficient combustible gas.

The product of the incomplete combustion is converted into a form which does not foul or clog up the surface of the mixing chamber or the portions of the engine with which it comes in contact.

The presence of the flame in the path of movement of the fuel tends to effect complete vaporization thereof and facilitates the mixture with the air, thus making a gas which is capable of being used directly in the cylinders of an internal combustion engine, and a gas which can be used to start such an engine when the cylinders are cold.

The auxiliary supply of air is admitted to the mixing chamber spaces 8 by means of a slide valve 34, which slide valve is carried by an arm 35 engaging a bar 36 secured to the slide valve 16.

The opening of the auxiliary air inlet port as well as the shape thereof, can be adjustably varied by means of the plate 41, which can be raised or lowered at one or both ends and secured in its adjusted position by means of the screws 42.

By means of the adjustable plate 41 and the slide valve 34, the ratio between the extra air admitted and the fuel is varied in any ascending or descending proportion as the passages are put in operation. For instance, if the right-hand end of such plate 41 in Fig. 1 be lowered in advance of the left-hand end, it would be seen that the fuel mixture for each succeeding chamber space from the left to the right will be richer because the more the ports for the extra air are reduced in area, the greater the suction and the greater the amount of fuel drawn in.

The slide valve 16 is shown provided with a porcelain insert 37 having passages for the reception of the conducting bars 27, 28.

An oil cup 39 is shown for affording lubrication to the slide valve where this engages with the blocks 17.

The sides 7 of the mixing chamber 11, plates 9 and their separators are securely fastened together in the present instance by means of bolts 40.

The valve chamber 15, which in one aspect is a partial combustion chamber, may be cooled in some suitable manner. Fins 43 are illustrated for this purpose.

The operation of the device is substantially as follows:

The reservoir 13 is filled with fuel and the reservoir 14 with water. Suitable electric connections are made in the spark plug 29 and the positions of the valve 16 and the valve 34 manually adjusted by the operator engaging, either manually or otherwise, the bar 35. It is assumed that the instrument is connected with an internal combustion engine, the suction of which draws air through the ports 20, 25 and 31, fuel through the ports 22, and water through the ports 30. The spark produced between the conductors 27 and 28 produces in the presence of the fuel and air a flame which only partially consumes the materials presented to it. Water from the water ports is atomized across the flame and converts the products thereof and the on-rushing fuel and air into a new chemical mixture which is of quite a stable character, and this is thoroughly mixed as it passes through the chambers 8 of the variable capacity mixing chamber. It is to be noted that the valves move in unison whereby the amount of air at admission valve 20 is regulated in proportion to the number of spaces 8 available for the passage of the gas and that the amount of exposed

flame producing electric conductors is also similarly and uniformly regulated.

The valves enlarge and decrease the zone of flame initiation in accordance with the amount of fuel and air admitted.

Although but one practicable embodiment of the invention is illustrated herein, yet it will be apparent that various changes may be made in the scope of the claims without departing from the spirit of the invention.

I claim:—

1. A carbureter, the combination with a chamber of variable capacity and means for varying the capacity of same, means for admitting oil and air into such chamber in amounts sufficient to support partial combustion, means for adjusting the supply of oil and air to increase the same with the expansion of the chamber, means for starting a flame in said chamber in connection with such oil and air, means for atomizing water across the flame, and means for admitting extra air to form a combustible mixture.

2. A carbureter, the combination with a chamber of variable capacity and means for varying the capacity of same, means for admitting oil and air into such chamber in amounts sufficient to support partial combustion, means for adjusting the supply of oil and air to increase the same with increase in capacity of the chamber, means for starting a flame in said chamber in connection with such oil and air, means for atomizing water across the flame, a second chamber in communication with said variable capacity chamber, and means for admitting extra air to said second chamber to form a combustible mixture.

3. In a carbureter, the combination with a chamber having within it a pair of electric conductors, means for admitting oil and air to such chamber at one side of the conductors, a mixing chamber in communication with said chamber at the other side of such conductors, and means for admitting air and water to said first mentioned chamber between the said conductors and the communication with the mixing chamber.

4. In a carbureter the combination with a mixing chamber having a plurality of chamber spaces, a series of ports for admitting the components of the gas, and a valve for controlling the said ports and the openings to the mixing chamber spaces whereby for each additional mixing chamber space open a corresponding fuel port opening is provided.

5. In a carbureter the combination with a mixing chamber formed of a plurality of chamber spaces, a valve chamber opening into said mixing chamber spaces, a valve therein adapted for opening the said chamber spaces one by one, a plurality of fuel admission ports opening into said valve chamber and located in position to be opened one by one in the order of the opening of the said chamber spaces.

6. In a carbureter, the combination with a chamber, of means for admitting oil and air to such chamber sufficient to support partial combustion, means for starting a flame in connection with such oil and air, means for increasing the supply of oil in accordance with the supply of air, means for regulating the volume of the flame space in accordance with the supply of oil and air, and means for admitting extra air to form a completely combustible mixture.

7. In a carbureter, the combination with a chamber of means for admitting oil and air to such chamber sufficient to support partial combustion, means for starting a flame in connection with such oil and air, means for increasing the supply of oil in accordance with the supply of air, means for regulating the volume of the flame space in accordance with the supply of oil and air, means for atomizing water across the flame, and means for admitting extra air to form a completely combustible mixture.

8. In a carbureter, the combination with a mixing chamber having a plurality of chamber spaces, each provided with an admission port, a series of ports in communication with the mixing chamber for supplying the components of the gas thereto, and a valve for controlling in unison the admission ports to the mixing chamber spaces and the said series of ports.

9. In a carbureter, the combination with a mixing chamber having a plurality of chamber spaces, each provided with an admission port, a series of ports in communication with the mixing chamber for supplying the components of the gas thereto, a valve for controlling in unison the admission ports to the mixing chamber spaces and the said series of ports, and adjustable means for admitting extra air to the mixing chamber spaces.

10. In a carbureter, the combination with a mixing chamber formed with a plurality of chamber spaces, a valve chamber opening into said mixing chamber spaces, a valve therein adapted for opening the said chamber spaces one by one, a plurality of fuel admission ports opening into said valve chamber and located in position to be opened one by one in the order of the opening of said chamber spaces, each of said chamber spaces being provided with a port for admitting extra air, and means for varying the ratio between the air and fuel admitted in any ascending or descending proportion as the mixing chamber spaces are put in operation.

11. A carbureter, the combination with a chamber of variable capacity, and means for varying the capacity of same, means for admitting oil and air into such chamber in amounts sufficient to support partial combustion, means for adjusting the supply of oil and air to increase the same with the expansion of the chamber, means for starting a flame in said chamber in connection with such oil and air, means for atomizing water across the flame, and means for apportioning the water in accordance with oil and air admitted.

12. In a carbureter, the combination with a delivery chamber, having a plurality of separate passages, a series of admission ports to said passages, a valve for controlling the openings to said passages and for controlling the said ports in unison, and adjustable means for admitting extra air to said delivery chamber.

CARL F. SCHULZ.

Witnesses:
GUSTAVE R. THOMPSON,
FRED WHITE.