R. L. ROBERTS.

CARBURETER.

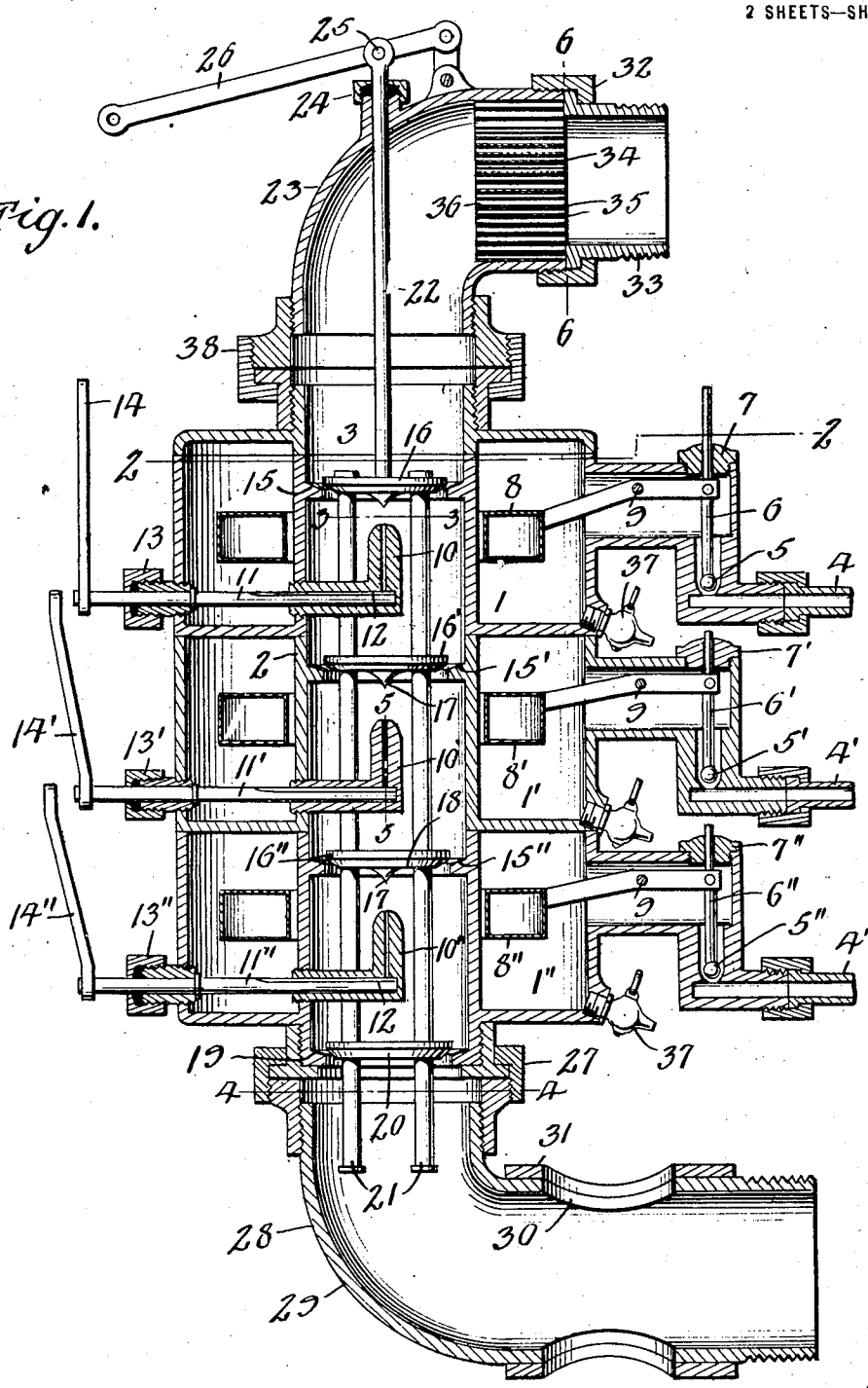
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1,177,538.

Patented Mar. 28, 1916.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

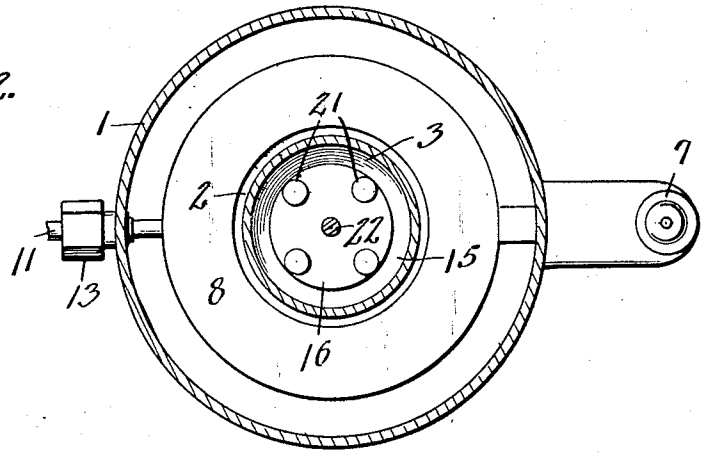


Fig. 3.

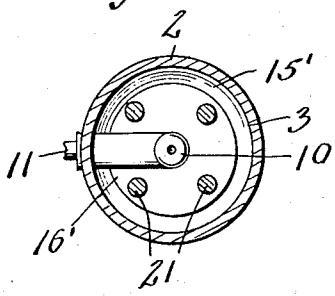


Fig. 4.

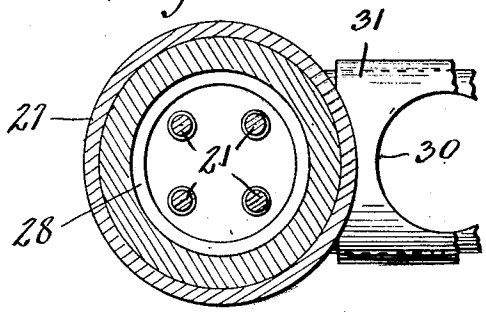


Fig. 5.

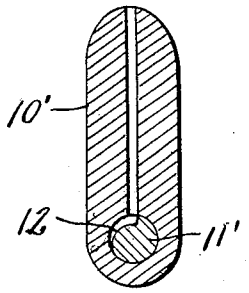
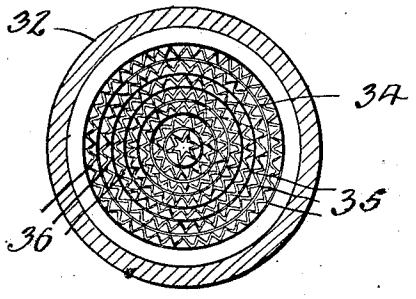


Fig. 6.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,177,538. Specification of Letters Patent. Patented Mar. 28, 1916.

Application filed February 12, 1915. Serial No. 7,779.

To all whom it may concern:

Be it known that I, ROBERT L. ROBERTS, a citizen of the United States, residing at Miami, in the county of Dade and State of Florida, have invented new and useful Improvements in Carbureters, of which the following is a specification.

This invention relates to carbureters especially designed for use as an adjunct to internal combustion engines, the object in view being to produce a multiple chambered article of the character referred to which will aid in the economical operation of the engines of the class indicated in that a plurality of liquid fuels of different grades or characters may be used either collectively or singly and either with or without water and also in connection with either hot or cold air, the construction providing for the breaking up or atomizing of the liquids and a thorough mixing of the same together with air before being drawn from the device and conducted to the combustion chamber of the engine.

A further object of the invention is to provide means for adjusting the flow of the atomized liquid and air, together with means for independently regulating the feeds of the liquids.

A further object of the invention is to provide simple and effective means for simultaneously adjusting a series of breaker valves in relation to their seats and the discharge nozzles of the liquid chambers, also a throttle valve which regulates the admission of air, hot or cold, to the flue into which the liquids are discharged.

A further object in view is to provide means consisting of a flame breaker for preventing back fire from the engine to the combined mixer and atomizer.

With the above and other objects in view, the invention consists in the novel construction, combination and arrangement of parts, as herein described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a diametrical section through a combined atomizer and mixer embodying the present invention, certain parts being shown in elevation. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a section on the line 4—4 of Fig. 1. Fig. 5 is a section on the line 5—5 of Fig. 1. Fig. 6 is a section on the line 6—6 of Fig. 1.

The combined atomizer and mixer of this invention, in its construction, comprises a stack of float chambers 1, 1′ and 1″, the said chambers being illustrated as superimposed one upon the other and three of such chambers being illustrated although it will, of course, be understood that the stack may comprise any number of float chambers. The chamber 1 is designed, for example, to contain gasolene, the chamber 1′ kerosene, and the chamber 1″ water. It will be understood, however, that any other liquid fuels may be substituted for the gasolene and kerosene in the chambers 1 and 1′, the device being adapted to use any volatile fuel oil or liquid such as gasolene, naphtha, kerosene, alcohol, etc. The float chambers are preferably annular in form, encircling a tubular inner wall 2 which forms an inclosed mixing flue 3 extending entirely through all of the float chambers as clearly shown in Fig. 1.

4, 4′ and 4″ indicate supply connections for the respective chambers 1, 1′ and 1″, said supply connections being controlled by float controlled level regulating valves 5, 5′ and 5″. These valves are shown as of the ball check type and are adapted to be pressed tightly to their seats by means of push rods 6, 6′ and 6″ which are extended to pass through tight fitting plugs 7, 7′ and 7″ in the top walls of the float chambers as shown, thereby enabling any one of the chambers to be flooded by lifting the respective push rod. The push rods have a jointed connection with a corresponding series of floats 8, 8′ and 8″ which are of annular form and encircle the central mixing flue 3. When the liquid level rises to a predetermined point in the float chambers, the said floats operate to close the valves 5, 5′ and 5″ and as the floats fall, the respective valves are permitted to open to allow the proper level to be maintained. Each of the floats is pivotally mounted at 9 in the lateral extension of the respective float chamber.

The liquid in each of the float chambers passes through one of a series of L-shaped nozzles 10, 10′ and 10″ which nozzles discharge in an upward direction centrally within the mixing flue 3. Each of said nozzles contains a regulating valve shown in the form of a rod 11, 11′ and 11″ one of which is illustrated in cross section in Fig. 5 wherein it is seen to comprise a facial recess 12 of gradually increasing width, the base of the recess being eccentric to the axis of

movement of the rod 11. Therefore, as the rod is turned in one direction or the other, a greater or less capacity of flow is provided for the respective nozzle. The valves consisting of the rods pass outwardly through stuffing boxes 13, 13′ and 13″ associated with the side walls of the float chambers where each of said valves is provided with an independent lever 14, 14′ and 14″ thereby enabling each valve to be regulated independently of the others and enabling a greater quantity of one liquid to be discharged from its nozzle than another liquid.

The central mixing flue 3 is provided with interior valve seats 15, 15′ and 15″ in conjunction with which breaker valves 16, 16′ and 16″ are employed, said breaker valves being located in front of the nozzles 10, 10′ and 10″, respectively, as shown in Fig. 1. Each of said valves is formed as shown in Fig. 1 with a central depending and substantially cone shaped projection 17 and a surrounding annular channel 18 whereby the liquid is deflected outwardly in all directions and caused to impinge against the inclined valve seat against which the outer beveled margin of each of said breaker valves is adapted to rest when the valve is entirely closed. This serves to thoroughly break up and atomize the liquid as it is taken up by the air rushing through the mixing flue. In the lower portion of the mixing flue 3 there is another valve seat 19 in connection with which a throttle valve 20 operates, the last named valve being shown in the form of a flat disk. All of the valves 16, 16′ and 16″ and 20 are connected together for simultaneous movement and operation by means of a yoke which is shown as consisting of parallel rods 21, all of the valves being fixedly attached to said rods. Connected to the uppermost valve 16 is a stem 22 which extends outwardly through an elbow 23 connected to the discharge end of the central flue 3 and provided with a stuffing box 24. The outer extremity of the valve stem 22 has a jointed connection at 25 with a throttle valve lever 26 from which any suitable operating connection may lead to a point within reach of the operator while in his seat in the machine.

Attached to the lower end of the central mixing flue 3, by means of a union 27 or equivalent means, is an air inlet connection 28 provided with an elbow 29 which is adapted to be connected to a hot air supply such as a horn applied to the exhaust manifold of an internal combustion engine. The intake connection is also provided with one or more cold air inlet ports or orifices 30 the admission of cold air being regulated by means of a damper 31 as shown in Fig. 1. The elbow 23 has connected thereto by means of a union 32 an outlet connection 33 and within said outlet connection or elbow 23 there is placed a flame breaker or back fire screen 34, the same being shown in Fig. 6 as consisting of flat and transversely corrugated strips 35 and 36, respectively, coiled in convolute form, the said flame breaker or screen serving to prevent any flame or back fire from the engine from reaching the explosive mixture in the central mixing flue 3.

Each of the float chambers is provided with a drain cock 37 so that any desired liquid may be drawn from the respective chamber.

38 designates a union connecting the elbow 23 with the upper extremity of the mixing flue 3.

From the foregoing description taken in connection with the accompanying drawings, it will now be understood that the combined mixer and atomizer is adapted to use various grades and characters of liquid fuels such as have herein been enumerated, either with or without the addition of water to form a vapor which combines with the atomized liquid fuel. The liquids thus used are broken up separately, atomized and thoroughly mixed in readiness to be ignited in the combustion chamber before they leave the combined atomizer and mixer, and the water vapor is added to give the mixture more elasticity and greater expansion and to keep the cylinders clear of carbon as well as the valves, spark plugs and other internal parts of the engine.

The device is adapted for use on all internal combustion engines, using the lighter grades of liquid fuels such as marine and automobile engines and is especially adapted for use in air craft motors where different atmospheric conditions are encountered due to high and low altitudes. A change from one fuel to another may be effected almost instantly or as gradually as the operator wishes and each fuel may be used alone or combined in any desired proportion with another or others. The water used in the chamber 1″ may be taken from the overflow of the engine cooling system after passing through the waterjacket and becoming heated or it may be derived from a separate water tank provided for that special purpose. It will further be understood that the device is susceptible to various changes in the form, proportion and minor details of construction which may accordingly be resorted to without departing from the principle or sacrificing any of the advantages of the invention.

What I claim is:—

1. An atomizer and mixer for internal combustion engines, comprising a stack of float chambers designed to contain liquids of different character, an independent supply connection for each of said chambers, a float controlled level regulating valve for

each of said chambers, a mixing flue intersecting all of said float chambers, a discharge nozzle for each of said chambers, a regulating valve for each of said nozzles, a breaker valve located in front of each of said nozzles, and means for simultaneously adjusting all of the breaker valves.

2. An atomizer and mixer for internal combustion engines, comprising a stack of float chambers designed to contain liquids of different character, an independent supply connection for each of said chambers, a float controlled level regulating valve for each of said chambers, a mixing flue intersecting all of said float chambers, a discharge nozzle for each of said chambers, a regulating valve for each of said nozzles, a breaker valve located in front of each of said nozzles, and means for simultaneously adjusting all of the breaker valves embodying a common yoke to which all of the breaker valves are attached.

3. An atomizer and mixer for internal combustion engines, comprising a stack of annular float chambers designed to contain liquids of different character, an independent supply connection for each of said chambers, a float controlled level regulating valve for each of said chambers, a mixing flue extending centrally through the stack of float chambers, a discharge nozzle for each of said chambers, all of said nozzles being arranged in said mixing flue, a regulating valve for each of said nozzles, breaker valves located in said mixing flue in front of said nozzles, and means for adjusting all of said breaker valves simultaneously.

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

ROBERT L. ROBERTS.

Witnesses:
P. A. HENDERSON,
MARY A. NALL.