

C. B. HATFIELD.
 FUEL MIXING DEVICE FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED SEPT. 13, 1913.

1,131,371.

Patented Mar. 9, 1915.

Fig 1

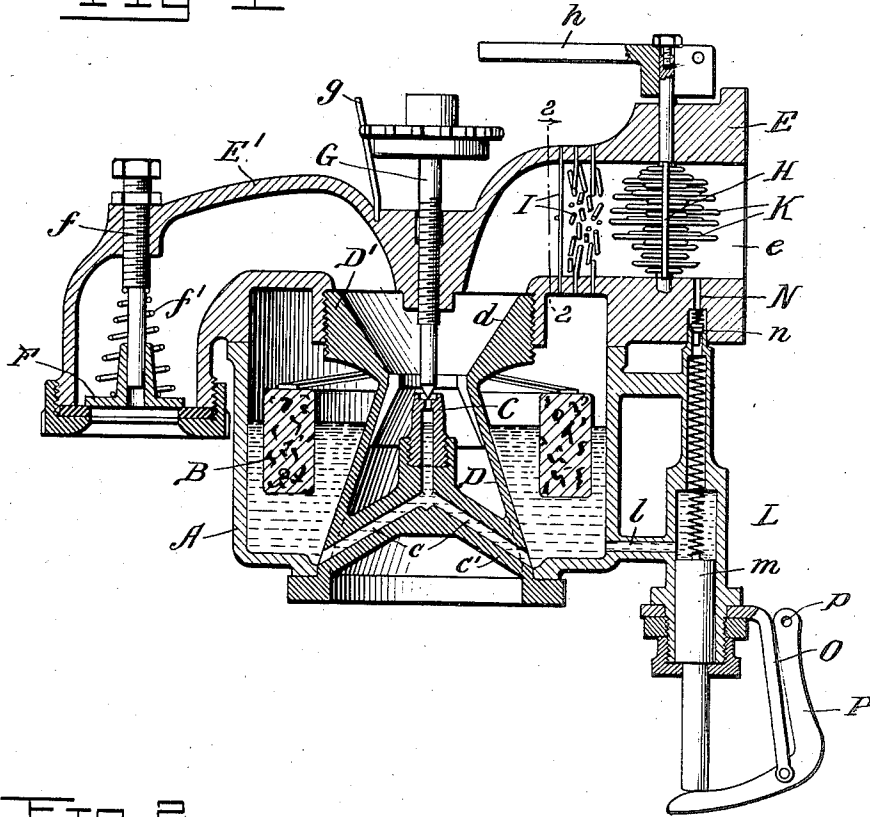


Fig 2

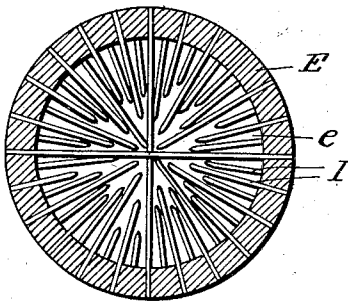
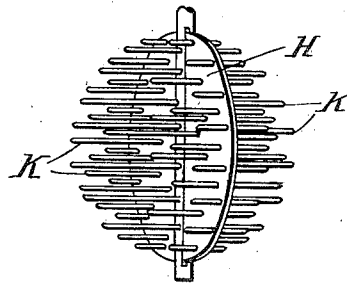


Fig 3



Witnesses
 Halbert P. Brown,
 M. S. Crandell

Inventor
 Charles B. Hatfield
 By Church & Church
 his Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES B. HATFIELD, OF ELMIRA, NEW YORK.

FUEL-MIXING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

1,131,371.

Specification of Letters Patent.

Patented Mar. 9, 1915.

Application filed September 13, 1913. Serial No. 789,657.

To all whom it may concern:

Be it known that I, CHARLES B. HATFIELD, a citizen of the United States, residing at Elmira, in the county of Chemung and State of New York, have invented certain new and useful Improvements in Fuel-Mixing Devices for Internal-Combustion Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to carbureters of that type wherein air is drawn around or past a liquid fuel supplying nozzle, the suction being effected through the partial vacuum created by the piston of an engine during its inspiration stroke.

In carbureters designed for this character of work and embodying a liquid fuel supplying nozzle it is well known that the liquid fuel discharged into the moving current of air is in a more or less globular condition, that is to say, particles or globules of fuel are carried with the air and remain in practically the same physical condition during their travel through the passages and into the cylinder. The fuel in this condition is not only injurious in its action on the walls of the cylinder, due to the fact that it deposits on said walls in a liquid condition, combines with the lubricant and produces carbonization, but its efficiency as a power producer is practically lost. Ideal conditions require that the fuel and air should be thoroughly homogenized with the fuel nebulized or reduced to the finest possible condition. A gaseous condition is of course the highest ideal condition for effective operation, but is extremely difficult if not impossible to attain in ordinary practice.

The present invention has for its object the production of a carbureter which will so nebulize the fuel as to prevent the entry of particles of the same in a globular condition into the engine cylinder and homogenize to a very high degree the air and fuel, from which the power of the engine is derived. In attaining the objects there is introduced into the passage between the fuel supplying nozzle and the engine through which passage the air and fuel is conducted, a series or multiplicity of baffle rods or members, each preferably separate and distinct from

the other, and so located that any globules or particles of fuel of appreciable size traveling through the passage will be intercepted and nebulized with the result that the air and fuel is supplied to the engine in a homogenous condition.

Referring to the accompanying drawings,—Figure 1 is a longitudinal section through a carbureter embodying the present improvements; Fig. 2 is a cross section of the passage substantially on the line 2—2 of Fig. 1 showing one arrangement of the baffle members; and Fig. 3 is a perspective view of the throttle valve which is conveniently of the butterfly type, for the purpose of illustrating the present invention.

Like letters of reference in the several figures indicate the same parts.

The carbureter adopted for illustrating the invention embodies in its construction a float chamber A to which liquid hydrocarbon is supplied through any of the usual inlet valve devices controlled by a float B, located within the chamber A for maintaining a proper level of the fuel in said chamber. Centrally of the chamber there is a fuel supplying nozzle C to which fuel ducts or passages *c* lead from the bottom of the float chamber, said passages extending through bridges or arms *c'* formed preferably as an integral part of a conical member D which forms a passage for the inlet of air around the nozzle C, the restricted portion of the passage being located approximately at or slightly above the outlet opening in the nozzle. The member D is provided with an enlarged upper portion D' having a reversely arranged conical recess therein at *d* and said enlarged portion D is adapted to be connected with the head or top of the float chamber by a screw thread connection which will serve to retain the parts in their proper relation.

The cover on the float chamber is preferably formed to embody or contain the air passage leading from the fuel nozzle to the engine cylinder or manifold and for this purpose at one side it is provided with an enlargement E adapted for connection with the manifold or cylinder of the engine and having within it an air passage *e* which at its inner end communicates with one side of the conical enlargement *d* of the member D. On the opposite side, the said head is provided with an enlargement and extension

E' having a passage therein which communicates at its inner end with the conical enlargement d and at its outer end is adapted for the reception of a spring seated air inlet valve F preferably seating downwardly and having an adjusting screw f for its seating spring f' , whereby the proportions of air admitted through the valve F and through the conical nozzle formed by the member D may be regulated in accordance with now well understood practice.

The liquid fuel supplied to the nozzle C may be regulated by a needle valve G preferably threaded through the float chamber cover and provided with means such as the spring g , whereby it may be retained in adjusted position.

The throttle valve, which as illustrated is of the butterfly type, is indicated at H, being located in the passage e preferably in the enlargement E near the point where the carbureter is connected with the manifold or engine, or between the fuel nozzle and said end of the passageway. The throttle valve is adapted to be controlled by a lever h of usual construction, and its movements are limited by the ordinary stop devices. In the passage e between the fuel nozzle and the engine connection there is located a multiplicity of baffle members, which are in the form of baffle rods I, each preferably independent of the other and in such staggered relation to each other that globules or particles of fuel traveling with the air through said passage will be inevitably intercepted, and through the action of the small baffle rods, effectually nebulized and the air fuel thoroughly homogenized. The baffle rods I referred to are, in the most effective arrangement known to me at present, of various lengths and project radially into the passageway, such arrangement not only serving to more effectually intercept any globules or particles of fuel, but leaving the largest possible cross sectional area of the passage for the travel of the air and fuel through the passage. In other words, this arrangement of the baffle rods obstructs the passage at any particular point, the least of any arrangement, and in fact reduces its capacity for carrying the air and fuel inappreciably. The baffle rods are preferably also supported at the ends only, and while two of the rods are shown in Fig. 2, as extending entirely across the passage at right angles to each other, the major portion of the rods are supported at one end only, this arrangement having been found particularly efficient, possibly due to the fact that under the influence of the air currents through the passageway a minute vibratory motion is imparted to the rods which is highly effective in securing the desired nebulization or vaporization of the fuel, with which the rods will be wetted during

the operation of the carbureter. As illustrated, it will be noted that the throttle valve H is also provided with a multiplicity of baffle rods K of graduated length and in staggered relationship, the length of the rods being so graduated that they will intercept any particles or globules of fuel regardless of the adjusted position of the valve, *i. e.*, whether fully opened or partly closed, and these baffle rods K are each independent of the other, and each is preferably mounted in the valve so as to leave its ends free.

The carbureter illustrated is provided with a means whereby fuel may be injected between the throttle valve and engine connection or manifold, for the purpose of starting the engine at which time a surplus of fuel is necessary. This means embodies a small pump cylinder L having a piston m therein and communicating at its lower portion through a passage l with the float chamber. At its upper end the cylinder L is provided with an exit orifice N leading into the passage e beyond the throttle valve H and with a spring pressed check valve n to complete the elements of a pump. The piston m is preferably spring-pressed downwardly, and the lower end of the cylinder L is provided with a swivel arm O to which a bell crank piston operating member P is attached, whereby it may be swung around the cylinder in any direction so that it may be operated by a pull cord or wire secured in the eye p . This pump cylinder L is conveniently formed as an integral part of the float chamber A, and its upper end fitted into a recess which terminates in the outlet M when the cover member is applied. The arrangement is such that a surplus of fuel may be injected in advance of the throttle valve and baffles to facilitate starting in the well understood manner.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a fuel mixer for internal combustion engines, the combination with the conduit through which the fuel mixture is conducted from the carbureter to the engine, of a multiplicity of baffle rods rigidly supported at one end only and arranged radially in staggered relation in said conduit, out of contact with each other, and each flexible and susceptible of being set into vibration by the flow of fuel mixture through the conduit whereby globules of fuel contacting therewith will be nebulized.

2. A fuel mixer for internal combustion engines embodying a carbureter, an outlet pipe through which the fuel mixture is conducted to the engine, and a multiplicity of baffle rods each of relatively small cross sectional area projecting from the peripheral wall radially in said passage in staggered re-

lation and with their inner portions out of contact with each other, whereby fuel globules traveling with the air will be intercepted and nebulized.

5 3. A fuel mixer for internal combustion engines embodying a carbureter, an outlet pipe through which the fuel mixture is conducted to the engine and a multiplicity of baffle rods each of relatively small cross sectional area and of varying length projecting from the peripheral wall radially in said passage in staggered relation and with their inner portions out of contact with each other, whereby fuel globules traveling with the air will be intercepted and nebulized.

10 4. In a fuel mixer for internal combustion engines, the combination with the conduit through which the fuel mixture is conducted from the carbureter to the engine, of a multiplicity of baffle rods rigidly supported at one end only and arranged radially in said conduit, out of contact with each other, and each flexible and susceptible of being set into vibration by the flow of fuel mixture

through the conduit whereby globules of fuel contacting therewith will be nebulized.

5. A fuel mixer for internal combustion engines, embodying a carbureter, an outlet pipe through which the fuel mixture is conducted to the engine, and a multiplicity of baffle rods each of relatively small cross sectional area mounted in said pipe out of contact with and capable of vibrating independent of each other, said rods being in position to intercept and nebulize globules of fuel traveling with the air.

6. In a fuel mixer, the combination with the pipe through which the fuel mixture is conducted from the carbureter to the engine, of a multiplicity of vibratory baffle rods supported at one end only, projecting freely in said pipe out of contact with each other, and with their free ends exposed to the air traveling through the pipe.

CHARLES B. HATFIELD.

Witnesses:

I. S. COPELAUS,
JAMES F. WOODFORD.