

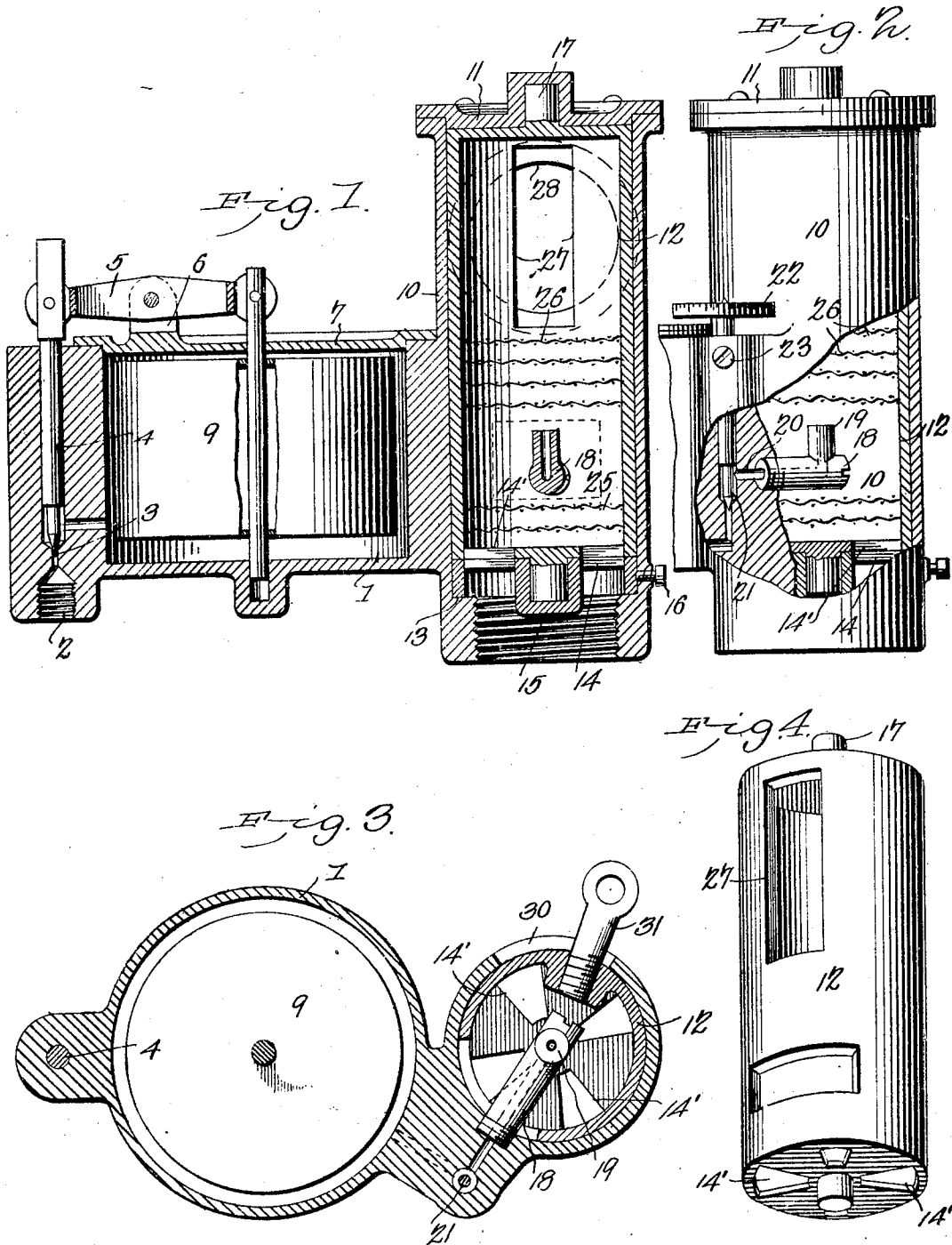
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E. B. & L. S. CUSHMAN.

CARBURETER.

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# UNITED STATES PATENT OFFICE.

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## CARBURETER.

SPECIFICATION forming part of Letters Patent No. 794,927, dated July 18, 1905.

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*To all whom it may concern:*

Be it known that we, EVERETT B. CUSHMAN and LESLIE S. CUSHMAN, citizens of the United States, residing at Lincoln, in the county of Lancaster and State of Nebraska, have invented a new and useful Carbureter, of which the following is a specification.

This invention relates to certain improvements in carbureters of that general class employed for the mixing of air and gasoline to form an explosive compound for use in connection with gas-engines.

The principal object of the invention is to provide a carbureting device in which the quantity of gasoline will at all times be strictly proportionate to the quantity of air, so that the compound will at all times be uniform, and thus result in more uniform action of the engine.

A further object of the invention is to provide a carbureting device in which a fixed quantity of gasoline will at all times be maintained in a chamber or vessel, from which it may be withdrawn by the suction due to the outstroke of the piston after the exhaust has been expelled from the cylinder, a constant supply being automatically maintained by means of a float-controlling valve disposed in said chamber, and in this connection a further object of the invention is to provide a valve which may be conveniently removed when it becomes necessary to cleanse either the valve-seat or valve and remove the sediment which naturally accumulates at this point.

A still further object of the invention is to provide a mechanism by means of which the quantity of gasoline fed at each operation may be gradually adjusted in accordance with the speed and load of the engine.

A still further object of the invention is to provide a carbureting mechanism in which a throttle-valve is movable to govern the entrance of the explosive charge to the explosion-chamber, said valve controlling not only the entrance of the explosive mixture to the engine, but also serving to control the quantity of air admitted to the mixing-chamber of the carbureter, so that the air-entrance

port will always be opened to a degree proportionate to the discharge-port of the explosive mixture, and thus render the suction through the mixing-chamber uniform, the result being the withdrawal from the gasoline-chamber of a quantity of gasoline proportionate to the quantity of air admitted to the mixing-chamber.

With this and other objects in view the invention consists in the novel construction and combination of parts hereinafter described, and illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes of the form, proportions, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a longitudinal sectional elevation of a carbureter constructed in accordance with the invention. Fig. 2 is an end elevation of the same, partly in section. Fig. 3 is a sectional plan view of the carbureter. Fig. 4 is a detail perspective view of the throttle-valve.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

A device forming the subject of the present invention comprises in general a pair of connected cylindrical chambers, which may be formed of an integral casting of a size proportionate to the size of the engine to which it is to be applied.

The chamber 1, which may be of cylindrical or other form, is designed to receive and to maintain a constant quantity of hydrocarbon, preferably in the form of gasoline, and this may be fed from an elevated tank or by a suitable pumping device of any kind, the gasoline being introduced through a feed-pipe connected to a threaded opening 2, the upper portion of which is a contracted opening 3, leading to the interior of the gasoline-chamber 1. At the top of the opening 3 is a valve-seat for the reception of a needle-valve 4, the stem of which fits in a suitable opening in the wall of the chamber, the top

of said valve-stem being pivotally connected to one arm of a lever 5, fulcrumed to ears or lugs 6, carried by the removable top 7 of the chamber 1. The valve is so constructed that  
 5 by removing the pivot-pin which connects its stem to the lever 5 said valve may be readily removed from position to permit the insertion of a suitable cleaning-tool and the removal of any sediment which may have accumulated at the valve-seat, and this may be  
 10 accomplished without disconnecting any other portion of the mechanism or the disconnection of any of the gasolene-pipes.

The bottom of the chamber 1 is provided  
 15 with a recess in which is guided the lower end of a float-rod 8, connected at its upper end to the lever 5 and being guided by a suitable opening in the removable head 7. The float-rod carries a hollow float 9, which rises or  
 20 lowers in proportion to the level of the gasolene in the chamber and on rising depresses the valve and keeps off the flow of gasolene. As the supply is exhausted the valve opens to a corresponding extent to renew the supply  
 25 to the chamber.

The mixing-chamber 10 is cylindrical in form and is provided with an upper removable head 11. The interior of this chamber is bored to receive a cylindrical throttle-valve 12, the interior of which really constitutes the mixing-chamber, and at the lower  
 30 end of said valve is a valve-seat 13, provided with a plurality of substantially triangular openings or ports 14, the central portion of the valve-seat member being provided with  
 35 a depending boss for the reception of a depending stem 15, carried by the valve. The valve-seat is in the form of a ring seated on a shoulder or flange at the lower portion of the  
 40 chamber 10 and may be circumferentially adjusted on its seat and locked in any position by means of a set-screw 16. The lower end of the throttle-valve is faced and is provided with triangular openings 14', corresponding to the similar openings 14 in the  
 45 valve-seat, so that by turning the valve the quantity of air admitted to the interior of the valve may be regulated to a nicety.

In order to properly guide the throttle-valve, the upper or closed end of said valve is provided with a vertically-disposed stud 17, fitting in a corresponding recess in the removable head 11. In the inner wall of the  
 50 chamber 10 is a threaded opening for the reception of a nipple 18, having a vertically-disposed discharge-opening 19, which is in communication with the gasolene-chamber, the gasolene passing from said chamber to the  
 55 needle through a port 20, and in said port is a valve-seat for the reception of a needle-valve 21, having a threaded stem fitted in a threaded opening in the wall of the chamber and provided at its upper end with a milled head or knob 22, by turning which the valve  
 60 may be opened or closed in order to regulate

a flow of gasolene from the chamber 1. The top of the knob 22 is preferably graduated in order to indicate the extent to which the valve is opened, and in one side of the wall-chamber is a threaded opening for the reception of a set-screw 23, which may be engaged  
 70 with the valve-stem to lock the latter in any desired position of adjustment. Immediately below the nipple are arranged a number of reticulated screens 25, and above the nipple are a number of similar screens 26, the first being for the purpose of distributing the air entering at the lower portion of the chamber and the latter serving as strainers to divide the air and permit it to absorb a greater  
 75 quantity of the liquid gasolene, and thus form a vapor suitable for use in the engine.

The level of gasolene maintained in the chamber 1 is constant and at all times is supposed to be about on a level with the upper  
 80 portion of the port 20 or at a trifle thereabove, so that the gasolene will not flow by gravity out through the nipple into the mixing-chamber, the withdrawal of the gasolene being dependent on the suction of the passing current  
 85 of air which enters at the lower portion of the valve and passes out through a suitable port 27 in the valve, the port communicating with a suitable connection 28, through which the explosive charge is led to the engine.

In one wall of the chamber 10 is a curved slot 30, through which extends a radially-disposed arm 31, carried by the valve and controlled by a suitable governor in accordance with the speed of the engine, or the arm  
 90 may serve for the purpose of manual adjustment when desired.

The air entering into the lower portion of the chamber passes through the ports 14' and is finely divided, so as to fill the entire  
 95 area of the mixing-chamber. In its passage through the chamber the suction exerted by the passing current serves to withdraw a quantity of gasolene through the nipple 18, and this liquid gasolene is mixed with or absorbed by the air, and after the mixture passes through the screens 26 it is led through the port 27 to the engine. It will be observed that the same valve controls both the admission of air and the exit of the explosive  
 100 mixture, so that when the valve is adjusted to increase the quantity of air admitted it also increases the area of the exit-opening for the explosive charge and reduces said area when the area of the entrance-ports is reduced. This serves effectually to keep the strength of the suction uniform, and as the quantity of gasolene withdrawn is proportionate to the quantity of air which effects its withdrawal the proportion of gasolene to the  
 105 air will at all times be uniform.

By adjusting the valve-ring 13 the carbureter may be rendered suitable for use in connection with engines of different size, or for the same engine under different conditions of  
 110 120 125 130

speed and load while further adjustment of the quantity of carbon in the mixture may be accomplished by the needle-valve 21.

Having thus described the invention, what is claimed is—

1. In a carbureter, a mixing-chamber, a gasolene-chamber, a detachable cover for the gasolene-chamber, a float within the chamber, a float-carrying rod secured to the float and extending through an opening in the cover, a gasolene-supply passage formed in a portion of the wall of the gasolene-chamber, said passage being extended upward through the top of the chamber at a point clear of the outer edge of the cover, a movable valve-stem guided within said passage, a valve carried by the stem and serving to close said passage, a lever fulcrumed to the cover and connected to the float-rod, and a detachable connection between the opposite end of the lever and the valve-stem, thereby to permit the removal of the stem without interfering with the cover, substantially as specified.

2. In combination, a cylindrical casing provided with a bottom air-inlet port, and near its upper end with a vapor-outlet port, a ported adjustable valve-seat carried by the casing, means for locking said seat in position, a cylindrical valve arranged within the casing and closed at its upper end, the lower end of said valve having air-ports and resting on the valve-seat, a vapor-discharge port arranged at the upper portion of the valve and movable into alinement with the smaller port of the casing, and a liquid-fuel-inlet port extending through the casing and into an opening into the interior of the valve.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

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Witnesses:

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