J. P. RYAN.

CARBURETER.

APPLICATION FILED JAN. 25, 1909.

970,558. Patented Sept. 20, 1910.

Fig. 1.

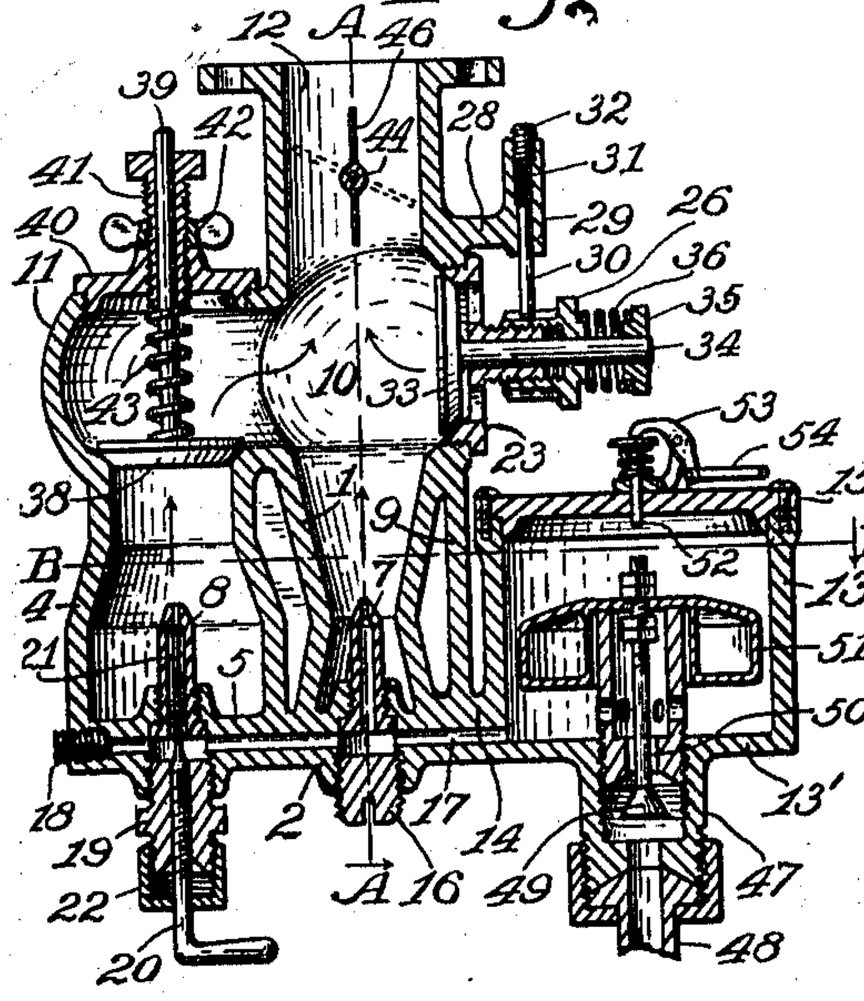


Fig. 2.

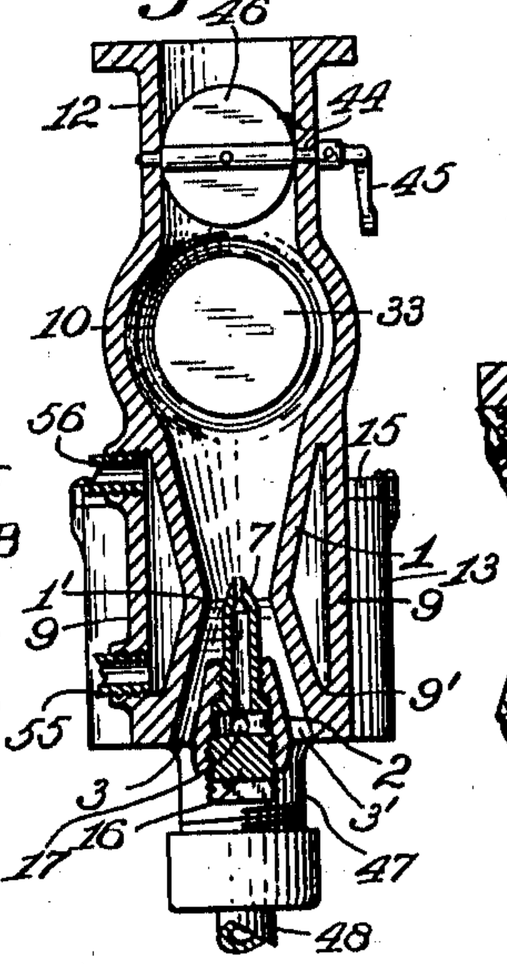


Fig. 3.

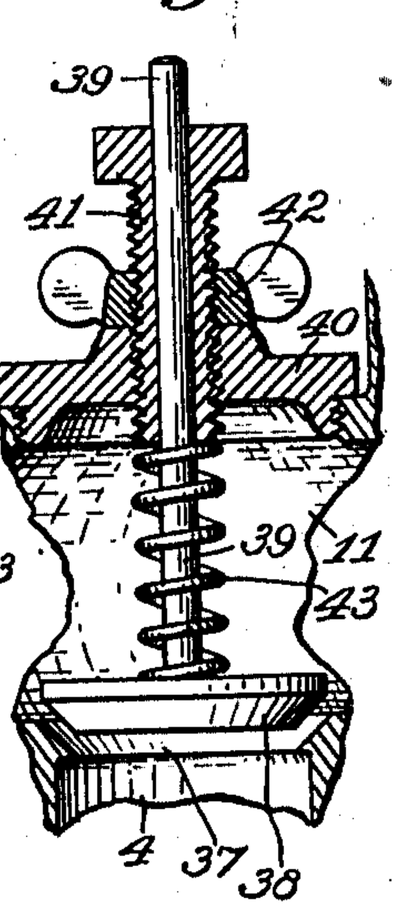


Fig. 4.

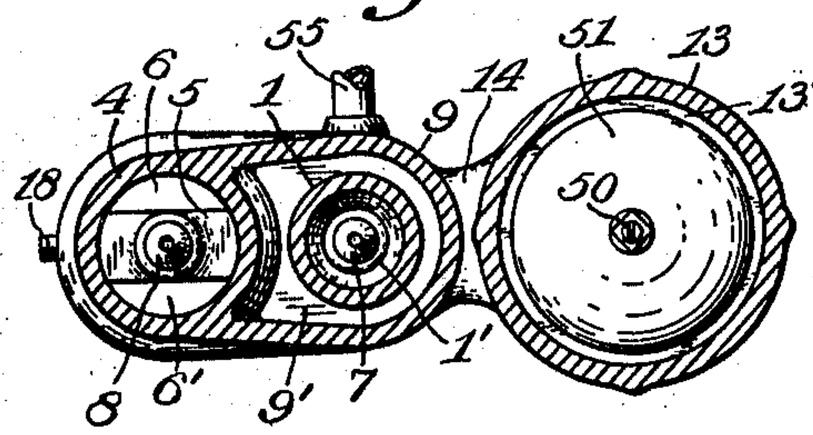


Fig. 5.

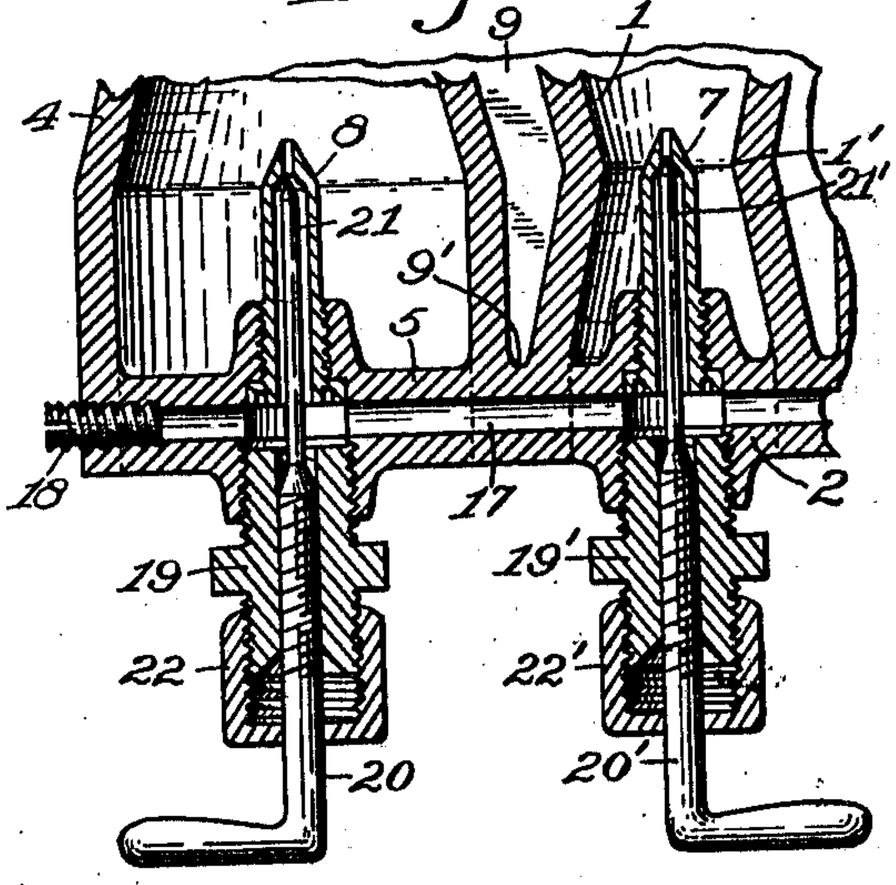


Fig. 6.

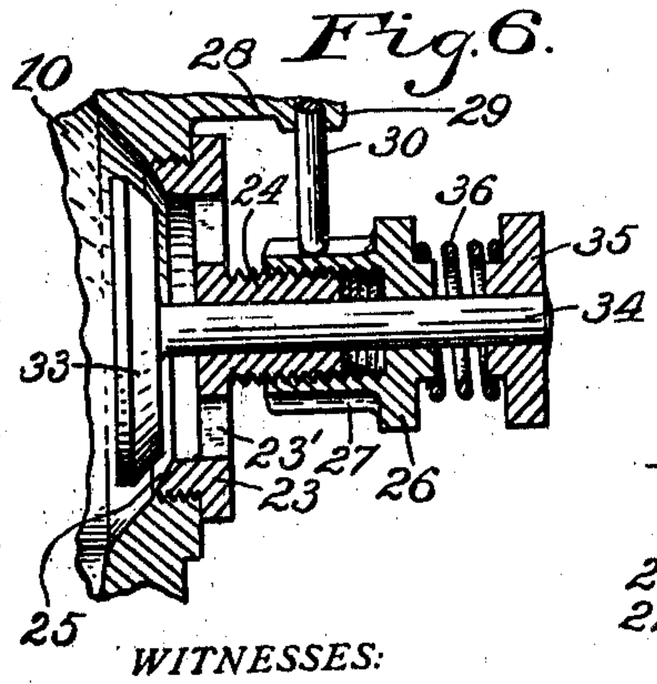
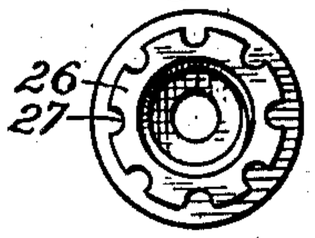


Fig. 7.



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CARBURETER.

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To all whom it may concern:

Be it known that I, JAMES P. RYAN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Carbureters; and I do declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to apparatus of the class commonly known as carbureters, and the type usually employed for mixing air and gasolene for charging explosive engines, the invention having reference particularly to a compound carbureter that is adapted to operate as a simple carbureter when the engine is starting or working at slow speeds, and automatically operates as a compound carbureter when the speed increases to higher speeds.

The object of the invention is to provide an improved carbureter that will be adapted to supply an explosive engine with carbureted air under varying speeds and without requiring particular attention of the attendant in attaining the results desired, another object being to provide a compound carbureter that will be adapted to be constructed cheaply, and be durable, reliable and economical in use.

With the above-mentioned and other objects in view the invention consists in a compound carbureter comprising a primary and an auxiliary carbureter, one having a primary feeder and mixer, and the other having an auxiliary feeder and mixer, constructed and connected operatively together in novel manner, and a reservoir for supplying both of the feeders and mixers with liquid hydro-carbon; and the invention consists further in the novel parts and in the combinations and arrangements of parts as hereinafter particularly described and then defined in the accompanying claims.

Referring to the drawings Figure 1 is a vertical central sectional view of the improved carbureter; Fig. 2, a vertical sectional view at the plane of the line A A in Fig. 1; Fig. 3, a fragmentary sectional view showing parts of Fig. 1 on an enlarged scale; Fig. 4, a horizontal sectional view approximately on the line B B in Fig. 1; Fig. 5, a fragmentary vertical sectional view showing parts of Fig. 1 on an enlarged scale and including modifications in the construction of the primary feeder and mixer of the carbureter; Fig. 6, a fragmentary vertical sectional view showing parts of Fig. 1 on an enlarged scale; and Fig. 7 an elevation of the inner end of the adjusting nut of the spring of the air inlet valve of the carbureter.

Similar reference characters in the different figures of the drawings indicate like parts or features of construction.

The improved carbureter as preferably constructed is made of suitable cast metal, so that the shell or principal body parts may be conveniently made integrally or all of one piece, the primary carbureter comprising a mixer body 1 which is circular in cross-section and has a contracted throat 1′, the body being open at its upper end and partially closed at its lower end by a bridge 2, leaving air passages 3 and 3′ at the sides of the bridge.

The auxiliary carbureter has a mixer body 4 adjacent the body 1 and it has a bridge 5 extending across its lower end, leaving air passages 6 and 6′ at the sides of the bridge, the bridge being in alinement with the bridge 2. A nozzle 7 extends from the bridge 2 into the body 1 approximately to the throat portion thereof, and a nozzle 8 extends from the bridge 5 into the body 4 a suitable distance, the nozzles being preferably screwed in, so as to be removable in order that different sizes of nozzles may be substituted therefor if desired. A casing 9 extends from the body 4 around the body 1, so as to form a water chamber around the mixer body 1, the chamber having a bottom 9′ extending from the casing to the body 1 and also to the body 4, the casing being joined at its top to the wall of the body 1 and also to the wall of the body 4. A substantially globular shaped valve case 10 is joined to the top of the mixer body 1, and a valve case 11 is joined to the top of the mixer body 4 and also to the valve case 10 at one side thereof, there being a neck 12 extending from the valve case 10 suitably adapted to be connected with an explosive engine, so as to deliver the carbureted air thereto.

It will be seen from the foregoing that air may pass through the mixer body 1 and out through the valve case 10 and the neck 12, and also that air may pass through the

mixer body 4 and through the valve cases 11 and 10 and thence out through the neck 12, it being designed to carburate the air in its passage through the channels above-mentioned.

A reservoir body 13 having a bottom 13′ is connected at its lower portion to the lower portion of the walls of the mixer body 1 and casing 9 by means of a web 14 which is in alinement with the bridge 2. The reservoir body 13 is cylindrical and has a suitable cover 15 thereon. Preferably the bridge 2 has a screw plug 16 in the under side thereof opposite to the lower end of the nozzle 7, so that when the plug is removed the nozzle may be removed. A straight duct 17 extends from the reservoir through the bridges 2 and 5 and has communication with the nozzles 7 and 8 to supply them with gasolene, the duct being preferably formed by drilling and then closed at its outer end by a plug 18. The bridge 5 has a packing box 19 suitably connected thereto at its under side in which is a valve stem 20 that is suitably screwed into the packing box and has a feed valve 21 thereon extending into the nozzle 8 and adapted to close the orifice of the nozzle, or to partially open it for feeding the gasolene, there being a packing nut 22 on the packing box. The nozzle 7 is somewhat smaller in diameter or has a smaller orifice than that of the nozzle 8, the relative sizes of the orifices of the nozzles being predetermined, but in some cases the nozzle 7 may be provided with a feed valve 21′ formed on the end of a valve stem 20′ that is screwed into a packing box 19′ with which the bridge 2 is provided in lieu of the plug 16, the packing box having a packing nut 22′ thereon, as shown in Fig. 5, so that the supply of gasolene to the nozzle 7 may be regulated.

One side of the valve case 10 has a valve seat ring 23 screwed therein, and the ring is provided with arms 23′ which support a centrally arranged valve-guide 24, the inner side of the ring having a valve-seat 25 formed thereon. An annular adjusting nut 26 is screwed onto the guide 24 and has longitudinal grooves 27 formed in the exterior face thereof. An arm 28 extends from the valve case 10 out over the guide 24 and supports a vertical guide 29 in which a latch-bolt 30 is movably mounted, so as to normally hold the adjusting nut 26 from turning by entering one of the grooves 27, the latch-bolt being engaged by a spring 31 on its top that is seated against an adjusting screw 32 inserted into the top of the guide 29. A valve 33 is normally seated on the valve-seat 25 and has a valve-stem 34 which extends through the guide 24 and also through the adjusting nut 26, the outer end of the stem having a head 35 suitably secured thereto, and a spring 36 is seated against the head and also against the adjacent nut 26, normally holding the valve 33 to its seat, but permitting the valve to be opened inward by suction of the engine piston, so that air may pass between the arms 23′ and past the valve into the valve case 10, and thence out through the neck 12. The tension of the spring 36 may be suitably adjusted by turning the adjusting nut 26, as will be understood.

An annular valve seat 37 is formed at the top of the auxiliary mixer body 4 and it faces upward in the valve case 11, a valve 38 normally resting on the valve seat and closing communication between the interior of the body 4 and the case 11, the valve having a stem 39 thereon. A cap 40 is screwed into the top of the case 11 and has a hollow valve guide 41 screwed into it, so as to be adjustable vertically, the stem 39 extending movably through the guide, and a lock-nut 42 is screwed onto the guide 41 and engages the cap 40 to prevent accidental movement of the guide, there being a spring 43 on the stem 39 and seated against the lower or inner end of the guide 41 and also against the valve 38 to normally hold the valve to its seat, but permitting the valve to rise or open inward into the case 11 by suction of the engine piston. The tension of the spring 43 as will be seen may be adjusted by means of the guide 41, so as to permit the valve 38 to open in accordance with predetermined design.

A shaft 44 is mounted rotatively in the neck 12 and is provided at one end with an operating lever 45, a throttle valve 46 being attached to the shaft within the neck, so as to regulate the mixture for the engine or engines.

The bottom 13′ of the reservoir has a valve-case 47 formed thereon with which a supply pipe 48 is to be connected, there being a suitable check-valve 49 provided that operates in the valve case, so as to close communication which is provided between the valve case and the reservoir, the valve having a stem 50 with which a suitable float 51 is adapted to coöperate to close the valve 49 when the reservoir contains a sufficient quantity of gasolene, the float rising with the gasolene to close the valve, and the valve may be opened at any time by means of a plunger 52 that is mounted in the cover 15 of the reservoir above the stem 50, to be operated by a lever 53 suitably fulcrumed on the cover and provided with an operating rod 54.

The water chamber formed by the casing 9 and the other walls hereinbefore described may be supplied with circulating water by connecting an inlet pipe 55 and an outlet pipe 56 to the casing 9, so that the mixer-body 1 may not become heated sufficiently to heat the reservoir.

In practical use a suitable quantity of gasolene or suitable liquid will be maintained in the reservoir and at such level that the gasolene can not flow from the nozzles 7 and 8. When starting the engines and at moderate speeds the valve 38 will be held in closed position, so that the gasolene will be fed only from the nozzle 7 and mixed with the air that enters the passages 3 and 3′, and if desired the spring 36 may be so adjusted as to permit air to be admitted by the valve 33. When the speed increases and the suction increases the valve 38 will open, so that the gasolene will be fed also from the nozzle 8 and be mixed with the air entering through the passages 6 and 6′, the feed valve 21 having been previously adjusted to fulfil the requirements, so that after proper adjustments have been made for the use of the auxiliary carbureter no further attention will be required. When the speed of the engine becomes again reduced the auxiliary carbureter will discontinue to act, as will be apparent.

Having thus described the invention, what is claimed as new, is—

1. In a carbureter, the combination of a mixer body, a feed nozzle in the mixer body, a valve-case on the mixer body, a valve-seat ring secured in one side of the valve-case, a valve-guide on the ring, an adjusting-nut screwed onto the valve-guide and having longitudinal grooves in the outer side thereof, an arm on the valve-case, a guide on the arm, a latch bolt movable in the guide into or out of either one of the grooves, a spring normally forcing the latch-bolt into contact with the adjusting-nut, an air-inlet valve seated on the inner side of the ring and having a valve-stem thereon that extends through the valve-guide and the adjusting-nut, the outer end of the valve-stem having a head thereon, and a spring seated against the head and also against the adjusting-nut.

2. In a carbureter, the combination of a primary mixer body that is open at its lower and upper ends, an auxiliary mixer body that is open at its lower end, a reservoir connected with the primary mixer body, a bridge in the lower end of the primary mixer body and having a duct therein that extends straight through the side of the reservoir, a nozzle on the bridge, a bridge in the lower end of the auxiliary mixer body in alinement with the first-described bridge and having a duct therein communicating with the first-described duct, a nozzle on the bridge in the auxiliary mixer body, an air-inlet valve-case on the primary mixer body and having an outlet, a valve-case on the auxiliary mixer body and joined to the air-inlet valve-case, a loaded valve seated on the upper end of the auxiliary mixer body, a valve-seat ring secured in the side of the air-inlet valve-case, a valve-guide on the ring, an air-inlet valve seated on the inner side of the ring and having a stem thereon extending through the valve-guide, the stem having a head thereon, and a spring engaging the head and holding the air-inlet valve removably against the ring.

3. In a carbureter, the combination of a primary mixer body and an auxiliary mixer body having each a bridge in its lower end, there being air-passages at opposite sides of the bridges and communicating ducts in the bridges, a casing extending from the auxiliary mixer body about the primary mixer body at a distance therefrom and having apertures in the upper and lower portions thereof, the casing being connected at its top to the upper portion and at its bottom to the lower portion of the primary mixer body at the top of the bridge therein, a reservoir body connected at the lower portion thereof to the wall of the primary mixer body and also to the casing, there being a duct extending through the walls of the reservoir body and the primary mixer body to the duct in the bridge that is in the primary mixer body, all of said ducts being in alinement, a nozzle upon the bridge in the primary mixer body, a nozzle upon the bridge in the auxiliary mixer body, a packing-box on the underside of the bridge of the auxilary mixer body, a valve-stem movable in the packing box and extending therethrough and through one of the communicating ducts to close or open the nozzle on said last-mentioned bridge, two communicating valve-cases on the primary and auxiliary mixer bodies respectively and having an outlet, a loaded valve seated removably on the auxiliary mixer body in one of the valve-cases, a valve-seat ring secured in the side of the other one of the valve-cases, and an air-inlet valve seated removably against the ring and spring-pressed thereto.

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

JAMES P. RYAN.

Witnesses:

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K. R. Woddell.