No. 871,741. PATENTED NOV. 19, 1907.

T. L. & T. J. STURTEVANT.

DOUBLE CARBURETER FOR EXPLOSIVE ENGINES.

APPLICATION FILED MAR. 14, 1907.

2 SHEETS—SHEET 1.

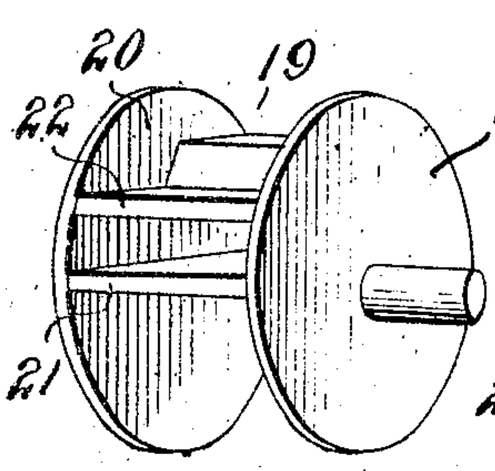


Fig. 7.

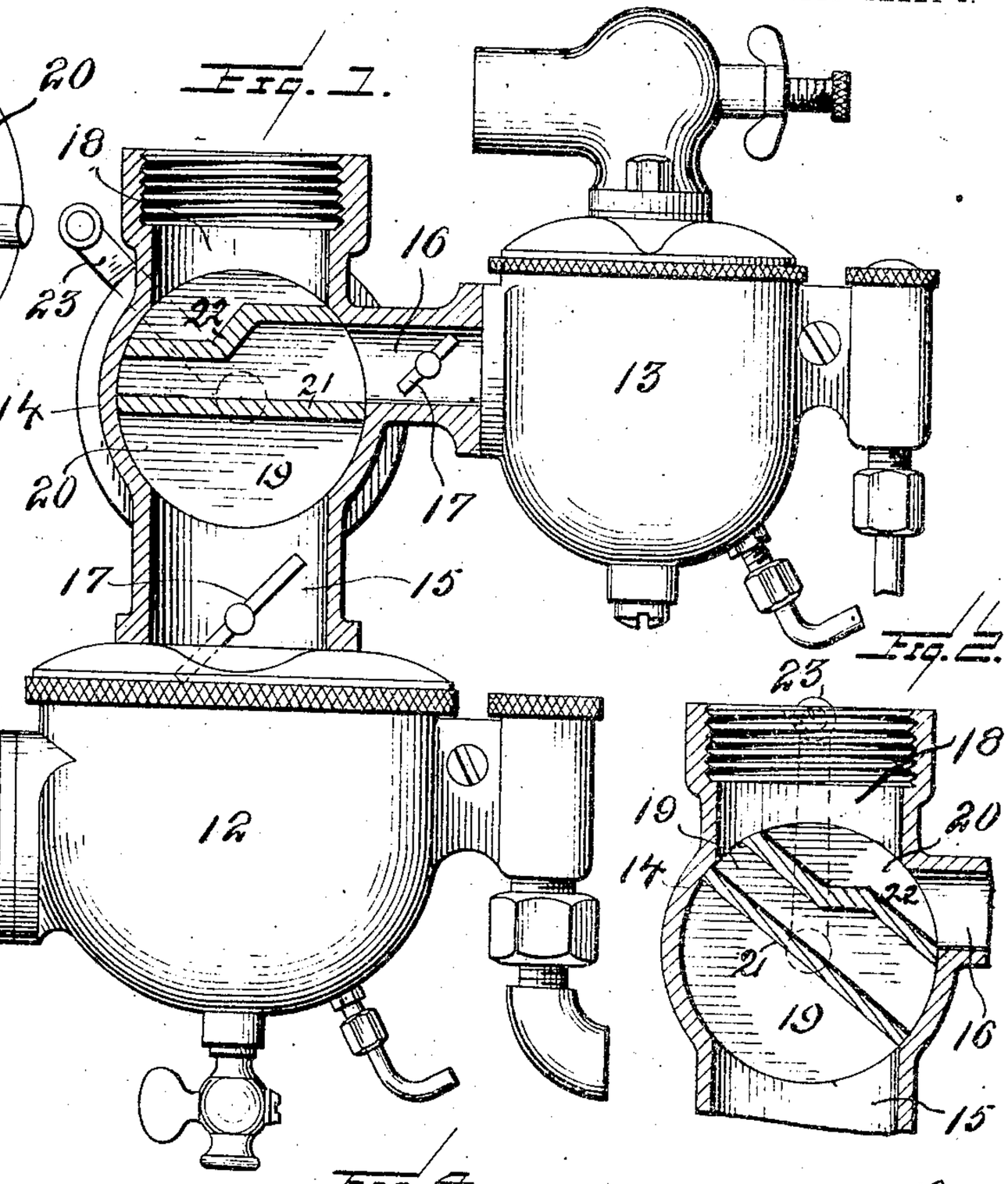
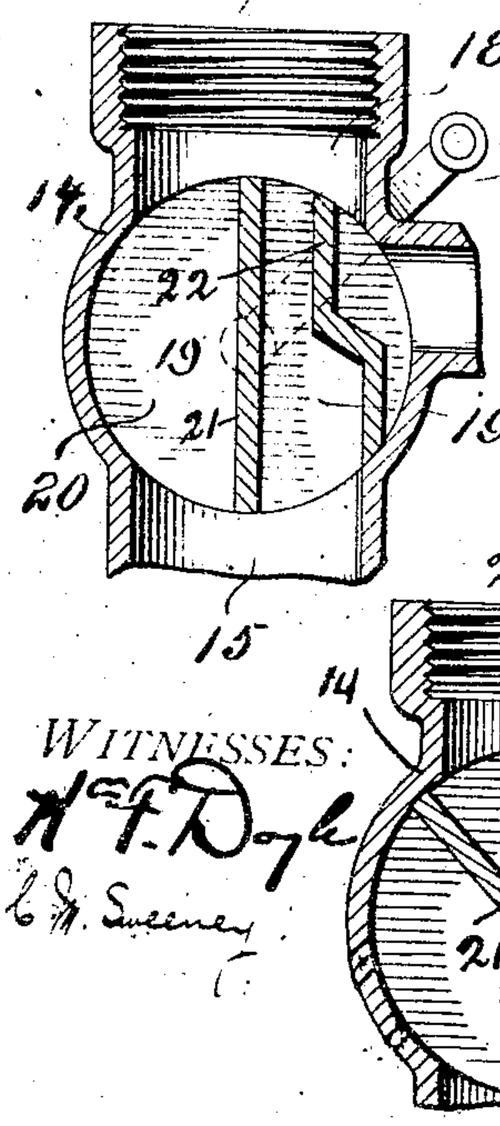
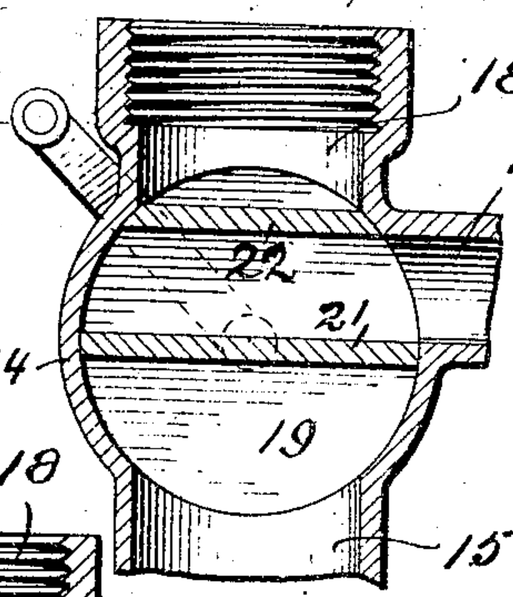


Fig. 1.

Fig. 2.

Fig. 4.





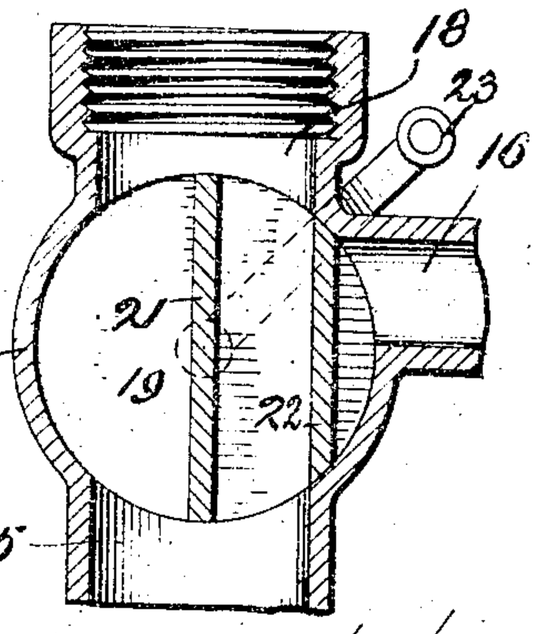


Fig. 6.

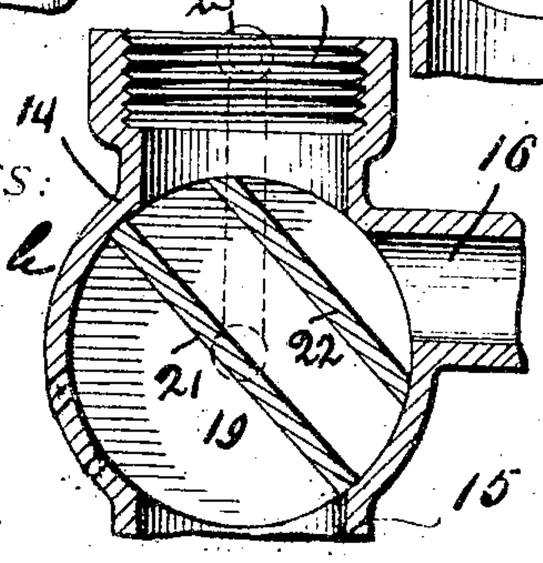


Fig. 5.

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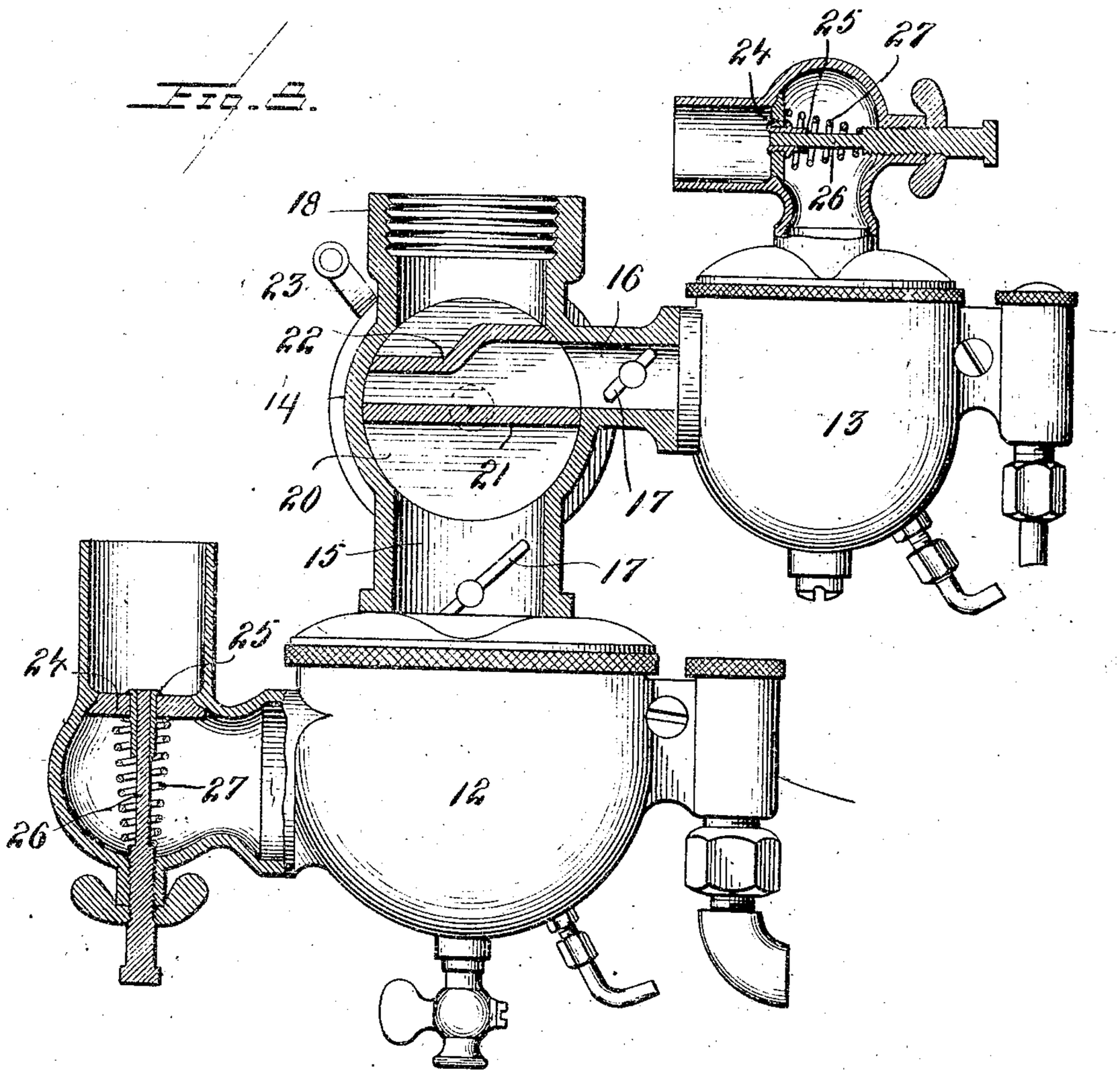
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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DOUBLE CARBURETER FOR EXPLOSIVE-ENGINES.

No. 871,741. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed March 14, 1907. Serial No. 362,313.

To all whom it may concern:

Be it known that we, THOMAS LEGGETT STURTEVANT and THOMAS JOSEPH STURTEVANT, citizens of the United States, residing, respectively, at Quincy and Wellesley, in the county of Norfolk and State of Massachusetts, have invented or discovered certain new and useful Improvements in Double Carbureters for Explosion-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

It is well known to those familiar with explosion gas engines that while the mixtures of air and gas produced by the carbureters may vary widely and yet explode with considerable force, certain proportions of air and of the vaporized hydro-carbon are required to produce maximum economic effects, or, in other words, to obtain the greatest amount of power from a given quantity of fuel; and various improvements in carbureters have been made so as to render them more or less automatic in their operation thereby to secure changing requirements according to changing engine speeds or conditions.

To properly vaporize the gasolene or other hydro-carbons used in these engines requires a strong current of air in order to thoroughly vaporize the liquid and thoroughly mix it with the air. The inward air movement is induced by the suction of the pistons of the motors, and when the pistons reciprocate slowly the current of air is more or less sluggish and incapable of properly raising, pulverizing, evaporating, and mixing the hydro-carbon with the air, so that a badly prepared mixture is drawn into the engine cylinders and explodes, if at all, ineffectively, with the usual accompaniments of bad combustion; and waste of the liquid hydro-carbon.

If to produce a strong air jet with slow piston movement the air passage of the carbureter into which the carbureter liquid is sprayed is of small size, so as to give an ample suction, to produce a proper air spraying current, considerable frictional resistance to suction of the air current in the contracted air tube results, with a corresponding reduction in the piston speed and efficiency. In such case, however, the spraying mixture is properly prepared and the motor starts easily and runs well at slow speeds, but at higher speeds such contracted air passage is objectionable owing to back resistance to the suction. If, however, the air passage be made sufficiently large to provide for high speeds of the engine the spraying and pulverizing effect is not properly proportioned to low engine speeds.

The present invention has for its object to provide a carbureter in which the objections above indicated will be avoided, and by which at low engine speeds a rapid but comparatively small current of air, for effecting the proper carburization, will be produced, but which will also afford ample air passage from the carbureter to the engine for high speeds, so that whatever may be the speed of the engine the most efficient carburization will result.

This invention is carried into effect by providing a double carbureter, or a plurality of carbureters, one of which can be connected with the outlet to the engine through a relatively small passage so that a relatively high-speed current of air, to produce proper carburization, will result when the engine is first started or when running at low speeds, but which will also provide a large air passage through the throttle valve from one or more carbureters when the engine is running at high speeds. In other words, in the preferred form of the invention, two carbureters of different sizes communicating with the outlet to the engine will be provided, the chambers of these carbureters opening into a common passageway or chamber communicating with the engine or with a passage or outlet to the engine preferably through what may be termed a "union" or receiver in which a throttle valve is located, said throttle valve being of such construction as to provide a comparatively small air passage from the smaller carbureter and a comparatively large air passage from the larger carbureter to the outlet to the engine, as may be desired; the larger passage being closed when the smaller passage is first opened, while the smaller passage may be either open or closed when the larger passage is open, as may be desired, and which will be controlled by the particular form of the throttle valve which may be employed.

In the accompanying drawings, Figure 1 illustrates the invention in connection with two carbureters of different sizes, both of which communicate with a union which provides an outlet passage from both carbureters to the engine, the throttle valve in this view being shown as closed, so that neither carbureter will be in communication with the outlet passage. Fig. 2 is a detail view of the union with the throttle valve mounted therein, and showing said valve in position to form communication between the smaller carbureter and the outlet passage to the engine. Fig. 3 is a view similar to Fig. 2 showing the throttle valve turned in such position as to form communication between both carbureters and the outlet to the engine. Figs. 4, 5 and 6 are detail views illustrating a slightly different form of throttle valve from that shown in Figs. 1, 2 and 3, and with the valve turned to different positions. Fig. 7 is a detail perspective view of the throttle valve. Fig. 8 is a view similar to Fig. 1, but with the carbureters partly in section to show the automatic air valve.

Referring to the drawings, 12 and 13 represent two carbureters of well-known form, but of different sizes. The chambers of these carbureters both communicate with a chamber in what may be termed a "union" 14, which provides means for forming a suitable connection between both of said carbureters and the passage to the engine, said union comprising a larger passage 15 communicating with the larger carbureter 12, and a smaller passage 16 communicating with the smaller carbureter 13. In these passages baffle plates or valves 17 may be located, if desired, for the purpose of wholly or partly closing the same under certain conditions. The union 14 has an outlet 18 which forms part of the passage to the engine for the carbureted air. Located in the chamber of the union 14 is the throttle valve 19 which is pivotally mounted on suitable trunnions, or otherwise, and which may comprise side disks 20 connected by webs 21 and 22. The said passages or passageways 15 and 16 are preferably at right angles to each other, as shown, for convenient coöperation with the said throttle-valve. Said webs 21 and 22 form separate passageways through the said throttle valve so as to afford a restricted or small passageway through said valve from the smaller carbureter when the passageway 15 from the larger carbureter is shut off, thereby insuring a high speed current, of small volume, when only a small fuel supply to the engine is required. This throttle valve is provided with an arm or handle 23 which will be suitably connected with a manually or automatically controlled operating lever.

Referring to the construction shown in Figs. 1, 2 and 3, when the throttle valve is in the position shown in Fig. 1 the passages 15 and 16 from the carbureters will be both closed or shut off from the outlet passage 18, but when the said valve is turned to the position shown in Fig. 2 the larger passage 15 will still be closed while the smaller passage 16 from the smaller carbureter will be placed in communication with the outlet passage 18. When the valve is turned to the position shown in Fig. 3 both passages 15 and 16 leading from both carbureters will be in communication with the outlet passage 18.

In the construction shown in Figs. 4, 5 and 6 both passages 15 and 16 will be closed to the outlet passage when the valve is in the position shown in Fig. 4; when the valve is in the position shown in Fig. 5 the larger passage 15 will be closed to the outlet passage and the smaller passage 16 will be open to said outlet passage. But when the valve is in the position shown in Fig. 6 the smaller passage 16 will be closed to the outlet passage, and the larger passage 15 will be placed in communication with said outlet passage. It will therefore be understood that the present invention provides means whereby when the engine is to be run slowly, and only a small volume of the carbureted mixture is desired, a swift air current will be maintained so as to produce a proper carburization, but when the engine is to be run faster a sufficiently large passage from the carbureter to the outlet passage to the engine will be provided so that there will not be any objectionable frictional resistance to the passage of the carbureted fluid, or any drag upon the engine due to improper back resistance to the suction. It will also be understood that in addition to the advantage of securing uniform mixtures at a wide range of engine speeds the present construction also presents the advantage that in case one carbureter should become damaged or deranged the other can still be used as in ordinary practice, while at all times economy in fuel can be secured owing to the fact that the explosive mixture produced will be as near to the maximum efficiency point as possible.

The union 14 is preferably employed in connection with a plurality of "automatic" carbureters or vaporizers, or carbureters or vaporizers provided with automatically-operated air-valves which regulate the intensity of the suction or partial vacuum at the liquid fuel nozzles or in the spraying chambers of such carbureters or vaporizers. The advantages of these automatic carbureters or vaporizers will thus be utilized, together with the advantages of the present invention as hereinbefore set forth.

Fig. 8 shows one form of automatically-operated air valves 24 carried by sleeves 25 fitted to slide easily on rods 26 and pressed against by light coil springs 27, so that said valves will move inwardly easily, by the force of the suction or partial vacuum in-

duced by the engine, against the stress of said springs, and thereby admit quantities of air proportional to the suction, and also regulate the partial vacuum in the spraying chambers, as is required to secure the best or most efficient and economical proportions of the explosive gaseous mixture of air and vaporized gasolene or oil.

Having thus described our invention we claim and desire to secure by Letters Patent:

1. The combination with a plurality of carbureters or vaporizers, of a union having an outlet and provided with a chamber and with separate passages leading from said carbureters to the chamber of said union, and a valve in the said chamber of said union, said valve having separate passages therethrough and being adapted to be moved to different positions to cause the outlet passage from the chamber of said union to be placed in communication with either or both of the said passages from the carbureters.

2. The combination with a plurality of carbureters or vaporizers, of a union having an outlet and provided with a chamber and with separate passages leading from said carbureters to the chamber of said union, and a valve in the said chamber of said union, said valve having separate passages therethrough and being capable of being moved to different positions to cause the outlet passage from the said chamber of said union to be placed in communication with either or both of the passages from the carbureters, the passages in said union leading from the chamber thereof to the chambers of the carbureters being provided with regulating means.

3. The combination with a plurality of carbureters or vaporizers of different sizes, of a union having an outlet and provided with a chamber and with separate passageways of different sizes leading from said carbureters to said chamber, and a valve in said chamber having separate passageways of different sizes therethrough, and which valve is adapted to be placed in communication with either or all of the different sized passageways from said carbureters to said chamber.

4. The combination with a plurality of carbureters or vaporizers of different sizes, of a union having a chamber, an outlet and separate passageways of different sizes from said carbureters into said chamber, and a valve in said chamber having separate passages of different sizes therethrough, and which valve is adapted to be placed in communication with either or all of the different sized passageways from said carbureters to said chamber, the passages in said union leading from the chamber thereof to the chambers of the carbureters being provided with regulating means.

5. The combination with a plurality of carbureters or vaporizers of different sizes, of a union provided with a chamber and with separate passageways of different sizes, and at right angles to each other, leading from said carbureters or vaporizers to said chamber, and a valve in the said chamber of said union and which valve serves to control or regulate the quantity of fuel mixture delivered to the engine.

6. The combination with a plurality of carbureters or vaporizers, of a union having a chamber communicating with said carbureters or vaporizers, and a valve in the said chamber of said union and having separate passageways of different sizes therethrough, said valve serving to control or regulate the amount of the fuel mixture delivered to the engine from each of said carbureters or vaporizers.

7. The combination with a plurality of automatic carbureters or vaporizers, of a union having a chamber and having also separate passages communicating with said carbureters or vaporizers, and a valve in the said chamber of said union constructed to afford separate passageways of different sizes therethrough, said valve serving to control or regulate the amount of fuel mixture delivered to the engine.

8. The combination with a plurality of automatic carbureters or vaporizers, of a union having an outlet and provided with a chamber and with separate passages leading from said carbureters to the chamber of said union, and a valve in the said chamber of said union, said valve being constructed to afford separate passages therethrough and being capable of being moved to different positions to cause the outlet passage from the said chamber of said union to be placed in communication with either or both of the passages from the carbureters, the passages in said union leading from the chamber thereof to the chambers of the carbureters being provided with regulating means.

9. The combination with a plurality of carbureters or vaporizers of different sizes or capacities and each of which is provided with an automatically-operated air-valve, of a common receiver opening to the engine and to which said carbureters deliver the vaporized fuel, and means for preventing or restraining more or less the passage of vaporized fuel from either of said automatic carbureters or vaporizers to said common fuel receiver.

10. The combination with a plurality of carbureters or vaporizers of different sizes and each provided with an automatically-operated air-valve, of a union or chamber communicating by separate inlet passages with each of said carbureters.

11. The combination with a plurality of

carbureters or vaporizers of different sizes and each provided with an automatically-operated air-valve, of a union or chamber communicating by separate inlet passages with each of said carbureters, and a valve in the said union or chamber adapted to be moved to different positions to open or close the said passages.

In testimony whereof we affix our signatures, in presence of two witnesses.

THOMAS LEGGETT STURTEVANT.
THOMAS JOSEPH STURTEVANT.

Witnesses:
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L. H. STURTEVANT.