May 1, 1923. 1,453,296

A. WAGNER

AUXILIARY AIR VALVE FOR INTERNAL COMBUSTION ENGINES

Filed Oct. 9, 1922

Fig. 1.

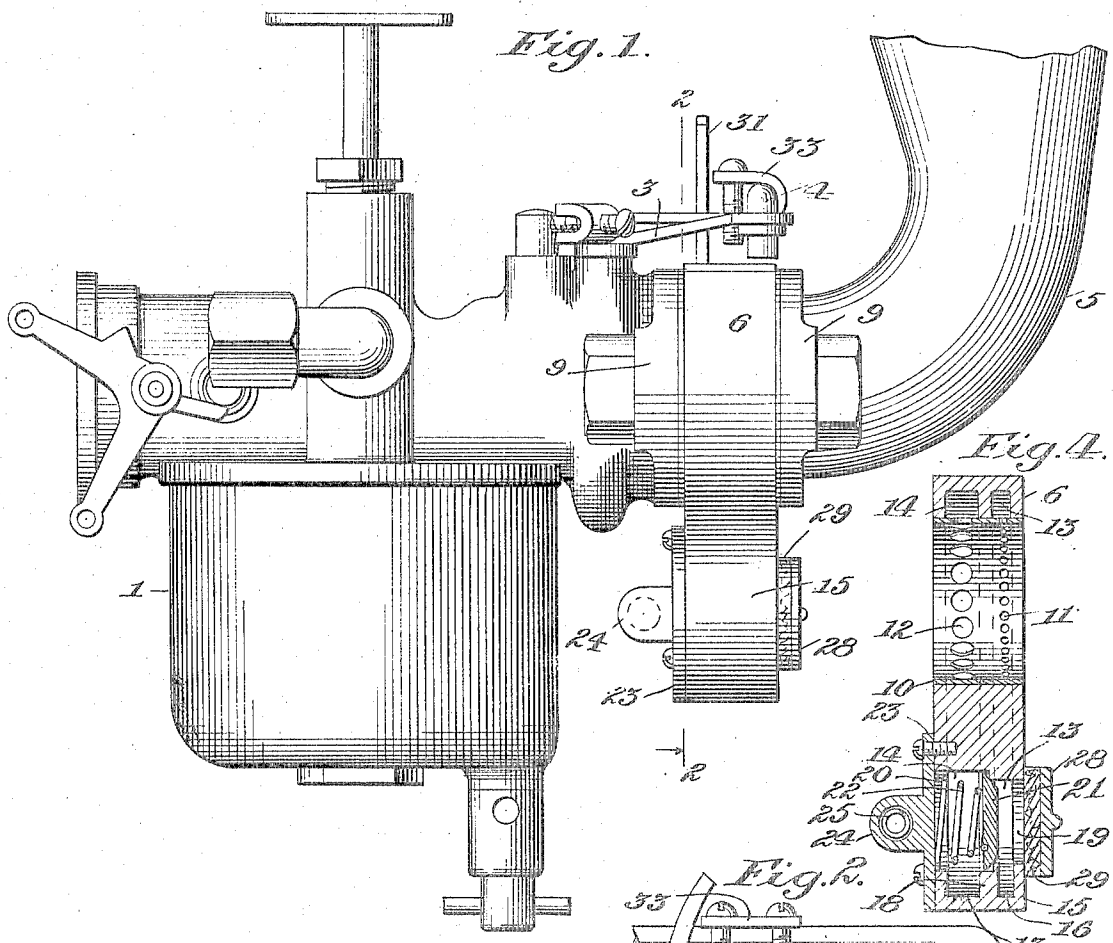



Fig. 4.




Fig. 2.

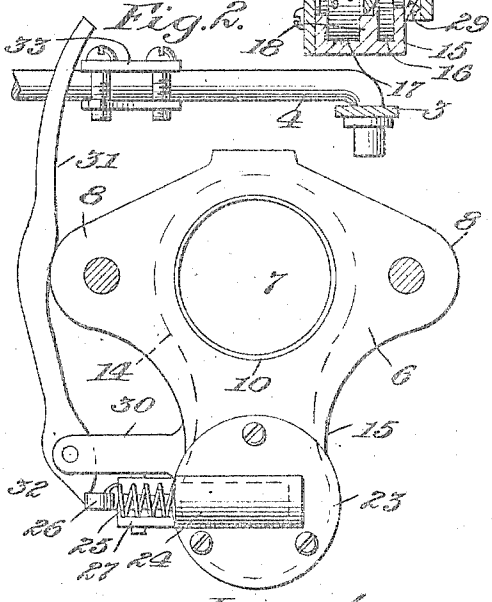
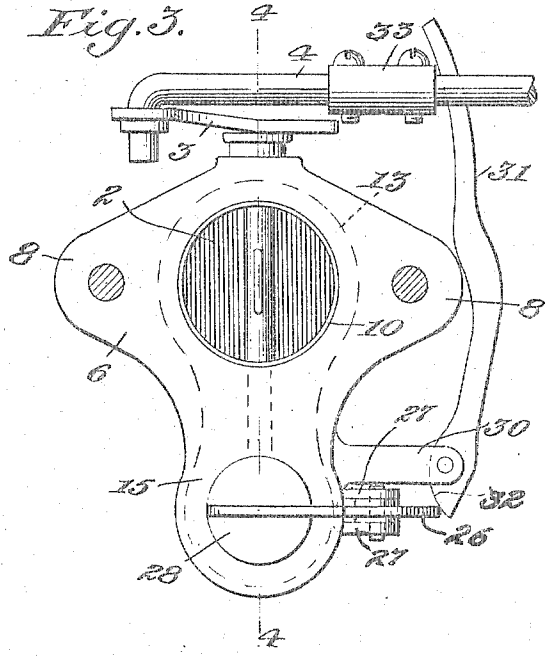



Fig. 3.




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# UNITED STATES PATENT OFFICE.

ALBERT WAGNER, OF CINCINNATI, OHIO, ASSIGNOR TO WAGNER RESEARCH SOCIETY, OF CINCINNATI, OHIO, A COPARTNERSHIP COMPRISING ALBERT WAGNER, HENRY A. MEYER, FELIX ELSBACH, AND JACOB BLOCH.

## AUXILIARY AIR VALVE FOR INTERNAL-COMBUSTION ENGINES.

Application filed October 9, 1922. Serial No. 593,294.

*To all whom it may concern:*

Be it known that I, ALBERT WAGNER, a resident of Cincinnati, in the county of Hamilton and State of Ohio, a citizen of the United States, have invented certain new and useful Improvements in Auxiliary Air Valves for Internal-Combustion Engines, of which the following is a specification.

This invention is a novel auxiliary air mixer or valve by the use of the which air is admitted between the carbureter and the intake manifold of an internal combustion engine to be mixed with the fuel from the carbureter.

The invention includes means whereby the air mixer will be set to admit more or less air according to the position of the throttle valve, and also includes means whereby at higher speeds of the engine a greater volume of air will be automatically admitted and a charge of the proper quality supplied to the engine thus increasing the power and speed of the engine and economizing fuel.

One embodiment of the invention is illustrated in the accompanying drawing, in which:—

Fig. 1 is an elevation of a carbureter and a part of the trunk of an intake manifold having my auxiliary device combined therewith,

Fig. 2 is a side view of my device with parts in section on the line 2—2 of Fig. 1,

Fig. 3 is a view similar to Fig. 2 but viewing the opposite side of the device, and

Fig. 4 is a section on the line 4—4 of Fig. 3.

The carbureter 1 may be of any well-known or preferred type and is controlled by a throttle valve 2 actuated by a lever 3 which is connected with a throttle rod 4. The fuel passing from the carbureter is delivered into the trunk 5 of the intake manifold and thence flows into the engine cylinders. In carrying out my invention, I interpose between the carbureter outlet and the trunk 5 a flat body 6 having an opening 7 through its upper portion adapted to register with the bores of the trunk and the carbureter outlet and of the same diameter so that a continuous passage for the flow of the gas will be provided. The body 6 is provided on opposite sides with lateral wings 8 through which and lugs 9 on the carbureter and the manifold trunk securing bolts are inserted to firmly connect the parts, suitable packing being provided between the opposed surfaces to prevent leakage. A lining ring 10 is fitted in the opening 7 and secured in place in any convenient manner, said lining ring being constructed with two series of openings or perforations, or ports, 11 and 12 which register respectively with the grooves or passages 13 and 14 formed in the body 6 around the opening 7, the ports restricting the communication between said grooves and the bore or opening 7, and the perforations or ports 11 being smaller in diameter than the perforations 12. The passages 13 and 14 are carried into a depending extension 15 of the body 6 where they merge into the walls of chambers 16 and 17 respectively, said chambers being separated by a ported partition 18 and the chamber 16 communicating with the outside air through a port 19 in the side of he body. An opening 20 is provided in the side of the chamber 17 to permit the insertion of a disk valve 21 and a spring 22 for holding said valve normally seated in the port of the partition 18. After the valve and spring are in place, as shown in Fig. 4, the opening 20 is covered by a cap plate 23 which is rigidly secured upon the side of the extension 15.

Upon the outer side of the cap plate 23 is a tubular body 24 in which is housed one end of a coiled spring 25, the outer end of said spring being attached to or bearing upon one end of a bent lever 26 which is fulcrumed between lugs 27 on the extension 15 and carries a valve adapted to cover the air inlet port 19. The said valve comprises a disk 28 secured to the end of the lever and a cushion or packing 29 secured upon the inner face of the disk. Lugs or arms 30 project from the extension 15 above the lugs 27 and a trip lever 31 is fulcrumed near its lower end between the same. The

lower end of the trip lever bears upon the outer edge of the lever 26 and presents a convex edge thereto, as shown at 32, while the upper longer arm of the trip lever is disposed adjacent and in the path of a trigger 33 secured upon the throttle rod 4.

It is thought the operation will be readily understood. The parts are illustrated in the position assumed when the engine is running idle. As the throttle is opened for more speed, the trigger 33 is caused to impinge upon the trip lever 31 and swing the upper end thereof outwardly or away from the body of the device. The lower end of the said lever will be thereby caused to rock the angle lever 26 against the tension of the spring 25 so that the valve 28 will be opened, thereby admitting air to the chamber 16. This air will at once flow through the groove 13 and escape through the ports or openings 11, which are appreciably smaller than the openings 12, in small streams of high velocity which will penetrate the mixture flowing from the carbureter. As the engine speed increases, the air pressure will eventually overcome the force of the spring 22 and unseat the valve 21 whereupon air will flow through the groove 14 to and through the ports 12 to penetrate the charge. As the engine speed decreases, the valve 21 will be seated but the valve 28 will remain open until the throttle rod 4 is shifted sufficiently to permit it to close.

It will be readily noted that I have provided a very simple and efficient device. By its use, mileage per gallon of fuel is increased and the engine will run more smoothly and with greater speed and power than heretofore. The device acts as a mixer by discharging streams of air at high velocity into the mixture supplied by the carbureter and the additional air supply results in greater speed and power. The inner valve 21 is brought into action only after the outer valve 28 is raised, and supplies needed additional air as the speed increases. When the speed drops under a load, as when climbing a hill in an automobile, the valve 21 will close but the valve 28 will remain open. The throttle may be set for full speed and under an increased load will remain wide open but air will enter only through the small ports 11.

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

1. A device of the character described adapted to be placed between a carbureter and an internal combustion engine, comprising a body or casing having an opening to register with the outlet of the carbureter, said body having a plurality of passages to admit air to said opening, a valve for admitting air to one of said passages, and a normally closed automatically actuated valve for admitting air to another of said passages, when the first mentioned valve is opened.

2. A device of the character described adapted to be placed between a carbureter and an internal combustion engine comprising a body or casing having an opening to register with the outlet of the carbureter, said body having a plurality of passages to admit air to said opening, independent valves controlling said passages, one of said valves being controlled by the throttling mechanism of the carbureter and the second valve being operable automatically by air pressure after the first valve is opened.

3. A device of the character described adapted to be placed between a carbureter and an internal combustion engine comprising a body or casing having an opening to register with the outlet of the carbureter, said body having a plurality of passages to admit air to said opening, means surrounding said opening provided with a plurality of perforations communicating with said passages, a valve for admitting air to one of said passages and a normally closed automatically actuated valve for admitting air to another of said passages, when the first mentioned valve is opened.

4. A device of the character described adapted to be placed between a carbureter and an internal combustion engine comprising a body or casing having an opening to register with the outlet of the carbureter, said body having a plurality of passages to admit air to said opening, means surrounding said opening provided with a plurality of perforations communicating with said passages, the perforations communicating with one of said passages being smaller in diameter than the perforations communicating with the adjacent passage, a valve for admitting air to one of said passages and a normally closed automatically actuated valve for admitting air to another of said said passages. when the first mentioned valve is opened.

5. In a device for the purpose set forth, the combination of a body having an air passage therein, a valve controlling said passage, a lever fulcrumed on the body and carrying said valve at one end, a spring housed upon the body and bearing upon the opposite end of the lever to hold the valve normally closed. and a second lever disposed at an angle to the first-mentioned lever and bearing upon an edge thereof and operable to rock the first-mentioned lever and open the valve.

6. A device for the purpose set forth comprising a body having an inlet opening in one side at one end and having an outlet opening through its opposite end and passages extending through the body from the

inlet end and in communication with the outlet opening, one of said passages being in direct communication with the inlet opening, a ported partition establishing communication between inlet ends of said passages, a valve normally closing the inlet opening, means operatively connecting said valve with throttle-controlling mechanism, a valve seating upon the ported partition, and yieldable means for holding the valve seated.

In testimony whereof I hereunto affix my signature.

ALBERT WAGNER.