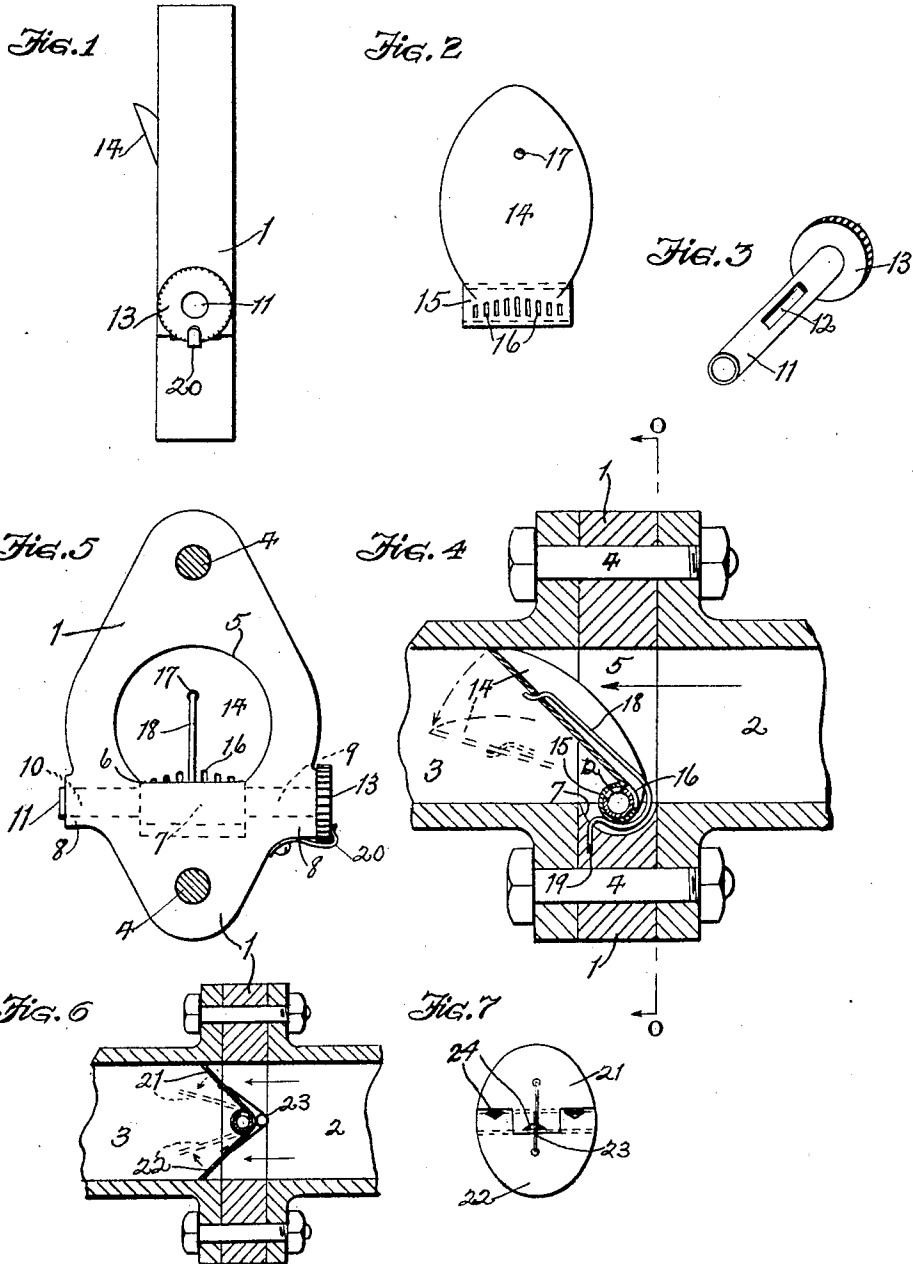


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 AUTOMATIC PRESSURE REGULATED AIR VALVE.
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1,393,204.

Patented Oct. 11, 1921.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC PRESSURE-REGULATED AIR-VALVE.

1,393,204.

Specification of Letters Patent.

Patented Oct. 11, 1921.

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To all whom it may concern:

Be it known that I, GEORGE W. DAGGETT, a citizen of the United States, residing at North Girard, in the county of Erie and State of Pennsylvania, have invented a certain new and useful Improvement in Automatic Pressure-Regulated Air-Valves, of which the following is a specification.

My invention is designed primarily for the purpose of providing an auxiliary air supply to the fuel gas as it enters the intake manifold or cylinders of internal combustion engines or motors, and prior to reaching the point of ignition.

This device is aptly termed and classified under the head of automatic pressure regulated air valves, its utility and function being advantageous on engines employing gasoline, natural gas, alcohol, or other kindred vaporizing explosive fuel elements.

The fundamental principle embodied in the construction of my invention is to automatically furnish an additional supply of either cold or pre-heated air, to mix with the fuel gas after it has passed through the carbureter, and prior to its entering the explosion cylinder, this auxiliary supply of air being admitted in proper proportions, according to the pressure or volume of gas passing into the motor, thereby always keeping the mixture at its highest degree of efficiency under all variable working conditions.

Acting on this theory of the advantages both in economy and efficiency of the explosive gas when given an additional mixture of air, my contention being that all mixtures are over-rich to variable degrees, and require additional air to insure a more perfect and economical usage, I have provided the special mechanism shown in the accompanying drawing, the detail construction of which is subject to various modifications. Therefore I do not necessarily limit myself to the exact arrangement illustrated, but reserve the right to make any changes that may be found advisable after a further reduction to practice, that will not depart from the original idea and intention, but will confine the invention within the scope of the claims.

Referring then to said drawing: Figure 1 is an edge view in elevation of the valve housing; Fig. 2 is a plan view of the vane portion of the mechanism; Fig. 3 is a perspective view of a hollow apertured shaft

member constituting part of the device; Fig. 4 is a longitudinal section showing the relative confined position of the assembled mechanism within the gas passage-way connecting the carbureter and manifold or motor direct; Fig. 5 is a face or side view of the valve housing, taken on the line O—O of Fig. 4; Fig. 6 is a longitudinal section of a modified construction involving two movable vanes or blades; and Fig. 7 is a detached plan view of the two hingedly associated vanes.

The valve housing, designated as a whole by the reference numeral 1, may be of any desired configuration, such as the substantially elliptical shape here shown, being designed to be rigidly and removably seated intermediate of the gas passage-way 2, leading from the carbureter, not shown, and the registering gas passage-way 3, leading to the manifold or motor, not shown, being held in position by bolts 4, or other adequate means.

Said housing is provided with a central opening 5 of the same diameter as the two registering passage-ways aforesaid, but does not form a complete circle, a segment of the circumference being substantially flat, as at 6, and at this point the wall of the opening is hollowed out or made substantially semi-circular in cross section in order to provide a recess or seat 7.

Said housing is furnished with oppositely disposed and alining boss portions or enlargements 8, through which are formed, by drilling or coring, suitable sized ports, 9 and 10 respectively, which are in true registering alinement with the semi-circular recess 7, in order to permit of the insertion from side to side of a rotative hollow shaft or tube element 11, shown in Fig. 3, which is open at one or both ends.

This said tube is provided with an aperture or apertures 12, approximately at its longitudinal center, and on one end of said tube is rigidly mounted a mill-edged wheel 13.

The vane element of the mechanism is shown in Fig. 2, and consists of a blade portion 14, which is preferably made concavo-convex in cross section, its configuration being substantially elliptical, as shown.

One end, or what may be termed the base of this vane, is bent into a complete circle, forming a sleeve or tube section 15, preferably integral with and positioned trans-

versely of the said projecting blade portion. This said sleeve is provided with one or a plurality of punched-out slots or apertures 16, of variable areas, those nearest the longitudinal center of the sleeve having the greater area, and gradually reducing as they approach each end of the sleeve.

The blade portion 14 has formed therein an aperture 17 for the insertion thereof through of one end of a spring wire element 18, which extends downward and partially around the said sleeve, its opposite end being inserted or anchored in a drilled hole 19 formed in the recess 7.

When the valve is assembled as shown in Fig. 5, the base or sleeve portion of the vane will receive and surround the longitudinal center of the hollow shaft 11, or such portion thereof as projects through the recess 7, the port or ports 16 being in registerable engagement with the slot or apertures 12, whereby both the vane and shaft will have independent rotary movement, said shaft being free to rotate in an unlimited path, but movement of the vane being restricted to the diameter of the passage-way 3, in which said vane functions.

When the vane is drawn to its maximum degree of angularity with the outward terminal edge thereof engaging the wall of the passage-way 3, as shown in Fig. 4, and held in this position by reason of the spring tension afforded by the element 18, which will be the normal position of the vane when no gas is flowing through to the motor, the said ports 16 will be out of register with the slot 12, thus shutting off any air from entering the passage-way. But just as soon as gas begins to pass from the carbureter to the manifold or motor, as indicated by the direction arrow Fig. 4, its increased or diminished force, as the quantity is graduated for high or low speed, it impinges against the sensitive spring actuated vane and automatically opens or closes the registering ports 12 and 16, according to the variable degrees of angularity assumed by said vane, thereby admitting more or less air to mix with the on-rushing gas. The stronger the gas pressure the more air there will be admitted, and vice versa, the lower the gas pressure the less air will be admitted. This is considered an ideal and well recognized condition for graduating the mixture of air and gas according to its volume and force.

The impact and intermingling of the comparatively fine jets of fast moving air with the intrushing gas has a tendency to break up the molecules and enhance the value of said gas as an explosive agency. All mixtures after passing through the carbureter are invariably more or less over-rich, and require an additional supply of air to insure a more perfect and economical mixture.

The ready adjustment of the hollow air

tube 11, which function is accomplished by means of the wheel 13, affords a means for changing the position of the slot or slots 12 with respect to the registering port or ports 16, in order that air may be admitted earlier or later in accordance with the angularity of the vane, or said tube can be so turned as to positively shut off any air from entering the manifold or motor, no matter what angular position is taken by the vane.

A spring member 20 secured to the housing and bearing against the said wheel 13, serves to retain the air tube 11 in fixed position after being properly adjusted to suit variable conditions.

In Figs. 6 and 7 I have shown a modified construction involving a pair of vanes, 21 and 22 respectively, which could possibly be substituted for the single vane disclosed in the preferred formation of my device, the desire being to anticipate this alteration, believing that it will come within the scope of the claims. The use of this substitute arrangement will necessitate positioning the intake air tube 11 transversely of the approximate center line of the opening 5, and eliminating the bottom recess 7. The size of the vanes will be altered accordingly, and their apertured sleeve portions will have an interlocking or hinged association with the inserted apertured shaft or tube 11, a modified form of spring 23 serving to automatically draw both vanes simultaneously to their normal maximum degree of angularity.

The intrushing gas will exert more or less pressure against both vanes 21 and 22, and by so doing will change their normally separated positions, or maximum degree of angularity, forcing said vanes toward each other, in accordance with the variable degrees of gas pressure, as clearly indicated by dotted lines Fig. 6, thereby rotating their apertured integral sleeve portions on the apertured tube 11, thus admitting air in variable quantities through the aperture 12 and registering apertures 24 formed in said vanes 21 and 22; being regulated wholly by the angularity assumed by the co-related vanes.

What I claim as my invention, and desire to secure by Letters Patent, is:—

1. In internal combustion engines, an automatic pressure regulated air valve positioned substantially intermediate of the carbureter and manifold, involving a housing having openings; a movable element within the housing having a vane or blade, together with an apertured cylindrical sleeve portion; and an air intake member inserted through the said housing and cylindrical sleeve, having an aperture to register with the aperture formed in said sleeve.

2. In internal combustion engines, an automatic pressure regulated air valve positioned substantially intermediate of the car-

bureter and manifold involving a housing having a central opening; an air admission tube inserted through the housing, the central portion thereof being apertured and in communication with the opening formed in the housing; a movable element seated within said housing opening involving a blade or vane, together with an apertured sleeve section, which latter part surrounds the exposed apertured part of the air admission tube; and tension means tending to automatically hold the blade in its normally closed position.

3. In internal combustion engines, an automatic pressure regulated air valve positioned substantially intermediate of the carbureter and manifold, involving a suitable housing having a central opening; an air ad-

mission tube removably and rotatively inserted through the housing, the central portion thereof being apertured and in exposed relationship with the opening formed in the housing; an oscillatory element seated within said housing opening, involving a blade or vane of predetermined cross section, together with an apertured base sleeve portion, which latter part surrounds the exposed apertured segment of the air admission tube; and spring tension means for automatically holding the blade in its normally closed position when pressure on said blade is removed.

Signed at Erie, in the county of Erie, and State of Pennsylvania, this 11th day of March, 1920.

GEO. W. DAGGETT.