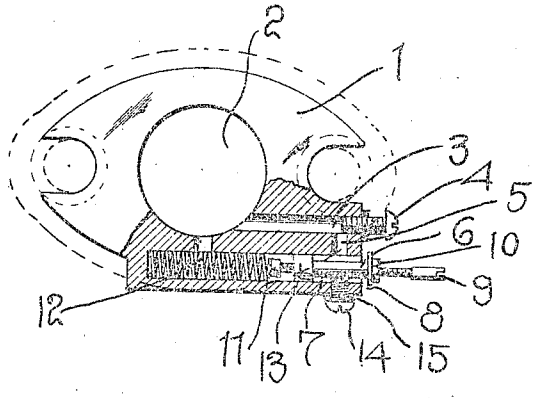
W. C. ENGEL.

AIR VALVE FOR AUTOMOBILE ENGINES.

APPLICATION FILED SEPT. 4, 1914.

1,146,931. Patented July 20, 1915.

Fig. 1



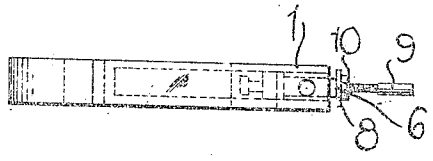


Fig. 2

Witnesses

Robert M. Luttgens.

A. L. Hind.

Inventor

W. C. ENGEL

By Watson E. Coleman

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM C. ENGEL, OF ADRIAN, MICHIGAN.

AIR-VALVE FOR AUTOMOBILE-ENGINES.

1,146,931. Specification of Letters Patent. Patented July 20, 1915.

Application filed September 4, 1914. Serial No. 860,256.

To all whom it may concern:

Be it known that I, WILLIAM C. ENGEL, a citizen of the United States, residing at Adrian, in the county of Lenawee and State of Michigan, have invented certain new and useful Improvements in Air-Valves for Automobile-Engines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to new and useful improvements in air valves for automobile engines and has particular reference to those of the type which are interposed between the carbureter and intake manifold flanges.

One of the principal objects of my invention is to construct an air valve which will open for the admission of additional air into the intake manifold in response to a decrease in the extent of the vacuum or suction in the manifold, rather than to increased suction.

A further and more specific object of the invention is to provide a valve which consists essentially in a plate-like body member adapted to be interposed between the coupling flanges of the intake manifold and carbureter, a piston which controls the valve of the air passage, and a spring which normally holds the piston in its projected position with the valve in open position.

The above, and other incidental objects of a similar nature, which will be hereinafter more specifically treated are accomplished by such means as are illustrated in the accompanying drawings, described in the following specification and then more particularly pointed out in the claims which are appended hereto and form part of this application.

With reference to the drawings, wherein there has been illustrated the preferred embodiment of this invention, as it is reduced to practice, and throughout the several views of which similar reference numerals designate corresponding parts, Figure 1 is a plan view partly in section; and Fig. 2 is an edge view.

As best shown in Fig. 1 of the accompanying drawings, the valve includes a body member 1, which is formed in the nature of a substantially oval and flat plate, in the center of which is formed a circular opening 12. This body plate is designed to be interposed between the coupling flanges of the manifold intake and the carbureter. When the body plate is properly positioned, the opening 2 forms a continuation of the manifold and the lead pipe of the carbureter. An air inlet passage 3 is formed in the body plate. This passage extends tangentially with respect to the opening 2 and at its outer end opens through the edge of the body plate. Extending at right angles to the passage 3, adjacent the outer terminal thereof, is a passage 5 which leads into the piston receiving bore or suction passage 7. This passage 7 opens at its outer end through the edge of the plate 1 and is disposed in parallel relation to the passage 3. Communication between the passage 7 and the opening 2 is established by a suction passage 16. The air let into the manifold passes into the outer end of the member 7, into the passage 5 and thence into the air inlet passage 3.

As a means for controlling the volume of air which may enter the passage 3 from the passage 5, I employ a controlling screw 4 which is threaded in the outer end of the passage 3 and may, as will be readily seen upon reference to Fig. 1, be adjusted to control the effective cross sectional area of the passage 5.

An internally threaded tubular piston 6 is mounted for sliding movement in the passage 7. On the outer end of the tubular piston is formed a valve head 8 which is adapted to engage against the edge of the body plate for sealing the outer end of the passage 7, whereby the passage 3 may be sealed to the atmosphere. The inner end of the piston 6 is equipped with a head 13 which is of such diameter that it snugly engages in the passage 7 whereby it will move inwardly through the passage 7 in response to the creation of a partial vacuum therein, as when the engine is running on closed throttle. An adjusting screw 9 is threaded through the piston to project at its inner end beyond the head 13 thereof. A head 11 carried on the inner end of the adjusting screw 9 is connected to the outer end of a helical spring 12 which is arranged within the passage 7 at the inner end thereof. A lock nut 10 is provided to hold the screw 9 in its adjusted position in the piston. A stop screw 14 is also threaded into the body plate and projected at its inner end in the path of the piston head 13 so that the piston and spring will be held against accidental displacement on the valve.

From the foregoing description, the actual construction and arrangement of the several parts of the valve will now be un-

derstood and it therefore remains to explain briefly the manner in which the valve operates, when in use.

Normally the valve head 8 is held in spaced relation to the adjacent face of the body plate 1, by the spring 12 which, as stated, is of the expansive type. The space normally comprehended between the valve head 8 and the adjacent face of the body plate may be readily varied by adjusting the screw 9, as will be readily observed upon reference to Fig. 1. Under normal conditions the valve 8 remains in open position for the spring 12 is of sufficient strength to resist a slight difference in the pressure within the manifold pipe and atmospheric pressure. When the suction increases within the manifold, however, as when the engine is running on closed throttle and a relatively high vacuum is produced within the manifold, the valve 8 moves to closed position against the adjacent face of the body member 1, since the spring 12 is not of sufficient strength to compensate for a material difference between the pressure in the chamber 7 and atmospheric pressure.

From the foregoing description it will now be apparent that I have provided a relatively simple, auxiliary air valve which is normally open to admit an additional supply of air into the intake manifold when the engine is running under normal conditions but is adapted to automatically close when the engine is running on closed throttle and the vacuum within the intake is relatively high and the mixture is relatively lean as a consequence. It will also be noted that the amount of air admitted, per unit of time, into the manifold may be varied by the controlling screw 4. Furthermore, it will be observed that the valve may be adjusted by means of the screw 9 to open in response to different degrees of suction.

In reduction to practice, it has been found that the form of this invention illustrated in the drawings, and referred to in the above description as the preferred embodiment is the most efficient and practical; yet realizing that the conditions concurrent with the adoption of this device will necessarily vary, it is desirable to emphasize the fact that various minor changes in the details of construction, proportion and arrangement of parts may be resorted to, when required, without sacrificing any of the advantages of this invention, as defined by the appended claims.

What I claim as new and desire to secure by Letters Patent is:—

1. An auxiliary air valve for internal combustion engines including a body plate, adapted to be interposed between the coupling flanges of the intake manifold and the carbureter, said plate being provided with a circular opening adapted to aline with the passage in the manifold, an air inlet passage leading into the opening, a suction passage communicating with the opening and with the air inlet passage, a piston slidable in the suction passage, a valve head carried on the outer end of the piston and engageable against the outer edge of the body plate when in closed position, and a spring arranged in the suction passage and at the inner end thereof, said spring normally tending to hold the valve in open position.

2. An auxiliary air valve for internal combustion engines including a body plate, adapted to be interposed between the coupling flanges of the intake manifold and the carbureter, said plate being provided with a circular opening adapted to aline with the passage in the manifold, an air inlet passage leading into the opening, a suction passage communicating with the opening and with the air inlet passage, a piston slidable in the suction passage, a valve head carried on the outer end of the piston and engageable against the outer edge of the body plate when in closed position, a spring arranged in the suction passage and at the inner end thereof, said spring normally tending to hold the valve in open position, and externally operable means for adjusting the tension of the spring.

3. An auxiliary air valve for internal combustion engines including a body plate adapted to be interposed between the coupling flanges of the intake manifold and the carbureter, said plate being provided with a circular opening adapted to aline with the passage in the manifold, an air inlet passage leading into the opening, a suction passage communicating with the opening and with the air inlet passage, a piston slidable in the suction passage, a valve head carried on the outer end of the piston and engageable against the outer edge of the body plate when in closed position, a spring arranged in the suction passage and at the inner end thereof, said spring normally tending to hold the valve in open position, externally operable means for adjusting the tension of the spring, and means for varying the volume of air which may pass per a unit of time into the air inlet passage.

4. An auxiliary air valve for internal combustion engines comprising a plate-like casing having an opening therethrough for alining with a passage in the manifold pipe, an inlet passage leading into said opening, a suction passage connected with the air inlet passage and with said opening, a piston slidable in the suction passage and having a valve on its outer end for controlling the air inlet passage, and a head on its inner end closing the suction passage, a spring in the suction passage coöperating with the piston so that the valve will tend to

close when the vacuum is high and to open, when the vacuum decreases, and means for adjusting the tension of the spring, whereby the opening and closing of the valve may be varied.

5. An auxiliary air valve for internal combustion engines including a body plate having an opening adapted to aline with the passage of a manifold pipe, an air inlet passage leading into this opening, a suction passage parallel to the air inlet passage, passages establishing communication between the suction passage and the air passage and the suction passage and the opening, an internally threaded tubular piston slidable in the suction passage, a valve head carried by the outer end of the piston, a spring arranged within the suction passage for normally holding the valve in open position, and an adjusting screw threaded through the piston and operable for varying the tension of the spring, said spring being adapted to hold the valve in open position when the vacuum in the manifold is relatively high and to permit the opening of the valve when the vacuum decreases.

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

WILLIAM C. ENGEL.

Witnesses:

WILLIAM P. WELCH,

ALANSON B. TREAT.