

A. DE CLAIRMONT.  
 COMBINED AIR AND DECARBONIZING VALVE.  
 APPLICATION FILED JULY 31, 1916.

1,296,922.

Patented Mar. 11, 1919.  
 2 SHEETS—SHEET 1.

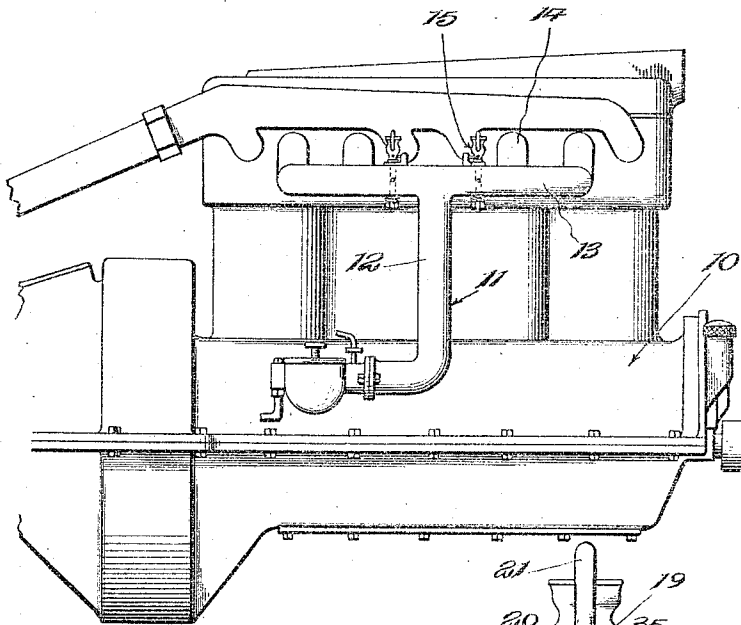


Fig. 1.

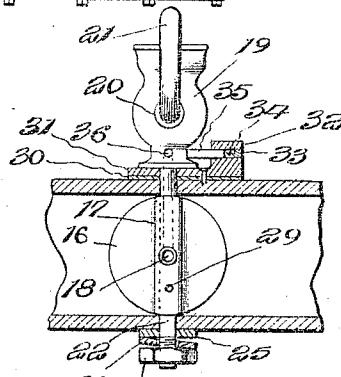


Fig. 2.

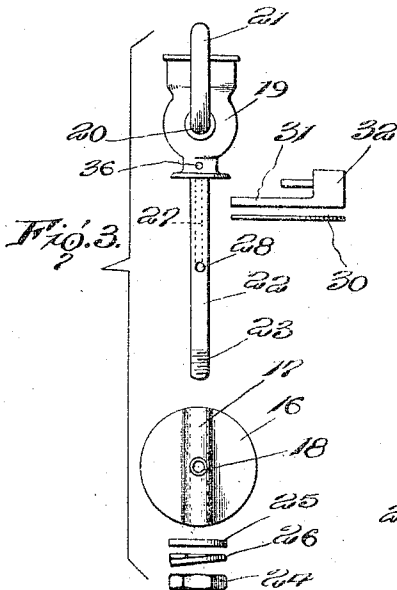


Fig. 3.

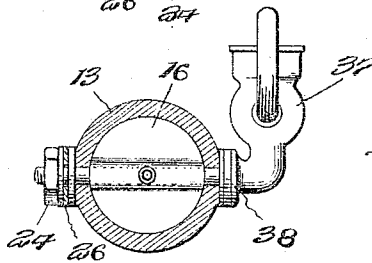


Fig. 4.

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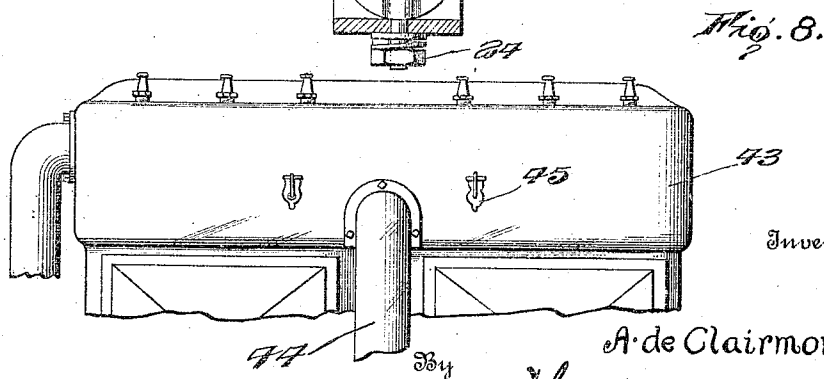
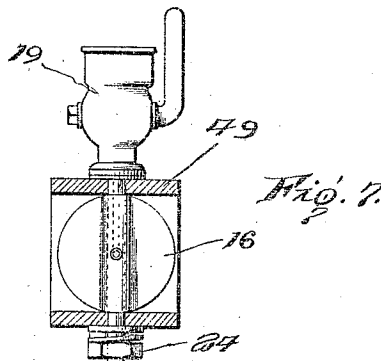
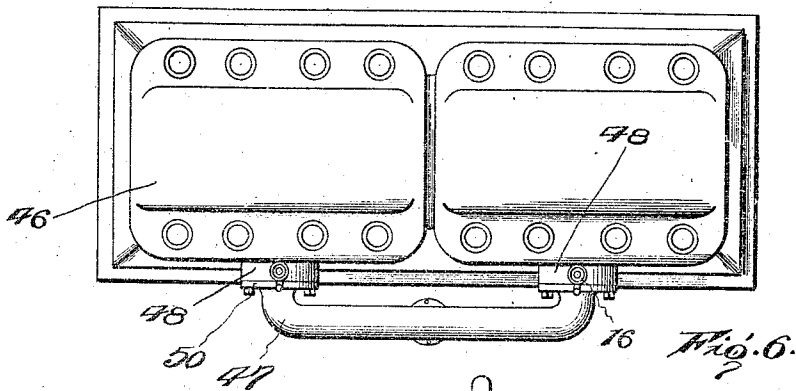
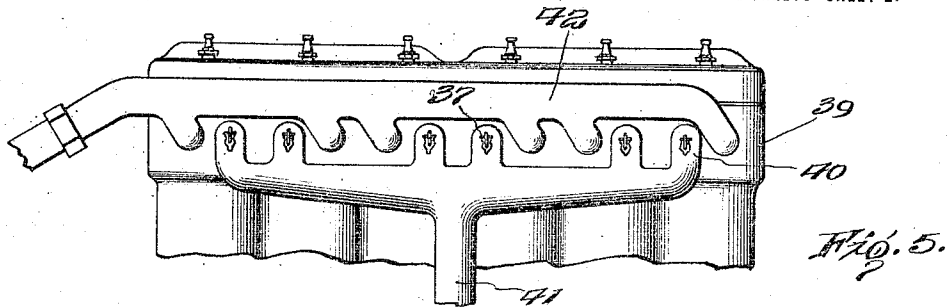
*Harman*, Attorneys.

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# UNITED STATES PATENT OFFICE.

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COMBINED AIR AND DECARBONIZING VALVE.

1,296,922.

Specification of Letters Patent.

Patented Mar. 11, 1919.

Application filed July 31, 1916. Serial No. 112,412.

*To all whom it may concern:*

Be it known that I, ADOLFO DE CLAIRMONT, a citizen of the United States, residing at Toledo, in the county of Lucas, and State of Ohio, have invented certain new and useful Improvements in Combined Air and Decarbonizing Valves, of which the following is a specification.

My present invention relates to new and useful improvements in combined decarbonizing devices and supplemental air valves, the primary object of my invention being the provision of a device which may be applied to the manifold of a gas engine and employed either as a means for admitting a predetermined amount of air to the manifold during running of the engine or as a means for admitting a decarbonizing fluid to the engine cylinders.

More specifically, one of the primary objects of my invention consists in providing a device of such a nature that two or more of them will be employed with the automobile engines now in use, one device being mounted in each branch of the intake manifold in order that the air or decarbonizing fluid may be independently supplied to the engine cylinders, the supply to each cylinder or pair of cylinders, according to the type of engine, being independent of that to the others.

The importance of this will be readily realized when notice is taken of the fact that in many instances one pair of cylinders in a four cylinder or six cylinder engine is found to require more air in the mixture supplied to them than the other pairs. It is for this reason that the provision of a single supplemental air valve in the main trunk of the manifold has been found ineffective.

In removing carbon from engine cylinders by the employment of a decarbonizing fluid, it has been found that the carbon is more effectively removed if the fluid is admitted while the engine is hot and in operation. At the same time, better results are obtained if no explosions are occurring in the engine cylinders being treated and if no explosive mixture is being supplied to such cylinders.

One of the objects of my present invention consists in providing decarbonizing devices which are so constructed that, while they are capable of supplying a decarbonizing fluid to a certain cylinder or a pair of

cylinders, they are also capable of shutting off passage of explosive mixture to the cylinders from the manifold.

More specifically, my invention comprehends the provision of valves, preferably of the butterfly type, which are inserted one in each of the branches of the intake manifold and any one of which may be turned to such a position as to shut off passage of explosive mixture through such branch to the corresponding cylinder or cylinders of the engine. It further consists in providing this butterfly valve with a shaft or stem of tubular construction having a port or passage opening through its side within the manifold in the direction of the valve chamber of the engine cylinder when the valve is closed and in mounting a priming cup upon the outer end of the stem which serves both as a means for operating the valve and as a means for supplying a priming and decarbonizing fluid to the manifold, the priming cup being provided with a cut off valve so that admission of air to the manifold may be prevented or regulated, as desired, either with the valve open or closed.

Another object which I have in view is, therefore, the provision of a combined valve and priming cup of the character set forth, together with means for locking the device in either open or closed position of the butterfly valve.

With these and other objects in view, my invention will be more fully described, illustrated in the accompanying drawings, and then specifically pointed out in the claims which are attached to and form a part of this application.

In the drawings:

Figure 1 is a side elevation of a conventional form of four-cylinder engine employing an intake manifold having two branches, one for each pair of cylinders, showing my improved devices applied thereto;

Fig. 2 is a central longitudinal vertical section through one of the branches of the intake manifold, showing certain details in the construction of my device;

Fig. 3 is a side elevation of one of my devices, the parts being unassembled;

Fig. 4 is a transverse sectional view taken through one branch of an intake manifold, showing the employment of a somewhat modified form of decarbonizing valve structure;

Fig. 5 is a fragmentary elevational view

of a six-cylinder engine in which the intake manifold is provided with a separate branch for each cylinder and in each of which a device constructed in accordance with the structure shown in Fig. 4 is employed;

Fig. 6 is a top plan view of a conventional form of engine, showing a pair of my devices arranged to be employed as gaskets between the ends of the branches of the intake manifold and the engine casing;

Fig. 7 is a sectional view of one of the devices as employed in Fig. 6;

Fig. 8 is a fragmentary side elevation, showing how my devices may be employed in connection with a built in manifold

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In order to insure a clear and accurate understanding of my invention and its use I have illustrated it in connection with a conventional form of internal combustion engine 10 having an intake manifold 11 which includes a trunk 12, a pair of diverging arms 13 and branches 14 extending from these arms to the valve chambers of the various engine cylinders. In this figure I have illustrated the employment of two of my devices, these devices being indicated as a whole by the numeral 15 and being disposed one in each of the arms 13 between the trunk 12 and the next adjacent branches 14, one of these devices controlling passage of explosive mixture, air and priming fluids to one pair of engine cylinders and the other to the other pair. These devices are identical in construction and one of them is clearly illustrated in Figs. 2 and 3. As there shown, each device includes a butterfly valve 16 corresponding in shape and size to the interior of the arm or branch of the intake manifold with which it is to be employed, generally being circular in shape, and formed along its vertical diameter with a tubular sleeve 17 provided intermediate its length with a passage 18. A priming cup 19, of the usual or any preferred type including in its structure a cut off valve 20 having a valve handle 21, is provided. This priming cup, instead of having a threaded tubular nipple of the usual type is provided with a shank or stem 22 which is adapted to be passed through openings formed in diametrically opposite portions of the intake manifold and through the sleeve 17 and which, at its free end, is threaded, as shown at 23, to receive a clamping nut 24, a plain washer 25 and a split resilient locking washer 26 being preferably interposed between the manifold and the nut 24, in the manner shown in Fig. 2. This stem or shank 22 is provided throughout a portion of its length with an axial passage 27 which communicates at one end with the priming cup

19 and which, at its other end, is formed with a radial extension or passage 28 adapted to align with the port or passage 18 of the sleeve 17 when the device is properly assembled. A set screw 29 or other suitable device may be employed for securing the valve in proper position upon the stem 22 to hold the passages 18 and 28 in alignment.

Preferably, a washer 30 is interposed between the manifold and the base of the priming cup 19 and also a disk shaped bracket 31 provided at one side with an upstanding arm or lug 32. This upstanding arm or lug 32 is formed with a bore which is radially disposed with respect to the stem or shank 22 and the outer end of which is closed by a screw plug 33. Seated in the socket thus formed is a helical spring 34 which engages against one end of a pin 35 which also seats in the socket, the spring tending at all times to hold the pin extended and, consequently, in engagement with one or the other of a pair of shallow seats or sockets 36 formed in the base portion of the priming cup 19. Because of this, this spring pressed pin will serve as a means for locking the priming cup and, consequently, the butterfly valve 16 against turning movement when it is either in open or closed position.

If my improved priming and decarbonizing devices are applied to the branches of the intake manifold adjacent its free ends, it will only be necessary to drill holes at diametrically opposite points through the manifold branches, insert the valves through the ends of the branches and pass the stems of the priming cups downwardly through the sleeves of the valves and then apply the clamping nuts and washers. If, on the other hand, the devices are inserted adjacent the trunk of the manifold, it will be necessary to split one wall of each branch of the manifold in order that the valve 16, already mounted upon the stem 22, may be passed into place, the opening thus formed in the manifold being later sealed by welding or other suitable means.

In Fig. 4 of the drawings, I have illustrated a somewhat modified form of invention, the sole distinction being the fact that the base portion of the priming cup 37 is disposed at a right angle to the body portion, as shown at 38, in order that the cup may occupy a proper vertical position at one side of the manifold when the stem is passed through the manifold in a horizontal direction. This form of device is primarily intended for use with manifolds in which the space above the manifold is limited or restricted. For instance, the form of device shown in Fig. 4 would be employed with an engine of the type shown at 39 in Fig. 5 in which the branches 40 of the intake manifold 41 extend vertically and are located im-

mediately beneath the main trunk 42 of the exhaust manifold. Obviously, with such an arrangement, the form of device shown in Fig. 1 could not be employed as there would not be sufficient room between the two manifolds. This form of device may also be employed with good results in the form of engine, as shown at 43 in Fig. 8, in which the branches of the intake manifold 44 are built into the engine casing, two of these devices being shown at 45.

In Figs. 6 and 7 I have illustrated a further form of device capable of being employed as a gasket between the free end of a branch of the intake manifold and the engine casing. In Fig. 6, the engine is indicated by the numeral 46 and the branches of the intake manifold by the numeral 47, while my improved decarbonizing devices and air valves are indicated by the numeral 48. As shown in Fig. 7, each of these devices is identical with the device shown in Fig. 3, with the exception that a gasket forming ring 49 is provided through which the stem passes and which, when the devices are applied, seats between the clamping flange 50 of the branch of the intake manifold and the casing of the engine. This ring is preferably equal in length to the diameter of the butterfly valve in order to insure perfect freedom of movement of the valve.

The operation of the various forms of devices illustrated and described is the same and I will therefore describe the operation in connection with the form shown in Figs. 1 to 3 of the drawings. Under normal conditions, the butterfly valves 16 are opened to permit free passage of explosive mixture through the branches of the intake manifold to the engine cylinders, while the cut off valves 20 of the priming cups are closed to prevent entry of air to the manifold. Obviously, if a weaker mixture is desired, these cut off valves 20 may be opened to a more or less extent, dependent upon the amount of air desired. Furthermore, if it is found that one pair of cylinders requires a weaker mixture than the other pair, the cut off valve of the device, in the corresponding branch of the manifold, may be opened to a greater extent. If the intake manifold has a separate branch for each cylinder and one of the devices is located in each branch, it will be clear that the amount of air supplied to each cylinder along with the explosive mixture may be independently regulated.

When the operator desires to remove carbon from the engine cylinders, he may disconnect the leads to the spark plugs of such cylinders, turn the device in that branch of the manifold supplying explosive mixture to such cylinders to close the throttle valve 16 of such device and thereby shut off passage of explosive mixture to the cylinders being treated and run the engine upon the

remaining cylinders. He may then supply any suitable decarbonizing fluid to the priming cup of the device thus employed, which fluid will be drawn by the suction of the engine into the passage 27 and through the aligned passages 28 and 18 into that portion of the intake manifold shut off from the carbureter and so to the cylinders being treated. As there is no firing in the cylinders being treated, a complete and effective removal of carbon is assured. After thus treating one cylinder or pair of cylinders, the device controlling them may be returned to normal position and another cylinder or pair of cylinders treated, this being repeated until all the cylinders have been freed from carbon.

Although my invention is not primarily intended for such purpose, it may be employed for priming the engine by placing the proper amount of gasoline or other fluid in the priming cups and opening the cut off valves to let such fuel flow into the branches of the intake manifold. The cut off valves may then be closed and the engine turned over and started in the usual manner.

Although I have illustrated and described my invention in all its details of construction, it will of course be understood that I do not wish to be limited to such details as various minor changes, within the scope of the appended claims, may be made at any time without in the slightest degree departing from the spirit of my invention.

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

1. A device of the character described including a butterfly valve adapted to be inserted in an intake manifold branch and having a diametric sleeve formed at one side with an opening, a stem adapted for passage through openings formed in opposite sides of the manifold branch and through the sleeve, a priming cup carried by one end of the stem, means applicable to the other end of the stem to hold the stem against displacement from the manifold while leaving it free for turning movement to turn the valve, yieldable tensioning means for the stem applicable between the said last mentioned means and the manifold, the stem being formed with a passage having uninterrupted communication at one end with the opening in the sleeve and at its other end with the priming cup, and a valve for the priming cup.

2. A device of the character described including a butterfly valve adapted to be inserted in an intake manifold branch and having a diametric sleeve formed at one side with an opening, a stem adapted for passage through openings formed in opposite sides of the manifold branch and through the sleeve, a priming cup carried by one end of the stem, means applicable to the other end of the stem to hold the stem

against displacement from the manifold while leaving it free for turning movement to turn the valve, the stem being formed with a passage communicating at one end with the opening in the sleeve and at its other end with the priming cup, a valve for the priming cup, and means coöperating with the priming cup for locking the stem against turning movement when the butterfly valve is in either open or closed position.

3. A device of the character described including a butterfly valve adapted to be inserted in an intake manifold branch and having a diametric sleeve formed at one side with an opening, a stem adapted for passage through openings formed in opposite sides of the manifold branch and through the sleeve, a priming cup carried by one end of the stem, means applicable to the other end of the stem to hold the stem against disengagement from the manifold while leaving it free for turning movement to turn the valve, the stem being formed with a passage communicating at one end with the opening in the sleeve and at its other end with the priming cup, a valve for the priming cup, and means for locking the stem against turning movement either when the butterfly valve is in open or closed position, said means including a bracket fixed against turning movement, and a spring pressed detent supported by the bracket and engaging the base portion of the priming cup to seat in one or the other of sockets formed therein.

4. A device of the character described including a butterfly valve adapted to be inserted in an intake manifold of an internal combustion engine, a rotatable stem adapted to extend through the manifold and having the valve fixed thereto, a priming cup carried by the stem and provided with a valve, the stem being formed with a passage leading from the priming cup and communicating with the manifold, a bracket jour-

naling the stem and providing a seat for the priming cup, and means carried by the bracket to coöperate with the said cup for locking the stem against turning movement either when the butterfly valve is in open or closed position.

5. A device of the character described including a butterfly valve adapted to be positioned in an intake manifold of an internal combustion engine and formed with a diametric sleeve, a valve stem adapted to extend through the manifold and through said sleeve for rotatably supporting the valve within the manifold, the stem being formed with a passage opening at its outer end at one end of the stem and opening at its inner end through one side of the stem, and a priming cup connected to the said end of the stem to communicate with said passage and having its base overhanging the stem and adapted to operatively coöperate with the manifold for limiting the stem against inward movement through the manifold, the sleeve being provided with an opening forming an outlet for the passage at its inner end.

6. A device of the character described including a butterfly valve adapted to be positioned in an intake manifold of an internal combustion engine and formed with a diametric sleeve, a valve stem adapted to be secured in the sleeve and formed with a passage opening at its outer end at one end of the stem and opening at its inner end through one side of the stem within said sleeve, and a priming cup carried by the said end of the stem to communicate with said passage, the sleeve being provided with an opening forming an outlet constantly in communication with the passage at its inner end whereby liquid entering the passage from the cup will be completely drained from the passage through the said opening.

In testimony whereof I affix my signature.

ADOLFO DE CLAIRMONT. [L. S.]