Mar. 13, 1923.

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F. B. LEONARD

COOLING AND OIL SAVING ATTACHMENT

Filed Apr. 13, 1921

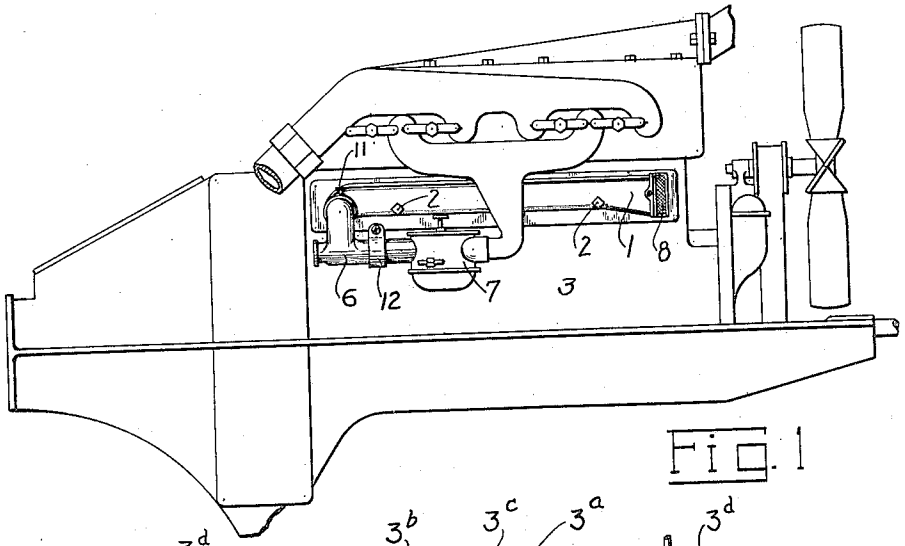


Fig. 1

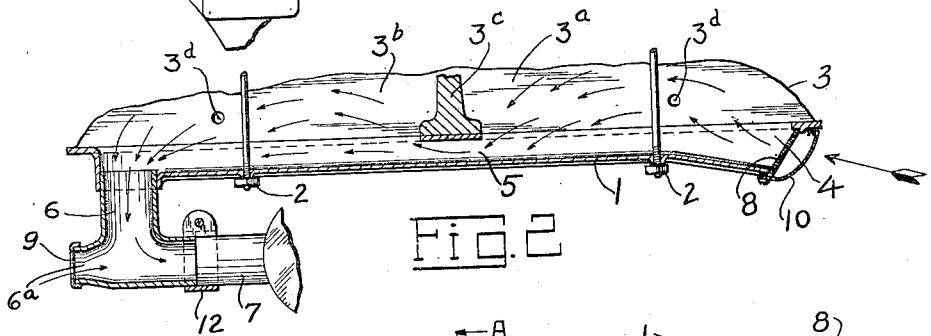


Fig. 2

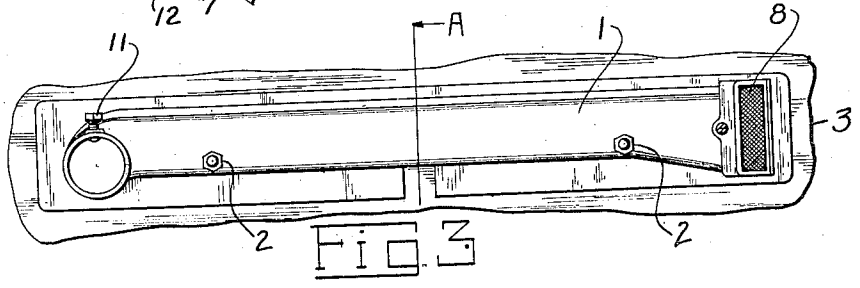


Fig. 3

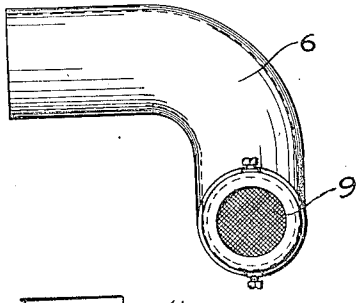


Fig. 4

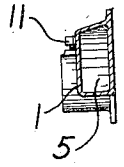


Fig. 5

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UNITED STATES PATENT OFFICE.

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COOLING AND OIL-SAVING ATTACHMENT.

Application filed April 13, 1921. Serial No. 461,084.

To all whom it may concern:

Be it known that I, FRANK B. LEONARD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Cooling and Oil-Saving Attachments, of which the following is a specification.

This invention has relation to an internal combustion engine, and refers particularly to means attachable to the valve operating chamber of such engine, for cooling such chamber.

Most internal combustion engines are of the poppet valve type, and to such this invention is directed. Below the valves is found a chamber, into which the stems of the valves extend, and in which are provided devices for operating the valves. This is so commonly known that no further explanation of this mechanism is required. Below the said chamber is the space within the crank-case, and separating the two is a thin floor, in which usually are provided one or more passages through which waste lubricating oil may return to the crank-case.

Vapors escape past the engine pistons and into the crank-case, from which they rise through the said passages and into the valve operating chamber, where they condense and return to the crank-case. Vapors from the valve intake chamber leak through the bearings of the valve stems and into the valve operating chamber, where they, also, condense and sink into the crank-case. The fuel which in this manner is wasted into the crank-case becomes mixed with and operates to cut the lubricating oil at the bottom of said case. Furthermore it is found that the hot vapors thus accumulating in the valve operating chamber affect the lubricating oil of the mechanism contained within said chamber.

With the above conditions in view the object of my invention is the provision of simple and inexpensive means for exhausting these vapors from the valve operating chamber. A further object is to make suitable operating connections, with the engine carburetor for the purpose of utilizing the power of the suction through said carburetor to draw such vapors out of the valve operating chamber. Another object is the provision of means for admitting a certain proportion of air to the carburetor in addition to the air and vapors drawn from the valve operating chamber. The further objects and the various important and advantageous features of my invention are hereinafter fully described and illustrated in the appended drawing, of which:

Fig. 1 is a side elevation of an internal combustion engine embodying the invention,

Fig. 2 is a plan view of certain parts of Fig. 1, drawn on a larger scale,

Fig. 3 illustrates an important part of the invention, substantially as said part appears in Fig. 1,

Fig. 4 shows another part of the invention removed from the engine elevation of Fig. 1,

Fig. 5 is a cross section through the structure shown in Fig. 3, and it is taken substantially on a line A, in direction of the arrow.

The hereinbefore described valve operating chamber opens to the side of the engine casting 3, and the opening, or mouth, of the chamber is closed by one or more plates, as well known to those versed in the art. Preparatory to applying my invention to the engine these plates are first detached, and a structure 1, having a base of substantially the same shape as said plates, is attached in their place, preferably by employing the same studs 2, 2, provided in the engine for such purpose. The structure 1 is substantially of a channel shape, having an air inlet at the front end, and facing toward the front of the engine. From this inlet, 4, extends an uninterrupted passage 5 to the extreme rear of the structure, whence it makes a double turn through an elbow 6 and into the carburetor 7.

The valve operating chamber is in this case divided by a partition 3^c into separate chambers 3^a and 3^b, and it is noticed that the passage 5 opens into both chambers. In the floor of the chambers are provided the aforenamed passages 3^d. From this short description, and by referring to the drawing, the operation of my device will be clear to those versed in the art. On the suction stroke of the engine it is perceived that air is quickly drawn in through the front inlet 4. Upon reaching within the chamber 3^a this air spreads and absorbs the accumulating vapors. The air is then rapidly drawn past

the partition 3^c, whereupon it again spreads within the chamber 3^b and absorbs such vapors as have here accumulated. Finally the charged air rushes through the passage of the elbow 6 and into the carburetor. The arrows in Fig. 2 indicate the course of the air current through the valve chambers just described.

As the inlet 4 faces forward it appears that air will also be forced into said chambers when the vehicle, which the engine is mounted to propel, is in motion. During rapid motion of the vehicle the air pressure is considerable, and in order to relieve this pressure, and also for the purpose of increasing the cooling effect, I have provided a rear opening 6^a in the elbow 6, through which air may escape and thereby reduce the pressure. This rear opening serves also another purpose. If the vehicle is at a standstill, or is moving slowly, and if the carburetor is then suddenly opened to admit the full amount of air and fuel, then the tortuous passage through the chambers and elbow may offer too much resistance to the flow of air, and the incoming air may for this reason be retarded, with the result that the fuel reaching the engine combustion chamber may be deficient in oxygen. Now the said rear opening 6^a is made of a certain size relative to the main passage, substantially one half the diameter of said passage, which has been found to be the proper proportion, and which is large enough to supply the deficiency occurring under such conditions as the one just outlined.

The inlet 4 is fitted with a detachable screen 8, and the rear opening of the elbow 6 is provided with a removable screen 9, both of which operate to exclude particles of dirt and other foreign matter. In addition to the screen 8 I may provide an outer screen 10. the function of which is to arrest the bulk of such foreign matter, some of which might otherwise settle in the meshes of the screen 8 and thereby obstruct the free passage of air into and through the valve operating chambers. Furthermore, as all the screens are removable, they may readily be detached and cleaned, or replaced, when necessary.

The main structure 1, of my invention, is securely mounted on the engine casting in the manner described. The elbow 6 is detachably fitted into the part 1, and it is retained in adjusted position by suitable means, such as a set screw 11. Said elbow may be adjusted in and out, and it may be turned into a horizontal position, as indicated in Fig. 1, or inclined to the front or rear in order to come into alignment with the carburetor to which it is attached. Once it has been brought into alignment it is locked in position by suitable means, such as a set screw 11. Any suitable means may be provided for joining the elbow to the carburetor intake, but I prefer to use an adjustable collar 12, such as shown in Figs. 1 and 2.

Various modifications and refinements may suggest themselves, and may be adopted, in order to make the structure more pleasing or cheaper, so long as they do not alter the important combinations and features of my invention as set forth in the following claims.

I claim:

1. In an internal combustion engine, a detachable device covering the engine valve chambers and extending to the engine carburetor, said device having a continuous air passage from the front of the engine to said carburetor, there being an auxiliary air intake in the rear end of the device, through which air passing through said valve chambers is free to escape, and through which the carburetor can draw air freely when insufficient air flows from the valve chambers and past the carburetor.

2. In an internal combustion engine having valve operating chambers opening to one side, a plate detachably mountable to close said opening, said plate having a forwardly directed front inlet and a continuous passage to the rear, said passage opening into said chambers, and a detachable elbow mountable to connect said passage with the engine carburetor, said elbow having a small auxiliary air inlet.

3. The combination with an internal combustion engine having valve operating chambers, of a carburetor, and a plate mountable on the engine to cover the opening of said chambers, said plate having an inlet forwardly directed, being in communication with said chambers and provided with a rear outlet, an elbow adjustably seated in said rear outlet and connecting with the engine carburetor, said elbow provided with a small auxiliary inlet, and a screen detachably mounted to cover each of said inlets.

4. In an internal combustion engine a valve chamber cover plate having a continuous passage opening inward, screens covering the front inlet to said passage, a carburetor, an elbow adjustably fitted in said plate and communicating with the carburetor and having a small air inlet, a screen mounted to cover said inlet, and an adjustable member for interconnecting the elbow and carburetor.

5. In an internal combustion engine, a cover plate for the valve chambers and having a straight longitudinal channel open at the front and into said chambers, a pendent elbow adjustably fitted in the rear end of the channel and having a passage leading to the engine carburetor, said passage extending rearward and decreasing to approximately one half its size, and detachable screens covering said front channel inlet and the said rear passage orifice.

6. The combination with an internal combustion engine having valve chambers covered by detachable plates, of a plate interchangeable with said plates, said plate having a continuous straight channel opening into said chambers and made with a front opening leading to said channel, a detachable tube adjustably seated in the rear end of said channel, said tube terminating at the bottom in a horizontal tube communicating at the front with the engine carburetor, a screen covering the entrance to said channel, and a screen over the rear aperture in said horizontal tube.

In testimony whereof I have hereunto affixed my signature.

FRANK B. LEONARD.