March 15, 1955 E. B. CASE 2,704,058

INTERNAL-COMBUSTION ENGINE DECARBONIZER

Filed Feb. 11, 1952

Fig. 1.

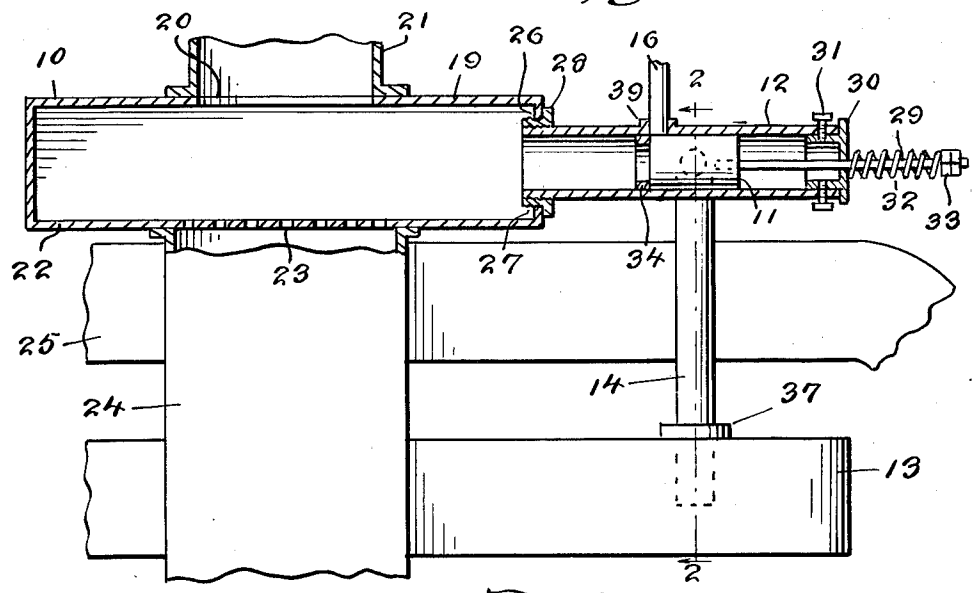


Fig. 3.

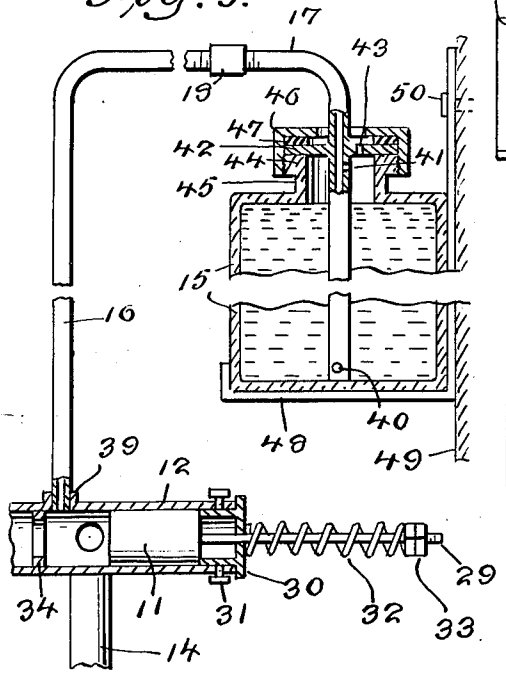
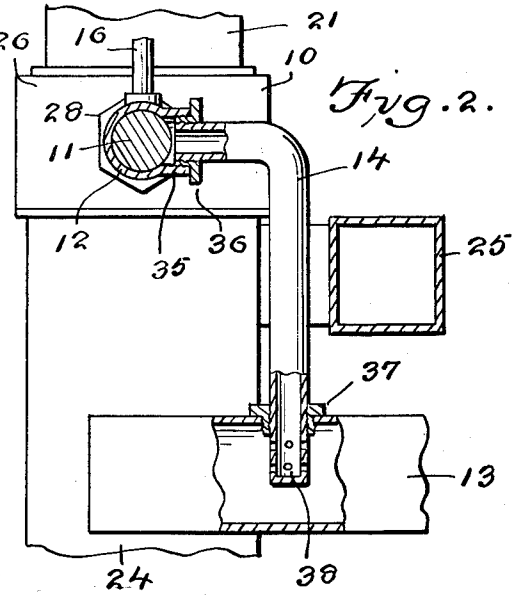


Fig. 2.



INVENTOR.

Earl B. Case

BY Victor J. Evans & Co.

ATTORNEYS

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INTERNAL-COMBUSTION ENGINE DECARBONIZER

Earl B. Case, Norfolk, Va.

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1 Claim. (Cl. 123—119)

This invention relates to internal combustion engines of the type generally used in motor vehicles, and in particular a by-pass connection on an internal combustion engine whereby some of the exhaust gases are passed back through the engine with the fuel for raising the temperature of the fuel as it is supplied to the combustion chamber.

The purpose of this invention is to eliminate a carbon knock resulting from quick acceleration of a motor vehicle and also to provide means for continuously cleaning the parts around the engine and particularly in the head of the engine.

Various attempts have been made to increase the efficiency of motor vehicle engines by removing carbon deposits in the combustion chambers and particularly around the spark plugs where the carbon deposits are still a troublesome problem. With this thought in mind this invention contemplates a by-pass connection from the exhaust manifold of an internal combustion engine to the intake manifold by the carburetor connection and with a vacuum actuated control valve in said connection and also with means for lubricating said valve.

The object of this invention is, therefore, to provide means for by-passing exhaust gases back into the combustion chamber of an internal combustion engine wherein the quantity of exhaust gases recirculated through the engine is controlled by the vacuum of the engine.

Another object of the invention is to provide a device for passing exhaust gases back into combustion chambers of an internal combustion engine that is adapted to be installed on engines now in use.

A further object of the invention is to provide a vacuum control device for passing exhaust gases back into the combustion chambers of an internal combustion engine which is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a substantially flat hollow housing positioned between the flanges of the intake manifold and carburetor of an internal combustion engine with a valve member slidably mounted in a cylinder extended from one side of the housing, with a spring for actuating the valve member against the vacuum of the engine, with a tube connecting the cylinder to the exhaust manifold of the engine, and with a lubricating connection from the cylinder to an oil supply container.

Other features and advantages of the invention will appear from the following description taken in connection with the drawing wherein:

Figure 1 is a side elevational view showing the manifold and carburetor connection at one side of an internal combustion engine with the cylindrical valve housing extended from a hollow chamber positioned between the carburetor and intake manifold and wherein the housing and chamber are shown in section.

Figure 2 is a cross section through the cylinder and exhaust manifold being taken on line 2—2 of Fig. 1 and showing one end of the carburetor connection with the intake manifold shown in section and with the exhaust manifold broken away.

Figure 3 is a detail illustrating a vacuum actuated lubricating system for supplying a lubricant to the valve in the connection from the exhaust manifold to the carburetor connection, the valve housing and lubricant container being shown in section.

Referring now to the drawing wherein like reference characters denote corresponding parts the exhaust by-pass device of this invention includes a hollow distributing housing 10, a valve having a sliding cylindrical element 11 positioned in a cylinder 12 with the cylinder connected to an exhaust manifold 13 with a tube 14 and also to a lubricant container 15 through tubes 16 and 17 which are connected by a coupling 18.

The housing 10 is substantially rectangular shaped in section having an upper panel 19 with an opening 20 therein, connecting the housing to a carburetor connection 21 and having a lower panel 22 with perforations 23 therein through which the gases pass through a connection 24 to an intake manifold 25.

The housing 10 is also provided with side and end walls, as shown in Fig. 1 the end wall 26 being provided with an opening 27 into which the end of the cylinder 12 extends, and the cylinder being mounted in the housing with a bushing 28.

The valve member 11 is slidably mounted in the cylinder 12 and the connecting rod 29 extends from the valve member through a cylinder head 30 which is secured in position with set screws 31 with the connecting rod 29 extended through the head 30 and the spring 32 secured on the extended end of the rod with nuts 33. By this means the valve member 11 is resiliently held outwardly, in the position shown in Fig. 3 when the engine is traveling or operating at normal or high speed wherein the vacuum is comparatively low and as the engine changes to idling speed the vacuum draws the valve member 11 against the spring 32, to the position shown in Fig. 1, wherein the exhaust connection is closed. The inner part of the cylinder 12 is provided with a ring 34 that provides a stop for the valve member and the side of the cylinder is provided with a boss 35 in which the end of the tube 14 is secured with a bushing 36 as shown in Fig. 2. The lower end of the tube 14 extends through the upper wall of the exhaust manifold 13 in which the tube is secured with a bushing 37 and, as also shown in Fig. 2 the lower end of the tube 14 is provided with perforations 38 through which the exhaust gases are drawn into the valve cylinder 12 and through the distributing housing 10 to the intake manifold.

The valve cylinder 12 is also provided with a boss 39 through which the tube 16 is connected to the cylinder and, as illustrated in Fig. 3, the tube 16 connects with the tube 17 which extends downwardly into the container 15, the lower end of the tube being provided with an inlet opening 40, and the upper part thereof provided with an opening 41 which provides a bleeder preventing syphoning the lubricant from the container 15 into the valve cylinder 12.

The tube 17 is provided with a flange 42 in which a vent 43 is provided and the flange is secured against the flange 44 on a neck 45 on the upper end of the container 15 with a cap 46. A sealing washer 47 is provided between the cap and flange 42.

The lubricant container 15 is supported by a bracket 48 which is attached to a valve wall 49 of a motor vehicle with bolts 50.

With the parts arranged in this manner the exhaust gases from the exhaust manifold 13 pass through the connection 14 to the valve cylinder 12, and from the cylinder, with the valve member 11 retracted to the position shown in Fig. 3, the gases pass into the distributing chamber or housing 19 from which they pass to the combustion chambers of an engine upon which the manifolds are mounted.

At idling speed when it is not desirable to mix the exhaust gases with the fuel entering the intake manifold the vacuum is sufficient to hold the valve member 11 over the connection of the tube 14 whereby the exhaust connection is closed and as the speed of the engine increases the decreasing vacuum permits the spring 32 to withdraw the valve member 11 whereby exhaust gases pass through the connection 14 and into the combustion chambers of the engine.

With the valve member 11 withdrawn to the position shown in Fig. 3 the connection to the tube 16 is also open and there is sufficient vacuum to draw lubricant from the container 15 into the valve cylinder 12 to lubricate the valve.

It will be understood that modifications may be made

in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

In a carbon eliminating device for an internal combustion engine having intake and exhaust manifolds, a hollow housing providing a distributing chamber positioned in a horizontal plane between a carburetor and a connection to the intake manifold of the engine, a valve cylinder extended from said housing in the same plane as said housing, a valve member slidably mounted in said cylinder, a connecting rod extended from the valve member through the end of the cylinder, a spring on the outer end of said connecting rod and positioned to urge the valve member toward the said outer end, a connection from the cylinder at right angles thereto and connected to the exhaust manifold of the engine upon which the device may be installed, said valve adapted to be actuated by the vacuum of the engine to close the connection to the exhaust manifold.

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