

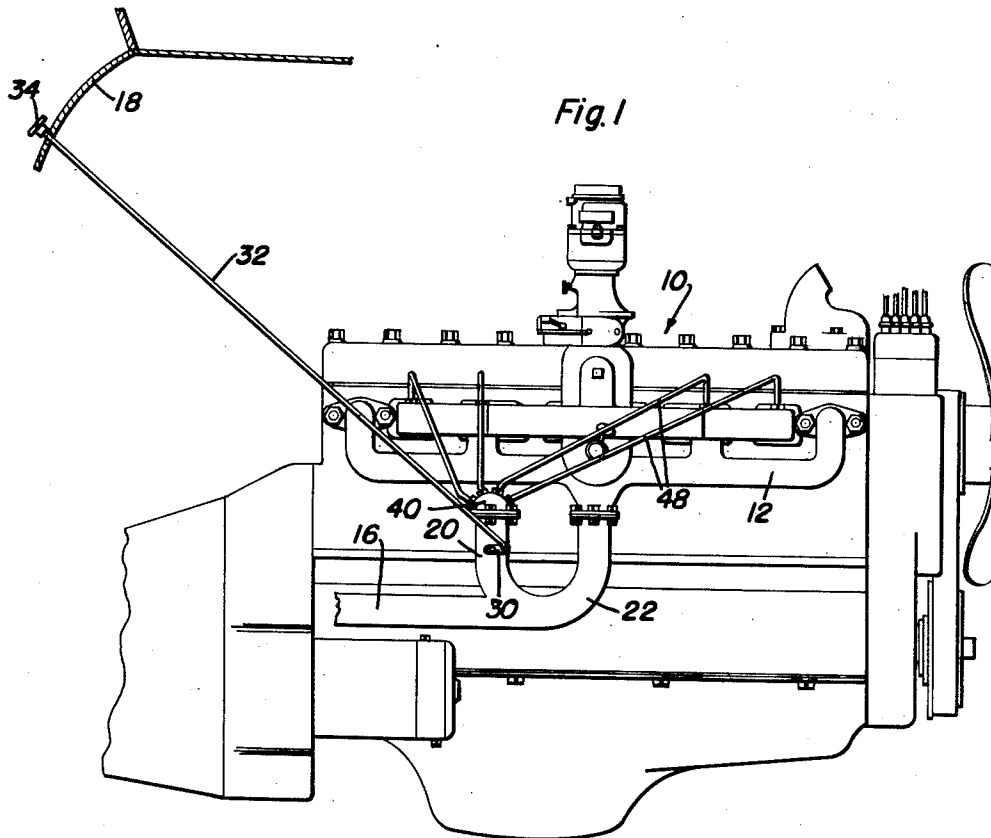
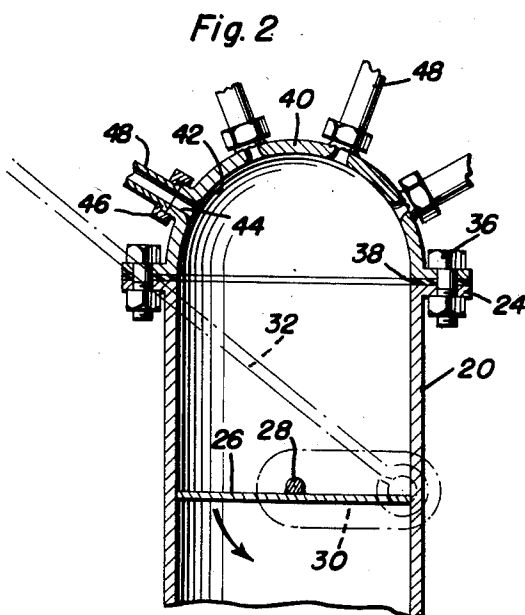
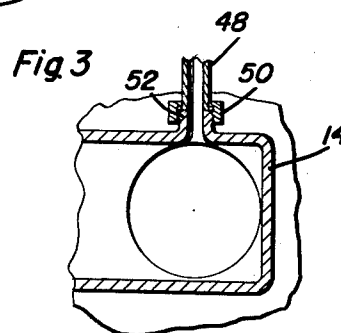
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EXHAUST FEED SUPPLY FOR ENGINES

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EXHAUST FEED SUPPLY FOR ENGINES

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1

This invention comprises novel and useful improvements in an exhaust feed supply for engines and more specifically relates to an attachment for supplying controlled quantities of exhaust gas from the manifold of an internal combustion engine to the intake manifold of the same at spaced positions therealong.

The primary object of the invention is to provide a device whereby certain constituents of the exhaust gases from an internal combustion engine may be reclaimed and supplied to the fuel charge of the same for increasing the economy of operation of the engine.

A further object of the invention is to provide a device in conformity with the preceding object which may be controlled and adjusted from a remote location as from the driver's seat and dash of the vehicle.

A still further object of the invention is to provide an attachment as set forth in the foregoing objects in which the quantities of exhaust gas supplied to the intake manifold may be accurately metered and controlled and may be evenly distributed to the various cylinders of the internal combustion engine.

A still further object of the invention is to provide an attachment as set forth in the above mentioned objects which shall be of simple and inexpensive construction, may be readily applied to existing forms of internal combustion engines, and shall be of a simple but sturdy construction.

These, together with various ancillary features and objects of the invention, which will later become apparent as the following description proceeds, are attained by the present invention, a preferred embodiment of which has been illustrated by way of example only, in the accompanying drawings, wherein:

Figure 1 is a side elevational view of a portion of an internal combustion engine showing the manner in which the attachment of this invention is applied thereto, together with a portion of a dash of a motor vehicle showing the control means for the device mounted thereon;

Figure 2 is a vertical sectional detail view through a portion of the exhaust gas removal conduit and the distributor cap for the same; and

Figure 3 is a sectional detail view upon an enlarged scale showing the connection of one of the exhaust gas supplying tubes to the intake manifold of the engine.

Referring now more specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the various views, it will be seen that the numeral 10 designates

2

generally any conventional internal combustion engine with which the present invention may be associated, this engine including the customary exhaust manifold 12, the intake manifold 14, and the exhaust pipe 16. There is also indicated at 18 a portion of the dash of a vehicle in which the engine is mounted.

In accordance with the present invention, an exhaust gas removal conduit 20 is connected with and communicates with the exhaust pipe 16 for withdrawing exhaust gas therefrom. The conduit 20 is preferably so disposed as to form part of a U-shaped member, the other portion 22 of which is detachably coupled to the exhaust manifold 12 in the usual manner. If desired, the member 20 may be formed integral with the member 22, whereby a replacement exhaust pipe 16 would be employed as a substitute for the conventional exhaust pipe. However, the invention also contemplates the attaching of the removal conduit 22 in any desired manner to the exhaust pipe 16, to provide substantially the arrangement shown in Figure 1.

The upper end of the removal conduit 22 is open and constitutes a discharge end therefrom, the same being provided with an annular flange 24 as clearly shown in Figure 2. Disposed within the removal conduit 20 and spaced inwardly from the end thereof, or between the two ends of the removal conduit, is a control valve which may conveniently take the form of a butterfly valve 26, mounted upon a transverse axle 28 extending through the side of the removal conduit 20, and being provided with a control or crank arm 30 to which is connected one end of the control rod 32 whose other extremity is provided with a finger grip or knob 34 disposed on the opposite side of the dash 18.

It will thus be apparent that by adjusting the control rod 32, the control valve 26 may be moved from its closed position shown in Figure 2 to various selected degrees of opening to thereby accurately meter and control the flow of exhaust gases from the exhaust pipe section 22 and through the removal conduit 20.

When removably secured to the open end of the removal conduit 20, as by fastening bolts 36 and a gasket member 38, is a hemispherical cap 40 constituting a gas distributor cap as set forth hereinafter. Although the cap illustrated is of hemispherical shape, and is preferably provided with a smooth hemispherical wall 42 forming a chamber upon the interior thereof, it is obvious that the cap could likewise be of different shapes as desired.

3

Disposed at convenient locations upon the spherical surface of the cap 40 are a plurality of tubular bosses 44 which are externally threaded for receiving coupling glands 46 whereby the ends of copper tubes 48, comprising exhaust gas supply tubes may be connected to the interior of the distributor cap.

It should be here noted that it is contemplated that the bosses 44 may be so located about the area of the hemispherical cap as to receive and withdraw substantially equal quantities of exhaust gases from the storage and distributing chamber formed between the control valve 26 and the hemispherical wall 42. The tubes 48 are preferably of copper or any other flexible material, such as would be suitable for handling hot exhaust gases, and while the same may be of any desired diameter, it is preferred to form the tubes of a diameter of about one-quarter of an inch.

As shown in Figures 1 and 3, the discharge ends of the tubes 48 are removably secured as by coupling glands 50 with externally threaded bosses 52 which are formed upon the intake manifold 14. These bosses may be integrally formed upon the manifold, as by providing a replacement intake manifold for the conventional intake manifold with which the internal combustion engine is originally supplied. However, it is also possible to form the bosses 52 separately from the intake manifold as by tapping the intake manifold and inserting threaded bushings therein constituting the bosses. In any event, exhaust gases are delivered partly through the pressure prevailing within the removal conduit 20 and distributor cap 40 thereof, and partly by the suction within the intake manifold, into the interior of the same.

By the above described apparatus, accurately controlled quantities of exhaust gas may be supplied to the intake manifold at spaced locations along the same which would facilitate an equal supply of the gases to the various cylinders of the engine. The device therefore enables the reclaiming of various unconsumed or only partially consumed fuel components of the exhaust gases in the fuel charge in the engine.

From the foregoing, the construction and oper-

4

ation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

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

1. An exhaust gas feeder for internal combustion engines comprising a vertical exhaust gas removal conduit connected to the exhaust pipe of an internal combustion engine at a place remote from the exhaust manifold, a gas distributor cap for said removal conduit on the upper end thereof, exhaust tubes connected to said distributor cap and in communication with the intake manifold at spaced positions thereon, which positions are each adjacent one of the connections of the intake manifold with a cylinder inlet port of the engine, a valve in said removal conduit, means operable from the dash of a vehicle for controlling said valve.

2. The combination of claim 1 wherein said distributor cap has a cross sectional area greater than the sum of the cross-sectional areas of the exhaust tubes.

3. The combination of claim 1 wherein said distributor cap is hemispherical and has a hemispherical chamber therein said tubes extending radially of said cap.

4. The combination of claim 1 wherein said valve is disposed remote from the discharge end of said removal conduit.

5. The combination of claim 1 including coupling flanges for removably securing said cap to the end of said removal conduit.

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