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FUEL ABSORBER AND REVAPORIZER

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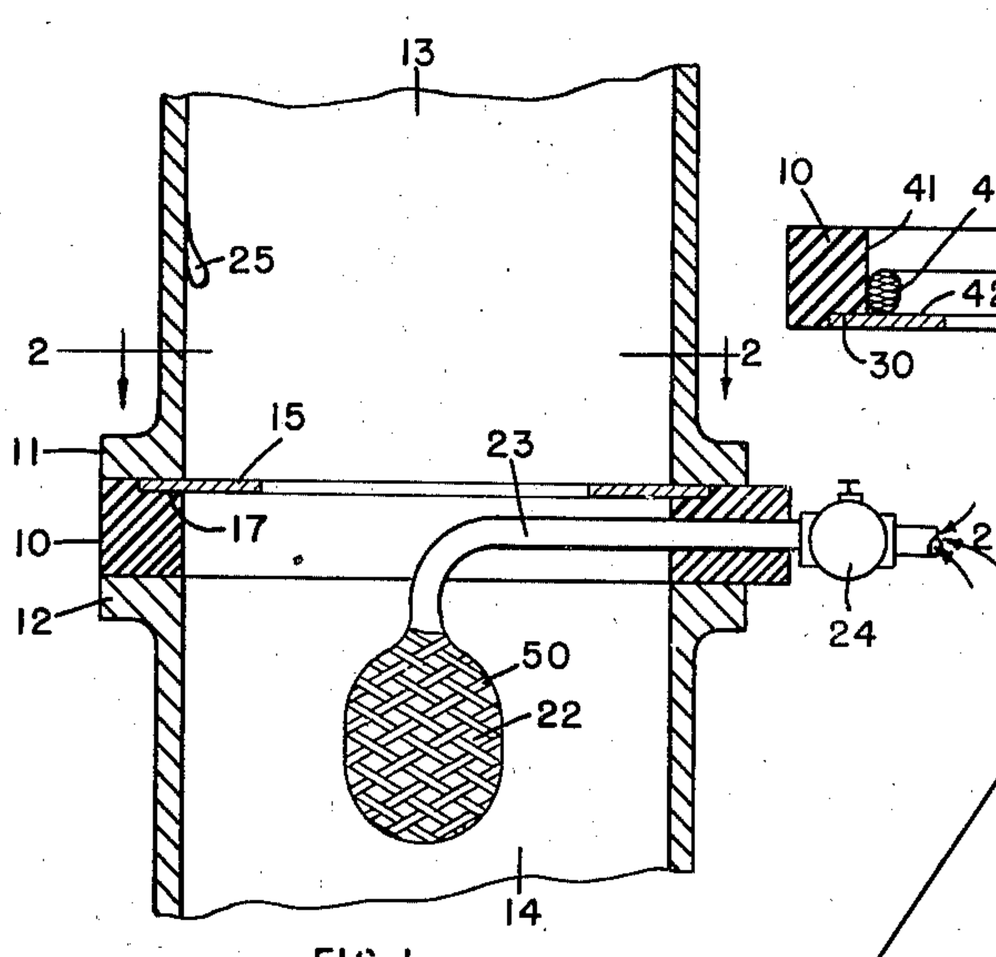

FIG. 1

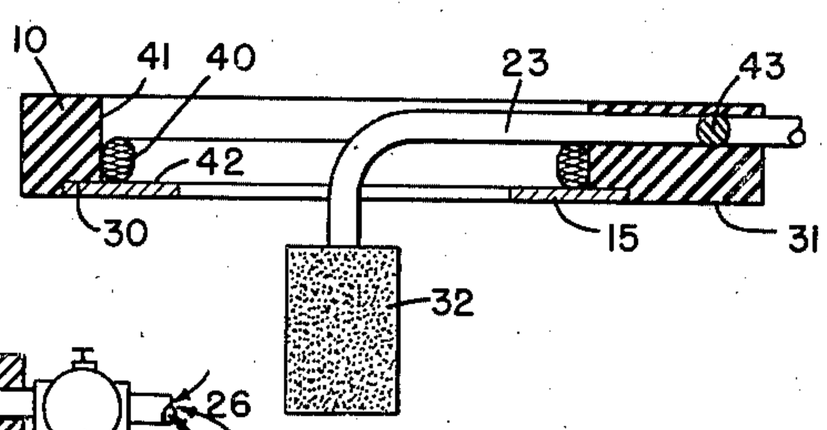

FIG. 3

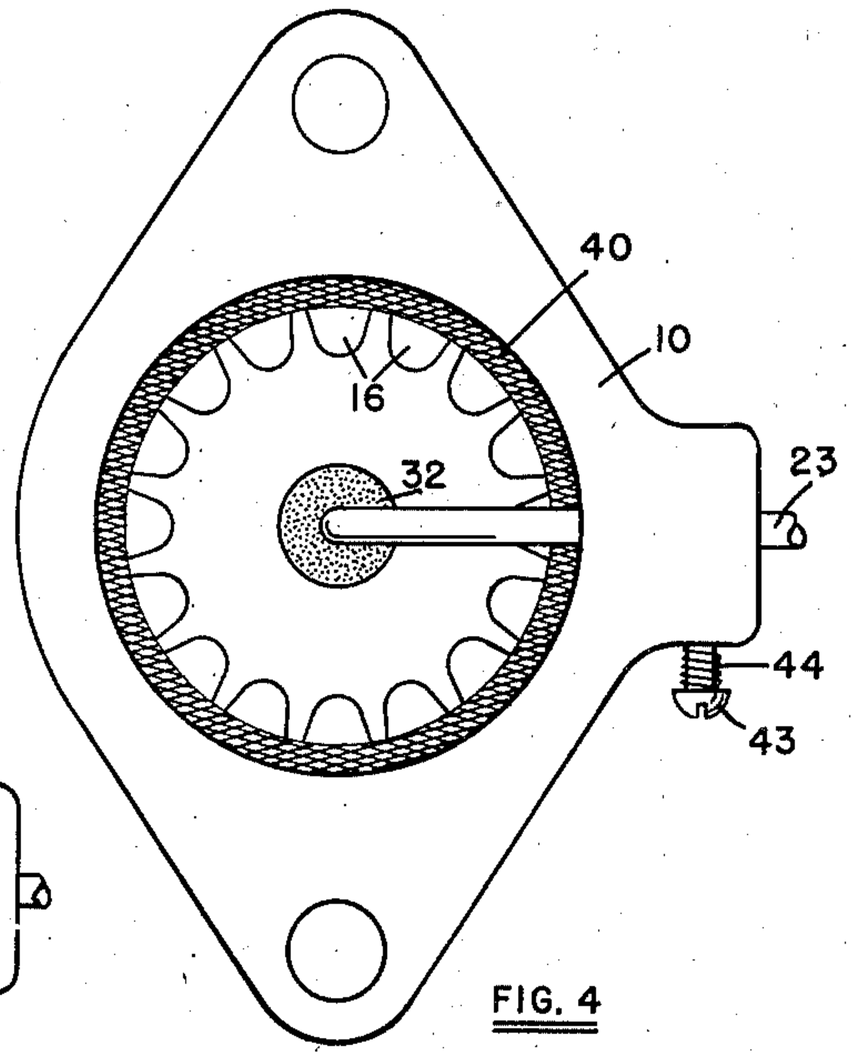

FIG. 4

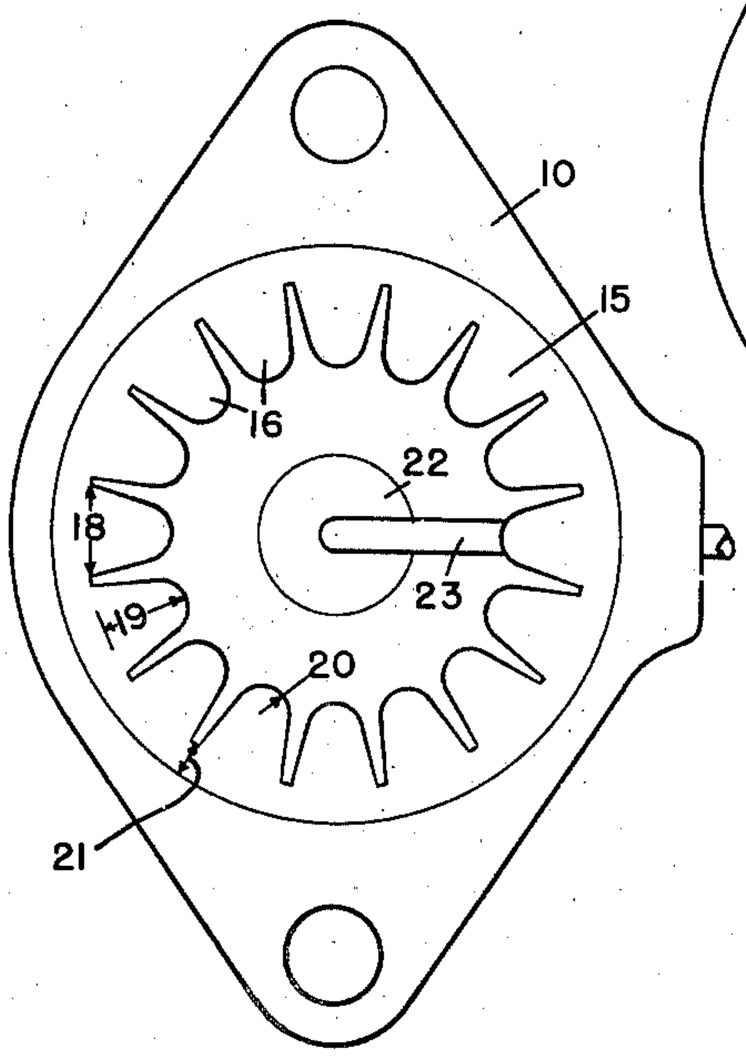

FIG. 2

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FUEL ABSORBER AND REVAPORIZER

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9 Claims. (Cl. 48—180)

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This invention relates to a fuel absorber and revaporizer which may be secured between the standard carburetor and intake manifold of an internal combustion engine.

This application is a continuation in part of my copending United States patent application, Serial Number 543,825, filed July 7, 1944.

An object of my invention is to provide a device which will collect the raw or unatomized fuel normally present in the outlet tube of a carburetor and for vaporizing this fuel by means of an auxiliary source of air.

Another object of the invention is to provide a device having the hereinabove-described characteristics, and which is adapted to collect the raw or unvaporized fuel deposited on the outer wall of the outlet tube leading from a carburetor and to deflect such fuel into the central portion of the outlet tube for the purpose of subjecting such unvaporized fuel to the vaporizing action of the vaporized fuel passing through said tube.

Still another object of the invention is to provide a device having the hereinabove-described characteristics which may be readily associated with the existing carburetor and intake manifold assembly of an automotive internal combustion engine without necessitating structural or functional changes of the carburetor.

Another object of the invention is to provide a device which will give continuous service and which is inexpensive and easily manufactured by modern mass production methods.

These and other objects may be attained by the means described herein, and as disclosed in the accompanying drawings in which:

Fig. 1 is a vertical sectional view of the device of the present invention located between the adjacent flanges of a carburetor outlet tube and an intake manifold.

Fig. 2 is a view taken on line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view of a modified form of my invention.

Fig. 4 is a view similar to Fig. 2 but showing the modification of Fig. 3.

With reference to the drawing, it will be observed that the present device comprises a gasket or body portion 10 which is adapted to be bolted between flanges 11 and 12 of a carburetor outlet tube 13 and an intake manifold 14.

An annular disc like member 15 having a plurality of spaced radially disposed deflectors or fingers 16 is carried by an annular recess 17 provided in the upper face of the gasket or body portion 10.

In the preferred embodiment of the device,

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sixteen deflectors or fingers 16 are provided. Although I am not able to explain the reason, I have found that the most satisfactory results are obtained when the relative proportions of the deflectors or fingers 16 are such that the root or base dimension 18 is substantially equal to the height dimension 19, and wherein the sides of the deflectors taper inwardly from the base member on a slope of from 1:4½ to 1:8. In the preferred embodiment of the invention the ends of the deflectors are rounded off, see radius 20, Fig. 2. Dimension 21 is dependent upon the strength characteristics of the material from which the annular member 15 is fabricated.

A porous absorber member 22, which may be fabricated from a wad of loosely packed material such as, by way of example, shredded copper, or other suitable material not adversely affected by the prolonged contact with hydrocarbonaceous fuels, may be secured to and carried by one end of an auxiliary air tube 23, the other end of which passes through the gasket or body portion 10, terminating exteriorly thereof.

Preferably, though not necessarily, an air-metering device, such as, by way of example, a valve or pet cock 24 is provided in air tube 23 as shown.

It has been observed that excellent results are obtained when the dimensions of the absorber member 22 are approximately three-quarters of an inch in diameter by three-quarters of an inch long.

With devices constructed in accordance with the above teachings the performance of 4, 6, and 8-cylinder automotive internal combustion engines has been uniformly improved to the extent that six gallons of fuel will do what it required eight gallons of the same type of fuel to do before the present device was installed.

In operation, the raw or unvaporized fuel, denoted by the numeral 25, which is deposited on and drips or runs down the inner face of the carburetor outlet tube 13 will be collected on annular member 15 and the deflectors 16. The stream of air-borne volatilized fuel passing downwardly through the carburetor outlet tube will sweep the particles of raw fuel toward the center of annular member 15 thereby deflecting the particles of raw fuel onto absorber member 22. The inherent characteristics of the absorber member will permit the raw fuel to readily penetrate into it whereby the raw fuel particles will be effectively collected in the center portion of the air-borne stream of volatilized fuel passing from the carburetor into the intake manifold.

Auxiliary air, denoted by the arrows **26** will enter air tube **23** and be discharged interiorly of absorber member **22**. It has been found that by thus introducing an auxiliary supply of air into absorber member **22** the raw fuel particles deposited therein will be almost instantly volatilized and blended in gaseous form into the stream of air-borne volatilized fuel.

Unlike other devices of the so-called gas-saver type the instant device does not provide the internal combustion engine with mixtures so lean as to burn the valves of the engine. Preferably the vacuum within the intake manifold should not be reduced more than 2'' of water by the addition of the instant device. This figure may be established and maintained by reason of the air-metering device **24**.

With reference now to Fig. 3, it will be observed that the annular disc like member **15** is seated within an annular recess **30** provided in the lower face **31** of the gasket or body portion **10**.

The porous absorber member, denoted by the numeral **32**, differs from absorber member **22** disclosed in Figs. 1 and 2 in that it is fabricated from a quantity of granular particles of metal fused together by pressure in such a manner as to provide a filtering medium. Auxiliary air tube **23** extends through the wall of the gasket or body portion **10** and terminates interiorly of absorber member **32**, whereby to effect substantially the same operating characteristics as are obtained when using the wad type of absorber member disclosed in Figs. 1 and 2.

An auxiliary absorber member **40** in the form of a continuous length of loosely woven or braided material such as, by way of example, copper or other suitable material not adversely affected by prolonged contact with hydrocarbonaceous fuels, is provided circumferentially of the inner wall **41** of the body portion with its lower edge resting upon the upper face **42** of the annular disc like member **15**.

The auxiliary absorber member noticeably increases the efficiency of the device disclosed in Fig. 1 since the raw or unvaporized fuel, denoted by the numeral **25** in Fig. 1, will drip or run down the inner face of the carburetor outlet tube **13** thence into the auxiliary absorber member. Capillary attraction, and the inherent characteristics of the auxiliary absorber member will cause the raw fuel to be distributed over a comparatively large area, thereby aiding evaporation and volatilization of the raw fuel before it reaches disc like member **15**. However, in the event that the quantity of raw or unvaporized fuel which trickles down wall **13** should be too great to be dissipated by means of the auxiliary absorber member, the particles of raw fuel which would drain off of the auxiliary absorber member will be collected on deflectors **16** of disc **15** in such a manner that the main stream of air-borne volatilized fuel passing downwardly through the carburetor outlet tube will sweep the particles of raw fuel from fingers **16** onto absorber member **32**.

Another distinction between the devices disclosed in Figs. 3 and 4 from those of Figs. 1 and 2 resides in the fact that a set screw **43** has been utilized for metering the flow of air through tube **23** in lieu of the valve **24** of Fig. 1. Spring **44** may be provided, as disclosed in Fig. 4, for maintaining the setting of screw **43** at any desired setting. It will be understood that the shank of screw **43** is adapted to extend into and through air passageway **23** in such a manner as to effect a metering of the flow of air through tube **23**.

It should be understood that the absorber members **32** and **22** may be interchanged if desired without impairing the operating characteristics of either device. It should also be borne in mind that if desired the auxiliary absorber member **40** may be provided with the device of Fig. 1, in which event it would be preferably secured to the carburetor side of annular member **15** in such a manner as to engage the inside of walls **13** of the carburetor outlet tube for intercepting and absorbing the particles of raw or unvaporized fuel **25**.

I have found that by providing a braided-like cover member, denoted generally by the numeral **50**, around a wad of loosely packed material, such as shredded metal or even non-metallic substances which are capable of retaining their filtering characteristics even though saturated with hydrocarbonaceous fuel, the absorber member will be sufficiently rugged, from a structural standpoint, to withstand the conditions which exist interiorly of the outlet tube of the carburetor of an internal combustion engine.

For clarity of detail, and in order to enable others to practice my invention, absorber member **32**, disclosed in Figs. 3 and 4, may be fabricated from commercially obtainable "Porex" which is a product of powder metallurgy. This material, which is referred to by name merely for the purpose of indicating a concrete example, has the inherent characteristic qualities of being able to diffuse and filter which makes it ideally suited for my absorber.

It should be borne in mind that the physical characteristics of absorbers **22** and **32** are such that they will readily permit passage of air while at the same time affording a vast area over which the particles of raw fuel may be distributed.

From the foregoing it will be observed that I have provided a simple and inexpensive, yet highly efficient device for utilizing the raw or unvolatilized fuel which would otherwise be wasted.

It should also be observed that the instant device likewise increases the efficiency of the carburetor by introducing auxiliary air into the center of the stream of combustible mixture flowing from the carburetor into the intake manifold. It should be understood that certain changes in the structural details of the device may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. A fuel absorber and revaporizer adapted to be located between the carburetor outlet tube and the intake manifold of an internal combustion engine, which comprises in combination, a body member having a central passageway for establishing communication between the carburetor outlet tube and the intake manifold, an annular recess provided in the carburetor side of said body portion, an annular member including a plurality of radially disposed deflectors carried by and secured in said annular recess, an absorber member disposed below and centrally of the central passageway of said body portion, and means extending through said body portion for interconnecting the interior of said absorber member with the atmosphere.

2. A fuel absorber and revaporizer adapted to be located between the carburetor outlet tube and the intake manifold of an internal combustion engine, which comprises in combination, a body

member having a central passageway for establishing communication between the carburetor outlet tube and the intake manifold, an annular recess provided in the carburetor side of said body portion, an annular member including a plurality of radially disposed deflectors carried by and secured in said annular recess, an absorber member disposed below and centrally of the central passageway of said body portion, said absorber member comprising a wad of loosely woven material characterized by its ability to withstand the deleterious action of hydrocarbonaceous fuels, means extending through said body portion for interconnecting the interior of said absorber member with the atmosphere, and means disposed in said last-mentioned means for metering the flow of air therethrough.

3. A fuel absorber and revaporizer adapted to be located between the carburetor outlet tube and the intake manifold of an internal combustion engine, which comprises in combination, a body member having a central passageway for establishing communication between the carburetor outlet tube and the intake manifold, an annular recess provided in the carburetor side of said body portion, an annular member including a plurality of radially disposed deflectors carried by and secured in said annular recess, and wherein the dimensional characteristics of each individual deflector are characterized by the base dimension being substantially equal to the height dimension and with the sides tapering inwardly from the base member, and wherein the innermost ends of said deflectors are free from sharp corners, an absorber member disposed below and centrally of the central passageway of said body portion, and means extending through said body portion for interconnecting the interior of said absorber member with the atmosphere.

4. A fuel absorber and revaporizer adapted to be located between the carburetor outlet tube and the intake manifold of an internal combustion engine, which comprises in combination, a body member having a central passageway for establishing communication between the carburetor outlet tube and the intake manifold, an annular recess provided in the carburetor side of said body portion, an annular member including a plurality of radially disposed deflectors carried by and secured in said annular recess, and wherein the dimensional characteristics of each individual deflector are characterized by the base dimension being substantially equal to the height dimension and with the sides tapering inwardly from the base member on a slope from 1:4½ to 1:8, and wherein the innermost ends of said deflectors are free from sharp corners, an absorber member disposed below and centrally of the central passageway of said body portion, and means extending through said body portion for interconnecting the interior of said absorber member with the atmosphere.

5. A fuel absorber and revaporizer adapted to be located between the carburetor outlet tube and the intake manifold of an internal combustion engine, which comprises in combination, a body member having a central passageway for establishing communication between the carburetor outlet tube and the intake manifold, an annular recess provided on the manifold side of said body portion, an annular member including a plurality of radially disposed deflectors carried by said annular recess, an absorber member disposed below and centrally of the central passageway of said body portion on the manifold side thereof, an auxiliary absorber member disposed within the central passageway of said body member and disposed on the carburetor side of said annular member, and means extending through said body portion for interconnecting the interior of said absorber member with the atmosphere.

6. A fuel absorber and revaporizer adapted to be located between the carburetor outlet tube and the intake manifold of an internal combustion engine, which comprises in combination, a body member having a central passageway for establishing communication between the carburetor outlet tube and the intake manifold, an annular recess provided in the manifold side of said body portion, an annular member including a plurality of radially disposed deflectors carried by and secured in said annular recess, an absorber member disposed below and centrally of the central passageway of said body portion and extending toward and into the intake manifold, said absorber member comprising a plurality of metallic particles bonded together for providing a porous member characterized by its ability to withstand the deleterious action of hydrocarbonaceous fuels and by its ability to permit the passage of fuel and air therethrough, means extending through said body portion for interconnecting the interior of said absorber member with the atmosphere, and means disposed in said last-mentioned means for metering the flow of air therethrough.

7. A fuel absorber and revaporizer adapted to be located between the carburetor outlet tube and the intake manifold of an internal combustion engine, which comprises in combination, a body member having a central passageway for establishing communication between the carburetor outlet tube and the intake manifold, an annular recess provided in the manifold side of said body portion, an annular member including a plurality of radially disposed deflectors carried by and secured in said annular recess, an absorber member disposed below and centrally of the central passageway of said body portion and extending toward and into the intake manifold, said absorber member comprising a plurality of metallic particles bonded together for providing a porous member characterized by its ability to withstand the deleterious action of hydrocarbonaceous fuels and by its ability to permit the passage of fuel and air therethrough, an auxiliary absorber member disposed within the central passageway and located on the carburetor side of the annular member, means extending through said body portion for interconnecting the interior of said absorber member with the atmosphere, and means disposed in said last-mentioned means for metering the flow of air therethrough.

8. A fuel absorber and revaporizer adapted to be located between the carburetor outlet tube and the intake manifold of an internal combustion engine, which comprises in combination a body member having a central passageway for establishing communication between the carburetor outlet tube and the intake manifold, an annular recess provided in the carburetor side of said body portion, an annular member including a plurality of radially disposed deflectors carried by and secured in said annular recess, an absorber member disposed below and centrally of the central passageway of said body portion, said absorber member comprising a wad of loosely woven material characterized by its

ability to withstand the deleterious action of hydrocarbonaceous fuels, an auxiliary absorber member disposed above and carried by said annular member, said absorber member comprising a length of loosely woven or braided material characterized by its ability to withstand the deleterious action of hydrocarbonaceous fuels, means extending through said body portion for interconnecting the interior of said absorber member with the atmosphere, and means disposed in said last-mentioned means for metering the flow of air therethrough.

9. A fuel absorber and revaporizer adapted to be located between the carburetor outlet tube and the intake manifold pipe of an internal combustion engine, which comprises in combination, a body member having a central passageway for establishing communication between the carburetor outlet tube and the intake manifold pipe, means secured to and carried by said body member for deflecting the materials of combustion passing through said carburetor outlet tube toward the center of said intake manifold pipe, and an absorber member carried by and located below said body member and centrally of said intake manifold pipe and located in the path of the materials of combustion deflected by said first-mentioned means.

ELBERT J. WULFHORST.

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