

[54] **FUEL ATOMIZING DEVICE AND VAPORIZER**

[76] Inventor: **Henry L. Daniels**, Box 223,  
Munfordville, Ky. 42765

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[51] Int. Cl.<sup>2</sup> .... **F02M 29/00**

[58] Field of Search .... **123/141; 48/180 R**

[56] **References Cited**

**UNITED STATES PATENTS**

|           |         |                     |          |
|-----------|---------|---------------------|----------|
| 889,323   | 6/1908  | Morgan .....        | 48/180 R |
| 942,503   | 12/1909 | Jacobs .....        | 123/141  |
| 1,874,894 | 8/1932  | Calbey .....        | 48/180 R |
| 1,937,875 | 12/1933 | Denman .....        | 123/141  |
| 2,415,668 | 2/1947  | Barabino .....      | 48/180 R |
| 3,615,296 | 10/1971 | Guarnaschelli ..... | 123/141  |

**FOREIGN PATENTS OR APPLICATIONS**

637,493 2/1962 Canada ..... 123/141

*Primary Examiner*—Charles J. Myhre

*Assistant Examiner*—R. H. Lazarus

*Attorney, Agent, or Firm*—Clarence A. O'Brien;  
Harvey B. Jacobson

[57] **ABSTRACT**

A fuel mixture atomizer is mounted in an atomizing zone between the carburetor barrel and the intake manifold of a combustion engine to enhance mixing and vaporization of the liquid fuel entrained in the in-flow of air induced by engine vacuum. A plurality of axially spaced, flow deflecting discs within the fuel atomizing zone, create vacuum regions therebetween causing lateral oscillation of the flowing air and fuel with different amplitudes.

**3 Claims, 3 Drawing Figures**

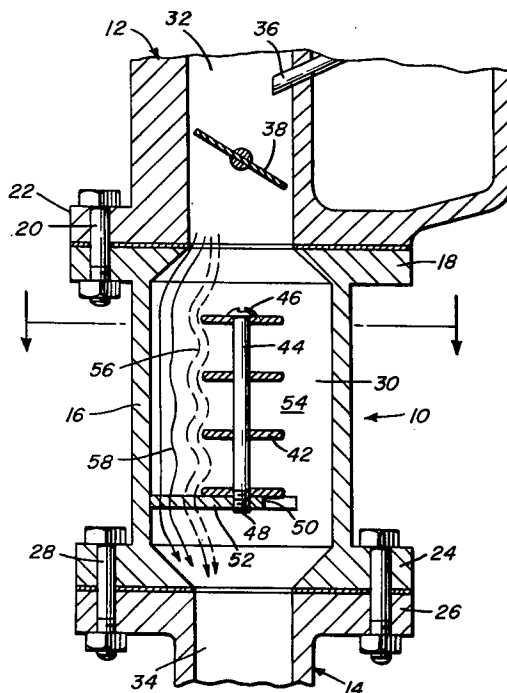


Fig. 1

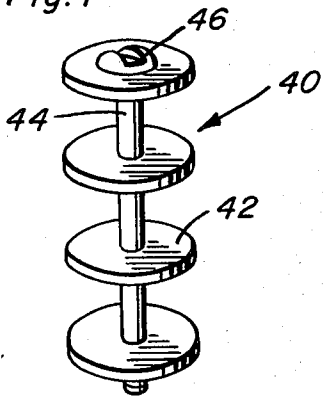


Fig. 3

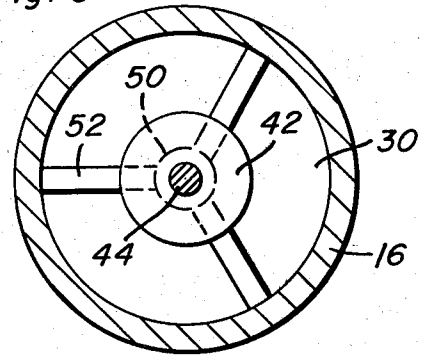
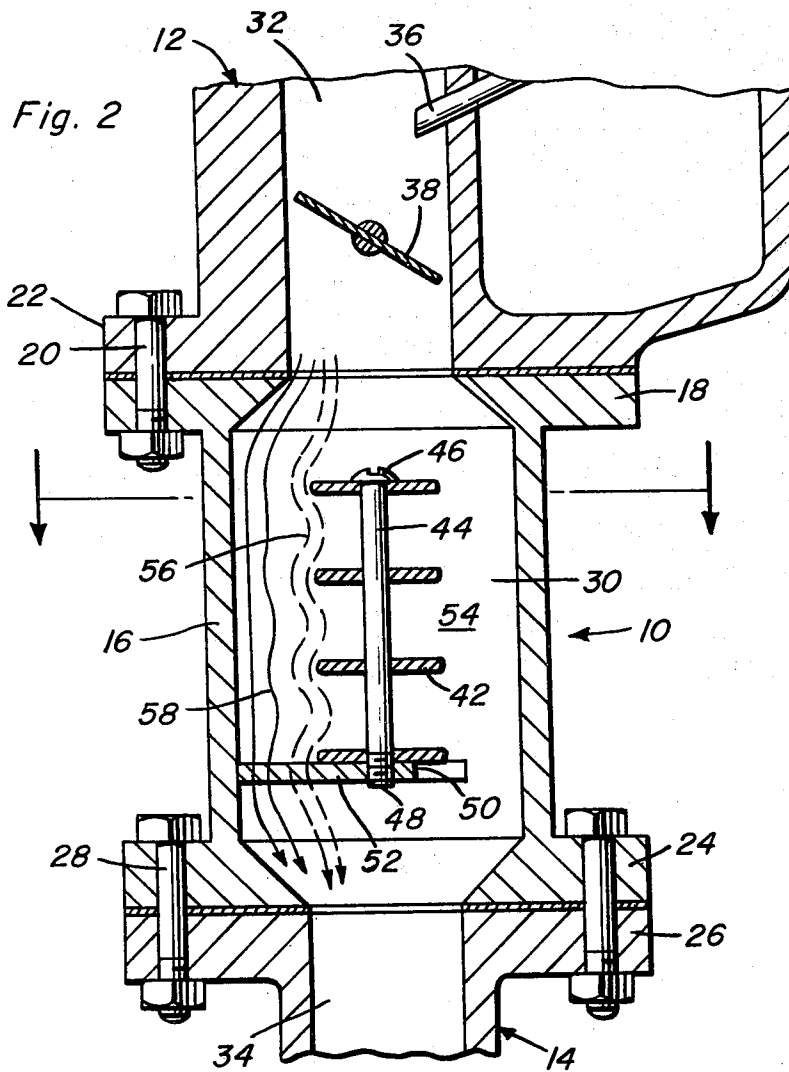


Fig. 2



## FUEL ATOMIZING DEVICE AND VAPORIZER

This invention relates to a device for economizing on the consumption of fuel by internal combustion engines in automotive vehicles, and more particularly to a fuel atomizing and vaporizing device.

Various fuel atomizing and vaporizing devices have heretofore been proposed for the purpose of obtaining a fuel air mixture capable of undergoing combustion with greater efficiency. Such prior devices, however, involve the baffling of the fuel mixture necessarily resulting in turbulence which in itself contributes to losses. It is, therefore, an important object of the present invention to provide a device adapted to be inserted between the casing of a carburetor and the intake manifold of an internal combustion engine which enhances the mixing of the liquid fuel and air in such a manner as to avoid turbulence and enhance evaporation or atomization of the liquid fuel.

In accordance with the present invention, the air fuel mixture is conducted from the carburetor to the intake manifold through the passage of a connecting conduit wherein lateral oscillations are imparted to the fluid flow stream by axially spaced, circular disc elements between which vacuum pressure regions are created. The dimensions of the flow deflecting discs and their axial spacing is such as to avoid destruction of lamina flow while producing the lateral oscillations of the flow stream. The amplitude of the oscillations imparted to the heavier or denser liquid fuel is less than that of the air thereby producing relative movement between the molecules of the liquid fuel and air to enhance atomization and vaporization of the liquid fuel. Suitable means is provided to support the assembly of axially spaced discs within a central portion of the conduit passage.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a perspective view showing the flow deflecting assembly of the present invention.

FIG. 2 is a side sectional view through a typical installation for the present invention.

FIG. 3 is a transverse sectional view taken substantially through a plane indicated by section line 3—3 of FIG. 2.

Referring now to the drawings in detail, FIG. 2 illustrates in side section the device of the present invention generally denoted by reference numeral 10 positioned as an adapter between the lower end of a typical single barrel carburetor 12 and the fuel intake manifold 14 associated with an internal combustion engine. The fuel atomizing device 10 includes a conduit section 16 having an upper flange 18 secured by a plurality of fastener assemblies 20 to the lower flange 22 of the carburetor 12. A mounting flange 24 is also provided at the lower end of the conduit 16 for attachment to the flange 26 of the intake manifold 14 by a plurality of fastener assemblies 28. A volumetrically enlarged passage 30 is positioned by the conduit section 16 in axial alignment between the down draft passage 32 of the carburetor and the inlet passage 34 of the intake manifold 14. As is well known to those skilled in the art, a liquid fuel is injected into the carburetor passage 32 from a

fuel jet 36 in order to form a fuel-air mixture supplied to the intake manifold at a rate controlled by the butterfly throttle valve 38. The inflow of air through the carburetor which mixes with the liquid fuel is induced by the engine vacuum communicated to the carburetor through the intake manifold. In accordance with the present invention, the fuel air mixture is conducted through the passage 30 in order to insure more complete combustion of the fuel therein so as to reduce the amount of unburned hydrocarbons from the exhaust of the engine.

A flow deflecting assembly generally referred to by reference numeral 40 is centrally positioned within the flow passage 30. In the illustrated embodiment, the flow deflecting assembly 40 includes a plurality of circular discs 42 respectively fixed to an elongated stem 44 having a slotted head 46 at one end and an opposite threaded end 48. The threaded end 48 is adapted to be threadedly connected to a support 50 centrally positioned within the lower end of the passage by a plurality of radially inwardly extending spokes or arms 52 secured to the internal wall surface of the conduit section 16.

The fluid flow stream conducted through the passage 30 will be deflected by the circular discs 42 to thereby create vacuum regions 54 located axially between the discs. The discs and their spacing relative to passage 30 are dimensioned so as to avoid any turbulence resulting in lateral oscillation of the flow streams. As diagrammatically shown in FIG. 2, the less dense portions of the fluid mixture conducted through the passage 30, labelled 56, will oscillate laterally under the influence of the vacuum regions 54. The vacuum regions will, however, have less of an effect on the more dense portions of the flow stream, labelled 58 in FIG. 2. Accordingly, the molecules of the less dense air in the fluid mixture will be oscillated at an amplitude substantially greater than the oscillation amplitude of the molecules of liquid fuel in the flow stream conducted through the passage 30. This will result in relative movement between the molecules of air and liquid fuel resulting in more complete mixing, atomization and vaporization of the liquid fuel. The foregoing effect is achieved without moving parts and without creating turbulence.

The foregoing is considered as illustrative only of the principles of the invention. Further, 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 and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. In combination with a carburetor supplying a mixture of liquid fuel and air to an intake manifold of an internal combustion engine, a fuel atomizing device comprising a conduit conducting the fuel-air mixture in one direction therethrough from the carburetor to the intake manifold and defining an atomizing zone intermediate the opposite ends of said conduit, said zone including a central longitudinal area bounded by an outer peripheral area extending about said central area and along said zone, and stationary flow deflecting means mounted within said central area and operative to impart lateral inward and outward oscillations to at least portions of the fuel and air in the mixture moving through said outer peripheral area at respectively different amplitudes in response to pressure differential

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induced flow of said mixture in said one direction, said flow deflecting means including a fixed central mounting stem, and a plurality of axially spaced generally flat discs secured to said stem defining low pressure pockets therebetween within the flow stream of said fuel-air mixture and disposed wholly within said central area.

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2. The combination of claim 1 wherein the amplitude of said lateral oscillations imparted to the air is greater than those imparted to the fuel.

5 3. The combination of claim 1 wherein said flow deflecting elements are circular discs.

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