

[54] **GASOLINE VAPORIZER APPARATUS**

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[51] Int. Cl. **F02m 29/00**

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48/180 B, 180 S, 180 M, 180 R; 261/DIG. 5,
84, 89

[56] **References Cited**

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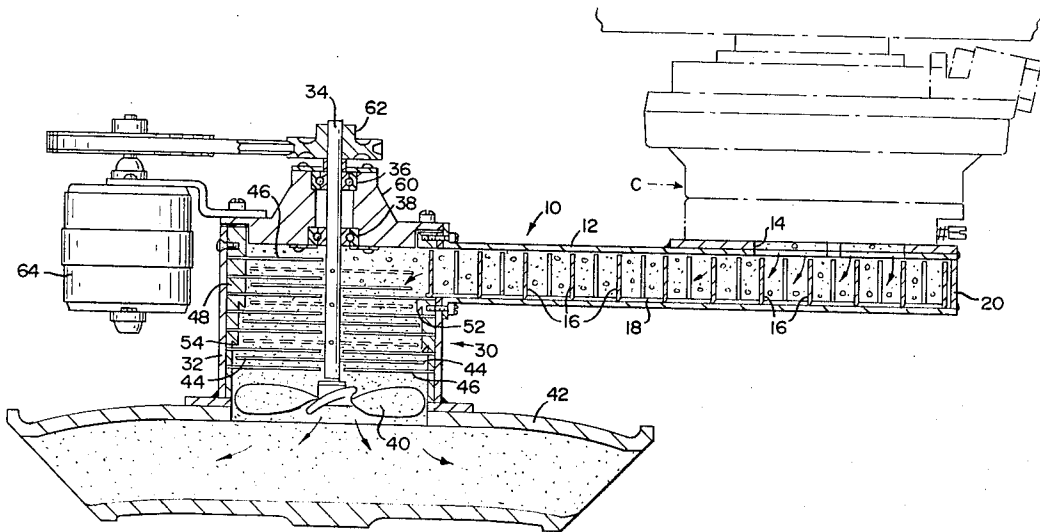
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[57] **ABSTRACT**

This vaporizer device is for connection between the carburetor outlet and the manifold inlet of a combustion engine. It comprises a conduit for receiving the air-fuel mix from the carburetor and for flow of the mix through the conduit which has a plurality of smooth fingers operatively positioned in the conduit normal to the flow path of the air-fuel mix, and a means connects to the conduit to receive the air-fuel mix therefrom. Such means includes a housing having a driven center shaft suspended therein and provided with a fan member at its lower end. A plurality of radially extending arms or fingers are carried by the shaft at axially spaced portions thereon and a second set of arms or fingers is secured to the housing and extends radially inwardly therefrom with the arms of the different sets being interleaved with each other for further agitation of the fuel-air mix as it moves through such means.

8 Claims, 4 Drawing Figures



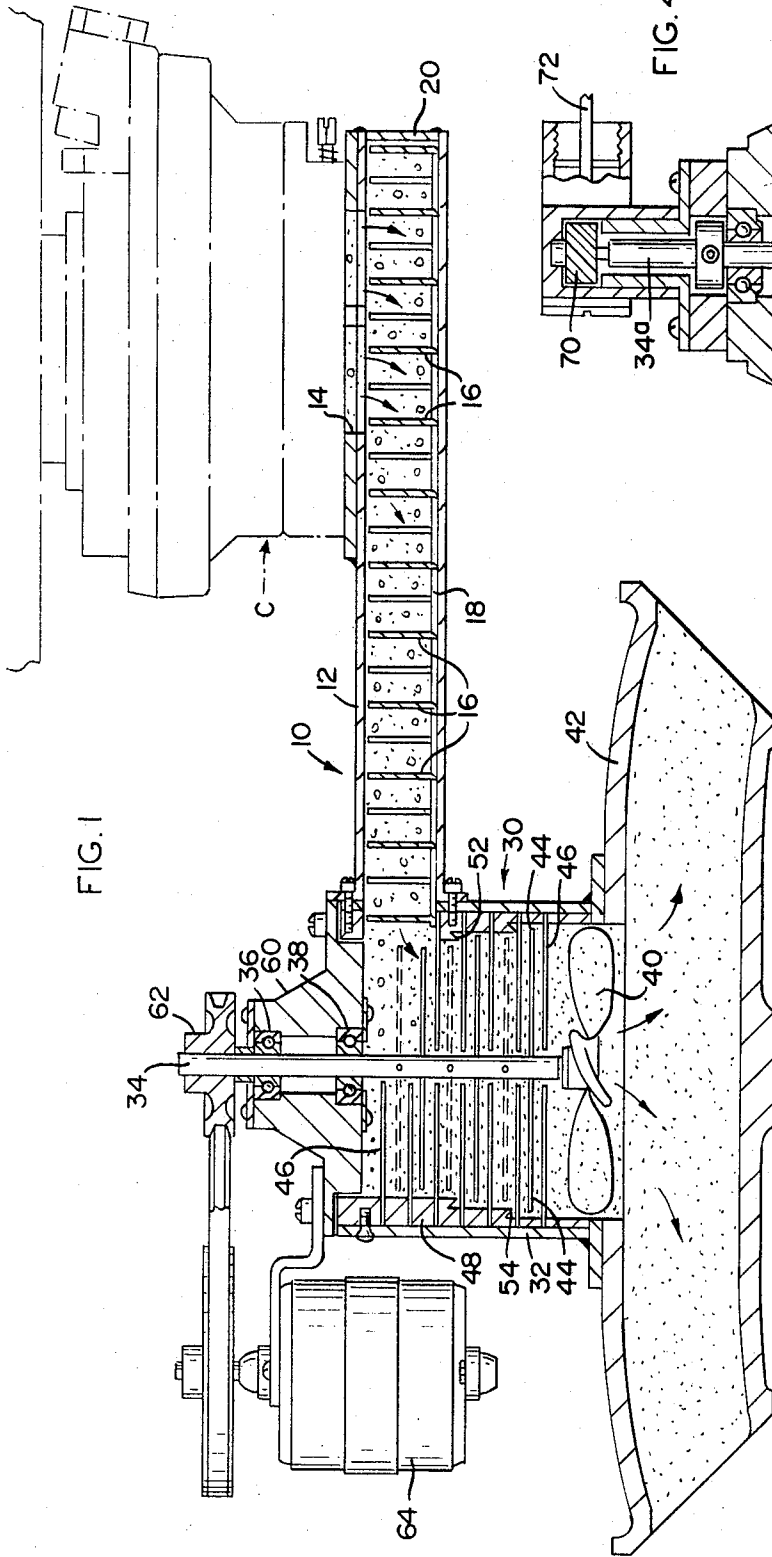


FIG. 1

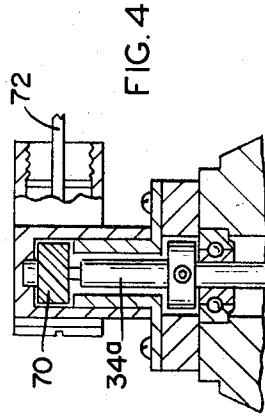


FIG. 4

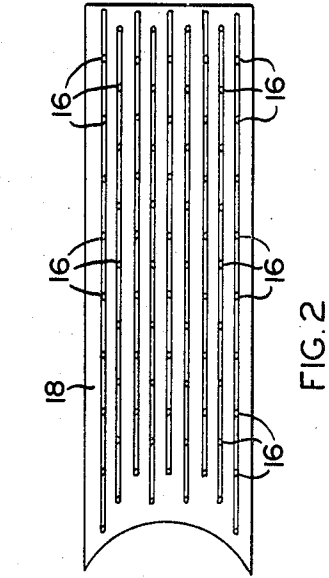


FIG. 2

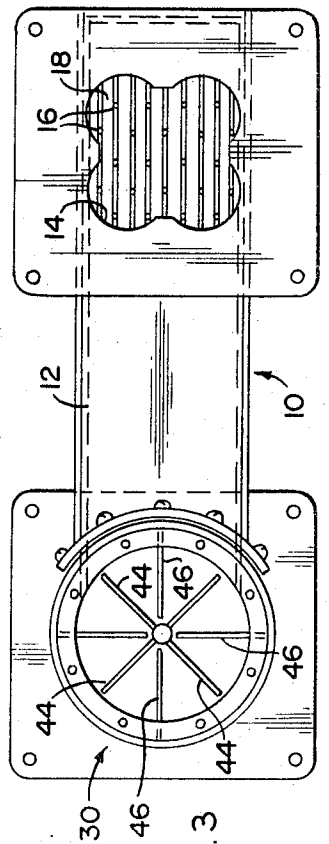


FIG. 3

GASOLINE VAPORIZER APPARATUS

This invention relates to gasoline vapor devices and particularly to a device for improving the fuel-air mix supplied to a combustion engine to improve the operating efficiency and combustion efficiency thereof.

BACKGROUND OF INVENTION

Heretofore there have been many, many efforts made to improve the efficiency of combustion engines. Especially, at the present time, it is very desirable to have complete combustion of the fuel in a combustion engine and to prevent the discharge of unburned fuel and/or carbon monoxide from the engine to avoid or reduce air pollution by the engine.

It is believed that some of the inefficiency of combustion engines result from supply to the engine of fuel thereto still in liquid form, and it is also believed that the engine may not draw, by vacuum alone, sufficient gas-fuel mix thereinto for maximum power output of the engine.

The general object of the present invention is to avoid and overcome deficiencies in prior types of carburetors and to provide improved means for vaporizing a liquid fuel completely before passage of the same to the inlet port of a combustion engine.

Another object of the invention to provide a relatively uncomplicated, inexpensive device for aiding in the vaporization of liquid fuel before it is transmitted to a combustion engine.

A further object of the invention is to provide mechanical means for aiding in agitating a fuel-air mix to break up any liquid fuel droplets in the mix and to vaporize the fuel by turbulence in the air-fuel mix flow, as well as by physical impingement of means against the fuel droplets.

Another object of the invention is to provide a fuel-air processing means portions of which can be readily removed for cleaning or replacement purposes, and to provide a driven fan means in a fuel vaporization unit to facilitate flow of an air-fuel mix therethrough and to aid in forcing the fuel-air mix into a combustion engine.

The foregoing and other objects and advantages of the invention will be made more apparent as the specification proceeds.

Reference now is made to the accompanying drawings, wherein:

FIG. 1 is a vertical section through apparatus embodying the principles of the invention and indicating it in association with a conventional carburetor;

FIG. 2 is a reduced size cross section of the fuel-air conduit forming a part of the apparatus of FIG. 1;

FIG. 3 is a plan view of the apparatus of FIG. 1 with the upper end portion of the housing removed and looking downwardly of the housing; and

FIG. 4 is a fragmentary section of another type of drive means for the apparatus of FIG. 1.

When referring to corresponding members shown in the drawings and referred to in the specification, corresponding numerals are used to facilitate comparison therebetween.

SUBJECT MATTER OF INVENTION

This new gasoline vaporizer apparatus relates to a conduit adapted to be connected to a carburetor to receive the air-fuel mix discharged therefrom, which conduit has a number of fingers or interrupters positioned

therein normal to the path of flow of the air-fuel mix through the conduit, and a second means receives the air-fuel mix from the conduit and transmits it downwardly for further agitation of the air-fuel mix to aid in breaking up any fuel droplets or particles therein. The second means includes a tubular housing having a vertical axis, a driven center shaft suspended in the housing and having a fan member at its lower end, and a plurality of radially extending arms or fingers are carried by the shaft in axially spaced positions thereon. A second set of arms is secured to the housing and they extend radially inwardly thereof in circumferentially and axially spaced positions to be interleaved with the fingers on the first set of arms or fingers for further agitating and breaking up of liquid fuel particles in the air-fuel mix. The lower end of the second means is designed for connection to a conventional manifold of a combustion engine.

Particular attention now is directed to the details of the structure shown in the drawings, and a conventional carburetor is indicated at C in the drawings. This carburetor C connects to the vaporizer apparatus of the invention indicated as a whole by the numeral 10. Such apparatus includes a conduit 12 of substantially rectangular shape in section and which conduit has an entrance opening 14 formed in its top surface, which opening 14 corresponds to the discharge openings in the carburetor for receiving the air-fuel mix therefrom. The conduit has a plurality of vertically extending fingers 16 positioned therein, which fingers are on a vertical axis whereas flow of the air-fuel mix through the conduit is on a horizontal axis. The fingers preferably are formed from an integral carrier or base sheet 18 by punching or striking them therefrom. The sheet 18 is removably associated with the conduit 12. Any suitable end plate 20 or the like is formed on the conduit 12 to close it but provide convenient access thereto.

The conduit engages a second means indicated as a whole by the numeral 30 at the opposite end of the conduit. This means 30 is for further processing the air-fuel mix and further breaking up and vaporizing the particles or drops of fuel in the mix. The means 30 normally includes a substantially tubular housing 32 positioned on a vertical axis. The housing 32 has a driven shaft 34 suitably positioned therein, as by a pair of bearings 36 and 38. A fan 40 is secured to the lower end of the shaft 34 adjacent the discharge end of the housing 32. Such housing 32 is adapted to engage with a conventional manifold 42. This manifold 42 connects to the inlet cylinders of a combustion engine in a conventional manner. The means 30 particularly provides two sets of fingers therein moving in rotation in relation to each other. One set of radially directed axially spaced fingers 44 is provided on and suitably carried by the shaft 34 at axially spaced and circumferentially spaced portions thereof. These fingers 44 are interleaved with a second set of fingers 46, the fingers 46 being secured to the housing 32 and extending radially inwardly thereof in circumferentially and radially spaced positions thereon.

It should be noted that the housing 32 has a removable sleeve or liner 48 provided therein and normally the fingers 46 are secured to the liner 48. The liner 48 has a plurality of shoulders or steps 52 and 54 provided therein to increase the diameter of the housing as approaching the lower or discharge end thereof. All of the sets of fingers 44 and 46 are arranged to be of such

length that they terminate either immediately adjacent the stepped inner surface of the line 48 or else terminate immediately adjacent the shaft 34. Hence, the fingers provide means for intercepting the falling or passage of any drops of material in the air-fuel mix and agitation and physical impingement on these drops of fuel is obtained between the two sets of fingers 44 and 46. The drive of the shaft is at any suitable speed so that the fingers will physically contact fuel drops and knock them into tiny particles which are readily vaporized as the air-fuel mix is passing through the means 30.

The fan 40 also aids in forcing air into a cylinder in an engine and this facilitates the feed of the gas-air mix thereto rapidly and insures complete filling of the cylinders with a desirable quantity of fuel.

The fan 40 and shaft 34 can be driven in any desired manner. Thus, a top bracket 60 is shown positioning the bearings 36 and 38 and a drive pulley 62 is provided on the end of the shaft. Such pulley in turn is shown driven by an electric motor 64 operatively connecting to the fan shaft. Any conventional controls can be provided for this motor for driving the fan to aid in providing the fuel vaporizing action of the invention.

FIG. 4 shows a slight modification of the invention wherein the fan positioning shaft 34a extends up through a positioning bracket and has a drive worm gear 70 secured to the end thereof. This worm type drive gear 70 in turn connects to a member such as a flexible shaft 72 for drive action of the fan in the apparatus. The flexible drive shaft 72 can be operated from the main drive shaft of the motor or be otherwise driven as desired.

The conduit 12 will engage with the carburetor C so that whether two barrels or four barrels of the carburetor are open, the air-fuel mix will flow into and through such conduit. Naturally, all of the flow interrupting means provided in the device of the invention are smoothly contoured and do not have any abrasive or rough surfaces to reduce the tendency for any fuel drops to cling thereto.

By use of the fan 40, a low pressure can be created in the manifold 42 such as about 1 or 2 ounces up to about a pound or less of pressure and this will aid in forcing the air-fuel mix into a cylinder.

The liquid fuel supplied through the carburetor C has been broken up and vaporized in its turbulent, somewhat delayed flow through the vaporizing device of the invention. However, the physical turbulence and physical impingement on the fuel liquid drops as they are being processed greatly aids in providing a larger surface area to the fuel and hence more rapid vaporization thereof.

The device of the invention can be made of any suitable size for attachment to an engine and it aids in providing vaporized fuel to the engine for combustion whereby a rapid and more efficient combustion action is obtained. Likewise, objectionable exhaust gases are

also reduced.

While one complete embodiment of the invention has been disclosed herein, it will be appreciated that modification of this particular embodiment of the invention may be resorted to without departing from the scope of the invention.

I claim:

1. A device for improving the fuel-air mixture for a combustion engine and comprising

a conduit for connection to a carburetor to receive an air-fuel mix therefrom, said conduit having a number of fingers operatively positioned therein normal to the path of flow of the air-fuel mix to aid in breaking up any liquid fuel particles carried by the air-fuel mixture, and

a means connected to said conduit to receive the air-fuel mix therefrom and including a vertically positioned housing, a driven center shaft suspended in said housing and having a fan member secured to its lower end to aid in drawing the air-fuel mix down through the housing, a set of radially extending fingers carried by said shaft in axially and circumferentially spaced positions thereon, a second set of fingers secured to said housing and extending radially thereof and positioned axially intermediate the members of the first set of fingers to agitate the air-fuel mixture and further break up any liquid fuel particles; the lower end of said housing being connectable to a manifold of a combustion engine.

2. A device as in claim 1 where said housing is tubular and has several steps of increased internal diameter from the top to the bottom thereof, and said fingers of said sets are longer at lower portions of said housing with the fingers of said first set being of lengths to end immediately adjacent the inner wall of said housing.

3. A device as in claim 2 where said sets of said fingers extend the length of said housing with the fingers of said sets being uniformly spaced radially and axially of said housing.

4. A device as in claim 1 and including said conduit being connected to an upper side portion of said housing.

5. A device as in claim 1 and where said conduit is of rectangular shape in cross section and said fingers extend the height of said conduit.

6. A device as in claim 1 and comprising said fingers being formed on a member removably carried in said conduit.

7. A device as in claim 1 and where said means has an inlet end and an outlet end and said fan is adjacent the outlet end to aid in drawing the air-fuel mix into and through said conduit and said housing.

8. A device as in claim 1 and including said shaft having variable speed drive means connecting thereto.

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