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(54) Fuel saving device.

(57) A device for increasing fuel efficiency in an internal combustion engine including a rotor assembly (10) positioned entirely within the manifold (14) of the engine and including a post (30) secured to the bottom of the manifold below the carburetor (12) and mounting a freely rotatable rotor (36) on the top of the post adjacent the carburetor opening of the manifold. The rotor includes a plurality of angled slots therethrough whereby the flow of the combustible mixture impels the rotor to spin. The spinning rotor causes the droplets of gasoline to further vaporize, thus boosting the fuel efficiency of the engine.

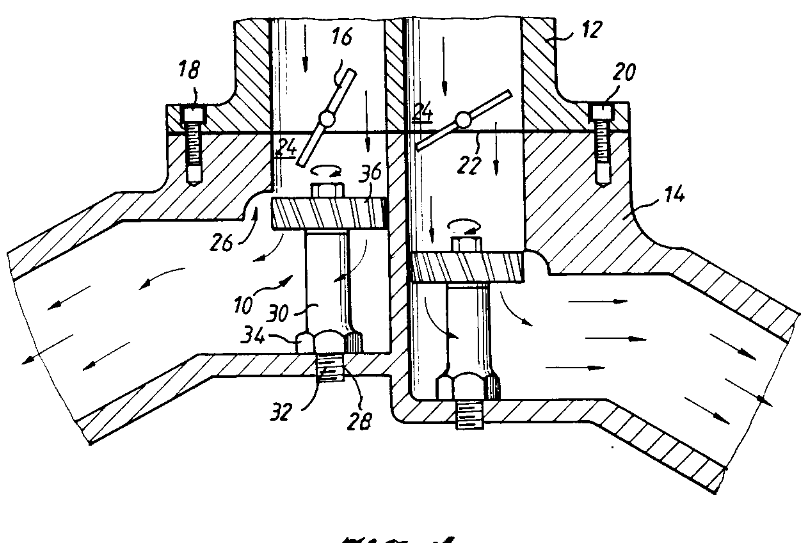

Fig. 1

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BACKGROUND OF THE INVENTION

This invention relates to internal combustion engines and more particularly to an improvement in carburetion by the installation of a rotor assembly in the manifold for the purpose of more throughly atomizing particles of gasoline mot completely vaporized in the carburetor.

The basic function of a carburetor is to provide an intimate mixture of fuel and air for consumption by an internal combustion engine. Efficiency of mixing depends upon atomizing the fuel into minute particles. Large particles, or droplets, allow some of the fuel to avoid contact with air in the combustion chambers of the engine and thus to go through the engine unburned.

The typical modern carburetor provides a duct through which air is drawn by the pumping action of the engine and atomizing is accomplished by delivering fuel in liquid form through a small nozzle to the center of the air stream. Owing to a vacuum which is created in the vicinity of the nozzle by the movement of the air, the fuel is drawn out of the nozzle, separated into droplets and carried into the engine.

It is found, however, that this method of mixing is not perfect. Certain air to fuel ratios are considered optimum for achieving an efficient burning of the fuel-air mixture. For example, fourteen parts air to one part gasoline is considered to be an optimum air to fuel ratio. But considering that with the prior carburetion systems some of the fuel remains in too large of droplets to mix with the air sufficiently to burn in the combustion chambers, the carburetor is usually adjusted to provide an over-abundance of fuel to the engine. This causes waste of the fuel and usually causes the discharge of pollutants into the atmosphere through the engine exaust system. Even with carburetors that are in proper operating condition, exaust analyses show that a significant portion of the fuel is never burned. With the current and ever increasing concern with the shortage of fuels, and the dangers of air pollution, it is becoming urgent to reduce fuel waste and reduce the exaust of pollutants to the atmosphere.

Numerous prior inventors have attemped to address this problem in the past. Many designs of devices have been proposed for more throughly atomizing the fuel after the air-fuel stream exits the carburetor. It is known to place a vaned rotor in the area between the carburetor and the manifold, and that such a rotor, so located, will serve to more throughly atomize the fuel. However, such prior art devices have many practical limitations.

One basic problem with inline devices as are known in the prior art is that the unit disposed between the carburetor and the manifold elevates the carburetor further above the engine. This disrupts all of the plumbing to the carburetor. But more importantly with today's compact engine compartments there is usually not sufficient room to elevate the carburetor without interfering with the closing of the engine compatment's hood. This is increasingly a concern with more emphasis being placed on an aerodynamically efficient exterior body shape.

Another limitation with prior art devices relates to their durability. It can be appreciated that there are significant forces at play in a rapidly spinning rotor assembly. Frictional forces generate sufficient heat that most prior art rotors seize up after a relatively short service life. These problems are compounded by vibration that occurs readily if the rotor is at all out of balance. With prior art rotors having vanes stamped out of sheet metal, balance and durability problems are common. Further, the assembly is in a constant solvent environment (gasoline) and this precludes most common bearing arrangemsnts, and prohibits many materials from being useful as bushings.

Accordingly, it is the general object of the present invention to provide a rotor assembly for improving the fuel efficiency of an internal combustion engine.

Another object is to locate said rotor assembly in the manifold of the engine.

Yet another object is to have no need for elevation of the carburetor in the istallation of the rotor assembly.

A further object is to provide a machined rotor so that balance is improved.

Yet another object is to provide a long wearing bushing assembly.

Still another object is to simplify the structure and installation of the rotor assembly retrofit into an existing engine.

These and other objects and advantages of the pressent invention and the manner in which they are achieved will be made apparent as the specification and claims proceed, taken in conjunction with the drawings which illustrate the preferred embodiment.

SUMMARY OF THE INVENTION

In its basic concept, the present invention is a fuel saving device for use in an internal combustion engine, including a post secured in the bottom of the manifold directly below the carburetor opening and mounting a rotor on top of the post, the rotor having a pluratity of angled slots therethrough whereby the flow of the combustible mixture impels the rotor to spin and thus further atomizes the fuel in the combustible mixture.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side view illustrating the fuel saving device of the present invention in its environment, with fragmentary portions of the carburetor and the manifold shown in section.

Figure 2 is a top plan view of the rotor of the fuel saving device of the present invention.

Figure 3 is a fragmentary exploded view of the component assembly of the fuel saving device of the present invention.

Figure 4 is a perspective view of Fig.1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The fuel saving device of the present invention is shown in its general environment in Figure 1 and Figure 4. A rotor assembly, denoted generally at 10 is mounted below carburetor 12 in manifold 14. The carburetor is of the conventional type, witbout any special modification. As such, only a fragmentary part of it is shown in the drawings, including its base and a throttle plate 16 in its barrel. The carburetor is secured to the manifold conventionally by bolts 18 and 20, with a gasket 22 for sealing purposes. It is to be noted that the height or position of the carburetor is not modified by the installation of the rotor assembly of the present invention.

In the top of manifold 14 is a hole or carburetor opening denoted at 24 aligned with the barrel of the carburetor. In most engines there is an exact alignment of the hole, straight into the manifold. Inside the manifold the interior is flared out as illustrated at 26.

To install the rotor assembly 10 in the manifold 14 a hole 28 is drilled and threaded in the bottom of the manifold directly below the center of the carburetor opening 24. The rotor assembly includes a post 30 which has a bottom end 32 which is a machined threaded section for engagement into hole 28. The bottom of the post 34 is preferably of hexagonal rod stock for the purpose of fitting with a socket wrench for easy and seure installation. A thread lock compound is used on threaded end 32 end the installation is permanent.

A rotor 36 is mounted on top of the post 30. The rotor is preferably a circular plate of solid material such as aluminum. A plurality of slots 38 are machined or otherwise formed into the rotor. Figure 2 illustrates the top of the rotor. It can be seen the particular configuration of the angled slots. Each slot is formed at from 20 to 45 degrees from vertical, preferably about 30 degrees. The number of slots may vary from 6 to 24 slots around the circumference of the rotor, preferably about 12 slots as shown. The critical thing is the balance of the rotor, which can be maintained by careful fabrication of the slots.

The position of the rotor 36 in manifold 14 is very important. Preferably the rotors top surface is located just at the bottom of the carburetor opening 24 at the point of the beginning of the flared out section 26. The diameter of the rotor is preferably substantially equal to the size of the carburetor opening, just enough undersized to be able to fit the rotor through the opening for installation. Of course the height and diameter of the rotor are individual for each type of engine. For those engines having more than one barrel carburetor, a corresponding number of rotor assemblies of the present invention are installed. The arrows in Figure 1 illustrate the flow of the combustible material through the slots and the resultant direction of the spinning of the rotor.

Figure 3 best illustrates the components of the rotor assembly 10. Retainer means is provided for holding the rotor 36 on the post 30. Preferably this comprises a threaded hole 40 in the top of the post which receives a bolt 42. The depth of the hole is so sized that the bolt binds before tightly gripping rotor 36, thus allowing the rotor to rotate freely on top of the post. The bolt extends through a bushing 44 which is press fit on axis into the rotor. Two washers 46.48 are disposed both side of the rotor. The bushing and washer provide bearing means for facilitating the rotation of the rotor on the post.

Bushing 44 is preferably made of a self lubricating, low friction material which is unaffected by exposure to gasoline vapor. One such material is Terkite brand graphite and moly filled PTFE. This material may be machined to the hollow circular cylindracal shape required.

The installation of the present invention into an internal combustion engine requires only that the carburetor be temporarily removed. Then a hole is drilled and threaded in the bottom of the manifold and post 30 installed. Rotor 36 is then lowered through the carburetor opening and the assembly is retained together by bolt 42. The carburetor is then replaced and the engine run normally.

The incoming stream of combustible mixture is pulled through the carburetor and through the rotor assembly by the normal aspiration of the engine. The air flowing through causes the rotor to begin to rotate at high speed. Droplets which are too large coming from the carburetor hit the rotating rotor and are broken down into fine mist which is combustible.

The features disclosed in the foregoing description in the following claims and/or in the accompanying drawings may, both separately and in any combination thereof, be material for realising the invention in diverse forms thereof.

Claims

1. A fuel saving device for use in an internal combustion engine having a carburetor, and therebelow a manifold for receiving a combustible mixture of gasoline and air from the carburetor through a carburetor opening in the manifold for distribution to the combustion chambers of the engine, the device comprising:

(a) a post securable to the bottom of the manifold directly below the carburetor opening and extendable upwardly through the manifold;

(b) a rotor mounted, freely rotatably, on the top of the post and positionable near the carburetor opening, the rotor having a plurality of angled slots therethrough whereby, in use, the flow of the combustible mixture impels the rotor to spin; and

(c) retainer means for holding the rotor on the post.

2. The fuel saving device of Claim 1 is mountable below carburetor in manifold.

3. The fuel saving device of Claim 1 or 2 further comprising bearing means mounting the rotor on the post.

4. The fuel saving device of Claims 1, 2 or 3 wherein the bearing means comprises a hollow circular cylindrical bushing of low friction material, unaffected by gasoline vapor.

5. The fuel saving device of Claim 4 wherein the bearing means comprises a hollow circular cylindrical bushing of Terkite material press fit on axis into the rotor.

6. The fuel saving device of any one of the preceding claims wherein the post is of hexagonal rod stock and wherein its bottom end includes a machined threaded section for engagement with a threaded hole in the bottom of the manifold, and wherein the top end of the post has a longitudinal threaded hole therein, and wherein the retainer means comprises a holt extending through the rotor and engaging the hole in the top of the post.

7. The fuel saving device of any one of the preceding claims wherein the rotor is positionable with its top surface adjacent the bottom of the carburetor opening the manifold.

8. The fuel saving device of any one of the preceding claims wherein the rotor comprises a circular plate of solid material having angled slots formed thereinto in a balanced configuration around the circumference of the plate.

9. The fuel saving device of Claim 8 wherein the rotor has a diameter substantially equal to the carburetor opening.

10. The fuel saving device of the preceding claims wherein each slot is oriented at between 20 and 45 degrees from vertical.

11. The fuel saving device of Claim 10 wherein each slot is oriented at approximately 30 degrees from vertical.

12. The fuel saving device of any one of the preceding claims wherein the rotor has from 6 to 24 slots therein.

13. The fuel saving device of Claim 12 wherein the rotor has 12 slots therein.

14. An engine comprising a carburetor, a manifold therebelow and a fuel saving device according to any one of the preceding claims.

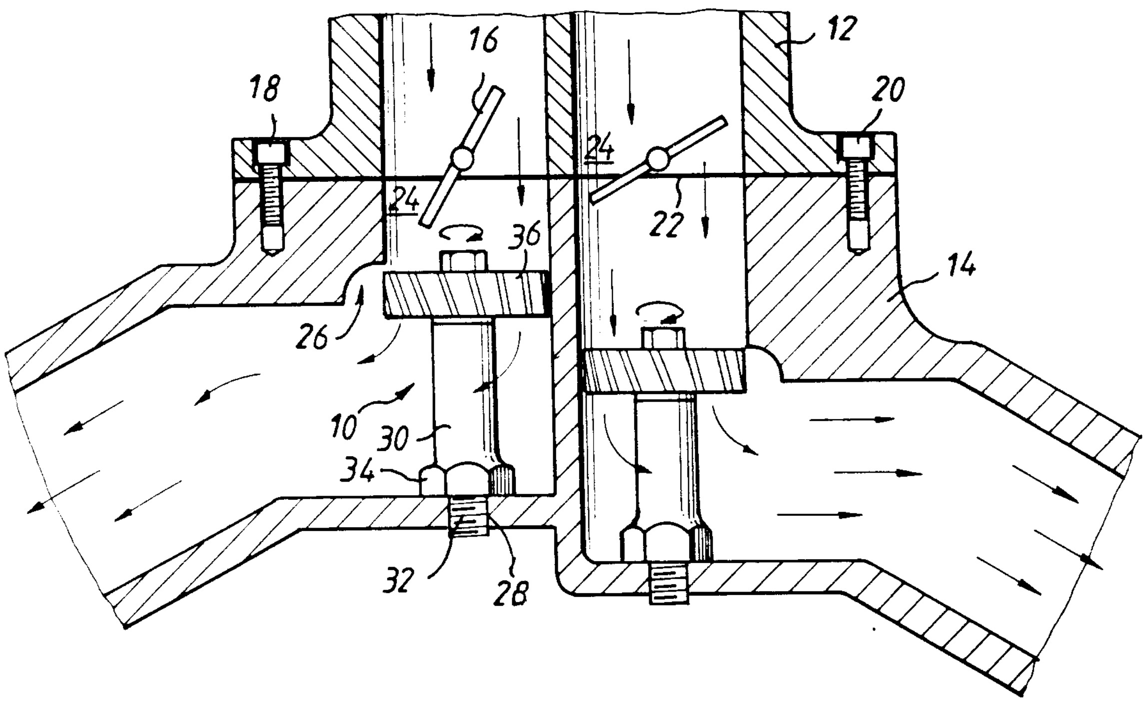

Fig. 1

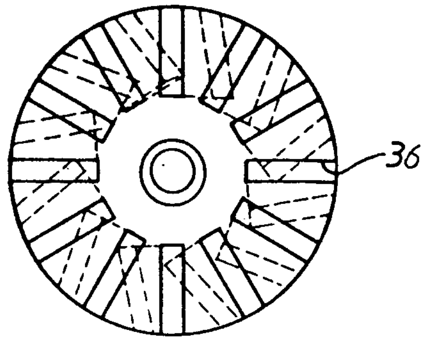

Fig. 2

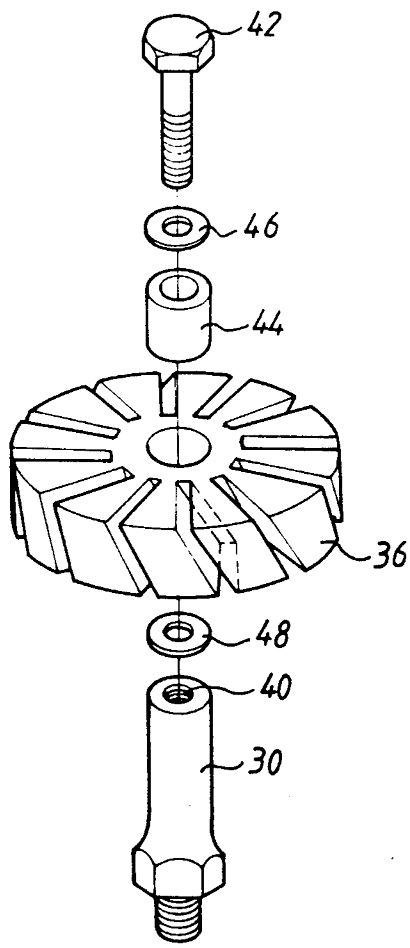

Fig. 3

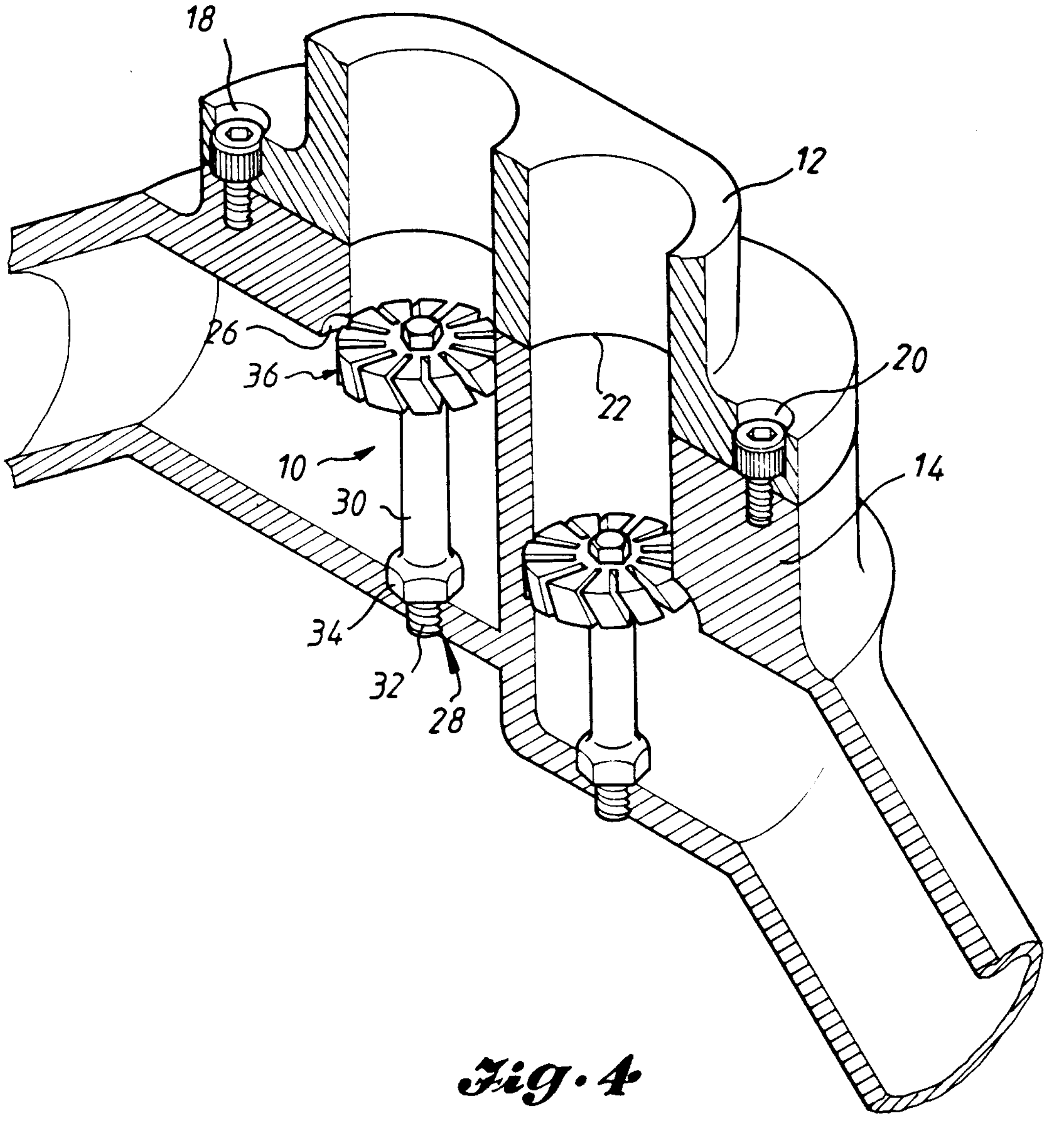

Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 30 1591

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X Y	FR-A-2 319 773 (KNOX) * The whole document * ---	1,2,4,8,12,14 3,4,10	F 02 M 29/02
Y	US-A-1 614 665 (DYER) * Page 1, lines 1-5; figures 2,4 * ---	3	
Y	BE-A- 532 605 (CHATWIN) * Claims 1-7; figure 3 * ---	4,10	
A	FR-A-2 373 680 (ARTHUR A. MICHELE ASSOCIATES) * Page 6, lines 22-38; figure 10 * -----	7-9	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

F 02 M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22-10-1991	KLINGER T.G.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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