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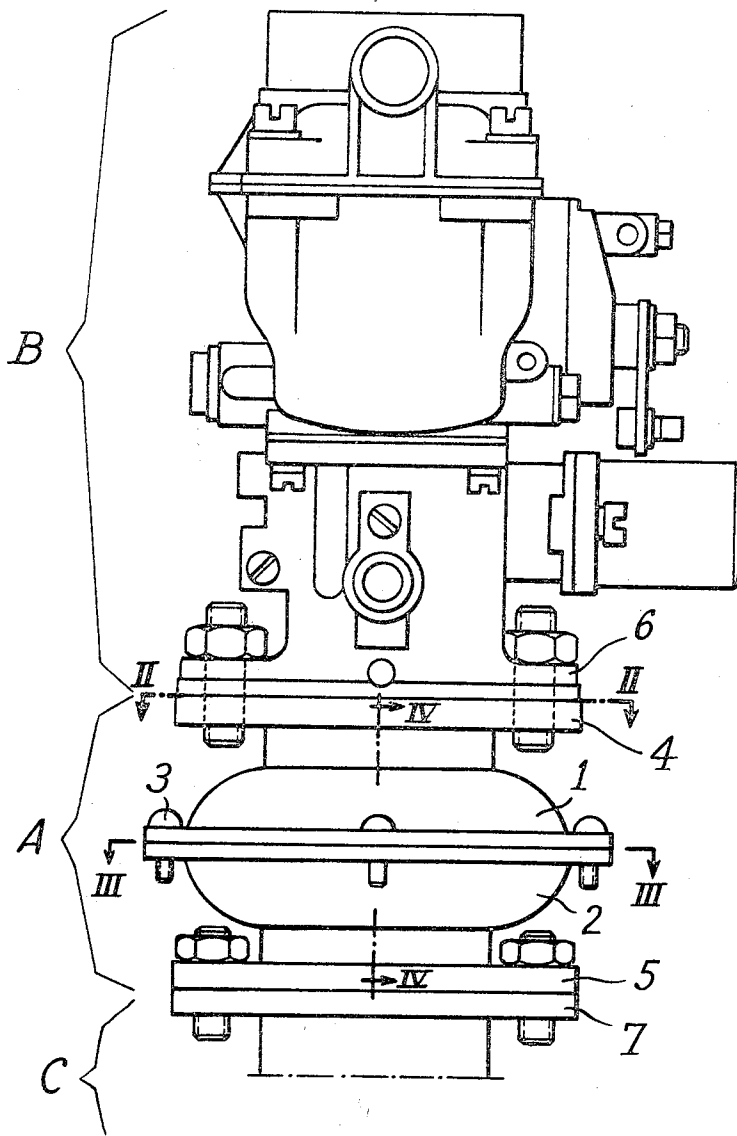
J. OLIVIE

3,490,883

FEED OF AN AIR-FUEL MIXTURE TO AN INTERNAL COMBUSTION ENGINE

Filed May 23, 1966

2 Sheets-Sheet 1



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Fig. 2

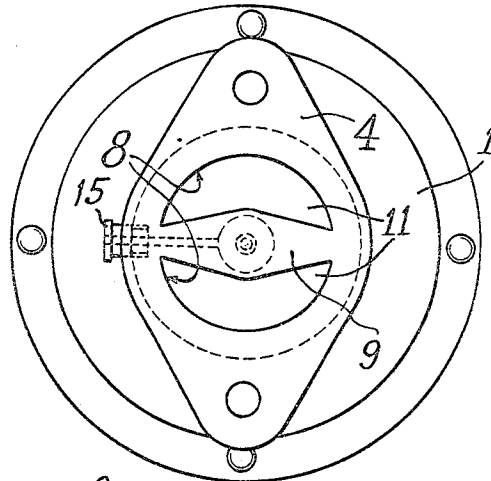


Fig. 4

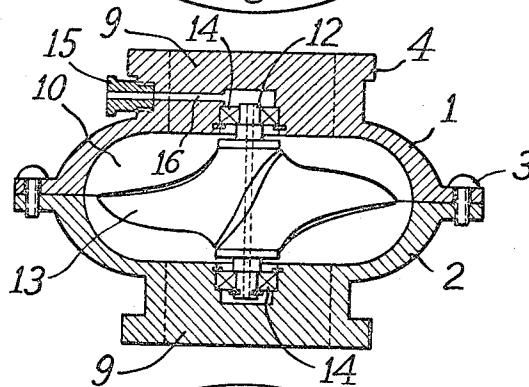
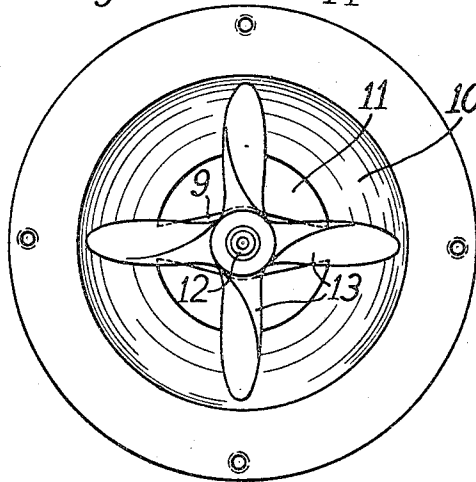


Fig. 3



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FEED OF AN AIR-FUEL MIXTURE TO AN INTERNAL COMBUSTION ENGINE

Jean Olivie, 15 Passage du Louvre,
Casablanca, Morocco

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8 Claims

The present invention is directed to improvements in the feed of an air-fuel mixture to an internal combustion engine and more particularly to improvements in the homogeneity of the air and fuel in the mixture.

It is an object of the invention to provide a simple device which effects mixing of the air and fuel in the mixture, as it passes from the carburetor to the engine, under the action of the flow energy of the advancing mixture itself.

Such a device preferably comprises an impeller member which is light in weight and formed with blades so that the impeller member is rotated by the advancing mixture to agitate the mixture and thoroughly mix the air and fuel thereof.

In order to promote the drive of the impeller member, it is a feature of the invention that the incoming air-fuel mixture is divided into two streams, each of which acts eccentrically on the impeller member.

In accordance with a preferred embodiment of the invention, there is provided a body between a carburetor and an internal combustion engine, in which an air-fuel mixture from the carburetor will be agitated and mixed before being delivered to the engine. The body defines a chamber having an inlet for receiving air-fuel mixture from the carburetor and an outlet for delivery of the mixture to the internal combustion engine. An impeller member is supported within the body and has blades extending radially into the chamber so as to undergo rotation by the passage of the air-fuel mixture through the chamber to agitate the mixture and mix the air and fuel in the mixture in the chamber before delivery to the outlet.

Further features and objects of the invention will become apparent from the following description of an embodiment of the invention taken with reference to the attached drawing, wherein:

FIGURE 1 shows in side view the device according to the invention, assembled with a carburetor and a delivery line to the engine;

FIGURE 2 is a plan view of the device according to the invention, as seen along lines II—II in FIG. 1;

FIGURE 3 is a plan view of the bottom portion of the device according to the invention, as seen along lines III—III in FIG. 1; and

FIGURE 4 is a sectional view taken along lines IV—IV in FIG. 1.

The device according to the invention is designated by assembly A in FIG. 1 and is adapted for being inserted between the outlet from a carburetor shown at B and an engine feed line or intake manifold C.

The device A is essentially a turbine which is constituted by a body inclusive of two half shells 1 and 2 assembled together by screws 3. Half shell 1 includes an integral flange 4 which is connected with flange 6 of the carburetor by suitable fasteners, whereas half shell 2 is integral with a flange 5 which is secured with flange 7 of the feed line C by suitable fasteners.

The half shell 1 has an inlet for the air-fuel mixture from the carburetor which is formed by a bore 8 partly obturated by a crosspiece 9 forming a bridge member so that the carburetor will communicate with the inner chamber 10 defined by the two half shells 1 and 2 solely through the passages 11. The passages are essentially

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of crescent shape and have a particular function, as will be discussed more fully hereinafter.

The half shell 2 is formed with an outlet bore and a crosspiece therein, in the same manner as the half shell 1.

The two upper and lower crosspieces 9 serve as supports for an axle 12 of a small impeller or turbine 13, having a plurality of blades, as for example, four, as shown in the drawing. The ends of the axle are supported in bearings 14 which are mounted in the crosspieces of the half shells 1 and 2.

As can be seen in the drawing, the crosspieces have a maximum width at the axis of rotation of the impeller which exceeds the diameter of the hub portion of the impeller. The incoming mixture is divided into two streams in the passages 11 which are directed onto the blades of the impeller, each stream being eccentric of the axis of rotation of the impeller. This promotes the rotation of the impeller and improves the agitation of the mixture and the consequent mixing of the air and fuel therein. The crosspieces taper in narrowing fashion from the axle radially outwards, in order to increase the quantity of air-fuel mixture which will be directed onto the blades at a greater distance from the axis of rotation of the impeller.

The impeller itself is made as light as possible and is formed of sheet material such as aluminum foil, so as to be freely rotatable under the action of the flow energy of the advancing mixture itself. It is to be understood that the mixture is advanced by the suction generated by the engine.

Inasmuch as the rotation of the impeller is produced by the relatively small flow energy of the advancing mixture, it is essential that the impeller be properly lubricated in order to minimize its resistance to rotation.

For this purpose there is provided a lubricator 15 which is filled with a suitable lubricant such as a ricinolic oil which is not decomposed by gasoline. The lubricator has an inner orifice which is in communication with a channel 16 formed in the end portion of half shell 1 and which opens into communication with the bearing 14 mounted in the crosspiece 9 in half shell 1.

The axle 12 is provided with a longitudinal bore which enables passage of the lubricant to the bearing in the crosspiece member in the lower half shell 2. Thus, the bearings of the impeller member are reliably lubricated, thereby minimizing the resistance to rotation.

In operation the air-fuel mixture enters the inlet of the half shell portion 1, where it is divided into two streams in the passages 11 and flows into chamber 10 in contact with the blades of the impeller member to cause rotation thereof. This produces agitation of the mixture and insures improved homogeneity of the air and fuel therein, resulting in improved combustion and fuel economy, and in the minimization of the discharge of noxious exhaust gases from the internal combustion engine.

Naturally the dimensions of the turbine and the number of blades will in each case be adapted to the power of the engine, and the carburetor jets will be adjusted as a function of the increased power resulting from the addition of the device according to the invention.

Numerous modifications and variations of the disclosed invention will now become apparent to those skilled in the art without departing from the scope and spirit of the invention as defined in the attached claims.

What is claimed is:

1. Apparatus for mixing air and fuel in a mixture flowing from a carburetor to an internal combustion engine, said apparatus comprising means defining a chamber having an inlet adapted for receiving an air-fuel mixture

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from a carburetor and an outlet for delivery of the mixture to an internal combustion engine, the air-fuel mixture being drawn through the chamber from the inlet to the outlet, blade means supported in said chamber and rotated by the passage of the air-fuel mixture through the chamber to mix the air and fuel in the mixture in said chamber before delivery to the outlet, said means defining the chamber comprising a body including opposite end portions, said inlet and outlet being disposed in respective end portions of the body in axially aligned relation, said body having bores in said end portions opening into said chamber, bridge members on the first said means and located in said bores dividing the same into separate passages, the passages in one portion constituting the inlet while the passages in the other portion constitute the outlet, said blade means comprises an impeller member mounted in said body and including a plurality of blades extending radially in the chamber, the passages in each of said end portions being of crescent shape, an axle supporting said impeller member, bearing means mounted in each bridge member and supporting respective ends of the axle for rotation, said body having a channel in one of said end portions for conveying lubricant to the bearing means therein, the axle being hollow to enable passage of the lubricant to the other of the end portions and the bearing means therein, and means supplying a lubricant to said channel.

2. Apparatus as claimed in claim 1, wherein said body is constituted by two half shells which are secured together.

3. Apparatus as claimed in claim 1 comprising flanges on each of said end portions, one adapted for connection with a carburetor for receiving air-fuel mixture and the other with a supply line to the engine.

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4. Apparatus as claimed in claim 1, wherein said impeller member is constituted by light weight sheet material and said blades are formed to enable rotation thereof at relatively low speeds of travel of the air-fuel mixture.

5. Apparatus as claimed in claim 4, wherein said impeller member is constituted of aluminum foil.

6. Apparatus as claimed in claim 4, wherein said impeller member includes a central hub portion from which the blades extend, said bridge members each having a transverse extent in the region of the central hub portion of the impeller member which exceeds that of the said hub portion.

7. Apparatus as claimed in claim 6, wherein each of said bridge members has a maximum extent at the axis of the impeller member and has a reduced taper in both directions radially thereof.

8. Apparatus as claimed in claim 1, wherein said chamber has a circular section with a maximum diameter substantially greater than that of said bores in the end portion of the body.

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MORRIS O. WOLK, Primary Examiner

M. D. BURNS, Assistant Examiner