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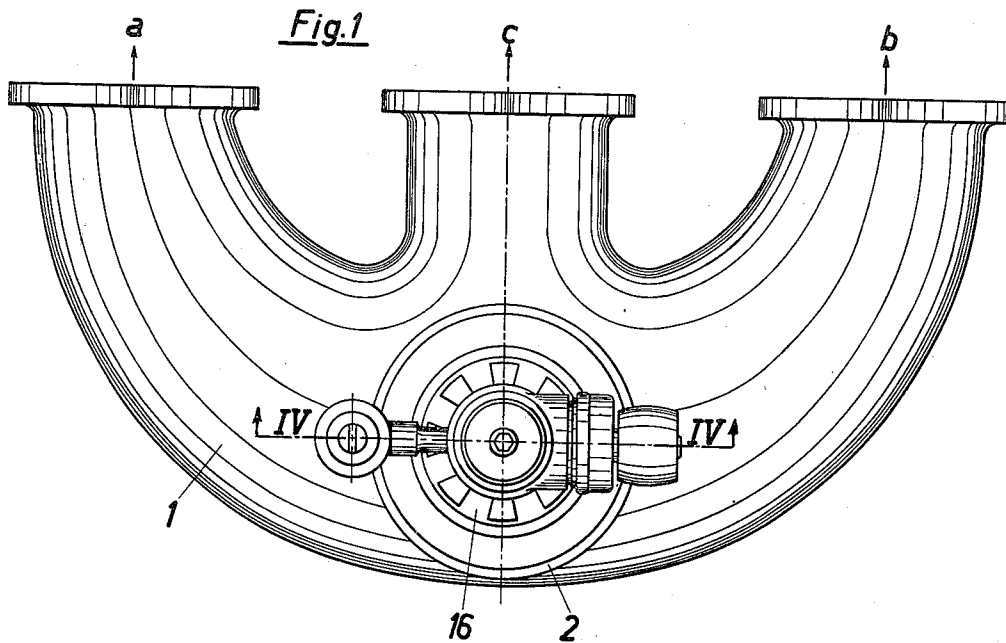
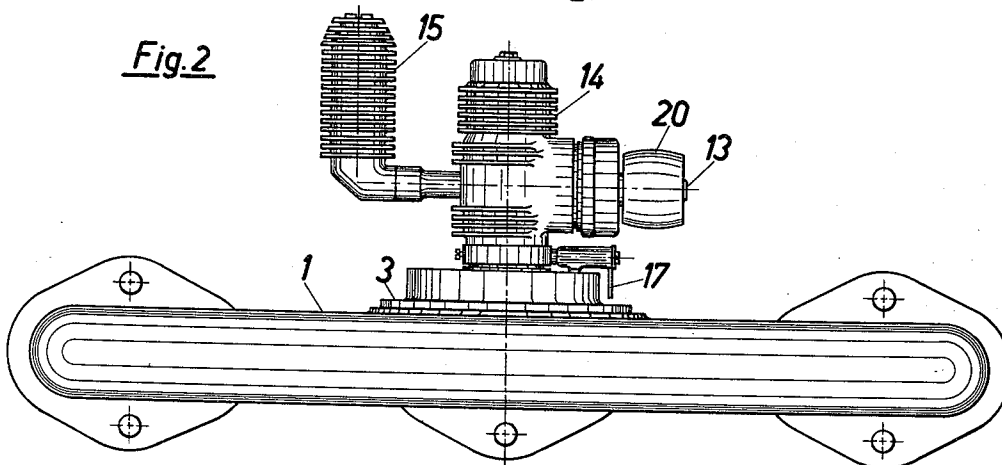
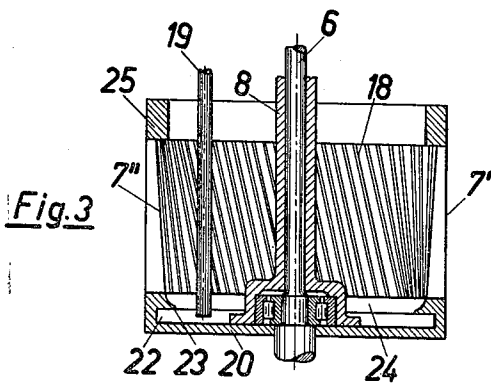
A. RUMPLER

2,665,892

ROTARY MIXER TYPE CARBURETOR

Filed June 15, 1951

2 Sheets-Sheet 1



INVENTOR,

Anton Rumpler;

BY

Anton Rumpler

ATTORNEY

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Fig. 4

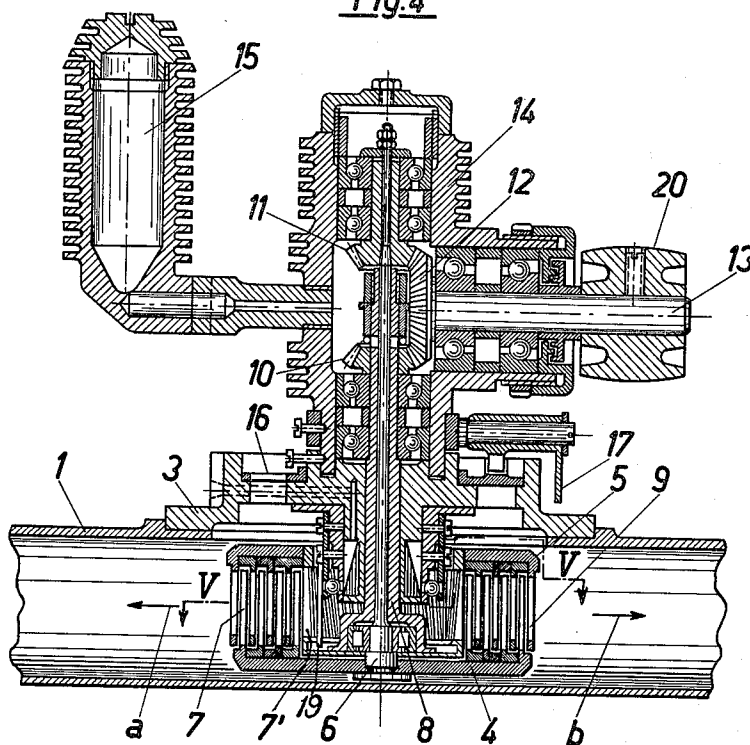
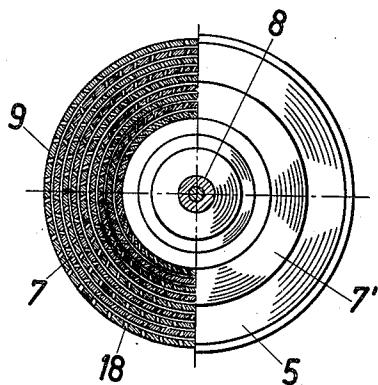


Fig. 5



INVENTOR,

Anton Rumpler;

BY

Anton Rumpler

ATTORNEY

UNITED STATES PATENT OFFICE

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ROTARY MIXER TYPE CARBURETOR

Anton Rumppler, Vienna, Austria

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5 Claims. (Cl. 261—89)

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This invention relates to a carburetor of that type, in which a perfectly homogeneous mixture is produced by mechanical methods so that the suction force of the engine merely effects the supply of the mixture to the cylinders. The carburetor consists essentially of two members which are rotatable at high speed in opposite senses on a common axis, and which mutually project one into the other with elements having blade-type bodies which cut through the fuel-air stream several thousand times a minute.

Experiments carried out have shown that unexpectedly more favorable results of carburetion can be achieved by a special arrangement and construction of such carburetors. On the one hand, the fuel consumption can be reduced to the largest extent and on the other hand the power can be considerably increased.

One feature of the invention resides in that the system of the carburetor rotors is located in the induction manifold of the internal-combustion engine itself and is surrounded by said manifold on all sides.

Another feature of the invention resides in that the axis of rotation of the rotors is at right angles to the plane in which lies the axis of the manifold.

Previously, nozzle-type carburetors and also rotor-type carburetors have been fitted outside of the induction manifold and the mixture produced has been sucked into and through said manifold. In the construction according to the invention the mixture is delivered from the rotors directly into the induction manifold, suitably in the axial direction thereof, and thus comes directly into the cylinders without any interference by throttling, deflecting, reflecting, etc. influences. In this construction the overall height of the carburetor is reduced by almost one half so that it requires much less space for accommodation.

Another feature of the invention resides in that the fuel emerging out of the fuel supply pipe in the central part or hub of the lower rotary body is conducted to the rotary bodies in such a manner that immediately after the preferably eccentric escape of the fuel out of the supply pipe the fuel is divided into smallest particles. For this purpose the innermost rim of the lower rotary body is provided with an upwardly widening conical internal surface so that the fuel, eccentrically let from the fuel supply pipe into the inner part of the rotary body and being urged outwardly under centrifugal force, rises along the conical internal wall and enters the oblique slots of the rim.

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Another feature of the invention resides in that a continuous annular groove with an inwardly directed projection arranged above said groove and adjoining the same is provided between the bottom of the lower rotary body and the conical internal surface of the innermost cogged rim of said rotary body. The thus formed overflow edge permits of the fuel passing over onto the conical internal surface and rising in the form of a very fine film along said surface.

According to another feature of the invention the conical internal surface of the innermost cogged rim is terminated at its upper end by an inwardly projecting locking ring, by which the fuel film rising along the conical internal surface is prevented from flowing over the upper edge of the toothed or slotted rim.

The drawings show by way of example an embodiment of a carburetor arrangement according to the invention.

Fig. 1 is a top plan view showing the induction manifold of the engine with the carburetor.

Fig. 2 is a view in elevation of the induction manifold with carburetor.

Fig. 3 is a vertical sectional view through the innermost rim of the lower rotary body.

Figure 4 is a cross-sectional view corresponding to line IV—IV of Figure 1.

Figure 5 is a cross-sectional view corresponding to line V—V of Figure 4.

In the embodiment shown in Figs. 1 and 2, the carburetor of an internal combustion engine is fixed with its flange 3 in an annular groove 2 of the induction manifold in which the rotary bodies 4, 5 of the carburetor are horizontally positioned, only the means for driving the rotary bodies appearing outside the induction manifold. The lower rotary body 4 is mounted on the solid shaft 6 and has four rims 7; the upper rotary body 5, which has four rims 9, is connected for joint rotation with the hollow shaft 8. The concentric rims 7 and 9 of both rotors have teeth of rhombic cross section (Figs. 4 and 5), with the acute angle lying in front in respect of the sense of rotation so that the teeth cut like blades through the fuel-air stream passing through. When the rotors are mounted one upon the other, their rims 7, 9 mutually project one into the other. The rotors are either moved both in opposite senses or one rotor stands still while the other is being moved. The drive is effected as follows: A bevel gear 10 is mounted on the hollow shaft 8, and a bevel gear 11 is mounted on the solid shaft 6. Both bevel gears are driven in opposite senses through a bevel gear 12, which

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is connected with the drive shaft 13 and receives its motion from a belt pulley or V belt pulley 20, or may be coupled directly to a small electric motor. This arrangement provides also for the mutually opposite motions of the two rotary bodies 4, 5. The solid shaft, the hollow shaft, and the drive shaft are journaled in the carburetor casing 14 by means of ball bearings. Owing to their high speed of rotation, e. g., 30,000 rotations per minute, the bevel gears as well as the ball bearings run in an oil bath, which is constantly being renewed from an oil pocket 15. For the intake of air, the flange 3 of the carburetor casing is constructed as an annular air inlet valve 16 and can be controlled by means of the lever 17.

For the purpose of achieving a better gasification of the fuel, the rims 7, 9 of the rotary bodies 4, 5 have fine slots 18, which are inclined oppositely to the sense of rotation by a slight angle towards the axis of rotation. The innermost rim 7' of the lower rotary body 4 is of special construction. Its inner side wall 7'' is of slightly conical, upwardly widening shape, to enable the fuel, admitted through the pipe 19, to rise along this wall and to distribute all over the internal surface, whence it enters into the narrow slots 18. At the point where the bottom 20 of the rotary body adjoins the side wall of the internal rim 7', a continuous annular groove 22, and above it an inner projecting part 23 adjoining said groove, are provided. Being urged towards the periphery and over the overflow edge 23 by centrifugal force, the fuel comes out of this groove onto the internal wall 7'' and covers it with a thin film, which enters into and passes through the slots 18. The overflow of the fuel beyond the upper edge of the rim 7' is prevented by an inwardly projecting terminating and locking ring 25.

The mode of action of the carburetor described hereinbefore is as follows: When the rotary bodies 4, 5 rotate relative of each other at about 30,000 rotations per minute, the upper rotary body 5 is sucking fuel out of the small tube 19 into the space 24 and is sucking air through the annular air inlet valve 16. The fuel is urged into the annular groove 22 and passes in the form of a fine film over the overflow edge 23 to the internal surface 7'' of the innermost rim 7' and into the fine slots 18 of the same. Thereby the fuel is divided into very small particles and mixed with air. Subsequently this mixture is completely gasified in the rims of the rotary bodies, which are turning in opposite senses. After having left the outermost rim, the fuel mixture flows in the induction manifold directly into the cylinders, in the direction of the arrows a, b, and c.

It has been possible to achieve an increase of power by up to 30% and at the same time a saving of fuel by up to 37% by the construction and use of the carburetor according to the invention.

I claim:

1. A carburetor for an internal-combustion engine, comprising two coaxial rotors arranged one above the other and mutually projecting one into the other with concentric cutting elements, a fuel supply connection to the central part of the lower rotor, an air supply connection to the rotors, and means for turning one rotor in one sense and the other rotor in the opposite sense, the cutting elements of the lower rotor being arranged in several concentric rims the innermost of which has fine slots which are inclined in respect of the axis of rotation oppositely to the

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sense of rotation of said lower rotor, and said innermost rim having an upwardly widening conical internal surface, said cutting elements being adapted to cut through a fuel-air stream passing through the rotors.

2. A carburetor for an internal-combustion engine, comprising two coaxial rotors arranged one above the other and mutually projecting one into the other with concentric cutting elements, a fuel supply connection to the central part of the lower rotor, an air supply connection to the rotors, and means for turning one rotor in one sense and the other rotor in the opposite sense, the cutting elements of the lower rotor being arranged in several concentric rims carried by a bottom part of said lower rotor, the innermost of which rims has fine slots which are inclined in respect of the axis of rotation oppositely to the sense of rotation, and said innermost rim having an upwardly widening conical internal surface, said lower rotor having a continuous annular groove between said bottom and said conical surface, and an inwardly projecting part above said groove and adjoining the same, said cutting elements being adapted to cut through a fuel-air stream passing through the rotors.

3. A carburetor for an internal-combustion engine, comprising two coaxial rotors arranged one above the other and mutually projecting one into the other with concentric cutting elements, a fuel supply connection to the central part of the lower rotor, an air supply connection to the rotors, and means for turning one rotor in one sense and the other rotor in the opposite sense, the cutting elements of the lower rotor being arranged in several concentric rims the innermost of which has fine slots which are inclined in respect of the axis of rotation oppositely to the sense of rotation of said lower rotor, and said innermost rim having an upwardly widening conical internal surface, and an inwardly projecting rim at the upper edge of said conical surface for delimiting the same, said cutting elements being adapted to cut through a fuel-air stream passing through the rotors.

4. A carburetor for an internal-combustion engine, comprising two coaxial rotors arranged one above the other and mutually projecting one into the other with concentric cutting elements, a fuel supply connection to the central part of the lower rotor, an air supply connection to the rotors, and means for turning one rotor in one sense and the other rotor in the opposite sense, the cutting elements of the lower rotor being arranged in several concentric rims carried by a bottom part of said lower rotor, the innermost of which rims has fine slots which are inclined in respect of the axis of rotation oppositely to the sense of rotation of said lower rotor, and said innermost rim having an upwardly widening conical internal surface, and an inwardly projecting rim at the upper edge of said conical surface for delimiting the same, said lower rotor having a continuous annular groove between said bottom and said conical surface, and an inwardly projecting part above said groove and adjoining the same, said cutting elements being adapted to cut through a fuel-air stream passing through the rotors.

5. A carburetor unit for an internal-combustion engine, comprising an induction manifold, two coaxial rotors arranged one above the other in and surrounded by said induction manifold and mutually projecting one into the other with concentric cutting elements, a fuel supply connection

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to the central part of the lower rotor, an air supply connection to the rotors, and means for turning one rotor in one sense and the other rotor in the opposite sense, the cutting elements of the lower rotor being arranged in several concentric rims carried by a bottom part of said lower rotor, the innermost of which rims has fine slots which are inclined in respect of the axis of rotation oppositely to the sense of rotation of said lower rotor, and said innermost rim having an upwardly widening internal surface, and an inwardly projecting rim at the upper edge of said conical surface for delimiting the same, said lower rotor having a continuous annular groove between said bottom part and said conical surface, and an inwardly projecting part above said groove and adjoining the same, said cutting ele-

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ments being adapted to cut through a fuel-air stream passing through the rotors.

ANTON RUMPLER.

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