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(54) Fluid mixture control valve; carburettor.

(57) Problems posed by liquid or gas fuels combustion pollution, requires that at any instant a better primary air-fuel mixture is needed. A non adequated excess-air factor will be the source for an incomplete combustion with formation of pollutants. In order to solve these problems a fluid mixture control valve that can be used as part of a carburettor as been invented.

The mixture valve invented, it is a mixture control valve controlling mixture of a fluid α on a second fluid β, and, it is composed by a set of two calibrated orifices [4] and [5], on a cilindrical tube [2], obturated by the rotative cilindrical pistons [1] and [3]. The fluid α flow (liquid ou gas) injected, will be dependent of angular position of the two pistons [1] and [3], and so, it will be a function of two independent control parameters.

As an application, it is also, patented, a carburettor for internal combustion engines, using the mixture valve [6] on primary-air flow condut (fluid β), controlling the fuel flow (fluid α). Mixture valve it is actuated by two cams [7] and [8], controlled respectively by butterfly valve [11] and by air-flow sensor [7].

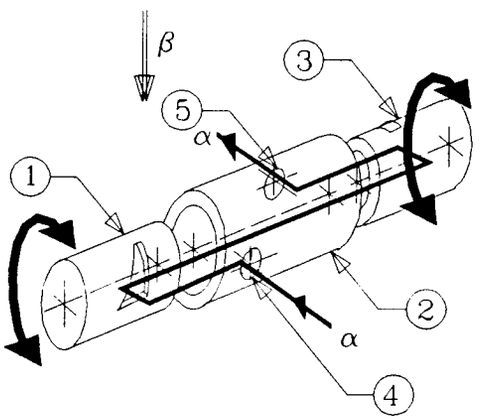

FIG. 1

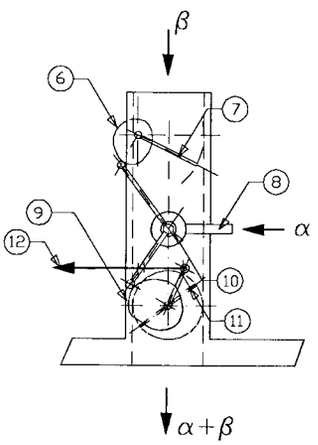

FIG. 3

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The invention relates to a mixture control valve controlling a fluid α flow (liquid or gas), in order to mix it with a second fluid β (liquid or gas), with or without state transition of any of the fluids. The control valve acts as a mixture control of fluid α flow with fluid β flow. An application, it is on controlling the primary air-fuel mixture, in combustion systems and/or in carburation systems on internal combustion engines, acting as a carburettor.

The mixture valve represented in exploded perspective in figure 1, and, sectionned in figure 2, it is constituted by a set of two calibrated orifices [4] and [5], on a cilindrical tube [2], the orifices are obturated by two rotative cilindrical pistons [1] and [3]. The pistons have a rotative displacement inside tube [2] and the profile cutted together with their displacement defines the pressure drop coefficient of each one of the sets rotative piston-orifice. So total pressure drop coefficient will be a function of angular position of the two pistons [1] and [3]. And the mixture control will be a function of those two independent parameters.

If cilinder [2] is placed on fluid β flow (liquid or gas), where we intend to control mixture with a second fluid α (liquid or gas) flow, it will be injected by mixture valve. Fluid α will be introduced at constant pressure, by an adequated tube on orifice [4], and comming out to mixture with fluid β (liquid or gas) on orifice [5]. The fluid α (liquid or gas) flow injected, will be a function of the angular position of the two pistons [1] and [3], and, will be a function of two independent parameters. So actuation on pistons will be mechanical, automated, motorized, and so on.

A typical application for the mixture valve corresponds to it's use on controlling the primary air-fuel mixture, in combustion systems and/or in carburation systems acting as a carburettor. So the fuel α flow will be controled on mixture with primary air β flow (see figures 3 and 4) in order to obtain a mixture $\alpha + \beta$ almost ideal in transients (during acceleration or desacceleration of internal combustion engines). One of the pistons will be actuated by engine accelerator [12], simulthaneously with butterfly valve [11], and the second piston will be actuated by sensor plate [7] measuring primary air flow, so we have a carburettor, that will provide at any instant an ideal primary air-fuel almost ideal (excess-air factor λ~constant). So a better specific consumation so as less carbon monoxide and less hidrocarbonets will be present on exhaust gas. Exhaust gas will present a more homogeneous and regular composition.

On figures 3 and 4 we represent side vues of the carburettor, where mixture valve [10], placed on primary air flow (fluid β) controls fuel flow injected (fluid α), and it is actuated by two cams [9] and [6], one controlled by butterfly valve [11] and the second controlled by air-flow sensor [7].

The two cams [9] and [6] displacement are compensated by ressorts, not represented in figures, but acting in order to compensate acelerator force, so as air-flow force on air-flow sensor.

Claims

1. Mixture control valve controlling the mixture of two fluids, function of two independent control parameters. This is a mixture valve controlling the fluid α flow in a second fluid β flow, it is composed by a set of two calibrated orifices [4] and [5], on a cillindrical tube [2], obturated by two cillindrical rotative pistons [1] and [3]. The fluid α flow (liquid ou gas) injected, will be dependent from angular position of the rotative pistons [1] and [3], so it will be a function of two independent control parameters..
   Control parameters will be the angular displacement of the cilindical pistons.

2. Internal combustion engine carburettor, based on an application of the mixture control valve [10] in claim 1. Mechanical control, based on two cams [9] and [6] will provide a primary air-fuel factor almost ideal, in transients (acceleration--desacceleration), cam [9] will be actuated simulaneously with butterfly valve [11] and cam [6] will be actuated by the air flow sensor [7].

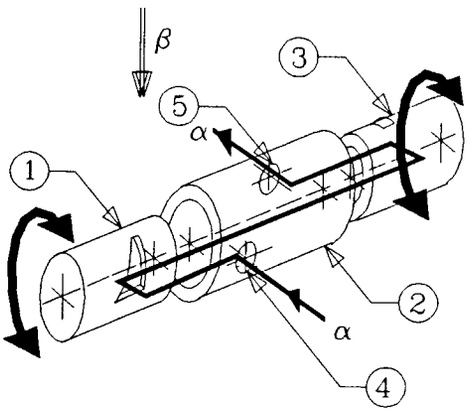

FIG. 1

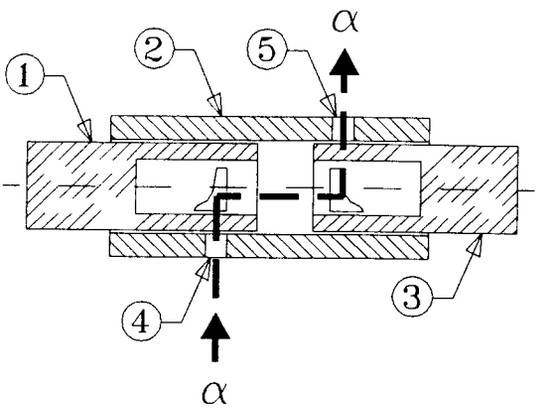

FIG. 2

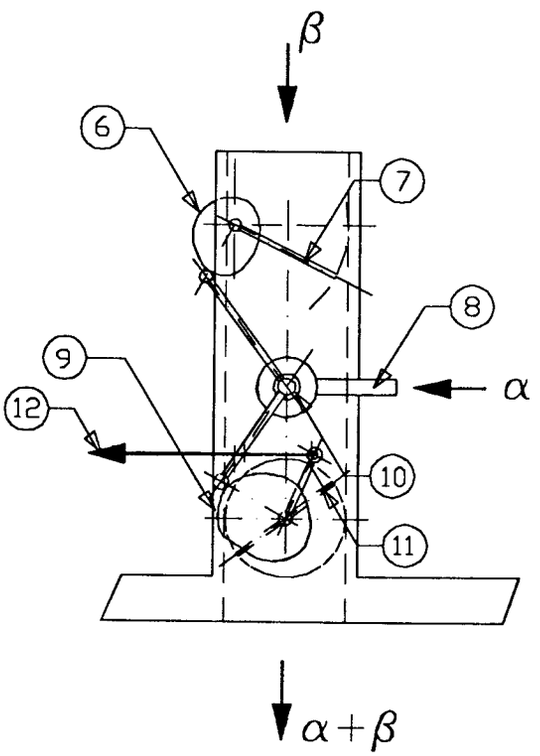

FIG. 3

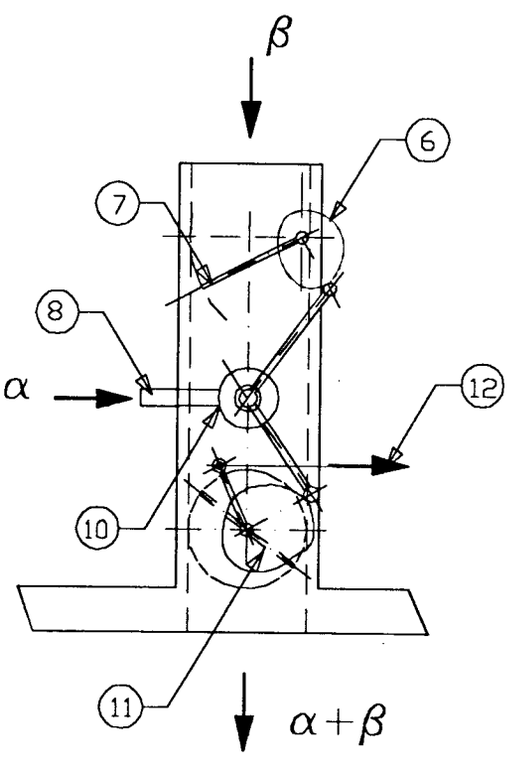

FIG. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 93 67 0004

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.6)
A	US-A-4 613 469 (PETERSON) * column 4, line 14 - column 5, line 36; figures *	1,2	F02M19/02
A	GB-A-1 441 398 (SCHOEMAN) * page 2, line 67 - page 3, line 59; figure 1 *	1,2	
A	US-A-4 133 848 (BLACK) * abstract *	1	
A	DE-A-19 36 383 (KAMPSMEYER) * page 6 - page 8; figures 5-8 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

F02M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 April 1994	Christensen, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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