



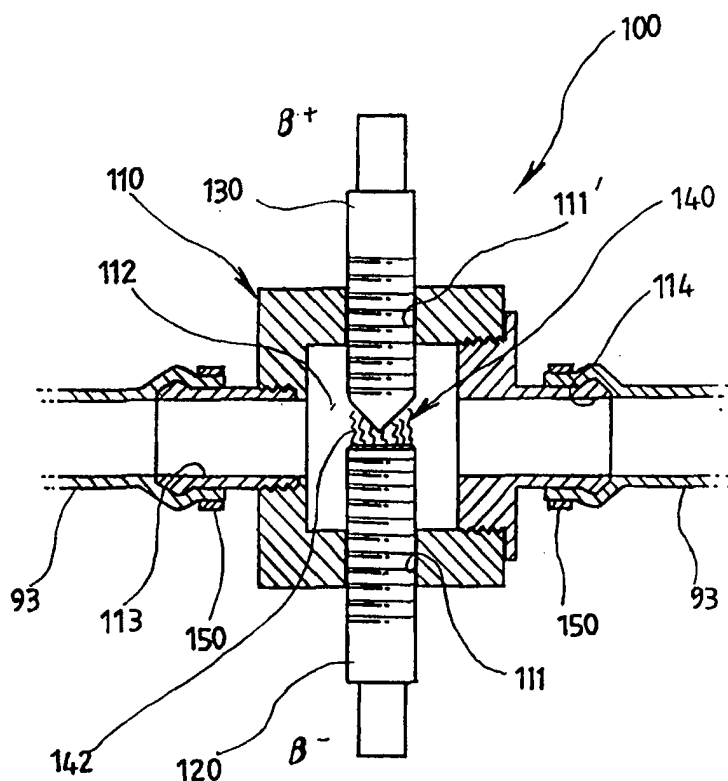
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : F02M 27/04	A1	(11) International Publication Number: WO 98/46874 (43) International Publication Date: 22 October 1998 (22.10.98)
(21) International Application Number: PCT/KR97/00062 (22) International Filing Date: 23 April 1997 (23.04.97) (30) Priority Data: 1997/13834 15 April 1997 (15.04.97) KR (71)(72) Applicant and Inventor: EOM, Jae, Pung [KR/KR]; 3018-14, Tae myung-dong, Nam-ku, Taegu-city 705-034 (KR). (74) Agent: LEE, So, Nam; Hwain Building 824-29, 4th floor, Yeok sam-dong, Kang nam-ku, Seoul 135-080 (KR).		(81) Designated States: AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GE, HU, IL, IS, JP, KE, LC, LK, LR, LS, LT, LV, MG, MK, MN, MW, MX, NO, NZ, PL, RO, SD, SG, SI, SK, TR, TT, UA, UG, US, UZ, VN, Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>

(54) Title: DEVICE FOR ACCELERATING PERFECT COMBUSTION OF FUEL

(57) Abstract

There is provided a device for accelerating perfect combustion of fuel which makes atomized fuel particles fine by generating a discharge with high-voltage electricity (+, -), passing liquefied fuel through a thus-produced discharge portion (140) which emits high heat and intense light, dissociating hydrogen having a strong binding force to oxygen from a liquefied fuel molecule containing carbon and hydrogen and tightly binding the dissociated hydrogen to oxygen and which achieves satisfactory perfect combustion of fuel by removing various components impeding perfect combustion of fuel so that fuel efficiency is maximized, fuel consumption is reduced and engine output is increased. For this purpose an accelerator (100) for perfect combustion of fuel is installed in a burning apparatus in which fuel is supplied from a fuel tank to a combustor through a vaporizing means in the form of a mixed gas and burned. The accelerator (100) generates a discharge on a connection pipe (93) between the fuel tank and the vaporizing means with high-voltage electricity, thus emitting high heat and intense light, and electrolytically dissociating hydrogen from carbon in the fuel passing through a discharge portion (140) so that the binding force of hydrogen to oxygen is increased and the fuel is perfectly burned.



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DEVICE FOR ACCELERATING PERFECT COMBUSTION OF FUEL**Technical Field**

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The present invention relates to a device for acceleration perfect combustion of fuel through light resolution of discharge, which electrolytically dissociates a liquefied fuel such as gasoline, diesel, or petroleum by generating an electrical discharge for the
10 liquefied fuel, using high-voltage bipolar electricity(+,-) so that the liquefied fuel can be perfectly burned. Here, the electrical discharge refers to a phenomenon that charge stored in a battery is discharged, generating heat and intense light, by increasing a voltage between both electrodes spaced from each other by a predetermined
15 distance and thus flowing a current between them.

Background Art

Generally, an internal or external combustion engine is provided
20 with a vaporizer for spraying an atomized mixture of liquefied fuel and air in the form of gas in a combustor. Such vaporizers are grouped into two types: a vaporization type of FIG. 1 and an injection type of FIG.2.

In a vaporizer 10 of the vaporization type, a narrow path 13 is
25 formed between a fuel inlet 11 and a fuel outlet 12, a fluid flowing through the path 13 is partially set to a low pressure, and the

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fluid of the low-pressure absorbs gas or liquid around a nozzle. Thus, the fluid of the low pressure is vaporized.

The above vaporization type, however, is so constituted that it
5 leads to imperfect combustion due to large and thus unstable atomized fuel particles and difficulty in entirely removing imperfectly burned material of a heavy metal, for example, lead(pb) included in the fuel.

On the other hand, in a vaporizer 20 of the injection type shown in FIG. 2, liquefied fuel stored in a tank 21 is mixed with a gas, for
10 example, vapor, compressed air, or oxygen, and pumped out at a high pressure of about 50-75kg/cm² from a fuel spraying pump 23 through a fuel discharge pipe 22. Then, gas or liquid is absorbed into a thus-produced low-pressure portion and mixed with compressed air, and the liquefied fuel is pumped into a combustor 24 in the form of
15 gas.

This injection type, however, though it generates smaller atomized gas particles than the above-described vaporization type and thus can increase combustibility, is unable to provide physical resistance to atomized particles, and remove a heavy metal such as lead included in
20 the gas. Accordingly, the injection type is also limited in achieving perfect combustion, since it decreases the combustibility of fuel.

Finer atomized particles, which are impossible to obtain in the above fuel spraying means, can be produced by fuel catalyzing means disclosed in U.S. Patent No. 5,329,941 and Korea Patent No. 095,961.

That is, carbon and hydrogen constituting fuel molecules relatively

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show charges of $\delta+$ and $\delta-$, respectively, due to electronegativity difference. When such fuel molecules pass through a screw-shaped wire net pipe, they also pass through a magnetic field directed from the north pole N to the south pole S of a magnet installed outside the pipe. Here, electrons of the fuel molecules are concentrated, unstable, and thus highly susceptible to reaction with oxygen, due to a current generated vertically upward from the direction of the magnetic field according to the rule of Fleming's right hand. On the basis of this principle, particles of the fuel become fine.

However, since such devices have theoretical limitations in that magnetic force is used to ionize fuel, they are ineffective, in fact. Furthermore, another reason for their ineffectiveness is that fuel activation effects resulting from circular movement according to the volume of a rotary motion are proportional to movement speed.

Disclosure of the Invention

Therefore, to effectively solve the conventional problem, the object of the present invention is to provide a device for accelerating perfect combustion of fuel through light resolution of discharge, which makes atomized fuel particles fine by generation a discharge with high-voltage electricity (+,-), passing a liquefied fuel through a thus-produced discharge portion which emits high heat and intense light, dissociating hydrogen, having a strong binding force to oxygen, from a liquefied fuel molecule containing carbon and hydrogen, and tightly binding the dissociated hydrogen to oxygen, and achieves satisfactory perfect combustion of fuel by removing

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various components impeding perfect combustion of fuel, so that fuel efficiency is maximized, fuel consumption is reduced, and engine output is increased.

25 To achieve the above object, there is provided a device for accelerating perfect combustion of fuel through light resolution of discharge in a burning apparatus in which fuel is supplied from a fuel tank to a combustor through a vaporizing means in the form of a mixed gas and burned, comprising an accelerator for generating a discharge on a connection pipe between the fuel tank and the vaporizing means with high-voltage electricity, thus emitting high heat and intense light, and electrolytically dissociating hydrogen from carbon in the fuel passing through a discharge portion, so that the binding force of hydrogen to oxygen is increased and the fuel is perfectly burned.

5 The accelerator for perfect combustion of fuel comprises a body which has screw holes in the upper and lower parts thereof and a space portion, and is screw-combined with a fuel inlet and a fuel outlet at both sides thereof; a (-)-ground conductive bolt screw-combined with the lower screw hole of the body; and a (+) high-voltage discharge bolt screw-combined with the upper screw hole of the body and spaced from the lower portion of the (-)-ground
10 conductive bolt by a predetermined distance suitable for discharge.

Brief Description of the Drawings

15 FIG. 1 is an exemplary diagram for showing the size of fuel particles in a combustion engine adopting a vaporization method;

FIG. 2 is an exemplary diagram for showing the size of fuel particles in a combustion engine adopting an injection method;

FIG. 3 is an exemplary diagram for showing the state where the present invention is installed; and

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20 FIG. 4 is a magnified vertical sectional view according to the present invention.

Best mode for carrying out the Invention

25 A preferred embodiment of the present invention will be described in detail, referring to the attached drawings.

 FIG. 3 is an exemplary diagram for showing the state where the present invention is installed. The present invention has a filter (not shown) for filtering foreign materials included in a liquefied fuel, a fuel tank 90
30 provided with a pump for pumping fuel to be transferred, and a vaporizing means 91 for producing atomized mixed gas containing oxygen needed for combustion, when the liquefied fuel is supplied from the fuel tank to a combustor 92.

 The fuel tank 90 and the vaporizing means 91 communicate with each
5 other by a connection pipe 93 formed of a flexible material, as in prior art. An accelerator 100 is installed in the present invention, for accelerating perfect combustion of fuel by generating a discharge on the connection pipe 93 between the fuel tank 90 and the vaporizing means 91, with high-voltage electricity, thus emitting high heat and intense light, electrolytically
10 dissociating hydrogen from carbon in the fuel passing through a discharge portion 140, and thus increasing the binding force of the hydrogen to oxygen.

 FIG. 4 is a magnified vertical sectional view according to the present invention. That is, the accelerator 100 for perfect combustion of fuel includes a body 110 which has screw holes 111 and 111' in the upper and
15 lower parts thereof and a space portion 112, and is screw-combined with a fuel inlet 113 and a fuel outlet 114. Here, the body should be formed of an insulating material.

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The lower screw hole 111 of the body 110 has screw teeth of the outer circumferential surface thereof. There is provided a (-)-ground conductive bolt 120 which has an end introduced into the space portion 112 of the body and the other end connected to an external metal through a ground wire (not shown). A (+) high-voltage electricity discharge bolt 130 is spaced from the end of the (-)-ground conductive bolt and screw-combined with the upper screw hole 111' of the body. An end of the bolt 130 is connected to a battery.

Meanwhile, preferably, the end portions of the bolts 120 and 130 are sharpened to facilitate a discharge.

Reference numeral 150 in the drawing denotes a fixing band for connection the connection pipe to the perfect combustion accelerator.

In the present invention as constituted above, the (-)-ground conductive bolt 120 is screw-combined with the lower screw hole 111 of the body 110 of the accelerator 100, and the (+) high-voltage electricity discharge bolt 130 is screw-combined with the upper screw hold 111'. Here, the bolts are spaced from each other by a predetermined distance to achieve an optimum discharge state.

Then, the connection pipe 93 is inserted into the fuel inlet 113 and the fuel outlet 114, which are connected to both sides of the body, and firmly fixed by the fixing band 150.

The operation of the accelerator for ionizing hydrogen included in fuel after the installation of the accelerator 100 will be described in detail.

First, the (+) high-voltage electricity discharge bolt 130 is connected to a high-voltage electricity line (not shown) of the battery. At this time, high-voltage discharge is generated, emitting light 141 and high heat, at the end of the (-)-grounded conductive bolt 120 by connecting the bolt to a (-)

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power source and operating a switch.

While the high-voltage discharge heat 140 and high heat is generated over the space portion 112 of the body 110, the fuel flowing through the fuel inlet 113 passes through the discharge portion 114. The fuel, for example, diesel ($\text{AH}_3(\text{AH}_2)_8\text{AH}_3$), gasoline ($\text{AH}_3(\text{AH}_2)_3\text{AH}_3$), or methane (AH_4) is ionized into hydrogen (H_2) and hydrocarbon (Ac). Then, the binding force of the dissociated hydrogen to oxygen is increased, which is a requirement for perfect combustion. That is, the amount of ionized hydrogen is increased. The hydrogen is introduced into the combustor 92 of the burning device in the form of atomized particles through the vaporizing means, a combustion time is reduced due to the affinity of hydrogen to oxygen, and combustion heat is increased. Consequently, perfect combustion is performed. An example of the fuel transmitted through the accelerator which is applied to a diesel or gasoline engine is shown in tables 1 and 2.

(Table 1)

* Comparison of distances covered per liter (ℓ)

car type	distance covered before installation	distance covered after installation
1-ton refrigerator car of HYUNDAI, '94	13.9km/ ℓ	18.5km/ ℓ
EXCEL of HYUNDAI of mileage 100,000km	16.5km/ ℓ	21.9km/ ℓ

(Table 2)

* Comparison of fuel components decomposed by high-temperature discharge light

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fuel kind	structure before decomposition	structure after decomposition
diesel	$\text{CH}_3(\text{CH}_2)_8 \text{CH}_3$	C, H ₂ , CH $\text{CH}_3(\text{CH}_2)_8 \text{CH}_3$
gasoline	$\text{CH}_3(\text{CH}_2)_3 \text{CH}_3$	C, H ₂ , CH $\text{CH}_3(\text{CH}_2)_3 \text{CH}_3$

Industrial Applicability

10 The present invention as described above makes atomized fuel particles fine by generating a discharge with high-voltage electricity (+,-), passing a liquefied fuel through a thus-produced discharge portion which emits high heat and intense light, independently dissociating hydrogen, having a strong binding force to oxygen, from a liquefied fuel molecule containing carbon and
15 hydrogen, and tightly binding the dissociated hydrogen to oxygen, and achieves satisfactory perfect combustion of fuel by removing various components impeding perfect combustion of fuel, so that fuel efficiency is maximized, fuel consumption is reduced, and engine output is increased.

 Meanwhile, the present invention can be applied to various heaters, and
20 boilers of heating devices for industrial use of home use as well as internal engines of cars.

 The Present invention is not limited to the above embodiment, which is a mere exemplary application. Thus, it is clearly understood that many variations can be made within the scope and spirit of the present invention
25 by anyone skilled in the art.

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What is claimed is:

1. A device for accelerating perfect combustion of fuel through light resolution of discharge in a burning apparatus in which fuel is supplied from a fuel tank 90 to a combustor 92 through a vaporizing means 91 in the form of a mixed gas and burned, comprising an accelerator 100 for generating a discharge on a connection pipe 93 between said fuel tank 90 and said vaporizing means 91 with high-voltage electricity, thus emitting high heat and intense light, and electrolytically dissociating hydrogen from carbon in the fuel passing through a discharge portion 140, so that the binding force of hydrogen to oxygen is increased and said fuel is perfectly burned.
2. A device for accelerating perfect combustion of fuel through light resolution of discharge as claimed in claim 1, wherein said accelerator 100 for perfect combustion of fuel comprises a body 110 which has screw holes 111 and 111' in the upper and lower parts thereof and a space portion 112, and is screw-combined with a fuel inlet 113 and a fuel outlet 114 at both sides thereof; a (-)-ground conductive bolt 120 screw-combined with said lower screw hold 111 of said body; and a (+) high-voltage discharge bolt 130 screw-combined with said upper screw hole 111' of said body and spaced from the lower portion of said (-)-ground conductive bolt by a predetermined distance suitable for discharge.

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FIG. 1

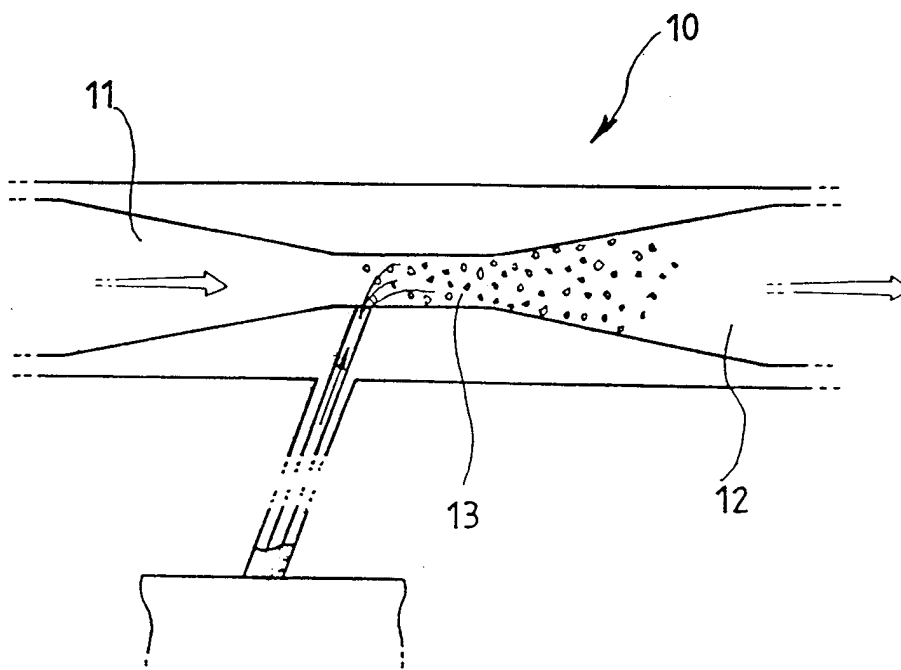
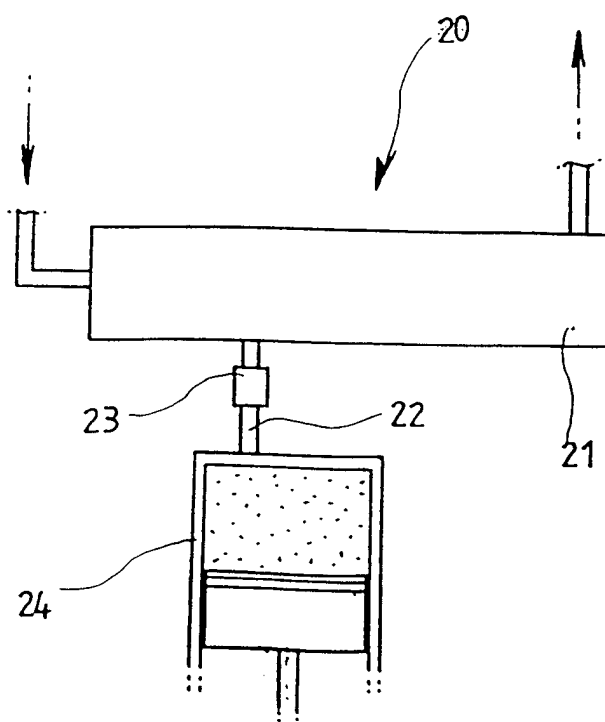


FIG. 2



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FIG. 3

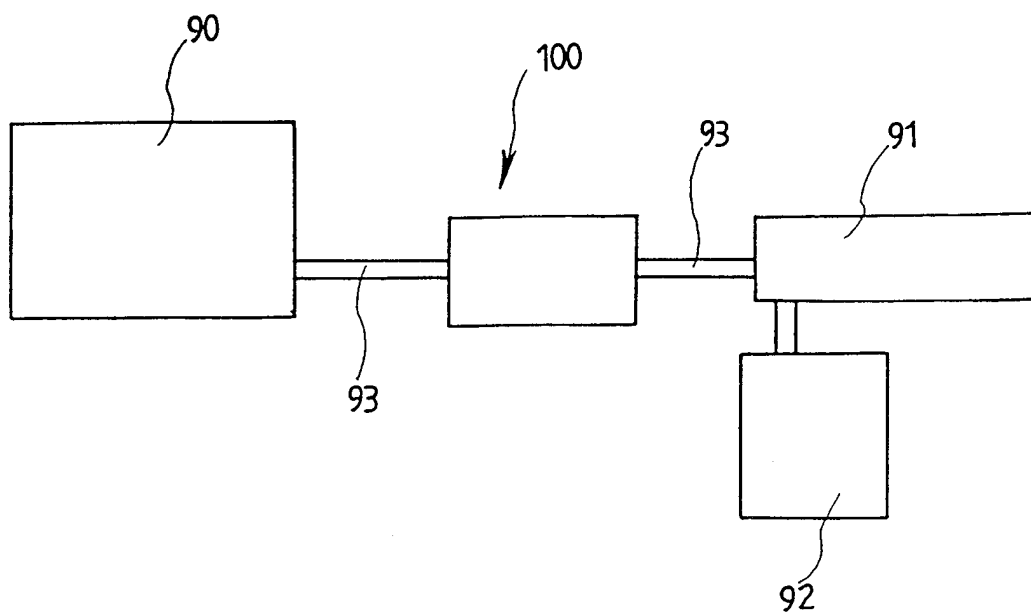
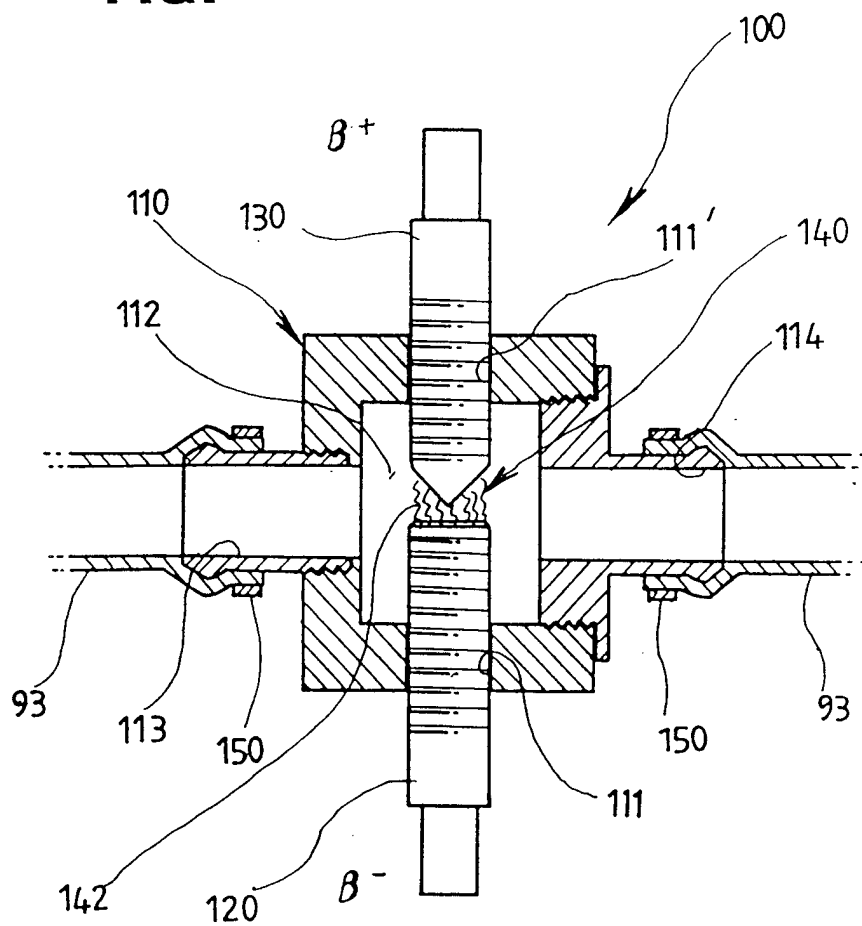


FIG. 4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR 97/00062

A. CLASSIFICATION OF SUBJECT MATTER

IPC⁶: F 02 M 27/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁶: F 02 M 27/00, 27/04; F 02 B 51/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 29 21 498 A1 (CIMA, G. et al.) 06 December 1979 (06.12.79), totality. -----	1

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

30 April 1998 (30.04.98)

Date of mailing of the international search report

15 May 1998 (15.05.98)

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DE A1 2921498	06-12-79	FR A1 2427481	28-12-79
		IT A0 7824052	31-05-78
		IT A 1096615	26-08-85