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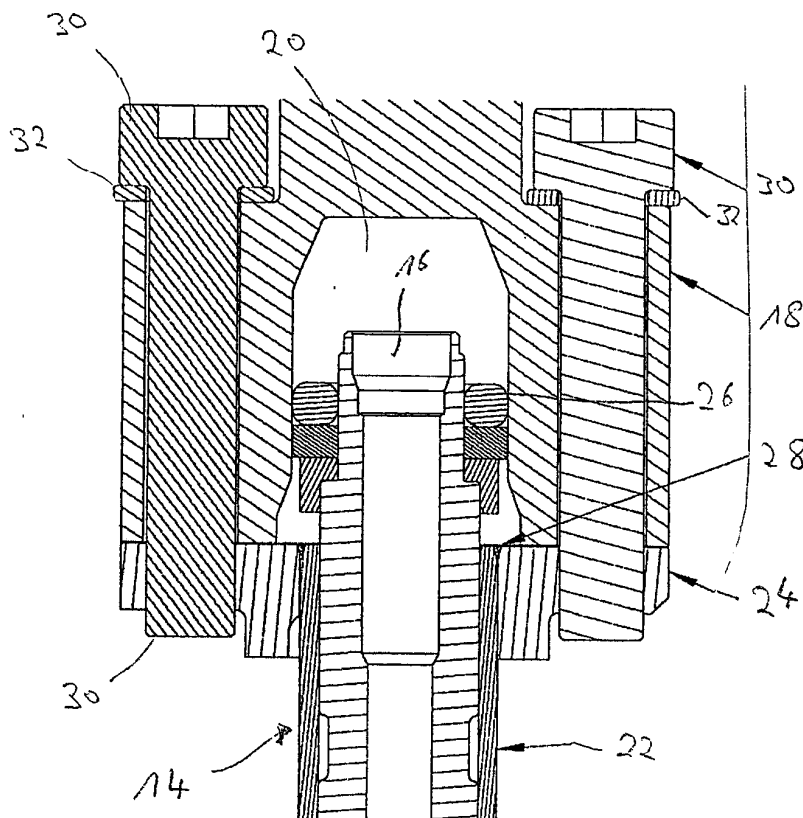
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(54) Fluid injector and fluid injector assembly

(57) A fluid injector (14) comprises a flange (22) for being coupled to an injector cup (16), the flange (22) having a cavity. The fluid injector (14) further comprises a

housing (24) and a fluid inlet portion (18), the housing (24) being mechanically coupled to the flange (22) such that the fluid injector (14) extends through the cavity of the flange (22).

FIG. 2



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Description

[0001] The invention relates to a fluid injector and a fluid injector assembly. Fluid injectors are in wide spread use, in particular as fuel injectors for combustion engines. Fuel can be supplied to the combustion engine by the fuel injector assembly that includes the fuel injector and the fuel injector cup. In order to keep pressure fluctuations during the operation of the combustion engine at a very low level, combustion engines are supplied with a fuel accumulator to which the fuel injector is connected and which has a relatively large volume. Such a fuel accumulator is often referred to as a fuel rail. Known fuel rails comprise a hollow body with recesses in the form of fuel injector cups which are coupled with the fuel injectors.

[0002] The EP 1 793 124 A1 discloses a fuel injector assembly including a central longitudinal axis comprising a fuel injector with a fuel inlet portion and an outer surface and a fuel injector cup with an inner surface, an outer surface and an end section. The fuel inlet portion of the fuel injector is designed to interact with the end section of the fuel injector cup. The inner surface of the fuel injector cup is designed to sealingly engage the outer surface of the fuel injector. The outer surface of the fuel injector comprises a projection, the end section of the fuel injector cup comprises a protrusion, and the protrusion engages the projection of the fuel injector for retaining the fuel injector in the fuel injector cup in direction of the central longitudinal axis.

[0003] The object of the invention is to create a fluid injector and a fluid injector assembly which are simply to be manufactured and which facilitate a reliable and precise connection between the fluid injector and the fluid injector cup.

[0004] The object is achieved by the features of the independent claims. Advantageous embodiments of the invention are given in the sub claims.

[0005] According to a first aspect the invention is distinguished by a fluid injector comprising a flange for being coupled to a fluid injector cup, the flange having a cavity. The fluid injector further comprises a housing and a fluid inlet portion. The housing is mechanically coupled to the flange such that the fluid injector extends through the cavity of the flange. This enables a reliable coupling of the fluid injector to the fluid injector cup. The fluid injector cup can be a connection branch of a fluid reservoir. For example, the fluid injector cup can be the fuel injector cup of a fuel rail in a combustion engine.

[0006] In an advantageous embodiment the fluid injector is mechanically coupled to the flange by a welding seam. This enables a simple and reliable coupling of the fluid injector to the flange.

[0007] According to a second aspect the invention is distinguished by a fluid injector assembly comprising the fluid injector with the fluid inlet portion having a sealing ring. The fluid injector assembly further comprises the fluid injector cup having a recess. The fluid injector cup

is mechanically coupled to the flange of the fluid injector such that the fluid inlet portion of the fluid injector is arranged in the recess of the fluid injector cup and the sealing ring is in a sealing engagement with the fluid injector cup. This enables a simple, reliable and sealing engagement between the fluid injector cup and the fluid injector. This further enables a mechanical decoupling of the fluid injector from a cylinder head of a combustion engine because the fluid injector can be held by the fluid injector cup. This may lead to a reduction of an acoustic noise propagation by a prevention of movements and impingements of the fluid injector relative to the cylinder head.

[0008] In an advantageous embodiment the fluid injector cup is mechanically coupled to the flange by screws. This enables a reliable coupling between the flange of the fluid injector and the fluid injector cup which also can be decoupled, for example if the fluid injector has to be maintained or exchanged, for example because of malfunctioning, by another fluid injector.

[0009] Exemplary embodiments of the invention are explained in the following with the aid of schematic drawings. These are as follows:

Figure 1 a fluid feed device,

Figure 2 a longitudinal section of a fluid injector assembly.

[0010] Elements of the same design and function that occur in different illustrations are identified by the same reference characters.

[0011] Figure 1 shows a fluid feed device 2 which is assigned to a combustion engine 4. The fluid feed device 2 includes a fluid tank 6 that is connected via a first fluid line to a low pressure pump 8. The output of the low pressure pump 6 is connected to a fluid inlet 10 of a fluid rail 12. Fluid injectors 14 are connected to the fluid rail 12. The fluid can be a fuel and is fed to the fluid injectors 14 via the fluid rail 12. The fluid injectors 14 have a sealed connection to the fluid rail 12 and are suitable for injecting fuel into the combustion engine.

[0012] Figure 2 shows a fluid injector assembly with the fluid injector 14 and a fluid injector cup 16. The fluid injector 14 comprises a fluid inlet portion 18 with a sealing ring 20 and a flange 22 which is mechanically coupled to a housing 24 of the fluid injector 14. In a preferred embodiment, the housing 24 of the fluid injector 14 is mechanically coupled to the flange 22 by a welding seam 26. The housing 24 can for example also be coupled to the flange 22 by two welding seams 26.

[0013] The fluid injector cup 16 is mechanically coupled to the flange 22 of the fluid injector 14 such that the fluid inlet portion 18 of the fluid injector 14 is arranged in a recess 28 of the fluid injector cup 16. In a preferred embodiment, the fluid injector cup 16 is mechanically coupled to the flange 22 by screws 30, for example by two screws 30 as it is shown in Figure 2. A disk 32 is arranged between a head of the respective screw 30 and

the fluid injector cup 16.

[0014] The mechanical coupling of the fluid injector 14 to the fluid injector cup 16 via the flange 22 can enable a reduction of an acoustic noise propagation by preventing an axial movement of the fluid injector 14 relative to the cylinder head of the combustion engine. This can prevent regular impingements of the fluid injector 14 on the cylinder head. A reason for the movements of the fluid injector 14 leading to the impingements can be forces which are exerted as a result of pressure fluctuations, for example in the recess 28 of the fluid injector cup 16.

[0015] In order to fix an angular position of the fluid injector assembly in relation to the cylinder head of the combustion engine, it is possible to apply an anti-rotation feature. For example, a bolt can be arranged between the flange 22 and the cylinder head of the combustion engine such that it extends partially in a cavity of the flange 22 and partially in a cavity of the cylinder head. This prevents any rotation of the flange 22 of the fluid injector 14 relative to the cylinder head. The bolt is not shown in Figure 2.

[0016] The usage of the screws 30 has got the advantage that the fluid injector 14 can be accessed and/or maintained by unscrewing the screws 30 and decoupling the fluid injector cup 16 from the flange 22 of the fluid injector 14.

pled to the flange (22) by screws (30).

Claims

1. Fluid injector (14) comprising
 - a flange (22) for being coupled to an injector cup (16), the flange (22) having a cavity,
 - a housing (24) and a fluid inlet portion (18), the housing (24) being mechanically coupled to the flange (22) such that the fluid injector (14) extends through the cavity of the flange (22).
2. Fluid injector (14) in accordance with claim 1, the fluid injector (14) being mechanically coupled to the flange (22) by a welding seam (26).
3. Fluid injector (14) assembly comprising
 - a fluid injector (14) in accordance with one of the claims 1 or 2, the fluid inlet portion (18) comprising a sealing ring (20),
 - the injector cup (16) with a recess (28), the injector cup (16) being mechanically coupled to the flange (22) of the fluid injector (14) such that the fluid inlet portion (18) of the fluid injector (14) is arranged in the recess (28) of the injector cup (16) and the sealing ring (20) is in a sealing engagement with the injector cup (16).
4. Fluid injector (14) assembly in accordance with claim 3, the fluid injector cup (16) being mechanically cou-

FIG 1

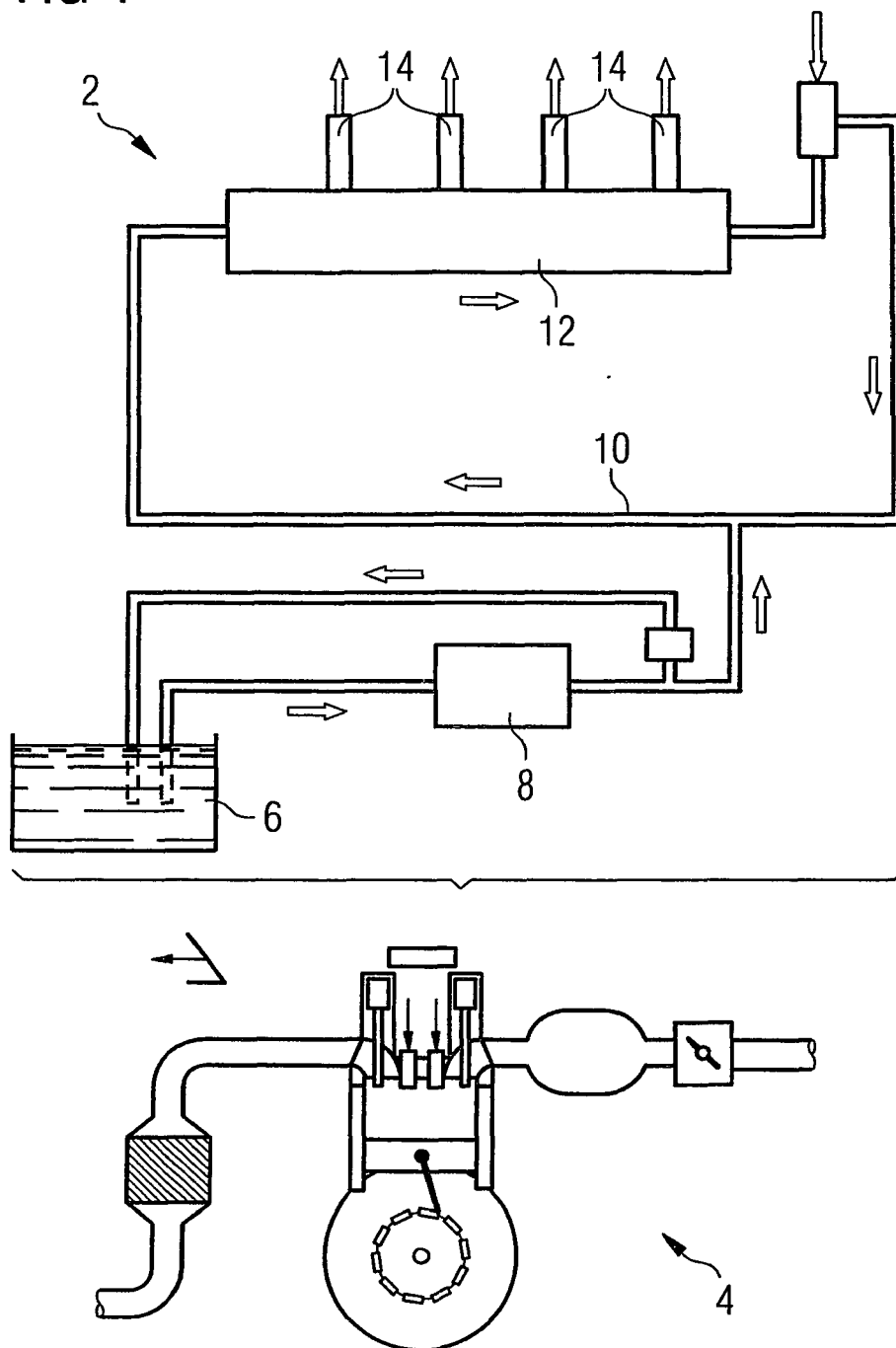
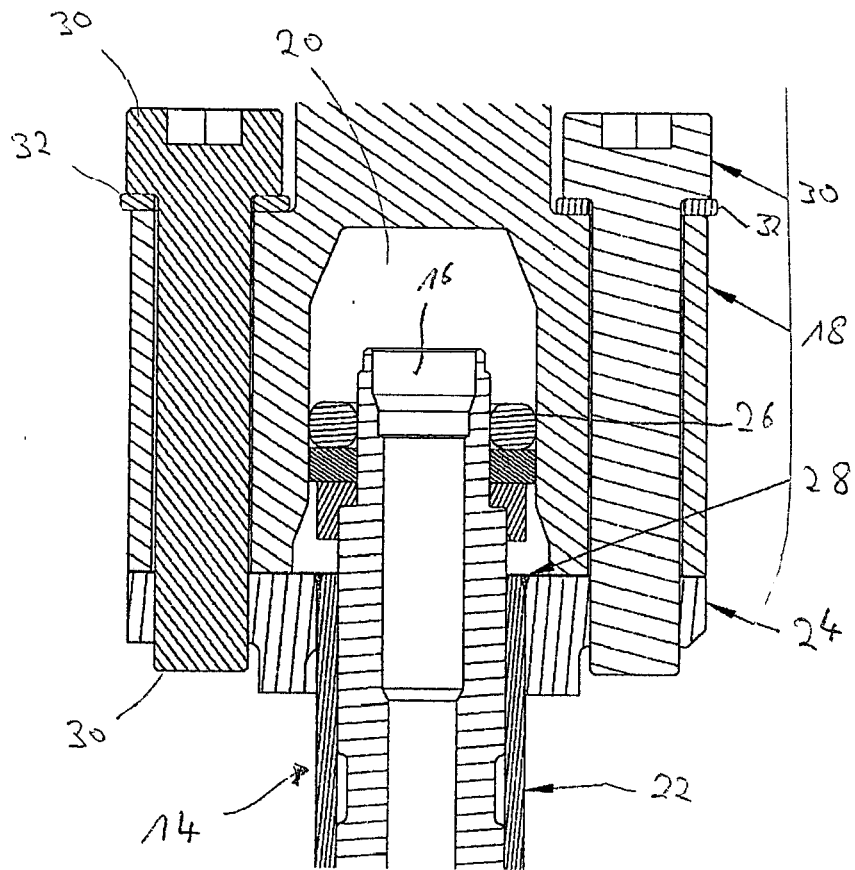


FIG. 2





EUROPEAN SEARCH REPORT

Application Number
EP 09 00 0441

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 02/097260 A2 (SIEMENS AG [DE]; HUMMEL HELMUT [DE]; ZANDER ECKBERT [DE]; WIRKOWSKI MI) 5 December 2002 (2002-12-05)	1-2	INV. F02M55/02 F02M55/00
Y	* page 7, line 22 - page 10, line 27; claim 5; figures 1,2 *	3-4	
Y	EP 1 475 530 A2 (YAMAHA MOTOR CO LTD [JP]) 10 November 2004 (2004-11-10) * paragraph [0091] - paragraph [0093]; figure 26 *	3-4	
X	DE 10 2006 017900 A1 (BOSCH GMBH ROBERT [DE]) 25 October 2007 (2007-10-25) * paragraph [0057] - paragraph [0066]; figures 10-13 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F02M
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 June 2009	Examiner Nobre Correia, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 (03.82) (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 00 0441

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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22-06-2009

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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