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(54) **A HIGH PRESSURE FUEL PUMP**

(57) A high pressure fuel pump (10) is described. The high pressure fuel pump (10) comprises a housing (12), a cylinder head (14) located on the housing (12), and a plunger (16) located within the housing (12) and adapted to reciprocate within a bore defined within the cylinder head (14). An annular space (18) is defined between the cylinder head (14) and the housing (12), the annular space (18) adapted to receive a spring (20) therein. A seal (22) is located in the housing (12), the seal (22) held between a first static fixation (24) that is secured to the cylinder head (14) and a second static fixation (25) that is secured to a roller tappet body (40) and positioned within the annular space (18), the seal (22) prevents lubrication oil mixing with fuel within the high pressure fuel pump (10).

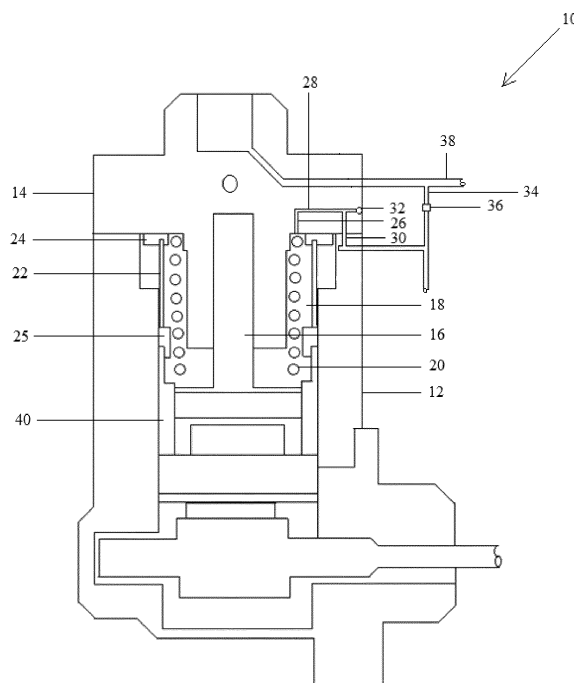


Figure 1

## Description

### Field of the invention:

[0001] This disclosure relates to a high pressure fuel pump, and more particularly to an apparatus for preventing fuel mixing with lubrication oil in the high pressure fuel pump.

### Background of the invention:

[0002] Indian Patent Application Number 3909/CHE/2014 discloses a high pressure fuel pump. The high pressure fuel pump comprises a housing having a plurality of recesses adapted to accommodate an inlet, an outlet, and a plunger in the plurality of recesses. A guide element is located in one of the plurality of recesses such that the plunger reciprocates through the guide element. A seal is located with reference to the guide element and the plunger such that the plunger reciprocates through the seal. A fuel passageway extends from the recess in which the guide element is located to the inlet to allow fuel to flow from the recess to the inlet.

### Brief description of the accompanying drawing:

[0003] An embodiment of the disclosure is described with reference to the following accompanying drawing:

Figure 1 illustrates a high pressure fuel pump in accordance with this disclosure.

### Detailed description of the embodiments:

[0004] Figure 1 illustrates a high pressure fuel pump 10. The high pressure fuel pump 10 comprises a housing 12, a cylinder head 14 located on the housing 12, and a plunger 16 located within the housing 12 and adapted to reciprocate within a bore defined within the cylinder head 14. An annular space 18 is defined between the cylinder head 14 and the housing 12, the annular space 18 adapted to receive a spring 20 therein. A seal 22 is located in the housing 12, the seal 22 held between a first static fixation 24 that is secured to the cylinder head 14 and a second static fixation 25 that is secured to a roller tappet body 40 and positioned within said annular space 18, the seal 22 prevents lubrication oil mixing with fuel within the high pressure fuel pump 10. At least one bore 30 is defined in the cylinder head and in flow communication with the annular space 18, the at least one bore 30 adapted to channel fuel from the annular space 18 out of the high pressure fuel pump 10.

[0005] Moreover, a high pressure fuel pump 10 is described. The high pressure fuel pump 10 comprises a housing 12, a cylinder head 14 located on the housing 12, and a plunger 16 located within the housing 12 and adapted to reciprocate within a bore defined within the cylinder head 14. An annular space 18 is defined between

the cylinder head 14 and the housing 12, the annular space 18 adapted to receive a spring 20 therein. A seal 22 is located in the housing 12, the seal 22 held between a first static fixation 24 that is secured to the cylinder head 14 and a second static fixation 25 that is secured to a roller tappet body 40 and positioned within said annular space 18, the seal 22 prevents lubrication oil mixing with fuel within the high pressure fuel pump 10.

[0006] As shown in Figure 1, the high pressure fuel pump 10 includes a housing 12. The housing 12 includes a compression chamber for sucking fuel from a fuel inlet pipe 38. A plunger 16 is positioned within the compression chamber to reciprocate and pressurize fuel for delivery through a fuel outlet supply path (not shown). The plunger 16 is coupled to a roller tappet body 40 that is positioned below the plunger 16, and reciprocates the plunger 16 to deliver fuel from the high pressure fuel pump 10.

[0007] The high pressure fuel pump 10 includes a seal 22. The seal 22 separates fuel from lubrication oil that is present in the side of the seal 22 opposite that of the spacing 18. The seal 22 is provided in an annular space 18 and housed between a first static fixation 24 and a second static fixation 25. The first static fixation 24 and the second static fixation 25 facilitates retaining the seal 22 in a press fit, thereby preventing movement of the seal 22 within the housing 12.

[0008] As shown in Figure 1, the seal 22 is provided on an inner periphery of the housing 12. The seal 22 has an outer surface that slidably and tightly contacts with the inner surface of the housing 12 of the high pressure fuel pump 10. The first static fixation 24 and the second static fixation 25 are each inserted within the seal 22 and pressed against the housing 12 such that the force exerted by the first static fixation 24 and the second static fixation 25 against the seal 22 facilitates maintaining a tight contact between the seal 22 and the housing 12.

[0009] The seal 22 has a cross section that is circular in shape. As a material of the seal 22, PTFE (polytetrafluoroethylene) having good fuel resistance and high wear resistance may be used. Alternatively, any material known in the art that facilitates providing a sealing arrangement between the seal 22 and the housing 12 may be used to seal the high pressure fuel pump 10. The roller tappet body 40 is in communication with a cam shaft and lifts the plunger 16 when it is required to deliver fuel from the high pressure fuel pump 10.

[0010] A spring member 20 is positioned within the annular space 18. The spring member 20 facilitates maintaining resistance against the plunger 16 when the plunger 16 reciprocates within the housing 12. A cylinder head 14 is positioned above the housing 12. The cylinder head 14 facilitates sealing the high pressure fuel pump 10. A portion of the cylinder head 14 is in flow communication with the annular space 18 that is defined in the housing 12. The cylinder head 14 includes a fuel inlet pipe 38 that is coupled to the cylinder head 14. The fuel inlet pipe 38 supplies fuel from a fuel tank to the cylinder head 14 of

the high pressure fuel pump 10.

**[0011]** The cylinder head 14 includes a bore 26 a first end of the bore is in flow communication with the annular space 18 and a second end of the bore is in flow communication with an outlet pipe 34. Alternatively, the cylinder head 14 includes a plurality of bores 26, 28, 30 that are each interconnected from a first end that is flow communication with the annular space 18 to a second end that is in flow communication with the outlet pipe 34. A ball 32 is placed in the bore 28. The ball 32 prevents escape of fuel from the bore 28 out of the high pressure fuel pump 10. A zero delivery throttle 36 is coupled to the outlet pipe 34. The zero delivery throttle 36 facilitates preventing fuel from the outlet pipe 34 from mixing with fuel from the fuel inlet pipe 38.

**[0012]** The working of the high pressure fuel pump 10 is described as an example. Fuel is channeled into the compression chamber of the high pressure fuel pump 10 via the fuel inlet pipe 38. Due to leakage between the plunger 16 and the cylinder head 14, the fuel flows through the leakage and into the annular space 18, thereby filling the annular space 18. From the annular space 18, the fuel flows into the bore 26. From the bore 26, the fuel flows through the bore 30, via the bore 28 and into the outlet pipe 34. The seal 22 facilitates preventing mixing of fuel with lubrication oil within the housing 12 of the high pressure fuel pump 10. The leakage of fuel from the bore 28 is prevented by means of the ball 32 that is present in the bore 28.

**[0013]** It should be understood that embodiments explained in the description above are only illustrative and do not limit the scope of this invention. Many such embodiments and other modifications and changes in the embodiment explained in the description are envisaged. The scope of the invention is only limited by the scope of the claims.

## Claims

1. A high pressure fuel pump (10), said high pressure fuel pump (10) comprising:

a housing (12);  
a cylinder head (14) located on said housing (12);  
a plunger (16) located within said housing (12) and adapted to reciprocate within a bore defined within said cylinder head (14);  
an annular space (18) defined between said cylinder head (14) and said housing (12), said annular space (18) adapted to receive a spring (20) therein;

### characterized in that

a seal (22) located in said housing (12), said seal (22) held between a first static fixation (24) that is secured to said cylinder head (14) and a second static fixation (25) that is secured to a

roller tappet body (40) and positioned within said annular space (18), said seal (22) prevents lubrication oil mixing with fuel within said high pressure fuel pump (10).

2. The high pressure fuel pump (10) in accordance with Claim 1 wherein said first static fixation (24) may be welded to said cylinder head (14) and said second static fixation (25) may be welded to said roller tappet body (40).
3. The high pressure fuel pump (10) in accordance with Claim 1 wherein said first static fixation (24) may be glued to said cylinder head (14) and said second static fixation (25) may be glued to said roller tappet body (40).
4. A high pressure fuel pump (10), said high pressure fuel pump (10) comprising:

a housing (12);  
a cylinder head (14) located on said housing (12);  
a plunger (16) located within said housing (12) and adapted to reciprocate within a bore defined within said cylinder head (14);  
an annular space (18) defined between said cylinder head (14) and said housing (12), said annular space (18) adapted to receive a spring (20) therein;

### characterized in that

a seal (22) located in said housing (12), said seal (22) held between a first static fixation (24) that is secured to said cylinder head (14) and a second static fixation (25) that is secured to a roller tappet body (40) and positioned within said annular space (18), said seal (22) prevents lubrication oil mixing with fuel within said high pressure fuel pump (10); and  
at least one bore (30) defined in said cylinder head (14) and in flow communication with said annular space (18), said at least one bore (30) adapted to channel fuel from said annular space (18) out of said high pressure fuel pump (10).

5. The high pressure fuel pump (10) in accordance with Claim 5 further comprising an outlet pipe (34) in flow communication with said at least one bore (30), said outlet pipe (34) adapted to channel fuel out of said high pressure fuel pump (10).
6. The high pressure fuel pump (10) in accordance with Claim 5 further comprising a zero delivery throttle (36) coupled between said outlet pipe (34) and a fuel inlet pipe (38), said zero delivery throttle (36) facilitates preventing fuel from said outlet pipe (34) from mixing with fuel from said fuel inlet pipe (38).

7. The high pressure fuel pump (10) in accordance with Claim 5 wherein said first static fixation (24) may be welded to said cylinder head (14) and said second static fixation (25) may be welded to said roller tappet body (40). 5
8. The high pressure fuel pump (10) in accordance with Claim 5 wherein said first static fixation (24) may be glued to said cylinder head (14) and said second static fixation (25) may be glued to said roller tappet body (40). 10

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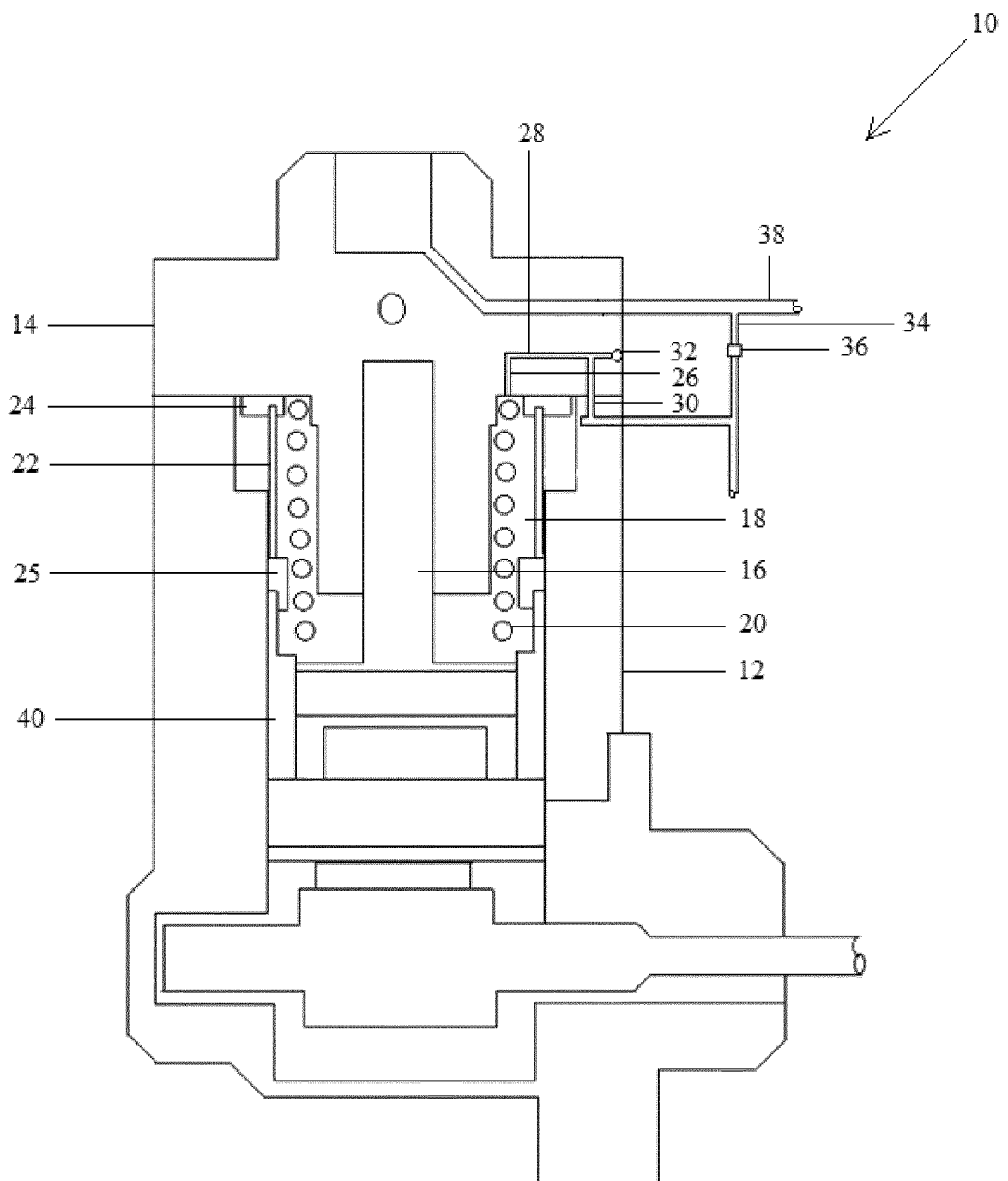


Figure 1



## EUROPEAN SEARCH REPORT

Application Number  
EP 16 18 2769

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			TECHNICAL FIELDS SEARCHED (IPC)
			F02M F04B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 22 November 2016	Examiner Landriscina, V
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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 &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)

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

EP 16 18 2769

5 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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22-11-2016

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