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[Continued on next page]

(54) Title: LARGE BORE FUEL SYSTEM AND FUEL INJECTOR FOR SAME

(57) Abstract: A low leakage large bore fuel system (10) includes a common rail (16) fluidly connected to at least one of a source of heavy fuel oil (12) and a source of distillate diesel fuel (14). A plurality of fuel injectors (30) are fluidly connected to the common rail (16) and each include a cooling inlet (35) and a cooling outlet (36). Each fuel injector (30) also includes an electrical actuator (40) coupled to a direct operated nozzle check valve by a pilot valve member (41) and a control valve member (45). Fuel leakage is reduced between injection events by equalizing pressures in a pilot control chamber (63) and an intermediate control chamber (62) that are separated by a guide surface of the control valve member (45). Also, between injection events the pilot valve member (41) blocks a drain outlet (37) from a common rail inlet (33) of the fuel injector (30).

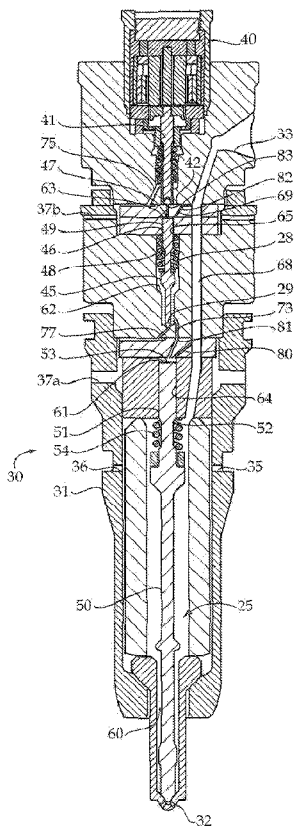


Fig 2

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**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

F02M 41/00; F02M 63/02; F02B 75/02; F02D 41/04; F02M 47/02; B05B 1/24; F02M 33/02; F02D 41/20; F02M 59/46; F02M 45/04; F02B 3/00

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

Korean utility models and applications for utility models  
Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) &amp; Keywords:HFO,diesel,rail,cooling

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages              | Relevant to claim No. |
|-----------|---|-----------------------|
| A         | US 2010-0084489 A1 (CHANG, DAVID) 08 April 2010<br>See paragraphs 0014-0024; figures 1,3.       | 1-10                  |
| A         | EP 2071177 A1 (MAN B & W DIESEL A/S) 17 June 2009<br>See paragraphs 0084-0092; figure 8.        | 1-10                  |
| A         | US 2008-0017169 A1 (HLOUSEK et al.) 24 January 2008<br>See paragraphs 0023-0025; figures 3,4.   | 1-10                  |
| A         | US 2001-0020467 A1 (COLDREN et al.) 13 September 2001<br>See paragraphs 0019-0023; figures 3,4. | 1-10                  |

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

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

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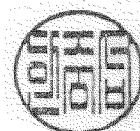
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Information on patent family members

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| Patent document cited in search report | Publication date | Patent family member(s)   | Publication date                                     |
|--|------------------|---|--|
| US 2010-0084489 A1                     | 08.04.2010       | US 2011-0056464 A1<br>US 7849836 B2<br>WO 2010-042359 A2<br>WO 2010-042359 A3 | 10.03.2011<br>14.12.2010<br>15.04.2010<br>08.07.2010 |
| EP 2071177 A1                          | 17.06.2009       | None  |  |
| US 2008-0017169 A1                     | 24.01.2008       | None  |  |
| US 2001-0020467 A1                     | 13.09.2001       | None  |  |