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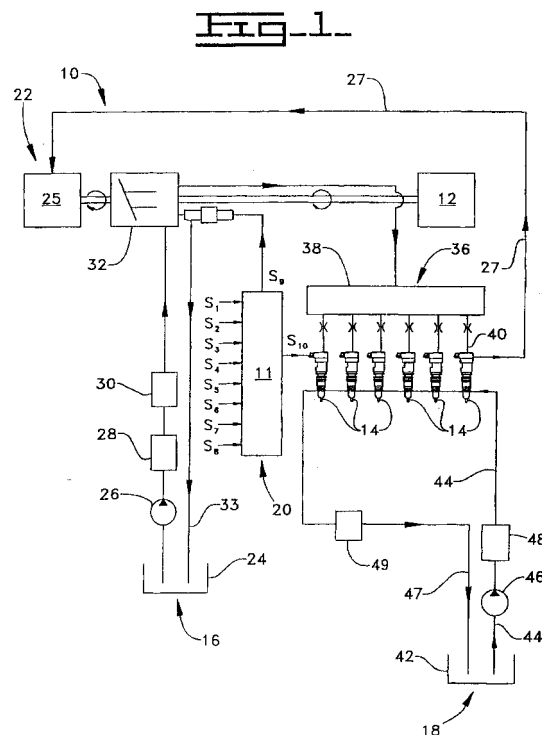
(71) Applicant: **CATERPILLAR INC.**
Peoria Illinois 61629-6490 (US)

(72) Inventors:
• **Chen, Shikui K.**
Peoria, Illinois 61615 (US)
• **Hefler, Gregory W.**
Chillicothe, Illinois 61523 (US)

(74) Representative: **Brunner, Michael John**
GILL JENNINGS & EVERY,
Broadgate House,
7 Eldon Street
London EC2M 7LH (GB)

(54) **Hydraulically-actuated fuel injector with direct control needle valve**

(57) A hydraulically actuated fuel injector (14') includes an injector body (105) having an actuation fluid inlet (106) and a needle control chamber (118). A hydraulic means within the injector pressurizes fuel in the injector body (105). The hydraulic means includes an actuation fluid control valve (140) having a solenoid (130) and is movable to open and close the actuation fluid inlet (106). A needle valve member (160) includes a closing hydraulic surface (167) exposed to pressure in the needle control chamber (118). A needle control valve (136), which utilizes the same solenoid (130), is mounted in the injector body (105) and movable to open and close the needle control chamber (118) to a source of high pressure fluid (106). The slower response time of the actuation fluid control valve (140) allows for direct control of the fast responding needle valve (160) by a single fast acting two-way solenoid (130).





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Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 11 7613

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 5 522 545 A (CAMPLIN FREDERICK A ET AL) 4 June 1996 (1996-06-04) * column 4, line 5 - line 42 * * column 5, line 19 - line 34; figures 2-4 *	1	F02M57/02 F02M47/02 F02M59/10 F02M59/46
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			F02M
The present search report has been drawn up for all claims			
Place of search: THE HAGUE		Date of completion of the search: 30 October 2002	Examiner: Sideris, M
<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 & : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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