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[Continued on next page]

(54) Title: VALVE ASSEMBLY

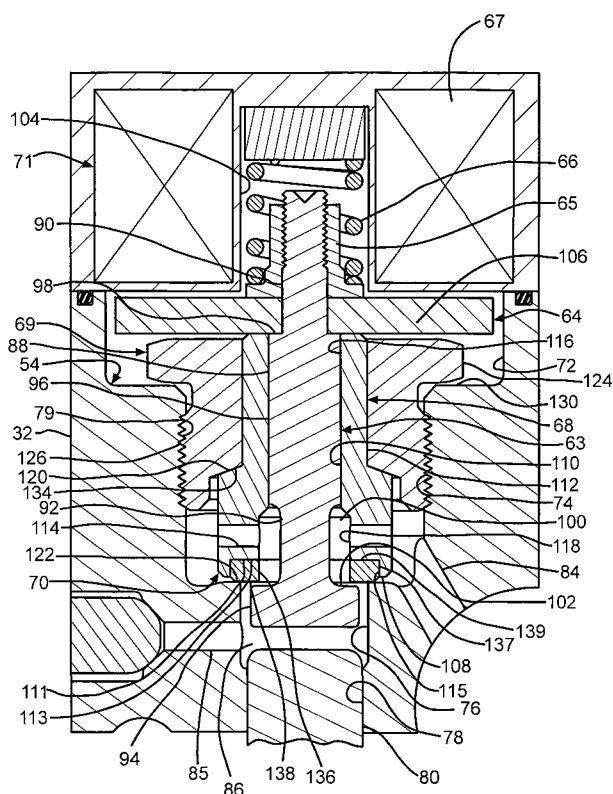


FIG. 3

(57) Abstract: Although modern diesel fuel formulations are intended to reduce emissions of diesel engines, at least some of those modern fuels tend to have relatively low lubricity levels. The control valve assemblies described herein help to minimize any increased wear that would otherwise result from the use of such low lubricity fuels by providing a valve element, a valve guide, and an insert. The valve element is received within the valve guide and is moveable between an open position and a closed position. The insert forms a first sealed interface and a second sealed interface with the valve element and the valve guide. When the valve element is in the closed position, both of the first sealed interface and the second sealed interface are engaged. When the valve element is in the open position, only one of the first sealed interface and the second sealed interface is engaged.

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A. CLASSIFICATION OF SUBJECT MATTER

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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)

F04B F16K

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 practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	column 2, line 14 - column 4, line 13; claim 1.4; figures 1,2 -----	2-8,10, 19-31
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Y	column 2, line 38 - line 67; figures 3,5,14 column 6, line 8 - column 8, line 14 column 12, line 64 - column 13, line 50 -----	2-8,10, 19-31
X	US 4 540 154 A (KOLCHINSKY ABEL E [US] ET AL) 10 September 1985 (1985-09-10)	1,9-18
Y	column 3, line 34 - line 44; figures 5,6 column 5, line 55 - column 7, line 3 ----- -/-	2-8, 19-31

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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INTERNATIONAL SEARCH REPORT

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