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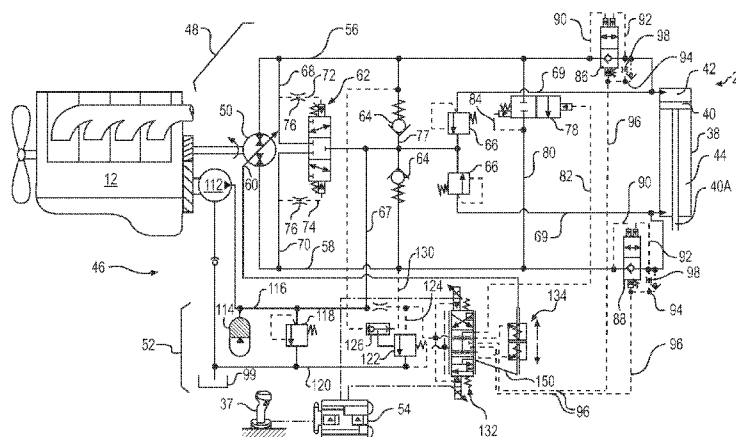
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[Continued on next page]

(54) Title: METERLESS HYDRAULIC SYSTEM HAVING DISPLACEMENT CONTROL VALVE

**FIG. 2**

(57) Abstract: A hydraulic system (46) is disclosed. The hydraulic system may have a pump (50), a tank (99), a displacement actuator (134) having first and second chambers (136, 140), a regeneration valve (78), and a load-holding valve (86, 88). The hydraulic system may also have a displacement control valve (132) including a valve element (146), and a stationary cage portion (148) at least partially forming a high-pressure passage (116) fluidly connecting the pump and the valve element, a low-pressure passage (120) fluidly connecting the valve element and the tank, a first displacement actuator passage (137) fluidly connecting the valve element and the first chamber, a second displacement actuator passage (139) fluidly connecting the valve element and the second chamber, a load-holding control passage (96) fluidly connecting the valve element and the load-holding valve, and a regeneration control passage (82) fluidly connecting the valve element and the regeneration valve. The displacement control valve may also include a movable cage portion (156) that is movable to selectively restrict fluid flow through only the first and second displacement actuator passages.



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A. CLASSIFICATION OF SUBJECT MATTER***F15B 13/02(2006.01)i, E02F 9/22(2006.01)i, F16K 11/065(2006.01)i***

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)

F15B 13/02; F04B 49/00; F15B 11/00; F16D 39/00; F15B 11/17; F15B 13/04; F15B 9/09; F15B 13/16

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) & Keywords: hydraulic system, displacement, pump, actator, and valve

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 08-049659 A (HITACHI CONSTR. MACH. CO., LTD.) 20 February 1996 See abstract, paragraphs [0013]-[0015], and figure 1.	1-10
A	US 2011-0030364 A1 (PERSSON, BENGT-GORAN et al.) 10 February 2011 See abstract, paragraphs [0106],[0107], and figure 8.	1-10
A	US 5205201 A (GOLLNER, WILHELM) 27 April 1993 See abstract, column 5, lines 1-24, and figures 1,2.	1-10
A	US 4359931 A (PALMERSHEIM, GERARD M. et al.) 23 November 1982 See abstract, columns 2-5, and figures 3,7.	1-10
A	JP 11-148463 A (HITACHI CONSTR. MACH. CO., LTD.) 02 June 1999 See abstract and figures 1,2.	1-10



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		KR 10-2010-0116664 A	01.11.2010
		WO 2009-102740 A2	20.08.2009
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