

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 09-SL28WO	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US2010/032389	International filing date (<i>day/month/year</i>) 26 APRIL 2010 (26.04.2010)	(Earliest) Priority Date (<i>day/month/year</i>) 28 APRIL 2009 (28.04.2009)
Applicant SMITH INTERNATIONAL, INC. et al		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

the international application in the language in which it was filed

a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. **Certain claims were found unsearchable** (See Box No. II)

3. **Unity of invention is lacking** (See Box No. III)

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

a. the figure of the **drawings** to be published with the abstract is Figure No. 2A

as suggested by the applicant.

as selected by this Authority, because the applicant failed to suggest a figure.

as selected by this Authority, because this figure better characterizes the invention.

b. none of the figure is to be published with the abstract.

A. CLASSIFICATION OF SUBJECT MATTER*E21B 43/12(2006.01)i, F04B 43/10(2006.01)i, E21B 43/16(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)

E21B 43/12; G06F 15/16; H04J 3/22; H04B 7/02

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 valve; pump; piston; and pilot spool

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008-0003118 A1 (TRAYLOR; LELAND B. et al.) 03 January 2008 See abstract; paragraphs [0019]-[0025]; claims 1, 12; and figures 1, 2	1-19
A	US 6889765 B1 (TRAYLOR; LELAND B.) 10 May 2005 See abstract; column 8 line 29-column 9 line 2; claim 1; and figure 1	1-19
A	US 2006-0008364 A1 (TRAYLOR; LELAND B.) 12 January 2006 See abstract; paragraphs [0018]-[0022]; claims 1, 9; and figure 1	1-19
A	US 4649956 A (ZEUNER; KENNETH W. et al.) 17 March 1987 See abstract; column 2 line 44-column 4 line 38; claim 1; and figure 1	1-19

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

03 JANUARY 2011 (03.01.2011)

Date of mailing of the international search report

03 JANUARY 2011 (03.01.2011)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

SO, Hyeon Young

Telephone No. 82-42-481-5521



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/032389

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2008-0003118 A1	03.01.2008	AU 2007-266495 A1 CA 2651181-A1 CN 101454570 A WO 2007-140436 A2 WO 2007-140436 A3 WO 2007-140436 A3	06.12.2007 06.12.2007 10.06.2009 06.12.2007 06.12.2007 16.10.2008
US 6889765 B1	10.05.2005	None	
US 2006-0008364 A1	12.01.2006	CA 2510919 C CA 2510919-A1 GB 0514048 D0 GB 2416004 A GB 2416004 B US 7252148 B2	12.01.2010 08.01.2006 17.08.2005 11.01.2006 31.12.2008 07.08.2007
US 4649956 A	17.03.1987	EP 0134744 A2 EP 0134744 A3 EP 0134744 B1 EP 0134744 B1 JP 07-076561 B2 JP 2079884 C JP 60-121305 A US 4589437 A1	20.03.1985 16.03.1988 09.05.1990 29.12.1999 16.08.1995 09.08.1996 28.06.1985 20.05.1986