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[Continued on next page]

(54) Title: EARTH BORING TOOLS INCLUDING RETRACTABLE PADS, CARTRIDGES INCLUDING RETRACTABLE PADS FOR SUCH TOOLS, AND RELATED METHODS

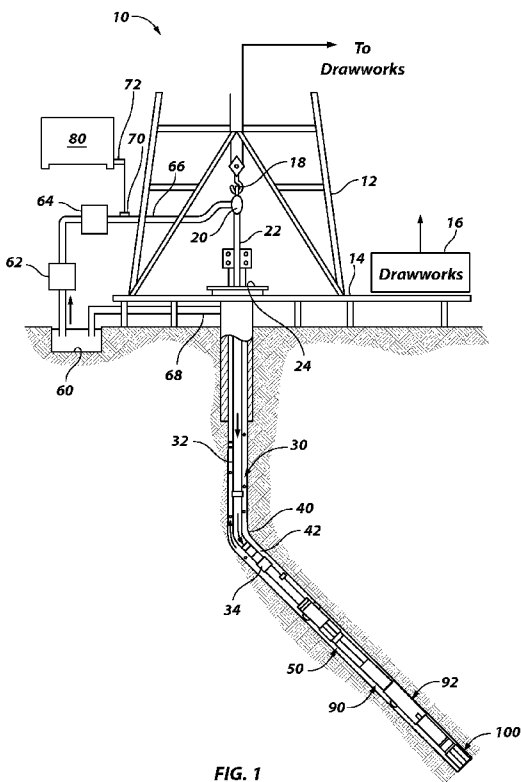
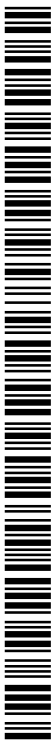


FIG. 1

(57) Abstract: An earth-boring tool may comprise at least one cavity formed in a face thereof. At least one retractable pad residing in the at least one cavity may be coupled to a piston located at least partially within the at least one cavity. Additionally, a valve may be positioned within the earth-boring tool and configured to regulate flow of an incompressible fluid in contact with the piston through an opening of a reservoir. A cartridge may comprise a barrel wall defining a first bore, and a piston comprising at least one retractable pad positioned at least partially within the first bore. The barrel wall and the piston may define a first reservoir within the first bore, and a valve may be positioned and configured to regulate flow through an opening to the first reservoir. Related methods and devices are also disclosed.





TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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A. CLASSIFICATION OF SUBJECT MATTER**E21B 10/62(2006.01)i, E21B 10/32(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 10/62; E21B 17/10; E21B 7/04; E21B 7/06; E21B 10/42

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: retractable pad, valve, extending, retracting and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2010-0071956 A1 (BEUERSHAUSEN, CHAD J.) 25 March 2010 See abstract, paragraphs 0026,0028,0031, claim 9 and figure 3B.	1-3,20-25,29,30 4-19,26-28
A	WO 2006-085105 A1 (MECIRIA LIMITED) 17 August 2006 See abstract, page 13, line 4 - page 14, line 23 and figures 3,5.	1-30
A	WO 2009-002996 A1 (SCHLUMBERGER CANADA LIMITED et al.) 31 December 2008 See abstract, page 4, lines 7 - 24 and figure 1.	1-30
A	US 2009-0008151 A1 (TURNER, WILLIAM E. et al) 8 January 2009 See abstract, paragraphs 0119,0121 and figure 12.	1-30

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

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0071956 A1	25.03.2010	CA 2736710 A1	15.04.2010
		EP 2340346 A2	06.07.2011
		US 2010-0071962 A1	25.03.2010
		US 7971662 B2	05.07.2011
		US 8205686 B2	26.06.2012
		WO 2010-036834 A2	01.04.2010
		WO 2010-036834 A3	17.06.2010
		WO 2010-042797 A2	15.04.2010
		WO 2010-042797 A3	08.07.2010
WO 2006-085105 A1	17.08.2006	CA 2597390 A1	17.08.2006
		GB 0503742 D0	30.03.2005
		GB 0602829 D0	22.03.2006
		GB 2423102 A	16.08.2006
		GB 2423102 B	27.06.2007
		GB 2423102 C	21.08.2007
		NO 20074499 A	12.11.2007
		US 2008-0000693 A1	03.01.2008
		US 7849936 B2	14.12.2010
		WO 2009-002996 A1	31.12.2008
CN 101772614 A	07.07.2010		
EP 2173960 A1	14.04.2010		
GB 0712340 D0	01.08.2007		
GB 2450498 A	31.12.2008		
JP 2010-531941 A	30.09.2010		
RU 2010102246 A	10.08.2011		
US 2009-0008151 A1	08.01.2009	CA 2606428 A1	09.11.2006
		US 2006-0243487 A1	02.11.2006
		US 7389830 B2	24.06.2008
		US 7762356 B2	27.07.2010
		WO 2006-119022 A2	09.11.2006
		WO 2006-119022 A3	29.03.2007