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[Continued on next page]

(54) **Title:** DRILL BIT FOR BORING EARTH AND OTHER HARD MATERIALS

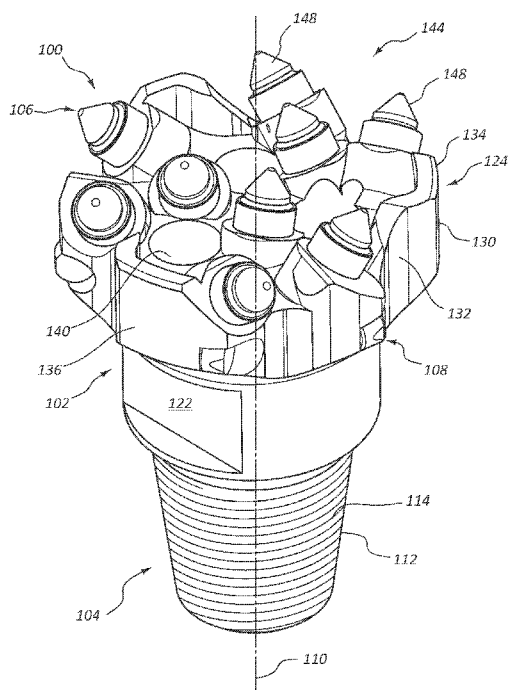


FIG. 1

(57) **Abstract:** A drill bit for drilling a hole through earth and hard materials, the drill bit including a bit body having an inner bore and a cutting head at a cutting end, the cutting head including a center portion with one or more apertures extending from the cutting end to the inner bore, a perimeter portion projecting radially outward to form a plurality of blades divided by a plurality of junk slots, a cutting face, and a plurality of cutter receptacles spaced about the cutting face. A plurality of cutters with cutter tips terminating in points are in mounted into the cutter receptacles at a pitch angle relative to the cutting face, and with the plurality of cutter points together defining a projected cutting surface.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/034908**A. CLASSIFICATION OF SUBJECT MATTER*****E21B 10/43(2006.01)i, E21B 10/56(2006.01)i, E21B 10/62(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 10/43; E21B 10/567; E21B 10/46; E21B 10/633; E21B 10/60; E21B 10/55

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: cutter, bore, receptacle, pocket 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	WO 2010-099512 A1 (JONES, MARK, L. et al.) 02 September 2010 See paragraphs 41-64, 68 and figures 1, 13	1-20
X	US 2010-0059288 A1 (HALL, DAVID R. et al.) 11 March 2010 See paragraphs 45-65 and figures 2a, 2b, 2c, 3, 5, 13	1-20
A	US 2009-0000828 A1 (HALL, DAVID R. et al.) 01 January 2009 See paragraphs 34-46 and figures 3, 11a	1-20
A	US 2010-0230175 A1 (ENGSTROM, ROBERT W.) 16 September 2010 See paragraphs 15, 16 and figure 1	1-20



Further documents are listed in the continuation of Box C.



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Information on patent family members

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/034908

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2008-0106139 A1	08.05.2008
		US 2008-0115977 A1	22.05.2008
		US 2008-0115978 A1	22.05.2008
		US 2008-0120163 A1	22.05.2008
		US 2008-0129104 A1	05.06.2008
		US 2008-0164072 A1	10.07.2008
		US 2008-0164073 A1	10.07.2008
		US 2008-0164748 A1	10.07.2008
		US 2008-0169698 A1	17.07.2008
		US 2008-0172627 A1	17.07.2008
		US 2008-0185468 A1	07.08.2008
		US 2008-0187452 A1	07.08.2008
		US 2008-0197691 A1	21.08.2008
		US 2008-0197692 A1	21.08.2008
		US 2008-0210798 A1	04.09.2008
		US 2008-0211290 A1	04.09.2008
		US 2008-0238181 A1	02.10.2008
		US 2008-0246329 A1	09.10.2008
		US 2008-0258536 A1	23.10.2008
		US 2008-0264697 A1	30.10.2008
		US 2008-0282584 A1	20.11.2008
		US 2008-0283256 A1	20.11.2008
		US 2008-0284236 A1	20.11.2008
		US 2008-0309146 A1	18.12.2008
		US 2008-0309147 A1	18.12.2008
		US 2008-0309148 A1	18.12.2008
		US 2008-0309149 A1	18.12.2008
		US 2008-0314647 A1	25.12.2008
		US 2008-0315667 A1	25.12.2008
		US 2009-0051211 A1	26.02.2009
		US 2009-0058174 A1	05.03.2009
		US 2009-0066149 A1	12.03.2009
		US 2009-0133938 A1	28.05.2009
		US 2009-0146489 A1	11.06.2009
		US 2009-0160238 A1	25.06.2009
		US 2009-0182473 A1	16.07.2009
		US 2009-200855 A1	13.08.2009
		US 2009-200857 A1	13.08.2009
		US 2009-263308 A1	22.10.2009
		US 2009-267403 A1	29.10.2009
		US 2009-273225 A1	05.11.2009
		US 2009-294182 A1	03.12.2009
		US 2010-011628 A1	21.01.2010
		US 2010-054875 A1	04.03.2010
		US 2010-059289 A1	11.03.2010
		US 2010-065332 A1	18.03.2010
		US 2010-065338 A1	18.03.2010
		US 2010-065339 A1	18.03.2010
		US 2010-071964 A1	25.03.2010
		US 2010-089648 A1	15.04.2010

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/034908

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2010-107455 A1	06.05.2010
		US 2010-237135 A1	23.09.2010
		US 2010-244545 A1	30.09.2010
		US 2010-263939 A1	21.10.2010
		US 2011-042150 A1	24.02.2011
		US 7223049 B2	29.05.2007
		US 7320505 B1	22.01.2008
		US 7338135 B1	04.03.2008
		US 7347292 B1	25.03.2008
		US 7353893 B1	08.04.2008
		US 7384105 B2	10.06.2008
		US 7387345 B2	17.06.2008
		US 7387464 B2	17.06.2008
		US 7387465 B2	17.06.2008
		US 7390066 B2	24.06.2008
		US 7396085 B2	08.07.2008
		US 7396086 B1	08.07.2008
		US 7401863 B1	22.07.2008
		US 7410221 B2	12.08.2008
		US 7413256 B2	19.08.2008
		US 7413258 B2	19.08.2008
		US 7413375 B2	19.08.2008
		US 7419224 B2	02.09.2008
		US 7445294 B2	04.11.2008
		US 7464993 B2	16.12.2008
		US 7469756 B2	30.12.2008
		US 7469971 B2	30.12.2008
		US 7473052 B2	06.01.2009
		US 7475948 B2	13.01.2009
		US 7544011 B2	09.06.2009
		US 7549821 B2	23.06.2009
		US 7568770 B2	04.08.2009
		US 7588102 B2	15.09.2009
		US 7591607 B2	22.09.2009
		US 7600823 B2	13.10.2009
		US 7635168 B2	22.12.2009
		US 7637574 B2	29.12.2009
		US 7641418 B2	05.01.2010
		US 7648210 B2	19.01.2010
		US 7661765 B2	16.02.2010
		US 7665552 B2	23.02.2010
		US 7669674 B2	02.03.2010
		US 7669938 B2	02.03.2010
		US 7676968 B2	16.03.2010
		US 7681338 B2	23.03.2010
		US 7686536 B2	30.03.2010
		US 7690138 B2	06.04.2010
		US 7712693 B2	11.05.2010
		US 7717365 B2	18.05.2010
		US 7722127 B2	25.05.2010

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/034908

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 7740414 B2	22.06.2010
		US 7744164 B2	29.06.2010
		US 7832809 B2	16.11.2010
		US 7854078 B2	21.12.2010
		US 7862126 B2	04.01.2011
		US 7871133 B2	18.01.2011
		US 7886851 B2	15.02.2011
		US 7946656 B2	24.05.2011
		US 7946657 B2	24.05.2011
		US 7950170 B2	31.05.2011
		US 7950746 B2	31.05.2011
		US 7963617 B2	21.06.2011
		US 7992944 B2	09.08.2011
		US 7992945 B2	09.08.2011
		US 7997661 B2	16.08.2011
		US 8007050 B2	30.08.2011
		US 8007051 B2	30.08.2011
		US 8028774 B2	04.10.2011
		US 8029068 B2	04.10.2011
		US 8033615 B2	11.10.2011
		US 8033616 B2	11.10.2011
		US 8038223 B2	18.10.2011
		US 8061784 B2	22.11.2011
		US 8109349 B2	07.02.2012
		US 8116953 B2	14.02.2012
		US 8118371 B2	21.02.2012
		US 8122980 B2	28.02.2012
		US 8123302 B2	28.02.2012
		US 8136887 B2	20.03.2012
		US 8201892 B2	19.06.2012
		US 8215420 B2	10.07.2012
		US 8292372 B2	23.10.2012
US 2009-0000828 A1	01.01.2009	None	
US 2010-0230175 A1	16.09.2010	AU 2007-328409 A1	12.06.2008
		AU 2007-328409 B2	18.11.2010
		CA 2641204 A1	12.06.2008
		CA 2641204 C	05.04.2011
		US 7882907 B2	08.02.2011
		WO 2008-069863 A2	12.06.2008
		WO 2008-069863 A3	12.06.2008