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(54) Title: APPARATUS AND METHODS FOR WELL-BORE WALL SURFACE FINISHING

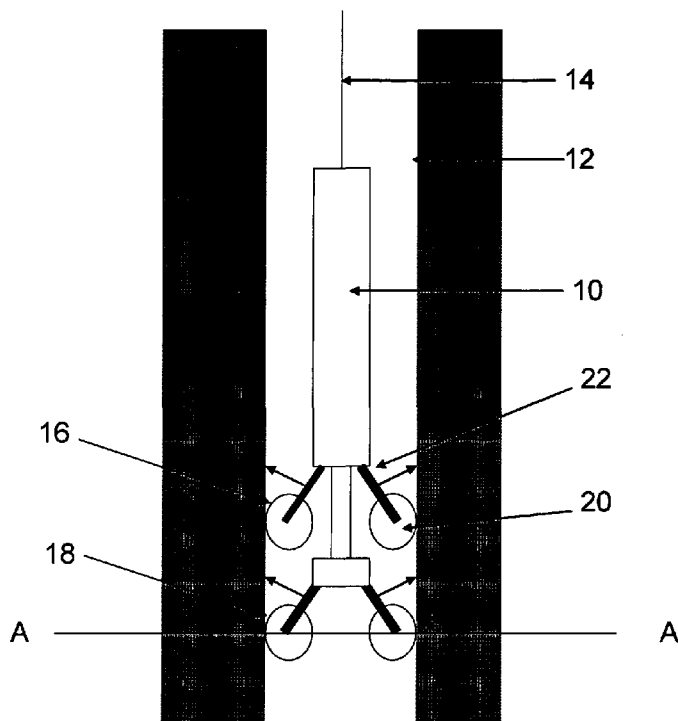


Figure 1

(57) Abstract: An apparatus for modifying the wall surface of a borehole drilled through an underground formation, comprising a tool body that can be introduced into the borehole using a conveyance system so as to be moveable along the borehole; and one or more members arranged so as to be able to be urged against, and moved across at least part of the borehole wall in order to work the surface thereof and modify its properties. A method of modifying the wall surface comprising the steps of positioning the tool body in the borehole at a location of interest using the conveyance system; urging the members against the borehole wall with sufficient force to modify the properties of the surface thereof; and moving the members across the surface of the borehole wall.



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Minimum documentation searched (classification system followed by classification symbols)
E21B

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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 418 212 A (BP EXPLORATION OPERATING [GB]; BP CORP NORTH AMERICA INC [US]) 22 March 2006 (2006-03-22) page 6 - page 14	1-6, 10, 12-14, 16, 20-23
X	GB 2 396 365 A (SCHLUMBERGER HOLDINGS [VG]) 23 June 2004 (2004-06-23) cited in the application the whole document	1-6, 21-23
A	GB 2 195 378 A (CONOCO INC CONOCO INC [US]) 7 April 1988 (1988-04-07) the whole document	1-23

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

☒ See patent family annex.

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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
GB 2418212	A	22-03-2006	NONE	
GB 2396365	A	23-06-2004	AU 2003290273 A1	14-07-2004
			CA 2510461 A1	08-07-2004
			WO 2004057151 A1	08-07-2004
			US 2009071722 A1	19-03-2009
			US 2006144620 A1	06-07-2006
GB 2195378	A	07-04-1988	NO 874085 A	05-04-1988
			US 4747452 A	31-05-1988