



- (51) International Patent Classification:  
B23B 51/04 (2006.01) B27B 5/12 (2006.01)  
B23B 41/02 (2006.01)
- (21) International Application Number:  
PCT/US2012/028427
- (22) International Filing Date:  
9 March 2012 (09.03.2012)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
61/451,878 11 March 2011 (11.03.2011) US
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

[Continued on next page]

(54) Title: HOLE SAW

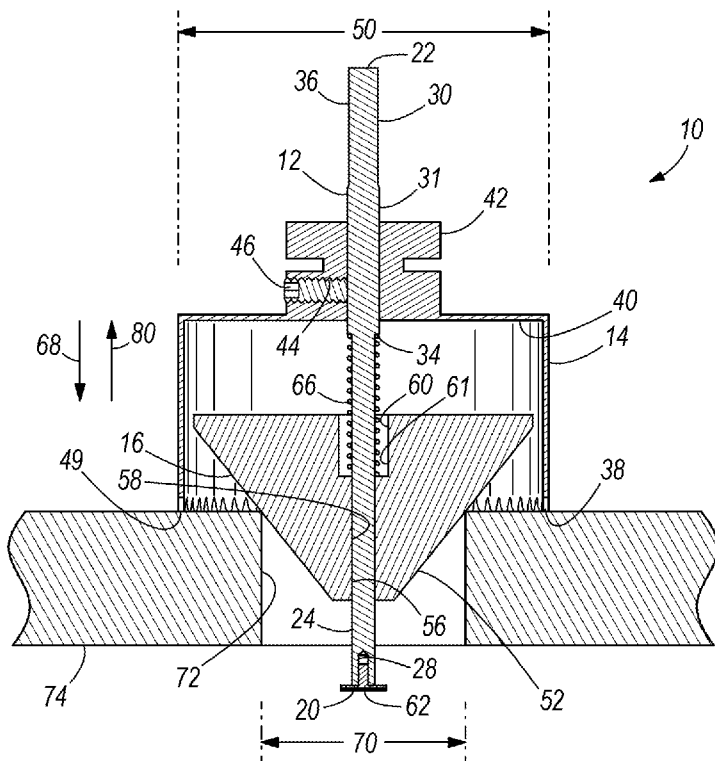


FIG. 5

(57) Abstract: A hole saw that includes a saw body including a circular cutting edge having a cutting edge diameter, and the saw body is coupled to a guide member for rotation with the guide member. A pilot is coupled to the guide member for movement relative to the guide member and the saw body, and the pilot includes an outer guide surface having a diameter that increases in a direction from a second end portion of the guide member toward a first end portion of the guide member. The pilot is coupled to the guide member such that at least a portion of the outer guide surface extends past the circular cutting edge of the saw body in a direction from the first end portion of the guide member toward the second end portion of the guide member.



GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

**(88) Date of publication of the international search report:**  
15 November 2012

**Published:**

— *with international search report (Art. 21(3))*

**A. CLASSIFICATION OF SUBJECT MATTER*****B23B 51/04(2006.01)i, B23B 41/02(2006.01)i, B27B 5/12(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)

B23B 51/04; B23B 35/00; B23B 41/00

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) &amp; Keywords: hole saw, guide, cutting edge, rod, aperture, spring

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 04749315A A (MILLS, SCOTT D.) 07 June 1988 See abstract, column 2, line 60 - column 4, line 3 and figures 1-3.	1-20
X A	US 6409437 B1 (METZGER, WILLIAM DAVIS) 25 June 2002 See abstract, column 2, lines 18-51, claims 1-20 and figures 1-2.	1,5,6,11-13,16-19 2-4,7-10,14,15,20
X A	US 05743682A A (CHANEY, SR. RAMON WILLIAM) 28 April 1998 See abstract, column 3, line 61 - column 6, line 26 and figures 1-7.	1,5,6,8-13,16-20 2-4,7,14,15
A	US 6305885 B1 (LINTHICUM, LEO) 23 October 2001 See abstract, column 2, line 48 - column 3, line 51 and figures 1-4.	1-20
A	US 2010-0303567 A1 (THOMAS, NICOLAS M.) 02 December 2010 See abstract, paragraphs [0021] - [0038] and figures 1-6.	1-20

 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

14 SEPTEMBER 2012 (14.09.2012)

Date of mailing of the international search report

**17 SEPTEMBER 2012 (17.09.2012)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office  
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**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

Claims 1-11 (Group I) and claims 12-20 (Group II) are directed to a hole saw. However, there is no technical relationship left over the prior art between Groups I and II because the common technical feature between Groups I and III, a hole saw comprising a guide member, a saw body and a pilot, does not involve an inventive step with respect to the documents of US 4749315 A or US 6409437 B1 or US 5743682 A which are cited in the ISR. Therefore, there is no technical relationship left over the prior art between the claimed inventions of Groups I and II leaving the claims without a single general inventive concept. Hence, there is a lack of unity "posteriori".

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2012/028427**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 04749315A A	07.06.1988	None	
US 6409437 B1	25.06.2002	None	
US 05743682A A	28.04.1998	None	
US 6305885 B1	23.10.2001	None	
US 2010-0303567 A1	02.12.2010	None	