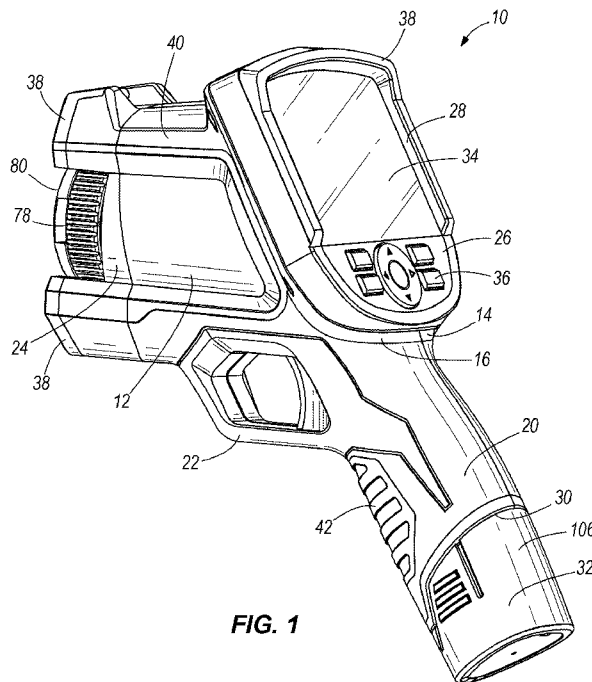




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- (71) Applicant (for all designated States except US): MILWAUKEE ELECTRIC TOOL CORPORATION [US/US]; 13135 West Lisbon Road, Brookfield, WI 53005 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): NGUYEN, Evans, H. [US/US]; 19849 Se 123rd Street, Issaquah, WA 98027 (US). NEITZELL, Roger, D. [US/US]; W1576 Marsh Road, Palmyra, WI 53156 (US).
- (74) Agent: COTRONE, Carlo, M.; Michael Best & Friedrich LLP, 100 East Wisconsin Avenue, Suite 3300, Milwaukee, WI 53202-4108 (US).
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- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, 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,

[Continued on next page]

(54) Title: THERMAL IMAGER



(57) Abstract: A handheld thermal imager includes a housing defining a cavity. A lens barrel has a first end portion and a second end portion. The lens barrel is at least partially disposed within the cavity. A lens is coupled to the lens barrel first end portion. A resilient buffer member supports the lens barrel within the cavity. A thermal sensor is coupled to the lens barrel second end portion. A processing module receives signals from the thermal sensor. A display is coupled to the processing module for displaying a temperature characteristic of a scene.





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

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/029217**A. CLASSIFICATION OF SUBJECT MATTER***G01J 5/60(2006.01)i, G01J 5/02(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)

G01J 5/60; G01J 5/08; G02B 7/04; G03B 17/02; G03B 17/00; G01J 5/30; H01L 31/09

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:portable, thermal, image, camera

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2010-0046577 A1 (SHEARD JUSTIN M. et al.) 25 February 2010 See paragraphs [0023]-[0042], claim 1 and figures 1-4,8.	1-20
Y	US 2008-0278833 A1 (YUAN KUN-I) 13 November 2008 See paragraph [0019], claim 1 and figure 3.	1-20
Y A	US 2009-0324213 A1 (WANG SHAO-HUNG) 31 December 2009 See paragraph [0016], claim 1 and figure 3.	8-10 1-7,11-20
Y A	US 2010-0148066 A1 (STRATMANN MARTIN et al.) 17 June 2010 See the abstract and figures 1A-1B.	17-19 1-16,20

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

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"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

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Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

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Authorized officer

KOH, JAE HYUN

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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
US 2010-0046577 A1	25.02.2010	None	
US 2008-0278833 A1	13.11.2008	CN 101303442 A CN 101303442 B US 7595943 B2	12.11.2008 02.02.2011 29.09.2009
US 2009-0324213 A1	31.12.2009	CN 101620304 A	06.01.2010
US 2010-0148066 A1	17.06.2010	EP 2197199 A2 EP 2197199 A3	16.06.2010 20.10.2010