



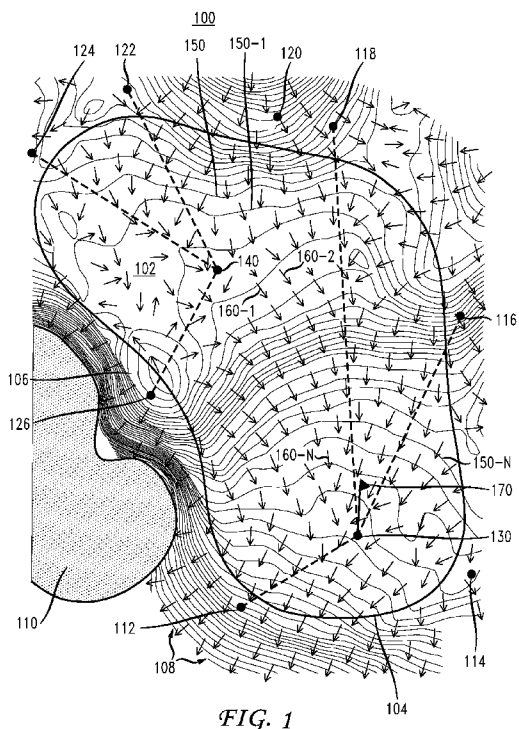
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G06K 9/00 (2006.01)
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[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR PRECISE DETERMINATION OF A POSITION OF A TARGET ON A SURFACE



(57) Abstract: A method and apparatus for determining the precise location of a target on a surface by utilizing a plurality of objects that are fixed in their position proximate to the location, thereby constituting a plurality of fixed reference points, upon which the target(s) resides or is otherwise located. The plurality of fixed references points are used either in conjunction with images of the target or certain distance measurements between the target and the fixed reference points to determine the precise location of the target(s) on the surface.

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— *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))*

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/072326

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01C11/06 G06K9/00 G06T7/00
ADD.
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)
G01C A63B B00K G06K G06T G01S

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/122257 A1 (KIRK JAMES C [US]) 26 May 2011 (2011-05-26)	1-3
Y	paragraphs [0018] - [0020]; figures 1,2 paragraph [0029] - paragraph [0063]; claim 13	4,5, 7-10,12, 13,15, 25-29, 36,37
Y	----- US 2013/178311 A1 (PETERSON JACK W [US]) 11 July 2013 (2013-07-11) paragraph [0067] - paragraph [0070]; figures 1,2 paragraph [0078] - paragraph [0086]; figures 1,2 ----- -/--	4,5, 7-10,12, 13,15, 25-29, 36,37

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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 14 August 2015	Date of mailing of the international search report 24/08/2015
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Chapple, Ian
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/072326

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 113 504 A (KUESTERS ECKHARD H [US]) 5 September 2000 (2000-09-05)	17,18, 20,21, 30-32
A	column 3, line 21 - column 8, line 46; claims 1-24; figures 1-8	19,22, 33,34
X	EP 1 666 916 A2 (FORBES WILLIAM [GB]) 7 June 2006 (2006-06-07)	17,18, 20,21, 30-32
A	paragraph [0032] - paragraph [0040]; figures 1-5	19,33
X	US 4 703 444 A (STORMS JR HARRISON A [US] ET AL) 27 October 1987 (1987-10-27) the whole document	17,30
X	US 5 056 106 A (WANG JAMES J [US] ET AL) 8 October 1991 (1991-10-08) column 4, line 30 - column 7, line 38; claims 1-11; figure 1	17,30
A	US 2010/182400 A1 (NELSON CHAD M [US] ET AL) 22 July 2010 (2010-07-22) the whole document	1-16, 25-29, 36,37
A	WO 02/28093 A1 (EWING GOLF ASSOCIATES LLC [US]; EWING DAVID J [US]; JOHNSON ZOLLIE L []) 4 April 2002 (2002-04-04) the whole document	1-16, 25-29, 36,37

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/072326

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:

see additional sheet

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 fees, this Authority did not invite payment of additional fees.
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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16, 25-29, 36, 37

A method for determining the location of a (golf) target on a (golf) surface by processing two images in which the target and a number of fixed reference points are visible.

2. claims: 17-24, 30-35

A method and apparatus for determining the location of a golf target on a golf green using a plurality of distance measurements between the target and a plurality of fixed reference points.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2014/072326

Patent document cited in search report	Publication date	Publication date	Patent family member(s)	Publication date
US 2011122257	A1	26-05-2011	NONE	
US 2013178311	A1	11-07-2013	US 2013178311 A1 WO 2013106574 A1	11-07-2013 18-07-2013
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