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KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
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(54) Title: ANTENNA SYSTEM AND METHOD FOR DETERMINING A TRANSIT OF A MOVING OBJECT THROUGH AN
AREA OF INTEREST

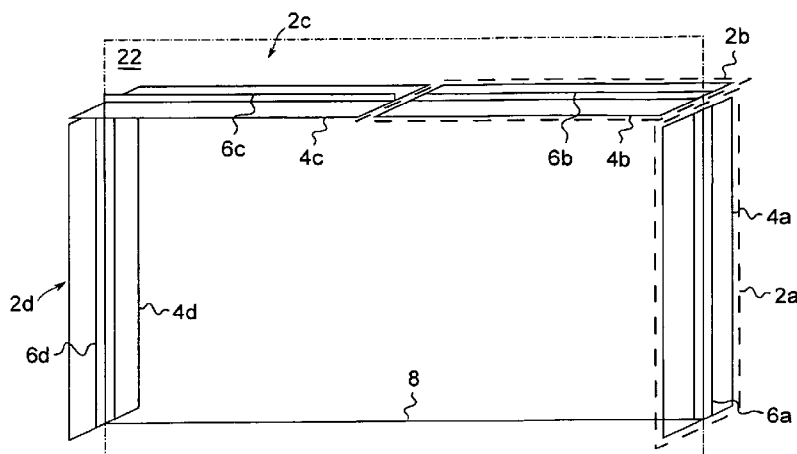


Fig. 1

(57) Abstract: An antenna system (2a-d) for determining a transit of a moving object (11) through an area of interest within a detection plane (22), the moving object (11) emitting an electromagnetic field (12), comprises at least one loop antenna (4c) for receiving the electromagnetic field (12), the at least one loop antenna (4c) comprising one or more antenna loops arranged only within an antenna plane, the antenna plane being perpendicular to the detection plane (22). The at least one loop antenna (4c) further comprises a signal terminal (60) for providing a receive signal (44a, 44b), the receive signal (44a, 44b) comprising information on a position of the moving object (11).

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/056007

A. CLASSIFICATION OF SUBJECT MATTER

INV. H01Q1/22 H01Q7/00 G06K19/077 H01Q21/28 A63B24/00
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)

H01Q G06K A63B

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	WO 2006/094508 A1 (GOALREF APS [DK]; ESKILSEN JOERN [DK]) 14 September 2006 (2006-09-14) pages 18-19; claims 1-13; figures 1-3 -----	1-7,16, 19-21
A		8,9
X	WO 00/47291 A1 (INTEGRATED DESIGN LIMITED [GB]; HUFF DEREK GRAHAM [GB]) 17 August 2000 (2000-08-17) the whole document -----	1,17,18, 22,23
X	GB 2 001 250 A (PRECITEC GMBH) 31 January 1979 (1979-01-31) the whole document -----	1,17,18, 22,23
X	EP 0 337 783 A2 (YAMATO SCALE CO LTD [JP]) 18 October 1989 (1989-10-18) paragraph [0014]; figures 1, 15, 16 ----- -/-	1,17,18, 22,23



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

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"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

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 227 453 A2 (BONELCO IND LTD [NZ]) 1 July 1987 (1987-07-01) paragraphs [0013] - [0020]; figures 1, 2 -----	1,17,18, 22,23
A	US 2007/299625 A1 (ENGLERT WALTER [DE] ET AL) 27 December 2007 (2007-12-27) the whole document -----	1-9,16, 19-21

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2012/056007

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.:
1-9, 16-23, 27
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/EP2012/056007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006094508	A1	14-09-2006	AT 486640 T 15-11-2010
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			DE 68912382 T2 26-05-1994
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			EP 0227453 A2 01-07-1987
US 2007299625	A1	27-12-2007	NONE

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-9, 16, 19-21

Coupling of separate transmit and receive circuits to a common loop antenna.

2. claims: 10-12

Compensation signal generator

3. claims: 13-15

Calibration signal generator

4. claims: 17, 18, 22, 23, 27

Signal evaluator for evaluating phase changes of an electromagnetic signal

5. claims: 24-26

Sports equipment with a 3D-loop antenna system
