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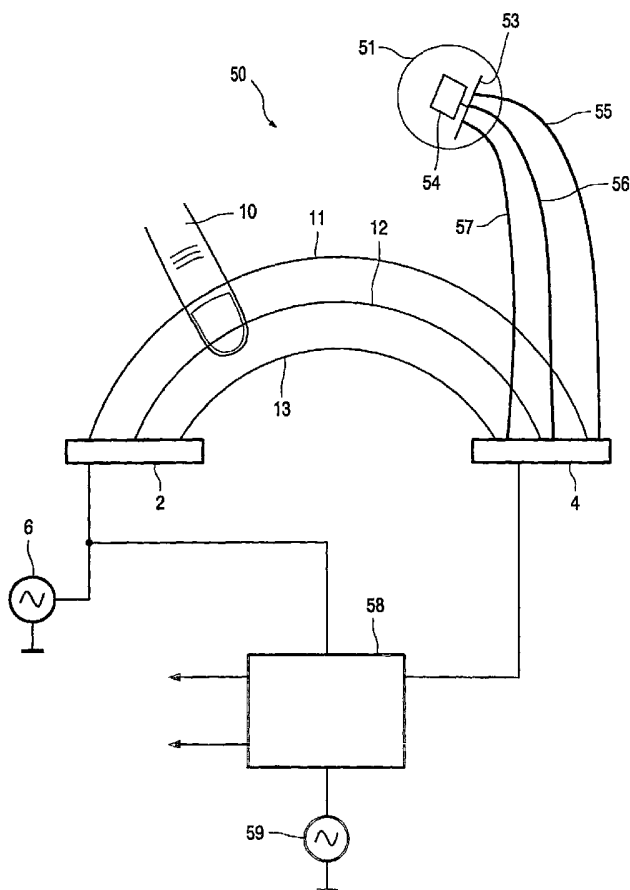
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(54) Title: OBJECT SENSING



(57) Abstract: A combined passive and active object sensing system (30; 50; 70) employing electric field sensing is described. An electric field sensing transmission electrode (2) generates a first electric field (11, 12, 13) that induces a current in an electric field sensing reception electrode (4). A passive object (10) is sensed from variation in this current. An active object (31; 51; 71) comprises a further electric field sensing transmission electrode (33; 53; 73) and generates a second electric field (35, 36, 37; 55, 56, 57; 75, 76, 77). This may be generated by the active object (31) coupling with and applying a phase shift to the first electric field (11, 12, 13). Alternatively the second electric field (55, 56, 57) may be generated at a different frequency to the first electric field (11, 12, 13). Alternatively the second electric field (75, 76, 77) may be generated by the active object (71) coupling with an alternating magnetic field generated by a coil (172). The second electric field (35, 36, 37; 55, 56, 57; 75, 76, 77) induces a current in the electric field sensing reception electrode (4) that varies with the position of the active object (31; 51; 71). The separate currents are distinguished by virtue of their different phase or frequency.



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INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IB 02/03160

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 G01B7/00 G01V3/08 H03K17/955 G08B13/26

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)  
IPC 7 G01V H03K G08B

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 94 24645 A (HANSSON GOERAN ;LINDGREN BO (SE); SOEDERBERG TOMMY (SE)) 27 October 1994 (1994-10-27) page 3, paragraph 6 -page 4, paragraph 3; claim 1; figure 1	9
A	WO 00 68044 A (AUTOMOTIVE SYSTEMS LAB) 16 November 2000 (2000-11-16) page 1, line 28 -page 2, line 5 page 2, line 27 -page 3, line 8 page 4, line 14 - line 23 page 9, line 4 - line 10 claim 1; figures 1-4	1-5,9-18
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Further documents are listed in the continuation of box C.       Patent family members are listed in 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 document 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 another 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.

"&" document member of the same patent family

Date of the actual completion of the international search  30 April 2003	Date of mailing of the international search report  12.08.03
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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, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  Schneiderbauer, K
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## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IB 02/03160

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00 52657 A (AUTOMOTIVE SYSTEMS LAB) 8 September 2000 (2000-09-08) page 11, line 20 -page 12, line 24 page 15, line 19 - line 23 figure 1 ---	1-5,9-18
A	US 6 025 726 A (SMITH JOSHUA R ET AL) 15 February 2000 (2000-02-15) cited in the application column 4, line 55 -column 6, line 54; figure 1A -----	1

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB 02/03160

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

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

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.:

1-5, 9-18

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: 1-5, 9-18

A current sensing circuit for sensing two electric fields.

2. Claims: 6-8

An active tag consisting of special transmission and reception electrodes for generating a second electric field based on the sensing of a first electrical field.

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/IB 02/03160

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