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<i>B60R 25/33</i> (2013.01)	<i>B60Q 1/30</i> (2006.01)
<i>G01S 1/68</i> (2006.01)	<i>B60Q 11/00</i> (2006.01)
<i>G01S 5/00</i> (2006.01)	<i>H05B 37/03</i> (2006.01)
<i>G08G 1/00</i> (2006.01)	

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[Continued on next page]

(54) Title: IMPROVED VEHICLE TRACKING AND FAILURE DETECTION

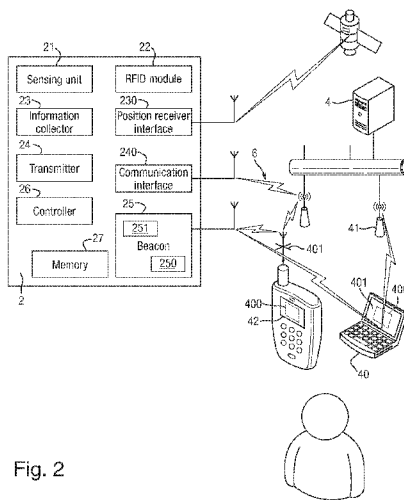


Fig. 2

(57) Abstract: In one aspect, a vehicle tracking device is adapted to be mounted on a vehicle, comprising: an information collector configured to collect position information, the position information indicating the position of the device within a first area; a transmitter configured to transmit the position information to a remote apparatus using a communication network, wherein the apparatus is configured to transmit the position information to a user terminal; and a beacon configured to send radio frequency signals to the user terminal (40) within a range covering at least the first area, in order to enable the terminal to locate the device within a second area, wherein the second area is smaller than the first area. In another aspect, a vehicle tracking device (2) is configured to be mounted on a vehicle (20), wherein the device is configured to have a normal operating mode and an energy saving operating mode, wherein the device further comprises a detection module (28) for detecting, in the energy saving mode of the device, at least one of a linear acceleration and an angular acceleration corresponding to a physical displacement of the device (2), and wherein the detection module (28) is configured to provide an operating mode instruction to the device, responsive to the detecting, wherein the instruction is adapted to trigger the device to operate in the normal mode if the detected linear acceleration or the angular acceleration of the device is greater than a threshold of at least one of 0.3m.s⁻² and 0.3°.s⁻². In another aspect, a vehicle tracking device (2) is configured to be mounted on a vehicle (20), wherein the device is configured

[Continued on next page]





TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, 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))

Published:

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to have a normal operating mode and an energy saving operating mode, wherein the device further comprises a heading measurement module (29) for detecting, in the energy saving mode of the device, a variation of a heading of the vehicle in a predetermined period of time, and wherein the heading measurement module (29) is configured to provide an operating mode instruction to the device, responsive to the detecting, wherein the instruction is adapted to trigger the device to operate in the normal mode if the variation of a heading of the vehicle is greater than a threshold corresponding to 30° per minute. In another aspect a lighting interface (21) for a vehicle (1) and trailer (2) combination is provided, wherein the trailer has a plurality of lighting circuits (22, 23, 24) including at least one of a stop signal and direction indicator signals to be powered by the vehicle, wherein the vehicle is arranged to detect the presence of the trailer by detecting a path to ground through a bulb of at least one of the lighting circuits, the interface comprising circuitry (100, 63) for providing a path to ground for the or each circuit within a predetermined resistance range, irrespective of the condition of the lighting circuit.

INTERNATIONAL SEARCH REPORT

International application No PCT/GB2014/050498
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A. CLASSIFICATION OF SUBJECT MATTER		
INV. G01S19/48	B60R25/102	B60R25/33
G08G1/00	G01S19/34	B60D1/62
H05B37/03		G01S1/68
		B60Q1/30
		G01S5/00
		B60Q11/00
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) G01S B60R G08G G08B B60D B60Q H05B		
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		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 03/079308 A1 (AUSTRALIAN ARROW PTY LTD [AU]; JAMES CAMPBELL RICHARD [AU]) 25 September 2003 (2003-09-25) abstract page 3, line 9 - line 36 page 4, line 1 page 6, line 22 - line 36 page 7, line 1 claims 1, 3 figure 2	1-21
Y	----- US 2009/058670 A1 (SWEENEY JEFFREY M [US] ET AL) 5 March 2009 (2009-03-05) claims 1, 4, 5, 13, 14 figure 1 ----- -/--	1-21
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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	Date of mailing of the international search report	
10 July 2014	30/05/2016	
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 Renaudie, Cécile	

INTERNATIONAL SEARCH REPORT

International application No PCT/GB2014/050498

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2007/136355 A1 (CISCO SECURITY PTE LTD [SG]; BAPTIST MARTIN JAMES [SG]; TAN POH BENG []) 29 November 2007 (2007-11-29) claims 1, 6, 7 <p style="text-align: center;">-----</p>	1-21
Y	WO 02/24496 A1 (BOOMERANG TRACKING INC [CA]) 28 March 2002 (2002-03-28) abstract page 4, line 4 - line 6 page 4, line 12 - line 28 claims 1, 2, 5 figure 2 <p style="text-align: center;">-----</p>	1-21

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2014/050498

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.:

1-21

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: 1-21

locating a vehicle

2. claims: 22-52

operational modes of a vehicle tracking device

3. claims: 53-93

lighting interface for a vehicle

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2014/050498

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 03079308	A1	25-09-2003	AU 2003209835 A1 29-09-2003
			EP 1509895 A1 02-03-2005
			JP 2005521140 A 14-07-2005
			US 2005200479 A1 15-09-2005
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			WO 2007136355 A1 29-11-2007

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			CA 2320519 A1 19-03-2002
			US 2002090955 A1 11-07-2002
			WO 0224496 A1 28-03-2002
