PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : G01C 21/20 | A1

(11) International Publication Number: WO 97/02469

(43) International Publication Date: 23 January 1997 (23.01.97)

(21) International Application Number: PCT/NL96/00277

(22) International Filing Date: 5 July 1996 (05.07.96)

(30) Priority Data:
1000733 5 July 1995 (05.07.95) NL

(71) Applicant *(for all designated States except US)*: KADASTER [NL/NL]; Waltersingel 1, NL-7314 NK Apeldoorn (NL).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: VAN BUREN, Joop [NL/NL]; Waltersingel 1, NL-7314 NK Apeldoorn (NL).

(74) Agent: SMULDERS, Th., A., H., J.; Vereenigde Octrooibureaux, Nieuwe Parklaan 97, NL-2587 BN The Hague (NL).

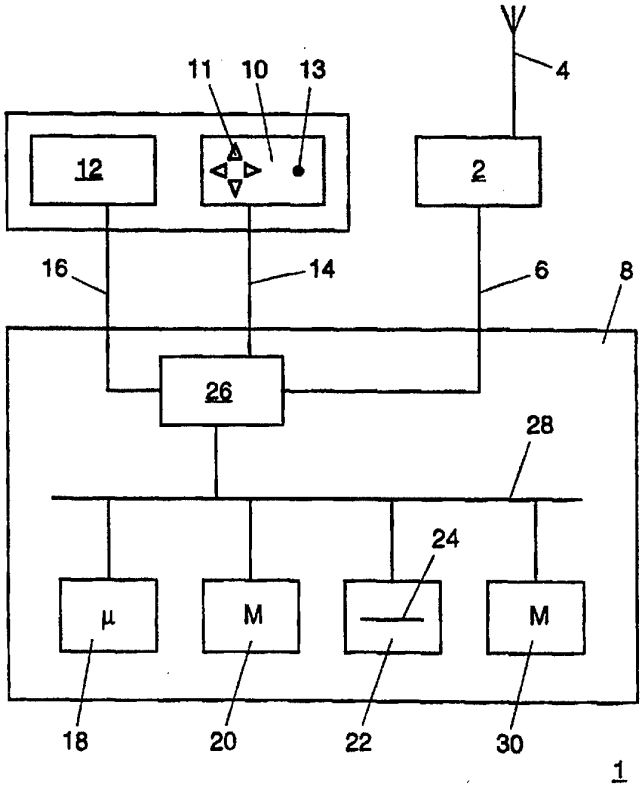
(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.
In English translation (filed in Dutch).

(54) Title: CAR COMPASS

(57) Abstract

A car compass comprising a satellite receiver which generates coordinates of an actual position of the car compass, input means for inputting a desired destination and a control unit which represents, on a display, the driving direction to be followed. The control unit comprises a first digital file wherein at least postcodes and position coordinates related thereto and associated with those postcodes are stored, whilst the control unit, in use, addresses, on the basis of a postcode associated with the inputted information about the desired destination, the first digital file to obtain the position coordinates of the desired destination; determines, on the basis of the position coordinates of the desired destination and the coordinates of the actual position, the driving direction to be followed; and displays an arrow on the display, with the direction of the arrow on the display corresponding to the driving direction to be followed.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	**GB**	United Kingdom	**MW**	Malawi
AT	Austria	**GE**	Georgia	**MX**	Mexico
AU	Australia	**GN**	Guinea	**NE**	Niger
BB	Barbados	**GR**	Greece	**NL**	Netherlands
BE	Belgium	**HU**	Hungary	**NO**	Norway
BF	Burkina Faso	**IE**	Ireland	**NZ**	New Zealand
BG	Bulgaria	**IT**	Italy	**PL**	Poland
BJ	Benin	**JP**	Japan	**PT**	Portugal
BR	Brazil	**KE**	Kenya	**RO**	Romania
BY	Belarus	**KG**	Kyrgystan	**RU**	Russian Federation
CA	Canada	**KP**	Democratic People's Republic of Korea	**SD**	Sudan
CF	Central African Republic			**SE**	Sweden
CG	Congo	**KR**	Republic of Korea	**SG**	Singapore
CH	Switzerland	**KZ**	Kazakhstan	**SI**	Slovenia
CI	Côte d'Ivoire	**LI**	Liechtenstein	**SK**	Slovakia
CM	Cameroon	**LK**	Sri Lanka	**SN**	Senegal
CN	China	**LR**	Liberia	**SZ**	Swaziland
CS	Czechoslovakia	**LT**	Lithuania	**TD**	Chad
CZ	Czech Republic	**LU**	Luxembourg	**TG**	Togo
DE	Germany	**LV**	Latvia	**TJ**	Tajikistan
DK	Denmark	**MC**	Monaco	**TT**	Trinidad and Tobago
EE	Estonia	**MD**	Republic of Moldova	**UA**	Ukraine
ES	Spain	**MG**	Madagascar	**UG**	Uganda
FI	Finland	**ML**	Mali	**US**	United States of America
FR	France	**MN**	Mongolia	**UZ**	Uzbekistan
GA	Gabon	**MR**	Mauritania	**VN**	Viet Nam

Title: Car compass

The invention relates to a car compass comprising a satellite receiver which on the basis of received satellite signals generates coordinates of an actual position of the car compass, input means whereby a user can input information about a desired destination, a control unit to which the coordinates of the actual position and the information about the desired destination are fed and which processes these coordinates and information in combination for obtaining information about a driving direction to be followed in order to reach the desired destination, and a display on which this driving direction to be followed is represented.

Such a car compass is known per se and is inter alia marketed under the names of Telepath 100 and Carin. These types of systems further comprise a magnetic-field probe for determining the direction of the car compass or the driving direction of the car, sensors for determining the number of revolutions of the front wheels of the car, and a car atlas in CD-version for, inter alia, obtaining coordinates of a desired destination. This renders the known systems fairly complex and economically unprofitable. Moreover, the processing in combination of information coming from four different sources of information - namely satellite receiver, magnetic probe, front wheel sensors and the car atlas in CD-version - involves a fairly substantial susceptibility to interference. In addition, a route to be followed is typically represented on the display by means of text and maps. This is often difficult to read for a user, as a result of which a user runs the risk of slackening his attention to the traffic.

The invention meets these drawbacks and has as a characteristic that the control unit comprises a first digital file wherein at least postcodes and position coordinates related thereto and associated with those postcodes are stored, whilst the control unit, in use:

- addresses, on the basis of a postcode associated with the inputted information about the desired destination, the

first digital file to obtain the position coordinates of the desired destination;

- determines, on the basis of the position coordinates of the desired destination and the coordinates of the actual position, the driving direction to be followed; and
- displays a direction arrow on the display, with the direction of the direction arrow on the display corresponding to the driving direction to be followed.

Because, in accordance with the invention, postcodes are used, a system of a high accuracy is obtained. Determining the position of a desired destination can be carried out very accurately by means of the postcodes, due to the fact that for instance in the Netherlands, the postcodes have an average distance which is less than 300 m. If the accuracy of the satellite receiver is for instance 100 m, this means that, starting from an area of a 100 m radius around the position wherein the car compass is located and a 150 m radius for the postcode area, the accuracy of the distance measurement between the actual and the desired position is about 180 m. In urban areas this is still better, because in these areas the postcode density is greater than mentioned above.

In addition, the reading of a direction arrow is very easy for a motorist. A quick glance at the display enables a motorist to read the driving direction to be followed. In practice, this proves to be far more easy than reading a route indicated on a map.

A particular embodiment of the car compass has as a characteristic that the control unit, in use:

- determines, on the basis of coordinates, successively determined by the satellite receiver, of at least two different consecutive actual positions of the car compass, the actual direction of movement of the car compass;
- determines, on the basis of the position coordinates of the desired destination, the coordinates of the actual position and the actual direction of movement of the car compass, the driving direction to be followed relative to the actual direction of movement; and

- displays the direction arrow on the display so that the direction of the direction arrow on the display corresponds to the driving direction to be followed relative to the actual direction of movement of the car compass.

This means that the driving direction of a vehicle relative to the earth can be determined very accurately and without the use of a magnetic probe. Another substantial advantage is that the arrow indicates the driving direction to be followed relative to the actual direction of movement of the vehicle. Hence, a user can establish directly in which direction he has to drive in order to reach the desired destination. Preferably, the direction of the direction arrow represents, relative to a vertical axis of the display, the driving direction to be followed relative to the actual direction of movement. Thus, the direction arrow forms a needle of a 'compass' pointing in the direction of the desired destination. In particular, the extremity of the direction arrow lies on an elliptic curve whose long axis is directed vertically and whose short axis is directed horizontally on the display. If a motorist has approached the desired destination very close, the final meters to the address can as a rule be travelled on the basis of street and house numbers.

Hereinafter, the invention will be specified with reference to the accompanying drawings, wherein:

Fig. 1 shows a possible embodiment of a car compass according to the invention;

Fig. 2 shows a vector diagram to illustrate the operation of the control unit of the car compass according to Fig. 1;

Fig. 3 shows a first possible representation on the display of the car compass;

Fig. 4 shows a second possible representation on the display of the car compass;

Fig. 5 shows a third possible representation on the display of the car compass;

Fig. 6 shows a schematic view of the first and the second digital file of the car compass according to Fig. 1; and

Fig. 7 shows a fourth possible representation on the display of the car compass.

In Fig. 1, by reference numeral 1, a possible embodiment of a car compass according to the invention is shown. The car compass 1 comprises a satellite receiver 2, known per se. The satellite receiver 2 comprises an antenna 4 for receiving and further processing satellite signals. In this example, the satellite receiver 2 is suitable for receiving signals transmitted by GPS-satellites. At this moment, 24 GPS-satellites are located at an altitude of 20,000 km above the earth. These satellites have a travelling time of 12 hours. They are evenly distributed over six orbit planes, so that, depending on the location on the earth, in each case at least four and maximally twelve satellites can be observed. The operation of the satellite receiver 2 is known per se and will presently not be further explained.

By means of reception of the above-mentioned satellite signals, the satellite receiver 2 determines coordinates of an actual position P_t at the point of time t of the car compass on the earth's surface. This actual position P_t is fed to a control unit 8 of the car compass 1 by means of line 6. The actual position P_t is expressed in coordinates $P_\phi(t)$ and $P_\gamma(t)$ of the coordinate system WGS84 (World Geodetic System 1984), known per se. The WGS84 coordinates are generally expressed in P_ϕ and P_γ on the WGS84 ellipsoid. The satellite receiver 2 can also provide a coordinate H indicating the altitude above the ellipsoid. In this connection, however, this coordination is less interesting.

The car compass further comprises input means 10 by means of which a user can input information about an address of a desired destination. In addition, the car compass comprises a display 12 for at least displaying information about a desired driving direction to be able to reach the desired destination. In this example, the input means 10 comprise four buttons 11 for the control of a cursor displayed on the display 12 and a button 13 for confirming an option on the display 12 indicated by means of the cursor buttons 11.

The input means 10 and the display 12 are connected to the control unit 8 by means of line 14 and line 16 respectively. In this example, the control unit 8 is composed of a microprocessor 18, a working memory 20, a map reader 22 wherein a smartcard and/or PC-card (PCMIA-card) 24 is included, and an interface 26. The microprocessor 18, the working memory 20, the map reader 22 and the interface 26 can communicate with one another in a manner known per se by means of a communication bus 28. Via line 14 and line 16, the interface 26 is further connected to the input means 10 and the display 12 to enable a communication between the input means 10 and the display 12 on the one hand and the microprocessor 18 on the other.

In this example, the smartcard 24 comprises a first digital file, wherein at least postcodes and position coordinates related thereto and associated with those postcodes are stored; see also Fig. 6. In the Netherlands, a postcode consists of four digits and two letters. Hence, a postcode can be represented by CCCCLL, wherein C indicates a digit and L indicates a letter. In this example, the first file comprises for all postcodes CCCCLL two associated coordinates G_x and G_y represented by the position G of the relevant postcode in the RD-system known per se. The RD-system ['Rijksdriehoekmeting' = state trigonometry] concerns the system of state trigonometry used in the Netherlands.

In this example, the smartcard 24 further comprises a second digital file (Fig. 6) with interrelated addresses and postcodes. Finally, the control unit 8 further comprises a ROM-memory 30 which is also connected to the bus 28. Stored in the ROM-memory 30 is software which, in use, determines the operation of the control unit and, accordingly, the operation of the car compass 1. During a first operating mode, a number of place names from the second digital file are displayed in alphabetic order on the display 12, under the control of the microprocessor 18. Fig. 3 shows an example of a possible representation on the display 12. By means of the cursor control keys 11, the alphabetic list of place names can be

gone through in a known manner. A cursor 32 can for instance by placed on the arrow 33 by means of the cursor keys 11, whereupon, by pressing the button 13, the list of place names is gone through in rising alphabetic order. Likewise, the list can be gone through in opposite direction by operating an arrow 34 in a similar manner. If the place name of a desired destination has been found, in this example Apeldoorn, the cursor 32 can be placed on the place name Apeldoorn, again by means of the cursor keys 11. A definitive choice is made by subsequently energizing the button 13. After the choice has been made, the cursor 32 can be placed in a box with the text "to screen 3", whereupon the confirmation button 13 should be energized. The control unit 8 is thus brought into a second operating mode. In this second operating mode, new information from the second digital file is displayed on the screen 12, under the control of the microprocessor 8. An example of a possible screen display is shown in Fig. 4. Displayed are a number of street names with corresponding house numbers and postcodes, associated with the selected place of Apeldoorn. As described in relation to Fig. 3, the list of street names can be gone through in alphabetic order, again by means of the cursor control keys 11. Hence, in this example, the microprocessor is controlled by the input means for selectively displaying a number of street names with, optionally, the associated house numbers and postcodes from the second digital file. When, by means of the cursor control key 11, the street name and the associated house number of the desired destination has been found, the cursor control key 11 can be placed on the desired destination. In this example, this is the 'Wapenrustweg'. By subsequently energizing the button 13, the Wapenrustweg is selected for the house numbers 100 to 134. In this example, the associated postcode is also displayed, as a check. After energization of the button 13, the relevant information about the desired destination has been inputted. Also, the postcode associated with that destination has been obtained. On the basis of the obtained postcode associated with the inputted information about the

desired destination, the microprocessor will now address the first digital file to obtain the position coordinates G_x and G_y of the desired destination G.

Now, in the control unit 8, the coordinates G_x, G_y of the desired destination G are known, as are the coordinates $P_\phi(t)$ and $P_\gamma(t)$ of the actual position P_t. In this example, the control unit 8 transforms the coordinates $P_\phi(t)$ and $P_\gamma(t)$ into coordinates $P_x(t)$ and $P_y(t)$, with the coordinates $P_x(t)$ and $P_y(t)$ representing the position of the car compass in the RD-system.

Consequently, the following tranformation is carried out:

$(P_\phi(t), P_\gamma(t)) \rightarrow (P_x(t), P_y(t))$

On the basis of the actual position $P_t = (P_x(t), P_y(t))$ of the car compass and the desired destination $G = (G_x, G_y)$, the driving direction D to be followed can be determined. In Fig. 2, the point P_t represents an example of an actual position of the car compass at the point of time t. Point G represents the desired destination. The vector D connects the point P_t to the point G and, accordingly, represents the driving direction to be followed. The control unit 8 determines the coordinates $D_x(t)$ and $D_y(t)$ of the driving direction to be followed at the point of time t as follows:

$$D_x(t) = G_x - P_x(t)$$

$$D_y(t) = G_y - P_y(t)$$

The coordinates $D_x(t)$ and $D_y(t)$ are again defined in the RD-system.

Next, the vector D can be displayed on the display 12 as it is shown in Fig. 2. The displayed vector D thereby forms the above-mentioned direction arrow. In that case, the x-axis and y-axis of the RD-system could also be displayed on the display 12. The direction arrow thus to be displayed can for instance be further standardized, so that it always has the length A. This can for instance be carried out as follows:

$$D_x'(t) = A.D_x(t) \; / \; \sqrt{D_x(t)^2+D_y(t)^2}$$

$$D_y'(t) = A.D_y(t) \; / \; \sqrt{D_x(t)^2+D_y(t)^2}.$$

In accordance with a particular embodiment of the car compass, the driving direction to be followed relative to the

actual direction of movement of the car compass is represented on the display by means of a direction arrow. For this purpose, the control unit 8 determines, on the basis of coordinates, successively received by the satellite receiver, of at least two different consecutive actual positions $P_{t-\Delta t}$ and P_t of the car compass, the actual direction of movement of the car compass at the point of time t. In Fig. 2, the point $P_{t-\Delta t}$ represents the actual position of the car compass at the point of time $t-\Delta t$. Likewise, the point P_t represents the actual position of the car compass at the point of time t. In this example, the vector R interconnecting the point $P_{t-\Delta t}$ and the point P_t is considered to represent the actual direction of movement of the car compass at the point of time t. By determining the angle ϕ between the vector R and the vector D, the driving direction to be followed relative to the actual driving direction can be determined. This driving direction can then be represented on the display 12 by means of a direction arrow again (see Fig. 5). The image according to Fig. 5 can for instance be obtained by moving the cursor into the frame with the text "to screen 1" and then pressing the button 13 (see Fig. 4). In Fig. 5, the direction of the direction arrow V on the display corresponds to the driving direction to be followed relative to the actual direction of movement of the car compass. The vertical axis of the display gives the actual direction of movement (vector R) of the car compass. The length of the direction arrow V is chosen so that it lies on an elliptic curve whose long axis is directed horizontally and whose short axis is directed vertically on the display. This elliptic curve is also shown, in dotted lines, in Fig. 5. It is thus suggested that the direction arrow moves in the plane of the road. The control unit 8 also determines the length of the vector D as it is shown in Fig. 2. The length of the vector D corresponds to the distance in a straight line between the desired destination G and the actual position P_t. The outcome of this calculation, in this example 12.4 km, is also represented on the display.

The above-outlined operation of the control unit can be specified as follows. The control unit determines coordinates $R_x(t)$ and $R_y(t)$ of the vector R in the RD-system as follows:

$$R_x(t) = P_x(t) - P_x(t-\Delta t)$$

$$R_y(t) = P_y(t) - P_y(t-\Delta t).$$

After this, a calculation, known per se, can be carried out, wherein the vector D is rotated anti-clockwise through an angle of $90-\phi°(t)$. The angle $\phi(t)$ follows directly from the coordinates $R_x(t)$ and $R_y(t)$. After this, the following transformation is carried out:

$$(D_x(t),\ D_y(t)) \overset{\phi(t)}{\rightarrow} (D_x''(t),\ D_y''(t))$$

The coordinates $D_x''(t)$ and $D_y''(t)$ of the vector D thus rotated through the angle $\phi(t)$ indicate the direction of the direction arrow as it is shown in Fig. 5. For this purpose, these coordinates $D_x''(t)$ and $D_y''(t)$ are standardized in a manner known per se, so that the extremity of the direction arrow to be displayed lies on the ellipse mentioned. The distance D to be travelled in a straight line, which distance is represented in Fig. 5 as 12.4 km, can be calculated as follows:

$$D = \sqrt{D_x(t)^2 + D_y(t)^2}.$$

It will be understood that many variants of the car compass are conceivable within the framework of the invention. For instance, the inputting of information about the desired destination can also be carried out by putting in directly a postcode associated with the desired destination. Inputting by means of a keyboard is also possible. This postcode could for instance be selected by displaying lists of postcodes from the first digital file on the display 12. Also, the inputting of an address of a desired destination need not necessarily concern a place of residence, street name and street number. For instance, the second digital file can be extended to include addresses or names of restaurants, petrol stations, banks, auxiliary services, tourist attractions on the one hand, and the associated postcodes on the other. In addition, it is possible to input customer-specific address files. If

necessary, this can be read in from another PC or by means of a PC-card.

In urban areas, the postcode areas are usually smaller, as a result of which the accuracy of the indications increases. However, in rural areas, the postcode areas are larger than the above-described 300 m section. In accordance with a particular embodiment of the car compass, a switch-over could be made for these areas from postcode coordinates to PAP-data (PAP: premises, address and place coordinates). In that case, for particular addresses the postcode is replaced by PAP-data. These PAP-data can then be related again to position coordinates of the desired destination.

More particularly, the first digital file is for this purpose provided with PAP-data related to the position coordinates associated with those PAP-data, while on the basis of PAP-data associated with the inputted desired destination, the control unit, in use, can address the first digital file to obtain the position coordinates of the desired destination.

If a particular postcode is not known in the first digital file, the control unit can for instance select a postcode which numerically and alphabetically is closest to a selected postcode of the desired destination. The more positions in the postcode correspond, the closer they will be in each other's vicinity. The control unit can further comprise a digital road-network file, known per se, with numbered roads for displaying on the display, by means of a map, the main route to be followed to the desired destination (Fig. 7). The control unit displays the main route in this known manner in particular if the car compass is located outside a densely built-up area, or if the distance in a straight line between the actual position of the car compass and the desired destination is greater than a predetermined value. If the map with the main route is not displayed, then the direction arrow is displayed. In particular, the direction arrow is displayed with a background that does not comprise any cartographic information (see Fig. 5). The background then

comprises, for instance, a neutral blue field, while the direction arrow is white. In that case, the direction arrow only indicates the direction relative to the actual direction of movement. Hence, in use, the map with the main route to be followed (Fig. 7) or the direction arrow (Fig. 5) will be displayed (depending on the circumstances). In addition, it is possible that the car compass further comprises means for informing a user of the desired driving direction through sound.

It will be understood that the first and second digital files can readily be replaced by new versions, simply by replacing the card 24 by a new smartcard. This is particularly convenient in view of the fact that new postcodes are regularly introduced for new housing estates. In this manner, the car compass 1 can always be kept up to date.

These variants are all understood to fall within the framework of the invention.

Finally, it is observed that in accordance with the invention, it is also possible to transform the coordinates of the desired destination defined in the RD-system to the GPS84-system. Subsequently, all calculations as discussed hereinabove can be carried out in an entirely analogous manner in the GPS84-system, instead of in the RD-system.

CLAIMS

A car compass comprising a satellite receiver which on the basis of received satellite signals generates coordinates of an actual position of the car compass, input means whereby a user can input information about a desired destination, a control unit to which the coordinates of the actual position and the information about the desired destination are fed and which processes said coordinates and information in combination for obtaining information about a driving direction to be followed in order to reach the desired destination, and a display on which said driving direction to be followed is represented, **characterized in that** the control unit comprises a first digital file wherein at least postcodes and position coordinates related thereto and associated with said postcodes are stored, whilst the control unit, in use:

- addresses, on the basis of a postcode associated with the inputted information about the desired destination, the first digital file to obtain the position coordinates of the desired destination;
- determines, on the basis of the position coordinates of the desired destination and the coordinates of the actual position, the driving direction to be followed; and
- displays a direction arrow on the display, with the direction of the direction arrow on the display corresponding to the driving direction to be followed.

2. A car compass according to claim 1, characterized in that the control unit:

- determines, on the basis of coordinates, successively determined by the satellite receiver, of at least two different consecutive actual positions of the car compass, the actual direction of movement of the car compass;
- determines, on the basis of the position coordinates of the desired destination, the coordinates of the actual position

and the actual direction of movement of the car compass, the driving direction to be followed relative to the actual direction of movement; and

- displays the direction arrow on the display so that the direction of the direction arrow on the display corresponds to the driving direction to be followed relative to the actual direction of movement of the car compass.

3. A car compass according to claim 2, characterized in that a vertical axis of the display represents the actual direction of movement and that the direction of the direction arrow represents, relative to a vertical axis of the display, the driving direction to be followed relative to the actual direction of movement.

4. A car compass according to claim 3, characterized in that the extremity of the direction arrow lies on an elliptic curve whose long axis is directed horizontally and whose short axis is directed vertically on the display.

5. A car compass according to claim 2 or 3, characterized in that at least during a movement of the car compass, the direction arrow is directed to the desired destination.

6. A car compass according to any one of the preceding claims, characterized in that by means of the input means, a postcode can be inputted as information about the desired destination.

7. A car compass according to claim 6, characterized in that in use, by means of the input means, the control unit can be controlled for selectively displaying a part of the postcodes from the first digital file on the display; and by means of the input means, one of the displayed postcodes can be selected for inputting information about the desired destination.

8. A car compass according to any one of the preceding claims, characterized in that the control unit comprises a second digital file containing interrelated addresses and postcodes.

9. A car compass according to claim 8, characterized in that by means of the input means, an address can be inputted as

information about the desired destination, with the control unit addressing, on the basis of the inputted address, the second digital file for obtaining the postcode associated with the inputted information about the desired destination.

10. A car compass according to claim 8, characterized in that by means of the input means, the control unit can be controlled for selectively displaying a number of addresses with, optionally, the associated postcodes from the second digital file; and that by means of the input means the control unit can be controlled for selecting one of the displayed addresses with the associated postcode from the second digital file and for inputting thereby the information about the desired destination and obtaining the postcode associated with said destination.

11. A car compass according to claim 10, characterized in that an address consists of a place name, street name and, possibly, a house number, wherein during a first operating mode of the control unit, by means of the input means, the control unit can be controlled for selectively displaying a number of place names from the second digital file, and wherein, by means of the input means, the control unit can be controlled for selecting one of the displayed place names from the second digital file; and wherein during a second operating mode of the control unit, by means of the input means, the control unit can be controlled for selectively displaying a number of the street names with, possibly, the associated house numbers and postcodes from the second digital file, and wherein, by means of the input means, the control unit can be controlled for selecting one of the displayed street names and the possibly displayed house numbers with associated postcodes from the second digital file and for inputting thereby the information about the desired destination and obtaining the postcode associated with said destination.

12. A car compass according to any one of claims 9-11, characterized in that in use, the control unit addresses, on the basis of the postcode of the desired destination selected

from the second digital file, the first digital file for determining said position coordinates.

13. A car compass according to claim 12, characterized in that in use, the control unit determines, from the first digital file, position coordinates associated with a postcode which numerically and alphabetically is closest or identical to the postcode of the desired destination selected from the second digital file.

14. A car compass according to any one of preceding claims 6-13, characterized in that the input means comprise a cursor control and a button and/or keyboard for selecting the information to be displayed and inputting the desired destination from the displayed information respectively.

15. A car compass according to any one of the preceding claims, characterized in that the coordinates, determined by the satellite receiver, of an actual position are defined in the GPS-system, the position coordinates of the postcodes being defined in the RD-system.

16. A car compass according to claim 15, characterized in that the control unit transforms the GPS-coordinates provided by the satellite receiver into RD-coordinates, and compares said RD-coordinates with the position coordinates of the desired destination for determining the desired driving direction.

17. A car compass according to any one of the preceding claims, characterized in that the control unit further comprises a digital road-network file with numbered roads for displaying on the display, by means of a map, the main route to be followed to the desired destination.

18. A car compass according to claim 17, characterized in that the control unit displays the main route if the car compass is located outside a densely built-up area or if the distance in a straight line between the actual position of the car compass and the desired destination is greater than a predetermined value.

19. A car compass according to any one of preceding claims 2-18, characterized in that the direction arrow is displayed

with a background which does not comprise any cartographic information.

20. A car compass according to claims 18 and 19, characterized in that, in use, the control unit displays the direction arrow when the map with the main route to be followed is not displayed.

21. A car compass according to any one of the preceding claims, characterized in that further stored in the first digital file are PAP-data related to position coordinates associated with said PAP-data, and wherein on the basis of PAP-data associated with the inputted desired destination, the control unit can, in use, address the first digital file to obtain the position coordinates of the desired destination.

22. A car compass according to any one of the preceding claims, characterized in that on the basis of the position coordinates of the desired destination and the coordinates of the actual position, the control unit, in use, determines the distance in a straight line between the actual position of the car compass and the desired destination, and displays said distance on the display.

23. A car compass according to any one of the preceding claims, characterized in that the car compass further comprises means for informing a user of the desired driving direction through sound.

1/3

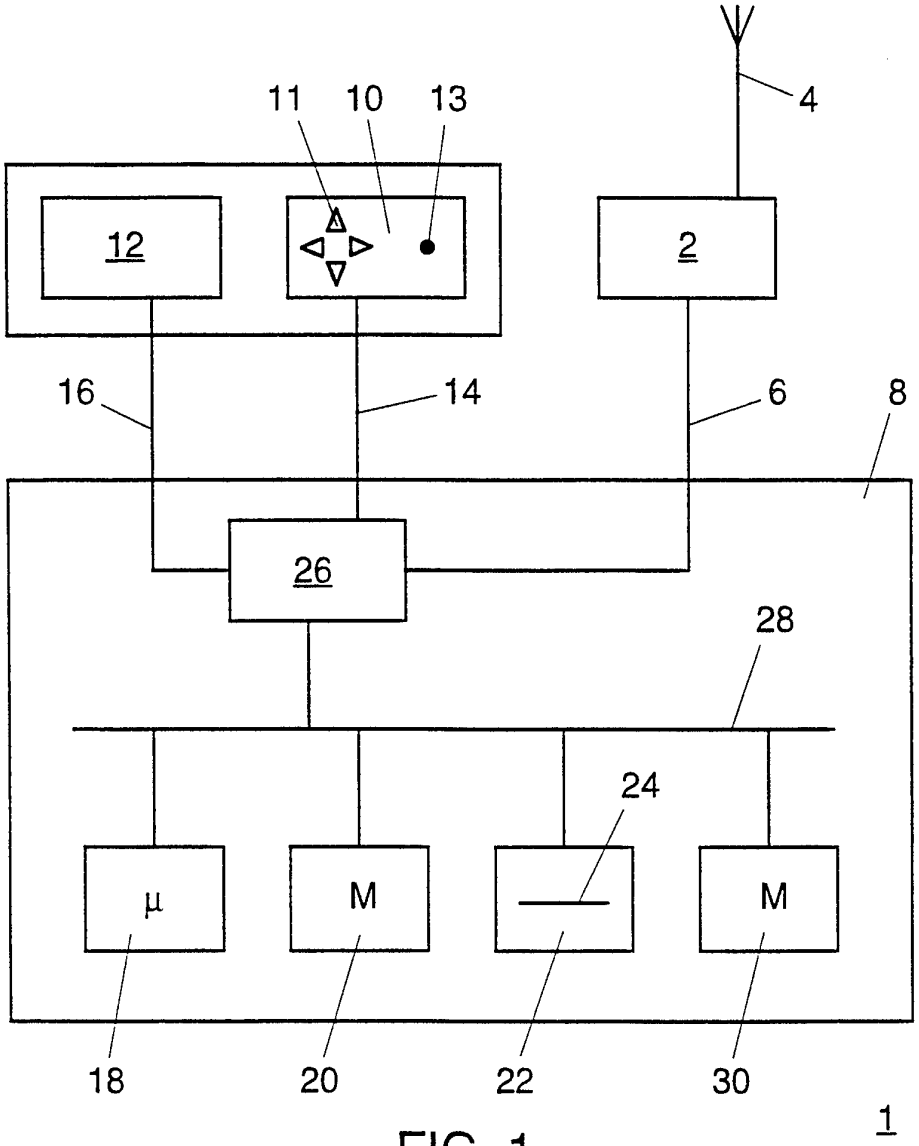


FIG. 1

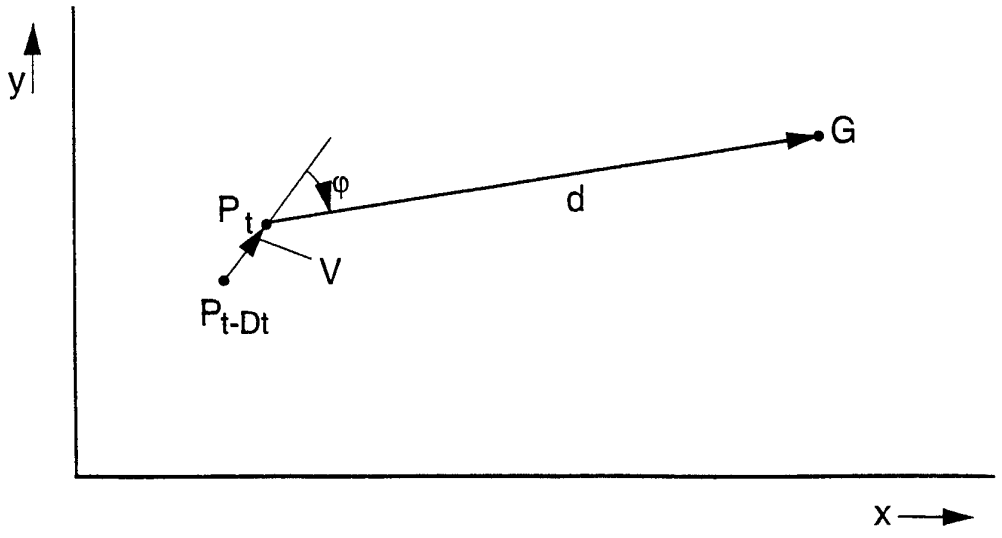


FIG. 2

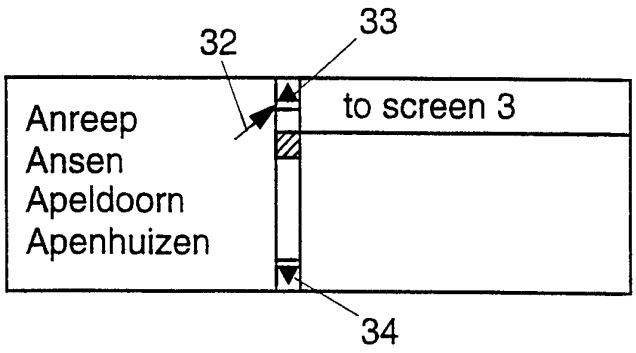


FIG. 3

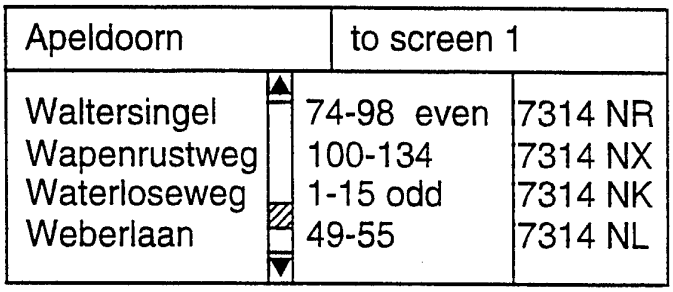


FIG. 4

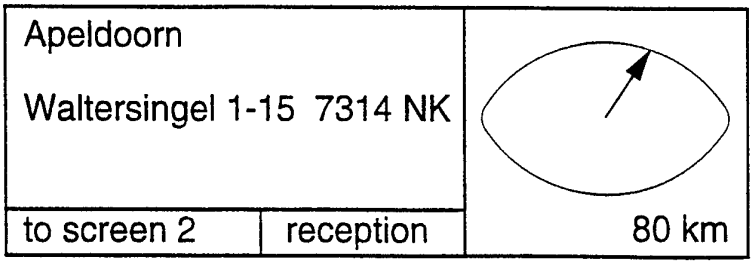


FIG. 5

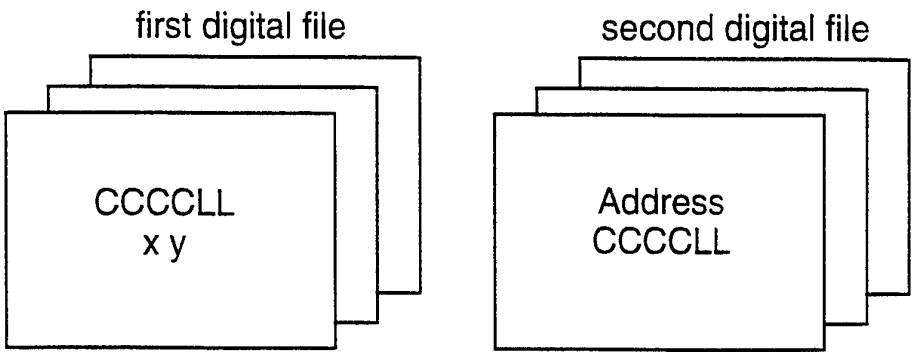

first digital file
second digital file
CCCCLL
x y
Address
CCCCLL

FIG. 6

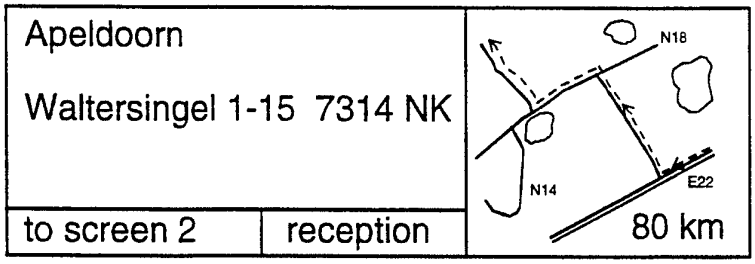

Apeldoorn
Waltersingel 1-15 7314 NK
to screen 2
reception
N18
N14
E22
80 km

FIG. 7

INTERNATIONAL SEARCH REPORT

Int onal Application No
PCT/NL 96/00277

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G01C21/20

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 6 G01C

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	DE,A,43 28 998 (GRUNDIG EMV) 16 March 1995	1,3,5,6, 8,14,22
Y	see the whole document	2,17,23
Y	EP,A,0 440 105 (PIONEER ELECTRONIC CORP) 7 August 1991 see abstract	2,17

-/--

[X] Further documents are listed in the continuation of box C.

[X] 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	Date of mailing of the international search report
24 September 1996	2.10.96

Name and mailing address of the ISA	Authorized officer
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	Hoekstra, F

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Int onal Application No
PCT/NL 96/00277

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	PROCEEDINGS OF THE VEHICLE NAVIGATION AND INFORMATION SYSTEMS CONFERENCE. (VNIS), TORONTO, SEPT. 11 - 13, 1989, no. CONF. 1, 11 September 1989, REEKIE D;CASE E; TSAI J, pages 467-473, XP000089913 CATLING I ET AL: "AUTOGUIDE-ROUTE GUIDANCE IN THE UNITED KINGDOM" see page 468, right-hand column, line 16 - line 19 see page 468, right-hand column, line 28 - page 469, left-hand column, line 3 see page 469, right-hand column, line 27 - line 31; figures 1,2 ---	23
A	DE,A,42 19 171 (MITSUBISHI ELECTRIC CORP) 14 January 1993 see abstract ---	1
A	PROCEEDINGS OF THE VEHICLE NAVIGATION AND INFORMATION SYSTEMS CONFERENCE, DEARBORN, OCT. 20 - 23, 1991, vol. VOL. 1, no. -, 1 October 1991, INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, pages 463-473, XP000347114 KUNIHIRO ISHIKAWA ET AL: "MAP NAVIGATION SOFTWARE OF THE ELECTRO-MULTIVISION OF THE '91 TOYOTA SOARER" see page 469, left-hand column, line 14 - line 31; figures 2,10 -----	1

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int onal Application No
PCT/NL 96/00277

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A-4328998	16-03-95	NONE	
EP-A-0440105	07-08-91	JP-A- 3226622	07-10-91
		JP-B- 7104171	13-11-95
		JP-A- 3264815	26-11-91
		DE-D- 69108581	11-05-95
		DE-T- 69108581	17-08-95
		US-A- 5179519	12-01-93
DE-A-4219171	14-01-93	JP-A- 5019684	29-01-93