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U.S. **UTILITY** Patent Application

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APPLICATION NO. 09/613634	CONT/PRIOR F	CLASS 701	SUBCLASS 200	ART UNIT 3661	EXAMINER B. F. HILLIARD <i>[Signature]</i>
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CANTS Kishiko Maruyama
Shigeru Shimada
Toshiichirou Sasaki

Portable terminal with the function of walking navigation

PTO-2040
12/89

ISSUING CLASSIFICATION											
ORIGINAL				CROSS REFERENCE(S)							
CLASS		SUBCLASS		CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						
701		200		701	201						
INTERNATIONAL CLASSIFICATION				302	357.0	357.08					
G01C	21/00			340	980						

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<input type="checkbox"/> TERMINAL DISCLAIMER	DRAWINGS			CLAIMS ALLOWED	
	Sheets Drwg. 10	Figs. Drwg. 15	Print Fig. 9	Total Claims 13	Print Claim for O.G. 1
<input type="checkbox"/> The term of this patent subsequent to _____ (date) has been disclaimed.	_____ (Assistant Examiner) _____ (Date)			NOTICE OF ALLOWANCE MAILED	
<input type="checkbox"/> The term of this patent shall not extend beyond the expiration date of U.S. Patent. No. _____ _____ _____	 YONEL BEAULIEU PRIMARY EXAMINER _____ (Primary Examiner)			ISSUE FEE <i>SR</i>	
				Amount Due <i>1280</i> Date Paid <i>6.17.02</i>	
<input type="checkbox"/> The terminal _____ months of this patent have been disclaimed.	<i>Casper</i> <i>3-20-02</i> _____ (Legal Instruments Examiner) _____ (Date)			ISSUE BATCH NUMBER	

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(FACE)

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Apple EX1002 Page 1

PATENT APPLICATION



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10864 U.S. PTD

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CONTENTS

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- 1/15 7. Reg 3 11-19-01
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Class	Sub.	Date	Exmr.
701	200	20 June 2001	YB
	201		
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340	988		
	995		
342	357.01		
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	357.08		
	443		
	147		
367	118		
Updated		7 Nov 2001	YB
Updated		11 Mar 2002	YB

INTERFERENCE SEARCHED			
Class	Sub.	Date	Exmr.
701	200	12 Mar 2002	YB
	201		
342	357.01		
	357.08		
340	988		

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	Date	Exmr.
WEST	20 June 2001	YB

DB 57/146
10-4

POSITION	INITIALS	ID NO.	DATE
FEE DETERMINATION	KW	68904	7/20/00
O.I.P.E. CLASSIFIER	JSW	72	7/24
FORMALITY REVIEW	Saha	JC645	8/29-00
RESPONSE FORMALITY REVIEW	JK	835	12/27/00

INDEX OF CLAIMS

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 - (Through numeral)... Canceled A Appeal
 ÷ Restricted O Objected

Claim	Date
Final	
Original	
1	21 Jan 2001
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US006430498B1

(12) **United States Patent**
Maruyama et al.

(10) **Patent No.:** **US 6,430,498 B1**
(45) **Date of Patent:** **Aug. 6, 2002**

(54) **PORTABLE TERMINAL WITH THE
FUNCTION OF WALKING NAVIGATION**

(75) **Inventors:** **Kishiko Maruyama; Shigeru
Shimada, both of Kodaira;
Toshiichirou Sasaki, Iwaki, all of (JP)**

(73) **Assignee:** **Hitachi, Ltd., Tokyo (JP)**

(*) **Notice:** Subject to any disclaimer, the term of this
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701/202, 211, 212, 213, 214; 340/988,
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367/118**

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* cited by examiner

Primary Examiner—Yonel Beaulieu

(74) *Attorney, Agent, or Firm*—Mattingly, Stanger &
Malur, P.C.

(57) **ABSTRACT**

A portable terminal has a function of walking navigation
The direction of the destination is displayed by an indicating
arrow that always points in the direction of the destination.
In the navigation processing, the user enters data to select a
menu and/or set retrieving conditions on the setup screen. At
first, the user gets the location information of the portable
terminal, represented by a latitude/longitude or coordinates
and an altitude, for example. Then, the user gets the direction
information of the portable terminal, which is the direction
of the tip of the portable terminal as determined by a
compass, a gyro, or a clinometer. The location information
and the direction information are set as terminal information
for the retrieving conditions. The system controls retrieving
of the database and retrieves the information corresponding
to the selected menu, such as route guidance.

13 Claims, 10 Drawing Sheets

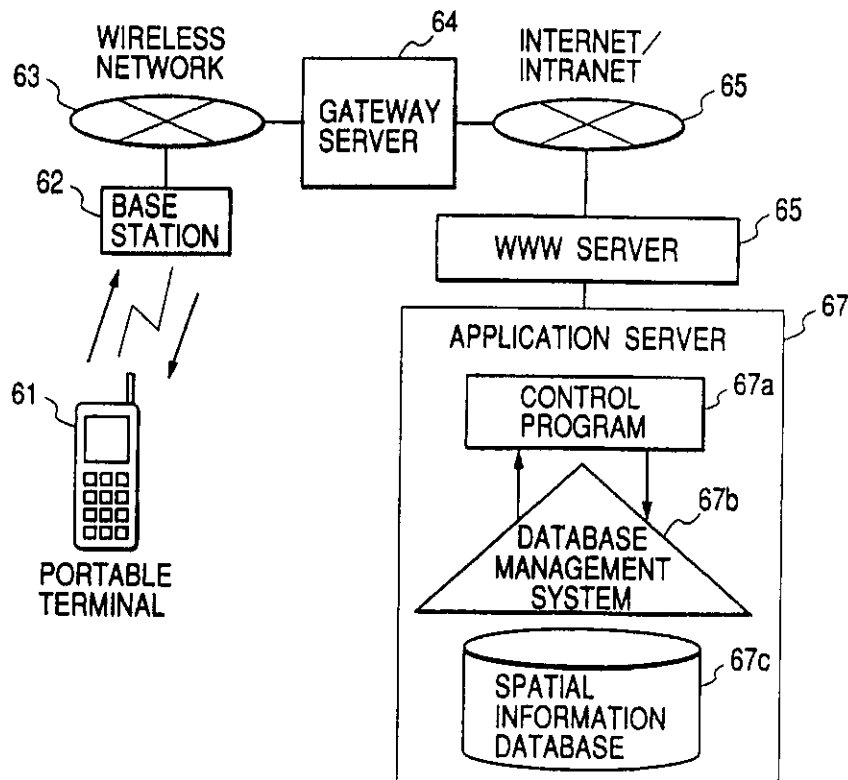


FIG. 1

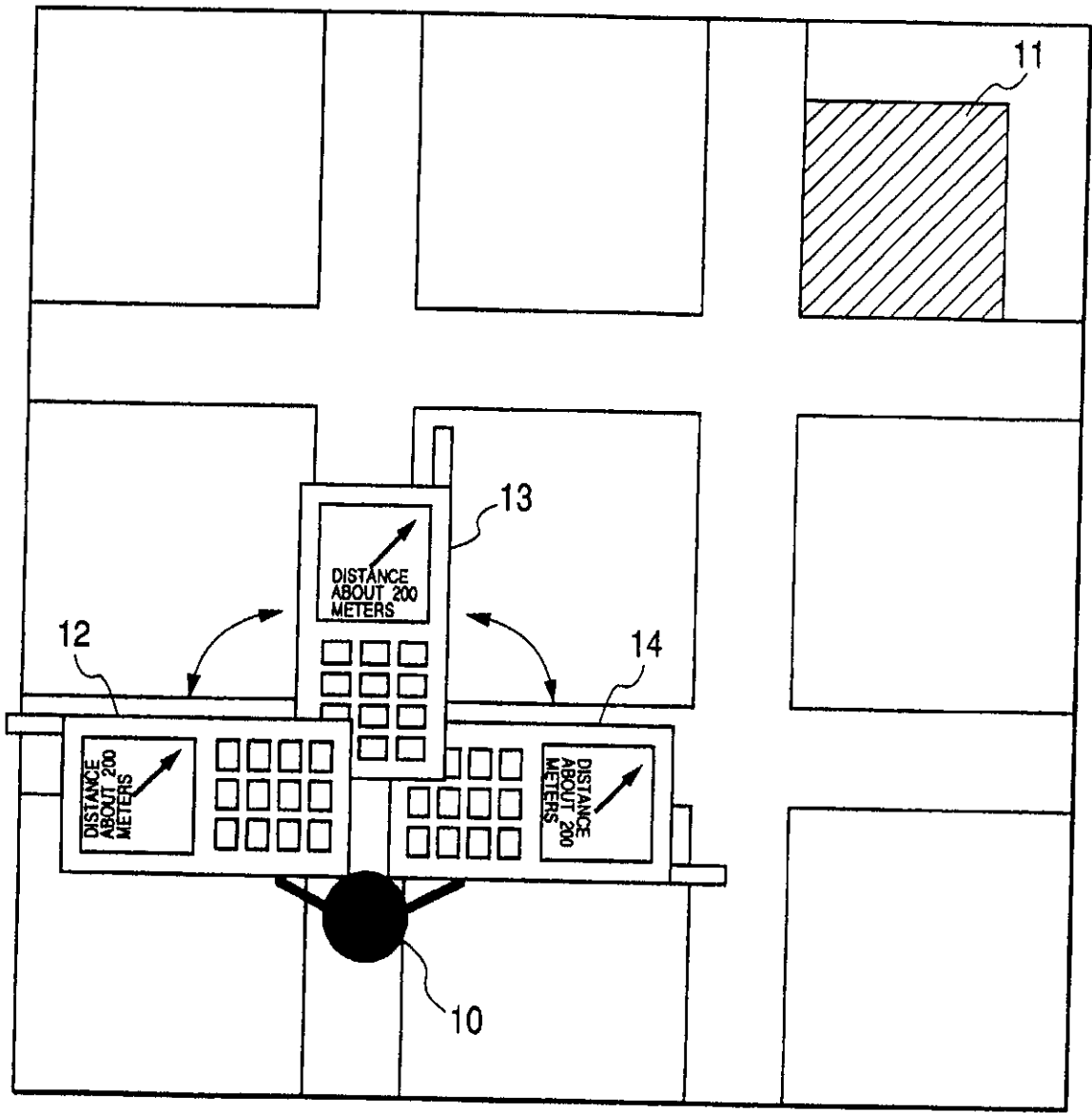


FIG. 2

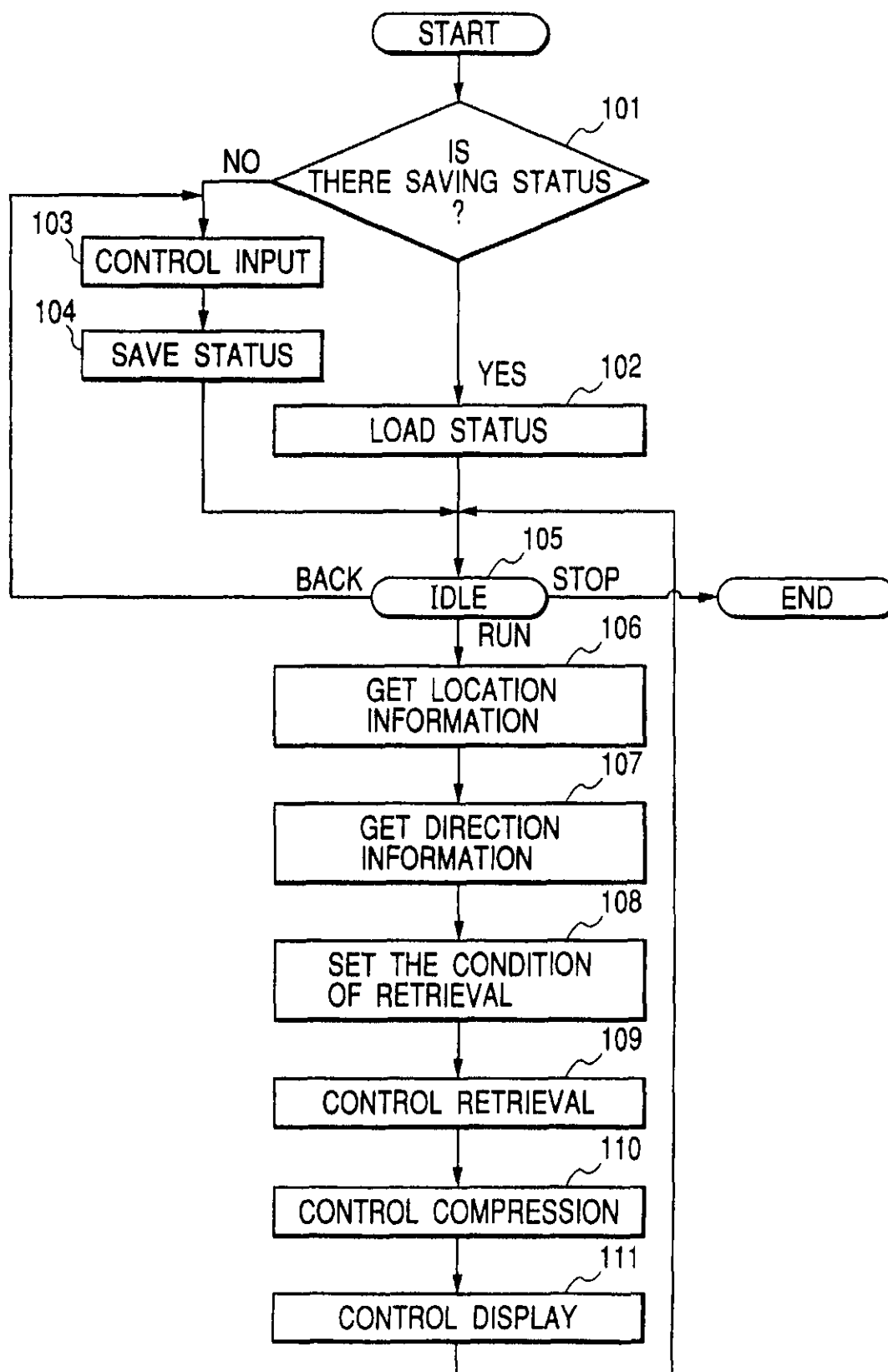


FIG. 3(a)

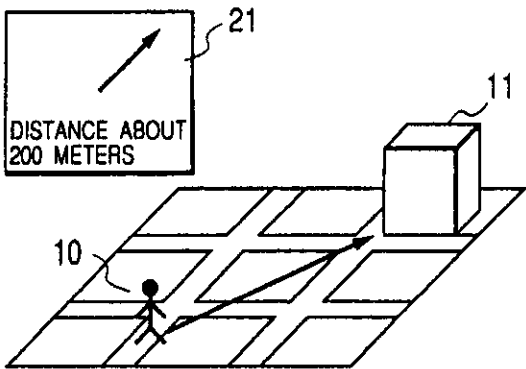


FIG. 3(b)

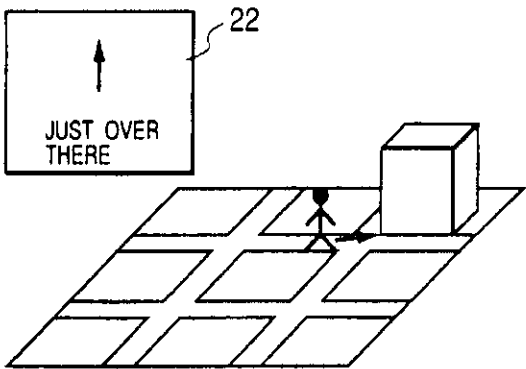


FIG. 3(c)

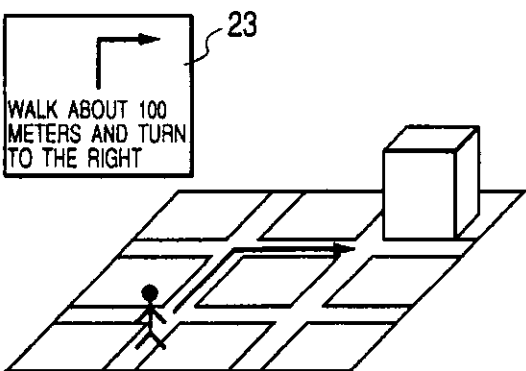


FIG. 3(d)

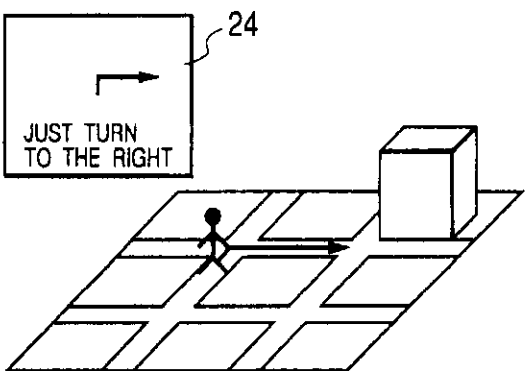


FIG. 3(e)

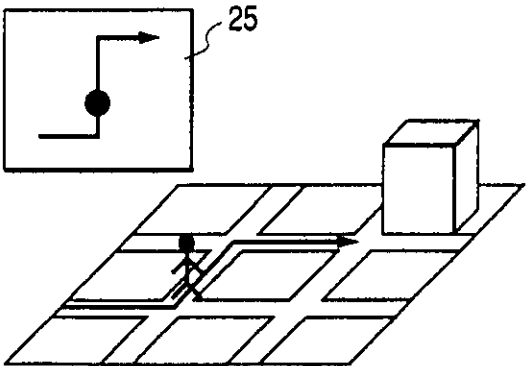


FIG. 3(f)

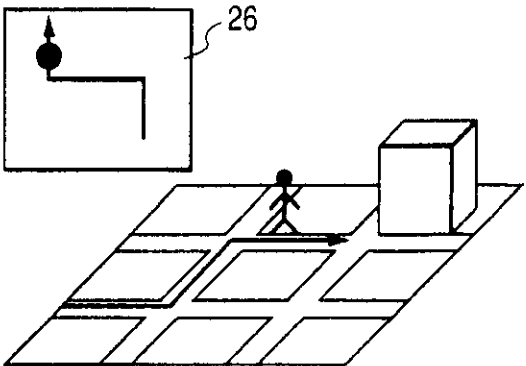


FIG. 4

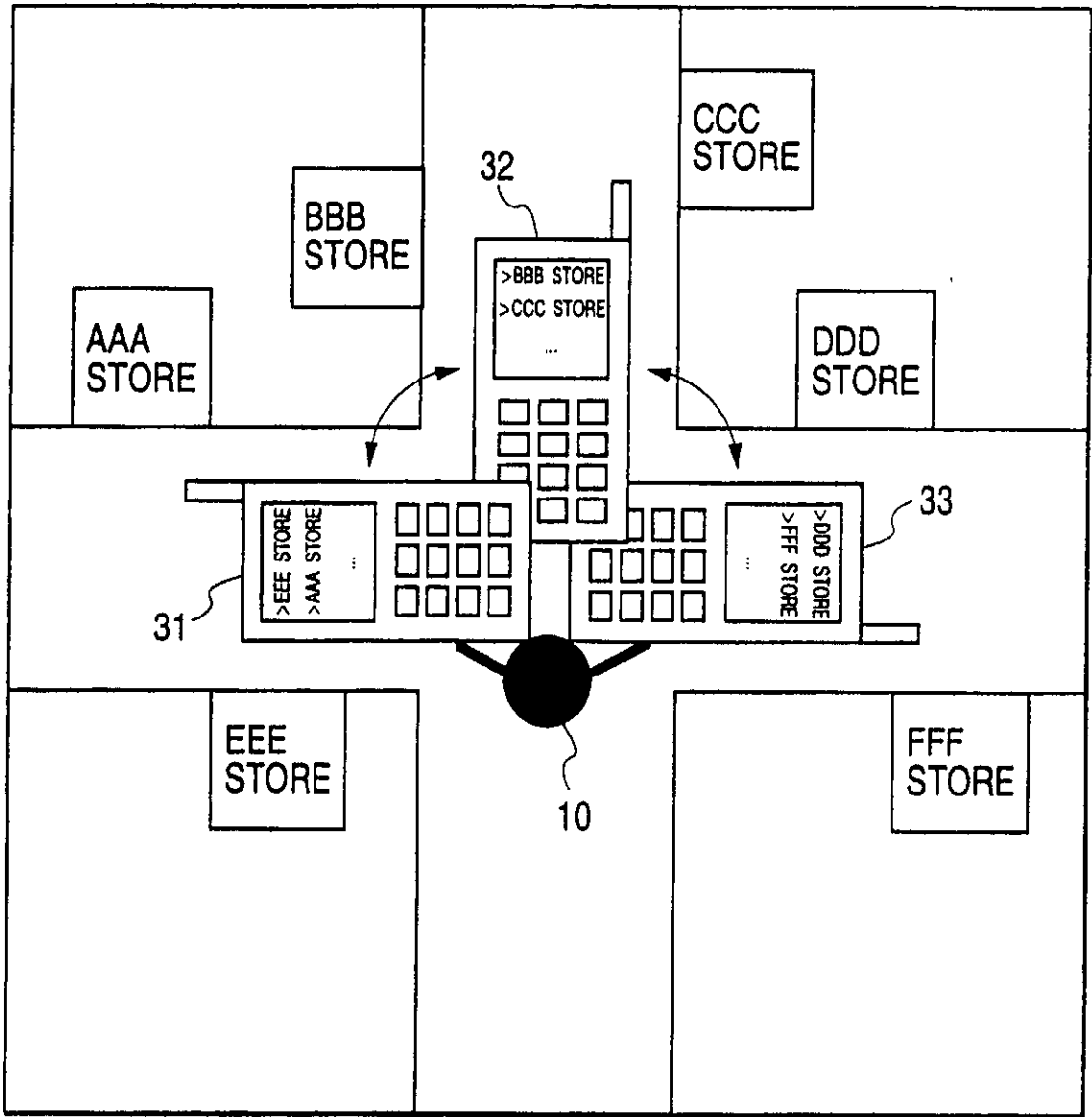


FIG. 5

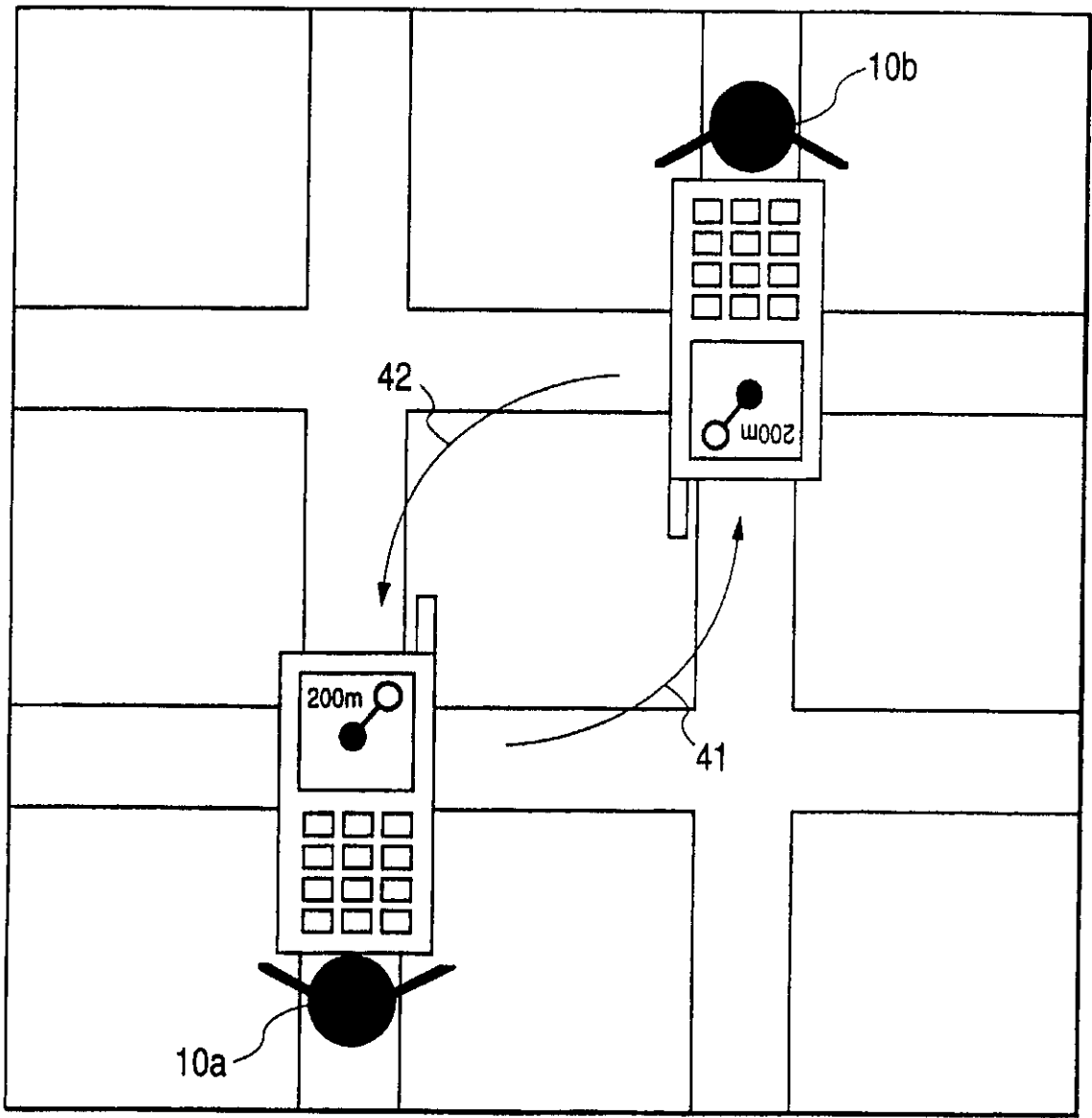


FIG. 6

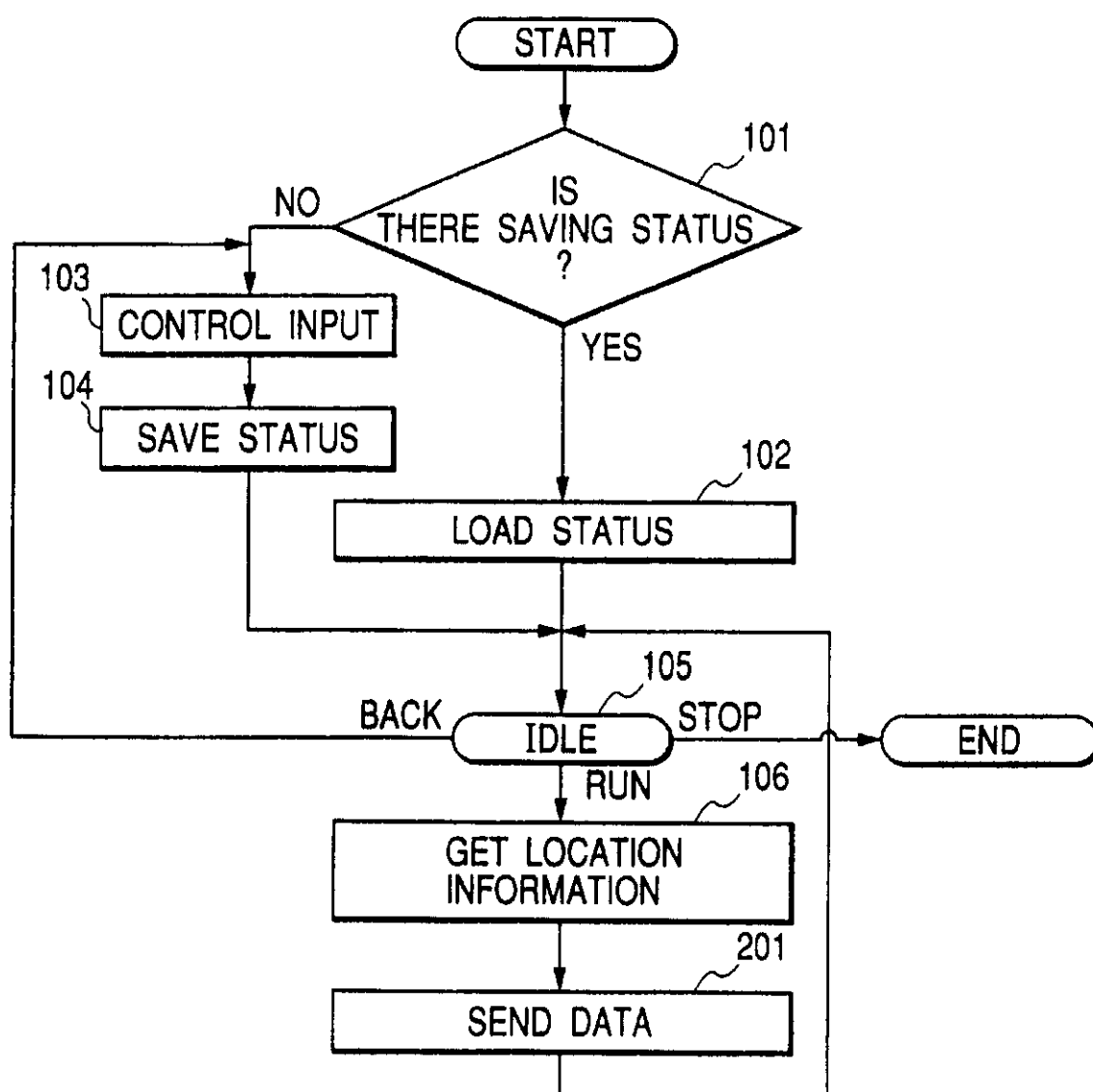


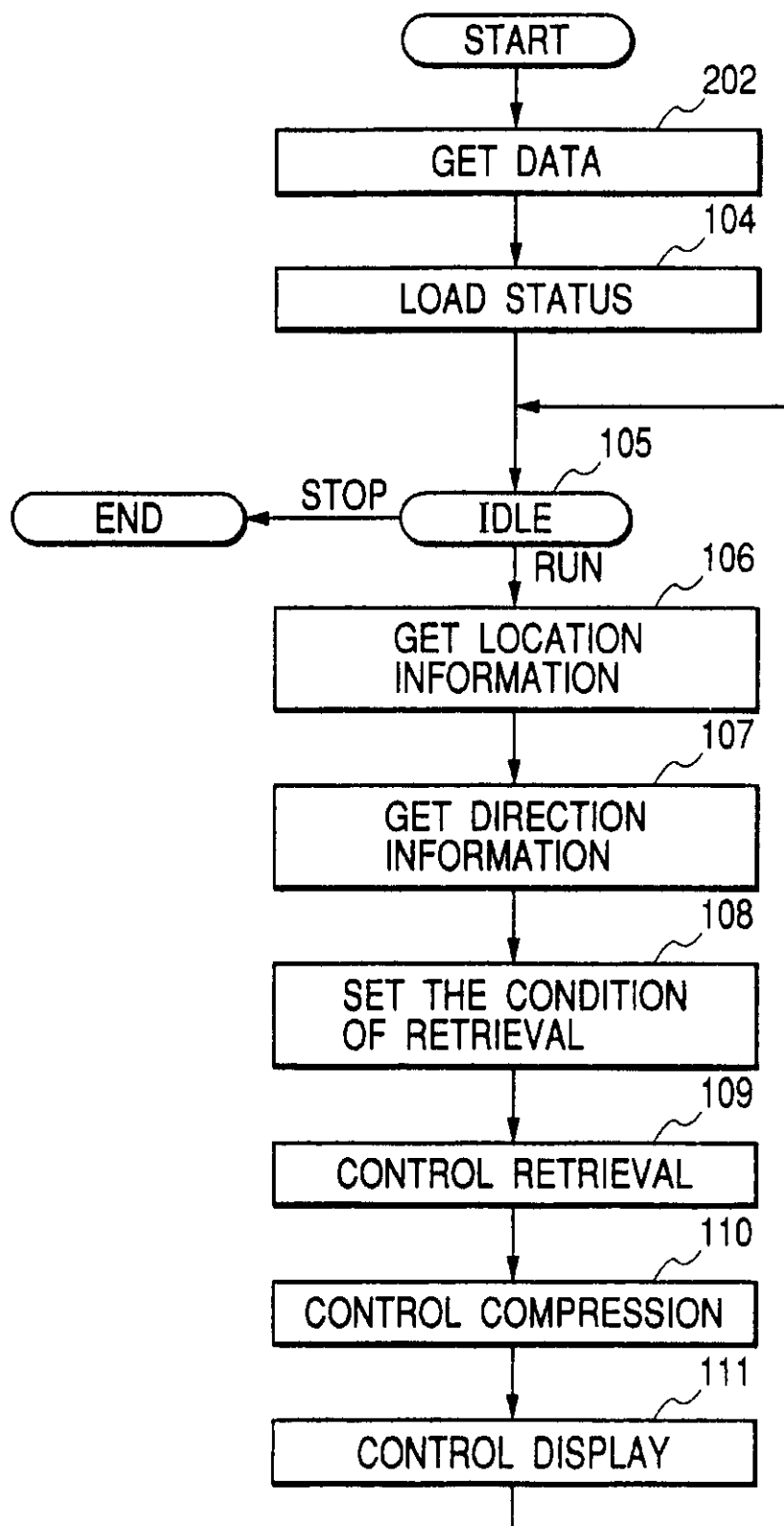
FIG. 7

FIG. 8

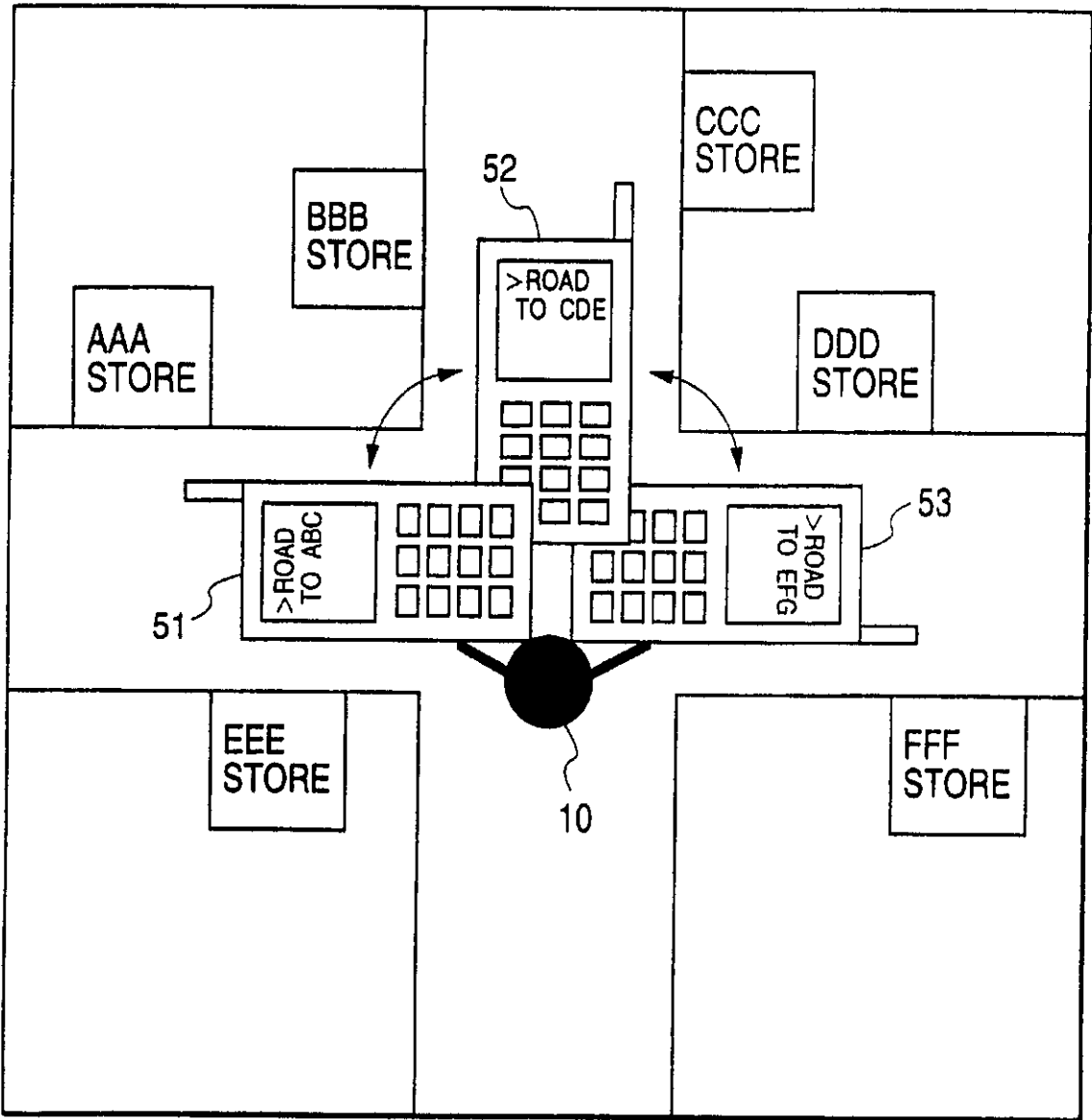


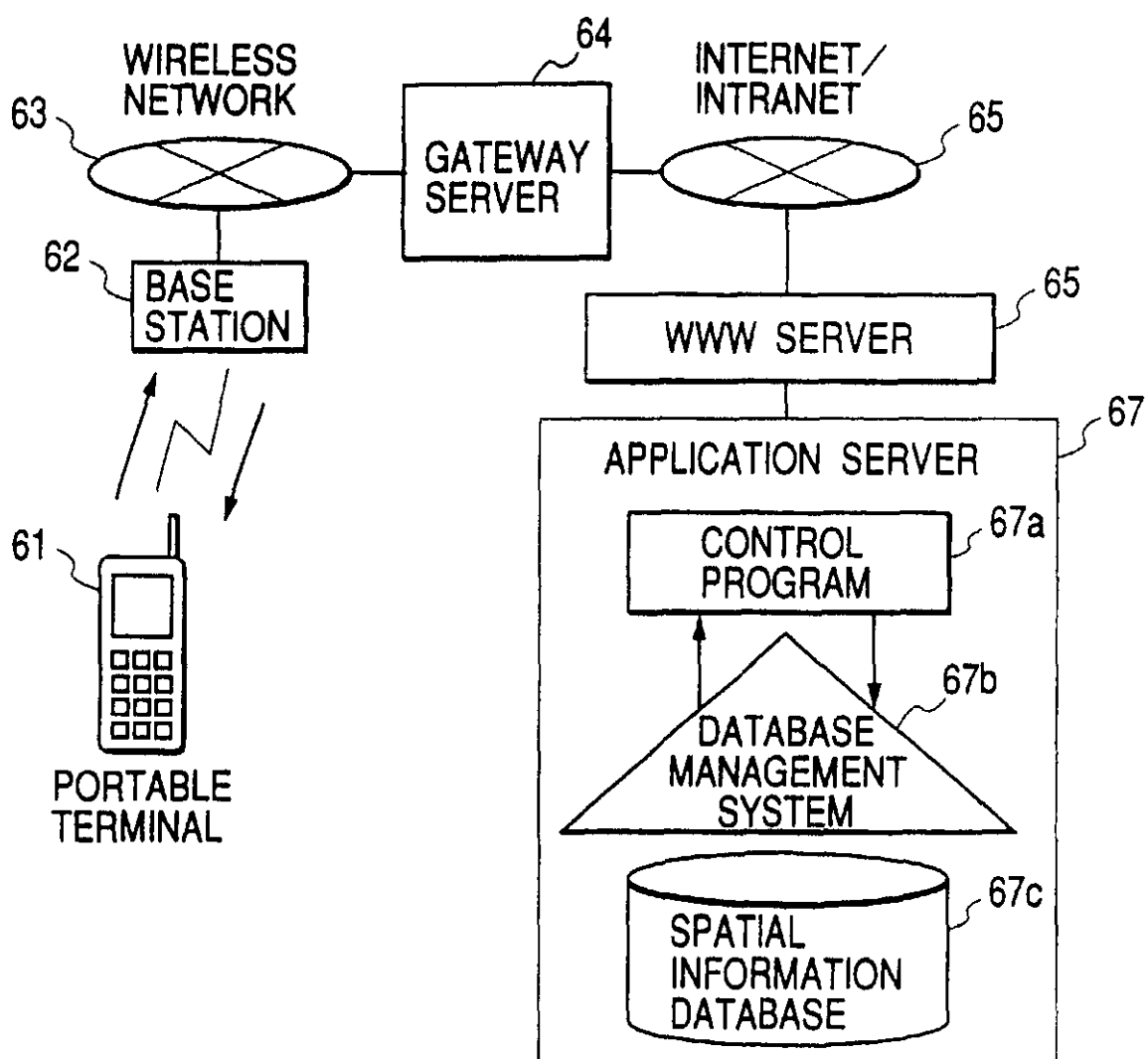
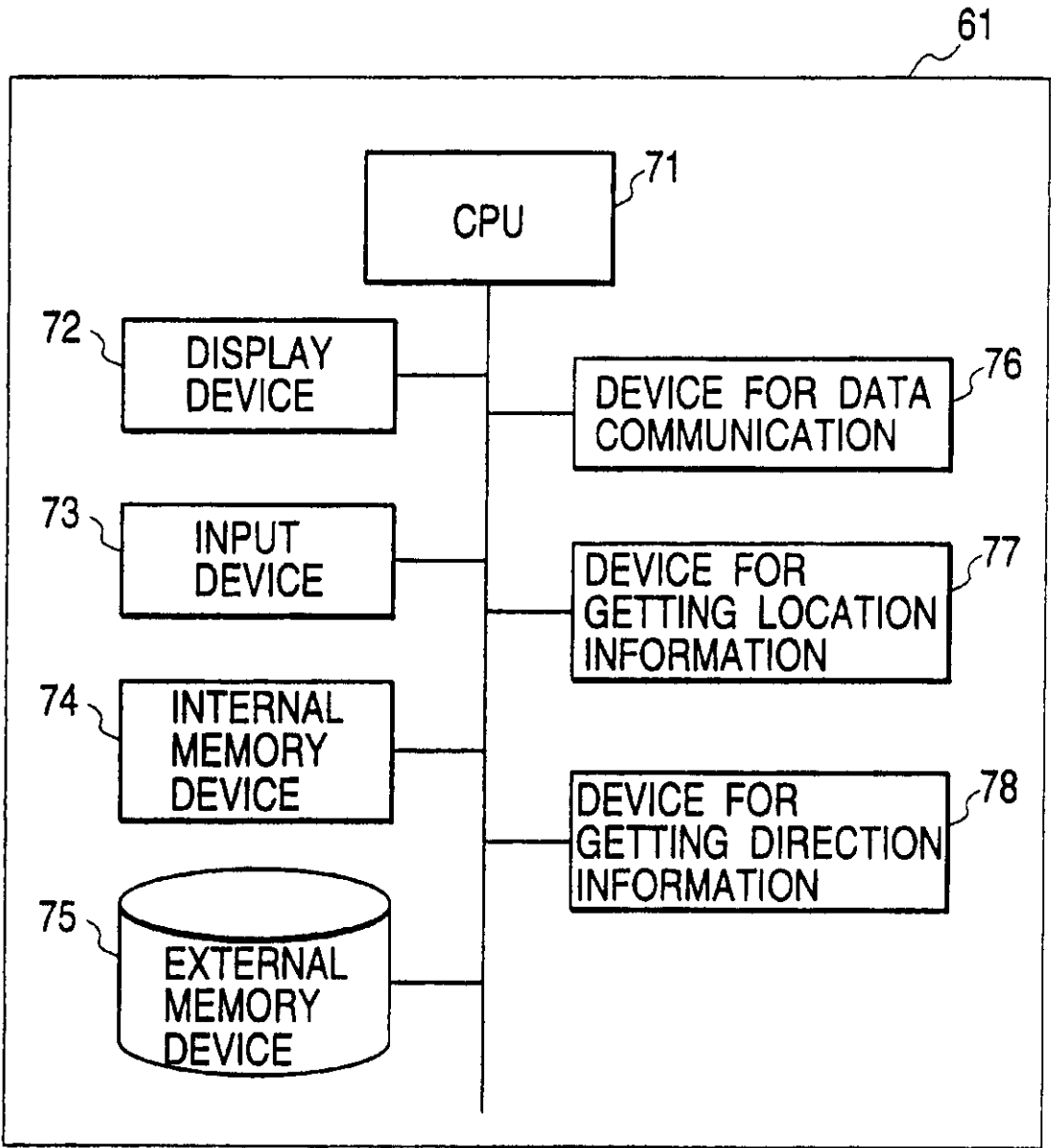
FIG. 9

FIG. 10



PORTABLE TERMINAL WITH THE FUNCTION OF WALKING NAVIGATION

BACKGROUND OF THE INVENTION

The present invention relates to a portable terminal including a portable telephone and a Personal Handyphone System (PHS)(including a telephone provided only with character data communication functions) and a personal data assistance (PDA) terminal provided with portable telephone or PHS data communication functions. More particularly, the present invention relates to a portable terminal provided with the function of walking navigation, which can supply location-related information to the walking user.

Conventionally, there have been many map information services for supplying maps and other map-related contents through the Internet and facsimile machines. In the case of those services, it is premised that information is supplied so as to be output onto such wide monitor screens of computers and printed out onto papers through facsimile machines. However, the use of PDA terminals and data communication functions of portable telephones or PHS's that are easy to carry about would make it easier for the users to obtain desired maps on sightseeing and business trips more favorably through the above services.

There are also many systems under development to be used for supplying the location information around the user's present place through the GPS (Global Positioning System). For example, a car navigation system to be mounted on a car is too large for a walker to carry around. In addition, because the navigation system premises that the system is used while the object car is running on a road, it cannot be used as a walker's navigation system as is. On the other hand, in the case of such a location information system as a PDA with GPS and a handy GPS intended to walkers, it is possible to show the user's present place on a map stored beforehand in its local memory or down-loaded from the above services.

SUMMARY OF THE INVENTION

The conventional map information services supply maps through the Internet, which are optimized on the assumption that the maps can be displayed at a resolution equivalent to that of personal computers. Consequently, they have been confronted with a problem that the maps, when displayed on small-size screen of portable telephones and PHS terminals, are not displayed clearly.

In addition, the map retrieving method employed for the above described services requires an enormous amount of cost for the communications with the server, so it is not suitable for walking navigation systems. For example, in the case of a method that narrows retrieving conditions by displaying a map in some steps of scales from a wide range to a detailed range, the map in each step must be down-loaded from the server in each of the retrieving operations. If text is entered and/or menus are selected to narrow those retrieving conditions, however, it will be possible to reduce the data communication amount during retrieving. In spite of this, the method still has some problems that if a specified place name is recorded over a plurality of pages, maps on the adjacent pages are also supplied, so that the desired map cannot be supplied directly. In such a case, the desired map will have to be retrieved by scrolling, scaling up/down the map in display. In addition, the map must be down-loaded in each of the display operations, since the map data is not accumulated beforehand in the local memory.

Furthermore, maps supplied by the above described services are not always easy for walkers to understand. For

example, when a walker (user) wants to know a route from his/her present place to a destination, the route might possibly be described over a plurality of pages. Even when the route is described only on one page, the displayed range is often too wide to obtain detailed information. In order to obtain necessary information in such a case, therefore, the user is requested to make such complicated operations as scrolling, scaling up/down the displayed map, thereby the cost of communications with the server comes to be enormous as described above.

Furthermore, if the object system requires a PDA terminal in addition to the portable telephone or the PHS, users who can receive the services will be limited in number. In addition, those portable devices must be connected to each other via cable, so that it would not be easy to use them during walking. On the other hand, there are also services for supplying such information contents as movies, entertainment and business events, restaurants, etc. available with use of only a portable telephone and/or a PHS terminal. Because it is premised that the information contents are displayed on the narrow screens of those portable telephones and PHS terminals, character information is often supplied as contents. However, when the user wants to know such a spatial position as a place and a route, those services will be difficult to cope with the user's need. In addition, the portable telephone and the PHS terminal are just provided with some button keys including dialing buttons used as input devices, so they will not be able to cope with inputs of complicated retrieving conditions.

On the other hand, the conventional PDA terminal with GPS and handy GPS are systems that can be used as a single unit. If they are just used to display maps stored beforehand in their local memories, they will not be a proper method to supply information matching with the user's needs and easier to understand. Also in this case, they will not be able to supply such real time information as movies, entertainment and business events, restaurants, etc. Of course, if the PDA terminal is additionally provided with data communication functions of a portable telephone and/or PHS terminal, however, it will be possible to connect them to Internet map information services only as a single unit. The above described services will not yet be easier for the users to understand.

Under such circumstances, it is an object of the present invention to provide a portable terminal with the function of walking navigation, which can supply location information easier for the user to understand during walking with use of a narrow screen of a portable telephone and/or PHS terminal. It is another object of the present invention to provide a portable terminal with the function of walking navigation, which can save labor to enter the condition for retrieving location information, as well as realize a user-friendly interface that enables the walker (user) to understand inputs of retrieving conditions intuitively.

In order to achieve the above objects, the portable terminal of the present invention with the function of walking navigation is provided with data communication, input, and display devices just like those of ordinary portable telephones and PHS terminals, as well as a device for getting location information and a device for getting direction information denoting the user's present place. Hereunder, the location information and the direction information gotten by those devices will be referred to as terminal information collectively.

Provided with those devices, the portable terminal of the present invention can use acquired terminal information as

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retrieving conditions, so the user can omit the input of his/her present place. The user can also specify a desired direction only by, for example, turning the tip of the portable terminal directly in the direction instead of entering such direction information as "towards the southern exit" or "along this street" when the user wants to know "what kinds of stores are there around the southern exit of the station" and/or "what kinds of stores are there on this street". Consequently, the user can save labor to enter retrieving conditions and it is possible to realize a user-friendly interface that enables the user to understand displayed items intuitively. In addition, the use of terminal information makes it possible to match a direction in an actual space with the displayed direction on the screen. For example, it is possible to compress information so as to display a direction of movement from the present place simply with an arrow. Consequently, location information can be displayed on a small-size display screen of a portable telephone and an PHS terminal so that the user can understand the displayed information easily while the information is compressed.

When using the portable terminal of the present invention with the function of walking navigation, it is expected that the following services are available.

- 1) "Route Guidance Service" . . . used when the user has decided a destination, but does not know how to get there.
- 2) "Neighborhood Guidance Service" . . . used for such information guidance as movies, entertainment and business events, restaurants, etc. when the destination is not decided yet.
- 3) "Meeting by Appointment Guidance Service" . . . used when meeting someone by appointment so as to notify the partner of his/her present place and/or to confirm where the partner is now.
- 4) "Present Place Guidance Service" . . . used to know where the walker (user) is now when he/she is lost.

To supply such services, the system is configured with a portable terminal of the present invention with the function of walking navigation respectively and a server that supplies necessary information on the Internet/intranet. Just like the Internet services available through portable telephones or PHS terminals, each portable terminal, wireless network, a gateway server, the Internet/intranet, and the application server are sequentially connected. The application server is provided with a spatial information database, a database management system, as well as a control program. The spatial information database stores maps information and such information contents as movies, entertainment and business events, restaurants, etc. The spatial information database may also be dispersed on the Internet/intranet. Each processing program compresses information to be supplied to portable terminals and controls the display on those terminals according to the terminal information. Concretely, the application server executes most of processings for walking navigation and each portable terminal is provided only with the function for displaying supplied information.

The above configuration is assumed so that such portable terminals as portable telephones and PHS terminals are low in processing capacity respectively. Portable terminals that are a little higher in processing capacity may also be employed to control the display according to the above described terminal information. In addition, entire map data may be received on such a portable terminal as a retrieving result so that the portable terminal controls all the necessary processings from compression to display of the map data according to the object terminal information. A further high performance portable terminal may be used as to store map information beforehand in its local memory and

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execute all the necessary processings from retrieving to compression and display of map information. In this case, the application server retrieves only such information contents as movies, entertainment and business events, restaurants, etc. that should be supplied in real time.

Furthermore, in the portable terminal of the present invention with the function of walking navigation, location information to get is represented by a latitude/longitude or coordinates and an altitude. For example, such a wireless antenna as a GPS, a PHS, etc., as well as an infrared ray sensor is used to measure location information. The portable terminal of the present invention may also be provided with any one of the above methods for measuring a position or some possible methods combined for measuring a position. Direction information to get is a direction and/or an angle of elevation representing the leading direction of the portable terminal or the orientation of the display. For example, a compass, a gyro, such a sensor as a clinometer, etc. are used to measure a direction and/or an angle of elevation. In this case, the axis of the compass is aligned to the normal of the display and the display is kept horizontal to the ground, thereby it is possible to know the direction (east, west, south, or north) in which the vertical axis of the display is oriented. The gyro, when it is set so as to keep pointing the north, can measure both direction and angle of elevation just like when a compass is used. In addition, if both compass and clinometer are used, it is possible to get not only a direction, but also such three-dimensional direction information as an angle of elevation to the ground. Instead of those compass and clinometer, a three-dimensional gyro may also be used for the above described measurement.

These and other objects, features, and advantages of the present invention will become more apparent in view of the following detailed description of the preferred embodiments in conjunction with accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an example of display control by a portable terminal of the present invention with the function of walking navigation.

FIG. 2 shows a total flow of a walking navigation processing by the portable terminal of the present invention with the function of walking navigation.

FIG. 3 shows how data compression is controlled for the "Route Guidance Service" by the portable terminal of the present invention with the function of walking navigation.

FIG. 4 shows how retrieving is controlled for the "Neighborhood Guidance Service" by the portable terminal of the present invention with the function of walking navigation.

FIG. 5 shows an embodiment of the "Meeting by Appointment Guidance Service" by the portable terminal of the present invention with the function of walking navigation.

FIG. 6 is a flowchart of data sending for the "Meeting by Appointment Guidance Service".

FIG. 7 is a flowchart of data receiving for the "Meeting by Appointment Guidance Service".

FIG. 8 shows how retrieving is controlled for the "Present Place Guidance Service" by the portable terminal of the present invention with the function of walking navigation.

FIG. 9 is a block diagram of a walking navigation system that uses the portable terminal of the present invention with the function of walking navigation.

FIG. 10 is a block diagram of the portable terminal of the present invention with the function of walking navigation.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereunder, the preferred embodiment of the present invention will be described with reference to the accompa-

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nying drawings. FIG. 1 shows how data display is controlled by the portable terminal of the present invention with the function of walking navigation. A walker (user) 10 is walking towards a destination 11. The walker can inquire the system of the direction of his/her destination and in which direction he/she should go each time he/she is lost. According to the present invention, the system, upon such an inquiry, supplies information compressed so as to be displayed on a narrow screen of the object portable telephone and/or PHS terminal. For example, the system supplies the direction and distance to the destination from the present place with an orientation and a length of an arrow on the screen. In the case of ordinary map systems, the top side of the map on the screen denotes the north. Because walkers are usually walking unconsciously with directions, the orientation of the map must be adjusted to the direction of the actual space. Usually, the walker can know his/her present place from the landmark information written on the map. However, it is actually impossible to display such detailed information on the narrow screen to be employed for the portable terminal of the present invention. In order to solve such a problem, therefore, the present invention enables the direction of the destination in the actual space to be controlled so as to be adjusted to the orientation of the arrow displayed on the screen. If the walker 10 inquires the system of a direction by turning his/her portable terminal as shown with the compressed information item 12, 13, or 14, the screen display is controlled so that the arrow always points the direction of the destination.

Next, a description will be made for a total flow of a walking navigation processing when the portable terminal of the present invention with the function of walking navigation is used. In step 103, an input by the walker 10 is controlled so that the walker 10 enters data to select a menu and/or set retrieving conditions on the setup screen interactively with use of such an input device as a button key, a pen, a microphone, etc. of the portable terminal. In step 104, the walking navigation system, expecting that the walker 10 will repeat inquiries, holds the input state in step 103. In this processing, at first, the system determines in step 101 whether or not any state is held. If any state is held, the system reads the state in step 102. If no state is held, the system controls the input in step 103. In step 105, the system waits for an input. In step 105, three choices are prepared; Run to execute the processings in steps 106 to 111, Back to return to the setup screen in step 103, and Stop to exit the program.

Next, a description will be made for a processing flow when the walker 10 selects Run in step 105. At first, the walker 10 gets the location information of the portable terminal with use of a device in step 106. The location information of the portable terminal here is represented by a latitude/longitude or coordinates and an altitude. For example, the location information is measured with use of a Cellular antenna and such an infrared ray sensor as a GSP, PHS, or the like. Then, the walker 10 gets the direction information of the portable terminal with use of a device in step 107. The direction information is the direction of the tip of the portable terminal or the orientation of the display screen represented by a direction and an angle of elevation. For example, a compass, a gyro, and such a sensor as a clinometer are used to measure the direction information. In step 108, the walker 10 sets the location information gotten in step 106 and the direction information gotten in step 107 as terminal information for retrieving conditions. In step 109, the system controls retrieving of the database and retrieves the information corresponding to the menu selected

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in step 103 on the retrieving conditions set in steps 103 and 108. If the route guidance service is selected in step 103, the system retrieves information of, for example, a route between the present place and the destination. In step 110, the system controls compression of the information, which is a result of retrieving in step 109 so as to compress the information according to the terminal information set in step 108 so that it is displayed on the small screen. In step 111, the system then controls display of the information, which is a result of compression in step 110 so as to convert the information according to the terminal information set in step 108. The information is thus displayed more easily for the walker to understand. At this time, the result of retrieving may be stored as needed. Finally, the system returns to step 105 so as to wait for another input.

Next, a description will be made in detail for the portable terminal of the present invention with the function of walking navigation on the assumption of concrete services. FIG. 3 shows how information compression is controlled for the "Route Guidance Service" with use of the portable terminal of the present invention with the function of walking navigation. This service is used when the walker 10, who has decided his/her destination, does not know the route to the destination. At first, how information compression is controlled for this service will be described with reference to the processing flow shown in FIG. 2. To begin the use of this service, at first the walker is requested to select "Route Guidance Service" from the service menus in step 3. Then, the walker must set the destination with use of an input device. The destination, for example, can be set with a text input with use of button keys or a pen and/or with a voice input from a microphone. The set states in step 103 are needed each time the walker makes an inquiry, so they are held in the system in step 104. The present place is updated automatically with the location information gotten in step 106 each time the walker makes an inquiry. The first point may be registered in the system as a starting point and a passing point may be registered in the system as a middle point.

Just like in FIG. 1, FIG. 3 shows the walker 10 walking towards a destination 11. If the system receives an inquiry in a state between (a) and (f), information compression is controlled so as to be represented as compressed information items 21 to 26 in the portable terminal of the present invention with the function of walking navigation. In the case of the compressed items 21 and 22, information is compressed so that both direction of the destination and distance from the present place are represented by an orientation and a length of an arrow. The compressed information item 21 denotes a far distance to the destination and the compressed information item 22 denotes a near distance to the destination respectively.

In the case of the compressed information items 23 and 24, the direction in which the walker 10 goes around the present place is represented by a bent line and an arrow. The compressed information item 23 denotes a far distance to the next corner and the compressed information item 24 denotes a near distance to the next corner. In the case of the compressed information items 25 and 26, a full route from the starting point to the destination is represented simply by a bent line. The present place on the full route is always represented by a black circle on the bent line. Compressed information items 25 and 26 denote inquiries issued on middle points on the same route. Between 21 and 26, the map is displayed with a direction of movement from the present place at the up-side.

Compressed information items 21 and 22 can be supplied if the location information of both present place and desti-

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nation is known. In step 109, therefore, it is only needed to retrieve the location information of the destination simply from the name of the destination, etc. In this case, because the location information of the destination is not changed in the same route, retrieved information is stored once and the next and subsequent processings are omitted. In the next step 110, both direction and distance to the destination from the present place are found from the location information of both present place and destination, then just represented by an arrow. On the other hand, to supply the compressed information items 23 and 24, the route information around the present place, selected from the route information between the present place and the destination is required. In step 109, therefore, the system retrieves information of the route between the present place and the destination by means of route retrieving and separates information of the route around the present place from this route information and supplies the information. In addition, to supply such compressed information items as 25 and 26, the system requires information of the route between the starting point and the destination. In step 109, therefore, the system retrieves information of the route between the starting point and the destination by means of route retrieving. In this case, because information of the route between the starting point and the destination remains the same as long as the same route is taken, retrieved information is stored. In the next step 110, the system supplies the information of the route between the starting point and the destination and the location information of the present place that are related to each other relatively.

FIG. 4 shows how retrieving is controlled for the "Neighborhood Guidance Service" with use of the portable terminal of the present invention with the function of walking navigation. This service is used when the walker does not decide his/her destination yet and wants to obtain information about movies, entertainment and business events, restaurants, etc. Hereafter, how information of the service is compressed and controlled will be described with reference to the processing flow shown in FIG. 2. At first, the walker is requested to select the "Neighborhood Guidance Service" from the service menus, then selects a category for retrieving in step 103. In the example shown in FIG. 4, the walker has selected a store as a category for retrieving. Usually, walkers who use this service do not search places around the present place conventionally, but they often want to search specific information, for example, "what kinds of stores are there around the southern exit" and "what kinds of stores are there along this street". However, it is difficult to set such complicated retrieving conditions by selecting an ordinary menu and a text input. To solve such a problem, therefore, the portable terminal of the present invention with the function of walking navigation has enabled a destination to be specified only by turning the tip of the portable terminal in the direction directly. In step 107, the system detects the orientation of the tip of the portable terminal and the orientation is set as a retrieving condition in step 108. Upon an inquiry specified by turning the tip of the portable terminal in the direction of the destination as shown with compressed information 31, 32, or 33, the portable terminal of the present invention with the function of walking navigation supplies, for example, a list of stores existing in the specified direction. The portable terminal can also be designed so as to display detailed information of each store in the list if the walker selects the store.

Next, a description will be made for an embodiment of the "Meeting by Appointment Guidance Service" with use of the portable terminal of the present invention with the

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function of walking navigation with reference to FIGS. 5, 6, and 7. This service is used when the user (walker), who is to meet someone by appointment, notifies his/her present place to the partner and confirm the partner's present place. In FIG. 5, 10a and 10b denote walkers who will meet each other by appointment. Compressed information items 41 and 42 denote flows of data sending/receiving to confirm their present places. In this embodiment, data may be exchanged directly between portable terminals just like the message sending function of portable telephones and PHS terminals. Otherwise, data may be exchanged via an Internet server just like the e-mail functions.

At first, the processing flow of data sending shown in FIG. 6 will be described on the assumption that the walker 10a notifies his/her present place to the walker 10b. The processings in steps 101 to 106 are identical to those shown in FIG. 2. When sending data, the walker 10a selects the data sending menu from the menus of this service in step 103 and sets the phone number of the walker 10b as the destination. In this case, if the walker 10a selects Run in step 105, the location information gotten in step 106 is sent to the walker 10b in step 201.

Next, the processing flow of data receiving shown in FIG. 7 will be described on the assumption that the walker 10b confirms the partner's present place. In step 202, if the walker 10b receives location information from the walker 10a, the phone number of the walker 10a, who is a source of data sending, as well as the received position information are stored as the partner's states in step 104. If the walker 10b selects Run in step 105, the system executes the processings in steps 106 to 111, then displays the partner's present place on the screen of the portable terminal of the walker 10b in step 105. The series of processings in steps 106 to 111 are the same as the processings for the "Route Guidance Service" in which the partner's present place is set as a destination. The portable terminal shown in FIG. 5 displays both direction and distance to the partner's present place (destination) from the user's present place (the present place). In this embodiment, the starting point (user's present place) of the arrow is represented by a black circle and the ending point (partner's present place) of the arrow is represented by a white circle instead of the arrow used for the "Route Guidance Service". To display the partner's present place again after Stop is selected to exit the processing in step 105, the same processing as that in FIG. 2 is executed.

FIG. 8 shows how retrieving is controlled for the "Present Place Guidance Service" with use of the portable terminal of the present invention with the function of walking navigation. This service is used to confirm where the user (walker) is now when he/she is lost. There may be services realized by the conventional technique so as to supply a map around the present place, but it would be difficult to display such a map on such a small-size screen as that of a portable telephone and/or PHS terminal. Actually, walkers often want to know specific information, for example, "what place this road leads to" and "what is that building?". They do not want to know general information around the present place. In such a case, the portable terminal of the present invention with the function of walking navigation enables a destination to be shown, for example, only by turning the tip of the portable terminal in the direction of the destination just like in the "Neighborhood Guidance Service". To enable this function, objects that the user (walker) wants to know are set beforehand by such a category as the destination of each road, the name of each building, etc. In the example shown in FIG. 8, the destination of a road is selected. If the user (walker) makes an inquiry by turning the tip of the portable

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terminal represented by compressed information item 51, 52, or 53, the portable terminal of the present invention with the function of walking navigation supplies information of the destination to which each road leads.

FIG. 9 shows a block diagram of a walking navigation system that uses the portable terminal of the present invention with the function of walking navigation. This system is composed of a portable terminal 61 and an application server 67 existing in the Internet/intranet. Just like the Internet services by a portable telephone or a PHS terminal, the portable terminal 61, a base station 62, a wireless network 63, a gateway server 64, a WWW server 66, the Internet/intranet 65, and the application server 67 are sequentially connected. The application server 67 stores a spatial information database 67c, a management system 67b used for the database 67c, and a control program 67a. This control program 67a controls a server processing of an input control in step 103, which is included in the processing steps shown in FIG. 2 and the processings from the setting of retrieving conditions in step 108 to the display in step 111. The portable terminal executes the client processing included in the input control in step 103 and the rest processings up to getting of direction information in step 107. The spatial information database 67c stores such information contents as maps information, movies, entertainment and business events, restaurants, etc. The database may be dispersed in the Internet/intranet.

FIG. 10 shows a block diagram of the portable terminal of the present invention with the function of walking navigation. The portable terminal 61 is provided with a CPU 71, which is a control unit; such a display device 71 as a liquid crystal display or the like; an input device 72 enabling inputs of button keys, a pen, etc.; such an internal memory device 74 as a ROM, a RAM, or the like; such an external memory device 75 as a flash memory, a DVD, or the like; a device for data communication 76 of an ordinary portable telephone and a PHS terminal; a device for getting location information; and a device for getting direction information 78. Those devices are connected to each another. The device for getting location information 77 is provided with such a wireless antenna, a GPS, a PHS, or the like; such a data receiver as an infrared ray sensor, or the like; and a control unit for analyzing received data, thereby calculating location information. The device for getting direction information 78 is provided with a compass, a gyro, such a sensor as a clinometer, and a control unit for analyzing sensor-measured data, thereby calculating direction information. The device for getting location information 77 and the device for getting direction information 78 are not necessarily built in the portable terminal; they may be provided outside the portable terminal so as to be used for walking navigation.

In FIGS. 9 and 10, the portable terminal is assumed to be low in performance just like a portable telephone and a PHS, so that it is provided only with a function for displaying supplied information. The configuration is not mandatory for the present invention; a portable terminal with a slightly higher performance may be used to control the display in step 111. In addition, the portable terminal may receive the retrieving result in step 109 together with entire map data and control the compression in step 110 and the display in step 111. In addition, a further higher performance portable terminal may be used to store map information from the spatial information database 7c in an external memory device 75 beforehand, thereby retrieving map information in the retrieving control in step 109, the compression controlling in step 110, and the display controlling in step 111. In this case, the application server retrieves only such infor-

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mation contents as movies, entertainment and business events, restaurants, etc. that should be displayed in real time. To execute the functions of the present invention with use of a PDA terminal, it is difficult to connect the portable terminal to a portable telephone or PHS via cable. However, the portable terminal is not necessarily required to have data communication functions of a portable telephone or PHS in itself; the portable terminal may be configured so as to be connected to the portable telephone or PHS via a Cellular network.

As described above, because the portable terminal of the present invention with the function of walking navigation can use both location information and direction information obtained thereby as retrieving conditions, it is possible to save labor to enter retrieving conditions and realize a user-friendly interface that enables the walker (user) to understand condition inputs intuitively. In addition, because both compression and display of retrieving result information are controlled according to terminal information, the information can be displayed satisfactorily on a small-size screen of the portable telephone or PHS terminal, while the information is supplied so as to be easily understood.

While the present invention has been described above in conjunction with the preferred embodiments, one of ordinary skill in the art would be enabled by this disclosure to make various modifications to this embodiment and still be within the scope and spirit of the invention as defined in the appended claims.

What is claimed is:

1. A portable terminal with the function of walking navigation, comprising:
 - a device for getting location information denoting a present place of said portable terminal; and
 - a device for getting direction information denoting an orientation of said portable terminal,
 wherein a direction and a distance of a destination from said present place are denoted with an orientation and a length of a line that is distinguished between starting and ending points to supply route guidance information as said walking navigation information.
2. A portable terminal with the function of walking navigation according to claim 1,
 - wherein said device for getting direction information gets information of a direction pointed by the tips of said portable terminal, as well as an angle of elevation.
3. A portable terminal with the function of walking navigation according to claim 1,
 - wherein said device for getting direction information gets orientation information of a display of said portable terminal.
4. A portable terminal with the function of walking navigation according to claim 1,
 - wherein location of a user is of said portable terminal is determined according to said location information and said direction information, and
 - wherein location of partner of the user is determined according to a location information from the partner's portable terminal.
5. A portable terminal with the function of walking navigation, comprising:
 - a device for getting location information denoting a present place of said portable terminal; and
 - a device for getting direction information denoting an orientation of said portable terminal,
 wherein a local route around said present place is shown with a bent line and a direction of movement is shown

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with an arrow on said bent line to supply route guidance information as said walking navigation information.
 6. The portable terminal with said function of walking navigation according to claim 5,
 wherein said device for getting direction information gets information of a direction pointed by the tip of said portable terminal, as well as an angle of elevation.
 7. The portable terminal with said function of walking navigation according to claim 5,
 wherein said device for getting direction information gets orientation information of a display of said portable terminal.
 8. The portable terminal with said function of walking navigation according to claim 5,
 wherein neighborhood guidance information is retrieved in a direction form said present place so as to supply said neighborhood guidance information as said walking navigation information.
 9. The portable terminal with said function of walking navigation according to claim 5,
 wherein location of a user is of said portable terminal is determined according to said location information and said direction information, and
 wherein location of partner of the user is determined according to a location from the partner's portable terminal.
 10. A portable terminal with the function of walking navigation, comprising:
 a device for getting location information denoting a present place of said portable terminal; and

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a device for getting direction information denoting an orientation of said portable terminal,
 wherein location of a user is of said portable terminal is determined according to said location information and said direction information,
 wherein location of a partner of the user is determined according to a location information from the partner's portable terminal, and
 wherein a full route from said starting point to said destination is shown with a bent line that is distinguished between starting and ending points and said present place is shown with a symbol on said line to supply said route guidance information as said walking navigation information.
 11. The portable terminal with said function of walking navigation according to claim 10,
 wherein said device for getting direction information gets information in a direction pointed by the tip of said portable terminal.
 12. The portable terminal with said function of walking navigation according to claim 10,
 wherein said device for getting direction information gets information of a direction pointed by the tip of said portable terminal, as well as an angle of elevation.
 13. The portable terminal with said function of walking navigation according to claim 10,
 wherein said device for getting direction information gets orientation information of a display of said portable terminal.

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United States Patent Application

Title of the Invention

PORTABLE TERMINAL WITH THE FUNCTION OF
WALKING NAVIGATION

Inventor

Kishiko MARUYAMA,
Shigeru SHIMADA,
Toshiichirou SASAKI.

ABSTRACT

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A portable terminal with the function of walking navigation. The portable terminal displays information on its narrow screen so as to make it easy for the user (walker) to understand and realize an interface that enables the user to understand inputs of retrieving conditions intuitively, thereby saving the input labor.

Assume now that a user (walker) 10 is lost while walking towards a destination 11. In such a case, the present invention enables necessary information to be compressed, for example, so as to display both direction and distance to the destination from a present place with an orientation and a length of an arrow on a small screen and further so as to match the orientation of the arrow with the direction of the destination in the actual space. If the user (walker) 10 specifies a compressed information item 12, 13, or 14 for inquiry, the present invention controls so that the arrow always points the direction of the destination corresponding to each of those compressed information items 12, 13, and 14. The condition of retrieval can also be set by turning, for example, the tip of the portable terminal directly in the desired direction 12, 13, or 14.

Title of the Invention

PORTABLE TERMINAL WITH THE FUNCTION OF WALKING NAVIGATION

Background of the Invention

The present invention relates to a portable terminal including a portable telephone and a Personal Handyphone System (PHS) (including a telephone provided only with character data communication functions) and a personal data assistance (PDA) terminal provided with portable telephone or PHS data communication functions. More particularly, the present invention relates to a portable terminal provided with the function of walking navigation, which can supply location-related information to the walking user.

Conventionally, there have been many map information services for supplying maps and other map-related contents through the Internet and facsimile machines. In the case of those services, it is premised that information is supplied so as to be output onto such wide monitor screens of computers and printed out onto papers through facsimile machines. However, the use of PDA terminals and data communication functions of portable telephones or PHS's that are easy to carry about would make it easier for the users to obtain desired maps on sightseeing and business trips more favorably through the above services.

There are also many systems under development to be used for supplying the location information around the user's present place through the GPS (Global Positioning System). For example, a car navigation system to be mounted on a car is too large for a walker to carry around. In addition, because the navigation system premises that the system is used while the object car is running on a road, it cannot be used as a walker's navigation system as is. On the other hand, in the case of such a location information system as a PDA with GPS and a handy GPS intended to walkers, it is possible to show the user's present place on a map stored beforehand in its local memory or down-loaded from the above services.

Summary of the Invention

The conventional map information services supply maps through the Internet, which are optimized on the assumption that the maps can be displayed at a resolution equivalent to that of personal computers. Consequently, they have been confronted with a problem that the maps, when displayed on small-size screen of portable telephones and PHS terminals, are not displayed clearly.

In addition, the map retrieving method employed for the above described services requires an enormous amount of cost for the communications with the server, so it is not

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suitable for walking navigation systems. For example, in the case of a method that narrows retrieving conditions by displaying a map in some steps of scales from a wide range to a detailed range, the map in each step must be down-loaded from the server in each of the retrieving operations. If text is entered and/or menus are selected to narrow those retrieving conditions, however, it will be possible to reduce the data communication amount during retrieving. In spite of this, the method still has some problems that if a specified place name is recorded over a plurality of pages, maps on the adjacent pages are also supplied, so that the desired map cannot be supplied directly. In such a case, the desired map will have to be retrieved by scrolling, scaling up/down the map in display. In addition, the map must be down-loaded in each of the display operations, since the map data is not accumulated beforehand in the local memory.

Furthermore, maps supplied by the above described services are not always easy for walkers to understand. For example, when a walker (user) wants to know a route from his/her present place to a destination, the route might possibly be described over a plurality of pages. Even when the route is described only on one page, the displayed range is often too wide to obtain detailed information. In order to obtain necessary information in such a case, therefore,

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the user is requested to make such complicated operations as scrolling, scaling up/down the displayed map, thereby the cost of communications with the server comes to be enormous as described above.

Furthermore, if the object system requires a PDA terminal in addition to the portable telephone or the PHS, users who can receive the services will be limited in number. In addition, those portable devices must be connected to each other via cable, so that it would not be easy to use them during walking. On the other hand, there are also services for supplying such information contents as movies, entertainment and business events, restaurants, etc. available with use of only a portable telephone and/or a PHS terminal. Because it is premised that the information contents are displayed on the narrow screens of those portable telephones and PHS terminals, character information is often supplied as contents. However, when the user wants to know such a spatial position as a place and a route, those services will be difficult to cope with the user's need. In addition, the portable telephone and the PHS terminal are just provided with some button keys including dialing buttons used as input devices, so they will not be able to cope with inputs of complicated retrieving conditions.

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On the other hand, the conventional PDA terminal with GPS and handy GPS are systems that can be used as a single unit. If they are just used to display maps stored beforehand in their local memories, they will not be a proper method to supply information matching with the user's needs and easier to understand. Also in this case, they will not be able to supply such real time information as movies, entertainment and business events, restaurants, etc. Of course, if the PDA terminal is additionally provided with data communication functions of a portable telephone and/or PHS terminal, however, it will be possible to connect them to Internet map information services only as a single unit. The above described services will not yet be easier for the users to understand.

Under such circumstances, it is an object of the present invention to provide a portable terminal with the function of walking navigation, which can supply location information easier for the user to understand during walking with use of a narrow screen of a portable telephone and/or PHS terminal. It is another object of the present invention to provide a portable terminal with the function of walking navigation, which can save labor to enter the condition for retrieving location information, as well as realize a user-friendly interface that enables the walker (user) to understand inputs of retrieving conditions intuitively.

In order to achieve the above objects, the portable terminal of the present invention with the function of walking navigation is provided with data communication, input, and display devices just like those of ordinary portable telephones and PHS terminals, as well as a device for getting location information and a device for getting direction information denoting the user's present place. Hereunder, the location information and the direction information gotten by those devices will be referred to as terminal information collectively.

Provided with those devices, the portable terminal of the present invention can use acquired terminal information as retrieving conditions, so the user can omit the input of his/her present place. The user can also specify a desired direction only by, for example, turning the tip of the portable terminal directly in the direction instead of entering such direction information as "towards the southern exit" or "along this street" when the user wants to know "what kinds of stores are there around the southern exit of the station" and/or "what kinds of stores are there on this street". Consequently, the user can save labor to enter retrieving conditions and it is possible to realize a user-friendly interface that enables the user to understand displayed items intuitively. In addition, the use of terminal information makes it possible to match a

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direction in an actual space with the displayed direction on the screen. For example, it is possible to compress information so as to display a direction of movement from the present place simply with an arrow. Consequently, location information can be displayed on a small-size display screen of a portable telephone and an PHS terminal so that the user can understand the displayed information easily while the information is compressed.

When using the portable terminal of the present invention with the function of walking navigation, it is expected that the following services are available.

- 1) "Route Guidance Service"... used when the user has decided a destination, but does not know how to get there.
- 2) "Neighborhood Guidance Service"... used for such information guidance as movies, entertainment and business events, restaurants, etc. when the destination is not decided yet.
- 3) "Meeting by Appointment Guidance Service"... used when meeting someone by appointment so as to notify the partner of his/her present place and/or to confirm where the partner is now.
- 4) "Present Place Guidance Service"... used to know where the walker (user) is now when he/she is lost.

To supply such services, the system is configured with a portable terminal of the present invention with the

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function of walking navigation respectively and a server that supplies necessary information on the Internet/intranet. Just like the Internet services available through portable telephones or PHS terminals, each portable terminal, wireless network, a gateway server, the Internet/intranet, and the application server are sequentially connected. The application server is provided with a spatial information database, a database management system, as well as a control program. The spatial information database stores maps information and such information contents as movies, entertainment and business events, restaurants, etc. The spatial information database may also be dispersed on the Internet/intranet. Each processing program compresses information to be supplied to portable terminals and controls the display on those terminals according to the terminal information. Concretely, the application server executes most of processings for walking navigation and each portable terminal is provided only with the function for displaying supplied information.

The above configuration is assumed so that such portable terminals as portable telephones and PHS terminals are low in processing capacity respectively. Portable terminals that are a little higher in processing capacity may also be employed to control the display according to the

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above described terminal information. In addition, entire map data may be received on such a portable terminal as a retrieving result so that the portable terminal controls all the necessary processings from compression to display of the map data according to the object terminal information. A further high performance portable terminal may be used so as to store map information beforehand in its local memory and execute all the necessary processings from retrieving to compression and display of map information. In this case, the application server retrieves only such information contents as movies, entertainment and business events, restaurants, etc. that should be supplied in real time.

Furthermore, in the portable terminal of the present invention with the function of walking navigation, location information to get is represented by a latitude/longitude or coordinates and an altitude. For example, such a wireless antenna as a GPS, a PHS, etc., as well as an infrared ray sensor is used to measure location information. The portable terminal of the present invention may also be provided with any one of the above methods for measuring a position or some possible methods combined for measuring a position. Direction information to get is a direction and/or an angle of elevation representing the leading direction of the portable terminal or the orientation of the display. For example, a compass, a gyro, such a sensor as

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a clinometer, etc. are used to measure a direction and/or an angle of elevation. In this case, the axis of the compass is aligned to the normal of the display and the display is kept horizontal to the ground, thereby it is possible to know the direction (east, west, south, or north) in which the vertical axis of the display is oriented. The gyro, when it is set so as to keep pointing the north, can measure both direction and angle of elevation just like when a compass is used. In addition, if both compass and clinometer are used, it is possible to get not only a direction, but also such three-dimensional direction information as an angle of elevation to the ground. Instead of those compass and clinometer, a three-dimensional gyro may also be used for the above described measurement.

These and other objects, features, and advantages of the present invention will become more apparent in view of the following detailed description of the preferred embodiments in conjunction with accompanying drawings.

Brief Description of the Drawings

Fig.1 is an example of display control by a portable terminal of the present invention with the function of walking navigation.

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Fig.2 shows a total flow of a walking navigation processing by the portable terminal of the present invention with the function of walking navigation.

Fig.3 shows how data compression is controlled for the "Route Guidance Service" by the portable terminal of the present invention with the function of walking navigation.

Fig.4 shows how retrieving is controlled for the "Neighborhood Guidance Service" by the portable terminal of the present invention with the function of walking navigation.

Fig.5 shows an embodiment of the "Meeting by Appointment Guidance Service" by the portable terminal of the present invention with the function of walking navigation.

Fig.6 is a flowchart of data sending for the "Meeting by Appointment Guidance Service".

Fig.7 is a flowchart of data receiving for the "Meeting by Appointment Guidance Service".

Fig.8 shows how retrieving is controlled for the "Present Place Guidance Service" by the portable terminal of the present invention with the function of walking navigation.

Fig.9 is a block diagram of a walking navigation system that uses the portable terminal of the present invention with the function of walking navigation.

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Fig.10 is a block diagram of the portable terminal of the present invention with the function of walking navigation.

Description of the Preferred Embodiments

Hereunder, the preferred embodiment of the present invention will be described with reference to the accompanying drawings. Fig.1 shows how data display is controlled by the portable terminal of the present invention with the function of walking navigation. A walker (user) 10 is walking towards a destination 11. The walker can inquire the system of the direction of his/her destination and in which direction he/she should go each time he/she is lost. According to the present invention, the system, upon such an inquiry, supplies information compressed so as to be displayed on a narrow screen of the object portable telephone and/or PHS terminal. For example, the system supplies the direction and distance to the destination from the present place with an orientation and a length of an arrow on the screen. In the case of ordinary map systems, the top side of the map on the screen denotes the north. Because walkers are usually walking unconsciously with directions, the orientation of the map must be adjusted to the direction of the actual space. Usually, the walker can know his/her present place from the landmark information

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written on the map. However, it is actually impossible to display such detailed information on the narrow screen to be employed for the portable terminal of the present invention. In order to solve such a problem, therefore, the present invention enables the direction of the destination in the actual space to be controlled so as to be adjusted to the orientation of the arrow displayed on the screen. If the walker 10 inquires the system of a direction by turning his/her portable terminal as shown with the compressed information item 12, 13, or 14, the screen display is controlled so that the arrow always points the direction of the destination.

Next, a description will be made for a total flow of a walking navigation processing when the portable terminal of the present invention with the function of walking navigation is used. In step 103, an input by the walker 10 is controlled so that the walker 10 enters data to select a menu and/or set retrieving conditions on the setup screen interactively with use of such an input device as a button key, a pen, a microphone, etc. of the portable terminal. In step 104, the walking navigation system, expecting that the walker 10 will repeat inquiries, holds the input state in step 103. In this processing, at first, the system determines in step 101 whether or not any state is held. If any state is held, the system reads the state in step 102.

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If no state is held, the system controls the input in step 103. In step 105, the system waits for an input. In step 105, three choices are prepared; Run to execute the processings in steps 106 to 111, Back to return to the setup screen in step 103, and Stop to exit the program.

Next, a description will be made for a processing flow when the walker 10 selects Run in step 105. At first, the walker 10 gets the location information of the portable terminal with use of a device in step 106. The location information of the portable terminal here is represented by a latitude/longitude or coordinates and an altitude. For example, the location information is measured with use of a Cellular antenna and such an infrared ray sensor as a GSP, PHS, or the like. Then, the walker 10 gets the direction information of the portable terminal with use of a device in step 107. The direction information is the direction of the tip of the portable terminal or the orientation of the display screen represented by a direction and an angle of elevation. For example, a compass, a gyro, and such a sensor as a clinometer are used to measure the direction information. In step 108, the walker 10 sets the location information gotten in step 106 and the direction information gotten in step 107 as terminal information for retrieving conditions. In step 109, the system controls retrieving of the database and retrieves the information corresponding to

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the menu selected in step 103 on the retrieving conditions set in steps 103 and 108. If the route guidance service is selected in step 103, the system retrieves information of, for example, a route between the present place and the destination. In step 110, the system controls compression of the information, which is a result of retrieving in step 109 so as to compress the information according to the terminal information set in step 108 so that it is displayed on the small screen. In step 111, the system then controls display of the information, which is a result of compression in step 110 so as to convert the information according to the terminal information set in step 108. The information is thus displayed more easily for the walker to understand. At this time, the result of retrieving may be stored as needed. Finally, the system returns to step 105 so as to wait for another input.

Next, a description will be made in detail for the portable terminal of the present invention with the function of walking navigation on the assumption of concrete services. Fig.3 shows how information compression is controlled for the "Route Guidance Service" with use of the portable terminal of the present invention with the function of walking navigation. This service is used when the walker 10, who has decided his/her destination, does not know the route to the destination. At first, how information

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compression is controlled for this service will be described with reference to the processing flow shown in Fig.2. To begin the use of this service, at first the walker is requested to select "Route Guidance Service" from the service menus in step 3. Then, the walker must set the destination with use of an input device. The destination, for example, can be set with a text input with use of button keys or a pen and/or with a voice input from a microphone. The set states in step 103 are needed each time the walker makes an inquiry, so they are held in the system in step 104. The present place is updated automatically with the location information gotten in step 106 each time the walker makes an inquiry. The first point may be registered in the system as a starting point and a passing point may be registered in the system as a middle point.

Just like in Fig.1, Fig.3 shows the walker 10 walking towards a destination 11. If the system receives an inquiry in a state between (a) and (f), information compression is controlled so as to be represented as compressed information items 21 to 26 in the portable terminal of the present invention with the function of walking navigation. In the case of the compressed items 21 and 22, information is compressed so that both direction of the destination and distance from the present place are represented by an orientation and a length of an arrow. The compressed

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information item 21 denotes a far distance to the destination and the compressed information item 22 denotes a near distance to the destination respectively.

In the case of the compressed information items 23 and 24, the direction in which the walker 10 goes around the present place is represented by a bent line and an arrow. The compressed information item 23 denotes a far distance to the next corner and the compressed information item 24 denotes a near distance to the next corner. In the case of the compressed information items 25 and 26, a full route from the starting point to the destination is represented simply by a bent line. The present place on the full route is always represented by a black circle on the bent line. Compressed information items 25 and 26 denote inquiries issued on middle points on the same route. Between 21 and 26, the map is displayed with a direction of movement from the present place at the up-side.

Compressed information items 21 and 22 can be supplied if the location information of both present place and destination is known. In step 109, therefore, it is only needed to retrieve the location information of the destination simply from the name of the destination, etc. In this case, because the location information of the destination is not changed in the same route, retrieved information is stored once and the next and subsequent

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processings are omitted. In the next step 110, both direction and distance to the destination from the present place are found from the location information of both present place and destination, then just represented by an arrow. On the other hand, to supply the compressed information items 23 and 24, the route information around the present place, selected from the route information between the present place and the destination is required. In step 109, therefore, the system retrieves information of the route between the present place and the destination by means of route retrieving and separates information of the route around the present place from this route information and supplies the information. In addition, to supply such compressed information items as 25 and 26, the system requires information of the route between the starting point and the destination. In step 109, therefore, the system retrieves information of the route between the starting point and the destination by means of route retrieving. In this case, because information of the route between the starting point and the destination remains the same as long as the same route is taken, retrieved information is stored. In the next step 110, the system supplies the information of the route between the starting point and the destination and the location information of the present place that are related to each other relatively.

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Fig.4 shows how retrieving is controlled for the "Neighborhood Guidance Service" with use of the portable terminal of the present invention with the function of walking navigation. This service is used when the walker does not decide his/her destination yet and wants to obtain information about movies, entertainment and business events, restaurants, etc. Hereafter, how information of the service is compressed and controlled will be described with reference to the processing flow shown in Fig.2. At first, the walker is requested to select the "Neighborhood Guidance Service" from the service menus, then selects a category for retrieving in step 103. In the example shown in Fig.4, the walker has selected a store as a category for retrieving. Usually, walkers who use this service do not search places around the present place conventionally, but they often want to search specific information, for example, "what kinds of stores are there around the southern exit" and "what kinds of stores are there along this street". However, it is difficult to set such complicated retrieving conditions by selecting an ordinary menu and a text input. To solve such a problem, therefore, the portable terminal of the present invention with the function of walking navigation has enabled a destination to be specified only by turning the tip of the portable terminal in the direction directly. In step 107, the system detects the orientation of the tip of

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the portable terminal and the orientation is set as a retrieving condition in step 108. Upon an inquiry specified by turning the tip of the portable terminal in the direction of the destination as shown with compressed information 31, 32, or 33, the portable terminal of the present invention with the function of walking navigation supplies, for example, a list of stores existing in the specified direction. The portable terminal can also be designed so as to display detailed information of each store in the list if the walker selects the store.

Next, a description will be made for an embodiment of the "Meeting by Appointment Guidance Service" with use of the portable terminal of the present invention with the function of walking navigation with reference to Figs.5, 6, and 7. This service is used when the user (walker), who is to meet someone by appointment, notifies his/her present place to the partner and confirm the partner's present place. In Fig.5, 10a and 10b denote walkers who will meet each other by appointment. Compressed information items 41 and 42 denote flows of data sending/receiving to confirm their present places. In this embodiment, data may be exchanged directly between portable terminals just like the message sending function of portable telephones and PHS terminals. Otherwise, data may be exchanged via an Internet server just like the e-mail functions.

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At first, the processing flow of data sending shown in Fig.6 will be described on the assumption that the walker 10a notifies his/her present place to the walker 10b. The processings in steps 101 to 106 are identical to those shown in Fig.2. When sending data, the walker 10a selects the data sending menu from the menus of this service in step 103 and sets the phone number of the walker 10b as the destination. In this case, if the walker 10a selects Run in step 105, the location information gotten in step 106 is sent to the walker 10b in step 201.

Next, the processing flow of data receiving shown in Fig.7 will be described on the assumption that the walker 10b confirms the partner's present place. In step 202, if the walker 10b receives location information from the walker 10a, the phone number of the walker 10a, who is a source of data sending, as well as the received position information are stored as the partner's states in step 104. If the walker 10b selects Run in step 105, the system executes the processings in steps 106 to 111, then displays the partner's present place on the screen of the portable terminal of the walker 10b in step 105. The series of processings in steps 106 to 111 are the same as the processings for the "Route Guidance Service" in which the partner's present place is set as a destination. The portable terminal shown in Fig.5 displays both direction and distance to the partner's

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present place (destination) from the user's present place (the present place). In this embodiment, the starting point (user's present place) of the arrow is represented by a black circle and the ending point (partner's present place) of the arrow is represented by a white circle instead of the arrow used for the "Route Guidance Service". To display the partner's present place again after Stop is selected to exit the processing in step 105, the same processing as that in Fig.2 is executed.

Fig.8 shows how retrieving is controlled for the "Present Place Guidance Service" with use of the portable terminal of the present invention with the function of walking navigation. This service is used to confirm where the user (walker) is now when he/she is lost. There may be services realized by the conventional technique so as to supply a map around the present place, but it would be difficult to display such a map on such a small-size screen as that of a portable telephone and/or PHS terminal. Actually, walkers often want to know specific information, for example, "what place this road leads to" and "what is that building?". They do not want to know general information around the present place. In such a case, the portable terminal of the present invention with the function of walking navigation enables a destination to be shown, for example, only by turning the tip of the portable terminal

in the direction of the destination just like in the "Neighborhood Guidance Service". To enable this function, objects that the user (walker) wants to know are set beforehand by such a category as the destination of each road, the name of each building, etc. In the example shown in Fig.8, the destination of a road is selected. If the user (walker) makes an inquiry by turning the tip of the portable terminal represented by compressed information item 51, 52, or 53, the portable terminal of the present invention with the function of walking navigation supplies information of the destination to which each road leads.

Fig.9 shows a block diagram of a walking navigation system that uses the portable terminal of the present invention with the function of walking navigation. This system is composed of a portable terminal 61 and an application server 67 existing in the Internet/intranet. Just like the Internet services by a portable telephone or a PHS terminal, the portable terminal 61, a base station 62, a wireless network 63, a gateway server 64, a WWW server 66, the Internet/intranet 65, and the application server 67 are sequentially connected. The application server 67 stores a spatial information database 67c, a management system 67b used for the database 67c, and a control program 67a. This control program 67a controls a server processing of an input control in step 103, which is included in the processing

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steps shown in Fig.2 and the processings from the setting of retrieving conditions in step 108 to the display in step 111. The portable terminal executes the client processing included in the input control in step 103 and the rest processings up to getting of direction information in step 107. The spatial information database 67c stores such information contents as maps information, movies, entertainment and business events, restaurants, etc. The database may be dispersed in the Internet/intranet.

Fig.10 shows a block diagram of the portable terminal of the present invention with the function of walking navigation. The portable terminal 61 is provided with a CPU 71, which is a control unit; such a display device 71 as a liquid crystal display or the like; an input device 72 enabling inputs of button keys, a pen, etc.; such an internal memory device 74 as a ROM, a RAM, or the like; such an external memory device 75 as a flash memory, a DVD, or the like; a device for data communication 76 of an ordinary portable telephone and a PHS terminal; a device for getting location information; and a device for getting direction information 78. Those devices are connected to each another. The device for getting location information 77 is provided with such a wireless antenna, a GPS, a PHS, or the like; such a data receiver as an infrared ray sensor, or the like; and a control unit for analyzing received data,

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thereby calculating location information. The device for getting direction information 78 is provided with a compass, a gyro, such a sensor as a clinometer, and a control unit for analyzing sensor-measured data, thereby calculating direction information. The device for getting location information 77 and the device for getting direction information 78 are not necessarily built in the portable terminal; they may be provided outside the portable terminal so as to be used for walking navigation.

In Figs.9 and 10, the portable terminal is assumed to be low in performance just like a portable telephone and a PHS, so that it is provided only with a function for displaying supplied information. The configuration is not mandatory for the present invention; a portable terminal with a slightly higher performance may be used to control the display in step 111. In addition, the portable terminal may receive the retrieving result in step 109 together with entire map data and control the compression in step 110 and the display in step 111. In addition, a further higher performance portable terminal may be used to store map information from the spatial information database 7c in an external memory device 75 beforehand, thereby retrieving map information in the retrieving control in step 109, the compression controlling in step 110, and the display controlling in step 111. In this case, the application

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server retrieves only such information contents as movies, entertainment and business events, restaurants, etc. that should be displayed in real time. To execute the functions of the present invention with use of a PDA terminal, it is difficult to connect the portable terminal to a portable telephone or PHS via cable. However, the portable terminal is not necessarily required to have data communication functions of a portable telephone or PHS in itself; the portable terminal may be configured so as to be connected to the portable telephone or PHS via a Cellular network.

As described above, because the portable terminal of the present invention with the function of walking navigation can use both location information and direction information obtained thereby as retrieving conditions, it is possible to save labor to enter retrieving conditions and realize a user-friendly interface that enables the walker (user) to understand condition inputs intuitively. In addition, because both compression and display of retrieving result information are controlled according to terminal information, the information can be displayed satisfactorily on a small-size screen of the portable telephone or PHS terminal, while the information is supplied so as to be easily understood.

While the present invention has been described above in conjunction with the preferred embodiments, one of

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ordinary skill in the art would be enabled by this disclosure to make various modifications to this embodiment and still be within the scope and spirit of the invention as defined in the appended claims.

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What Is Claimed Is:

1. A portable terminal with the function of walking navigation, comprising:

a device for getting location information denoting a present place of said portable terminal; and

a device for getting direction information denoting an orientation of said portable terminal.

2. The portable terminal with function of walking navigation according to claim 1;

wherein display of walking navigation information supplied to said portable terminal is controlled so as to match with its actual spatial location according to said location information and said direction information.

3. The portable terminal with said function of walking navigation according to claim 1;

wherein the condition of retrieval is set according to said location information and said direction information so as to retrieve said walking navigation information with use of said portable terminal.

4. The portable terminal with said function of walking navigation according to claim 2;

wherein a direction and a distance of a destination from said present place are denoted with an orientation and a length of a line that is distinguished between starting and ending points so as to supply route guidance information as said walking navigation information.

5. The portable terminal with said function of walking navigation according to claim 2;

wherein a local route around said present place is shown with a line and a direction of movement is shown with an arrow on said line so as to supply route guidance information as said walking navigation information.

6. The portable terminal with said function of walking navigation according to claim 2;

wherein a full route to a destination from a starting point is shown with a line that is distinguished between starting and ending points and said present place is shown with a symbol on said line so as to supply route guidance information as said walking navigation information.

7. The portable terminal with said function of walking navigation according to claim 3;

wherein neighborhood guidance information is retrieved in a direction from said present place so as to

supply said neighborhood guidance information as said walking navigation information.

8. The portable terminal with said function of walking navigation according to claim 2;

wherein the user's location is regarded as a present place and the partner's location as a destination; and

a direction and a distance of said destination from said present place are shown with an orientation and a length of a line that is distinguished between starting and ending points so as to supply "meeting by appointment" guidance information as said walking navigation information.

9. The portable terminal with said function of walking navigation according to claim 2;

wherein the user's location is regarded as a present place and the partner's location as a destination; and

a local route around said present place is shown with a line and a direction of movement is shown with an arrow on said line so as to supply said route guidance information as said walking navigation information.

10. The portable terminal with said function of walking navigation according to claim 2;

wherein said user's location is regarded as a present place and said partner's location as a destination; and a full route from said starting point to said destination is shown with a line that is distinguished between starting and ending points and said present place is shown with a symbol on said line so as to supply said route guidance information as said walking navigation information.

11. The portable terminal with said function of walking navigation according to claim 3;

present place guidance information is retrieved in a direction from said present place so as to supply said present place guidance information as said walking navigation information.

12. The portable terminal with said function of walking navigation according to claim 1;

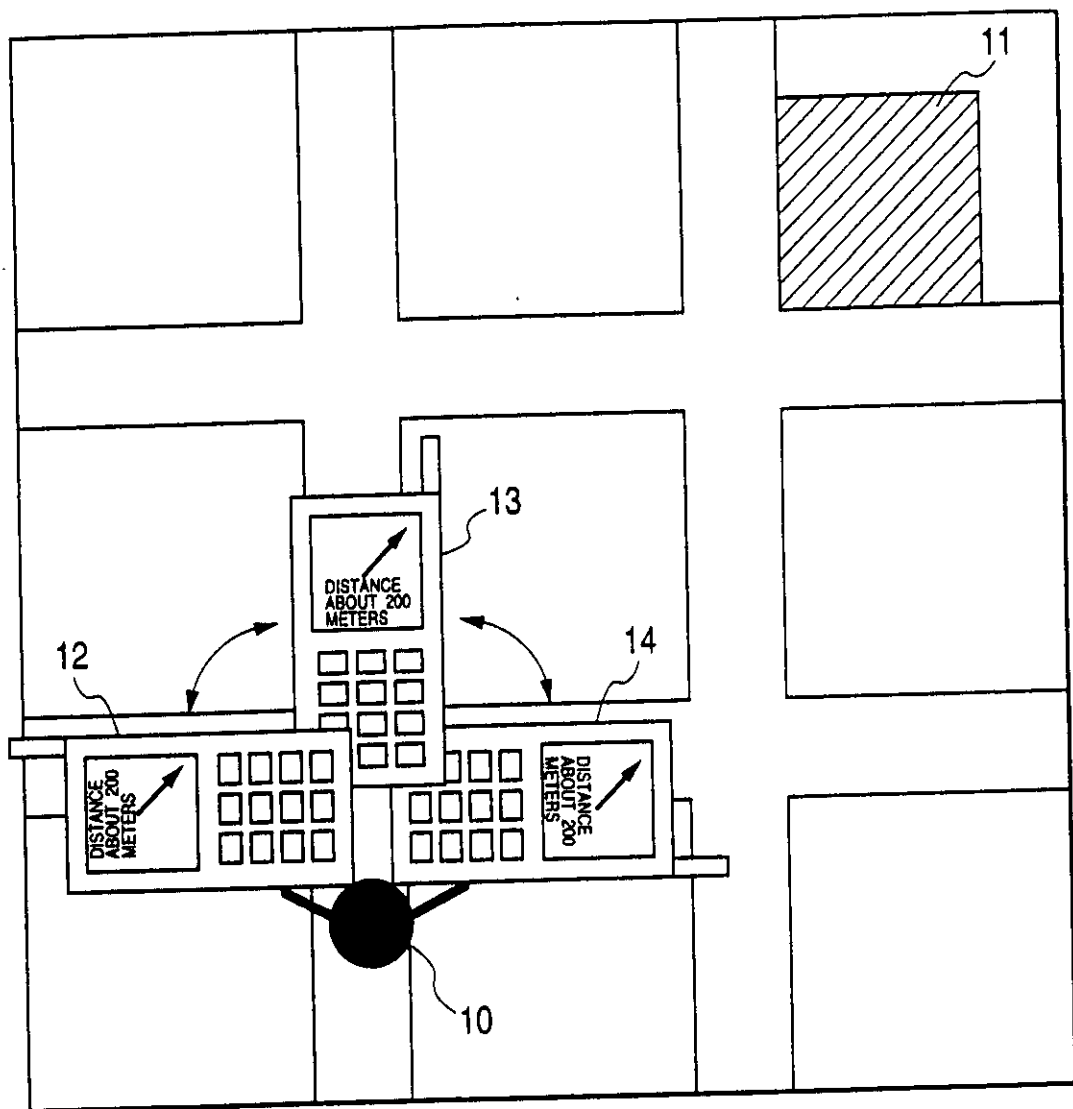
said device for getting direction information gets information in a direction pointed by the tip of said portable terminal, etc.

13. The portable terminal with said function of walking navigation according to claim 1;

14. The portable terminal with said function of walking navigation according to claim 1;

wherein said device for getting direction information gets orientation information of a display of said portable terminal.

FIG. 1



10 figs

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FIG. 2

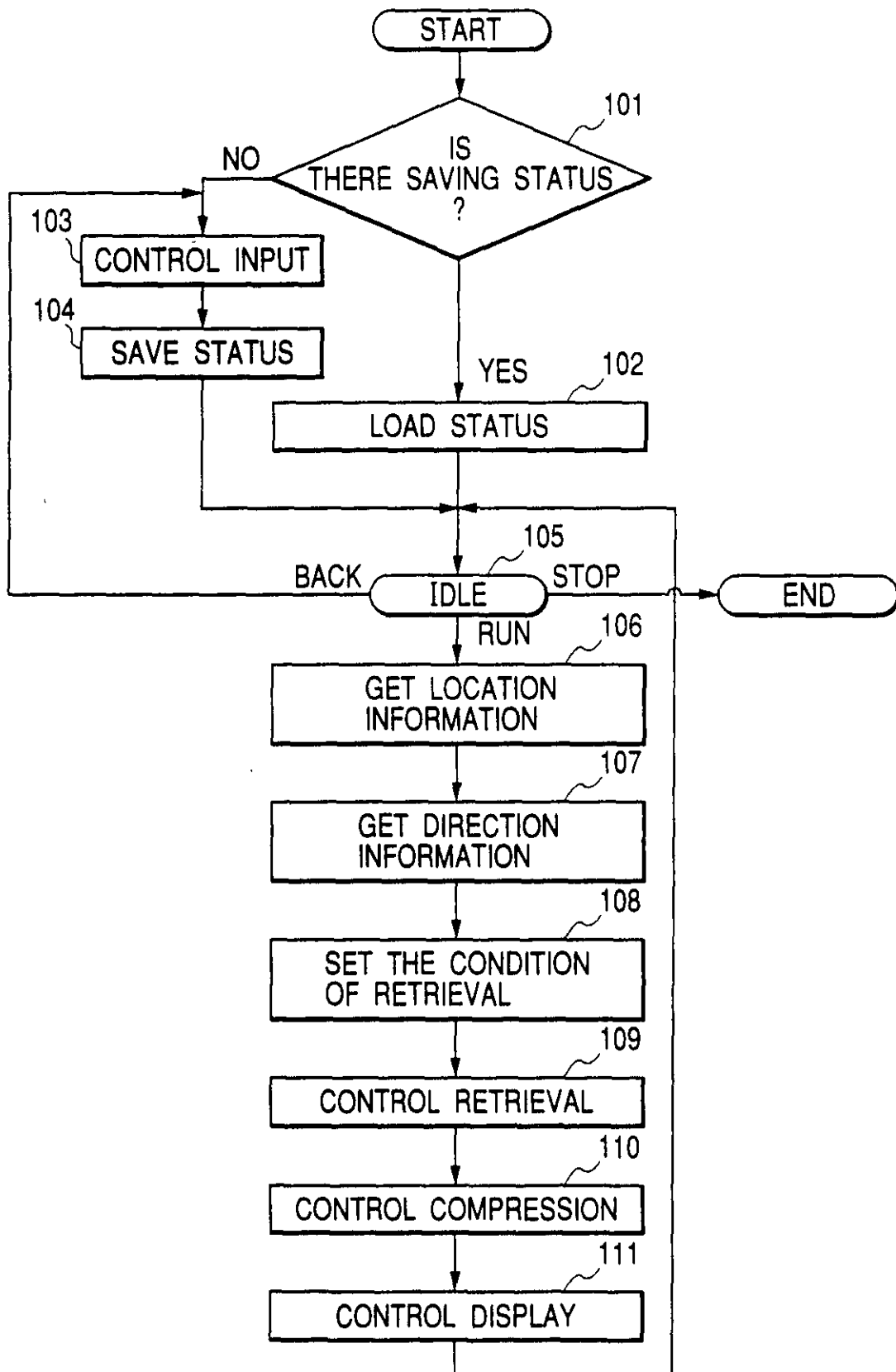


FIG. 3(a)

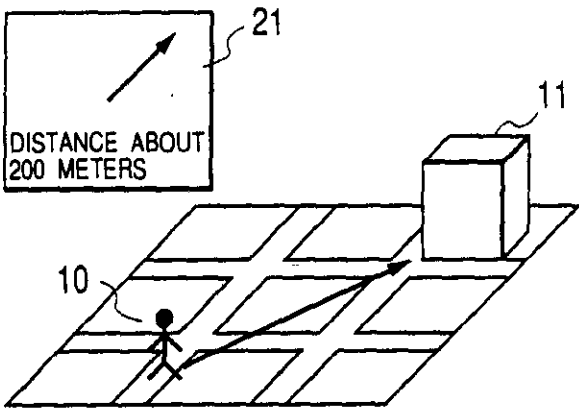


FIG. 3(b)

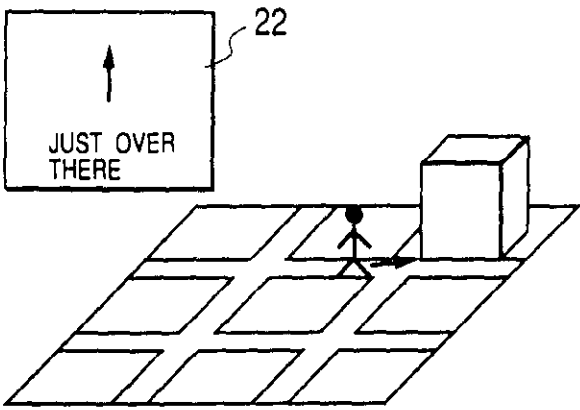


FIG. 3(c)

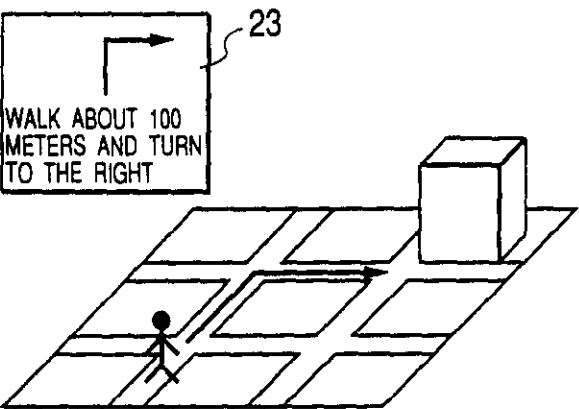


FIG. 3(d)

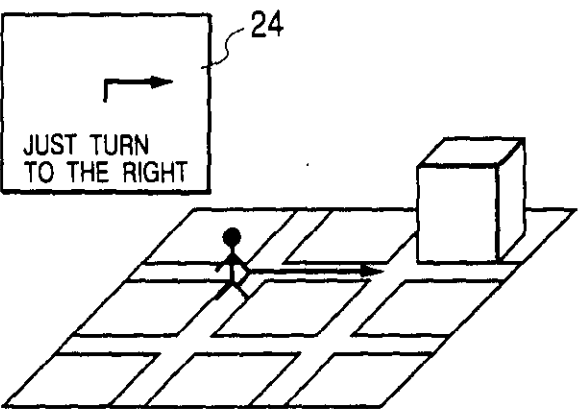


FIG. 3(e)

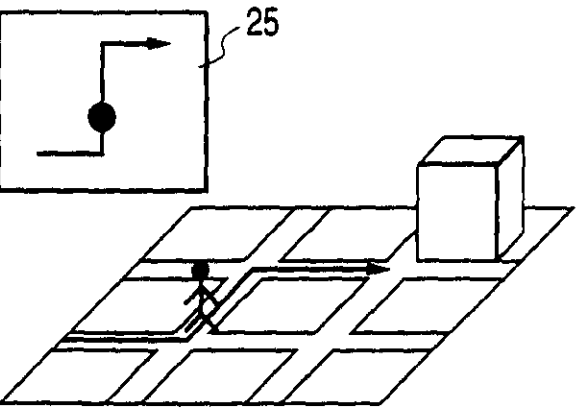


FIG. 3(f)

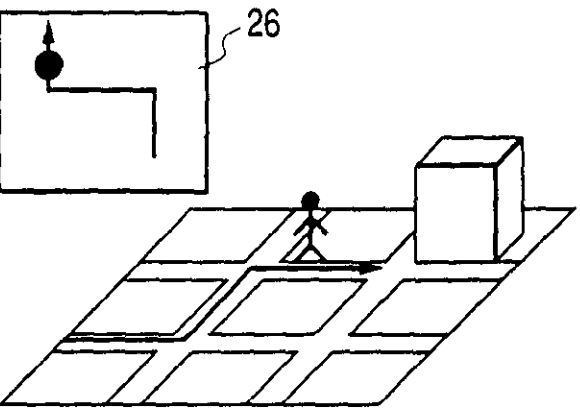


FIG. 4

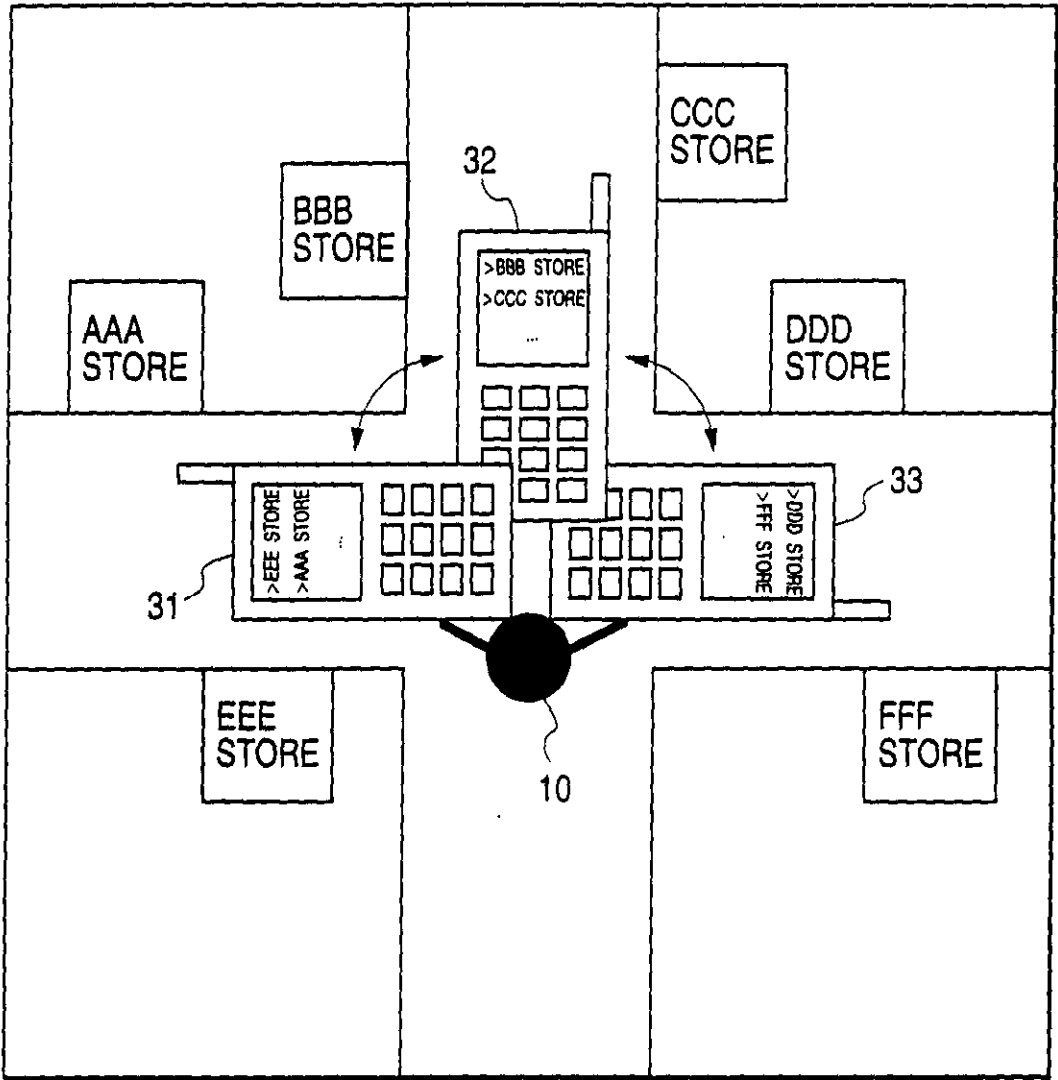


FIG. 5

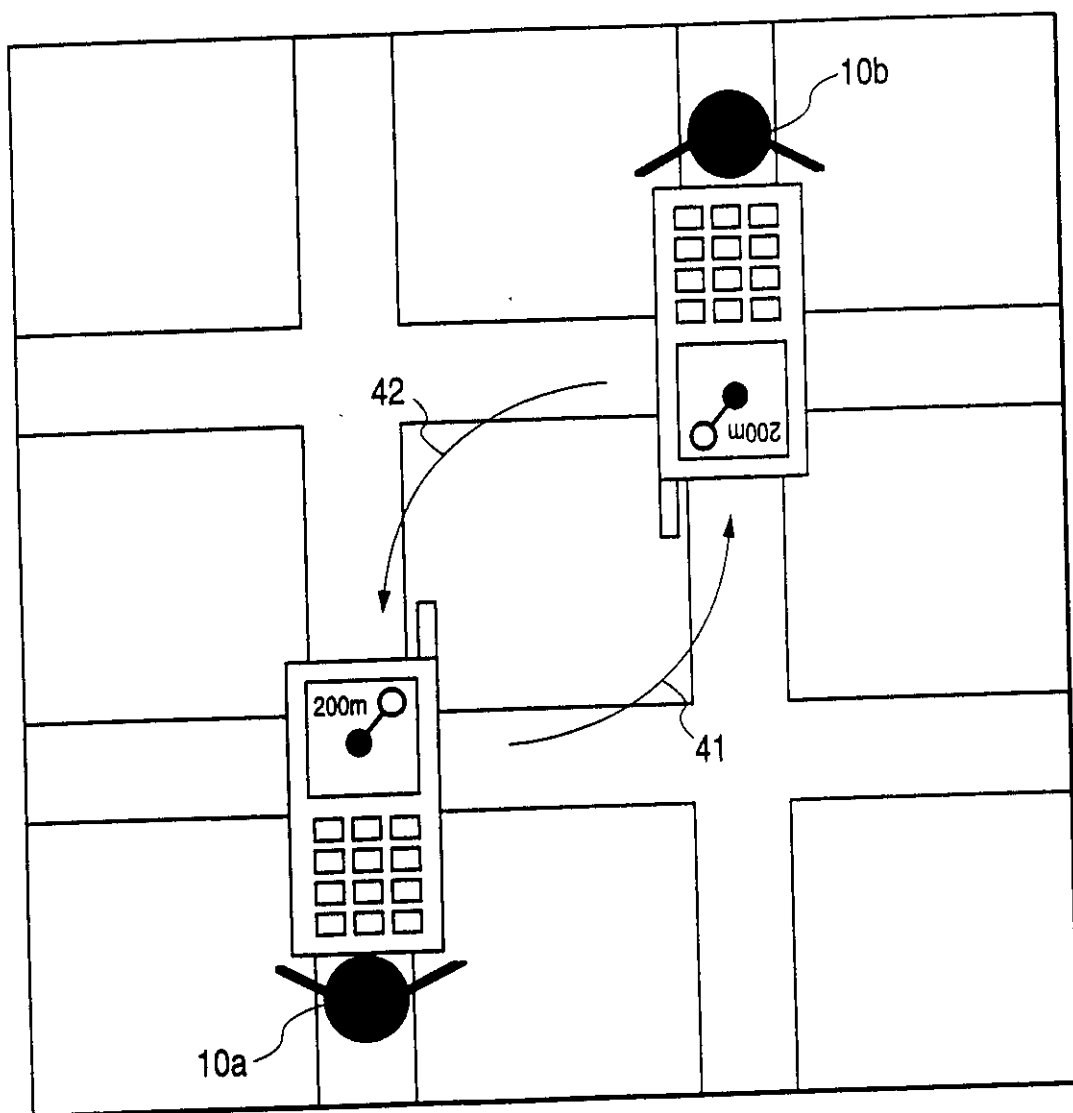
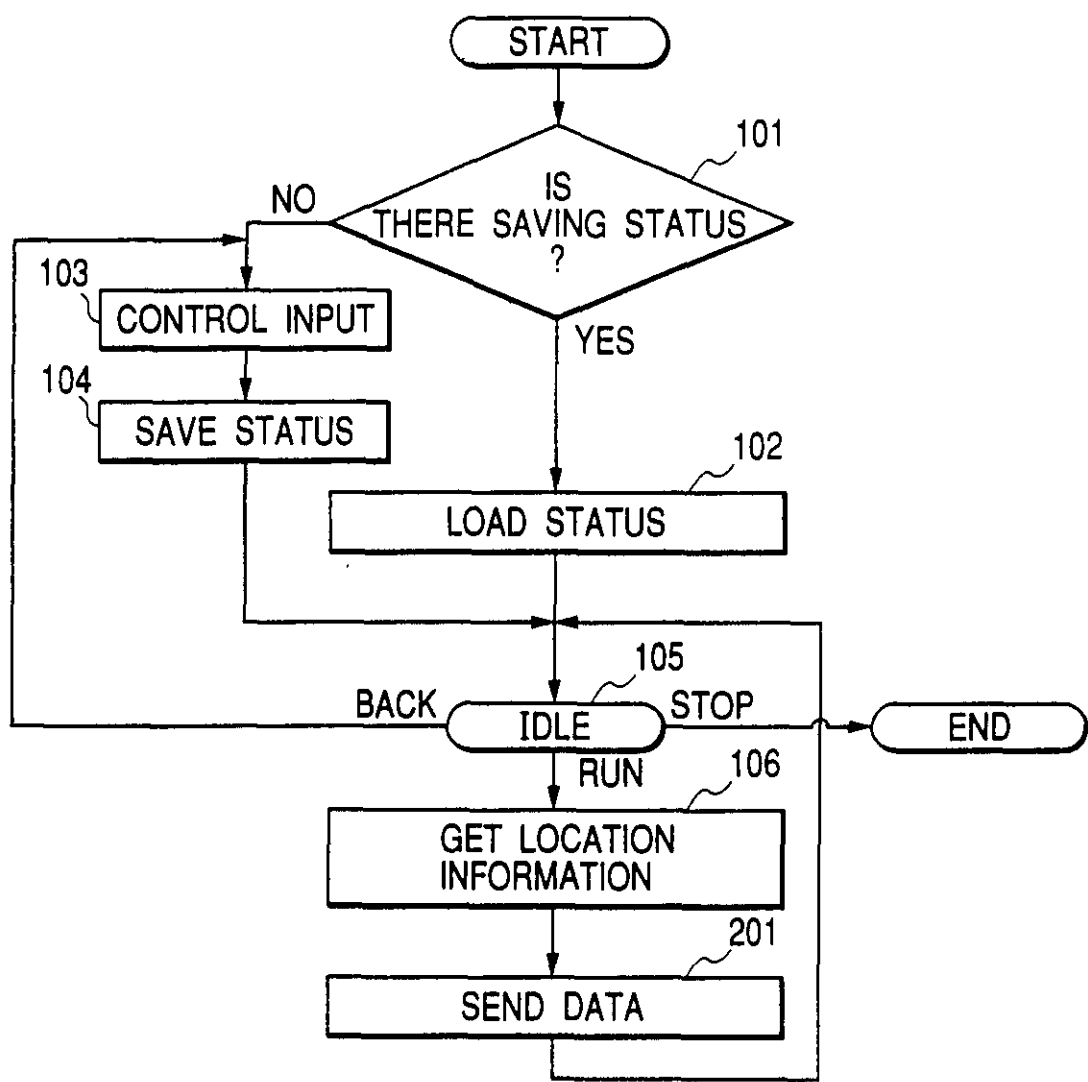
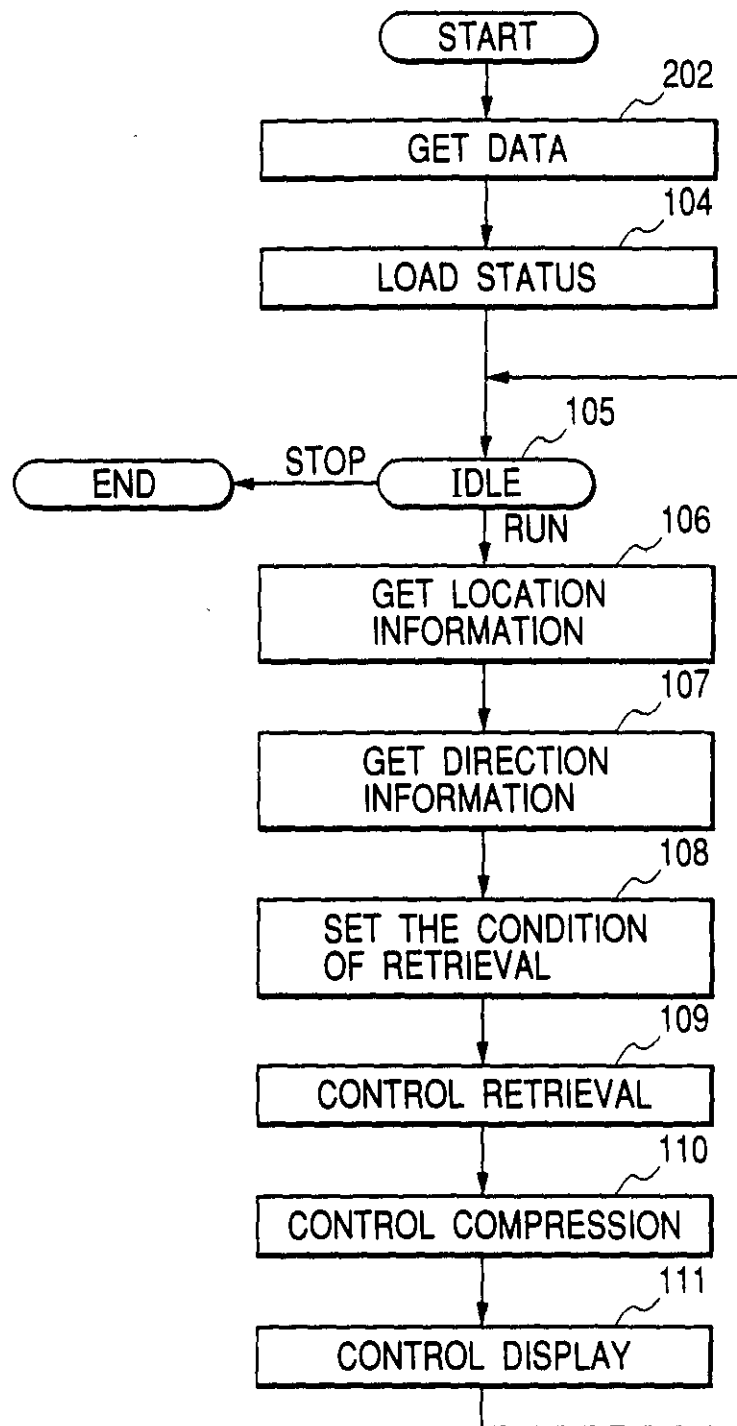


FIG. 6



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FIG. 7



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FIG. 8

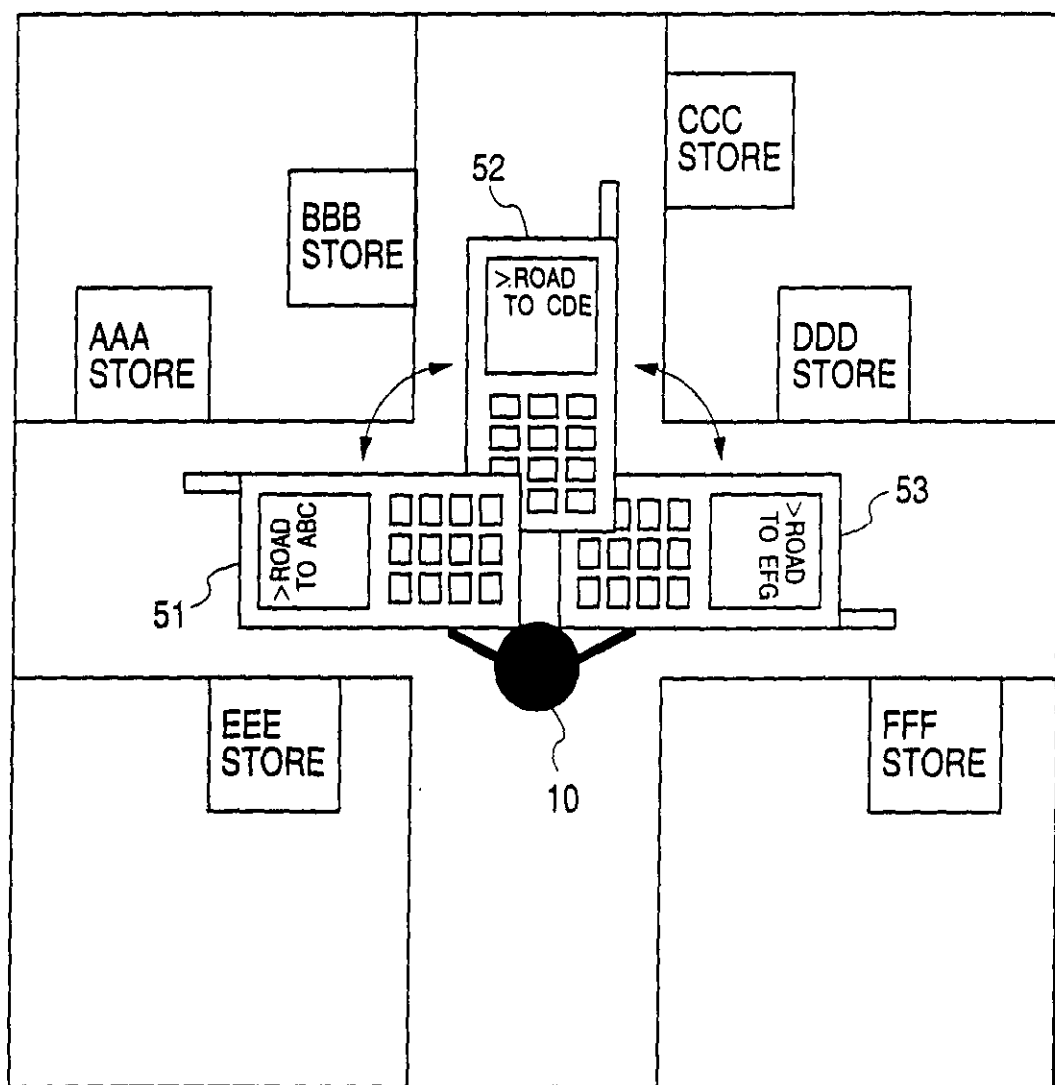


FIG. 9

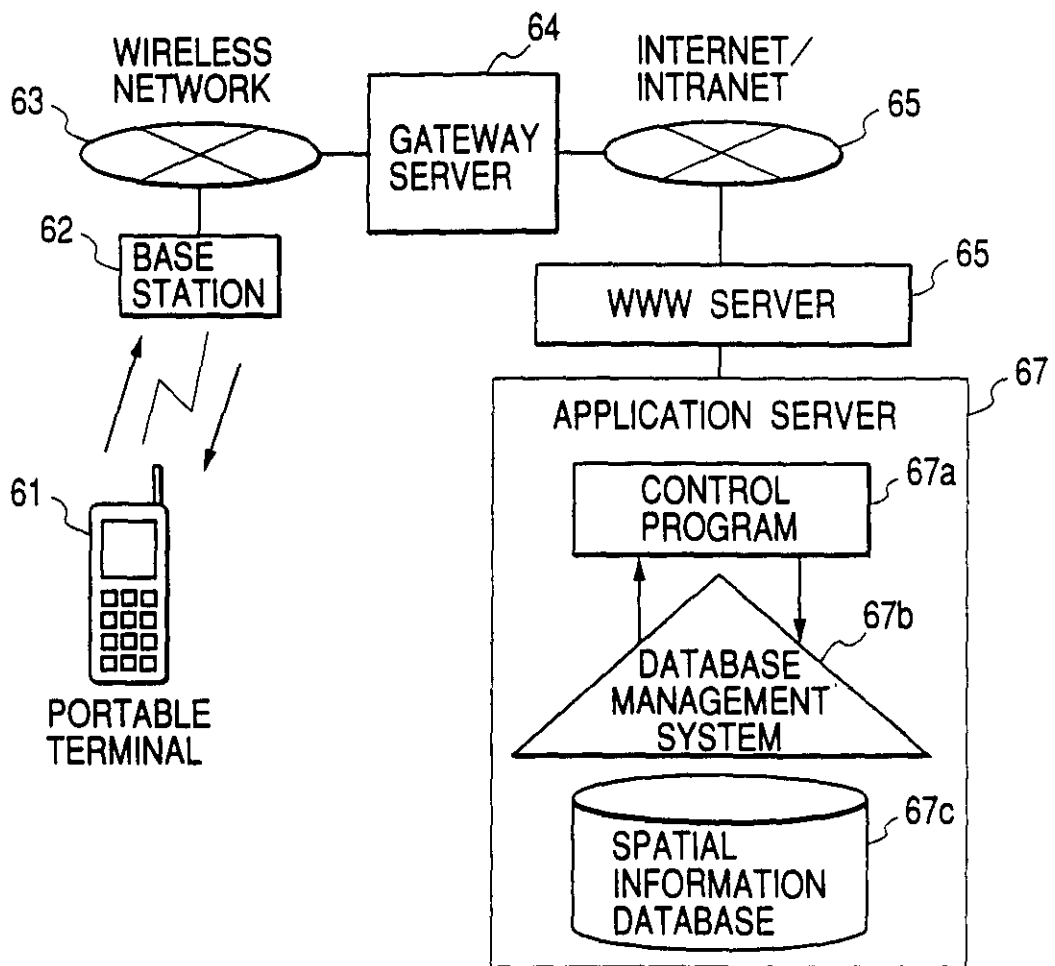
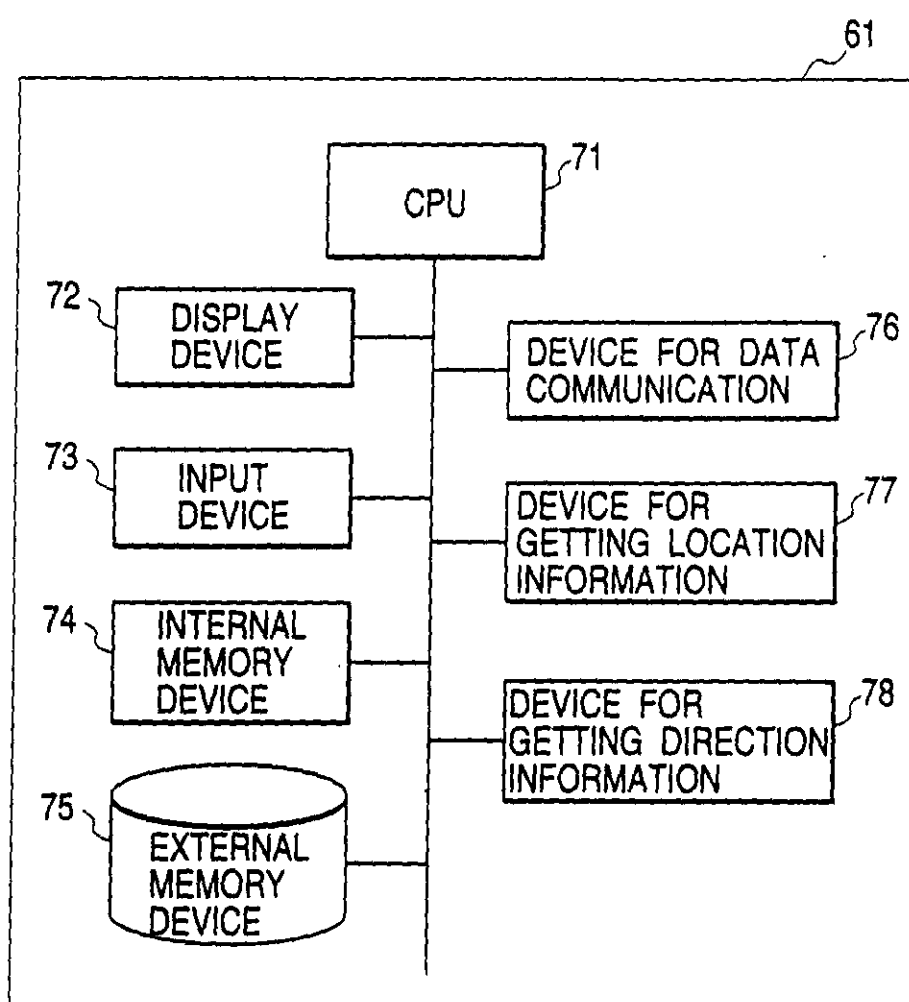


FIG. 10



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LIST OF INVENTORS' NAMES AND ADDRESSES

Kishiko MARUYAMA, Tokyo, JAPAN;
Shigeru SHIMADA, Tokyo, JAPAN;
Toshiichirou SASAKI, Tokyo, JAPAN.

MA, GLY, STANGER & MALUR, '

JOHN R. MATTINGLY*
DANIEL J. STANGER
SHRINATH MALUR*

GENE W. STOCKMAN
Of Counsel

JEFFREY M. KETCHUM
SCOTT W. BRICKNER
Registered Patent Agents

* Bar Membership Other Than Virginia

ATTORNEYS AT LAW

104 EAST HUME AVENUE
ALEXANDRIA, VIRGINIA 22301

(703) 684-1120

PATENT, TRADEMARK
AND COPYRIGHT LAW
FACSIMILE: (703) 684-1157

JC003 U.S. PTO



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Date: July 11, 2000

Attorney Docket No. H-922

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09/613634
07/11/00

To: Assistant Commissioner for Patents
Washington, D.C. 20231

Sir: Transmitted herewith for filing is the patent application of:

Inventor: SEE ATTACHED LIST (K. MARUYAMA et al)

For:
PORTABLE TERMINAL WITH THE FUNCTION OF
WALKING NAVIGATION

Enclosed are:

- ☒ 10 Sheets of Drawings
- ☒ This application is being filed without an executed Declaration.
- ☒ Priority is claimed from Japanese Application No. 11-197010
filed July 12, 1999. ☒ A certified copy is attached herewith.
- ☐ Copies of the disclosure documents listed on the attached PTO 1449 form and
☐ discussed in the specification or ☐ attached Information Disclosure Statement.
- ☐ A verified statement to establish small entity status under 37 CFR 1.9 and 1.27.
- ☒ Specification: Abstract X, Description 27 pages; and 14 claim(s).
- ☐ Preliminary Amendment.
- ☐ Executed Declaration.

The filing fee is calculated as shown below:

			Small Entity		OR	Large Entity	
For:	No. Filed	No. Extra	Rate	Fee		Rate	Fee
Basic Fee				\$ 345			\$ 690
Total Claims	14 - 20 =	* 0	x 9	\$		x 18	\$ 0
Indep Claims	1 - 3 =	* 0	x 39	\$		x 78	\$ 0
<input type="checkbox"/> Multiple Dependent Claim (s)			+ 130	\$		+ 260	\$ 0
			Total	\$		Total	\$ 690

* If difference is less than zero
then enter '0' in second column

- ☒ A check in the amount of \$ 690.00 is enclosed for the filing fee.
- ☒ The Commissioner is hereby authorized to charge any additional fees that may be required to
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Respectfully Submitted,

By: John R. Mattingly
Registration No. 30,293



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Mattingly Stanger & Malur PC
Attorneys at Law
104 East Hume Avenue
Alexandria, VA 22301

FORMALITIES LETTER



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Date Mailed: 10/11/2000

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given TWO MONTHS from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.
- The balance due by applicant is \$ 130.

*A copy of this notice **MUST** be returned with the reply.*

Customer Service Center
Initial Patent Examination Division (703) 308-1202

PART 3 - OFFICE COPY

Section #

H-922

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

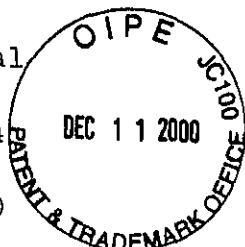
In re Patent Application of

K. MARUYAMA et al

ATTN: Manager,
Applications Branch

Serial No. 09/613,634

Filed: July 11, 2000



For: PORTABLE TERMINAL WITH THE FUNCTION OF
WALKING NAVIGATION

TRANSMITTAL OF LATE DECLARATION

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

Responsive to the NOTICE TO FILE MISSING PARTS OF
NONPROVISIONAL APPLICATION - FILING DATE GRANTED mailed
October 11, 2000, Applicants submit herewith the executed
Declaration and Power of Attorney, along with the required
surcharge as set forth in 37 CFR 1.16(e).

Our check in the amount of \$130.00 is attached.

As required, a copy of the NOTICE of October 11, 2000 is
enclosed herewith.

Please charge any additional fees which may be required,
or credit any overpayment to our Deposit Account No. 50-1417.
A duplicate copy of this Letter is enclosed.

Respectfully submitted,

John R. Mattingly
Registration No. 30,293
Attorney for Applicant(s)

MATTINGLY, STANGER & MALUR
104 East Hume Avenue
Alexandria, Virginia 22301
(703) 684-1120
Date: December 11, 2000

#3

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書



下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PORTABLE TERMINAL WITH THE FUNCTION OF

WALKING NAVIGATION

上記発明の明細書（下記の欄で×印がついていない場合は、本書に添付）は、

The specification of which is attached hereto unless the following box is checked:

☐ __月__日に提出され、米国出願番号または特許協定条約国際出願番号を____とし、
(該当する場合) _____に訂正されました。

☐ was filed on July 11, 2000
as United States Application Number or
PCT International Application Number
09 / 613634 and was amended on
____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1条56項に定義されたとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Japanese Language Declaration
(日本語宣言書)

私は、米国法典第35編119条(a)-(d)項又は365条(b)項に基づき下記の、米国外の国の少なくとも一カ国を指定している特許協力条約365(a)項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

Prior Foreign Application(s)

外国での先行出願

11-197010	Japan
(Number)	(Country)
(番号)	(国名)
(Number)	(Country)
(番号)	(国名)

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Not Claimed

優先権主張なし

12 / July / 1999	<input type="checkbox"/>
(Day/Month/Year Filed)	
(出願年月日)	
(Day/Month/Year Filed)	<input type="checkbox"/>
(出願年月日)	

私は、第35編米国法典119条(e)項に基づいて下記の米国外の特許出願規定に記載された権利をここに主張いたします。

(Application No.)	(Filing Date)
(出願番号)	(出願日)

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.)	(Filing Date)
(出願番号)	(出願日)

私は、下記の米国法典第35編120条に基づいて下記の米国外の特許出願に記載された権利、又は米国外を指定している特許協力条約365条(c)に基づき権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第35編112条第1項又は特許協力条約で規定された方法で先行する米国外の特許出願に開示されていない限り、その先行米国外出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第37編1条56項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

(Application No.)	(Filing Date)
(出願番号)	(出願日)

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

(Application No.)	(Filing Date)
(出願番号)	(出願日)

(Status: Patented, Pending, Abandoned)
(現況: 特許許可済、係属中、放棄済)

私は、私自身の知識に基づいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の表明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Japanese Language Declaration
(日本語宣言書)

委任状： 私は下記の発明者として、本出願に関する一切の
手続きを米特許商標局に対して遂行する弁理士または代理人
として、下記の者を指名いたします。（弁護士、または代理
人の氏名及び登録番号を明記のこと）

POWER OF ATTORNEY: As a named inventor, I hereby appoint
the following attorney(s) and/or agent(s) to prosecute this application
and transact all business in the Patent and Trademark Office
connected therewith (*list name and registration number*)

John R. Mattingly, Reg. No.30,293;
Daniel J. Stanger, Reg. No.32,846;
Shrinath Malur, Reg. No.34,663;
Gene W. Stockman, Reg. No.21,021;
Jeffrey M. Ketchum, Reg. No.31,174;
Scott W. Brickner, Reg.No.34553;

書類送付先

Send Correspondence to:

MATTINGLY, STANGER & MALUR, P. C.
104 East Hume Avenue
Alexandria, Virginia 22301

直接電話連絡先：（名前及び電話番号）

Direct Telephone Calls to: (*name and telephone number*)

Telephone: (703) 684-1120
Fax: (703) 684-1157

唯一または第一発明者名	Full name of sole or first inventor
発明者の署名	Inventor's signature
日付	Date
住所	Residence
国籍	Citizenship
私書箱	Post Office Address

Kishiko Maruyama 8/4/2000
Kodaira, Japan
Japan
c/o Hitachi, Ltd., Intellectual Property Group
New Marunouchi Bldg. 5-1, Marunouchi 1-chome,
Chiyoda-ku, Tokyo 100-8220, Japan

(第二以降の共同発明者についても同様に記載し、署名をす
ること)

(Supply similar information and signature for second and
subsequent joint inventors.)

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

第二共同発明者名		Full name of second joint inventor, if any	
		Shigeru SHIMADA	
第二共同発明者の署名	日付	Second inventor's signature	Date
		<i>Shigeru Shimada</i>	8/4/2000
住所		Residence	
		Kodaira, Japan	
国籍		Citizenship	
		Japan	
私書箱		Post Office Address	
		c/o Hitachi, Ltd., Intellectual Property Group New Marunouchi Bldg. 5-1, Marunouchi 1-chome, Chiyoda-ku, Tokyo 100-8220, Japan	
第三共同発明者名		Full name of third joint inventor, if any	
		Toshiichirou SASAKI	
第三共同発明者の署名	日付	Third inventor's signature	Date
		<i>Toshiichirou Sasaki</i>	8/4/2000
住所		Residence	
		Iwaki, Japan	
国籍		Citizenship	
		Japan	
私書箱		Post Office Address	
		c/o Hitachi, Ltd., Intellectual Property Group New Marunouchi Bldg. 5-1, Marunouchi 1-chome, Chiyoda-ku, Tokyo 100-8220, Japan	
第四共同発明者名		Full name of fourth joint inventor, if any	
第四共同発明者の署名	日付	Fourth inventor's signature	Date
住所		Residence	
国籍		Citizenship	
私書箱		Post Office Address	
第五共同発明者名		Full name of fifth joint inventor, if any	
第五共同発明者の署名	日付	Fifth inventor's signature	Date
住所		Residence	
国籍		Citizenship	
私書箱		Post Office Address	

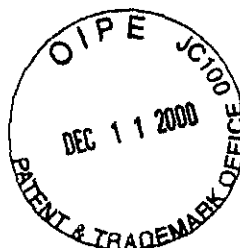


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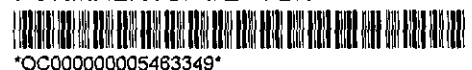
COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
09/613,634	07/11/2000	Kishiko Maruyama	H-922

Mattingly Stanger & Malur PC
Attorneys at Law
104 East Hume Avenue
Alexandria, VA 22301



FORMALITIES LETTER



OC000000005463349

Date Mailed: 10/11/2000

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

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- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$130 for a non-small entity, must be submitted with the missing items identified in this letter.
- The balance due by applicant is \$ 130.

*A copy of this notice **MUST** be returned with the reply.*

[Signature]

Customer Service Center

Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

10/12/2000 RWAR:SA 00000086 03613634

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日 本 国 特 許 庁
PATENT OFFICE
JAPANESE GOVERNMENT

別紙添付の書類に記載されている事項は下記の出願書類に記載されて
る事項と同一であることを証明する。

This is to certify that the annexed is a true copy of the following application as filed
in this Office.

出 願 年 月 日
Date of Application:

1999年 7月12日

願 番 号
Application Number:

平成11年特許願第197010号

願 人
Applicant (s):

株式会社日立製作所

15564 U.S. PTO
09/613634
07/11/00

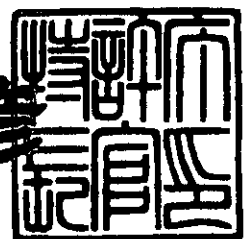
U.S. Appln Filed 7-11-00

Inventor: K. Maruyama et al
Mattingly, Stanger & Malor
H- 922

2000年 4月21日

特 許 庁 長 官
Commissioner,
Patent Office

近 藤 隆 彦



出証番号 出証特2000-3028595

特平 11-197010

【書類名】 特許願

【整理番号】 H99016571A

【提出日】 平成11年 7月12日

【あて先】 特許庁長官 殿

【国際特許分類】 G08G 1/00

【発明者】

【住所又は居所】 東京都国分寺市東恋ヶ窪一丁目 280 番地
株式会社日立製作所中央研究所内

【氏名】 丸山 貴志子

【発明者】

【住所又は居所】 東京都国分寺市東恋ヶ窪一丁目 280 番地
株式会社日立製作所中央研究所内

【氏名】 嶋田 茂

【発明者】

【住所又は居所】 茨城県日立市大みか町五丁目 2 番 1 号
株式会社日立製作所大みか事業所内

【氏名】 佐々木 利一郎

【特許出願人】

【識別番号】 000005108

【氏名又は名称】 株式会社日立製作所

【代理人】

【識別番号】 100075096

【弁理士】

【氏名又は名称】 作田 康夫

【電話番号】 03-3212-1111

【手数料の表示】

【予納台帳番号】 013088

【納付金額】 21,000円

特平 11-197010

【提出物件の目録】

【物件名】	明細書	1
【物件名】	図面	1
【物件名】	要約書	1
【ブルーフの要否】	要	

特平 11-197010

【書類名】 明細書

【発明の名称】 歩行者ナビゲーション機能を有する携帯端末

【特許請求の範囲】

【請求項 1】

携帯端末の現在地を示す位置情報を取得する位置情報取得手段と、該携帯端末の向きを示す方向情報を取得する方向情報取得手段とを有することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 2】

請求項 1 において、該携帯端末に提供される歩行者ナビゲーション情報の表示が実際の空間的な位置関係と一致するように、前記位置情報と前記方向情報に基づいて制御することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 3】

請求項 1 において、該携帯端末を用いて歩行者ナビゲーション情報を検索する際に、前記位置情報と前記方向情報に基づいて検索条件を設定することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 4】

請求項 2 において、歩行者ナビゲーション情報として経路案内情報を提供する際に、現在地から見た目的地の方向及び距離を、始点と終点の区別がつく線分を用いて、該線分の向き及び長さで示して提供することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 5】

請求項 2 において、歩行者ナビゲーション情報として経路案内情報を提供する際に、現在地付近における局所的な経路を折れ線で示し、進行方向を該折れ線上の矢印で示して提供することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 6】

請求項 2 において、歩行者ナビゲーション情報として経路案内情報を提供する際に、出発地から目的地までの全行程を始点と終点の区別がつく折れ線で示し、該折れ線上に現在地を記号で示して提供することを特徴とする歩行者ナビゲーション

ョン機能を有する携帯端末。

【請求項 7】

請求項 3 において、歩行者ナビゲーション情報として周辺案内情報を提供する際に、現在地からある方向にある周辺案内情報を検索して提供することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 8】

歩行者ナビゲーション情報として待合せ案内情報を提供する際に、自分の居場所を現在地、相手の居場所を目的地と見なし、請求項 4 又は請求項 5 又は請求項 6 のいずれかの表示方法を用いて提供することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 9】

請求項 3 において、歩行者ナビゲーション情報として現在地案内情報を提供する際に、現在地からある方向にある現在地案内情報を検索して提供することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 1 0】

請求項 1 において、前記方向情報取得手段では、該携帯端末の先端などの指す方角の情報を取得することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 1 1】

請求項 1 において、前記方向情報取得手段では、該携帯端末の先端などの指す方角及び仰角の情報を取得することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【請求項 1 2】

請求項 1 において、前記方向情報取得手段では、ディスプレイの向きの情報を取得することを特徴とする歩行者ナビゲーション機能を有する携帯端末。

【発明の詳細な説明】

【0 0 0 1】

【発明の属する技術分野】

本発明は、携帯電話及び P H S (Personal Handyphone System) (データ通信

機能のみの文字電話を含む) 及び携帯電話又は PHS のデータ通信機能付き携帯情報端末 (PDA: Personal Data Assistance) を包含する携帯端末に係り、歩行者向けの位置情報に関連した情報提供を可能とする歩行者ナビゲーション機能を有する携帯端末に関する。

【0002】

【従来の技術】

従来の地図情報サービスとして、インターネットや F A X を通じて地図や地図に付随するコンテンツ情報を提供するサービスが多数存在している。これらのサービスでは、パソコンや F A X のような表示面積の広い画面や紙面への出力を前提とした情報提供方法が用いられている。歩行者が携帯可能な P D A と、携帯電話や P H S のデータ通信機能を用いれば、上記サービスにより旅先や出張先で所望の地図を取得することが可能である。

【0003】

また、G P S (Global Positioning System) を利用して自己の現在地を示す位置情報を提供するシステムが多数開発されている。例えば、自動車に搭載することを前提としたカーナビゲーションシステムは、歩行者が携帯するには装置サイズが大きく、また、道路走行を前提としたナビゲーション方法が用いられているため、歩行者ナビゲーションに直接利用することはできない。一方、G P S 付き P D A やハンディ G P S のような歩行者向けの位置情報システムでは、予めローカルメモリに格納されている地図や上記サービスからダウンロードした地図を表示して、歩行者の現在地を示すことが可能となっている。

【0004】

【発明が解決しようとする課題】

従来のインターネット地図情報サービスでは、パソコンと同程度の表示解像度を前提として最適化した地図を提供している。このため、携帯電話や P H S の狭いディスプレイに表示したのではつぶれて見難くなるという問題がある。

【0005】

また、上記サービスで用いられる地図の検索方法はサーバとの通信コストが膨大なため、歩行者ナビゲーションには適していない。例えば、広域地図から詳細

地図へと何段階かの縮尺で地図を表示して検索条件を絞り込んでいく方法では、検索操作の度にサーバから地図をダウンロードしなければならない。テキスト入力やメニュー選択によって検索条件を絞り込んでいく方法ならば、検索途中でのデータ通信量を削減することが可能である。しかしながら、指定した地名が複数のページに跨っている場合には隣接するページの地図が提供されるなど、所望の地図がダイレクトに提供されない可能性もある。このような場合には、スクロールや拡大・縮小といった表示操作によって所望の地図を検索しなければならないが、地図データを予めローカルメモリに蓄積しているわけではないので、表示操作の度にサーバから地図をダウンロードしなければならない。

【0006】

さらに、上記サービスで提供される地図が必ずしも歩行者にとって判り易い形態とは限らない。例えば現在地から目的地への道順を知りたい場合に、現在地から目的地までの経路が複数のページに跨っていたり、同じページにあっても広域すぎて詳細情報が判らなかつたりすることが多い。このような場合に必要な情報を取得するためには、スクロールや拡大・縮小といった煩雑な表示操作が必要であり、上述のようにサーバとの通信コストが膨大になる。

【0007】

さらに、携帯電話やPHSの他にPDAを必要とする機器構成では、サービスを受けられるユーザが限定される上、携帯機器間をケーブルなどで接続しなければならず、歩行中に手軽に利用できないという問題もある。一方、携帯電話又はPHS単独で利用可能な、映画やイベント、レストランなどのコンテンツ情報を提供するサービスも存在する。これらのコンテンツ情報は、携帯電話やPHSの狭いディスプレイに表示することを想定しているため、文字情報として提供されることが多い。しかしながら、場所や道順といった空間的な位置関係を知りたい場合、このような形態での提供が判り易いとは言えない。また、携帯電話やPHSにはダイヤルボタンを含むいくつかのボタンキーが入力デバイスとして用意されているだけなので、複雑な検索条件の入力は煩わしいという問題もある。

【0008】

一方、従来のGPS付きPDAやハンディGPSは単独の機器構成で利用する

ことが可能なシステムである。しかしながら、予めローカルメモリに格納されている地図を表示するだけでは、歩行者の要求に合致した判り易い情報提供方法とは言えないし、映画やイベント、レストランといったリアルタイムな情報を提供することもできない。勿論、PDAに携帯電話やPHSのデータ通信機能を付加すれば、単独の機器構成でインターネット地図情報サービスに接続することも可能であるが、上述のようなサービスでは、歩行者にとって判り易い情報提供方法とは言えない。

【0009】

そこで本発明の目的は、携帯電話やPHSの狭いディスプレイを用いて、歩行者にとって判り易い位置情報に関連する情報の提供が可能な歩行者ナビゲーション機能を有する携帯端末を提供することにある。また、本発明の他の目的は、歩行者が位置情報に関連する情報を検索するときに検索条件の入力に要する労力を軽減すると共に、直感的に判り易いインタフェースを実現する歩行者ナビゲーション機能を有する携帯端末を提供することにある。

【0010】

【課題を解決するための手段】

上記目的を達成するため、本発明の歩行者ナビゲーション機能を有する携帯端末には、通常の携帯電話やPHSが有するデータ通信手段や入力手段、表示手段などの他に、自己の現在地を示す位置情報を取得する位置情報取得手段と自己の向きを示す方向情報を取得する方向情報取得手段を備える。以下では、これらの手段によって取得される位置情報と方向情報をまとめて端末情報と称す。

【0011】

上述の手段を備えることにより、取得した端末情報を検索条件として利用することが可能になるので、明示的な現在地の入力が必要になるばかりでなく、「南口方面にどんな店があるか」とか「この通りを行くとどんな店があるか」といった検索要求の内、「南口方面に」とか「この通りを行くと」といった方向に関する部分の入力を、例えば携帯端末の先端を直接その方向に向けることによって指示することが可能になる。従って、検索条件の入力に要する労力が軽減されると共に、直感的に判り易いインタフェースが実現される。また、端末情報を利用す

ることにより、実際の空間での方向とディスプレイ上の表示を一致させることができ、例えば、現在地における進行方向を単なる矢印で表現するといった圧縮形態で提供することが可能になる。これより、携帯電話やPHSの狭いディスプレイに表示可能な圧縮形態でありながら、歩行者にとって判り易い位置情報に関する情報の提供が実現される。

【0012】

ここで、本発明の歩行者ナビゲーション機能を有する携帯端末の利用において、想定するサービスは次の通りである。1) 目的地が決まっている目的地までの経路が判らない場合に経路案内として利用する「経路案内サービス」、2) どこに行くか目的地が決まっていない場合に映画やイベント、レストランなどの情報案内として利用する「周辺案内サービス」、3) 人と待ち合わせをする場合に、自分の居場所を相手に伝えたり、相手の居場所を確認したりするために利用する「待ち合わせ案内サービス」、4) 自分がどこにいるか判らなくなった場合に現在地がどこであるかの案内に利用する「現在地案内サービス」。

【0013】

このようなサービスは例えば、本発明の歩行者ナビゲーション機能を有する携帯端末とインター／イントラネット上の情報提供サーバという構成で構築される。携帯端末と情報提供サーバの間は例えば、携帯電話やPHSによるインターネットサービスの場合と同様に、無線通信網からゲートウェイサーバを介してインター／イントラネットへと接続される。情報提供サーバには、空間情報データベースとその管理システム部の他に、制御プログラムを備える。ここで、空間情報データベースは、地図情報と映画やイベント、レストランなどのコンテンツ情報を格納し、インター／イントラネット上に分散していてもよい。処理プログラムでは、携帯端末に提供する情報の圧縮と携帯端末上での表示を端末情報に基づいて制御する。すなわち、歩行者ナビゲーションのためのほとんどの処理を情報提供サーバで実行し、携帯端末には、単に提供される情報を表示する機能だけをもたせる。

【0014】

以上は携帯電話やPHSのように処理能力の低い携帯端末を想定した構成であ

るが、もう少し処理能力の高い携帯端末を用いて、端末情報に基づく表示の制御を携帯端末で実行してもよい。また、検索結果を地図データごと携帯端末で受信し、端末情報に基づく圧縮から表示までの制御を携帯端末で実行してもよい。さらに処理能力の高い携帯端末を用いて、予め地図情報をローカルメモリに格納しておき、地図情報の検索から圧縮・表示までを携帯端末で実行してもよい。この場合、映画やイベント、レストランのようなリアルタイム性を要求されるコンテンツ情報のみを情報提供サーバで検索する。

【0015】

さらに本発明の歩行者ナビゲーション機能を有する携帯端末において、取得する位置情報は緯度・経度又は座標や高度で表わされ、例えば、GPS又はPHSなどの無線アンテナや赤外線センサなどを用いて測定される。どれか一つの方法を備えて測定してもよいし、いくつかの方法を備えて状況に応じて測定可能な方法で測定してもよい。また、取得する方向情報は携帯端末の先端方向又はディスプレイの向きを方角や仰角で表わしたもので、例えば、コンパスやジャイロ、クリノメータなどのセンサを用いて測定される。コンパスの軸とディスプレイの法線方向を一致させ、ディスプレイを地面に対して水平に保てば、ディスプレイの上方向が東西南北どちらの方角を指しているか判る。ジャイロの場合も常に北を指すように設定しておけば、コンパスの場合と同様の測定が可能である。さらに、コンパスとクリノメータを用いれば、方角だけでなく地面に対する仰角といった3次元的な方向情報を取得することも可能である。また、コンパスとクリノメータの代わりに3次元ジャイロを用いても、同様の測定が可能である。

【0016】

【発明の実施の形態】

以下に図面を参照して、本発明の実施の形態を説明する。図1に、本発明の歩行者ナビゲーション機能を有する携帯端末による表示制御例を示す。歩行者10はある目的地11に向かって歩いている途中である。歩行者は、目的地の方向や進行方向が判らなくなる度に、システムに問合せをすることができる。システムに問合せがあると、本発明では、携帯電話やPHSの狭いディスプレイに表示可能な圧縮形態、例えば、現在地から見た目的地の方向や距離を矢印の向きと長さ

で表現するような形態で情報を提供する。通常の地図システムでは、ディスプレイの上方向が北となるように地図を表示していることが多い。実際の歩行者は方向を意識せずに歩いていることが多いので、地図を実際の空間と照らし合わせて地図の向きを合わせる必要がある。通常は地図に書かれているランドマーク情報などから対応関係を把握することができるが、本発明の対象となる狭いディスプレイでは、このような詳細な情報を表示することはできない。そこで本発明では、実際の空間での目的地の方向とディスプレイに表示する矢印の向きが一致するように制御する。12又は13又は14のように携帯端末を向けて歩行者10が問合せをすると、ここでは、それぞれの場合に矢印がいつでも目的地の方向を指すように表示を制御する。

【0017】

次に、本発明の歩行者ナビゲーション機能を有する携帯端末を用いた歩行者ナビゲーションにおける処理全体の流れを図2を用いて説明する。ステップ103では、歩行者が携帯端末のボタンキーやペン、マイクなどの入力手段を用いて、メニューの選択や検索条件の設定などを設定画面で対話的に指示するために、入力制御が実行される。歩行者ナビゲーションでは、歩行者から繰り返し問合せがあると考えられるので、ステップ104では、ステップ103で入力された状態を保存しておく。本処理ではまず、ステップ101において、保存されている状態があるかどうかの判定を行う。保存されている状態がある場合には、ステップ102において前の状態を読み込み、保存されている状態がない場合には、ステップ103において入力制御を実行する。ステップ105は、入力の待ち状態を表わし、ここでは、ステップ106からステップ111を実行するRun、ステップ103の設定画面に戻るBack、プログラムを終了するStop、以上の三つの選択肢を用意した。

【0018】

ステップ105において、歩行者がRunを選択した場合の処理の流れを説明する。まずステップ106では、携帯端末の位置情報を何らかの手段で取得する。ここで、位置情報は携帯端末の位置を緯度・経度又は座標や高度で表わしたものであり、例えば、GPS又はPHSなどの無線アンテナや赤外線センサなどを利

用して測定される。次にステップ 107 では、携帯端末の方向情報を何らかの手段で取得する。方向情報は携帯端末の先端方向又はディスプレイの向きを方角や仰角で表わしたものであり、例えば、コンパスやジャイロ、クリノメータなどのセンサを利用して測定される。ステップ 108 では、ステップ 106 で取得した位置情報とステップ 107 で取得した方向情報を端末情報として検索条件に設定する。ステップ 109 では、データベースの検索制御を実行し、ステップ 103 で選択されたメニューに対応する情報をステップ 103 及びステップ 108 で設定された検索条件で検索する。ステップ 103 で経路案内サービスが選択されていたとすると、例えば、現在地から目的地までの経路情報が検索される。ステップ 110 では、ステップ 109 の検索結果である情報の圧縮制御を実行し、ステップ 108 の端末情報に基づいて、狭いディスプレイに表示可能な形態に圧縮する。さらにステップ 111 では、ステップ 110 の圧縮結果である情報の表示制御を実行し、ステップ 108 の端末情報に基づいて、歩行者にとって判り易い形態に変換して表示する。ここで、必要があれば検索結果をメモリに保存してもよい。最後に、表示画面はそのままステップ 105 の待ち状態に戻る。

【0019】

次に、具体的なサービスを想定して、本発明の歩行者ナビゲーション機能を有する携帯端末を詳細に説明する。図 3 に、本発明の歩行者ナビゲーション機能を有する携帯端末を用いた「経路案内サービス」の圧縮制御例を示す。このサービスは、目的地が決まっていり目的地までの経路が判らない場合の経路案内として利用される。そこで、図 2 の処理フローと対応付けながら、本サービスの圧縮制御を説明する。本サービスを利用する場合にはまず、ステップ 103 においてサービスメニューから「経路案内サービス」を選択し、何らかの手段で目的地を設定しておく。目的地は、例えば、ボタンキーやペンによるテキスト入力やマイクからの音声入力によって設定される。これらのステップ 103 で設定した状態は、歩行者からの問合せの度に必要になるので、ステップ 104 でシステムに保存しておく。現在地には、ステップ 106 で取得した位置情報を用い、歩行者からの問合せの度に自動的に更新していく。また、最初の地点を出発地としてシステムに登録したり、通過点を途中経過としてシステムに登録してもよい。

【0020】

図1と同様に、図3における歩行者10はある目的地11に向かって歩いている途中である。図3の(a)から(f)に示した状況でシステムに問合せがあった場合に、本発明の歩行者ナビゲーション機能を有する携帯端末における情報の圧縮制御例を21から26に示す。まず、21及び22では、現在地から見た目的地の方向と距離を矢印の向きと長さで表現するという圧縮形態が用いられている。21は目的地までの距離が遠い場合に、22は近い場合にそれぞれ対応している。23及び24では、現在地付近の進行方向を折れ線と矢印で表現するという圧縮形態が用いられ、23は次の曲がり角までの距離が遠い場合に、24は近い場合にそれぞれ対応している。25及び26では、出発地から目的地までの全行程を単なる折れ線で表現するという圧縮形態が用いられ、さらに全行程中の現在地を折れ線上の黒丸で表現している。25及び26は同じ行程の途中経過での問合せにそれぞれ対応している。尚、21から26では、現在地での進行方向が上になるように表示した。

【0021】

21及び22のような圧縮形態は現在地と目的地の位置情報が判れば提供できるので、ステップ109では、単に目的地の名称などから目的地の位置情報を検索するだけである。ここで、目的地の位置情報は同じ行程の途中で変化しないので、一度検索した情報を保存して、次からこの処理を省略する。次のステップ110では、現在地と目的地の位置情報から現在地から見た目的地の方向と距離を求めて、矢印で表現しているだけである。一方、23及び24のような圧縮形態を提供するためには、現在地から目的地までの経路情報の内、現在地付近での経路情報が必要となる。そこで、ステップ109ではその都度、経路探索によって現在地から目的地までの経路情報を検索し、ステップ110においてこの経路情報から現在地付近の経路情報を切出して提供する。さらに、25及び26のような圧縮形態を提供するためには、出発地から目的地までの経路情報が必要となる。そこで、ステップ109では、経路探索によって出発地から目的地までの経路情報を検索する。ここで、出発地から目的地までの経路情報は同じ行程の途中で変化しないので、一度検索した情報を保存しておく。次のステップ110では、

出発地から目的地までの経路情報と現在地の位置情報を相対的に関連付けて提供する。

【0022】

図4に、本発明の歩行者ナビゲーション機能を有する携帯端末を用いた「周辺案内サービス」の検索制御例を示す。このサービスは、どこに行くか目的地が決まっていない場合に映画やイベント、レストランなどの情報案内として利用される。そこで、図2の処理フローと対応付けながら、本サービスの圧縮制御を説明する。本サービスを利用する場合にはまず、ステップ103においてサービスメニューから「周辺案内サービス」を選択し、さらに検索対象のカテゴリを選択しておく。図4の例では、検索対象のカテゴリとしてお店を選択している。ところで、周辺案内サービスを利用する場合に歩行者は、従来のように現在地周辺を漠然と検索するのではなく、「南口方向にどんな店があるか」とか「この通りを行くとどんな店があるか」といった特定の情報を検索したいことがある。しかしながら、通常のメニューの選択やテキストの入力でこのような複雑な検索条件を設定することは困難である。そこで本発明の歩行者ナビゲーション機能を有する携帯端末では、例えば携帯端末の先端を直接検索したい方向に向けて指示することを可能にした。ステップ107により携帯端末の先端方向の向きが検出され、ステップ108において検索条件として設定される。31又は32又は33のように携帯端末の先端を向けて問合せをすると、本発明の歩行者ナビゲーション機能を有する携帯端末では、それぞれの方向にある店を例えばリストにして提供する。さらに、リストからお店を選択すると、そのお店についての詳細情報が表示されるように設計することも可能である。

【0023】

次に、図5、図6及び図7を用いて、本発明の歩行者ナビゲーション機能を有する携帯端末を用いた「待合せ案内サービス」の一実施例を説明する。このサービスは、人と待合せをする場合に、自分の居場所を相手に伝えたり、相手の居場所を確認したりするために利用される。図5において、10aと10bは待合せをしている歩行者を表わし、41及び42はお互いの居場所を確認するためのデータ送受信の流れを表わす。ここでは、携帯電話やPHSのメッセージ送信機能

のように、携帯端末の間で直接データを送受信してもよいし、電子メール機能のように、インターネット上のサーバを介してデータを送受信してもよい。

【0024】

まず、歩行者10aが歩行者10bに自分の居場所を伝える場面を想定し、図6に示したデータ送信の処理フローを説明する。ここで、ステップ101からステップ106までは図2と同様の処理である。データ送信を実行する場合に歩行者10aは、ステップ103において、サービスメニューから本サービスのデータ送信を選択し、送信先に歩行者10bの電話番号を設定しておく。この場合に、ステップ105で歩行者10aがRunを選択すると、ステップ201では、ステップ106で取得した位置情報のデータを歩行者10bに送信する。

【0025】

次に、歩行者10bが相手の居場所を確認する場面を想定し、図7に示したデータ受信の処理フローを説明する。ステップ202において、歩行者10bが歩行者10aから送信された位置情報のデータを受信した場合に、ステップ104では、発信元である歩行者10aの電話番号や受信した位置情報のデータを待合せ相手の状態として保存しておく。ステップ105で歩行者10bがRunを選択すると、ステップ106からステップ111までの処理が実行され、歩行者10bの携帯端末に相手の居場所が表示される。ここで、ステップ106からステップ111までの一連の処理は、待合せ相手の居場所を目的地として設定した「経路案内サービス」の場合と同様の処理である。図5の携帯端末にはそれぞれ、自分の居場所（現在地）から見た相手の居場所（目的地）の方向と距離が表示されている。ここでは、「経路案内サービス」で用いた矢印の代わりに、矢印の始点（自分の居場所）を黒丸、矢印の終点（相手の居場所）を白丸で表わした。尚、ステップ105でStopを選択して処理を終了した後で、もう一度相手の居場所を表示したい場合には、図2と同様の処理を実行する。

【0026】

図8に、本発明の歩行者ナビゲーション機能を有する携帯端末を用いた「現在地案内サービス」の検索制御例を示す。このサービスは、自分がどこにいるか判らなくなった場合に現在地がどこであるかの案内に利用される。従来技術により

、現在地付近の地図を提供するサービスが考えられるが、携帯電話やPHSのような狭いディスプレイに表示することは困難である。実際の歩行者は、現在地周辺の情報を漠然と知りたいというよりも、「この道路はどこに至るか」とか「あの建物は何か」といった特定の情報を知りたいことが多い。このような場合にも、本発明の歩行者ナビゲーション機能を有する携帯端末によれば「周辺案内サービス」の場合と同様にして、例えば携帯端末の先端を直接知りたい方向に向けて指示することが可能である。そこでまず、道路の行き先や建物の名称などのカテゴリから、何を知りたいかを目的別に予め設定しておく。図8の例では、道路の行き先が選択されている。51又は52又は53のように携帯端末の先端を向けて問合せをすると、本発明の歩行者ナビゲーション機能を有する携帯端末では、それぞれの道路がどこに至るかという情報を提供する。

【0027】

図9に、これまで説明してきた本発明の歩行者ナビゲーション機能を有する携帯端末を用いた歩行者ナビゲーションシステムの構成例を示す。本システムは、携帯端末61とインター／イントラネット上の情報提供サーバ67という構成で構築されている。携帯端末61と情報提供サーバ67の間は、携帯電話やPHSによるインターネットサービスの場合と同様に、基地局62から無線通信網63に接続し、ゲートウェイサーバ64を介してインター／イントラネット65に接続し、さらに、WWWサーバ66を介して接続している。ここで、情報検索サーバ67には、空間情報データベース67cとその管理システム部67bの他に、制御プログラム67aを備える。この制御プログラム67aには、図2の処理ステップの内、ステップ103の入力制御におけるサーバ処理と、ステップ108の検索条件設定からステップ111の表示制御までが含まれる。ステップ103の入力制御におけるクライアント処理と、ステップ107の方向情報取得までの残りの処理は携帯端末61で実行される。空間情報データベース67cは、地図情報と映画やイベント、レストランなどのコンテンツ情報を格納し、インター／イントラネットに分散して存在していてもよい。

【0028】

最後に、本発明の歩行者ナビゲーション機能を有する携帯端末61の構成例を

図10に示す。携帯端末61には、制御ユニットであるCPU71を中心に、液晶ディスプレイなどの表示手段71、ボタンキーやペンなどの入力を可能とする入力手段72、ROMやRAMなどの内部記憶手段74、フラッシュメモリやDVDなどの外部記憶手段75、通常の携帯電話やPHSの有するデータ通信手段76の他に、位置情報取得手段77及び方向情報取得手段78を備え、互いに接続する。ここで、位置情報取得手段77には、GPS又はPHSなどの無線アンテナや赤外線センサなどのデータ受信機と、受信データを解析して位置情報を計算する制御ユニットを備える。また、方向情報取得手段78には、コンパスやジャイロ、クリノメータなどのセンサと、センサによる測定データを解析して方向情報を計算する制御ユニットを備える。尚、位置情報取得手段77と方向情報取得手段78は、必ずしも携帯端末に内蔵されている必要があるとは限らず、歩行者ナビゲーションとして利用するときには外付けで利用可能な構成であってもよい。

【0029】

図9及び図10の構成例では、携帯電話やPHSのように処理能力の低い携帯端末を想定し、携帯端末には単に提供される情報を表示するだけの機能をもたせた。このような構成は本発明において必須ではなく、もう少し処理能力の高い携帯端末を用いて、ステップ111の表示制御を携帯端末で実行してもよい。また、ステップ109の検索結果を地図データごと携帯端末で受信し、ステップ110の圧縮制御及びステップ111の表示制御を携帯端末で実行してもよい。さらに処理能力の高い携帯端末を用いて、空間情報データベース67cの地図情報を外部記憶手段75に予め格納しておき、ステップ109の検索制御における地図情報の検索、ステップ110の圧縮制御及びステップ111の表示制御を携帯端末で実行してもよい。この場合、映画やイベント、レストランのようなりアルタイム性を要求されるコンテンツ情報のみを情報提供サーバで検索する。尚、PDAで本発明の機能を実現する場合、携帯電話又はPHSとケーブルで接続して利用することは困難であるが、必ずしも携帯電話又はPHSのデータ通信機能を内蔵する必要があるとは限らず、携帯電話又はPHSと無線で接続可能な構成をとってもよい。

【0030】

【発明の効果】

以上に説明したように、本発明の歩行者ナビゲーション機能を有する携帯端末においては、携帯端末で位置情報及び方向情報を取得して検索条件として利用できるようにしたので、検索条件の入力に要する労力が軽減されると共に、直感的に分かり易いインタフェースが実現される。さらに、検索結果である情報の圧縮及び表示を端末情報に基づいて制御できるようにしたので、携帯電話やPHSの狭いディスプレイに表示可能な圧縮形態でありながら、歩行者にとって判り易い情報提供が可能になる。

【図面の簡単な説明】

【図1】

本発明の歩行者ナビゲーション機能を有する携帯端末による表示制御例を示す図。

【図2】

本発明の歩行者ナビゲーション機能を有する携帯端末を用いた歩行者ナビゲーション処理全体の流れを示す図。

【図3】 本発明の歩行者ナビゲーション機能を有する携帯端末を用いた「経路案内サービス」の圧縮制御例を示す図。

【図4】

本発明の歩行者ナビゲーション機能を有する携帯端末を用いた「周辺案内サービス」の検索制御例を示す図。

【図5】

本発明の歩行者ナビゲーション機能を有する携帯端末を用いた「待合せ案内サービス」の一実施例を示す図。

【図6】

「待合せ案内サービス」におけるデータ送信の処理フローを示す図。

【図 7】

「待合せ案内サービス」におけるデータ受信の処理フローを示す図。

【図 8】

本発明の歩行者ナビゲーション機能を有する携帯端末を用いた「現在地案内サービス」の検索制御例を示す図。

【図 9】

本発明の歩行者ナビゲーション機能を有する携帯端末を用いた歩行者ナビゲーションシステムの構成図。

【図 10】

本発明の歩行者ナビゲーション機能を有する携帯端末の構成図。

【符号の説明】

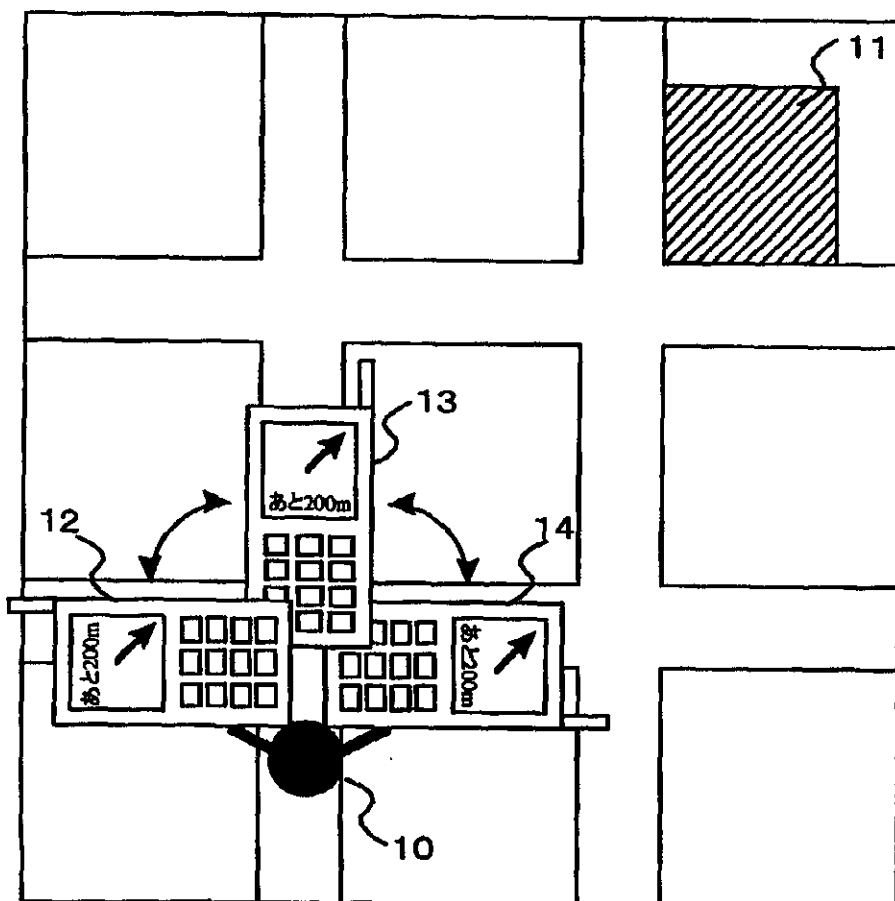
10、10a、10b…歩行者、11…目的地、12～14…表示制御の例、21～26…圧縮制御の例、31～33…検索制御の例（周辺案内サービス）、41、42…データ送受信の流れ、51～53…検索制御の例（現在地案内サービス）、61…携帯端末、62…基地局、63…無線通信網、64…ゲートウェイサーバ、65…インター／イントラネット、66…WWWサーバ、67…情報検索サーバ、67a…制御プログラム、67b…空間情報DB管理システム、67c…空間情報DB、71…CPU、72…表示手段、73…入力手段、74…内部記憶装置、76…データ通信手段、77…位置情報取得手段、78…方向情報取得手段、101…保存状態があるかの判定部、102…状態読み込み部、103…入力制御部、104…状態保存部、105…待ち状態、106…位置情報取得部、107…方向情報取得部、108…検索条件設定部、109…検索制御部、110…圧縮制御部、111…表示制御部、201…データ送信部、202…データ受信部。

特平 11-197010

【書類名】図面

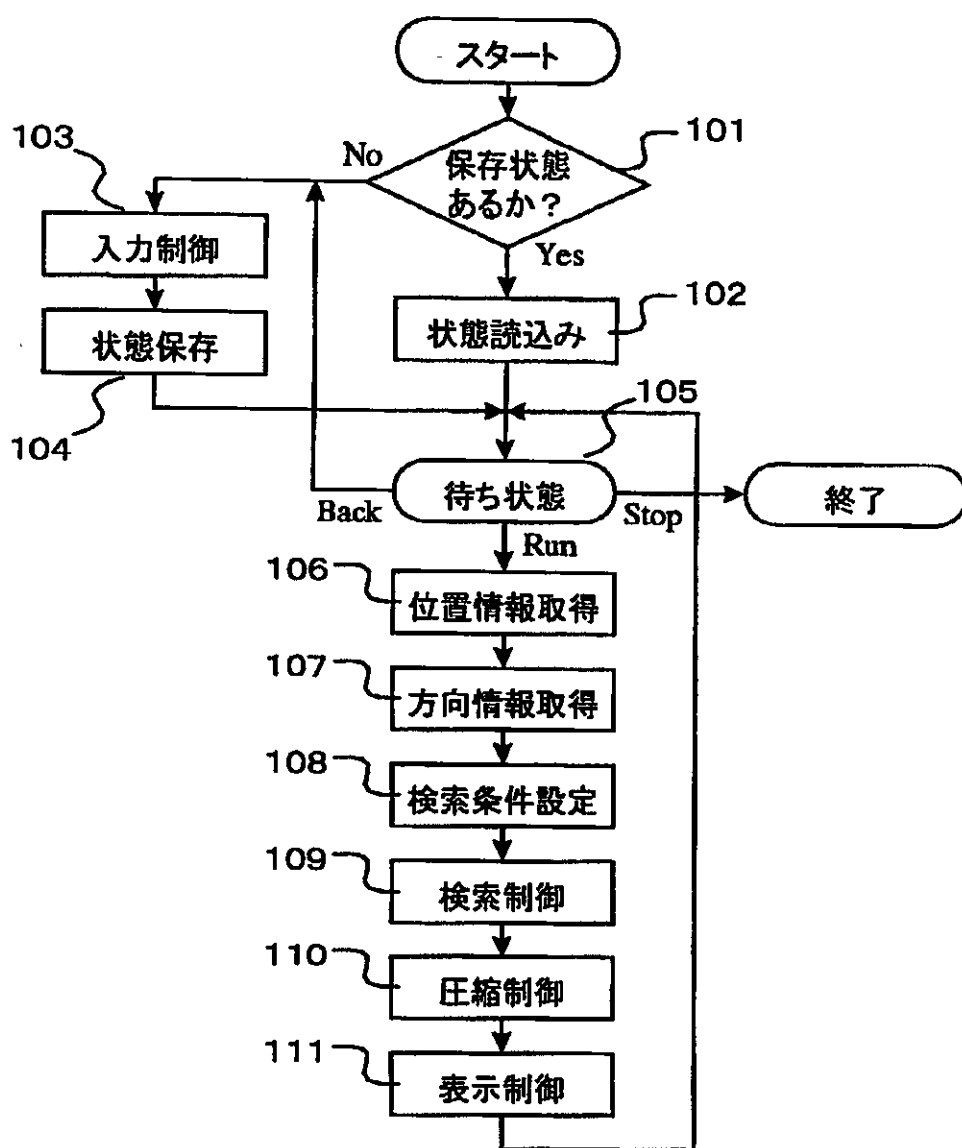
【図 1】

図 1



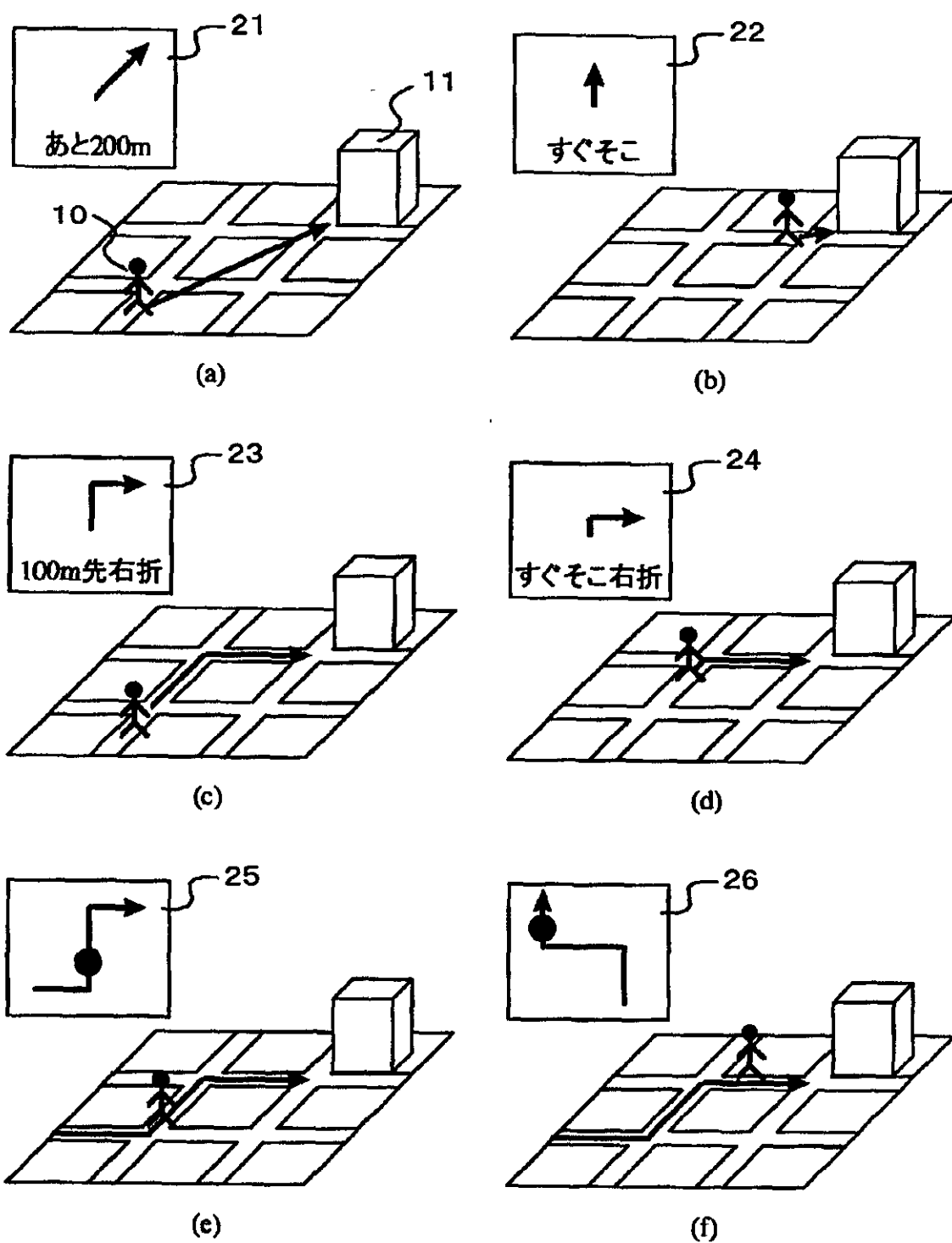
【図 2】

図2



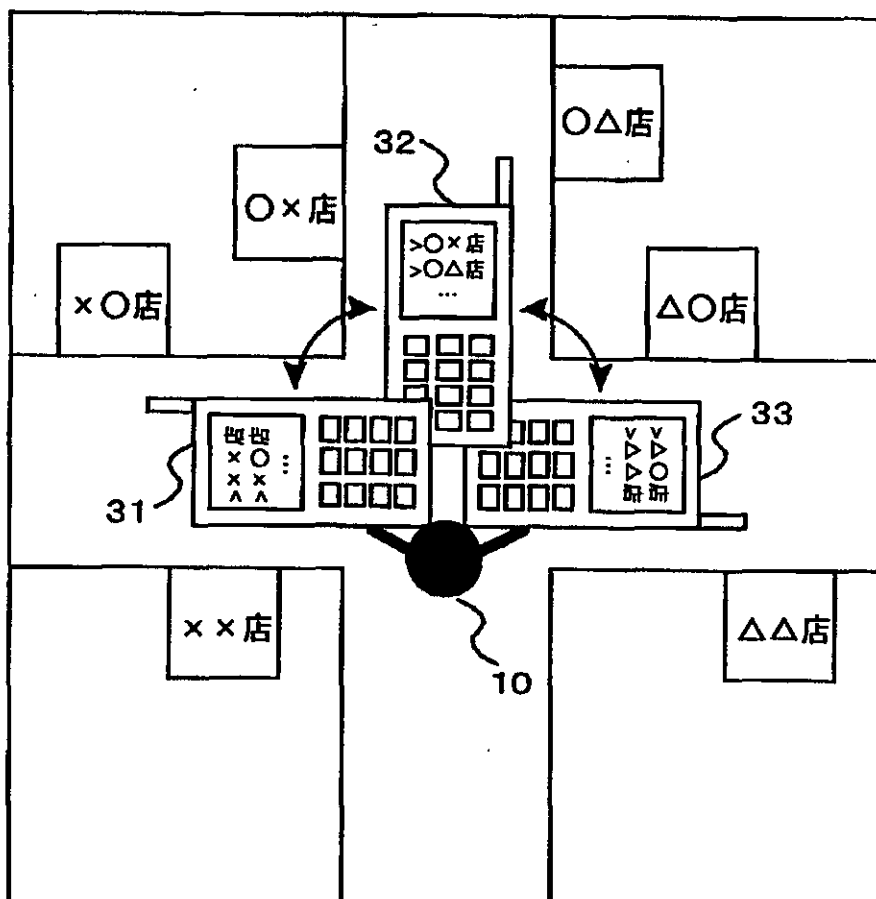
【図3】

図3



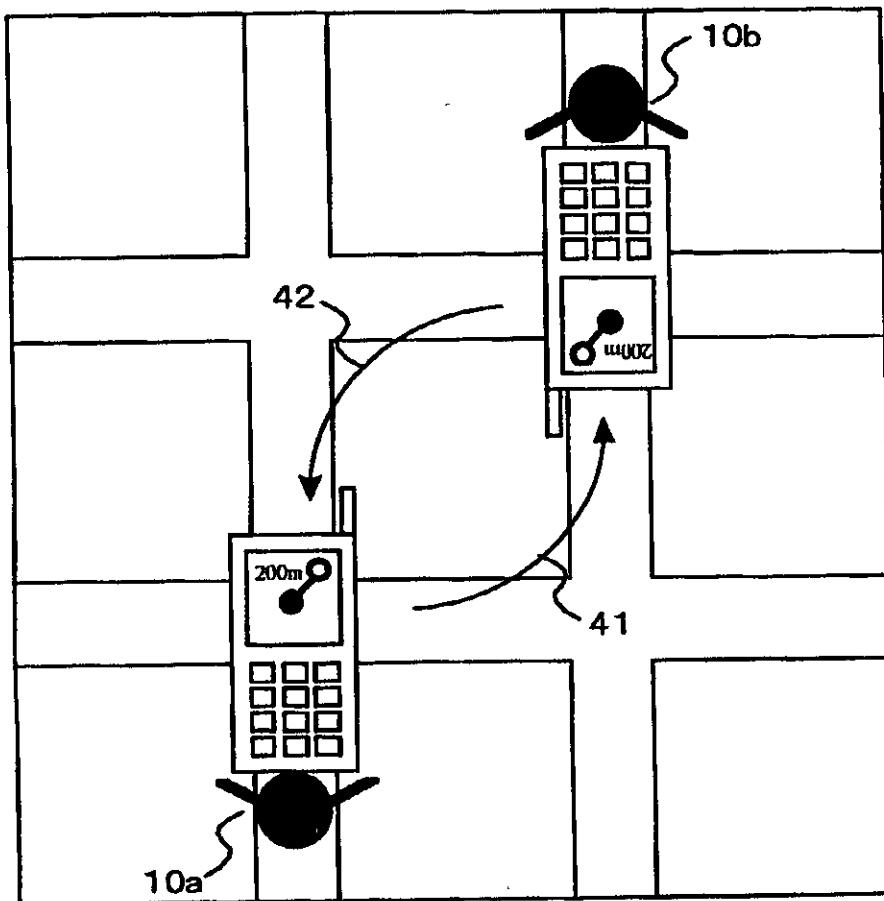
【図4】

図4



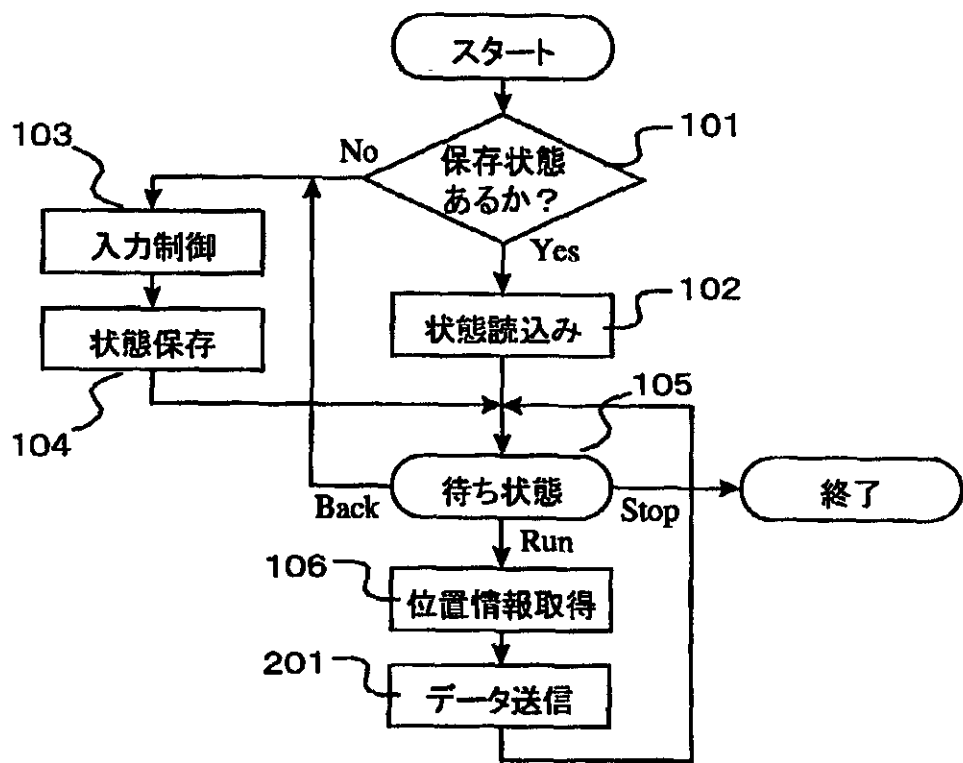
【図 5】

図5



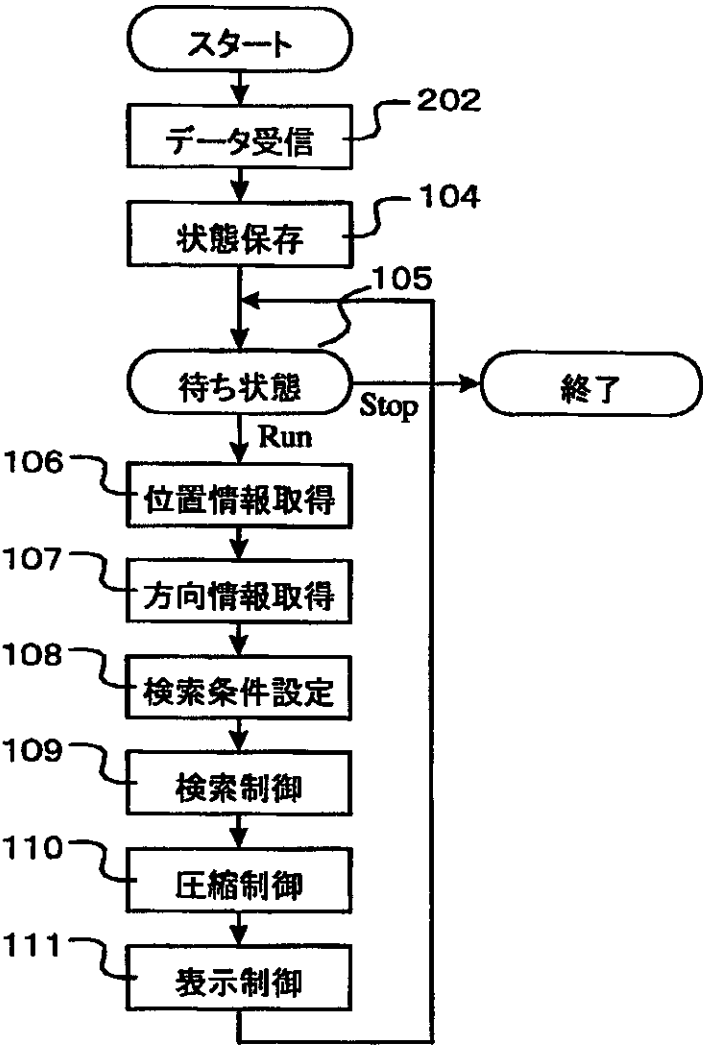
【図 6】

図6



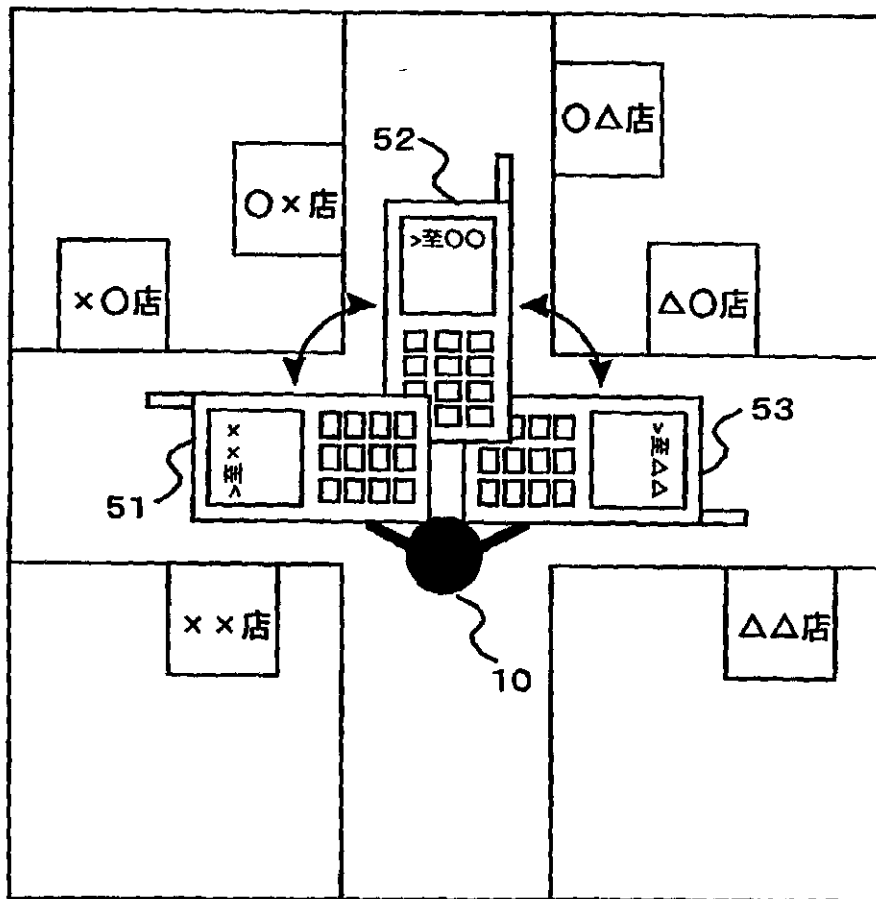
【図 7】

図7



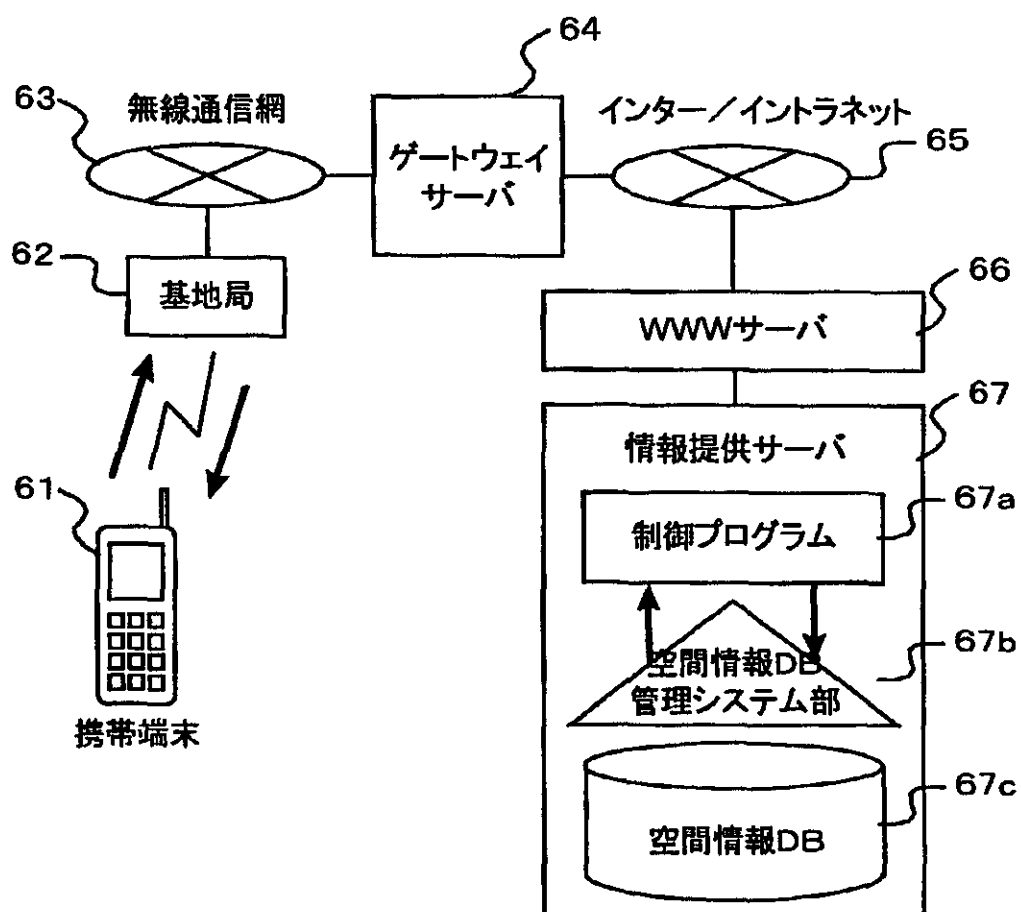
【図8】

図8



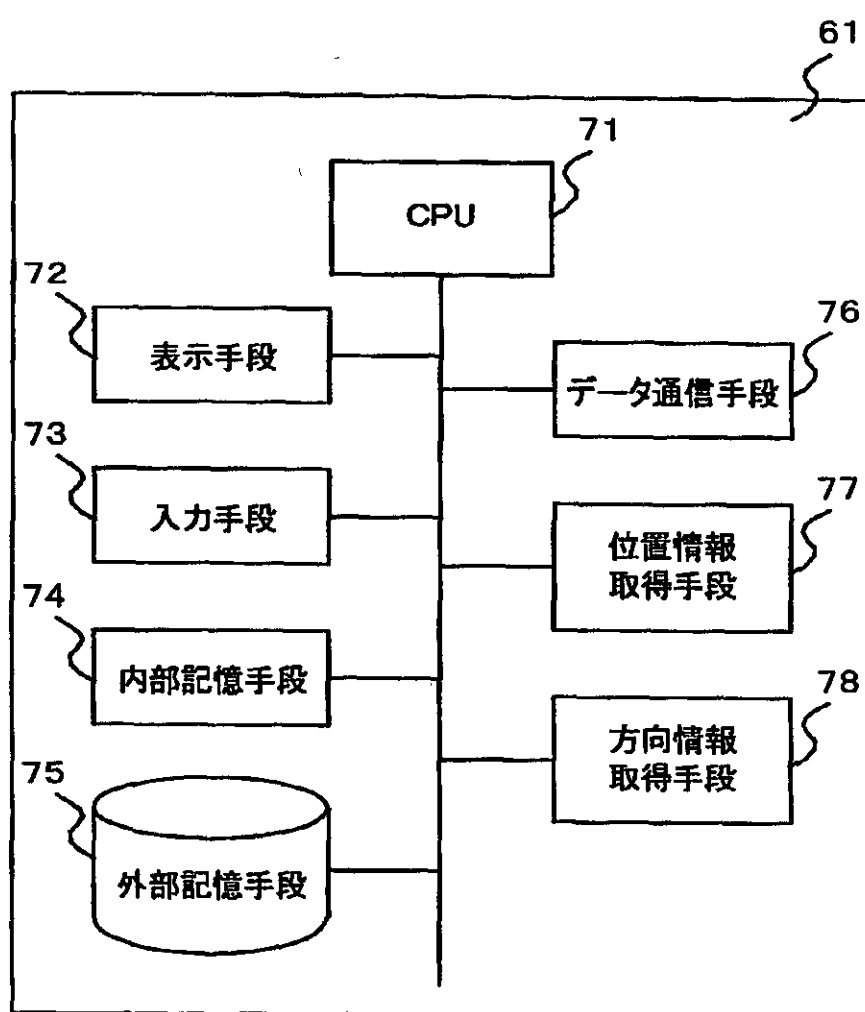
【図9】

図9



【図 10】

図10



特平 11-197010

【書類名】 要約書

【要約】

【課題】狭いディスプレイを用いて歩行者にとって判り易い情報を提供すると共に、検索条件の入力に要する労力を軽減した直感的に判り易いインタフェースを実現する歩行者ナビゲーション機能を有する携帯端末を提供する。

【解決手段】歩行者 10 がある目的地 11 に向かって歩いている途中で目的地の方向や進行方向が判らなくなったとする。本発明では、狭いディスプレイに表示可能な圧縮形態、例えば、現在地から見た目的地の方向や距離を矢印の向きと長さで表現するような形態に情報を圧縮し、さらに実際の空間での目的地の方向と矢印の向きが一致するようにディスプレイに表示する。12、13 又は 14 のように携帯端末を向けて歩行者 10 が問合せをすると、本発明では、それぞれの場合に矢印がいつでも目的地の方向を指すように表示を制御する。検索条件を設定する際にも、12、13 又は 14 のように携帯端末の先端などを直接検索したい方向に向けて指示することを可能にする。

【選択図】 図 1

特平11-197010

出願人履歴情報

識別番号 [000005108]

1. 変更年月日	1990年 8月31日
[変更理由]	新規登録
住 所	東京都千代田区神田駿河台4丁目6番地
氏 名	株式会社日立製作所



UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/613,634 07/11/00 MARUYAMA

K H-922

EXAMINER

PM82/0627

MATTINGLY, STANGER & MALUR, P.C.
104 EAST HUME AVENUE
ALEXANDRIA VA 22301

BEAULIEU, Y

ART UNIT

PAPER NUMBER

3661

DATE MAILED:

06/27/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/613,634	MARUYAMA ET AL.	
	Examiner	Art Unit	
	Yonel Beaulieu	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 July 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 20) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally **limited to a single paragraph** on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Therefore, "the present invention" (bridging lines 8-9) and line 16 is implied and should be avoided.

Claim Rejections - 35 USC § 112

Claims 3, 7, and 8 – 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 3, "the condition of retrieval" (line 3) lacks antecedent basis because such has not previously been identified. Claims 7 and 11 are necessarily rejected as being dependent upon claim 3.

Regarding claims 8 – 10, "the user's location" and "said user's location" (lines 3 in claims 8-10, respectively) and "the partner's location" and "said partner's location" (lines 4 in claims 8-10, respectively) lack antecedent basis. Such have not previously been identified.

Regarding claims 12 and 13, "etc." (lines 5, respectively) is vague and indefinite because the resulting claim does not clearly set forth the metes and bounds of the patent protection desired.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4 - 7, 11 – 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ghaem et al. (US 5,146,231A).

Regarding claims 1, 2, 4 - 7, 11 – 14, Ghaem et al. teaches a portable terminal (10; see figs. 1 and 2 at least) with the function of walking navigation, comprising a device (28) for getting location information denoting a present place of the terminal (col. 5: 39 – 56 at least) and a device for getting direction information via a display (14) denoting an orientation of the terminal (col. 5: 6 – 9; col. 6: 41 – 48 at least); the device further getting the direction information in a direction pointed by the tip of the terminal and angle of elevation (col. 5: 17 – 38 at least); Ghaem et al. further teaches direction and distance of a destination from the present place denoted with a length of a line having starting and ending points as to supply route guidance information as the walking navigation information (col. 3: 12 – col. 4: 3 at least).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 8 – 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghaem et al. ('231A).

As discussed above, Ghaem et al. teaches all of the limitations except for the explicit recitation of "retrieval" of navigational information and a "partner's location" being a "meeting location."

However, Ghaem et al. has been shown to suggest item 55 in fig. 2 that would achieve the idea of "retrieving" navigational information and a 'meeting location' (desired destination as noted in col. 2: 7 – 13 and 45 – 58; col. 3: 20 – 26 and 51 – 54 at least).

It would have been obvious to one of ordinary skill in the art at the time of the invention that Ghaem et al.'s terminal is at least fully functionally equivalent to the claimed invention because Ghaem et al. has been shown to suggest all of the necessary structural features in order to achieve the same end result of supplying location-related information to a walking user is achieved.

Application/Control Number: 09/613,634
Art Unit: 3661

Page 6

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Steiner et al. (US 5,528,248A) teaches a personal digital location apparatus for displaying a geographical location; Garthwaite et al. (US 6,124,826A) teaches a navigation device for people; and Lanciaux (US 6,069,585A).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yonel Beaulieu whose telephone number is (703) 305-4072. The examiner can normally be reached on Monday to Friday (0630-1600), first Friday off.

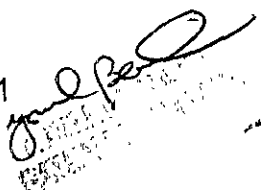
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William A. CUCHLINSKI can be reached on (703) 308-3873. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7687 for regular communications and same for After Final communications.

Application/Control Number: 09/613,634
Art Unit: 3661

Page 7

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.

Y. Beaulieu
June 21, 2001

A handwritten signature in dark ink is written over a circular official stamp. The signature is cursive and appears to read 'Y. Beaulieu'. The stamp is partially obscured by the signature but contains some text, including what looks like 'JUN 21 2001'.

Notice of References Cited	Application/Control No. 09/613,634	Applicant(s)/Patent Under Reexamination MARUYAMA ET AL.	
	Examiner Yonel Beaulieu	Art Unit 3661	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number	Date	Name	Classification	
		Country Code-Number-Kind Code	MM-YYYY			
	A	US-5,146,231-A	09-1992	Ghaem et al.	342	419
	B	US-5,528,248-A	06-1996	Steiner et al.	342	357
	C	US-6,069,585-A	05-2000	Lanciaux	342	443
	D	US-6,124,826-A	09-2000	Garthwaite et al.	342	357.09
	E	US- -				
	F	US- -				
	G	US- -				
	H	US- -				
	I	US- -				
	J	US- -				
	K	US- -				
	L	US- -				
	M	US- -				

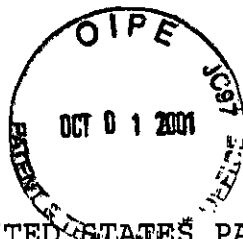
FOREIGN PATENT DOCUMENTS

*		Document Number	Date	Country	Name	Classification	
		Country Code-Number-Kind Code	MM-YYYY				
	N	- -					
	O	- -					
	P	- -					
	Q	- -					
	R	- -					
	S	- -					
	T	- -					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



H-922

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

K. MARUYAMA et al

Serial No. 09/613,634

Group Art Unit: 3661

Filed: July 11, 2000

Examienr: Y. Beaulieu

For: PORTABLE TERMINAL WITH THE FUNCTION OF
WALKING NAVIGATION

RECEIVED

OCT 04

03600 MAIL ROOM

AMENDMENT

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated June 27, 2001,
please amend the above-identified application as follows:

IN THE ABSTRACT OF THE DISCLOSURE

Cancel the Abstract, and substitute therefor the Abstract
of the Disclosure provided on the attached separate page.

IN THE CLAIMS

Cancel claim 2, and amend claims 1, 3-6, 8-10, 12 and 13
as follows:

1. (Once Amended) A portable terminal with a function
of walking navigation, comprising:

A
Cancel.
a device for getting location information denoting a present place of said portable terminal; and

a device for getting direction information denoting an orientation of said portable terminal, wherein

display of walking navigation information provided from an application server is controlled to match actual spatial location of said portable terminal according to said location information and said direction information.

A
Cancel
3. (Once Amended) A portable terminal with a function of walking navigation , comprising:

a device for getting location information denoting a present place of said portable terminal; and

a device for getting direction information denoting an orientation of said portable terminal, wherein

a condition of retrieval including said location information and said direction information is transmitted to an application server so as to retrieve said walking navigation information with use of said portable terminal.

4. (Once Amended) The portable terminal with said function of walking navigation according to claim 1;

A2
Cont.
wherein a direction and a distance of a destination from said present place are denoted with an orientation and a length of a line that is distinguished between starting and ending points so as to supply route guidance information as said walking navigation information.

5. (Once Amended) The portable terminal with said function of walking navigation according to claim 1;

wherein a local route around said present place is shown with a line and a direction of movement is shown with an arrow on said line so as to supply route guidance information as said walking navigation information.

6. (Once Amended) The portable terminal with said function of walking navigation according to claim 1;

wherein a full route to a destination from a starting point is shown with a line that is distinguished between starting and ending points and said present place is shown with a symbol on said line so as to supply route guidance information as said walking navigation information.

A3
Cont.
8. (Once Amended) The portable terminal with said function of walking navigation according to claim 1;

13
Cat
wherein location of a user of said portable terminal is determined according to said location information and said direction information;

location of a partner of the user is determined according to a location information from the partner's portable terminal; and

a direction and a distance of said destination from said present place are shown with an orientation and a length of a line that is distinguished between starting and ending points so as to supply "meeting by appointment" guidance information as said walking navigation information.

9. (Once Amended). The portable terminal with said function of walking navigation according to claim 1;

wherein location of a user of said portable terminal is determined according to said location information and said direction information;

location of a partner of the user is determined according to a location information from the partner's portable terminal; and

A local route around said present place is shown with a line and a direction of movement is shown with an arrow on said line so as to supply said route guidance information as said walking navigation information.

10. (Once Amended) The portable terminal with said function of walking navigation according to claim 1;

wherein location of a user of said portable terminal is determined according to said location information and said direction information;

location of a partner of the user is determined according to a location information from the partner's portable terminal; and

a full route from said starting point to said destination is shown with a line that is distinguished between starting and ending points and said present place is shown with a symbol on said line so as to supply said route guidance information as said walking navigation information.

12. (Once Amended) The portable terminal with said function of walking navigation according to claim 1;

A#
Cancel
said device for getting direction information gets information in a direction pointed by the tip of said portable terminal.

13. (Once Amended) The portable terminal with said function of walking navigation according to claim 1;

said device for getting direction information gets information of a direction pointed by the tip of said portable terminal, as well as an angle of elevation.

REMARKS

Applicants have canceled claim 2 and rewritten claim 3 in independent form. Also. Claims 4-10 have been amended to depend from claim 1. No new claims have been added, accordingly, claims 1 and 3-14 are pending.

A new Abstract has been provided as required by the Examiner.

The claims have been amended to overcome the 35 U.S.C. § 112, second paragraph rejection. See page 21, line 1 to page 22, line 9 of the specification for support in the disclosure of the relationship between a user and a user's partner, for example.

Applicants request reconsideration of the 35 U.S.C. § 102 rejection of claims 1, 4-7 and 11-14 as being anticipated by Ghaem et al, and the rejection of claims 3 and 8-10 under 35 U.S.C. § 103 over Ghaem et al. Claims 1 and 3 are the independent claims that are patentable over Ghaem, as amended, whether or not the reference is considered in combination with any of the other references of record.

According to the invention, a small portable terminal is used for walking navigation by a user and/or a user's partner. Such a device has a small display which makes it difficult to display detailed information. In order to solve the problem, therefore, the present invention enables the direction of an indicating arrow that is displayed to always point in the direction of the destination (see Fig. 1).

In particular, in the navigation processing, the user enters data to select a menu and/or set retrieving conditions on the setup screen interactively with the use of an input device such as a button key, a pen, a microphone, etc. of the portable terminal. At first, the user gets the location information of the portable terminal, represented by a latitude/longitude or coordinates and an altitude, for example. Then, the user gets the direction information of the portable terminal. The direction information is the direction

of the tip of the portable terminal or the orientation of the display screen represented by a direction and an angle of elevation. For example, a compass, a gyro, or a clinometer are used to measure the direction information. The location information and the direction information are set as terminal information for the retrieving conditions. The system controls retrieving of the database and retrieves the information corresponding to the selected menu, such as route guidance, neighborhood guidance and meeting by appointment guidance, etc. If the route guidance service is selected, the system retrieves information of a route between the present place and the destination, for example.

Claim 1 sets forth that the portable terminal includes a device for getting location information denoting a present place of the portable terminal and a device for getting direction information denoting an orientation of the portable terminal, wherein the display of walking navigation information provided from an application server with which the terminal communicates is controlled to match the actual spatial location of the portable terminal according to the location and direction information. Claim 3 also sets forth the devices with condition of retrieval including location information and direction information being transmitted to an

application server so as to retrieve the walking navigation information. Neither of these claims is anticipated by or rendered unpatentable by Ghaem et al.

Rather, Ghaem et al disclose that the user inputs data regarding the latitude and longitude of the user's present position and the latitude and longitude of the desired destinations (see col. 3, lines 14-17 of the reference). Accordingly, the reference does not disclose the location information and direction information obtaining devices, as claimed by Applicants.

The dependent claims 4-14 have been rejected over Ghaem et al, however since each of these claims is a dependent claim that has claims 1 or 3 as its base claim, each of these claims is at least patentable for the reason that it depends from an allowable base claim. Accordingly, the 35 USC §103 rejection should be withdrawn.

Serial No. 09/613,634

H-922

In view of the foregoing amendments and remarks,
reconsideration and reexamination are respectfully requested.

Respectfully submitted,

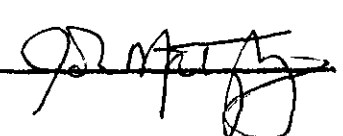


John R. Mattingly
Registration No. 20,293
Attorney for Applicant(s)

MATTINGLY, STANGER & MALUR
1800 Diagonal Road, Suite 370
Alexandria, Virginia 22314
(703) 684-1120
Date: September 27, 2001

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being
deposited with the United States Postal Service as first
class mail in an envelope addressed to:
Commissioner of Patents and Trademarks,
Washington, D.C. 20231

on September 27 2001 by 

MARKED UP VERSION OF REWRITTEN CLAIMS

1. (Once Amended) A portable terminal with a a [the] function of walking navigation, comprising:

a device for getting location information denoting a present place of said portable terminal; and

a device for getting direction information denoting an orientation of said portable terminal, wherein

display of walking navigation information provided from an application server is controlled to match actual spatial location of said portable terminal according to said location information and said direction information.

3. (Once Amended) A [The] portable terminal with a [said] function of walking navigation [according to claim 1;

wherein the condition of retrieval is set according to said location information and said direction information], comprising:

a device for getting location information denoting a present place of said portable terminal; and

a device for getting direction information denoting an orientation of said portable terminal, wherein

a condition of retrieval including said location information and said direction information is transmitted to

an application server so as to retrieve said walking navigation information with use of said portable terminal.

4. (Once Amended) The portable terminal with said function of walking navigation according to claim [2] 1;

wherein a direction and a distance of a destination from said present place are denoted with an orientation and a length of a line that is distinguished between starting and ending points so as to supply route guidance information as said walking navigation information.

5. (Once Amended) The portable terminal with said function of walking navigation according to claim [2] 1;

wherein a local route around said present place is shown with a line and a direction of movement is shown with an arrow on said line so as to supply route guidance information as said walking navigation information.

6. (Once Amended) The portable terminal with said function of walking navigation according to claim [2] 1;

wherein a full route to a destination from a starting point is shown with a line that is distinguished between starting and ending points and said present place is shown

with a symbol on said line so as to supply route guidance information as said walking navigation information.

8. (Once Amended) The portable terminal with said function of walking navigation according to claim [2] 1;

[wherein the user's location is regarded as a present place and the partner's location as a destination; and]

wherein location of a user of said portable terminal is determined according to said location information and said direction information;

location of a partner of the user is determined according to a location information from the partner's portable terminal; and

a direction and a distance of said destination from said present place are shown with an orientation and a length of a line that is distinguished between starting and ending points so as to supply "meeting by appointment" guidance information as said walking navigation information.

9. (Once Amended) The portable terminal with said function of walking navigation according to claim [2] 1;

[wherein the user's location is regarded as a present place and the partner's location as a destination; and]

wherein location of a user of said portable terminal is determined according to said location information and said direction information;

location of a partner of the user is determined according to a location information from the partner's portable terminal; and

a local route around said present place is shown with a line and a direction of movement is shown with an arrow on said line so as to supply said route guidance information as said walking navigation information.

10. (Once Amended) The portable terminal with said function of walking navigation according to claim [2] 1;

[wherein said user's location is regarded as a present place and said partner's location as a destination; and]

wherein location of a user of said portable terminal is determined according to said location information and said direction information;

location of a partner of the user is determined according to a location information from the partner's portable terminal; and

a full route from said starting point to said destination is shown with a line that is distinguished between starting

and ending points and said present place is shown with a symbol on said line so as to supply said route guidance information as said walking navigation information.

12. (Once Amended) The portable terminal with said function of walking navigation according to claim 1;

said device for getting direction information gets information in a direction pointed by the tip of said portable terminal[, etc].

13. (Once Amended) The portable terminal with said function of walking navigation according to claim 1;

said device for getting direction information gets information of a direction pointed by the tip of said portable terminal[, etc.], as well as an angle of elevation.

ABSTRACT OF THE DISCLOSURE

A5
A portable terminal has a function of walking navigation. The direction of the destination is displayed by an indicating arrow that always points in the direction of the destination. In the navigation processing, the user enters data to select a menu and/or set retrieving conditions on the setup screen. At first, the user gets the location information of the portable terminal, represented by a latitude/longitude or coordinates and an altitude, for example. Then, the user gets the direction information of the portable terminal, which is the direction of the tip of the portable terminal as determined by a compass, a gyro, or a clinometer. The location information and the direction information are set as terminal information for the retrieving conditions. The system controls retrieving of the database and retrieves the information corresponding to the selected menu, such as route guidance

FORM PTO-1083

PATENT

Case Docket No. H-922

In RE application of K. MARUYAMA et al

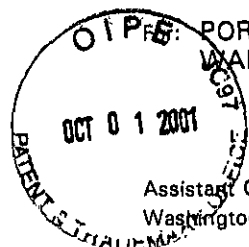
Serial No.: 09/613,634

Group Art Unit: 3661

Filed: July 11, 2000

Examiner: Y. Beaulieu

CAP-3661

PORTABLE TERMINAL WITH THE FUNCTION OF
WALKING NAVIGATIONAssistant Commissioner for Patents
Washington, D.C. 20231

RECEIVED

OCT 04 2001

O 3600 MAIL ROOM

Sir:

Transmitted herewith is an Amendment in the above-identified application.

- ☐ Small entity status of this application under 37 CFR 1.9 and 1.27 has been established by a verified statement previously submitted.
- ☐ A verified statement to establish small entity status under 37 CFR 1.9 and 1.27 is enclosed.
- ☒ No additional fee is required.

The fee has been calculated as shown below:

	(COL. 1)		(COL. 2)		(COL. 3)
	Claims Remaining After Amendment		Highest No. Previously Paid For		Present Extra
Total	13	Minus	20	=	0
Indep.	2	Minus	3	=	0
<input type="checkbox"/> First Presentation of Multiple Dependent Claims					

SMALL ENTITY

Rate	Additional Fee
x 9	\$
x 40	\$
+ 135	\$
Total	\$

OTHER THAN A
SMALL ENTITY

Rate	Additional Fee
x 18	\$ 0
x 80	\$ 0
+ 270	\$ 0
Total	\$ 0

- * If the entry in Col. 1 is less than the entry in Col. 2, write '0' in Col. 3.
- ** If the 'Highest Number Previously Paid For' IN THIS SPACE is less than 20, write '20' in this space.
- *** If the 'Highest Number Previously Paid For' IN THIS SPACE is less than 3, write '3' in this space.
- The 'Highest Number Previously Paid For' (Total or Independent) is the highest number found from the equivalent box in Col. 1 of a prior Amendment or the number of claims originally filed.

- ☐ Please charge my Deposit Account No. 50-1417 in the amount of \$ _____.
- ☐ A check in the amount of \$ _____ is attached in payment of: _____.
- ☒ The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-1417.
- ☒ Any filing fees under 37 CFR 1.16 for the presentation of extra claims.
- ☒ Any patent application processing fees under 37 CFR 1.17.
- ☒ Any Extension of Time fees that are necessary, which are hereby requested if necessary.

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Rd., Suite 370
Alexandria, Virginia 22314
(703) 684-1120

Date: September 27, 2001

CERTIFICATE OF MAILING

By:

John R. Mattingly
I hereby certify that this correspondence is being
deposited with the United States Postal Service as first
class mail in an envelope addressed to:
Commissioner of Patents and Trademarks,
Washington, D.C. 20231

on September 27, 2001 by J.R. Mattingly



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Washington, D C 20231
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/613,634	07/11/2000	Kishiko Maruyama	H-922	1235

7590 11/19/2001

MATTINGLY, STANGER & MALUR, P.C.
104 East Hume Avenue
Alexandria, VA 22301

EXAMINER

BEAULIEU, YONEL

ART UNIT	PAPER NUMBER
3661	7

DATE MAILED: 11/19/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/613,634	MARUYAMA ET AL.	
	Examiner	Art Unit	
	Yonel Beaulieu	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to remaining claims 1, and 3 - 14 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 3 - 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghaem et al. (US 5,146,231) in view of Garthwaite et al. (US 6,124,826).

Regarding remaining claims 1 and 3 - 14, Ghaem et al. teaches a portable terminal (10; see figs. 1 and 2 at least) with the function of walking navigation, comprising a device (28) for getting location information denoting a present place of the terminal (col. 5: 39 - 56 at least) and a device for getting direction information via a display (14) denoting an orientation of the terminal (col. 5: 6 - 9; col. 6: 41 - 48 at least); the device further getting the direction information in a direction pointed by the tip of the terminal and angle of elevation (col. 5: 17 - 38 at least); Ghaem et al. further teaches direction and distance of a destination from the present place denoted with a length of a

line having starting and ending points as to supply route guidance information as the walking navigation information (col. 3: 12 – col. 4: 3 at least).

Furthermore, Ghaem et al. has been shown to suggest item 55 in fig. 2 that would achieve the idea of "retrieving" navigational information and a 'meeting location' (desired destination as noted in col. 2: 7 – 13 and 45 – 58; col. 3: 20 – 26 and 51 – 54 at least).

Ghaem et al. fails to teach the navigation information is being provided from an application server.

However, Garthwaite et al. teaches navigation information provided from an application server (as illustrated in fig. 1 at least; note col. 4: 3 – 33).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the navigation from an application server as evidenced by Garthwaite et al. in order to provide for versatility and high accuracy in using the portable device.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yonel Beaulieu whose telephone number is (703) 305-

Application/Control Number: 09/613,634
Art Unit: 3661

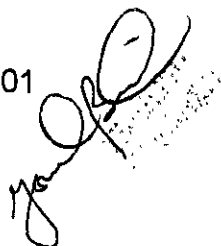
Page 4

4072. The examiner can normally be reached on Monday to Friday (0630-1600), first Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William A. CUCHLINSKI can be reached on (703) 308-3873. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7687 for regular communications and same for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.

Y. Beaulieu
November 8, 2001

A handwritten signature in black ink, appearing to be 'Y. Beaulieu', with a large, stylized loop at the end.



H-922

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

K. MARUYAMA et al

Serial No. 09/613,634

Group Art Unit: 3661

Filed: July 11, 2000

Examiner: Y. Beaulieu

For: PORTABLE TERMINAL WITH THE FUNCTION OF
WALKING NAVIGATION

AMENDMENT

RECEIVED

FEB 21 2002

GROUP 3600

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated November 19, 2001,
please amend the above-identified application as follows:

IN THE CLAIMS

Cancel claims 1 and 3-14 without prejudice or disclaimer,
and add new claims 15-27:

15. A portable terminal with the function of walking
navigation, comprising:

a device for getting location information denoting a
present place of said portable terminal; and

a device for getting direction information denoting
an orientation of said portable terminal,

wherein a direction and a distance of a destination
from said present place are denoted with an orientation and a

length of a line that is distinguished between starting and ending points to supply route guidance information as said walking navigation information.

²
~~16~~. A portable terminal with the function of walking navigation according to claim ~~15~~,

wherein said device for getting direction information gets information of a direction pointed by the tips of said portable terminal, as well as an angle of elevation.

³
~~17~~. A portable terminal with the function of walking navigation according to claim ~~15~~,

wherein said device for getting direction information gets orientation information of a display of said portable terminal.

⁴
~~18~~. A portable terminal with the function of walking navigation according to claim ~~15~~,

wherein location of a user is of said portable terminal is determined according to said location information and said direction information, and

wherein location of partner of the user is determined according to a location information from the partner's portable terminal.

⁵
~18. A portable terminal with the function of walking navigation, comprising:

B/ a device for getting location information denoting a present place of said portable terminal; and

a device for getting direction information denoting an orientation of said portable terminal,

wherein a local route around said present place is shown with a bent line and a direction of movement is shown with an arrow on said bent line to supply route guidance information as said walking navigation information.

⁶
~20. The portable terminal with said function of walking navigation according to claim ⁵18,

wherein said device for getting direction information gets information of a direction pointed by the tip of said portable terminal, as well as an angle of elevation.

⁷
~21. The portable terminal with said function of walking navigation according to claim ⁵19,

wherein said device for getting direction information gets orientation information of a display of said portable terminal.

8
22. The portable terminal with said function of walking navigation according to claim 19,

B1
wherein neighborhood guidance information is retrieved in a direction from said present place so as to supply said neighborhood guidance information as said walking navigation information.

9
23. The portable terminal with said function of walking navigation according to claim 19,

wherein location of a user is of said portable terminal is determined according to said location information and said direction information, and

wherein location of partner of the user is determined according to a location from the partner's portable terminal.

10
24. A portable terminal with the function of walking navigation, comprising:

a device for getting location information denoting a present place of said portable terminal; and

a device for getting direction information denoting an orientation of said portable terminal,

wherein location of a user is of said portable terminal is determined according to said location information and said direction information,

wherein location of a partner of the user is determined according to a location information from the partner's portable terminal, and

wherein a full route from said starting point to said destination is shown with a bent line that is distinguished between starting and ending points and said present place is shown with a symbol on said line to supply said route guidance information as said walking navigation information.

¹¹
~~25~~. The portable terminal with said function of walking navigation according to claim ¹⁰~~24~~,

wherein said device for getting direction information gets information in a direction pointed by the tip of said portable terminal.

B7 Canceled
¹²
~~M26~~. The portable terminal with said function of walking navigation according to claim ¹⁰~~24~~,

wherein said device for getting direction information gets information of a direction pointed by the tip of said portable terminal, as well as an angle of elevation.

¹³
~~M27~~. The portable terminal with said function of walking navigation according to claim ¹⁰~~24~~,

wherein said device for getting direction information gets orientation information of a display of said portable terminal.

REMARKS

Claims 1 and 3-14 have been cancelled. New claims 15-27 have been added. Accordingly, claims 15-27 are currently pending in the application.

Claims 1 and 3-14 stand rejected under 35 USC §103(a) as being unpatentable over Ghaem et al (US Pat. No. 5,146,231) in view of Garthwaite et al (US Pat. No. 6,124,826). This rejection is traversed as follows.

The present invention is directed to a portable terminal with the function of walking navigation as recited in new claims 15-27. Independent claim 15 contains the following limitation: "a direction and a distance of a destination from said present place are denoted with an orientation and a

length of a line that is distinguished between starting and ending points to supply route guidance information as said walking navigation information". Independent claim 19 recites the following: "a local route around said present place is shown with a bent line and direction of movement is shown with an arrow on said bent line to supply route guidance information as said walking navigation information." Finally, independent claim 24 recites the following: "a full route from said starting point to said destination is shown with a bent line that is distinguished between starting and ending points and said present place is shown with a symbol on said line to supply said route guidance information as said walking navigation information."

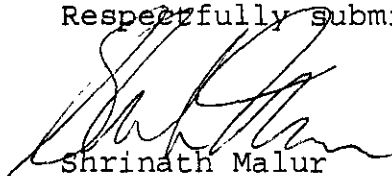
None of the cited references disclose these features of the present invention. For example, Ghaem et al disclose an electronic direction finder in which bearing/heading information is provided to a user with respect to the user's present heading and/or with respect to the heading which a user should follow to arrive at a desired destination. Ghaem et al do not disclose or suggest the "distance" and "bent line" recited in the present pending claims. Ghaem's "direction finder" merely provides a visual arrow indication. Furthermore, the Examiner states that Ghaem discloses an angle of elevation, referring to column 5, line 17-38. However, Applicants submit that this portion of Ghaem et al does not

disclose angle of elevation. Reconsideration is hereby requested.

The deficiencies in Ghaem et al are not overcome by resort to Garthwaite et al. The Examiner relied upon Garthwaite et al merely for the teaching of navigation information provided from an application server. As such, it is submitted that the pending claims patentably define the present invention over the cited art.

In view of the foregoing amendments and remarks, reconsideration and re-examination are respectfully requested.

Respectfully submitted,



Shrinath Malur
Registration No. 34,663
Attorney for Applicant(s)

MATTINGLY, STANGER & MALUR
1800 Diagonal Road, Suite 370
Alexandria, Virginia 22314
(703) 684-1120
Date: February 19, 2002

FORM PTO-1083

PATENT

Case Docket No. H-922

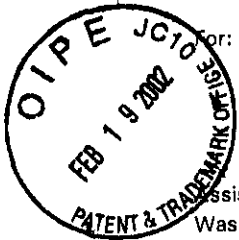
In RE application of K. MARUYAMA et al

Serial No.: 09/613,634

Group Art Unit: 3661

Filed: July 11, 2000

Examiner: Y. Beaulieu



For: PORTABLE TERMINAL WITH THE FUNCTION OF WALKING NAVIGATION

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

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GROUP 3600

Transmitted herewith is an Amendment in the above-identified application.

- ☐ Small entity status of this application under 37 CFR 1.9 and 1.27 has been established by a verified statement previously submitted.
- ☐ A verified statement to establish small entity status under 37 CFR 1.9 and 1.27 is enclosed.
- ☐ No additional fee is required.

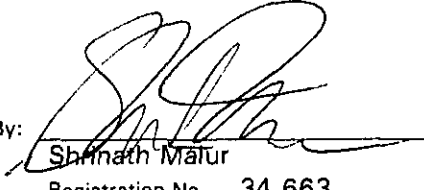
The fee has been calculated as shown below:

(COL. 1)		(COL. 2)		(COL. 3)	SMALL ENTITY		OR	OTHER THAN A SMALL ENTITY	
	Claims Remaining After Amendment		Highest No. Previously Paid For	Present Extra	Rate	Additional Fee		Rate	Additional Fee
Total	* 13	Minus	** 20	= 0	x 9	\$		x 18	\$ 0
Indep.	* 3	Minus	*** 3	= 0	x 42	\$		x 84	\$ 0
<input type="checkbox"/> First Presentation of Multiple Dependent Claims					+ 140	\$		+ 280	\$ 0
					Total	\$		Total	\$ 0

- * If the entry in Col. 1 is less than the entry in Col. 2, write '0' in Col. 3.
- ** If the 'Highest Number Previously Paid For' IN THIS SPACE is less than 20, write '20' in this space.
- *** If the 'Highest Number Previously Paid For' IN THIS SPACE is less than 3, write '3' in this space.
- The 'Highest Number Previously Paid For' (Total or Independent) is the highest number found from the equivalent box in Col. 1 of a prior Amendment or the number of claims originally filed.

- ☐ Please charge my Deposit Account No. 50-1417 in the amount of \$ _____.
- ☐ A check in the amount of \$ _____ is attached in payment of: _____.
- ☒ The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-1417.
- ☒ Any filing fees under 37 CFR 1.16 for the presentation of extra claims.
- ☒ Any patent application processing fees under 37 CFR 1.17.
- ☒ Any Extension of Time fees that are necessary, which are hereby requested if necessary.

MATTINGLY, STANGER & MALUR, P.C.
1800 Diagonal Rd., Suite 370
Alexandria, Virginia 22314
(703) 684-1120

By: 
Shrinath Malur
Registration No. 34,663
Attorney for Applicant(s)

Date: February 19, 2002

Notice of Allowability

Application No.

09/613,634

Examiner

Yonel Beaulieu

Applicant(s)

MARUYAMA ET AL.

Art Unit

3661

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendments/arguments filed 19 February 2002.
2. ☒ The allowed claim(s) is/are 15-27.
3. ☒ The drawings filed on 11 July 2000 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____.
5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - (a) ☐ The translation of the foreign language provisional application has been received.
6. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☐ CORRECTED DRAWINGS must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No. _____.
 - (b) ☐ including changes required by the proposed drawing correction filed _____, which has been approved by the Examiner.
 - (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the top margin (not the back) of each sheet. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1 <input type="checkbox"/> Notice of References Cited (PTO-892) | 2 <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3 <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 4 <input type="checkbox"/> Interview Summary (PTO-413), Paper No. _____ |
| 5 <input type="checkbox"/> Information Disclosure Statements (PTO-1449), Paper No. _____ | 6 <input type="checkbox"/> Examiner's Amendment/Comment |
| 7 <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | 8 <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9 <input type="checkbox"/> Other |

Yonel Beaulieu
YONEL BEAULIEU
PRIMARY EXAMINER

Allowable Subject Matter

Claims 15 – 27 are allowed in view of Applicants' amendments and arguments and the following is a statement of reasons for indicating allowable subject matter.

Specifically, the prior art of record fail to fairly suggest a portable terminal with the function of walking navigation, comprising, among other limitations, a direction and a distance of a destination from a present place are denoted with an orientation and a length of a line that is distinguished between starting and ending points to supply route guidance information as walking navigation information; a local route around the present place being shown with a bent line and direction of movement is shown with an arrow on the bent line to supply the route guidance walking information; and a full route from the starting point to the destination being also shown with a bent line and the present place is shown with a symbol on the bent line to supply the information.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yonel Beaulieu whose telephone number is (703) 305-4072. The examiner can normally be reached on Monday to Friday (0630-1600), first Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William A. CUCHLINSKI can be reached on (703) 308-3873. The fax phone

Application/Control Number: 09/613,634

Page 3

Art Unit: 3661

numbers for the organization where this application or proceeding is assigned are (703)

305-7687 for regular communications and same for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1113.

Y. BEAULIEU
March 13, 2002


YONEL BEAULIEU
PRIMARY EXAMINER



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D C 20231
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 03/18/2002
MATTINGLY, STANGER & MALUR, P.C.
104 East Hume Avenue
Alexandria, VA 22301

EXAMINER	
BEAULIEU, YONEL	
ART UNIT	CLASS-SUBCLASS
3661	701-200000

DATE MAILED: 03/18/2002

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/613,634	07/11/2000	Kishiko Maruyama	H-922	1235

TITLE OF INVENTION: PORTABLE TERMINAL WITH THE FUNCTION OF WALKING NAVIGATION

TOTAL CLAIMS	APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
13	nonprovisional	NO	\$1280	\$0	\$1280	06/18/2002

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above. If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is changed, pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above and notify the United States Patent and Trademark Office of the change in status, or

B. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

☐ Applicant claims SMALL ENTITY status.
See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

File History Report

☐ Paper number _____ is missing from the United States Patent Trademark Office's copy of the file History. No additional information is available.

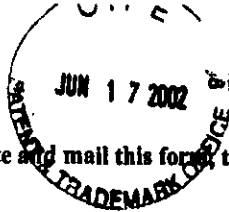
☒ The following page(s) 2 of 3, 3 of 3 of paper number 10 is/are missing from the United States Patent and Trademark Office's original copy of the file history. No additional information is available

☐ The following checked item(s) below of paper number _____ is/are missing from the United States Patent and Trademark Office's original copy of the file history. No additional information is available

- ☐ PTO 1449
- ☐ PTO 892
- ☐ PTO 948
- ☐ PTO 1474
- ☐ Assignment
- ☐ Cover page

Additional comments: _____

BEST COPY



PART B - FEE(S) TRANSMITTAL

Complete and mail this form, together with applicable fee(s), to:

Box ISSUE FEE
Assistant Commissioner for Patents
Washington, D.C. 20231

MAILING INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

7590 03/18/2002

MATTINGLY, STANGER & MALUR, P.C.
104 East Hume Avenue
Alexandria, VA 22301

Note: The certificate of mailing below can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

Certificate of Mailing

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/613,634	07/11/2000	Kishiko Maruyama	H-922	1235

TITLE OF INVENTION: PORTABLE TERMINAL WITH THE FUNCTION OF WALKING NAVIGATION

TOTAL CLAIMS	APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
13	nonprovisional	NO	\$1280	\$0	\$1280	06/18/2002

EXAMINER	ART UNIT	CLASS-SUBCLASS
BEAULIEU, YONEL	3661	701-200000

OK to Enter

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). Use of PTO form(s) and Customer Number are recommended, but not required.

☒ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47) attached.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

MATTINGLY, STANGER
& MALUR, P.C.

2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

HITACHI, LTD.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Tokyo, Japan

Please check the appropriate assignee category or categories (will not be printed on the patent) ☐ individual ☒ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

☒ Issue Fee

☐ Publication Fee

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

☒ A check in the amount of the fee(s) is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Commissioner is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number 50-1417 (enclose an extra copy of this form).

The COMMISSIONER OF PATENTS AND TRADEMARKS is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature) _____ (Date)

John R. Mattingly; Reg. No. 30,293 6/17/02

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending on the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, United States Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND FEES AND THIS FORM TO: Box Issue Fee, Assistant Commissioner for Patents, Washington, D.C. 20231

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06/21/2002 INQUIRY# 00000097 09613634

01 FC:142

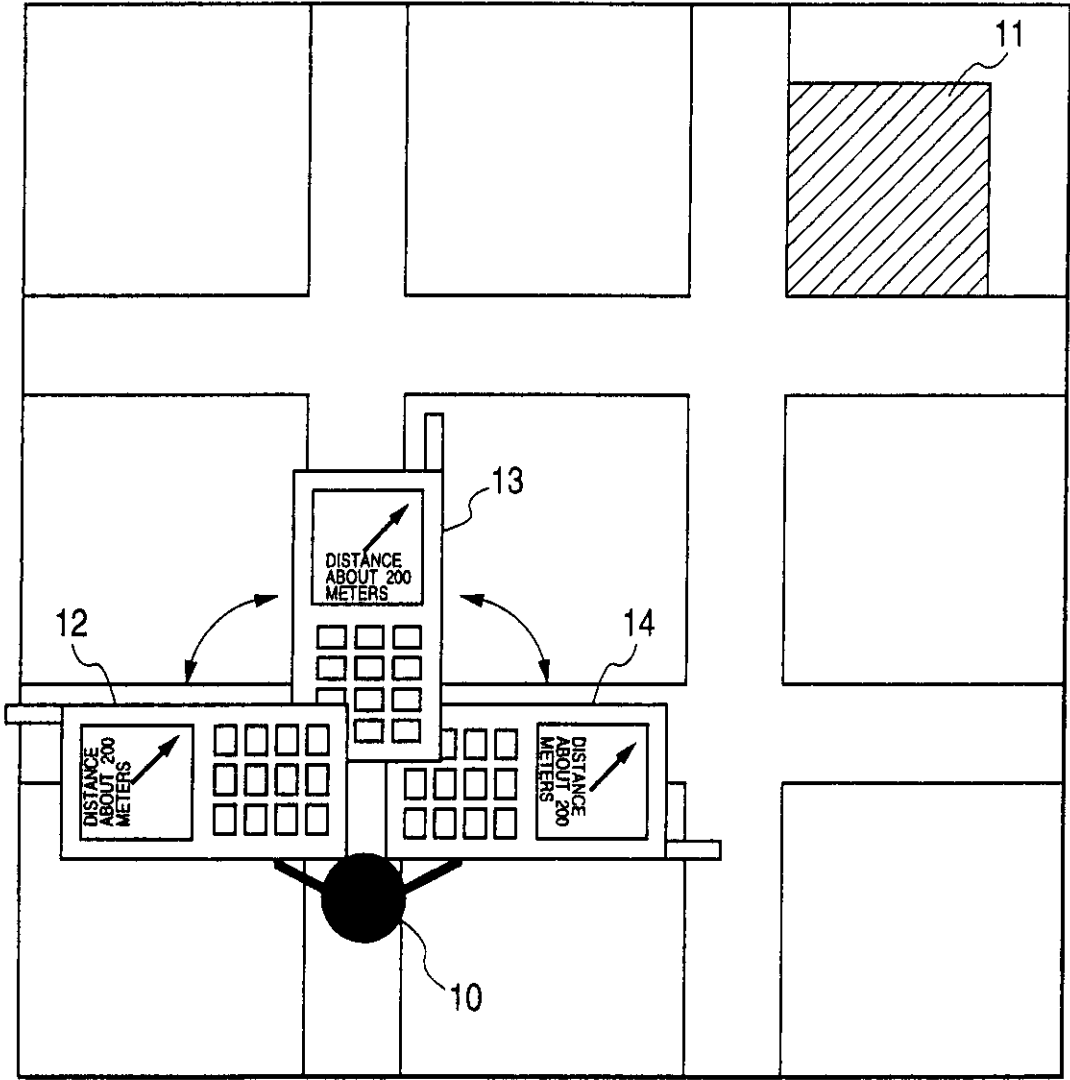
1280.00 DP

TRANSMIT THIS FORM WITH FEE(S)

PTOL-85 (REV. 07-01) Approved for use through 01/31/2004. OMB 0651-0033

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

FIG. 1



10
fig.

FIG. 2

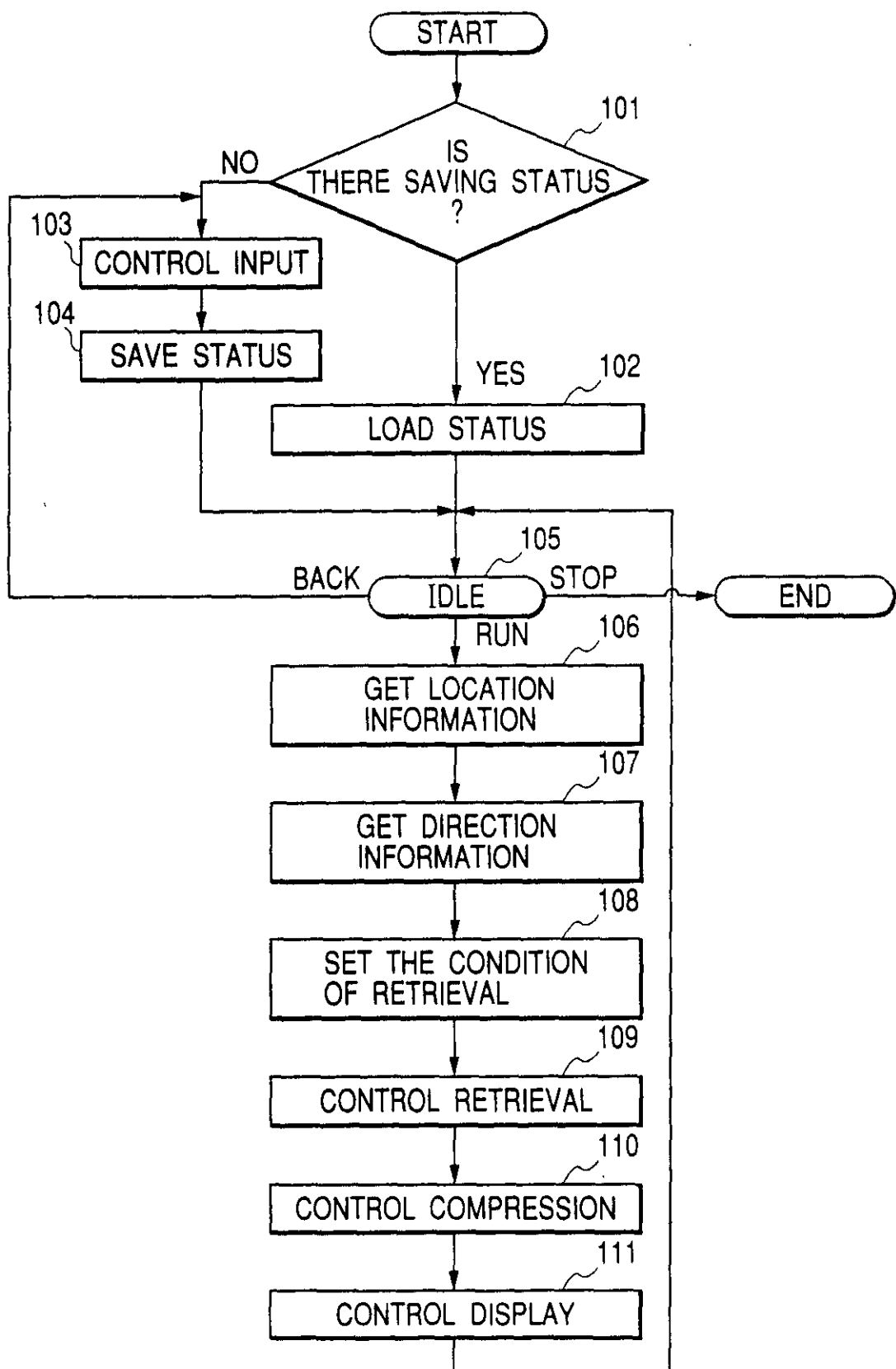


FIG. 3(b)

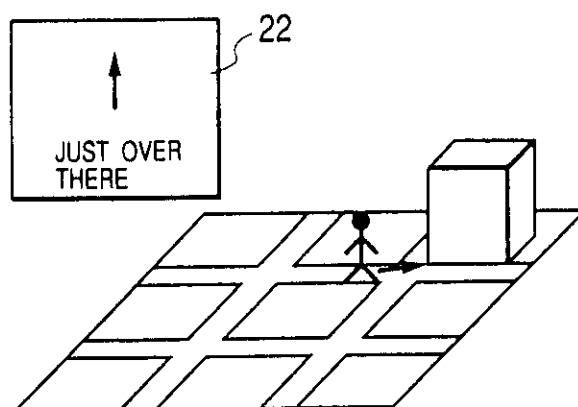


FIG. 3(d)

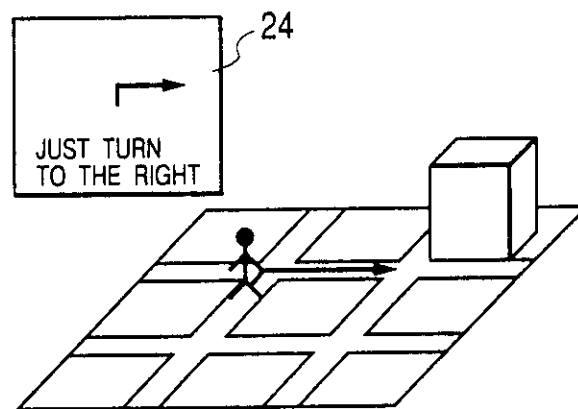


FIG. 3(f)

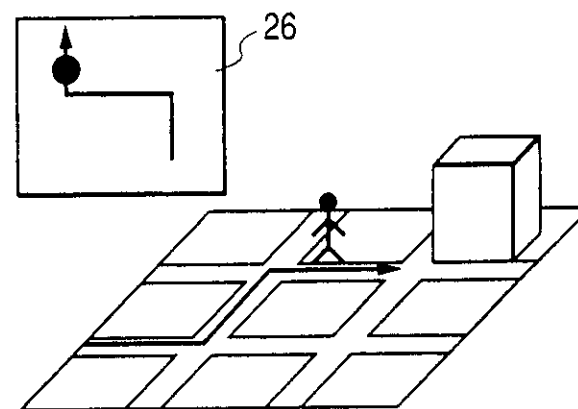


FIG. 4

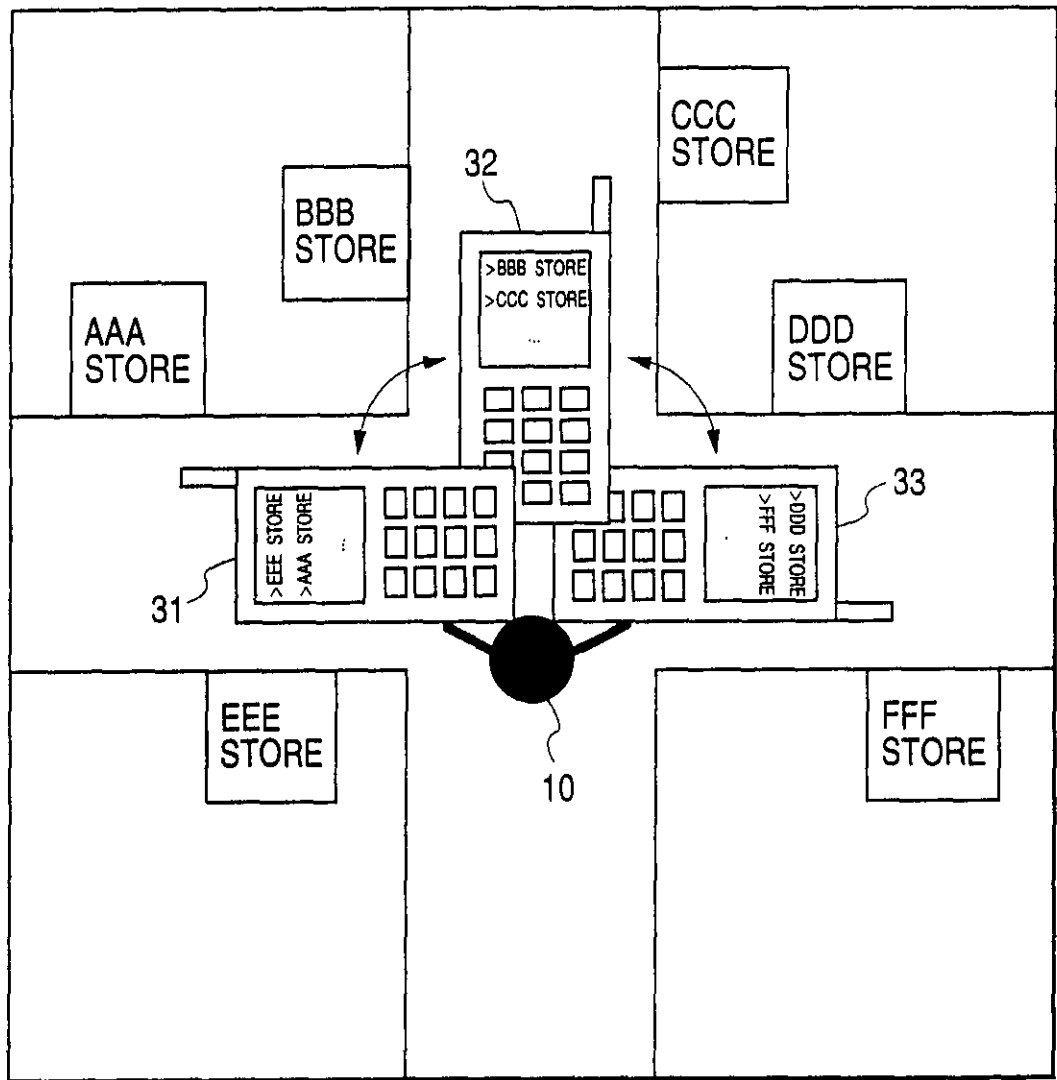


FIG. 5

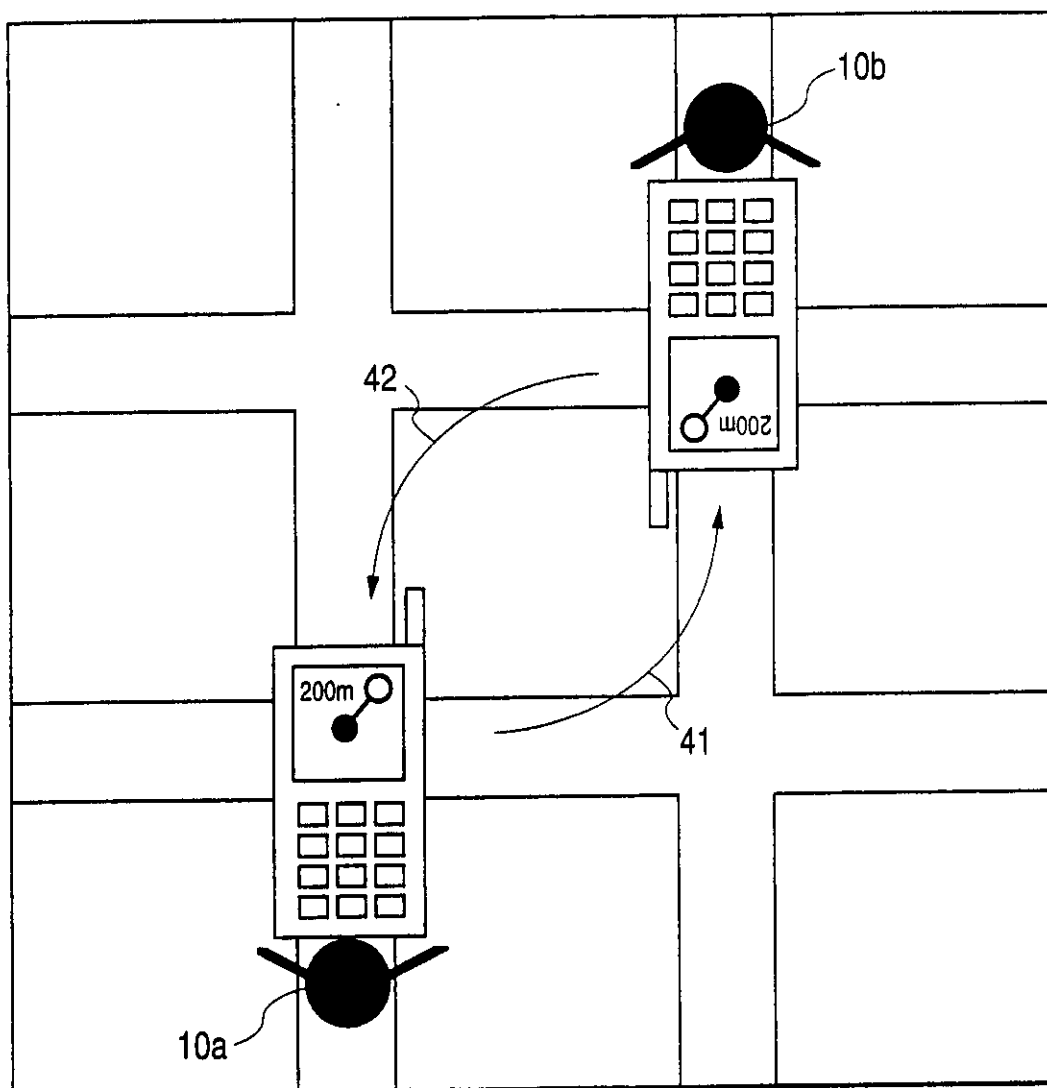


FIG. 6

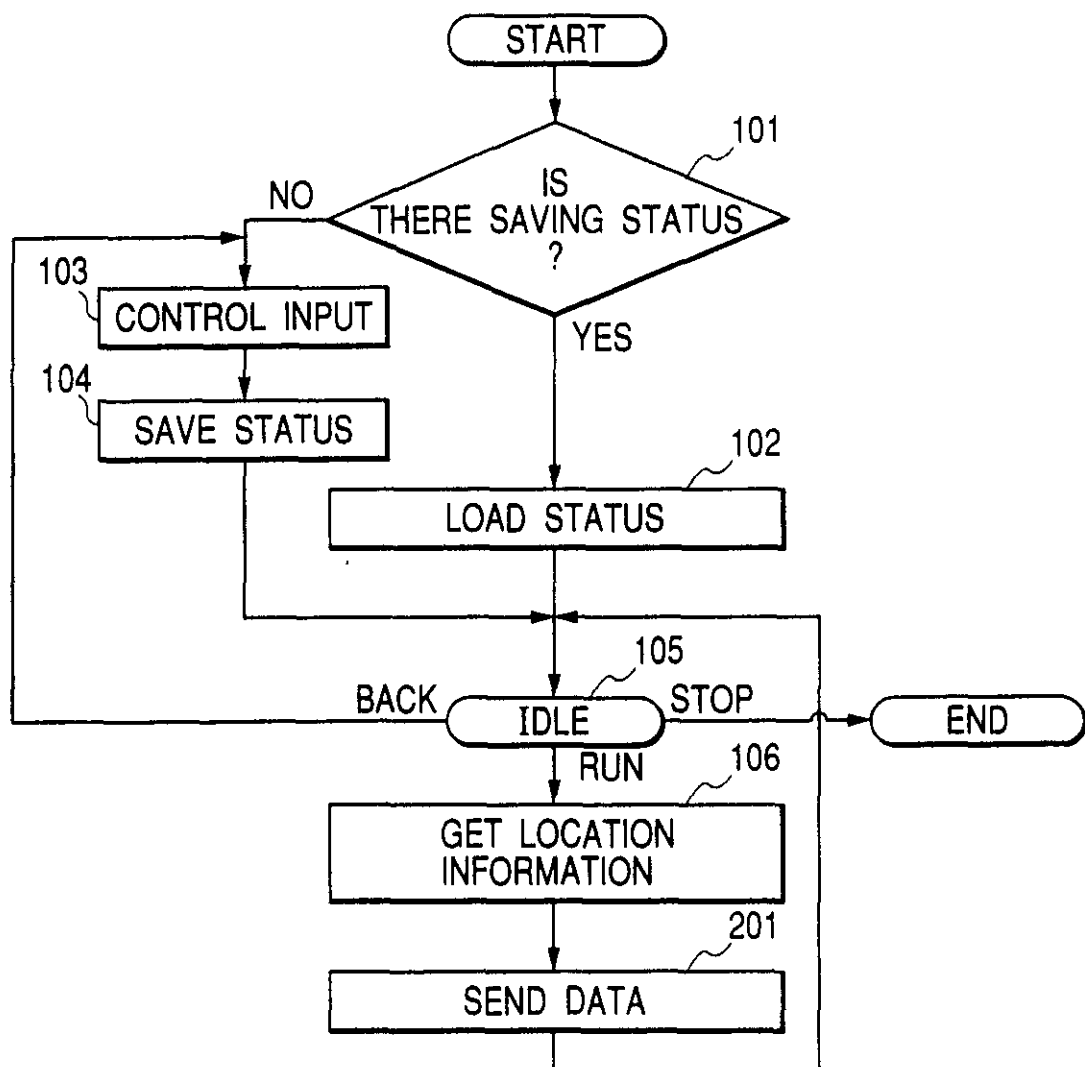


FIG. 7

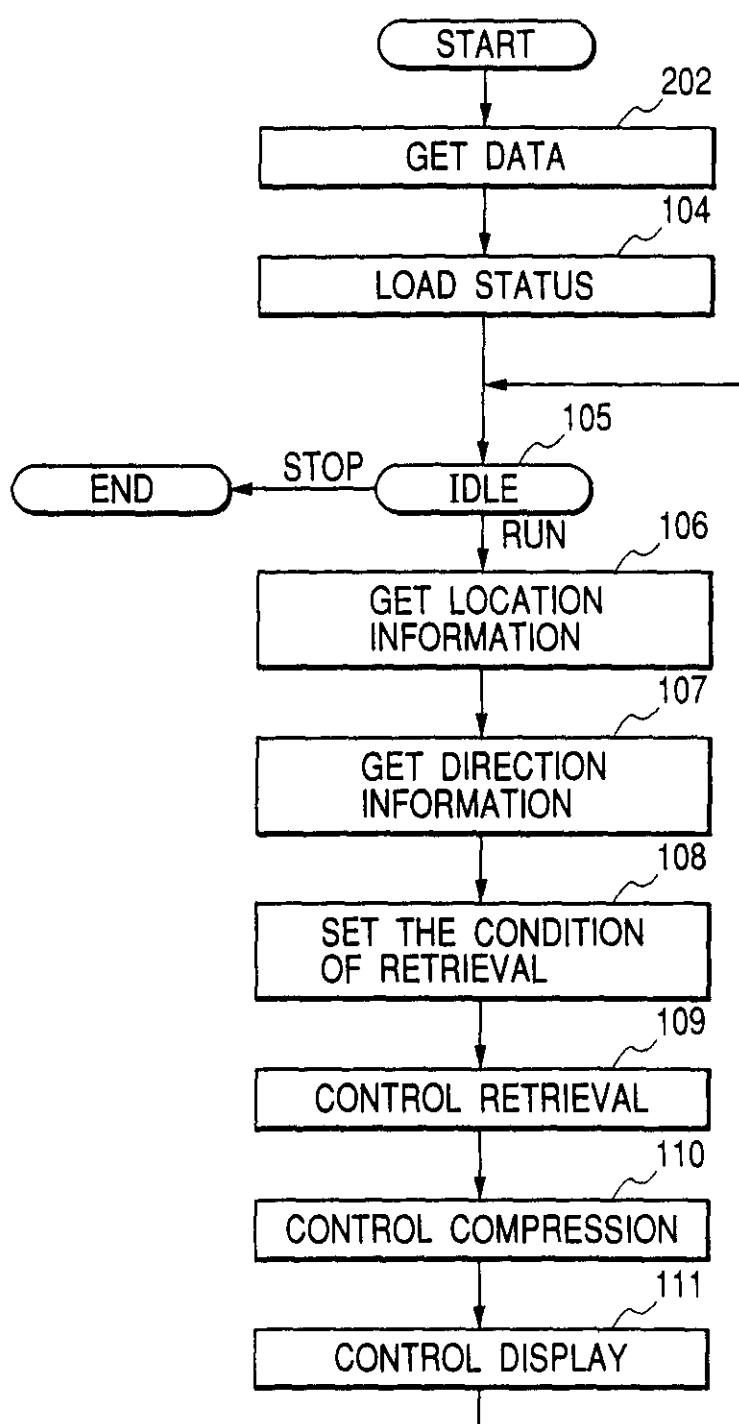


FIG. 8

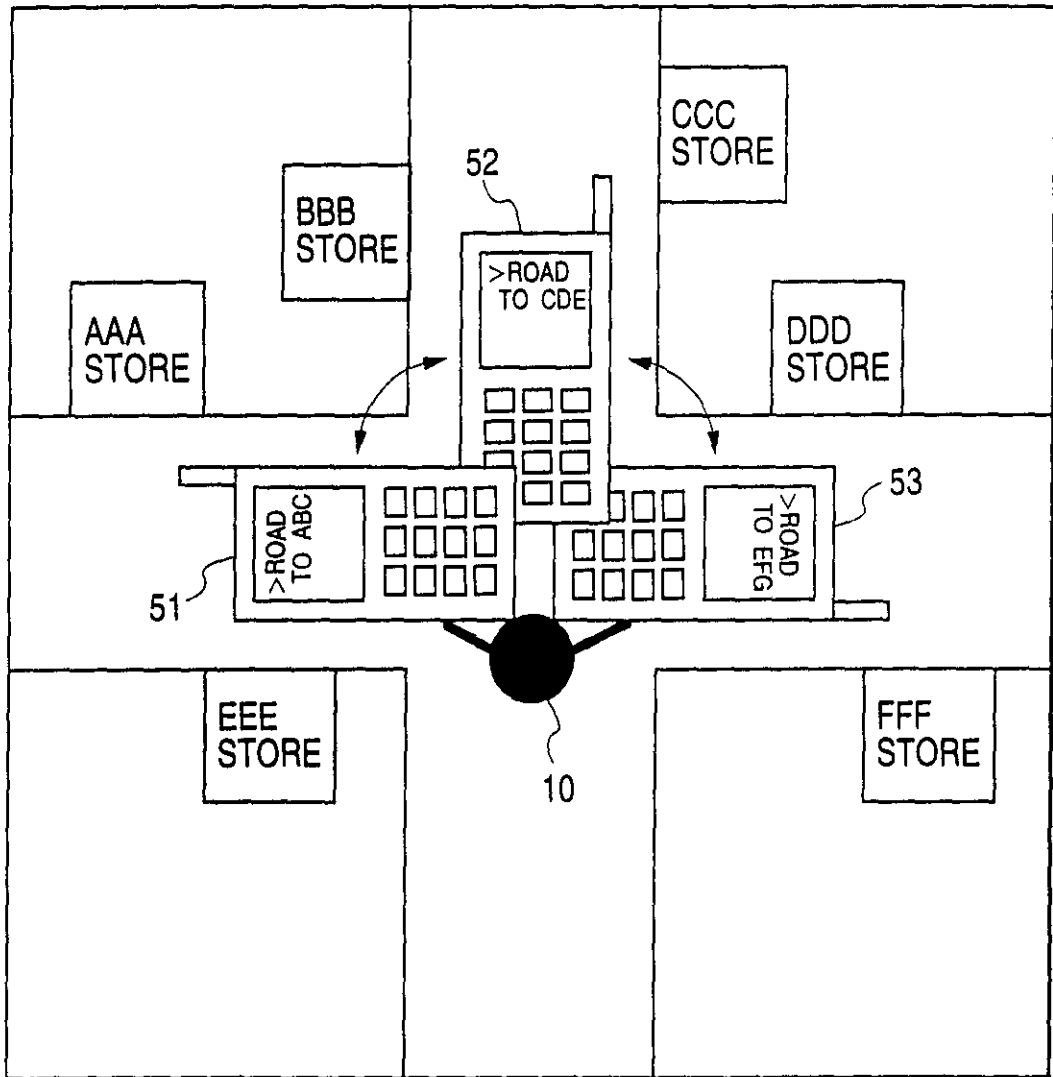


FIG. 9

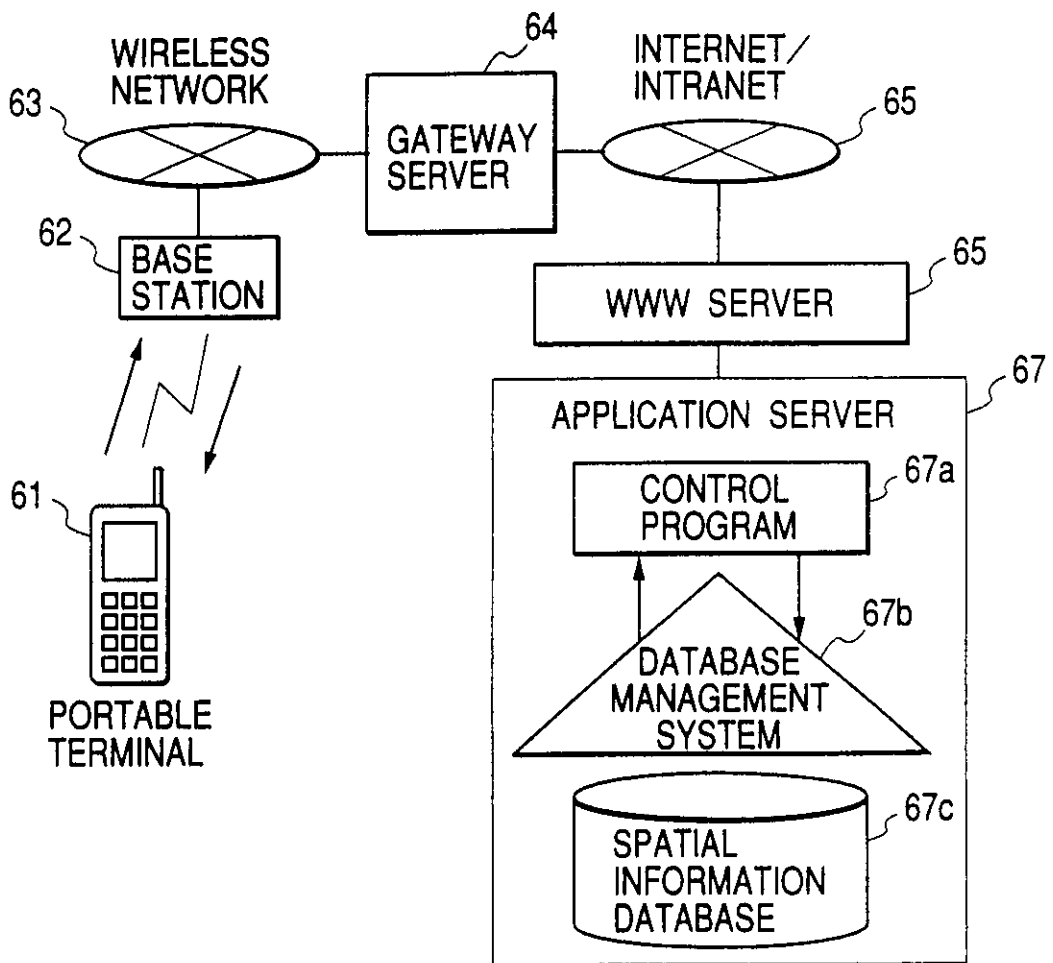
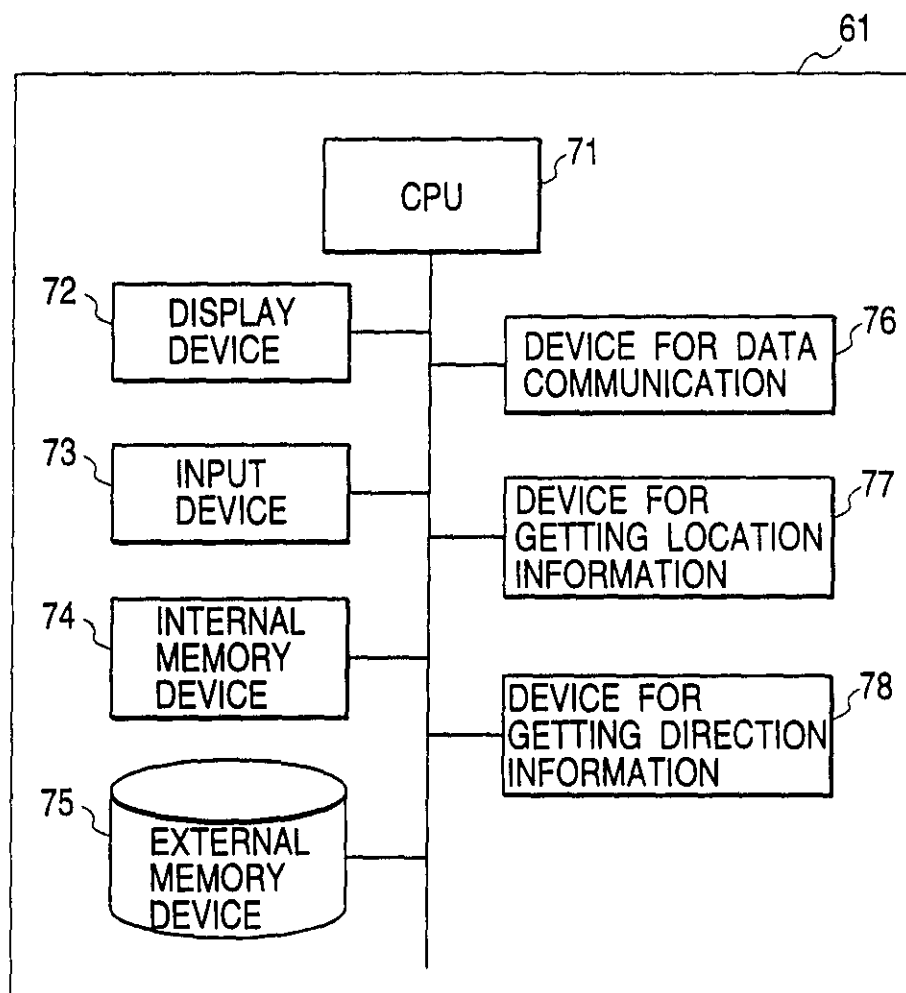


FIG. 10






#11
5-7-02
BC

PTO/SB/122 (10-97)
Approved for use through 10/31/2002. OMB 0551-0028
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CHANGE OF CORRESPONDENCE ADDRESS Application	
Application Number	09/613,634
Filing Date	7/11/2000
First Named Inventor	K. Maruyama
Art Unit	3661
Examiner Name	Beaulieu, Yonel
Attorney Docket Number	H-922

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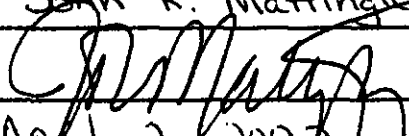
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Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).
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- ☐ Registered practitioner named in the application transmittal letter in an application without an executed oath or declaration. See 37 CFR 1.33(a)(1). Registration Number _____

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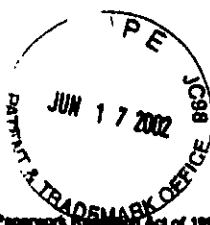
GRO

Typed or Printed Name	John R. Mattingly
Signature	
Date	April 2, 2002

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CHANGE OF CORRESPONDENCE ADDRESS Application

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Typed or Printed
Name

John R. Mattingly; Reg. No. 30,293

Signature

Date

6-17-02

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USPT	l4 near l8	50	<u>L9</u>
USPT	portable	110258	<u>L8</u>
USPT	l6 or l2	1385720	<u>L7</u>
USPT	direction	1307842	<u>L6</u>
USPT	gps	12399	<u>L5</u>
USPT	navigation	14516	<u>L4</u>
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USPT	orientation	294024	<u>L2</u>
USPT	janky.in.	54	<u>L1</u>

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USPT	terminal	506927	<u>L11</u>
USPT	l5 and l7 and l9	31	<u>L10</u>
USPT	l4 near l8	50	<u>L9</u>
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USPT	navigation	14516	<u>L4</u>
USPT	l1 and l2	7	<u>L3</u>
USPT	orientation	294024	<u>L2</u>
USPT	janky.in.	54	<u>L1</u>

PATENT APPLICATION FEE DETERMINATION RECORD

Effective December 29, 1999

Application or Docket Number

CLAIMS AS FILED - PART I

(Column 1)

(Column 2)

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE		
TOTAL CLAIMS	14 minus 20 = *	
INDEPENDENT CLAIMS	minus 3 = *	
MULTIPLE DEPENDENT CLAIM PRESENT		

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

(Column 1)

(Column 2)

(Column 3)

AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	* 13 Minus	** 20	= -
Independent	* 2 Minus	*** 3	= /
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			

(Column 1)

(Column 2)

(Column 3)

AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	* 13 Minus	** 20	= -
Independent	* 3 Minus	*** 3	= /
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			

(Column 1)

(Column 2)

(Column 3)

AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	* Minus	**	=
Independent	* Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐ OR

OTHER THAN SMALL ENTITY

RATE	FEE	RATE	FEE
	345.00		690.00
X\$ 9=		X\$18=	
X39=		X78=	
+130=		+260=	
TOTAL		TOTAL	

SMALL ENTITY OR

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X39=		X78=	
+130=		+260=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

RATE ADDITIONAL FEE

RATE ADDITIONAL FEE

X\$ 9=		X\$18=	
X39=		X78=	
+130=		+260=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

RATE ADDITIONAL FEE

RATE ADDITIONAL FEE

X\$ 9=		X\$18=	
X39=		X78=	
+130=		+260=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	