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Translation Department

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(54) [Title of the Invention] Position information identifying member

(57) ABSTRACT

PROBLEM

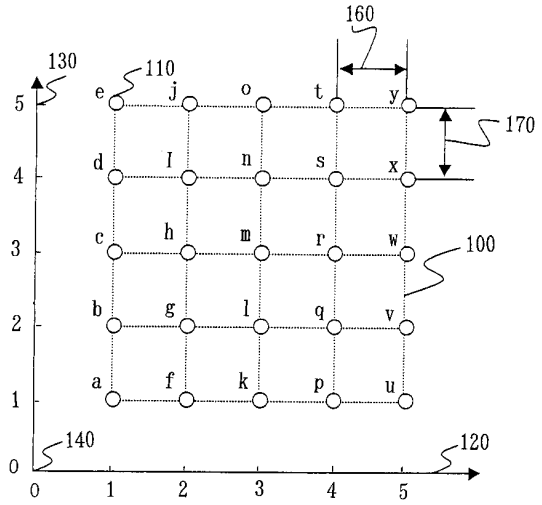
An object of the present invention is to provide a position information identifying member that can be easily installed and can accurately identify position information both outdoors and indoors without radio wave interference.

RESOLUTION MEANS

The present invention is a position information identifying member, wherein a plurality of elements having a unique recognition code that can be read by a reading device are regularly integrally attached to a sheet-like or mesh-like member.

[Selected Drawing] FIG. 1

FIG. 1



CLAIMS

[Claim 1]
A position information identifying member, wherein a plurality of IC tags having a unique recognition code that can be read by a reading device are regularly integrally attached to a sheet-like or mesh-like member, and the position of the element can be read by the reading device from the recognition code.

DETAILED DESCRIPTION OF THE INVENTION

TECHINICAL FIELD

[0001]
The present invention relates to a novel position information identifying member suitable for indoor locations where GPS cannot be used and for cases where measurement accuracy is insufficient when using GPS or wireless LAN, in the fields of object position surveying, position identification, position indication, and the like.

CONVENTIONAL TECHNOLOGY

[0002]
Conventionally, position information identification methods using the Global Positioning System (GPS) or wireless base stations are known, as shown in Patent Documents 1 and 2.
[0003]
Patent Document 1 describes a system for correcting errors in a mobile GPS device using a stored error information database by determining the error in the GPS measured position at a reference station.
[0004]
Patent Document 2 describes a positioning system that measures a position of a mobile object by triangulation by measuring the distance between a mobile object and a base station based on transmitted and received power and the phase difference of a carrier wave for radio communication from the mobile object and radio communication from the base station.
[0005]
Patent Document 1: Japanese Unexamined Patent Application 2003-84057
Patent Document 2: Japanese Unexamined Patent Application 2005-86579

DISCLOSURE OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0006]
However, GPS has a problem in that it cannot be used indoors, and although the method using radio propagation time measurement by wireless base stations using a wireless LAN (Local Area Network) or the like can be used indoors, it has a problem in that the position cannot be detected or the measurement accuracy is low due to radio wave obstacles or the like.
[0007]
An object of the present invention is to provide a position information identifying member that can be easily installed at an arbitrary location or position, and can accurately identify position information both outdoors and indoors without radio wave interference.

MEANS FOR SOLVING THE PROBLEM

[0008]
The present invention is a position information identifying member, wherein a plurality of elements having a unique recognition code that can be read by a reading device are regularly integrally attached to a sheet-like or mesh-like member, and the position of the element can be read by the reading device from the recognition code.
[0009]
In addition, the recognition code is read non-contact by the reader using the radio waves received by the device as the operating power, the recognition code that was read preferably can be transmitted by the IC tag (RFID), and the sheet-like member is embedded in a flexible cloth, plastic, paper, or the like, or the mesh-like member has flexibility. The elements are arranged in a single row in a one-dimensional coordinate system or in a matrix in a two-dimensional coordinate system, and these are preferably used to form a three-dimensional coordinate system.
[0010]
Furthermore, with the present invention, preferably, a light emitting element including a light emitting diode or lamp is mounted at a position corresponding to each of the elements, and a temperature sensor or humidity sensor is mounted corresponding to each of the elements.

[0011]
The present invention is a position information identifying device where the position information identifying member is stretched over at least one of a floor, ceiling, or wall of a building, and the reading device is installed on a cane, footwear, cart, or self-propelled robot. The aforementioned buildings include storage facilities and ordinary houses.
[0012]
In other words, the present invention is based on the idea that by arranging IC tags (RFID: Radio Frequency Identification), each of which has a unique ID, in a matrix pattern based on a two-dimensional coordinate system, and by mapping the unique ID of an IC tag to an address (x, y) in the coordinate system in advance, the IC tags can be attached to either a one-dimensional or two-dimensional sheet-like target, plate-like target, or mesh-like target. Furthermore, by reading the unique ID of the nearest IC tag at an arbitrary point on the coordinate system, it is possible to identify the position information on the IC tag coordinate system.

EFFECT OF THE INVENTION

[0013]
With the position information identifying member and the position information identifying device using this member, the IC tag can easily be installed in a predetermined location or position on at least one of the floor, ceiling, or wall of a building, and position information can be accurately identified both outdoors and indoors without radio interference.

PREFERRED EMBODIMENT OF THE INVENTION

[0014]
Embodiments for performing the present invention will be described below in detail based on specific examples.
Example 1
[0015]
FIG. 1 is a diagram depicting a two-dimensional coordinate IC tag position identifying member of the present invention. FIG. 1 depicts a two-dimensional coordinate IC tag position information member 100 with IC tag where the IC tag 110 is positioned in the two-dimensional coordinate system 150. If the size of the two-dimensional coordinate system 150 including X axis 120 and Y axis 130 and coordinate origin 140 is (X = M, Y = N, where M and N are integers), the two-dimensional coordinate IC tag position information member 100 includes (M x N) IC tags 110 (RFID) each with a unique identifiable ID, placed at each coordinate point a to y. Here, each coordinate point of the X-axis 120 and Y-axis 130 is a physical distance corresponding to an interval, the X-coordinate point interval 160 and Y-coordinate point interval 170 are set, for example, at intervals of 1 cm, 10 cm, 50 cm, 1 m, and 5 m, respectively. The X-coordinate point interval 160 and Y-coordinate point interval 170 are normally equally spaced at 1:1, but can be varied according to the purpose of use to vary the coarseness and density of the coordinate points in one direction as appropriate. Furthermore, as described earlier, the readable distance of the IC tags must be kept sufficiently smaller than the corresponding coordinate point interval to avoid incorrect reading of IC tags at adjacent coordinate points.
[0016]
FIG. 2 depicts the IC tag coordinate system of the present invention. The IC tag coordinate system depicted in FIG. 2A is constituted by a one-to-one correspondence between the unique ID held by each IC tag 110 located at each coordinate point of the two-dimensional coordinate IC tag location information holding means 100 and the address on the coordinate system (X coordinate system and Y coordinate system). The IC tag coordinate system is configured of a coordinate point-to-IC tag ID correspondence table 200 and a coordinate basic information management table 300. The coordinate point to IC tag ID correspondence table 200 is created by reading the IC tag ID of the IC tag for each coordinate point and writing to the "IC tag ID" column of the table. In this method, a user who needs to identify position information at an arbitrary point in the space where the two-dimensional coordinate IC tag location information holding means 100 is located can use an IC tag reader held by the user to read the unique ID of the IC tag 110 closest to the intended point, and thereby the user can identify the position information of any point in the IC tag coordinate system with IC tag coordinate system accuracy.
[0017]
FIG. 3 is a perspective view of an IC tag position information identifying member with an IC tag attached in one piece to a two-dimensional sheet-like target. Flexible materials such as cloth, vinyl sheets, and paper are used as the sheet material. The IC tag position information identifying member can be used as an IC tag member by regularly attaching or implanting an IC tag to a flexible member in one row in one dimension or by attaching or implanting as a matrix in two dimensions.

These IC tag coordinate systems may be created for each IC tag member at the time of manufacture in the factory and attached to the product as an IC chip, or the IC tag coordinate system may be provided by the manufacturer via the Internet as a downloadable service for each IC tag member. Note that the IC tag information itself can also be used to identify each IC tag member.

[0018]

The IC tag position information identifying member depicted in FIG. 3 can be laid out on a floor of a large building such as a warehouse, and when an IC tag is attached to an article such as materials or the like, the information on the IC tag of the article and the information on the IC tag of the sheet coordinates closest to the position where the article is placed can be managed as a set on the IC tag coordinate system. Thereby the position information of each article can be managed. In such cases, it is more convenient to configure the coordinate system in the form of a sheet with grid lines that can also be identified by color.

[0019]

FIG. 4 depicts an IC tag position information identifying device with an IC tag attached to a two-dimensional plate-shaped target. This IC tag position information identifying device can be used as flooring or wall material of a building, and is suitable for buildings that require a large surface area, such as a warehouse. Use as flooring material for buildings is similar to the sheet example in FIG. 3, but when used on a floor, IC tags are held more stably than when using sheets, making the IC tags suitable for the reading of IC tag information by machines such as carts or conveyance robots. Wall materials are suitable for cases such as tool management, where hooks or the like are attached to a wall, and articles are managed by hanging the articles on the hooks. In this case, the IC tag may be attached to a hook at the coordinate point.

[0020]

FIG. 5 depicts an IC tag position information identifying member with an IC tag attached as one body to a two-dimensional mesh-shaped target. This IC tag position information identifying member can be achieved by attaching an IC tag to each intersection of the net. This application is suitable for applications that require a large area, such as a material yard.

[0021]

FIG. 6 is a perspective view of an IC tag attached to a building construction site or the like as a position information identifying member in a three-dimensional coordinate system. If each floor of a building is provided with two-dimensional coordinate IC tag position identifying member 100, position information can be obtained for these three-dimensional coordinates.

[0022]

The IC tag subject to reading in this example must be reliably read without being affected by the presence of adjacent IC tags, and the readable distance of the IC tag must be small enough for the physical distance between each coordinate point. This type of IC tag is also referred to as an RFID that internally contains an antenna in a 0.4 mm square chip and can transmit an ID number, by non-contact, using the radio waves received by the antenna as operating power, and each tag contains an IC chip that holds the unique ID (identification information), and can wirelessly (RF) read, by non-contact, information including the unique ID of each IC tag using a reader (or scanner). The reading range is restricted to the immediate vicinity of the IC tag, making it extremely suitable for the present invention.

[0023]

In addition, hierarchical coordinate system information can be achieved by providing the IC tags with detection mechanisms with a different frequency for each specific unit of the coordinate axes of the coordinate system (for example, 1 cm for 1 m or the like).

[0024]

According to the present example, IC tags can be easily installed on at least one of the floor, ceiling or walls of a building, and position information can be accurately identified both outdoors and indoors without radio interference.

Example 2

[0025]

The IC tag position information identifying member in this example includes the IC tags of Example 1 and a lamp or a light emitting diode such as an LED or the like as a light emitting element at a position corresponding to each IC tag.

In this example, the coordinate points of the two-dimensional coordinate system can be displayed in an easy-to-understand manner. This can be easily achieved for each of the previously described examples by integrating the IC tag into the LED lamp and adding wiring to supply power to the lamp. In this case, the point where the IC tag is attached can be easily detected by a lamp, improving user convenience.

[0026]

In other words, a circuit is provided to transmit an ON-OFF control signal to the display device on each coordinate point in order to easily determine which coordinate point is being read by changing the display conditions of the display device such as the LED, lamp or the like on the coordinate point subject to reading when a reading operator reads an IC tag at an arbitrary point and reads the unique ID of the nearest IC tag. This makes it easier for users to locate objects when moving stored items in material yards, or the like, thus reducing the burden on the user to search for the location of the target and improving user convenience.

[0027]

Furthermore, with the present example, IC tags can be easily installed on at least one of the floor, ceiling or walls of a building or at a position where there is a desire to install an IC tag, and position information can be accurately identified both outdoors and indoors without radio interference.

Example 3

[0028]

The IC tag position information identifying member in this example has a sensor that detects various information regarding the target, such as a temperature sensor, humidity sensor, and the like, in the vicinity of the coordinate point at a corresponding point to each IC tag in Example 1. The present example allows the IC tag to be easily installed on at least one of the floor, ceiling, or walls of a building, and to accurately identify position information both outdoors and indoors without radio interference. Furthermore, by integrating the IC tag with a sensor that detects various types of information on a target that exists in the vicinity of a coordinate point on a two-dimensional coordinate system, and by adding wiring to supply power to the sensor, for example, temperature or humidity can be observed as value-added information on the storage status of each article in a material yard, thereby improving user convenience.

Example 4

[0029]

In this example, the IC tag reading device is installed on a cane, shoe, or other footwear so that the reading operator can read the IC tag at their feet while standing, in order to read the unique ID of the nearest IC tag at any point of the IC tags in Examples 1 through 3. With the present example, IC tags can be easily installed on at least one of the floor, ceiling or walls of a building or at a position where there is a desire to install an IC tag, and position information can be accurately identified both outdoors and indoors without radio interference, and the burden on the operator for acquiring the position information is reduced, and the convenience of the user is enhanced.

[0030]

In addition, by installing the IC tag reader on a cart for installation materials, users are relieved of the burden of acquiring position information, thereby improving user convenience.

Example 5

[0031]

FIG. 7 is a configuration diagram depicting the flow of processing up to control of position information of each IC tag based on the stored position information. As shown in the IC tag coordinate system of FIG. 2, this example combines the origin position of the coordinate system with the position coordinate system as GPS geographic information. The position information of each IC tag accumulated in the position information DB (database) 1 (stored in the position information database 7) is combined with the map information DB (database) 2 by the server processing unit 3. The synthesized information is sent to a user processing unit 5 of each IC tag via a general public line 4, or the like, and the exact location of each IC tag under management can be determined by displaying each synthesized IC tag on a map on a display device 6. For example, a road map is used as the map information. Furthermore, even if map information is not synthesized, the information can be used (output) as a form from an IC position information outputting device 7.

[0032]

With the present example, geographical position information can be obtained simply by measuring the origin information without always providing GPS, and furthermore, IC tags can be easily installed on at least one of the floor, ceiling or walls of a building or at a position where there is a desire to install an IC tag, and position information can be accurately identified both outdoors and indoors without radio interference.

BRIEF DESCRIPTION OF THE DRAWINGS

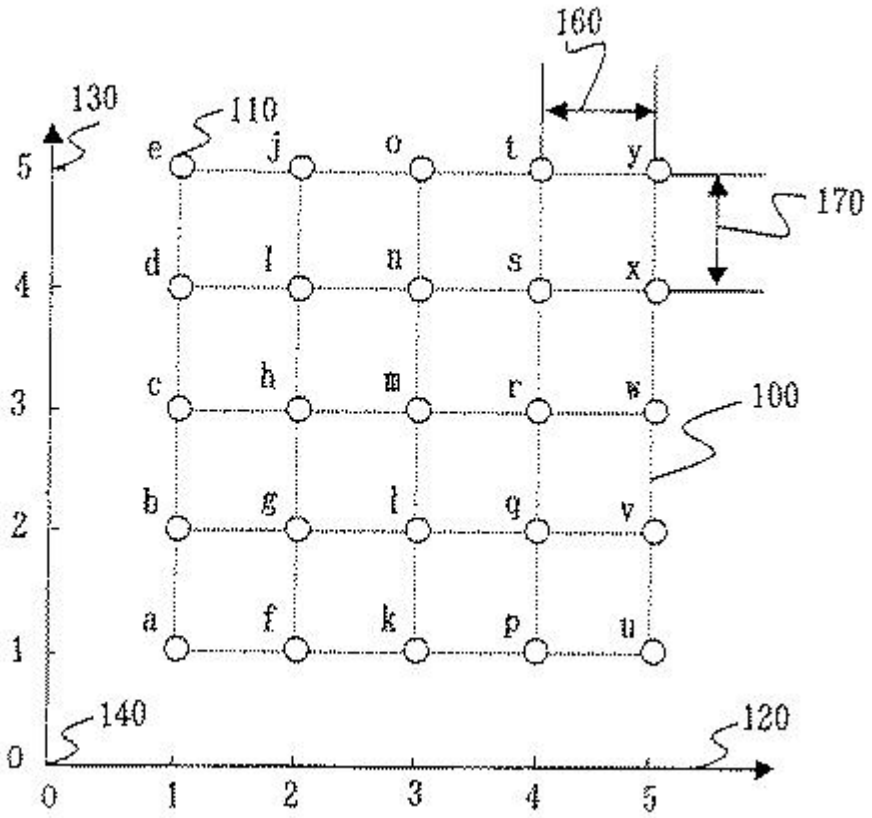
[0033]
FIG. 1 a configuration diagram depicting two-dimensional coordinates of the position information identifying member with IC tag of the present invention.
FIG. 2 is a diagram depicting the IC tag coordinate system of the present invention.
FIG. 3 is a configuration diagram of a position information identifying member with lC tag placed on sheet-like two-dimensional coordinates according to the present invention.
FIG. 4 is a configuration diagram of a position information identifying member with lC tag placed on plate-like two-dimensional coordinates according to the present invention.
FIG. 5 is a configuration diagram of a IC tag position information identifying member with an IC tag placed on mesh-like two-dimensional coordinates according to the present invention.
FIG. 6 a configuration diagram where the position information identifying member with IC tag of the present invention is provided on three-dimensional coordinates.
FIG. 7 is a configuration diagram depicting the flow of processing up to control of position information of each IC tag based on the stored position information according to the present invention.

DESCRIPTION OF CODES

[0034]
1. Position information DB, 2. Map information DB, 3. Server processing unit, 4. General public line, 5. User processing unit, 6. Map and position display unit, 7. Position information output device, 100. Two-dimensional coordinate IC tag position information holding means, 110. IC tag (RFID), 120. X coordinate, 130. Y coordinate, 140. Coordinate origin, 150. Two-dimensional coordinate system, 160. X coordinate point interval, 200. Coordinate point to IC tag ID correspondence table, 300. Coordinate basic information control table, 400. Sheet, 500. Plate, 600. Mesh (mesh net).

[FIG. 1]

FIG. 1



[FIG. 2]

FIG. 2

200

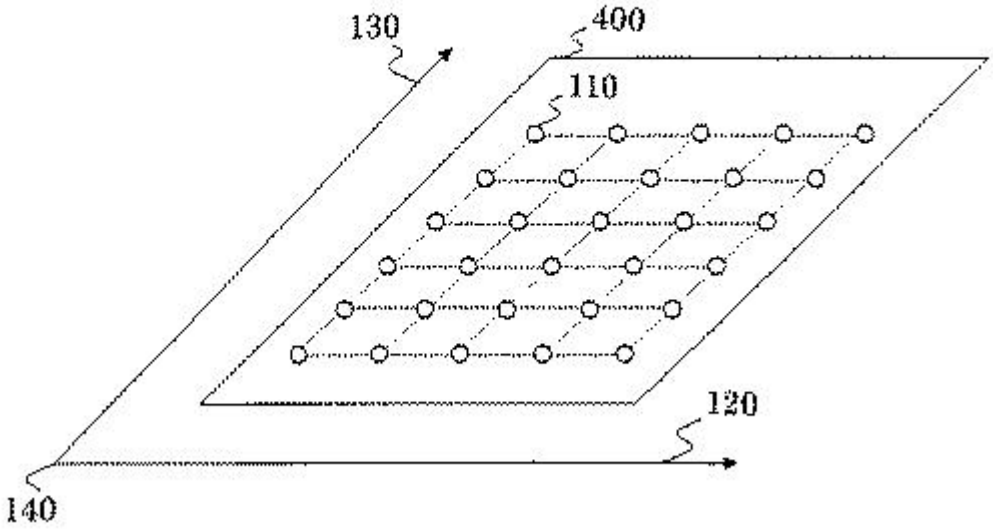
No.	X Coordinates	Y Coordinates	IC Tag ID
1	1	1	a
2	1	2	b
3	1	3	c
4	1	4	d
5	1	5	e
		1	f
M*N−3	M		
M*N−2	M	N−2	...
M*N−1	M	N−1	...
M*N	M	N	...

	X Coordinates	Y Coordinates
Home position	x0	y0
Distance between coordinates	Dx	Dy

300

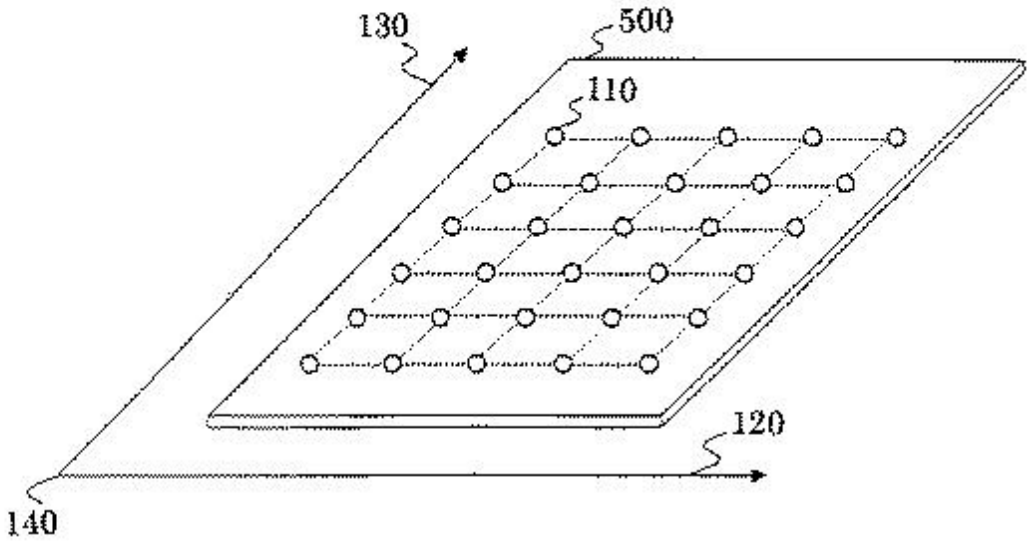
[FIG. 3]

FIG. 3



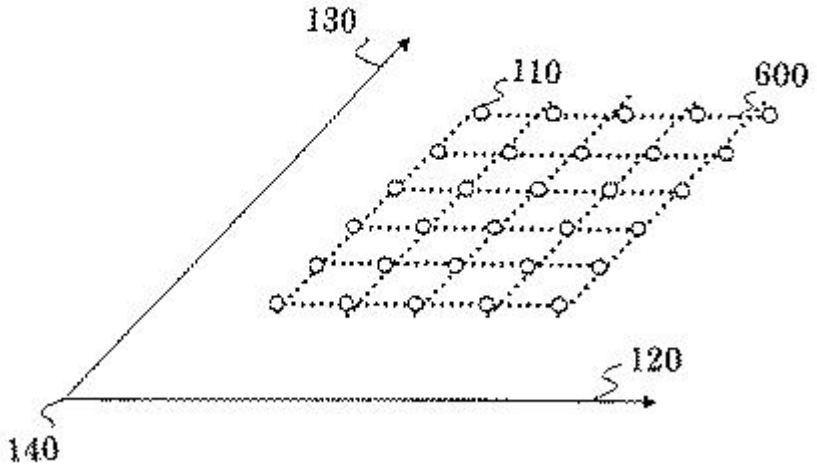
[FIG. 4]

FIG. 4



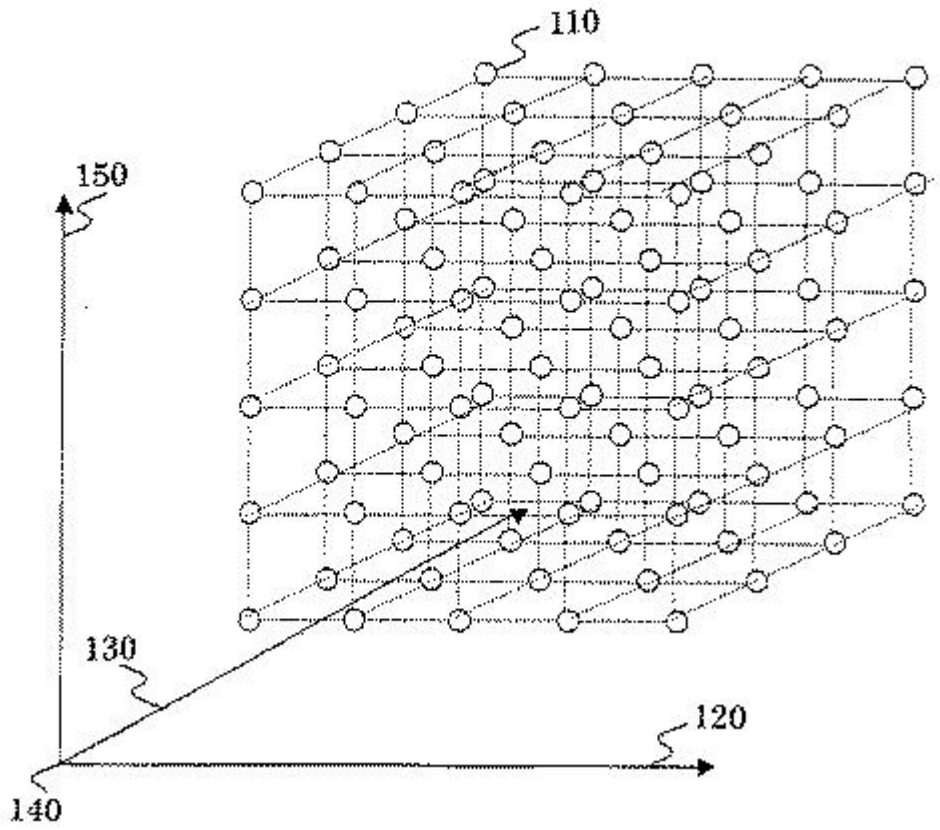
[FIG. 5]

FIG. 5



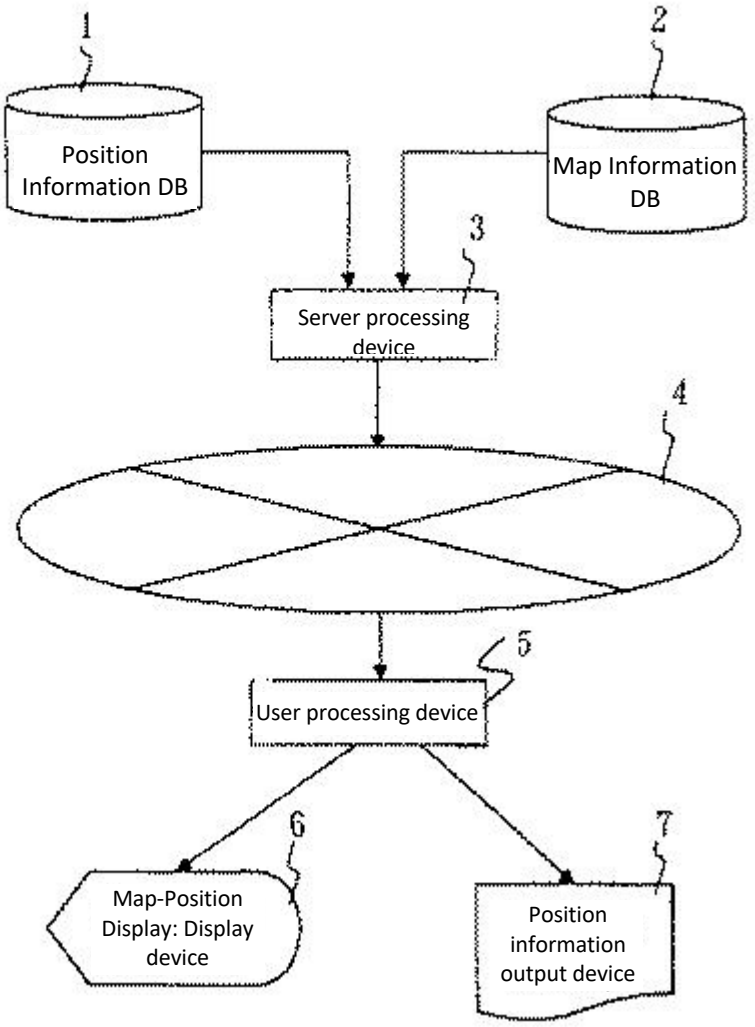
[FIG. 6]

FIG. 6



[FIG. 7]

FIG. 7


1
Position Information DB
2
Map Information DB
3
Server processing device
4
5
User processing device
6
Map-Position Display: Display device
7
Position information output device