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(54) System for providing a warning signal when a movable organism is present in a predetermined non-allowable zone

(57) System for providing a warning signal when a movable organism is present in a non-allowable zone which is separated from an allowable zone by a predetermined boundary, wherein the system comprises a first device and second device, wherein the first device is arranged to be carried by a movable organism and is provided with a facility for determining position coordinates of the first device and a transmitter for transmitting a signal to the second device, wherein the second device is provided with a receiver for receiving the signal of the first device, wherein the system is provided with an analyser for analysing the position coordinates on the basis of predetermined data, wherein the system is further provided with a generator for generating the warning signal when the analyser establishes that the movable organism is present within the non-allowable zone, wherein the predetermined data are such that the predetermined boundary is dependent on the position coordinates of the first device and/or on a position of the second device.

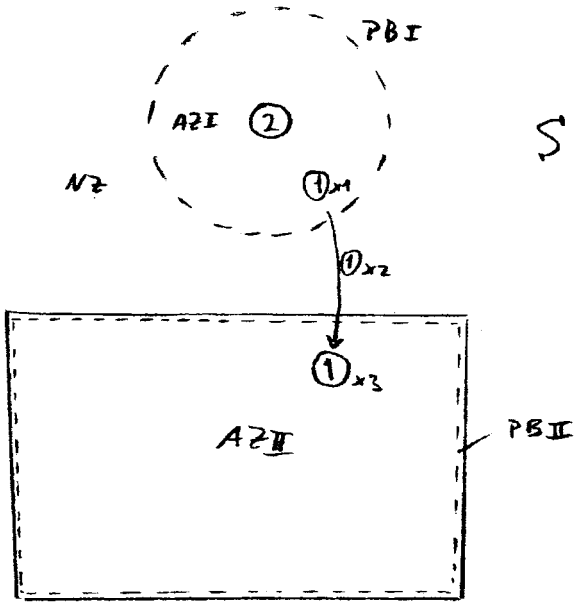

Fig 1

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Description

[0001] The invention relates to a system for providing a warning signal when a movable organism is present in a predetermined non-allowable zone which is separated from a predetermined allowable zone by a predetermined boundary, wherein the system comprises at least a first device and second device, wherein the first device is arranged to be carried by a movable organism and is provided with a facility for determining position coordinates of the first device and a transmitter for transmitting a signal to the second device, wherein the second device is provided with a receiver for receiving the signal of the first device, wherein the system is provided with an analyser for analysing the position coordinates on the basis of predetermined data, wherein the system is further provided with a generator for generating the warning signal when the analyser establishes that the movable organism is present within the non-allowable zone.

[0002] Such a system is known from NL 1021921. In use, the first device may be carried by an animal or for instance a child, and the second device may be carried or positioned near an animal minder or child minder. When the animal or child carrying the first device moves from the allowable zone to the non-allowable zone and a predetermined border is crossed, the second device will generate a warning signal so that the animal minder or the child minder can act upon this information. An advantage of the known system is that the predetermined boundary does not need to be physically present. No fences etc. are needed. In a sense the system provides a virtual fence. The technology is also referred to as geofencing.

[0003] Although the known system is indeed usable, there is a need for a much more versatile system.

[0004] It is an object of the present invention to meet that need.

[0005] This object of the invention is met by a system according to the preamble of claim 1 and that is further characterized in that the predetermined data are such that the predetermined boundary is dependent on the position coordinates of the first device and/or on a position of the second device.

[0006] A system according to an embodiment of the invention allows thus for an alteration of the predetermined boundary depending on the position coordinates of the first device and/or on a position of the second device.

[0007] It should be understood that the term "position coordinates" encompasses quantitative information about the position of e.g. the first device with respect to an external reference system.

[0008] The term "position" is not necessarily equivalent to the term "position coordinates". A "position" may also entail settings of the device itself without reference to an external reference system. Such a position of the second device may, for instance, entail the time as monitored by the second device by an internal clock.

[0009] It is possible that the first device is provided with the analyser, and that the transmitter of the first device is arranged to transmit a data signal to the second device when the analyser establishes that the movable organism is present within the non-allowable zone.

[0010] It is also possible that the second device is provided with the analyser, and that the transmitter of the first device is arranged to transmit the position coordinates of the first device to the second device.

[0011] A particular embodiment of a system according to the invention is characterized in that, in use, the first device is carried by the movable organism and that the analyser is arranged to establish that the movable organism is present within the non-allowable zone on the basis of the position coordinates of the first device carried by the movable organism. This allows for simple detection of the presence or absence of the movable organism carrying the first device within the non-allowable zone.

[0012] It is possible that the generator is arranged for activating the warning signal when the movable organism crosses the predetermined boundary into the non-allowable zone, and for deactivating the warning signal when the movable organism crosses the predetermined boundary into the allowable zone. Thus, the warning signal is generated during the entire stay of the movable organism in the non-allowable zone.

[0013] It is also possible that the predetermined data are such that the predetermined boundary is dependent on the position coordinates of the first device. It may, for instance, be the case that when the carrier of the first device is within an allowable zone represented by a set of predetermined position coordinates, for instance a fenced garden of a house, the distance between the first and second device is not relevant.

[0014] It is also possible though that the second device is provided with a facility for determining its position coordinates. In that case the predetermined data may be dependent on the position coordinates of the second device. It may for instance apply that the predetermined data comprise a distance between the position coordinates of the first device and the position coordinates of the second device. This is in particular very useful when, for instance, a child minder would like a child to be within a predetermined radius from the child minder. When the child minder, carrying the second device, and the child carrying the first device, move with respect to each other, and the distance between the two becomes larger, a predetermined boundary is crossed. When the child minder walks away and the child does not follow, an alarm signal is generated to the child minder, and when the child walks away from the child minder also an alarm signal, or warning signal, is provided so that the child minder knows that the distance between the child and the minder itself is growing.

[0015] It may also be that the predetermined data comprise a distance between the position coordinates of the first device and the position coordinates of a predetermined position. For instance, when the child carrying a

first device is within a predetermined radius from a predetermined position within the area of a school, no warning signal will be generated. However, when the distance is growing, and the predetermined boundary which is based on the predetermined data, is crossed by the child carrying the first device, the second device will generate the warning signal.

[0016] The position coordinates may be GPS-coordinates but may also be based on any other external reference system.

[0017] It is also possible that the first and second device are both arranged to be carried by the movable organism. In this particular case the first and the second device may be integrally positioned within one housing. The movable organism carrying the device may in that particular embodiment also be warned by the warning signal when the movable organism is present in a non-allowable zone.

[0018] It is also possible that the system comprises a plurality of second devices. In that case the plurality of second devices may comprise at least a first second device and a second second device, both provided with a facility for communicating with each other. It may for instance apply that the first second device communicates the presence of the first device within an allowable zone associated with the first second device to the second second device. In response, the second second device may refrain from generating the warning signal, or suppress the warning signal, which warning signal would indicate the absence of the first device in an allowable zone associated with the second second device.

[0019] Preferably each zone is a three-dimensional zone.

[0020] It is also possible that the warning signal comprises information about a position of the first device. This may in particular urgent circumstances be very helpful.

[0021] It is possible that the first device is further provided with a sensor for measuring a parameter, such as gas, moisture, angle of inclination, altitude, drop, velocity, acceleration, jerk, heart rate, blood pressure, and/or temperature, wherein the generator is arranged for generating the data signal when the measured value of the parameter exceeds a predetermined level. It is possible that the warning signal comprises information about the measured value of the parameter.

[0022] It furthermore applies that the first and/or the second device comprises an input facility for inputting predetermined data. It is for instance possible that dependent on who in particular is carrying the first and/or second device, a first or a second set of predetermined data apply.

[0023] It is possible that the first and/or second device comprises a phone facility for sending a message via a phone network. A system according to the invention may in that case easily be incorporated in current communication systems.

[0024] An other particular embodiment of a system according to the invention is characterized in that the system is further provided with a third device for detecting the position of the movable organism, which third device is communicatively connected to the second device, wherein the system is arranged to generate the warning signal if the analyser establishes that the movable organism is present within the non-allowable zone on the basis of the position of the movable organism detected by the third device, and that the position of the movable organism is outside the allowable zone defined by the predetermined boundary associated with the position coordinates of the first device. Thus, the system may differentiate between movable organisms not carrying a first device and movable organisms carrying a first device (or accompanied by a movable organism carrying a first device) and determine accordingly whether the presence of the movable organism on the detected position is allowed or not allowed.

[0025] Further embodiments will be discussed below.

[0026] The invention is now further elucidated on the basis of a drawing, in which:

Fig. 1 shows schematically a first embodiment of a system according to the invention;
Fig. 2 shows schematically a second embodiment of a system according to the invention;
Fig. 3 shows schematically a third embodiment of a system according to the invention;
Fig. 4a shows schematically a first example of a fourth embodiment of a system according to the invention;
Fig. 4b shows schematically a second example of the fourth embodiment of a system according to the invention; and
Fig. 5 shows schematically a fifth embodiment of a system according to the invention.

[0027] In the drawing, like parts or like features are referred to by like references.

[0028] All figures show schematically examples of a system for providing a warning signal W when a movable organism (not shown in Figs 1-4) is present in a predetermined non-allowable zone NZ which is separated form a predetermined allowable zone AZ by a predetermined boundary PB, PBI, PBII. The system comprises a first device 1 and a second device 2. The first device 1 is arranged to be carried by the movable organism which is not shown. The first device 1 may be arranged to be strapped to a leg or arm or wrist or other part of the movable organism. The first device 1 is further provided with a facility for determining its position coordinates. These position coordinates are to an external reference system. Such coordinates may for instance be GPS-coordinates or any other suitable position coordinates. The first device 1 may further be provided with a transmitter (not shown) for transmitting a signal to the second device 2. The second device 2 is provided with a receiver (not shown) for receiving the signal of the first device 1. The system is further provided with an analyser for analyzing

the position coordinates of the first device 1 on the basis of predetermined data. Here the term position coordinates also encompasses information representative of the position coordinates. The system is further provided with a generator (not shown) for generating the warning signal when the analyser establishes that the movable organism is present within the non-allowable zone NZ. In Figs. 1-5 the second device 2 is provided with the generator. In Figs. 1-4b the first device 1 is provided with the analyser, and the transmitter of the first device 1 is arranged to transmit a data signal to the second device 2 when the analyser establishes that the movable organism is present within the non-allowable zone.

[0029] According to the invention the predetermined data are such that the predetermined boundary PB is dependent on the position coordinates of the first device 1 and/or on a position of the second device 2. The predetermined data do in fact not necessarily always represent predetermined boundaries. After all, the predetermined data may lead to the determination of a predetermined boundary PB after input of for instance the position coordinates of the first device 1. Additionally or alternatively the position of the second device 2 determines in combination with the predetermined data how a predetermined boundary PB is defined.

[0030] In Fig. 1 the first device 1 is carried by the movable organism. In the embodiment shown in Fig. 1 the system is such that the predetermined boundary is dependent on the position coordinates of the first device 1. For instance when first device 1 is at position X1 the predetermined boundary PBI applies. The position coordinates of first device 1 are determined by the first device 1. The analyser of the first device 1 analyses these position coordinates on the basis of the predetermined data and in this case, decides not to transmit a data signal to the second device 2 as the analyser establishes, on the basis of the position coordinates of the first device carried by the movable organism and on the basis of the predetermined data, that the predetermined boundary PBI is not crossed by the first device, i.e. the movable organism is not present in the non-allowable zone NZ. First device 1 is currently present in an allowable zone AZ, viz. in the allowable zone AZI. However, when first device 1 moves from position X1 to position X2, a predetermined boundary is crossed, viz. the predetermined boundary PBI. The first device 1 determines its position coordinates. As the analyser of the first device 1 establishes that the predetermined boundary is crossed, i.e. that the first device is present in the non-allowable zone NZ, the transmitter of the first device 1 transmits a data signal to the second device 2. The generator of the second device 2 generates the warning signal on receipt of the data signal. Thus, in this example the analyser is arranged to establish that the movable organism is present within the non-allowable zone on the basis of the position coordinates of the first device carried by the movable organism. It is worth noting that in this example the analyser may not detect the presence of a movable organism not carrying a first device.

[0031] When the first device 1 moves from position X2 to position X3 predetermined boundary PBII is crossed. When the first device 1 is in the allowable zone AZII the predetermined boundary PBII is defined on the basis of a distance from coordinates of a predetermined position. In this case it is worth noting that the predetermined boundary PBII is also independent of position coordinates of the second device 2.

[0032] Fig. 2 is intended to explain an embodiment wherein the second device 2 is provided with a facility (not shown) for determining its position coordinates. In this embodiment it is possible that the predetermined boundary PBI is dependent on the position coordinates of the second device 2. In this example the predetermined boundary PBIII is not dependent on the position coordinates of the second device 2. For instance, when second device 2 is at position Y1 the predetermined boundary PB may be determined by the predetermined boundaries PBI and PBIII defining the allowable zones AZI and AZII and non-allowable zone NZ in which first device 1 may or may not be present respectively. This embodiment is suitable for a child minder which is following the child. For instance, when the child carrying first device 1 moves away from child minder carrying second device 2, the child minder will be warned by the warning signal if the child carrying first device 1 crosses the predetermined boundary PBI into the non-allowable zone NZ. As a result thereof the child minder carrying second device 2 can decide to move towards the child carrying first device 1, in the example towards position Y2, so that the child carrying first device 1 is again within an allowable zone AZ, this time defined by predetermined boundary PBII. In this example the predetermined boundary PBIII may e.g. represent a garden in which the child carrying first device 1 may be present regardless of the position of the child minder carrying the second device 2.

[0033] In this embodiment the predetermined data are such that the predetermined boundary PBI, PBII is dependent on a position of the second device 2. In this embodiment it is thus possible that the predetermined data comprise an allowable distance between the position coordinates of the first device 1 and the position coordinates of the second device 2. Thus, the predetermined boundary is relative to the position coordinates of the second device 2.

[0034] The predetermined boundary following from the predetermined data may at some stage also be a fixed predetermined boundary. It is for instance possible that the predetermined data comprises a distance between the position coordinates of the first device 1 and position coordinates of a central point in a physically fenced zone.

[0035] Fig. 3 shows an embodiment of a system according to the invention wherein the predetermined data represent a plurality of predetermined two-zones-separating boundaries PB which are unconnected to each other. In this example, the predetermined data represent position coordinates of a plurality of predetermined two-zones-separating boundaries PB. Each predetermined

boundary PB defines by itself, or by itself and another predetermined boundary PB, an allowable or non-allowable zone. The movable organism carrying first device 1 can freely move in the allowable zone AZ between or around non-allowable zones NZIII, NZIV and NZI. Although all predetermined two-zones-separating boundaries PB appear related to a radius of a circle that surrounds a predetermined position, i.e. the centre of a circle, it is of course possible that one or each of the predetermined two-zones-separating boundaries are unrelated to a radius of a circle. In fact, each predetermined boundary can have any desired shape. It will be appreciated that this also applies to the embodiments shown in Figs. 1, 2, 4a, 4b and 5. In Fig. 3 non-allowable zone NZI and NZII may be defined by predetermined data which represent at least two predetermined two-zones-separating boundaries which are related to two zones of which one comprises the other. It is of course also possible that the predetermined data represent at least two predetermined two-zones-separating boundaries which are unrelated to two zones of which one comprises the other, e.g. that the predetermined data represent at least two predetermined two-zones-separating boundaries which are related to two zones of which one does not comprise the other. The latter situation is shown by non-allowable zone NZIII and NZIV.

[0036] Figs. 4a and 4b show an embodiment wherein the system is provided with a plurality of second devices 2.1,2.2. In this example the system is provided with two second devices 2.1, 2.2, each of which is carried by a movable organism, e.g. a child minder. This embodiment is suitable for two child minders which both follow a child. In this example, one second device 2.1 is carried by a father, the other second device 2.2 is carried by a mother and the first device 1 is carried by a child. Each second device 2.1,2.2 is provided with a facility (not shown) for determining its respective position coordinates. In this embodiment it is possible that the predetermined boundary PBI is dependent on the position coordinates of the second device 2.1 while the predetermined boundary PBII is dependent on the position coordinates of the second device 2.2. For instance, when second device 2.1 is at position P1 and the second device 2.2 is at position R1 the predetermined boundary PB may be defined by an outer perimeter of the predetermined boundaries PBI and PBII, thus defining the allowable and non-allowable zone in which device 1 may or may not be present respectively. Note that in Fig. 4a the allowable zone AI associated with the second device 2.1 and the allowable zone AII associated with the second device 2.2 share a common allowable zone AZIII.

[0037] If the father and mother carrying the second devices 2.1 and 2.2, respectively, move away from each other, e.g. to positions P2 and R2, respectively, as shown in Fig. 4b, the allowable zones AZI and AZII become separated. The analyser of the first device will establish that the child carrying the first device is present within the allowable zone associated with the second device 2.2. Thus, the first device will not transmit the data signal to the second devices 2.1,2.2. In this example the second devices 2.1 and 2.2 are each provided with a facility (not shown) for communicating with the other second device 2.2 and 2.1, respectively. In the example of Fig. 4b the second device 2.2 can communicate the presence of the (child carrying) first device 1 within the allowable zone AZII associated with the second device 2.2 to the second device 2.1. Thus, a network may be formed, wherein either second device can communicate the presence and/or absence of the first device within the allowable zone associated with that second device to the other second device.

[0038] When the child carrying first device 1 moves away from both the father carrying second device 2.1 and the mother carrying second device 2.2, both the father and the mother will be warned by the warning signal if the child carrying first device 1 crosses the predetermined boundary PB into the non-allowable zone NZ outside the allowable zones AZI and AZII. In that situation, the analyser of the first device will establish that the child carrying the first device is present within the non-allowable zone. Thus, the first device will transmit the data signal to the second devices 2.1,2.2. The generator of each second device 2.1,2.2 may then generate the warning signal. It is also possible that just one second device 2.1,2.2 of the plurality of second devices, e.g. only the second device 2.1,2.2 nearest to the first device 1, generates the warning signal if the child carrying first device 1 crosses the predetermined boundary PB into the non-allowable zone NZ.

[0039] In response to the warning signal, the father and/or the mother carrying second device 2.1,2.2 can decide to move towards the child carrying first device 1 so that the child carrying first device 1 is again within an allowable zone. It will be appreciated that once the child carrying the first device 1 is again within the allowable zone associated with one of the second devices 2.1,2.2, the respective second device may be arranged to communicate the presence of the (child carrying) first device 1 within the allowable zone associated with the respective second device to the other second device.

[0040] In this embodiment it is thus possible that the predetermined data comprise an allowable distance between the position coordinates of the first device and the position coordinates of the second devices 2.1 and 2.2.

[0041] In general, the position coordinates may be expressed in GPS-coordinates (Global Positioning System) or any other position coordinates which are based on a external reference system, such as position coordinates generated by LPM (Local Position Measurement), GSM (Global System for Mobile communications) positioning, Acoustic positioning system (e.g. ATT, Acoustic Tracing and Tracking), UWB (Ultra Wide Band) positioning, and/or WLAN (Wireless Local Area Network) positioning systems.

[0042] Fig. 5 shows an embodiment of a system according to the invention wherein the predetermined data

represent position coordinates of a predetermined boundary PBI which is independent on the position coordinates of the first device 1. The area within the predetermined boundary PBI is in this example defined as non-allowable zone NZ, e.g. a yard or an office building, and outside the predetermined boundary PBI may be defined as allowable zone AZI. In this example the second device is provided with the analyser and with the generator. The first device is arranged to transmit its position coordinates to the second device, e.g. at regular time intervals or when requested by the second device. In Fig. 5 the system is further provided with a third device 3. The third device 3 is arranged for detecting the position, e.g. position coordinates, of the movable organism. The third device 3 may e.g. comprise a video camera or an infrared detector. The third device may function as a known security system for detecting the presence of a movable organism within the non-allowable zone NZ. The third device 3 is communicatively connected to the second device 2 and/or first device 1. It will be appreciated that the second device and the third device may be integrated into a single apparatus.

[0043] In the example of Fig. 5 the predetermined boundary PBII is dependent on the position coordinates of the first device 1. For instance when first device 1 is at position Q1 the predetermined boundary PBII applies. The predetermined boundary PBII defines the allowable zone AZII associated with the position coordinates of the first device 1.

[0044] Fig. 5 shows a first movable organism MOI carrying the first device 1. The third device 3 will detect the position of the first movable organism. The second device 2 will receive the position coordinates of the first device 1. The second and third device are communicatively connected, and the analyser may be provided with a comparator for comparing the position of the first movable organism detected by the third device, with the position coordinates of the first device detected by the second device. If the analyser determines that the first movable organism is within the allowable zone AZII associated with the position coordinates of the first device 1, the system will not generate a warning signal, as the first movable organism is detected to be present within an allowable zone, viz. allowable zone AZII. It will be appreciated that it is also possible that a plurality of movable organisms is present within the allowable zone AZII associated with the position coordinates of the first device, and that the plurality of movable organisms is detected by the third device. In this case the system will not generate a warning signal, as each movable organism of said plurality of movable organisms is detected to be present within the allowable zone.

[0045] Fig. 5 also shows a second movable organism MOII, not carrying a first device 1. The third device 3 will detect the position of the second movable organism. The second device 2 will detect the position coordinates of the first device 1. The analyser will now determine that the second movable organism is not within the allowable zone AZII associated with the position coordinates of the first device 1, the system will generate a warning signal as the second movable organism is detected to be present within a non-allowable zone, viz. non-allowable zone NZ. It will be appreciated that if the analyser determines that the second movable organism not carrying a first device 1 is within the allowable zone AZI, no warning signal will be generated.

[0046] In this example the first movable organism MOI carrying the first device 1 can move freely, without causing a warning signal to be generated, throughout the area within the predetermined boundary PBI and outside the predetermined boundary PBI, since the first movable organism is present within the allowable zone AZII associated with the position coordinates of the first device 1. The second movable organism MOII can, in this example, move freely, without causing a warning signal to be generated, throughout the area outside the predetermined boundary PBI since, in that case, the second movable organism is present within the allowable zone AZI. The second movable organism MOII can, however, not move freely throughout the area within the predetermined boundary PBI since, in that case, the second movable organism is present within the non-allowable zone NZ. Therefore, the warning signal will be generated when the second movable organism, not carrying a first device 1, crosses the predetermined boundary PBI into the non-allowable zone NZ where it is detected by the third device 3. In this example, the warning signal may comprise information about the position of the second movable organism.

[0047] In general, known security systems are activated when no movable object is allowed, e.g. during night time, in a zone, e.g. an office building, that is secured using the security system. In general the known security systems are deactivated when predetermined movable organisms, e.g. employees, are allowed, e.g. during working hours, in the zone, e.g. the office building, that is secured using the security system. This has the disadvantage that during the time the known security system is deactivated, the known security system is unable to detect movable organism that are not allowed to be present within the zone that is secured using the security system.

[0048] In the system according to the invention, as explained in relation to Fig. 5, it is possible that a security system, comprising the third device 3, or a plurality of third devices 3, is active at all times, thus detecting the presence of any movable object at all times. In case the presence of a movable object is detected in an allowable zone associated with the position coordinates of the first device, e.g. an employee carrying the first device, no warning signal will be generated, or the warning signal from the third device will be suppressed. In case the presence of a movable object, e.g., a person that is not allowed to be present, is detected outside an allowable zone associated with the position coordinates of the first device, i.e. in a non-allowable zone, the warning signal

will be generated. Thus, the system according to the invention provides a higher level of security, since the system will be activated at all times.

[0049] It will be appreciated that the first, second and/or (if present) third devices, or a plurality of first, second and/or third devices, may form a network, wherein any signal or information, such as e.g. position coordinates (e.g. determined by the third or first device) may be distributed from any device to any other device (e.g. to the second device), either directly or via any first, second and/or third device.

[0050] In the example of Fig. 5, the predetermined boundary PBI is determined by the predetermined data. It will be appreciated, that the predetermined boundary PBI can also be determined by parameters of the third device, e.g. a field of view of a camera or a detection range of a detector, or external parameters, e.g. walls of an office building, which define the non-allowable zone in which the third device may detect the presence of a movable organism. In that case it is possible that if a movable organism is present within the allowable zone AZI outside the predetermined boundary PBI, the third device is inherently unable to detect the presence of the movable organism, so that, inherently, no warning signal will be generated.

[0051] It will be appreciated that in the example of Fig. 5 it is not required that the analyser is arranged to establish that the movable organism carrying the first device is present within the non-allowable zone on the basis of the position coordinates of the first device, as, in the example of Fig. 5, the first device, and hence the movable organism carrying the first device, is always within the allowable zone AZII associated with the position coordinates of the first device.

[0052] In Fig. 5 the system comprises one non-allowable zone NZ, one stationary allowable zone AZI and one movable allowable zone AZII. It will be appreciated that the system may also comprise a plurality of non-allowable zones, e.g. a plurality of offices in an office building, and/or a plurality of stationary allowable zones, e.g. a plurality of corridors in an office building, and/or a plurality of movable allowable zones, e.g. a plurality of allowable zones each associated with a respective first device of a plurality of first devices wherein e.g. each first device may be carried by an employee of a plurality of employees.

[0053] In Fig. 5 the system is provided with one third device. It will be appreciated that the system may also be provided with a plurality of third devices.

[0054] It will be appreciated that it is also possible that predetermined access rights are assigned to a first device. In this case, it is possible that an allowable zone associated with the position coordinates of this first device is overruled by a first non-allowable zone and not by a second non-allowable zone. Thus, a movable organism carrying the first device may be allowed to be present in the area generally occupied by the second non-allowable zone, as the first device defines an allowable zone within the second non-allowable zone wherein the allowable zone (locally) overrules the second non-allowable zone. The movable organism carrying the first device may, however, not be allowed to be present in the first non-allowable zone, as the allowable zone defined by the first device does not overrule the first non-allowable zone.

[0055] In the examples of Figs. 1-5 the system is provided with one first device. It will be appreciated that the system can also be provided with a plurality of first devices. This may e.g. prove useful for a child minder, or a plurality of child minders, minding a plurality of children each carrying a first device. It is possible that a warning signal that is generated by the system when a certain first device is present in a non-allowable zone can be distinguished from a warning signal that is generated when another first device is present in a non-allowable zone.

[0056] In the examples the first and the second device may both be arranged to be carried by a movable organism. It is also possible that the first and the second device are both arranged to be carried by the same movable organism. In this case the organism, e.g. a person, carrying the first device and the second device will itself receive the warning signal when a predetermined boundary is crossed into a non-allowable zone. Although Figs. 1 to 5 show two-dimensional zones it is possible that one or each zone is actually three-dimensional. As said before the warning signal may be any audible, visible or other type of signal. It is even possible that the warning signal comprises information about a position of the first device. It is also possible that the first and/or second device comprises a phone facility for sending a message via phone network. The first and/or second device may comprise an input facility for inputting predetermined data. It will be understood that allowable zones and non-allowable zones are fully interchangeable if so desired. A system according to an embodiment of the invention can be carried out on the level of hardware and/or on the level of software. After all, the components needed to build such a system are all available in the art.

[0057] In the examples of Figs. 1-4b the first device is provided with the analyser, and the transmitter of the first device is arranged to transmit a data signal to the second device when the analyser establishes that the movable organism is present in a non-allowable zone. Thus, in these examples the analyser of the first device determines, on the basis of the position coordinates of the first device carried by the movable organism, whether the movable organism is present in a non-allowable zone. The data signal, signalling that the first device is present in the non-allowable zone, is transmitted to the second device. This provides the advantage that the first device only needs to transmit a signal, viz. the data signal, to the second device, when the first device is present in the non-allowable zone, thus, e.g., reducing power consumption of the first device. In the example of Fig. 5 the second device 2 is provided with the analyser, and the

transmitter of the first device 1 is arranged to transmit the position coordinates of the first device to the second device. It will be appreciated that in the example of Fig. 5 the first device may be provided with the analyser and/or that in the examples of Figs. 1-4b the second device may be provided with the analyser. In the latter case, the analyser of the second device determines, on the basis of the position coordinates received from of the first device, whether the movable organism carrying the first device is present in the non-allowable zone. This provides the advantage that the first device need not comprise the analyser. This may e.g. be particularly advantageous when the system is provided with a plurality of first devices. In that case, the system may require only one single analyser in the second device.

[0058] Both when the analyser is provided in the first device or in the second device, the first device may transmit the position coordinates of the first device to the second device when first device is present in the non-allowable zone and/or when the first device is present in the allowable zone. It is also possible that the warning signal comprises information about the position coordinates of the first device, e.g. the position coordinates, to enable a quick response to the warning signal.

[0059] Optionally, the first device 1 described in the examples may be provided with a facility for determining movement or motion of the first device 1, e.g. on the basis of the position coordinates of the first device 1. The first device may be arranged to transmit a data signal to the second device when the first device has not moved for a predetermined period of time. Thus, the second device 2 will be warned when the first device is immobile longer than the predetermined period of time.

[0060] It is also possible that the first device 1 is arranged to transmit a reporting signal to the second device 2 at a predetermined time interval. The second device may be arranged to generate a warning signal when the reporting signal has not been received a predetermined period of time after the last received reporting signal. Thus, the second device may generate the warning signal when the first device has e.g. become submersed in water, or when the first device 1 has entered an area with no (or poor) reception/transmission properties. In an advanced embodiment, the second device may be arranged to generate a warning signal and/or to determine the position coordinates of the first device, e.g. on the basis of position coordinates of the first device transmitted by the first device, when the reporting signal is received by the second device, after not having been received during the predetermined period of time after the previous received reporting signal. Thus the second device recognizes that the first device reappears after having been lost.

[0061] It is also possible that the first device is provided with a sensor for measuring a parameter. This sensor may e.g. comprise a gas detection sensor, a moisture or water detection sensor, an inclination angle detection sensor, a drop detection sensor, an altitude sensor, a velocity sensor, an acceleration sensor, a jerk sensor, a heart rate sensor, a blood pressure sensor and/or a temperature sensor. The transmitter of the first device may then be arranged to transmit a data signal when the measured value of the parameter exceeds a predetermined level, e.g. when the heart rate drops below a predetermined heart rate, or when the temperature (e.g. body temperature of the movable organism) rises above a predetermined temperature. The first device may transmit the measured value of the parameter to the second device when the predetermined level is exceeded, and/or when the predetermined level is not exceeded, e.g. to monitor the measured value of the parameter. It is also possible that the warning signal comprises information about the measured value of the parameter, e.g. the measured value, to enable a quick response to the warning signal. Here the term measured value also encompasses information representative of the measured value.

[0062] It is possible that the first device is arranged to refrain from transmitting any signal until the analyser establishes that the first device is present in the non-allowable zone. This provides the advantage that the power consumption of the first device may be relatively low as no signals are transmitted when the first device is present in the allowable zone. This may also be used when the first device is not to be detected by external systems. As long as the first device does not transmit any signal, it may remain unnoticeable e.g. to receivers of the external system.

[0063] The second device may be provided with a transmitter for transmitting an information request signal to the first device. The first device may be provided with a receiver for receiving the information request signal, and may be arranged to, in response to receiving the information request signal, transmit an information signal. e.g. an information signal comprising the position coordinates of the first device and/or an information signal comprising the measured value of the parameter measured by the sensor. In an advanced embodiment the first and/or second device may be provided with a facility for controlling whether the second device is allowed or disallowed to transmit the information request signal, and/or a facility for controlling whether the first device is allowed or disallowed to transmit the information signal in response to an information request signal.

[0064] In the examples it may apply that the second device is provided with a generator for generating the warning signal, while the first device is free of a generator for generating a warning signal. Hence, the movable organism carrying the first device may not be warned by a warning signal when the movable organism is present within the non-allowable zone. This may prove especially useful when the movable organism carrying the first device is not to be distressed and/or informed by the warning signal. In an advanced embodiment the first an/or second device is provided with a facility for controlling whether the generator of the second device is enabled

or disabled. It is, thus, possible that the first and/or second device comprises e.g. a switch to disable the generator of the second device, so that no warning signal is generated at the second device, or that the warning signal is suppressed at the second device, when the analyser establishes that the movable organism is present within the non-allowable zone.

[0065] It is also possible that the first device is provided with a generator for generating the warning signal. In an advanced embodiment, the first an/or second device is provided with a facility for controlling whether the generator of the first device is enabled or disabled. It is, thus, possible that the first and/or second device comprises e.g. a switch to disable the generator of the first device, so that no warning signal is generated at the first device, or that the warning signal at the first device is suppressed, when the analyser establishes that the movable organism is present within the non-allowable zone.

[0066] It will be appreciated that the generator for generating the warning signal may be arranged for activating the warning signal when the first device crosses the predetermined boundary into the non-allowable zone, and for deactivating the warning signal when the first device crosses the predetermined boundary into the allowable zone. The generator may thus generate two signals, e.g. an enable-signal and a disable-signal, while the warning signal will remain activated during the entire period that the movable organism is detected present in the non-allowable zone.

[0067] In the examples the movable organism is allowed to be present in the allowable zone and not allowed to be present in the non-allowable zone. It will be appreciated that it is also possible that the movable organism is allowed to be present in the non-allowable zone and not allowed to be present in the allowable zone. It is also possible that the movable organism is allowed or not allowed to be present in both the allowable and non-allowable zone. In these cases it may be required that the warning signal is generated if the movable organism is present in the non-allowable zone. It is also possible that a first warning signal is generated if the movable organism is present in the allowable zone and a second warning signal is generated if the movable organism is present in the non-allowable zone.

[0068] An embodiment of a system according to the invention may be combined with a system wherein images as recorded by cameras are compiled on an image carrier, on the basis of the warning signal.

[0069] All such variants are understood to fall within the scope of the invention as defined by the appended claims.

Claims

1. System for providing a warning signal when a movable organism is present in a predetermined non-allowable zone which is separated from a predetermined allowable zone by a predetermined boundary, wherein the system comprises at least a first device and second device, wherein the first device is arranged to be carried by a movable organism and is provided with a facility for determining position coordinates of the first device and a transmitter for transmitting a signal to the second device, wherein the second device is provided with a receiver for receiving the signal of the first device, wherein the system is provided with an analyser for analysing the position coordinates on the basis of predetermined data, wherein the system is further provided with a generator for generating the warning signal when the analyser establishes that the movable organism is present within the non-allowable zone, **characterized in that**, the predetermined data are such that the predetermined boundary is dependent on the position coordinates of the first device and/or on a position of the second device.

2. System according to claim 1, wherein the first device is provided with the analyser, and wherein the transmitter of the first device is arranged to transmit a data signal to the second device when the analyser establishes that the movable organism is present within the non-allowable zone.

3. System according to claim 1, wherein the second device is provided with the analyser, and wherein the transmitter of the first device is arranged to transmit the position coordinates of the first device to the second device.

4. System according to any one of the previous claims, wherein, in use, the first device is carried by the movable organism and wherein the analyser is arranged to establish that the movable organism is present within the non-allowable zone on the basis of the position coordinates of the first device carried by the movable organism.

5. System according to any one of the previous claims, wherein the generator is arranged for activating the warning signal when the movable organism crosses the predetermined boundary into the non-allowable zone, and for deactivating the warning signal when the movable organism crosses the predetermined boundary into the allowable zone.

6. System according to any one of the previous claims, wherein the predetermined data are such that the predetermined boundary is dependent on the position coordinates of the first device.

7. System according to any one of the previous claims, wherein the second device is provided with a facility for determining its position coordinates.

8. System according to claim 7, wherein the predetermined data are such that the predetermined boundary is dependent on the position coordinates of the second device.

9. System according to claim 8, wherein predetermined data comprise an allowable distance between the position coordinates of the first device and the position coordinates of the second device.

10. System according to any one of the previous claims, wherein the predetermined data comprise a distance between the position coordinates of the first device and position coordinates of a predetermined position.

11. System according to any one of the previous claims, wherein the first device is provided with a facility for determining movement or motion of the first device, wherein the first device is arranged to transmit a data signal to the second device when the first device has not moved for a predetermined period of time.

12. System according to any one of the previous claims, wherein the first device is arranged to repeatedly transmit a reporting signal to the second device at a predetermined time interval, wherein the second device is arranged to generate the warning signal when the reporting signal has not been received a predetermined period of time after the last received reporting signal.

13. System according to claim 12, wherein the second device is arranged to generate a warning signal and/or to determine the position coordinates of the first device when the reporting signal is received by the second device, after not having been received during the predetermined period of time after the previous received reporting signal.

14. System according to any one of the previous claims, wherein the first device is further provided with a sensor for measuring a parameter, wherein the transmitter is arranged for transmitting a data signal when the measured value of the parameter exceeds a predetermined level.

15. System according to claim 14, wherein the parameter is at least one of gas, moisture, angle of inclination, altitude, drop, velocity, acceleration, jerk, heart rate, blood pressure, and temperature.

16. System according to any one of the previous claims, wherein the transmitter of the first device is arranged for transmitting the position coordinates of the first device to the second device.

17. System according to claim 14 or 15, wherein the transmitter of the first device is arranged for transmitting the measured value of the parameter to the second device.

18. System according to claim 2, wherein the first device is arranged to refrain from transmitting any signal until the analyser establishes that the predetermined boundary is crossed.

19. System according to any one of the previous claims, wherein the second device is provided with a transmitter for transmitting an information request signal to the first device.

20. System according to claim 19 and 16 and/or 17, wherein the first device is arranged for transmitting the position coordinates of the first device and/or the measured value of the parameter to the second device upon receiving the information request signal.

21. System according to claim 20, wherein the first and/or second device is provided with a facility for controlling whether the second device is allowed or disallowed to transmit the information request signal.

22. System according to any one of the previous claims, wherein the position coordinates are generated by at least one of GPS, LPM, GSM, Acoustic positioning, UWB positioning or WLAN positioning systems.

23. System according to any one of the previous claims, wherein the first and the second device are both arranged to be carried by the movable organism.

24. System according to any one of the previous claims, wherein each zone is three dimensional.

25. System according to any one of the previous claims, wherein the warning signal comprises information about the position of the first device.

26. System according to claim 14, wherein the warning signal comprises information about the measured value of the parameter.

27. System according to any one of the previous claims, wherein the first and/or second device comprises an input-facility for inputting predetermined data.

28. System according to any one of the previous claims, wherein the first and/or second device comprises a phone facility for sending a message via a phone network.

29. System according to claims 1 and 6, wherein the system is further provided with a third device for detecting the position of the movable organism, which third device is communicatively connected to the

second device, wherein the system is arranged to generate the warning signal if the analyser establishes that the movable organism is present within the non-allowable zone on the basis of the position of the movable organism detected by the third device, and that the position of the movable organism is outside the allowable zone defined by the predetermined boundary associated with the position coordinates of the first device.

30. System according to any one of the previous claims, wherein the predetermined data represent a plurality of predetermined two-zones-separating boundaries which are unconnected to each other.

31. System according to claim 30, wherein the predetermined two-zones-separating boundaries are unrelated to a radius of a circle that surrounds a predetermined position.

32. System according to claim 30 or 31, wherein the predetermined data represent at least two predetermined two-zones-separating boundaries which are related to two zones of which one does not comprise the other.

33. System according to claim 30, 31 or 32, wherein the predetermined data represent at least two predetermined two-zones-separating boundaries which are related to two zones of which one comprises the other.

34. System according to any one of the previous claims, wherein the first and second device, and optionally the third device, form a network.

35. System according to any one of the previous claims, wherein the system comprises a plurality of first devices.

36. System according to any one of the previous claims, wherein the system comprises a plurality of second devices.

37. System according to claim 36, wherein the plurality of second devices comprises at least a first second device and a second second device, both provided with a facility for communicating with each other.

38. System according to any one of the previous claims, wherein the second device is provided with the generator for generating the warning signal when the movable organism is present within the non-allowable zone.

39. System according to claim 38, wherein the first and/or second device is provided with a facility for controlling whether the generator of the second device is enabled or disabled.

40. System according to any one of the previous claims, wherein the first device is provided with the generator for generating the warning signal when the movable organism is present within the non-allowable zone.

41. System according to any one of claims 1-39, wherein the first device is free of a generator for generating the warning signal when the movable organism is present within the non-allowable zone.

42. System according to claim 40, wherein the first and/or second device is provided with a facility for controlling whether the generator of the first device is enabled or disabled.

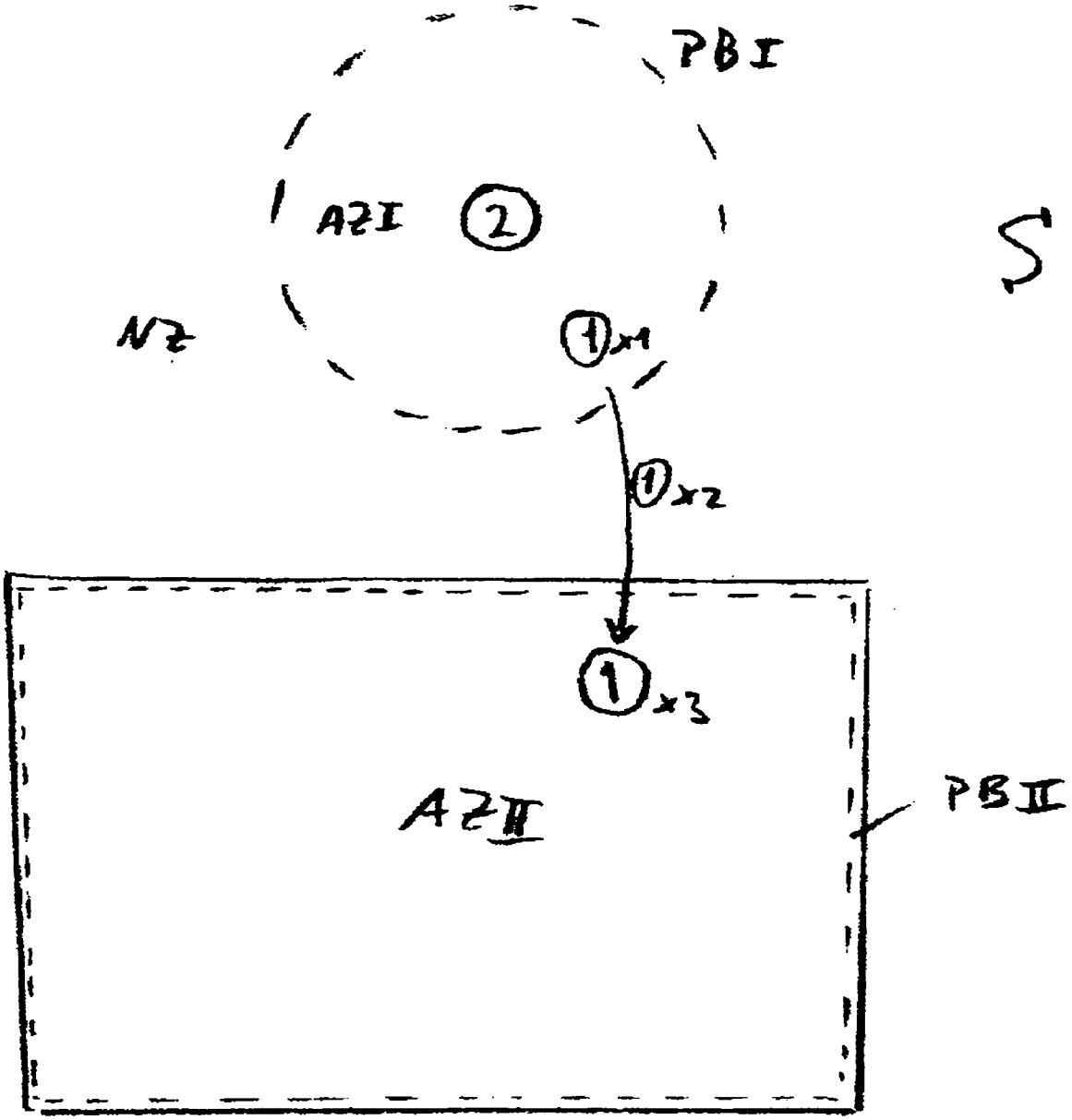

Fig 1

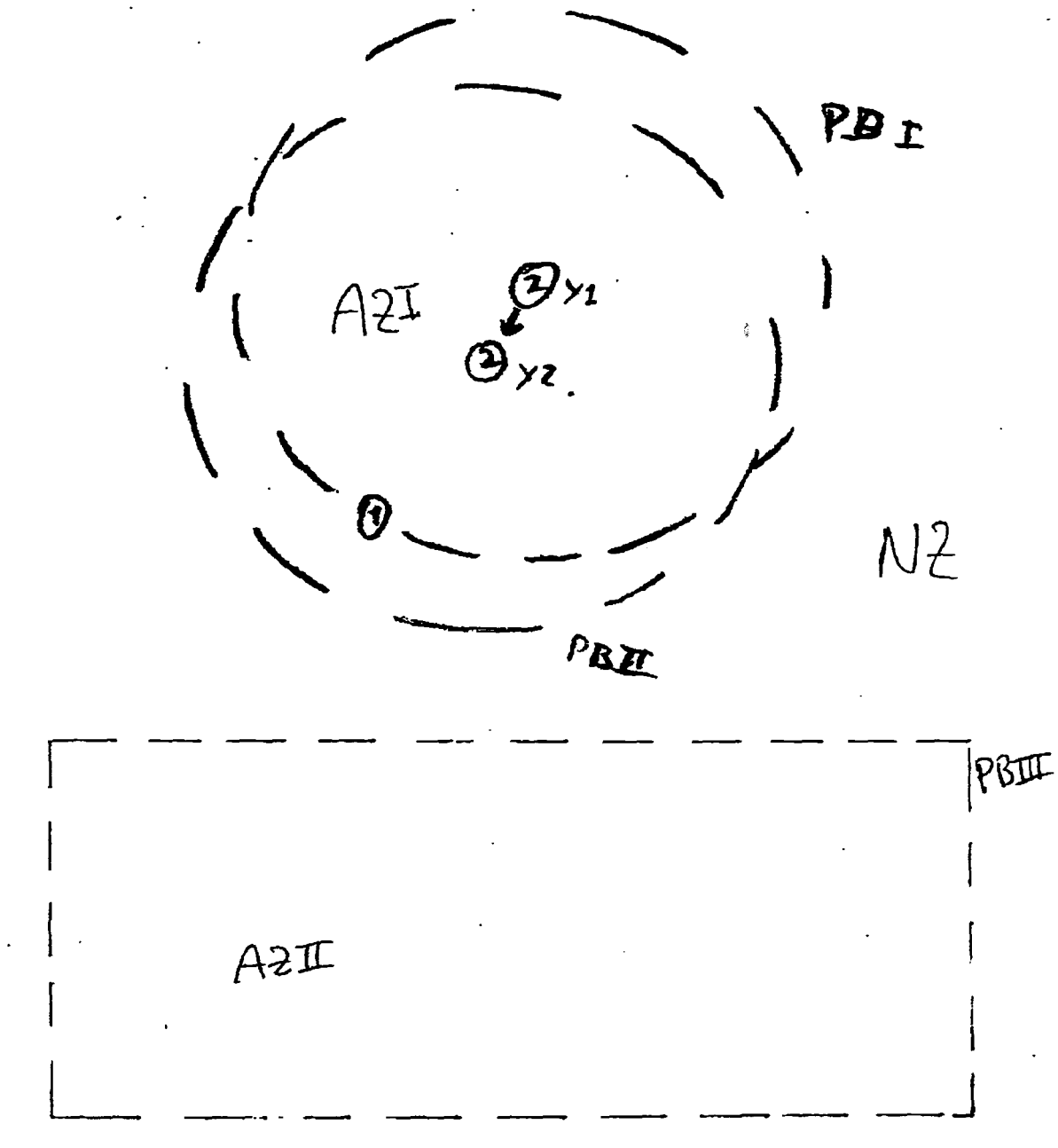

Fig. 2

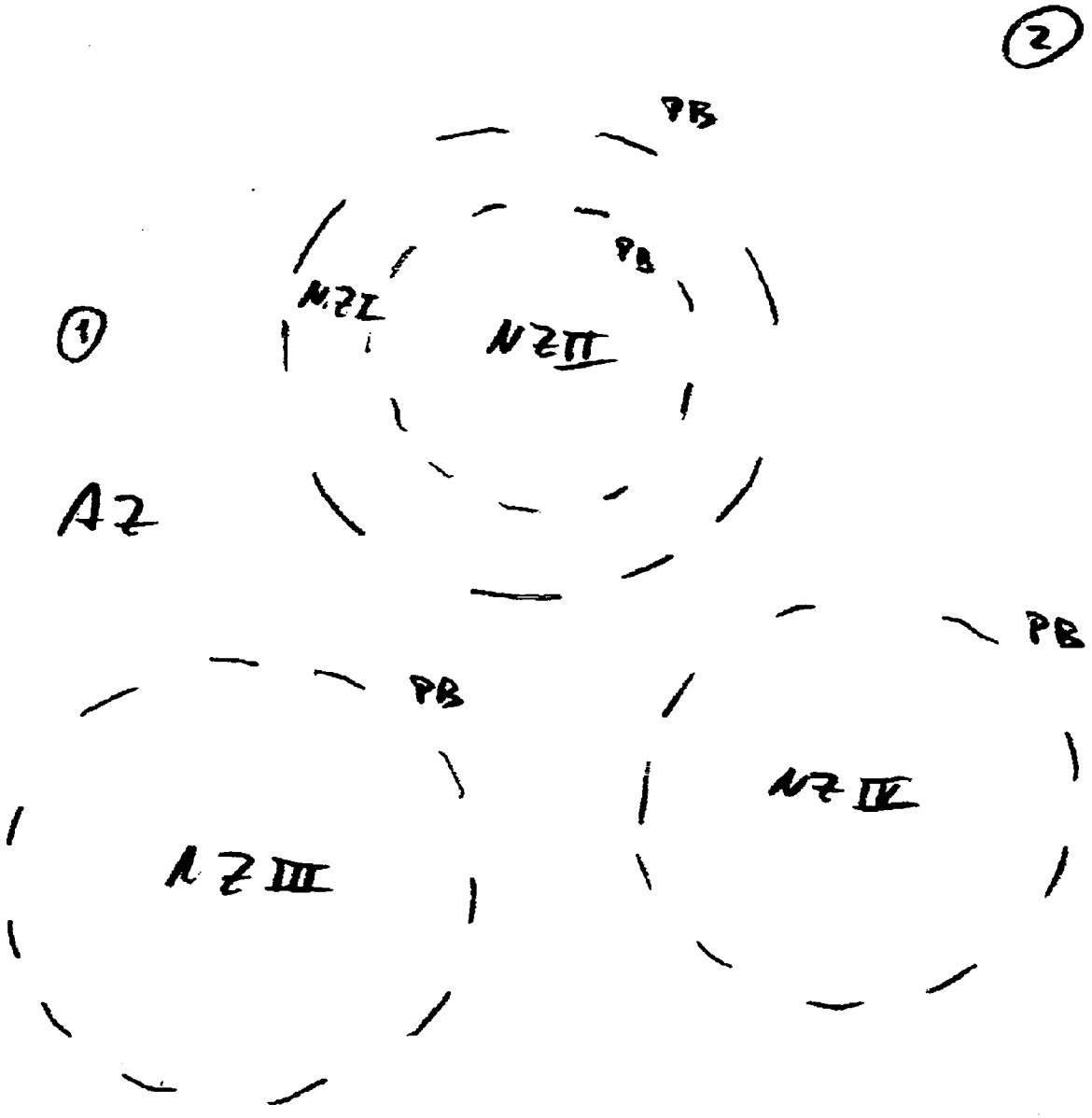

Fig 3

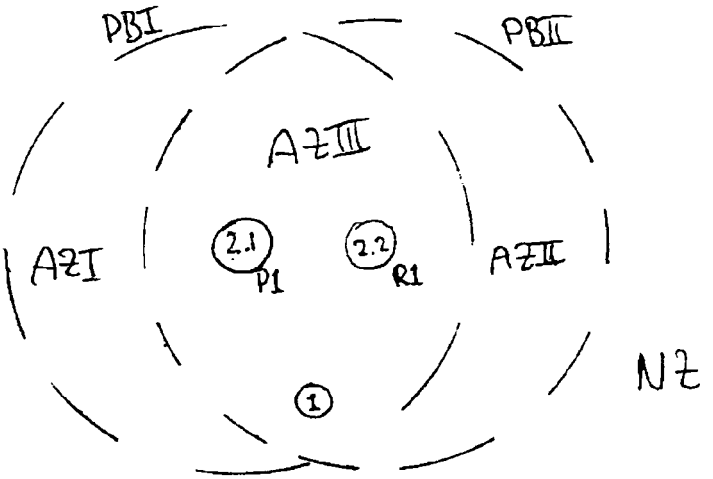
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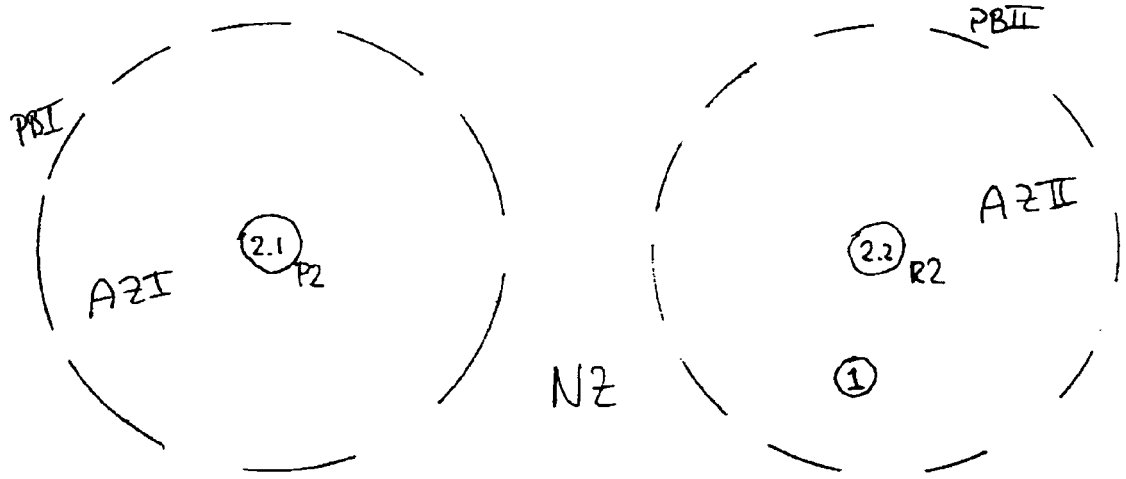
Fig.4a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2.2
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Fig.4b

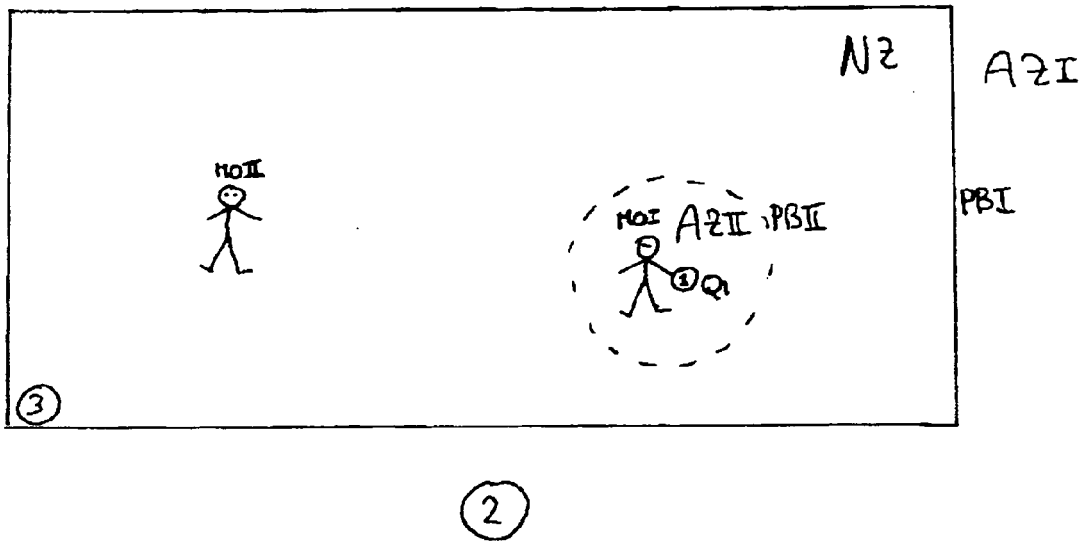

Fig 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 07 7845

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 2004/183674 A1 (RUVARAC THOMAS C) 23 September 2004 (2004-09-23) * figures 1-4,9,10 * * page 2, paragraphs 17-20,23 * * page 3, paragraph 25 * * page 4, paragraph 39 * * page 7, paragraph 64 * -----	1-21, 29-42 22-28	INV. G08B21/02
Y	US 5 461 390 A (HOSHEN ET AL) 24 October 1995 (1995-10-24) * figures 1,2 * * column 2, lines 31-57 * * column 4, lines 37-54 * -----	22-28	

TECHNICAL FIELDS SEARCHED (IPC)

G08B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 May 2006	Coffa, A

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 07 7845

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05-05-2006

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US 2004183674 A1	23-09-2004	NONE	
US 5461390 A	24-10-1995	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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