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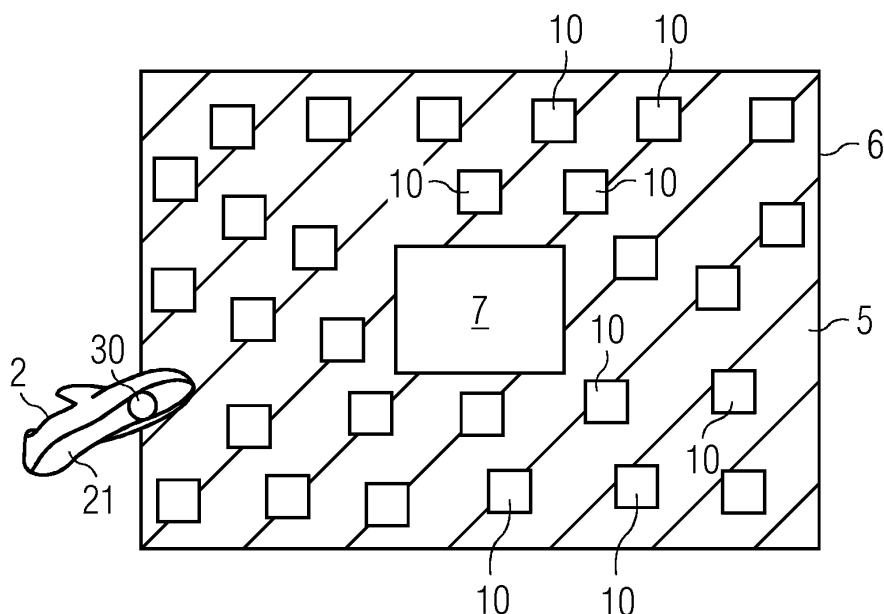
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(54) **A TECHNIQUE FOR CONTROLLING PHYSICAL ACCESS OF A USER WITH RESPECT TO A DESIGNATED AREA**

(57) In the present technique for controlling physical access of a user with respect to a designated area, one or more electromagnetic floor elements are positioned within the designated area. A current controller varies an electric current provided to the electromagnetic floor elements based on instructions received by the current controller, through a communication interface of the current controller. The instructions are indicative of an amount of electric current to be provided to the electro-

magnetic floor elements. One or more ferromagnetic elements are positioned on the user such that the ferromagnetic elements generate a haptic feedback, perceivable by the user, when the user is within the designated area. The haptic feedback is generated in response to the strength of magnetic field resulting from the ferromagnetic elements which in turn depends upon the amount of electric current provided to the electromagnetic floor elements.

FIG 2



Description

[0001] The present invention relates to methods and systems for controlling physical access of a user with respect to a designated area.

[0002] Controlling physical access of a person with respect to a designated area is often required in various industrial setups and other facilities. Controlling physical access of a person with respect to a designated area includes instances where a person present in vicinity of the designated area needs to be restricted from entering the designated area or at least be warned or intimated about the restriction with respect to the designated area. For example, in a factory environment, there may be intermittently moving robots or operational heavy machinery that can be potentially hazardous to workers and thus the workers are required to physically stay out of the movement area of the robots or of the area where the operational heavy machinery is installed.

[0003] Another example may be a hospital environment, where the medical staff is required to physically stay out of the X-ray room while X-ray imaging is being performed in order to avoid risk of exposure. Furthermore, in the hospital a certain room may have been sterilized and is needed to stay sterile and thus hospital staff is required to physically stay out of the sterilized room. Yet another example is a road crossing, where pedestrians are required to stay off the road in order to avoid accidents with automobiles moving on the road while the signal for the movement of the automobiles is on. A further example is physical location hosting a virtual reality environment, where a virtual reality user is unable to see the physical location, for example due to usage of Virtual Reality headset, and is required to be restricted from bumping into the real walls or structures of the physical location.

[0004] Controlling physical access of a person with respect to a designated area also includes instances where a person present within the designated area needs to be restricted from leaving the designated area or at least be warned or intimated about the restriction about leaving the designated area. For example, in a hospital environment, where the medical staff performing X-ray procedure is required to physically stay within a designated area, for example behind a protective shield, while X-ray imaging is being performed in order to avoid risk of exposure. Another example may be, where in an emergency situation in a factory environment, the workers are required to physically stay within a designated safe area until the emergency situation ceases to exist.

[0005] Presently, controlling physical access of a person with respect to a designated area is performed by various different approaches for example by installing or temporarily positioning chains or rope barriers that are manually placed in front of designated area or zones where a person is not supposed to enter. Another approach is by using auditory or visual signals such as a pictorial or a written warning or signal such as traffic

lights, or selectively illuminated 'do not enter' or 'do not leave' signs, flashing 'hazard' light, warning sirens, etc. Also, indoor positioning systems for mobile devices, e.g. using WiFi or UWB location technology, are known; these can detect a user's position and send an alert to the user's mobile device when the user is approaching a designated area or zone which the user is supposed to enter or not to enter. However the aforementioned conventional approaches can get ignored if the person to whom they are directed or supposed to be directed is not careful enough to notice the auditory or visual signals. Furthermore, many individuals suffer from auditory and/or visual impairment and are less likely to perceive the auditory or visual cues.

[0006] Furthermore, most of the aforementioned auditory or visual signals are public in nature i.e. are perceivable by every individual in vicinity of the signals and thereby may cause disturbance to others for whom the signal is not intended. Also, in some circumstances controlling physical access of one person with respect to a designated area may be different from that of another person with respect to the same designated area, for example, while a common worker of a factory may be required to stay physically away from operational heavy machinery that can be potentially hazardous to the common worker and thus the common worker is required to physically stay out of the area where the operational heavy machinery is installed, a skilled machine operator may be required to stay physically within the area where the heavy machinery is operated so that the skilled operator can monitor or operate the heavy machinery appropriately. Thus there is a need for a technique for controlling physical access of a person with respect to a designated area which reduces or obviates the drawbacks of the aforementioned conventional methods.

[0007] An object of the present invention is to provide a technique, other than auditory and visual techniques, for controlling physical access of a person with respect to a designated area. It is also desirable that the technique is able to implement controlling of physical access of a person with respect to a designated area in a personalized form thereby avoiding or reducing causation of disturbance to others for whom the signal is not intended. It is further desired that the technique for controlling physical access with respect to a designated area is capable of providing different instructions to different persons with respect to the same designated area.

[0008] The above objects are achieved by a system for controlling physical access of a user with respect to a designated area according to claim 1 and by a method for controlling physical access of a user with respect to a designated area according to claim 7 of the present technique. Advantageous embodiments of the present technique are provided in dependent claims.

[0009] In a first aspect of the present technique, a system for controlling physical access of a user with respect to a designated area is presented. The designated area is any area, which may be part of a larger area, of an

establishment with regard to which controlling physical access is required or desired, for example the designated area may be a section of floor of a manufacturing facility in which heavy machinery is operational. The section may be recognized as the designated area during all times of a day or during certain specific time intervals of a day, for example, an area that contains the high voltage electrical wiring hubs in a factory may be recognized as the designated area at all times, whereas an area that contains the heavy machinery in the factory may be recognized as the designated area at only those time intervals during which the heavy machinery is operational or intended to be operational. The designated area includes the area into which entry of the user is required to be or desired to be restricted and/or the area from which exit of the user is required to be or desired to be restricted.

[0010] The system includes one or more electromagnetic floor elements, a current controller, and one or more ferromagnetic elements.

[0011] The one or more electromagnetic floor elements are positioned within the designated area, for example in a floor within the designated area or in a wall within the designated area or a handle of a door to access or exit the designated area. The current controller varies an electric current provided to the one or more electromagnetic floor elements based on instructions received by the current controller. The current controller includes a communication interface to receive the instructions. The instructions are indicative of an amount of electric current to be provided to the one or more electromagnetic floor elements. When electrical current is provided to the electromagnetic floor element, a magnetic field is generated as a result. The strength of the magnetic field depends upon or is proportional to the amount of the electric current provided to the electromagnetic floor element. The one or more ferromagnetic elements are positioned on the user, for example on or in a footwear of the user such as sole of the footwear of the user, such that the one or more ferromagnetic elements generate a haptic feedback, perceivable by the user, when the user is within the designated area. The haptic feedback is generated in response to the strength of magnetic field resulting from the one or more electromagnetic floor elements which in turn depends upon the amount of electric current provided to the one or more electromagnetic floor elements.

[0012] When an area or a zone is not required to be or desired to be recognized as the designated area for a specific time interval, or when the entry into and/or exit from the designated area is required to be or desired to be allowed, then instructions provided to the current controller are such that the strength of the magnetic field generated by the one or more electromagnetic floor elements is zero, i.e. when no electric current is supplied to the electromagnetic floor element, or so negligible, when negligible amount of electric current is supplied to the electromagnetic floor element, as to be haptically imperceptible by the user via the one or more ferromagnetic

elements. Alternatively, when an area or a zone is required to be or desired to be recognized as the designated area for a specific time interval, or when the entry into and/or exit from the designated area is required to be or desired to be not allowed or restricted, then instructions provided to the current controller are such that the strength of the magnetic field generated by the one or more electromagnetic floor elements is non-zero, and of such strength so as to be haptically perceptible by the user via the one or more ferromagnetic elements, and thereby rendering information to the user about remaining inside or outside the designated area. The strength of the magnetic field generated is such that the user is able to move, while perceiving the haptic feedback, within the designated area or away from the designated area.

[0013] The present technique is thus free from disadvantages of audio or visual techniques, as aforementioned, of controlling access to a designated area. Furthermore, the present technique for controlling physical access of a person, i.e. the user, with respect to the designated area is implemented in a personalized form, i.e. only the user with the ferromagnetic element placed thereupon is able to perceive the haptic feedback and thereby avoiding or reducing causation of disturbance to others for whom the requirement of controlling physical access is not intended. Also, a first user, for example a skilled machine operator, may be allowed uncontrolled access, by not placing the ferromagnetic element on the first user, to the designated area holding operational heavy machinery, whereas access of a second user, for example a general worker without knowledge of machine operator, to the designated area holding operational heavy machinery may be controlled, by placing the ferromagnetic element on the second user and providing electric current to the electromagnetic floor elements within the designated area. Thus the present technique is capable of providing different instructions to different persons with respect to the same designated area.

[0014] In an embodiment of the system of the present technique, the one or more electromagnetic floor elements includes at least a first electromagnetic floor element and a second electromagnetic floor element. The current controller is configured to vary the electric current provided to the first electromagnetic floor element independently of the electric current provided to the second electromagnetic floor element, i.e. the current controller can supply different electrical current to the first and the second floor elements thereby creating different magnetic field strengths in corresponding parts of the designated area. Thus the electromagnetic floor elements can be arranged such that the haptic responses received by the user are different in different parts of the designated area. This can help in providing an increase or decrease, continuously or intermittently, in the haptic response to the user.

[0015] In another embodiment of the present technique, the system includes a main control. The main control provides, through wired connection or wirelessly, in-

structions to the current controller based on manual inputs received by the main control and/or based on predetermined set of rules regarding recognition of at least a part of a larger area as the designated area for one or more time intervals. Thus the main control can be operated by an operator to vary the electric current provided to the one or more electromagnetic floor elements and/or may have a computer program based on predetermined set of rules to vary the electric current provided to the one or more electromagnetic floor elements for different designated areas and/or for different time intervals with respect to a given designated area.

[0016] In another aspect of the present technique, a method for controlling physical access of a user with respect to a designated area is presented. In the method, one or more electromagnetic floor elements are positioned within the designated area for example positioned at a floor of the designated area, and one or more ferromagnetic elements are positioned on the user for example in or on a footwear of the user such as sole of the footwear. Instructions are provided to a current controller that is configured to vary an electric current provided to the one or more electromagnetic floor elements based on instructions received by the current controller. The current controller includes a communication interface to receive the instructions indicative of an amount of electric current to be provided to the one or more electromagnetic floor elements. Positioning on the user of one or more ferromagnetic elements is performed such that the one or more ferromagnetic elements generate a haptic feedback, perceivable by the user, when the user is within the designated area and in response to a strength of magnetic field generated by the one or more electromagnetic floor elements resulting from the amount of electric current provided to the one or more electromagnetic floor elements. The method has same advantages as aforementioned with respect to the first aspect of the present technique.

[0017] In an embodiment of the method, in providing instructions to the current controller, the instructions provided are indicative of different amounts of electric current to be provided to different electromagnetic floor elements, independent of each other. The current controller thus varies the electric current provided to different electromagnetic floor elements, say the electric current provided to the first electromagnetic floor element is independently variable of the electric current provided to the second electromagnetic floor element, i.e. the current controller can supply different electrical current to the first and the second floor elements thereby creating different magnetic field strengths in corresponding parts of the designated area. Thus the instructions can be such that the haptic responses received by the user are different in different parts of the designated area. This can help in providing an increase or decrease, continuously or intermittently, in the haptic response to the user.

[0018] In another embodiment of the present technique, the method includes generating instructions, via

a main control and to be provided to the current controller through wired connection or wirelessly, based on manual inputs received by the main control and/or based on predetermined set of rules regarding recognition of at least a part of a larger area as the designated area for one or more time intervals. Thus the main control can be operated by an operator to vary the electric current provided to the one or more electromagnetic floor elements and/or may have a computer program based on predetermined set of rules to vary the electric current provided to the one or more electromagnetic floor elements for different designated areas and/or for different time intervals with respect to a given designated area.

[0019] The present technique is further described hereinafter with reference to illustrated embodiments shown in the accompanying drawing, in which:

FIG 1 schematically illustrates an exemplary embodiment of a system of the present technique;

FIG 2 schematically illustrates an exemplary arrangement of one or more electromagnetic floor elements;

FIG 3 schematically illustrates another exemplary arrangement of one or more electromagnetic floor elements; and

FIG 4 schematically illustrates yet another exemplary arrangement of the electromagnetic floor elements; in accordance with the aspects of the present technique.

[0020] Hereinafter, above-mentioned and other features of the present technique are described in details. Various embodiments are described with reference to the drawing, wherein like reference numerals are used to refer to like elements throughout. In the following description, for purpose of explanation, numerous specific details are set forth in order to provide a thorough understanding of one or more embodiments. It may be noted that the illustrated embodiments are intended to explain, and not to limit the invention. It may be evident that such embodiments may be practiced without these specific details.

[0021] It may be noted that in the present disclosure, the terms "first", "second", etc. are used herein only to facilitate discussion, and carry no particular temporal or chronological significance unless otherwise indicated.

[0022] FIG 1 schematically illustrates an exemplary embodiment of a system 1 of the present technique. The system 1 includes one or more electromagnetic floor elements 10, a current controller 20, and one or more ferromagnetic elements 30, and may optionally include a main control 40. The electromagnetic floor element may be one in number substantially extending throughout the designated area; or along but within a periphery of the designated area. Alternatively, the electromagnetic floor

elements may be multiple and may be arranged substantially extending throughout the designated area; or along but within a periphery of the designated area.

[0023] FIGs 2 and 3 schematically illustrate different exemplary arrangements of the electromagnetic floor elements 10 within a designated area 5. The designated area 5 may be an area around a heavy machine 7 or other equipment 7 from vicinity of which the user is required to stay away. As depicted in FIG 2, the electromagnetic floor elements 10 are arranged such that the arrangement substantially extends throughout the designated area 5. Alternatively, as depicted in FIG 3, the electromagnetic floor elements 10 are arranged such that the arrangement extends along a periphery 6 of the designated area 5 but within the periphery 6 of the designated area 5. It may be noted that FIGs 2 and 3 show a plurality of different electromagnetic floor elements 10, hereinafter also referred to as the floor elements 10, however as aforementioned there may be just one electromagnetic floor element 10 shaped corresponding to the designated area 5 or to the periphery 6 of the designated area 5.

[0024] The one or more electromagnetic floor elements 10 are positioned within the designated area 5, for example in a floor within the designated area 5 or in a wall within the designated area 5 or a handle of a door to access or exit the designated area 5. The electromagnetic floor elements 10 may be embedded within the floor surface or wall surface or handle surface of the door, or may be arranged on the floor surface or wall surface or handle surface of the door. The electromagnetic floor elements 10 may be arranged or attached to the designated area 5 fixedly or removably i.e. can be removed from the designated area 5 and reinstalled within the designated area 5 in same or different position or arrangement. The electromagnetic floor elements 10 are electromagnets and consequently generate a magnetic field when electric current is provided to the electromagnetic floor elements 10. When no electric current is provided to the electromagnetic floor elements 10, no magnetic field is consequently generated.

[0025] Referring to FIG 1, in combination with FIGs 2 and 3, the current controller 20 varies an electric current provided to the one or more electromagnetic floor elements 10 based on instructions received by the current controller 10. Constructional details and principle of operations of such current controllers 20 are well known in the art of electrical sciences and thus not explained herein in details for sake of brevity. The current controller 20 includes a communication interface 25 to receive the instructions. The instructions may be provided to the current controller 20 directly by an operator or through the main control 40. The main control 40 provides, through wired connection or wirelessly, the instructions to the current controller 20 based on manual inputs received by the main control 40 for example by the operator to vary the electric current provided to the one or more electromagnetic floor elements 10. Additionally or alternatively, the main control 40 provides, through wired connection

or wirelessly, the instructions to the current controller 20 based on predetermined set of rules regarding recognition of at least a part of a larger area as the designated area 5 for one or more time intervals i.e. by executing a computer program in the main control 40. The computer program may be based on predetermined set of rules to vary the electric current provided to the one or more electromagnetic floor elements 10 for different designated areas 5 and/or for different time intervals with respect to a given designated area 5.

[0026] The instructions are indicative of an amount of electric current to be provided to the one or more electromagnetic floor elements 10. When electrical current is provided to the electromagnetic floor elements 10, the magnetic field is generated as a result. The strength of the magnetic field depends upon or is proportional to the amount of the electric current provided to the electromagnetic floor element 10.

[0027] The one or more ferromagnetic elements 30 are positioned on the user, for example on or in footwear 2 or shoe 2, as shown in FIG 2, of the user such as a sole 21 of the footwear 2 of the user. The one or more ferromagnetic elements 30 are positioned on the user such that the one or more ferromagnetic elements 30 generate a haptic feedback, perceivable by the user, when the user is within the designated area 5 or at the periphery 6 of the designated area 5. The haptic feedback is generated in response to the strength of magnetic field resulting from the one or more electromagnetic floor elements 10 which in turn depends upon the amount of electric current provided to the one or more electromagnetic floor elements 10 via the current controller 20 in response to the instructions provided to the current controller 20.

[0028] When an area or a zone is not required to be or desired to be recognized as the designated area 5 for a specific time interval, or when the entry into and/or exit from the designated area 5 is required to be or desired to be allowed, then instructions, for example commands executable by a processor within the current controller 20, provided to the current controller 20 are such that the strength of the magnetic field generated by the one or more electromagnetic floor elements 10 is zero, i.e. when no electric current is supplied to the electromagnetic floor element 10, or so negligible, when negligible amount of electric current is supplied to the electromagnetic floor elements 10, as to be haptically imperceptible by the user via the one or more ferromagnetic elements 30.

[0029] Alternatively, when an area or a zone is required to be or desired to be recognized as the designated area 5 for a specific time interval, or when the entry into and/or exit from the designated area 5 is required to be or desired to be not allowed or restricted, then instructions or commands provided to the current controller 20 are such that the strength of the magnetic field generated by the electromagnetic floor elements 10 is non-zero, and of such strength so as to be haptically perceptible by the user via the ferromagnetic element 30, and thereby rendering information to the user about remaining inside or outside

the designated area 5 or alerting the user to another mode (not shown) of audiovisual signal that may be present in the vicinity of the designated area 5 or simply alerting the user to be careful about entry into or exit from or remaining stationed within the designated area 5. The strength of the magnetic field generated is such that the user is able to move, while perceiving the haptic feedback, within the designated area 5 or away from the designated area 5.

[0030] FIG 4 schematically illustrates yet another exemplary arrangement of the electromagnetic floor elements 10 and in combination with FIG 1 schematically depicts another exemplary embodiment of the system 1 of the present technique. In the system 1, the electromagnetic floor elements 10 include at least a first electromagnetic floor element 11 and a second electromagnetic floor element 12. Each of the first electromagnetic floor element 11 and the second electromagnetic floor element 12 may be one or multiple in number. The first electromagnetic floor element 11 and the second electromagnetic floor element 12 may be same in construction for example may have same size or magnetic properties, or may be different for example, as shown in FIG 4, the first electromagnetic floor elements 11 may be bigger and/or magnetically more powerful than the second electromagnetic floor elements 12.

[0031] The current controller 20 is configured to vary the electric current provided to the first electromagnetic floor element 11 independently of the electric current provided to the second electromagnetic floor element 12. When the current controller 20 is instructed or commanded, by providing corresponding instructions directly to the communication interface 25 from the operator or via the main control 40 as aforementioned, to supply different electrical currents to the first and the second electromagnetic floor elements 11, 12, different magnetic field strengths are generated in different parts or regions of the designated area 5. For example in FIG 4, the designated area 5 is divided into a first region 51, a second region 52 and a third region 53. The first electromagnetic floor elements 11 are positioned within the first area 51 and the second electromagnetic floor elements 12 are positioned within the second area 52. Optionally, yet another electromagnetic floor elements (not shown) different than or same as one of the first and the second electromagnetic floor elements 11, 12 may be positioned within the third region 53.

[0032] In the arrangement of the electromagnetic floor elements 11, 12 shown in FIG 4, when a first amount of electric current is supplied to the first electromagnetic floor elements 11 and a second amount of electric current is supplied to the second electromagnetic floor elements 12, the magnetic fields generated by the electromagnetic floor elements 11, 12 in their corresponding regions 51, 52 of the designated area 5 are different. For example, the instructions provided to the current controller 20 may be such that more electric current is provided by the current controller 20 to the second electromagnetic floor el-

ements 12 compared to the electric current provided to the first electromagnetic floor elements 11, and thus the strength of the magnetic field in the second region 52 is greater than the strength of the magnetic field in the first region 51 of the designated area 5. Consequently, the user with the ferromagnetic element 30, when approaches the second region 52 receives or perceives a stronger or greater haptic feedback at the second region 52 compared to the haptic feedback received or perceived by the user when at the first region 51.

[0033] As shown in the example of FIG 4, the electromagnetic floor elements 11, 12 can be arranged such that the haptic feedbacks or responses received by the user are different in different parts or regions of the designated area 5. This can help in providing an increase or decrease, continuously or intermittently, in the haptic response to the user.

[0034] In the present technique, the haptic feedback or response is a feedback or response that is also referred to sometimes as haptic or kinesthetic communication and includes mechanical stimulation or tactile stimulation to the user. The haptic feedback recreates the sense of touch by using the magnetic force experienced by the ferromagnetic element 30 when interacting with the magnetic field generated by the electromagnetic floor elements 10, 11, 12.

[0035] While the present technique has been described in detail with reference to certain embodiments, it should be appreciated that the present technique is not limited to those precise embodiments. Rather, in view of the present disclosure which describes exemplary modes for practicing the invention, many modifications and variations would present themselves, to those skilled in the art without departing from the scope and spirit of this invention. The scope of the invention is, therefore, indicated by the following claims rather than by the foregoing description. All changes, modifications, and variations coming within the meaning and range of equivalency of the claims are to be considered within their scope.

Claims

1. A system (1) for controlling physical access of a user with respect to a designated area (5), the system (1) comprising:
 - one or more electromagnetic floor elements (10,11,12) configured to be positioned within the designated area (5);
 - a current controller (20) configured to vary an electric current provided to the one or more electromagnetic floor elements (10,11,12) based on instructions received by the current controller (20), wherein the current controller includes a communication interface (25) to receive the instructions indicative of an amount of electric current to be provided to the one or more electro-

- magnetic floor elements (10,11,12); and
 - one or more ferromagnetic elements (30) configured to be positioned on the user such that the one or more ferromagnetic elements (30) generate a haptic feedback, perceivable by the user, when the user is within the designated area (5) and in response to a strength of magnetic field generated by the one or more electromagnetic floor elements (10,11,12) resulting from the amount of electric current provided to the one or more electromagnetic floor elements (10,11,12).
2. The system (1) according to claim 1, wherein the one or more electromagnetic floor elements (10,11,12) comprises at least a first electromagnetic floor element (11) and a second electromagnetic floor element (12) and wherein the current controller (20) is configured to vary the electric current provided to the first electromagnetic floor element (11) independently of the electric current provided to the second electromagnetic floor element (12).
 3. The system (1) according to claim 1 or 2, wherein the one or more electromagnetic floor elements (10,11,12) is configured to be positioned at a floor of the designated area (5).
 4. The system (1) according to any of claims 1 to 3, wherein the one or more ferromagnetic elements (30) are configured to be positioned on or within footwear (2) of the user.
 5. The system (1) according to claim 4, wherein the one or more ferromagnetic elements (30) is on or within the sole (21) of the footwear (2).
 6. The system (1) according to any of claims 1 to 5, further comprising:
 - a main control (40) configured to provide instructions to the current controller (20) based on manual inputs received by the main control (40) and/or based on predetermined set of rules regarding recognition of at least a part of a larger area as the designated area (5) for one or more time intervals.
 7. The system (1) according to claim 6, wherein the main control (40) is configured to provide the instructions wirelessly to the current controller (20).
 8. A method for controlling physical access of a user with respect to a designated area (5), the method comprising:
 - positioning within the designated area (5) one or more electromagnetic floor elements
 - (10,11,12);
 - providing instructions to a current controller (20), wherein the current controller (20) is configured to vary an electric current provided to the one or more electromagnetic floor elements (10,11,12) based on instructions received by the current controller (20), and wherein the current controller (20) includes a communication interface (25) to receive the instructions indicative of an amount of electric current to be provided to the one or more electromagnetic floor elements (10,11,12); and
 - positioning on the user one or more ferromagnetic elements (30), wherein the one or more ferromagnetic elements (30) are positioned on the user such that the one or more ferromagnetic elements (30) generate a haptic feedback, perceivable by the user, when the user is within the designated area (5) and in response to a strength of magnetic field generated by the one or more electromagnetic floor elements (10,11,12) resulting from the amount of electric current provided to the one or more electromagnetic floor elements (10,11,12).
 9. The method according to claim 8, wherein in providing instructions to the current controller (20), the instructions provided are indicative of different amounts of electric current to be provided to different electromagnetic floor elements (11,12), independent of each other.
 10. The method according to claim 8 or 9, wherein the one or more electromagnetic floor elements (10,11,12) are positioned at a floor of the designated area (5).
 11. The method according to any of claims 8 to 10, wherein the one or more ferromagnetic elements (30) are positioned on or within footwear (2) of the user.
 12. The method according to claim 11, wherein the one or more ferromagnetic elements (30) is on or within the sole (21) of the footwear (2).
 13. The method according to any of claims 8 to 12, further comprising:
 - generating instructions, via a main control (40) and to be provided to the current controller (20), based on manual inputs received by the main control (40) and/or based on predetermined set of rules regarding recognition of at least a part of a larger area as the designated area (5) for one or more time intervals.
 14. The method according to any of claims 8 to 13,

wherein the instructions are provided wirelessly to the current controller (20).

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FIG 1

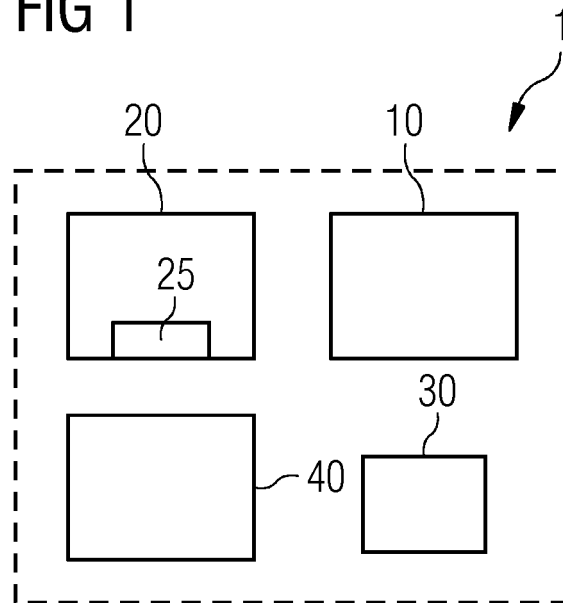


FIG 2

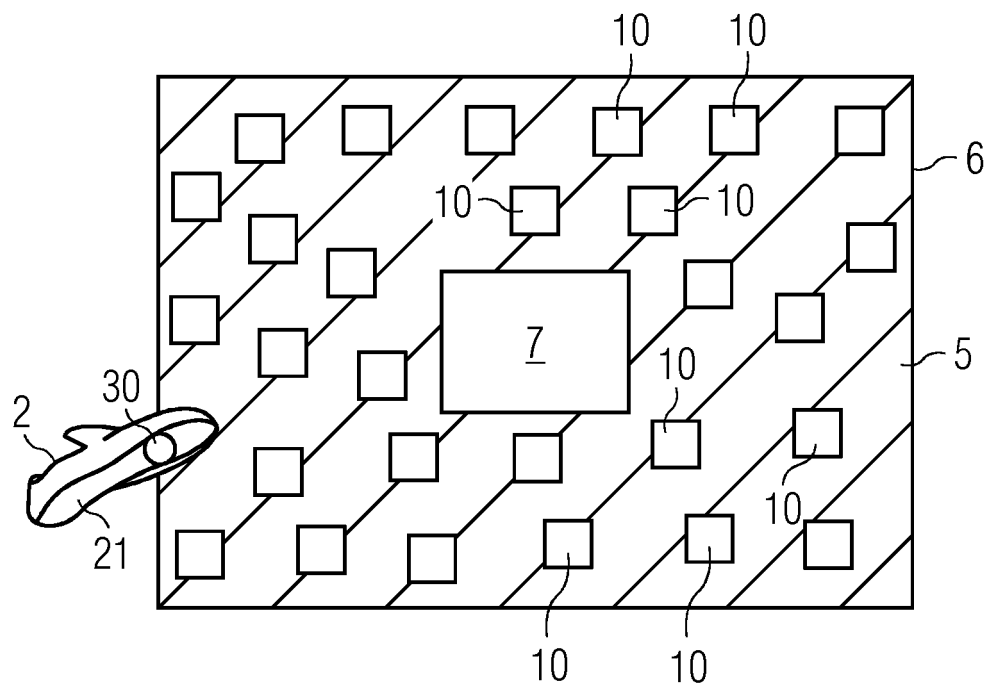


FIG 3

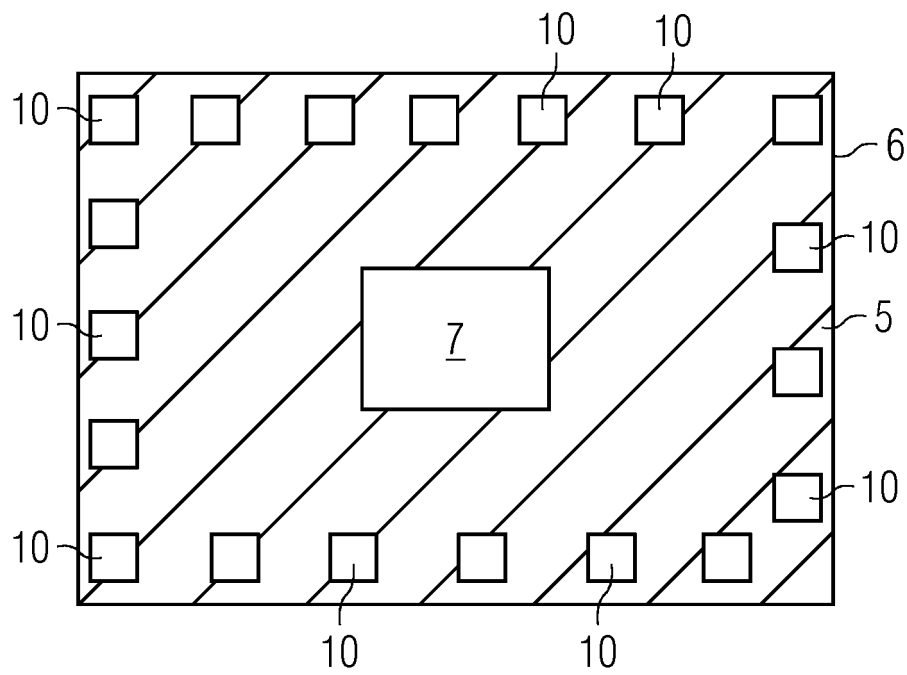
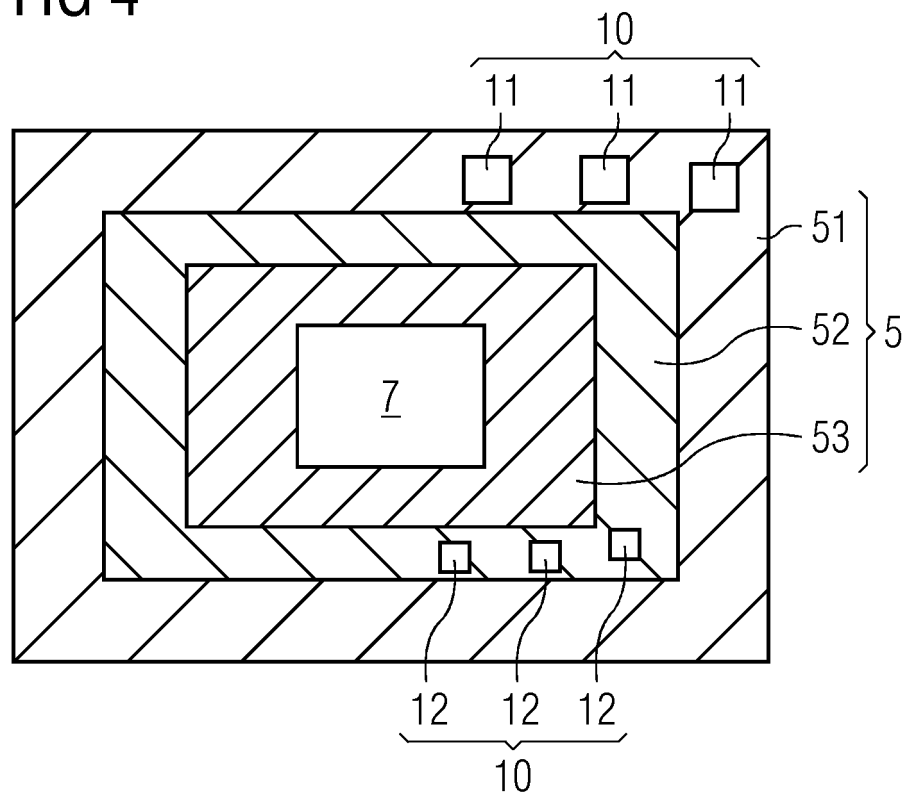


FIG 4





EUROPEAN SEARCH REPORT

Application Number
EP 17 16 0095

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	CN 104 346 924 A (WANG HAIPENG) 11 February 2015 (2015-02-11) * Page 5, last paragraph; Page 6, last three paragraphs; Page 7, first and last two paragraphs; Page 8, fourth paragraph; Claim 1; Figures 1, 4. The above passages refer to the annexed machine translation of CN104346924. *	1-14	INV. G08B6/00
Y	EP 0 632 419 A1 (NIPPON ROAD [JP]; NEC ENVIRONMENT ENG LTD [JP]) 4 January 1995 (1995-01-04) * column 1, lines 1-15 * * column 3, line 43 - column 4, line 55 * * column 6, line 14 - column 7, line 29 * * figures 1,6-8 *	1-14	
A	JP H10 113359 A (OZAKI YORIYASU) 6 May 1998 (1998-05-06) * figures 1,3 *	4,5,11,12	TECHNICAL FIELDS SEARCHED (IPC) G08B A61H G08G
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 September 2017	Examiner Meister, Mark
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 16 0095

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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