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(54) Title: A TACTILE GUIDING LINE SYSTEM DESIGNED FOR BLIND AND VISUALLY IMPAIRED PERSONS

(57) Abstract: The present invention relates to tactile guiding tiles configurable to provide guiding lines on surfaces of respective gangways, and a system and method thereof and especially to a tactile tile body arranged with a tactile contrast element providing visual and tactile contrasts indicating possible walking directions.

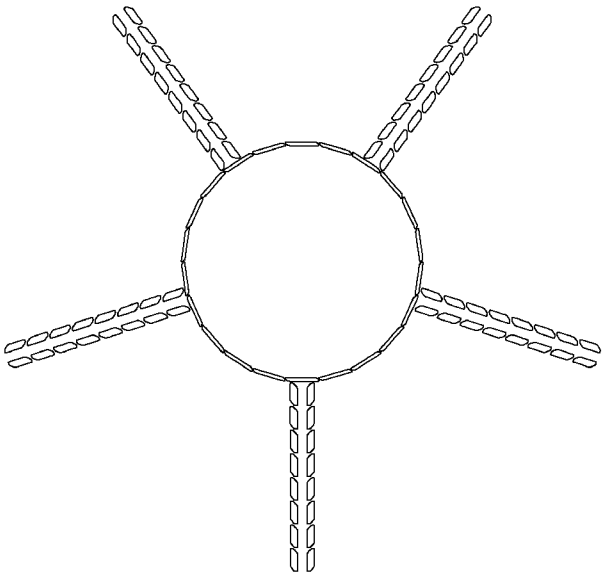

Figure 5

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A tactile guiding line system designed for blind and visually impaired persons.

FIELD OF THE INVENTION

The present invention relates to tactile guiding tiles configurable to provide guiding lines on surfaces of respective gangways, and a system and method thereof and especially to a tactile tile body arranged with a tactile contrast element providing visual and/or tactile contrasts indicating possible walking directions.

BACKGROUND OF THE INVENTION

Blind people and visually impaired people do have a challenge in daily life when walking in streets, or inside buildings like bank offices, post offices, or at railway stations, metro stations, or buss stations, for example. In recent years many city councils have deployed a large number of tactile guiding tiles like the one illustrated in figure 9 (ref. DK 96 00285 U3) in streets and public buildings. The tiles may be made of metal and they are usually arranged as guiding lines enabling a person with a mobility cane to follow the guiding lines by allowing the mobility cane to follow the direction defined by a series of aligned outer periphery surfaces of each respective tile in the guiding lines. With reference to figure 9, the end sections of the prior art tiles are rounded with a circle like shaped section. This enables tiles to be configured in curved shapes, or even sharp angles between sections of a guiding line, thereby enabling the deployment of a guiding line according to topographic properties in the terrain, or layout of streets, or corridors inside buildings. Further, the rounded corners may provide a smooth tactile response for a person through a mobility cane that is pushed along the guiding line from one tactile tile to a next tactile tile in the guiding line. The distance between the tactile tiles are less than the diameter of the mobility cane. Therefore, the tactile response may be a smooth movement with some distinct transverse movements due to the round end shapes and gaps between the tactile tiles of prior art.

It is further known to arrange fields of prior art tiles in front of stairs or elevators for example, which can indicate "be aware", or is an indication of danger when for example a blind person is standing at the top of staircases etc.

However, if a person with a mobility cane crosses a line of prior art tiles somewhere along the guiding line, it is very difficult for the person to decide which one of the two possible directions of walking left or right from the point of crossing the person should select to reach an intended destination in an end of the guiding line. Therefore, even if the tiles may guide a person in a direction, it is still a challenge to know which direction to choose. The destination could for example be an elevator inside buildings, or at street level, an entrance to a subway station, etc.

If a person enters a door of a building, and then finds a starting point of a line of tactile tiles, the person is given an indication of direction. For example, it would be obvious that by walking along the tactile tiles away from the door, this would probably lead the person to an intended destination, which could be for example a ticket office if the building is a railway station, an elevator and/or stairs in an apartment building, an information desk in a hospital, or a reception desk in a hotel etc. However, when for example the person has acquired a ticket for a train from a ticket office at the railway station, how can the person then find the direction and destination of a specific platform the train is leaving from? The similar situation may arise for example at a hospital. Even if the person is given a correct description of direction at an information desk at the entrance of the hospital, the question remains how to guide a person from a single starting point to one of a plurality of different possible destinations along tactile guiding lines.

Generally, it is a problem to identify one destination among a plurality of possible destination with a line of guiding tactile tile bodies which has only one starting point and only one ending point.

Therefore, even if the prior art tactile tiles may be arranged to guide a blind or visual impaired person to a destination, a person following the tiles may not know at which end of the line of tiles the intended destination of the guiding line is actually located.

Hence, an improved tactile tile, and a method of deploying the same, would be advantageous, and in particular a tactile tile providing indication of direction would be advantageous.

OBJECT OF THE INVENTION

It is a further object of the present invention to provide an alternative to the prior art.

In particular, it may be seen as an object of the present invention to provide a tactile tile body comprising a tactile contrast element that are configurable to provide a tactile contrast, and/or an optional visual contrast, and/or an optional acoustical contrast that are different dependent on a direction of movement along a lengthwise periphery side of the tactile tile body.

SUMMARY OF THE INVENTION

Thus, the above described object and several other objects are intended to be obtained in a first aspect of the invention by providing a tactile tile body configurable to be part of a guiding line, wherein a specific shaping of the outer geometry of the tactile tiles is configurable to provide a tactile contrast, and/or an optional visual contrast, and or an optional acoustical contrast, wherein the contrast(s) are different dependent on a direction of movement along the tactile guiding line constituted by the tactile tile bodies.

The invention is particularly, but not exclusively, advantageous for obtaining a tactile tile body configurable to be part of a tactile guiding line associated with blind or visual impaired persons using a mobility cane, wherein a periphery side face in a lengthwise direction of the tactile tile body comprises a tactile contrast element configurable to provide a tactile sensation through an associated mobility cane when the associated mobility cane is being moved along the lengthwise side face of the tactile tile body, wherein the tactile sensation provided for by the tactile contrast element is dependent on which side of the tactile contrast element

the mobility cane approaches the contrast element when being moved by an associated person.

The invention further relates to a system of a plurality of guiding lines being interconnectable via special sections of configurable patterns of tactile tile bodies.

This aspect is particularly, but not exclusively, advantageously for obtaining a tactile guiding line system comprising a plurality of guiding lines, wherein the plurality of guiding lines are interconnected via a circle shaped roundabout constituted by tactile tile bodies configurable to indicating a walking direction around the roundabout for an associated blind or visually impaired person.

The invention further relates to a method being adapted to provide directional information to users walking along guiding lines constituted by a row of tactile tile bodies along an intended walking direction.

This aspect of the invention is particularly, but not exclusively, advantageous in that the method according to the present invention may be implemented by arranging a tactile contrast element in side faces of tactile tile bodies constituting a guiding line, wherein the tactile contrast is different dependent on which side of the tactile contrast element a person using an associated mobility cane is approaching the tactile tile element along the guiding line.

The respective different aspects of the present invention may each be combined with any of the other aspects. These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

DESCRIPTION OF THE FIGURES

The tactile tile body, system and method thereof according to the present invention will now be described in more detail with reference to the accompanying figures. The figures illustrates examples of embodiments of the present invention and is not to be construed as being limiting to other possible embodiments falling within the scope of the attached claim set.

Figure 1a illustrates an example of embodiment of the present invention viewed from a top side.

Figure 1b illustrates the example of embodiment depicted in figure 1b viewed from a lengthwise side.

Figure 1c illustrates a cross section of the example of embodiment depicted in figure 1a.

Figure 2a illustrates an example of tactile contrast sensation according to the present invention.

Figure 2b illustrates another example of tactile contrast sensation according to the present invention.

Figure 3 illustrates another example of embodiment of the present inention.

Figure 4 illustrates an example of a guiding line according to the present invention.

Figure 5 illustrates another example of a guiding line system according to the present invention.

Figure 6 illustrates an example of application of an example of embodiment of the present invention.

Figure 7 illustrates parameters of an example of embodiment of the present invention.

Figure 8 illustrates another example of embodiment of the present invention.

Figure 9 illustrates an example of prior art.

DETAILED DESCRIPTION OF AN EMBODIMENT

Although the present invention has been described in connection with the specified embodiments, it should not be construed as being in any way limited to the presented examples. The scope of the present invention is set out by the accompanying claim set. In the context of the claims, the terms "comprising" or "comprises" do not exclude other possible elements or steps. Also, the mentioning of references such as "a" or "an" etc. should not be construed as excluding a plurality. The use of reference signs in the claims with respect to elements indicated in the figures shall also not be construed as limiting the scope of the invention. Furthermore, individual features mentioned in different claims, may possibly be advantageously combined, and the mentioning of these features in different claims does not exclude that a combination of features is not possible and advantageous.

Blind people and visually impaired persons may rely on memorized routes and physical indications, for example guiding lines, signs with Braille coded text, trained dogs etc. to be able to move around. Generally, any posting of information on signs, on pavements etc. directed towards blind and visually impaired persons may rely on providing specific designed contrasts between the common surrounding and the item used for conveying information to such persons. In this context it is possible to provide tactile contrast, acoustic contrast and also visual contrasts in some instances. However, the use of a mobility cane may also represent a load on the wrist of the person using the mobility cane. For example, when following a guiding line provided for by prior art tiles, as depicted in figure 9, the mobility cane may be moved back and forth across the walking direction due to the circle shaped end sections of the tiles forming the guiding line. Even if the movement of a mobility cane is easy, since the mobility cane is a light weight construction, a monotonous movement of the wrist along kilometres of walk along a tactile guiding line day in and day out may provoke attrition and damage to the wrist. Therefore, it is also important when designing tactile tile bodies to take into account ergonomic requirements of the design.

According to an aspect of the present invention a guiding line for blind or visually impaired persons may be configurable to provide a contrast to the surrounding

environment, wherein the nature or an experienced sensation for a user of the guiding line related to the contrast may be used to provide an indication of an intended direction of the guiding line, or respectively an indication of an opposite direction of the intended direction. In a sense, this may provide an indication of "correct" walking direction or a "wrong" walking direction. What is deemed to be a "correct" or "wrong" walking direction is a question of definition related to the use and/or location of a guiding line. For example, a guiding line from an entrance of a hospital to an information desk may be deemed to be the "correct" direction.

With respect to the phenomena of tactile contrast it is possible to assign a "correct" walking direction of a guiding line for example, comprising tactile tile bodies, as a direction wherein a mobility cane that is moved along a periphery of the tactile tiles along the guiding line direction is providing a feedback via the mobility cane to the user that is providing a sensation of "smooth" and unhindered movement of the mobility cane. A contrast to this phenomenon, which then can be used to identify a "wrong" direction, could be to arrange a contrast providing an increase in friction of the movement forward of the mobility cane for example, or a sudden induced transversal movement of the mobility cane for example. These kinds of sensations should then appear if the mobility cane is moved along the periphery of the tactile tile bodies of the guiding line in an opposite direction of the assigned "correct" direction.

Further, the tactile contrast inducing elements in a guiding line should also preferable provide a visual contrast indicating "correct" or "wrong walking directions. Therefore, it is preferable to use distinct geometrical shapes or forms of the periphery of tactile tile bodies as contrast inducing elements. The periphery of the tactile tile bodies are the physical contact interface to a mobility cane, and by using a shape or form to provide the tactile contrast with distinct geometrical shapes the visual contrast may also be present providing a visual contrast for visually impaired persons.

It is within the scope of the present invention that a tactile tile body should be configurable in a guiding line to provide tactile contrast indicating a direction of the guiding line. Visual and/or acoustical contrasts are optional contrasts that can be used instead of tactile contrast or together with the tactile contrast. It is

further within the scope of the present invention that a tactile inducing element may be arranged in an interface section between two tactile tile bodies located in a row next to each other in a guiding line.

Figure 1a illustrates an example of embodiment of the present invention. Figure 1a illustrates a tactile tile body viewed from a top side that can be used in a guiding line. As can be seen, the tile is longer than it is wider, and comprises a middle section 11 interposed between a first end section 10 and a second end section 12. Interconnections of all the three sections are provided for by an upper periphery side 17 and a respective lower periphery side 18 of the middle section 11. These periphery sides 17, 18 constitute the periphery sides of tiles a mobility cane may be in contact with when guiding a person along a guiding line assembled with a plurality of tiles as depicted in figure 1a.

The first end section 10 may be a mirrored version of the second end section 12. It is further within the scope of the present invention that a tile may be a mirrored version of the whole tile body along the lengthwise direction of the tile.

The length A of a tile as depicted in figure 1b may be selected according to the use and location of a guiding line comprising the tiles. If there is a long straight section of the guiding line the tile bodies may be longer than when the tiles are used in bends or circle shaped sections of the guiding line. Then it is preferable to have a shorter length A of the tactile tile body.

Figure 1c depicts the width B and height C of a tactile tile body according to the present invention. The main feature is that it is advantageous to have a curved upper surface of the tactile tile body and that the height of the tile should be limited. This is due to the fact that the tactile tile bodies may be used on gangway surfaces and should not be a blunt physical obstacle for walking people. The tactile body of the tactile tile is mainly provided for by the periphery surfaces along the outer surface close to the bottom of the tactile tile body.

An aspect of the present invention is to provide a shape of the tactile tile body that may provide directional information to a person following for example a periphery side 17 or 18 of the middle section 11. To achieve this object of the

present invention, the first end section 10 is shaped differently than the second end section 12. For example, in figure 2a an example with two tactile tile bodies of a section of a guiding line are arranged such that the second end section 12 of a first tactile tile body 50 is located opposite the first end section 10 of second tactile tile body 51. The line 53 in figure 2a illustrates the movement of a mobility cane 52 along the two tactile tiles 50, 51. The straight arrowed line indicates the moving direction of a blind person carrying the mobility cane 52.

When the mobility cane comes to the end of the second periphery side surface 18 of the middle section 11 of the first tactile tile body 50, the rounded corner of the second end section 12 of the first tactile tile body 50 will guide the mobility cane 52 abruptly inwards along the first end section periphery side surfaces 14 in the gap formed in between the two tactile tiles 50, 51. The mobility cane will then be inside the gap but since the person using the mobility cane moves forward the mobility cane will be moved towards the sloping or inclined periphery side surface part 15 of the first end section 10 of the second tactile body 51. The angle of the slope or inclination will then enable a smooth capture of the mobility cane and then gently guide the mobility cane out of the gap towards the second periphery surface 18 of the second tactile tile body 51 when the user of the mobility cane moves further onwards. The movement along the tactile tiles 50, 51 in figure 2a will therefore provide a tactile sensation via the mobility cane to the user that is a smooth unhindered movement with just a small sideways movement of the mobility cane when passing the gap between the next to each other located tactile tile bodies 50, 51.

In figure 2b it is depicted a movement in a direction from the tactile tile body 51 to the tactile tile body 50. The illustration in figure 2b has been turned around to align the movement direction depicted in figure 2a with a same movement direction in figure 2b. In this manner it is easier to understand the technical effect of the configuration of the example of tactile tile bodies according to the present invention.

The mobility cane is first moved along the second periphery surface 18 of the second tactile tile body 51. When the mobility cane 51 is at the end of the periphery surface 18 the mobility cane will be guided smoothly and unhindered

along the sloping side surface of the first end section 10 of the second tactile tile body 51. Since the user moves on further, the mobility cane now being inside the gap between the tactile tile bodies 50, 51, will be moved on further and will hit the orthogonally oriented surface part 13 of the second end section of the first tactile tile body 50. This will therefore provide a tactile sensation via the mobility cane to the user that is an abrupt stopping of the movement forward. Since the user still moves forward the mobility cane will be drawn out of the gap with a small jump like movement that will provide a further tactile sensation for the user.

In this manner there will be a distinct tactile sensation dependent on which direction a mobility cane will be moved along periphery surfaces of the tactile tile bodies arranged in a guiding line. This difference may therefore be used to assign a "correct" direction, or a "wrong" direction. This definition may also be dependent on how the relationship is between the user and the guiding line. For example, by convention, it may be the side of the tactile guiding line closest to the foot of a person using the mobility cane that defines a direction.

The minimum distance between the first tactile body 50 and the second tactile tile body 51 in the example of embodiment in figure 2a and figure 2b may be of a size being less than a diameter of the section of a mobility cane (the foot of the mobility cane) being in contact with the tactile tile bodies. This enhances the smooth tactile sensation and limits how far inside the gap between the tactile tile bodies the mobility cane can move before being stopped by the minimum distance between the tactile tile bodies before being moved out of the gap again. This provides a better ergonomic situation for a user of a guiding line according to the present invention.

However, it is also within the scope of the present invention to allow the distance between the tactile tiles to be greater than the diameter of mobility cane. With reference to figure 2b, in this situation, when the mobility cane is guided along the sloped side face 15 of the second tactile body 51, the mobility cane will then be captured by the other sloped side face 16 of the second end section of the first tactile tile body 50. Therefore, the mobility cane will be guided to the other side of the guiding line thereby providing a distinct tactile sensation to the user via a significant sideways movement of the mobility cane. A movement in the other

direction will provide a same tactile sensation as described with reference to figure 2a.

The above described example of embodiment of the present invention represents an example of tactile contrast element that may be arranged in gaps between tactile tile bodies according to the present invention.

Figure 3 illustrates another example of embodiment of the present invention. A periphery side face 63 in a lengthwise direction of a tactile tile body 60 comprises an opening into a cutout 64 which constitutes an example of tactile contrast element. The periphery side face 63 continues into the cutout via a rounded corner before being joined to a first sloping periphery side face section 61 of the cutout 64. The first sloping periphery side face section 61 of the cutout 64 has a geometrical shape providing an uninterrupted guiding of an associated mobility cane when being moved in either direction along the first sloping periphery side face section 64. A second periphery side face section 62 is arranged opposite the first sloping periphery side face section 61 of the cutout 64. A geometrical shape of the second periphery side face section 62 is providing a tactile contrast sensation via an associated mobility cane when being moved along the second periphery side face section 62 from a bottom side of the cutout towards the opening of the cutout and then further along the periphery side face 63.

The second periphery side face section 62 of the cutout 64 may be arranged with a parallel direction to the first periphery side face section 61. The cutout may then function as a "pocket" wherein the mobility cane will be "captured" by the "pocket". In the depicted example in figure 3, the second periphery side face section comprises a hump 65 providing a backward movement of the mobility cane when the mobility cane is being moved along the tactile tile body 60.

Optionally, the periphery side face section 62 of the cutout 64 may be arranged orthogonally, optionally ± five degrees, relative to the periphery side face 63.

Figure 8 illustrates another example of embodiment of the present invention. On a periphery side face 71, in a lengthwise direction of a tactile tile body 70, there is arranged a protruding part 72 as an example of tactile contrast element. The

protruding part 72 has a shape of a right-angled triangle, wherein a first leg 74 of the right angle is in the plane of the periphery side face 71 of the tactile tile body 70 while the other leg 75 of the right angle is orthogonal, optionally ± five degrees, and protruding out from the periphery side 71. The hypotenuse 73 of the triangle shaped protruding part constitutes a sloping part providing an unhindered movement of a mobility cane following the hypotenuse. The orthogonal protruding right angle side 75 of the triangle constitutes a tactile contrast when a mobility cane is being moved towards the orthogonal protruding part. Thereby, it is possible to define a "correct" walking direction, and a "wrong" walking direction.

The above disclosed non-limiting examples of embodiments of a tactile contrast element utilizes a sensation of altering a smooth forward movement of a mobility cane, i. e. the dynamic behavior experienced by the movement itself. The examples disclosed above either stops a forward movement, turns a movement forward backwards, or is providing unexpected abrupt transvers movements relative to the forward smooth movement. In the examples, a first section having a shaped surface providing none or slowly experienced dynamical movement changes is combined with a second section providing one or more of the above described changes of dynamical experienced movements. The directional identification is provided for by arranging the second section in front of the first section when viewed in a "correct" direction. The dynamical behavior of the tactile contrast is that when a mobility cane is moved across the second section towards the first section, the mobility cane passes unhindered past the contrast inducing element of the second section, and the mobility cane will then be "captured" by the surface of the first section and guided further with slowly or soft changes of dynamical behavior when the mobility cane is moved on further away from the tactile contrast element in the "correct" defined direction.

According to another aspect of the present invention, it is not necessary that each and every one of the tactile tile elements of a guiding line comprises a tactile contrast element. By convention, the distance between tactile tile bodies providing direction information may be located at distances of one meter distance, two meter distance, three meter distance and so on.

Further, with reference to figure 1a and figure 7, the tactile tile body end sections may be constituted by at least two respective periphery side surfaces 13, 14, 15, 16 having a different inclination angle relative to each other. In an example of embodiment the inclination angle of the first periphery side surface part 13 of the first end section 10 may an angle in a non-limiting range from eighty-five to ninety degrees relative to the first periphery side surface of the middle section, and a second periphery side surface part 15 of the first end section 10 may have an angle in a non-limiting range from thirty-five to fifty-five degrees relative to the second periphery side surface 18 of the middle section 11.

It is within the scope of the present invention that any other difference of inclination angle is possible as long as they provide a difference in tactile sensation. These ranges of inclination angles apply for both the first end section 10 and the second end section 12 if the second end section 12 is a mirrored version of the first end section 10.

It is also within the scope of the present invention to provide an acoustical contrast. For example, each respective end sections 10, 12 may be arranged hollow, thereby providing an acoustical contrast when a mobility cane is hitting a periphery surface of the respective end sections 10, 12. With reference to figure 2a and figure 2b, if the periphery side surface 14 of the second end section 12 of the first tactile tile body 50 is hollow, and the sloping periphery side surface 15 of the first end section 10 of the second tactile tile body 51 is solid, the acoustical feedback when hitting the side surface 14 of the first tactile tile body 50 when walking in the "wrong" direction will be significantly different from the sound of hitting the side surface 15 of the second tactile tile body 51 when walking in the "correct" direction.

Optionally light sources may also be configurable on an upward faced surface of the tactile tile body providing a visual indication of direction for visually impaired persons. For example, Light Emitting Diodes may be configured as an arrow indicating a "correct" walking direction.

It is also possible to optionally arrange a global positioning system transmitter in the body of a tactile tile body, or locate the transmitter in the support structure

(floor, ground, gangway etc.) underneath the tactile tile body. The transmitter may also be in communication with a wireless transmitter that has a limited range. In this manner a person may carry a receiver that receives positional information when the person is in the vicinity of the tactile tile equipped with the positional system. The receiver may be a smart phone and the wireless communication may be via the wireless connection of the phone, or via Bluetooth transmissions. In the smartphone there might be an application transforming the positional information into locations on a map, such as known with google maps, or the identified location may be translated to indicate street name, public buildings nearby with voice communication, as known to a person skilled in the art.

It is also within the scope of the present invention to optionally arrange Braille symbols on the upward faced surface of the tactile tile bodies. This can be text indicating location and/or direction to follow.

The above described non limiting examples of embodiments of the present invention may be used to arrange a guiding line for blind and visually impaired persons by aligning tiles in a line wherein a first end section of a first tile is located facing towards a second end face of a next tile thereby enabling a directional indications as explained with reference to the examples of embodiments in figure 2a and figure 2b. It is also within the scope of the present invention that such guiding lines may be arranged on outside walls as well as inside walls and other building elements. When arranged in this manner a person may use a finger to follow the guiding line and experience the tactile and visual contrast provide for by the tactile tile bodies according to the present invention. It is also within the scope of the present invention to use for example two parallel lines of tactile tile bodies. Each respective line may indicate opposite directions.

Another aspect of the present invention is to utilize the directional information in staircases. It is known in prior art to arrange tactile tile bodies at the top and respectively at the bottom of staircases, and also on the steps of a staircase (ref. figure 6). When tactile tile bodies according to the present invention are arranged as "warning sections" at staircases, the directional information may be used to

indicate at which side of the staircase there is a hand rail for supporting persons walking in the staircase.

Another aspect of the present invention is the possibility to interconnect a plurality of guiding lines in a system of guiding blind or visually impaired persons from a single starting point to a plurality of different destinations. For example, when a person enters the entrance of a railway station a first guiding line from the entrance would guide the person towards a ticket office. When the ticket is purchased, a next guiding line may guide the person to an arranged roundabout as depicted in figure 5. When the person encounters the roundabout pattern formed by tactile tile bodies according to the present invention the person may easily identify a walking direction around the roundabout. This may be necessary to reduce the risk of blind people walking into each other when the walk in the round about. When people walk in the same direction the risk of a collision is reduced significantly.

At each crossing point between the roundabout and the different guiding lines branching out from the roundabout, there can be posted signs with Braille coded text, loud speakers like "sound showers", wireless communication with smart phones combined with positional information as known to a person skilled in the art, which may for example identifying which platform in a railway station the particular guiding line is leading the person to. In this manner it is possible for the blind or visual impaired person to buy a ticket and also find the correct platform to use when entering a train.

It is further within the scope of the present invention to use a plurality of roundabouts in a system of guiding lines.

According to a method of the present invention, directional information may be possible to assign to a guiding line for blind or visually impaired persons comprising steps of:

arranging a tactile contrast element in side faces of tactile tile bodies constituting a guiding line, wherein the tactile contrast is different dependent on which side of

the tactile contrast element a person using an associated mobility cane is approaching the tactile tile element along the guiding line.

The method comprises further to arrange tactile contrast elements in interface locations between two tactile tile bodies located next to each other in the guiding line.

According to an example of embodiment of the present invention, the tactile tile bodies may be manufactured out of ceramics, metal, composite materials, plastics etc. It is further an advantage to provide a flat even bottom surface of the tactile tile body thereby providing a larger area of contact between the tactile tile body and the supporting surface of a gangway for example. These examples of embodiments make it also possible to glue the tactile tile bodies to the supporting surface.

It is also possible to add coloring pigments to for example a ceramic material. In this manner it is possible to manufacture tactile tiles with different colors. For example, it is possible to have green section and a respective red section after each other in the lengthwise direction of the tiles. When the tiles are aligned in a guiding line with a same orientation according to color, it is possible to define a "correct" walking direction as a direction of walking towards the green sectiosn of each respective tactile tile body.

Further, internationally there exist a standard ISO 23599 for "Assitive products for blind and vision-impaired persons – Tactile walking surface indicators". In the standard there are respective parameters and requirement of tiles in addition to standardized patterns of "Tactile walking surface indicators". It is within the scope of the present invention to provide examples of embodiment of the tactile tile body fulfilling various requirements set forth in the standard.

Claims:

1.

A tactile tile body (50, 51, 60, 70) configurable to be part of a tactile guiding line associated with blind or visual impaired persons using a mobility cane (52), wherein a periphery side face (17, 18, 63, 71) in a lengthwise direction of the tactile tile body comprises a tactile contrast element (13, 14, 15, 16, 64, 72) configurable to provide a tactile sensation through an associated mobility cane when the associated mobility cane is being moved along the lengthwise side face of the tactile tile body, wherein the tactile sensation provided for by the tactile contrast element is dependent on which side of the tactile contrast element the mobility cane (52) approaches the contrast element when being moved by an associated person.

2.

The tactile tile body according to claim 2, wherein the tactile contrast element is constituted by an opening (64) in a lengthwise periphery side face (63) of the tactile tile body (60), into a cutout (64) in the body of the tactile tile, wherein the periphery side face continues into the cutout via a rounded corner before being joined to a first sloping periphery side face section (61) of the cutout, wherein the first sloping periphery side face section of the cutout has a geometrical shape providing an uninterrupted guiding of an associated mobility cane being moved in either direction along the first sloping periphery side face section, a second periphery side face section (62) is arranged opposite the first sloping periphery side face section of the cutout, wherein a geometrical shape (65) of the second periphery side face section is providing a tactile contrast sensation via an associated mobility cane when being moved along the second periphery side face section from a bottom side of the cutout towards the opening of the cutout.

3.

The tactile tile body according to claim 2, wherein the cutout in the lengthwise direction of the tactile tile body is arranged as part of an interface between a first tactile tile body (50) being located in a row next to a second tactile tile body (51) in a guiding line, wherein the first sloping periphery side face (15, 16) of the cutout is part of an end periphery side face of the first tactile tile body facing

towards the next in line arranged second tactile tile body, wherein the second periphery side face (13, 14) of the cutout is part of an end face of the second tactile body.

4.

The tactile tile body according to claim 2, wherein the second periphery side face section continues from a bottom side of the cutout (64) towards a hump like section (65) before being joined with the periphery side face (63) in the lengthwise direction of the tactile tile body.

5.

The tactile tile body according to claim 2, wherein the second periphery side face section continues from a bottom side of the cutout in parallel with the first periphery side face section before being joined with the periphery side face in the lengthwise direction of the tactile tile body via a rounded corner.

6.

The tactile tile body according to claim 2, wherein the second periphery side face section continues from a bottom side of the cutout towards a straight section of the second periphery side face being oriented orthogonal, optionally ± five degrees, relative to the lengthwise direction of the periphery side face of the tactile tile body before being joined via a rounded corner with the periphery side face in the lengthwise direction of the tactile tile body.

7.

The tactile tile body according to claim 1, wherein the tactile contrast element of the tactile tile body comprises a middle section (11) interposed between a first end section (10) and a respective second end section (12), wherein a first periphery side surface (17) and a respective opposite located periphery side surface (18) of the middle section (11) are interconnecting periphery side surfaces (13, 15) of the first end section (10) and periphery side surfaces (14, 16) of the second end section (12), wherein the outer shape of the periphery side surfaces (13, 15) of the first end section (10) is provided different from the outer shape of the periphery side surfaces (14, 16) of the second end section (12) in transitional sections between the respective first and second periphery side surfaces (17, 18)

of the middle section (11) and the respective periphery sides (13, 15) of the first end section (10), and the respective periphery sides (14, 16) of the second end section (12), thereby enabling tactile identification of either the first end section (10) or the respective second end section (12) through the provided difference in shape of the respective end sections (10, 12) when an associated mobility cane is guided along the first periphery side surface (17) of the middle section (11), either in a direction from the first end section (10) towards the second end section (12), or from the second end section (12) towards the first end section (10), or when the associated mobility cane is guided along the second periphery side surface (18) of the middle section (11), either in a direction from the first end section (10) towards the second end section (12), or from the second end section (12) towards the first end section (10).

8.

The tactile tile body according to claim 7, wherein the first and respective second end sections (10, 12) comprises at least two respective periphery side surfaces each (13, 14, 15, 16) having a different sloping angle relative to each other.

9.

The tactile tile body according to claim 8, wherein a first periphery side surface part (13) of the first end section (10) has an angle in a range from eighty-five to ninety degrees relative to the first periphery side surface (17) of the middle section (11), and a second periphery side surface part (15) of the first end section (10) has an angle in the range from thirty-five to fifty-five degrees relative to the second periphery side surface (18) of the middle section (11).

10.

The tactile tile body according to claim 8, wherein a first periphery side surface part (14) of the second end section (12) has an angle in a range from eighty-five to ninety degrees relative to the second periphery side surface (18) of the middle section (11), and a second periphery side surface part (16) of the second end section (12) has an angle in the range from thirty-five to fifty-five degrees relative to the first periphery side surface (17) of the middle section (11).

11.

The tactile tile body according to claim 1, wherein the tactile contrast element is constituted by a from the periphery side face outwardly protruding right-angled triangle like body (72), wherein one leg (74) of the right-angle is in the plane of the periphery side face (71), while the other leg (75) is orthogonal, optionally ± five degrees, relative to the periphery side face (71).

12.

The tactile tile body according to any claim 1 to 11, wherein the outer shape of a tactile tile body are constituted by mirroring the tactile tile body along a lengthwise direction of the tactile tile body.

13.

The tactile tile body according to claim 1, wherein the lengthwise periphery side faces of the tactile tile body is arranged in parallel with each other.

14.

The tactile tile body according to claim 1, wherein the tactile tile body comprises a hollow section located in one of the end sections terminating the lengthwise side faces of the tactile tile body.

15.

The tactile tile body according to claim 1, wherein light sources located on a top surface of the tactile tile body is configurable to provide visual contrast indicating an orienting direction of the tactile tile body.

16.

The tactile tile body according to claim 1, wherein the tactile tile body comprises a global positioning system transmitter, or is optionally buried below the tactile tile body in a structure supporting the tactile tile body, the transmitter has a limited transmitter radius.

17.

The tactile tile body according to claim 16, wherein a wireless interface system is connected to the global positioning system transmitter, thereby enabling

communication of positional information to a receiver carried by an associated blind or visually impaired person.

18.

The tactile tile body according to claim 1, wherein a text coded in Braille symbols is located on a top surface of the tactile tile body.

19.

A tactile guideline for blind and visually impaired persons, comprising a plurality of tactile tile bodies according to any claim 1 to 18, wherein each respective tactile tile body in the guideline are arranged such that respective sensations of tactile and/or visual and/or audio contrasts are experienced in a consistent manner in a same walking direction along the tactile guiding line.

20.

The tactile guideline according to claim 19, wherein the tactile tile bodies are arranged in a line defining a guiding line direction with a mutual distance between the tactile tile bodies that are less than the diameter of an associated mobility cane, or is optionally greater than the diameter of the associated mobility cane.

21.

The tactile guiding line according to claim 19, wherein the tactile tile bodies of the guiding line is mounted on walls and/or pillars and/or similar elements of buildings.

22.

The tactile guiding line according to claim 19, wherein the tactile guiding line comprises two parallel guiding lines, wherein tactile tile bodies are arranged such that an indication of direction in one of the two parallel guiding lines is opposite the indication of direction in the other of the two parallel guiding lines.

23.

A tactile guiding line system comprising a plurality of guiding lines according to any claim 17 to 20, wherein the plurality of guiding lines are interconnected via at least one circle shaped roundabout constituted by tactile tile bodies configurable

to indicate a walking direction around the roundabout for an associated blind or visually impaired person.

24.

A method of providing directional information in a guiding line for blind or visually impaired persons, comprising:

arranging a tactile contrast element in side faces of tactile tile bodies constituting a guiding line, wherein the tactile contrast is different dependent on which side of the tactile contrast element a person using an associated mobility cane is approaching the tactile tile element along the guiding line.

25.

The method according to claim 22, wherein the method further comprises the step of arranging tactile contrast elements in interface locations between two tactile tile bodies located next to each other in the guiding line.

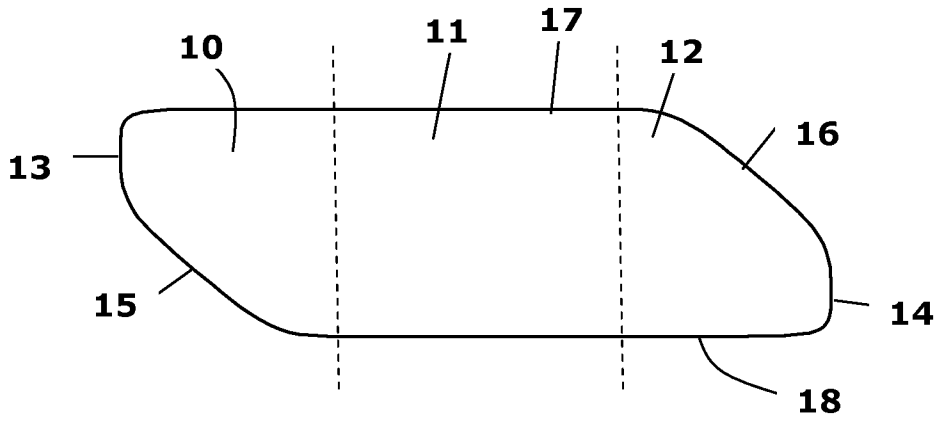


Figure 1a

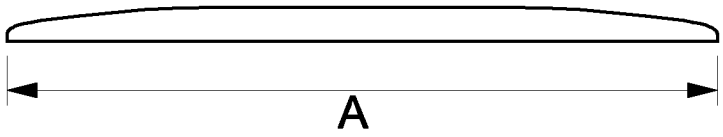


Figure 1b

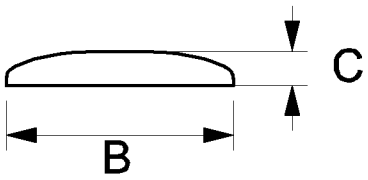


Figure 1c

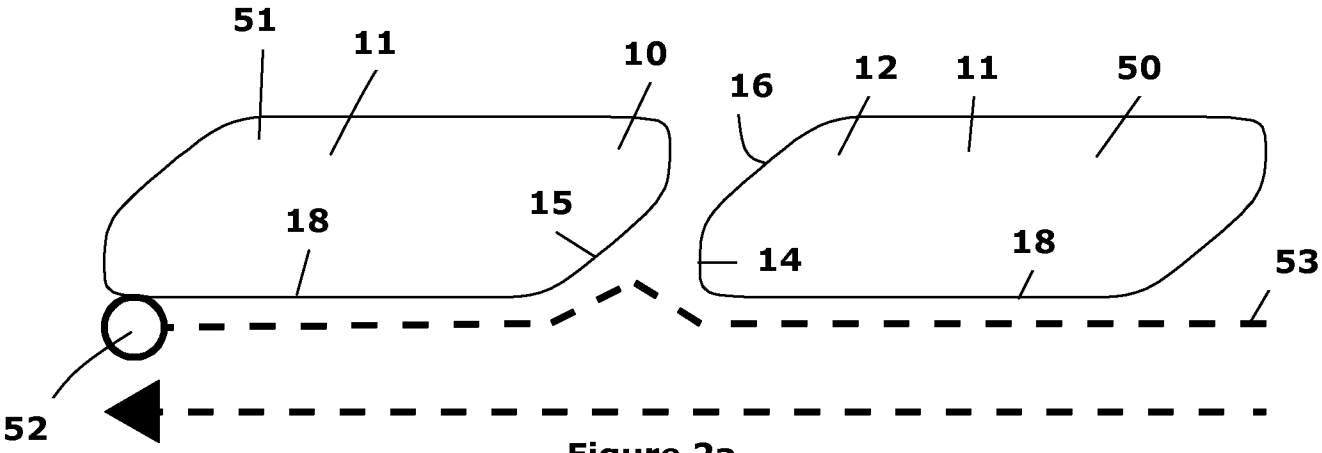


Figure 2a

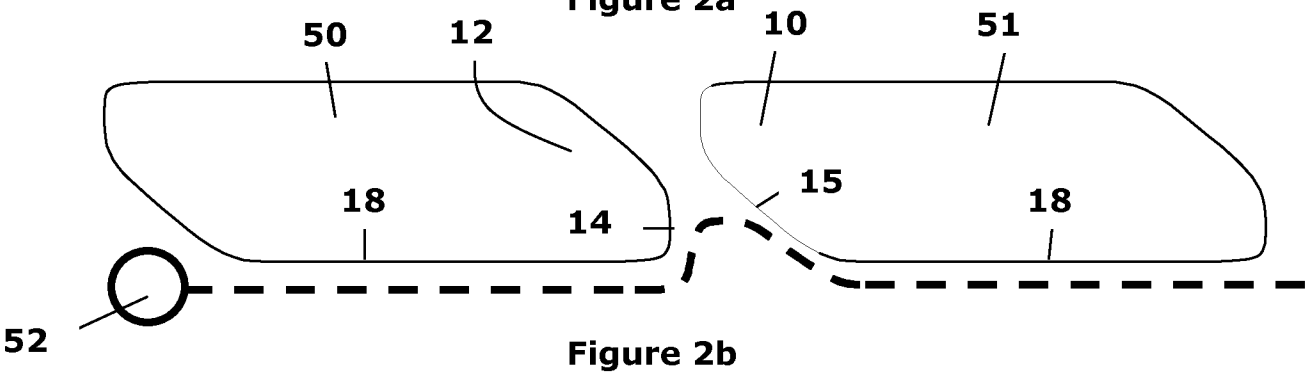


Figure 2b

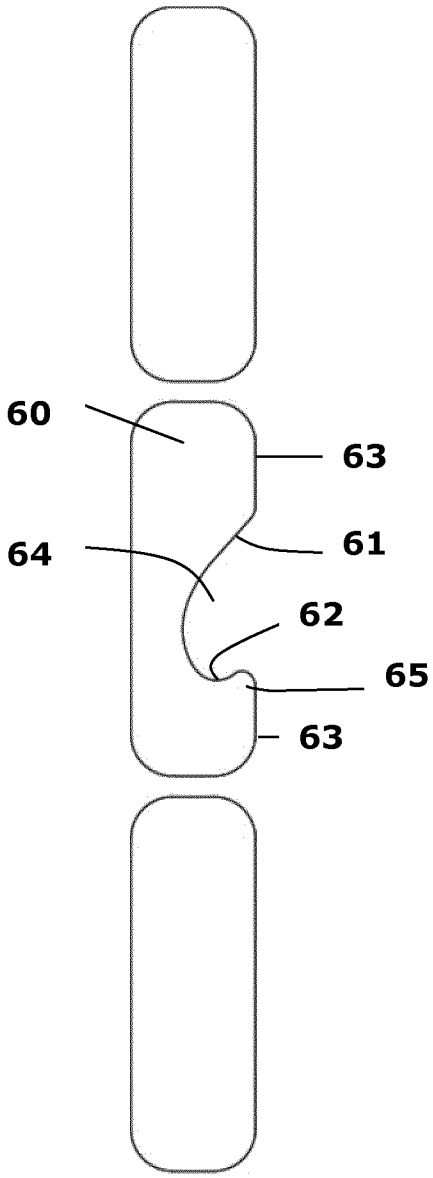


Figure 3

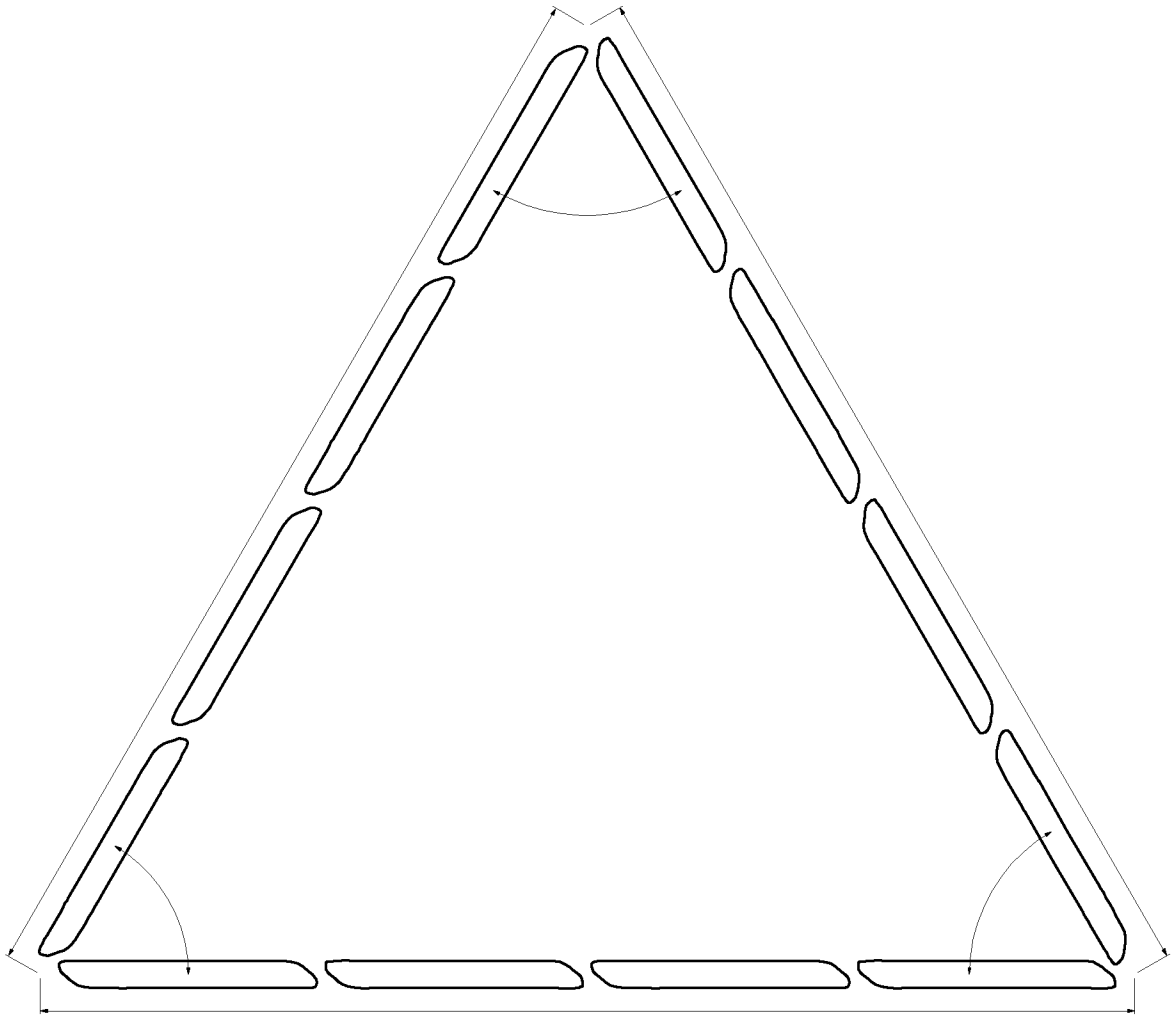

**Figure 4**

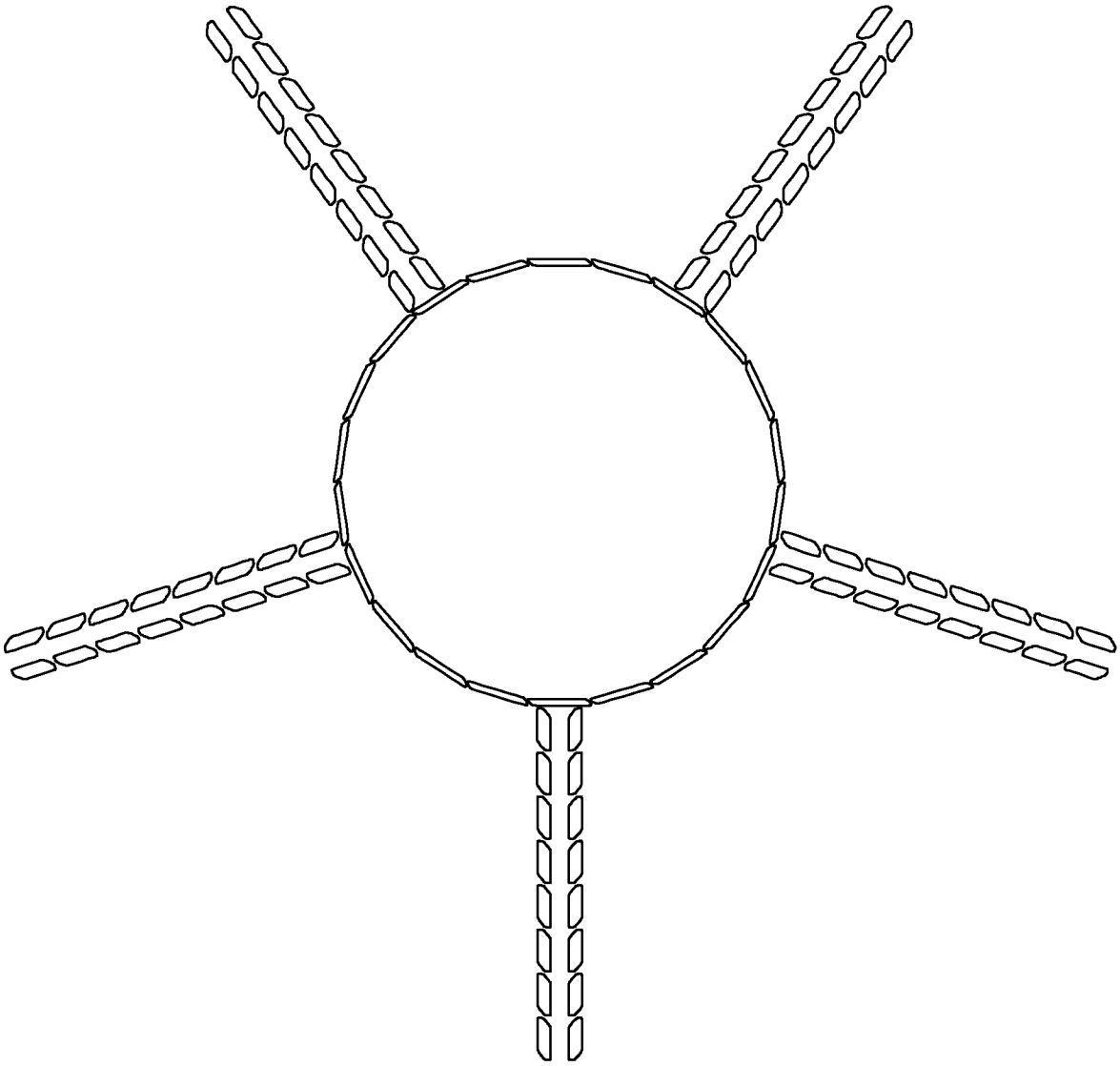

**Figure 5**

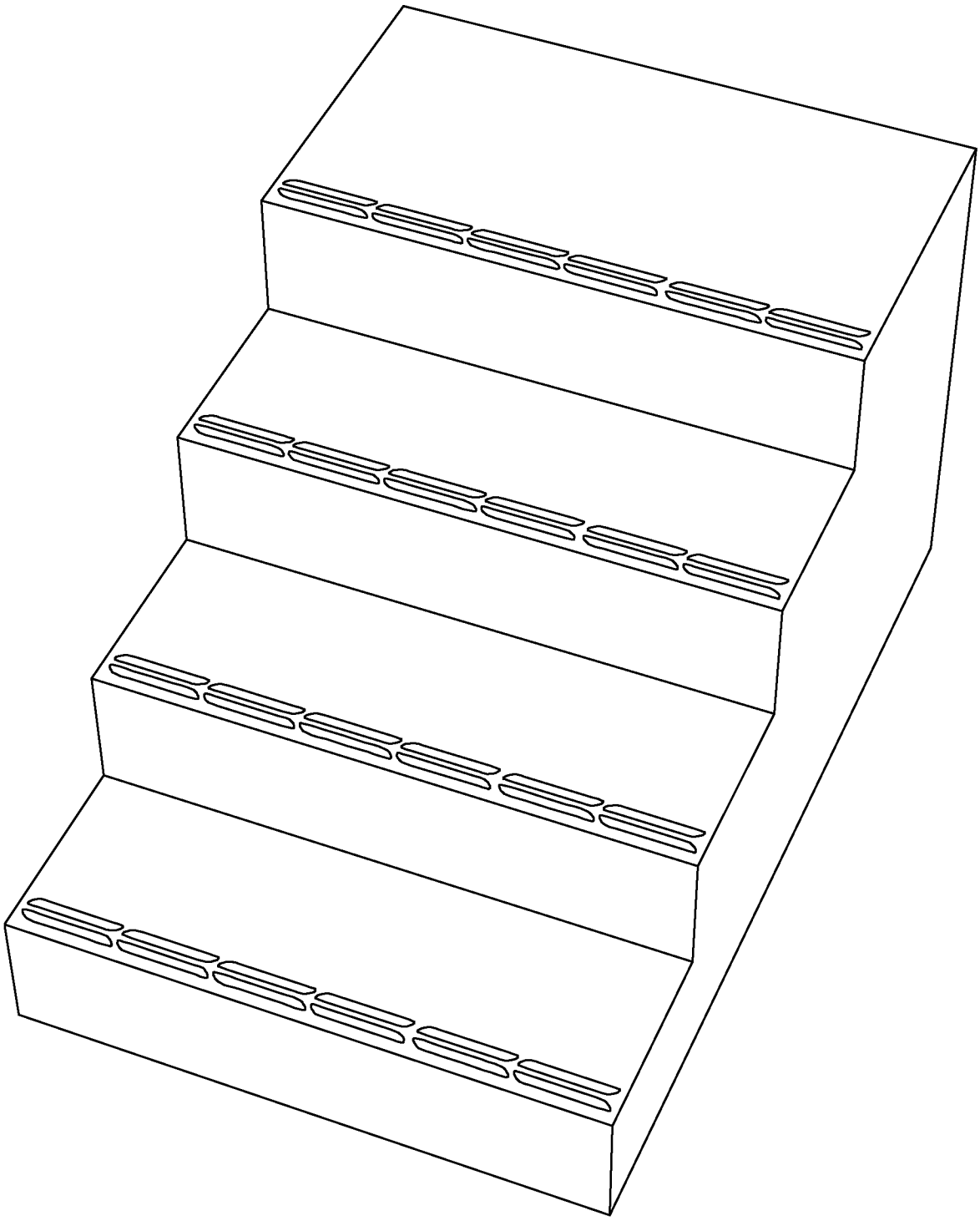

Figure 6

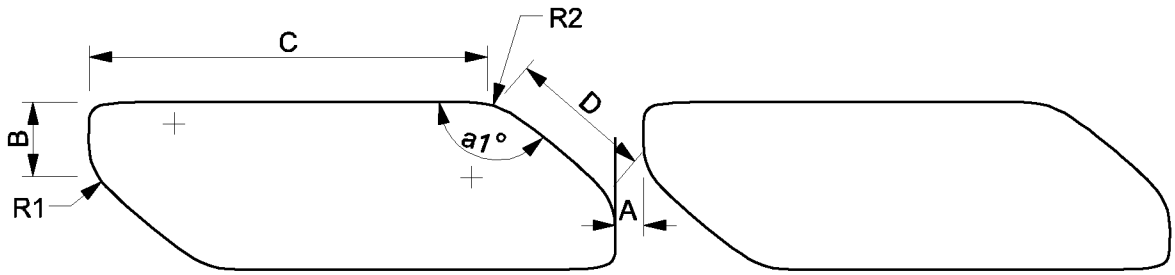


Figure 7

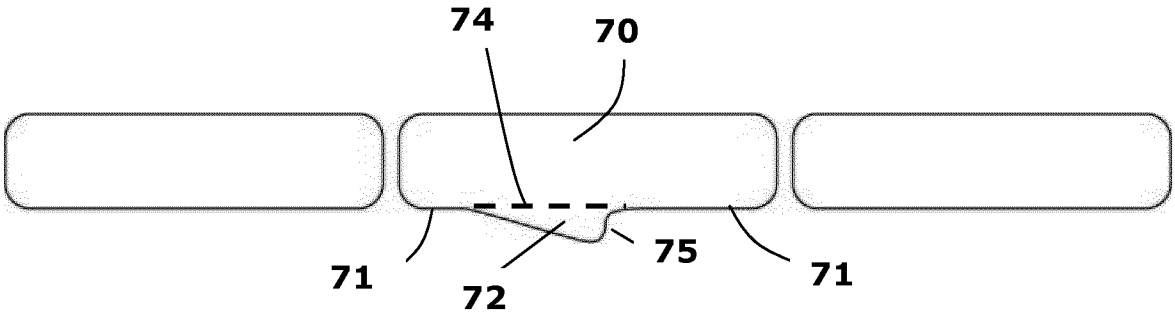


Figure 8

**Figure 9**
**PRIOR ART**

# INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/069096

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61H3/06
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 22 February 2013 | 01/03/2013 |

| Name and mailing address of the ISA/ | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016 | Knoflacher, Nikolaus |

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Form PCT/ISA/210 (second sheet) (April 2005)

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International application No
PCT/EP2012/069096

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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International application No
PCT/EP2012/069096

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