US 20060024132A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2006/0024132 A1

Seman (43) Pub. Date: Feb. 2, 2006

(54) TACTILE WARNING SYSTEM

(76) Inventor: **Todd J. Seman**, Roy, WA (US)

Correspondence Address:
CHRISTENSEN, O'CONNOR, JOHNSON, KINDNESS, PLLC
1420 FIFTH AVENUE
SUITE 2800
SEATTLE, WA 98101-2347 (US)

(21) Appl. No.: **10/926,835**

(22) Filed: **Aug. 25, 2004**

Related U.S. Application Data

(60) Provisional application No. 60/598,250, filed on Aug. 2, 2004.

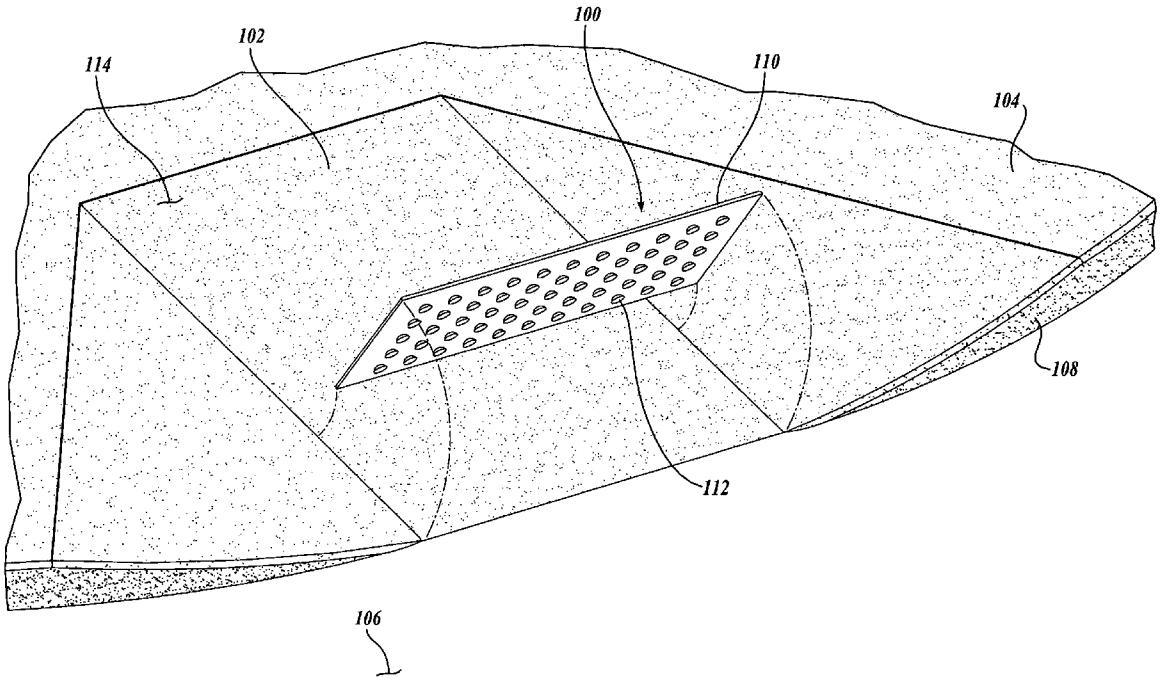
Publication Classification

(51) **Int. Cl.**
E01F 11/00 (2006.01)

(52) **U.S. Cl.** **404/15**

(57) **ABSTRACT**

A tactile warning system (**100** or **200**) having an application surface (**114** or **214**) and a sheet (**110** or **210**) formed from a predetermined material and adhered to the application surface. The tactile warning system includes a plurality of tactile warning members (**112** or **212**) formed from a selected material different from the predetermined material of the sheet. The plurality of tactile warning members are disposed between the sheet and the application surface. The plurality of tactile warning members contact the application surface without an intermediate layer disposed therebetween.



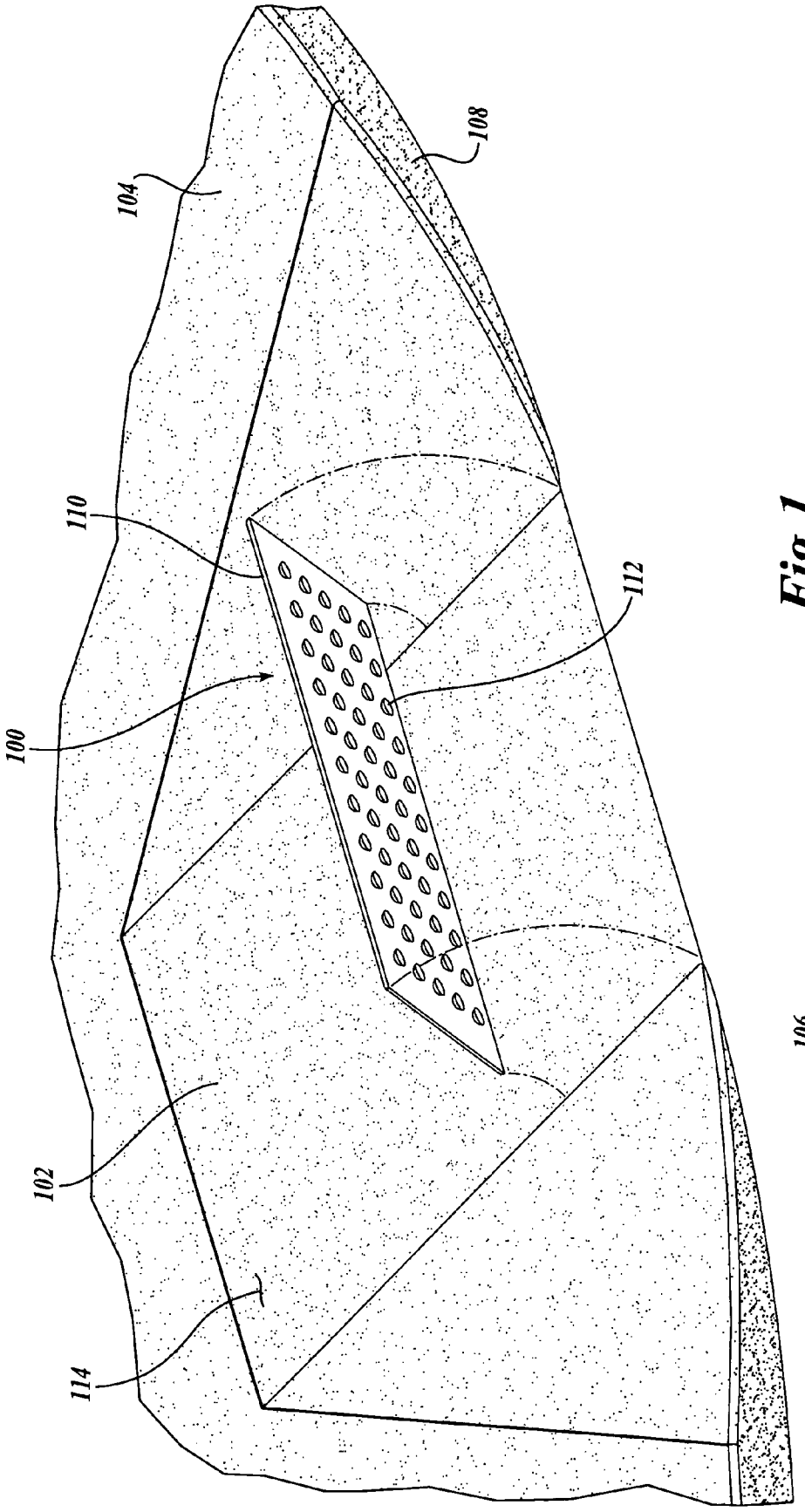


Fig. 1.

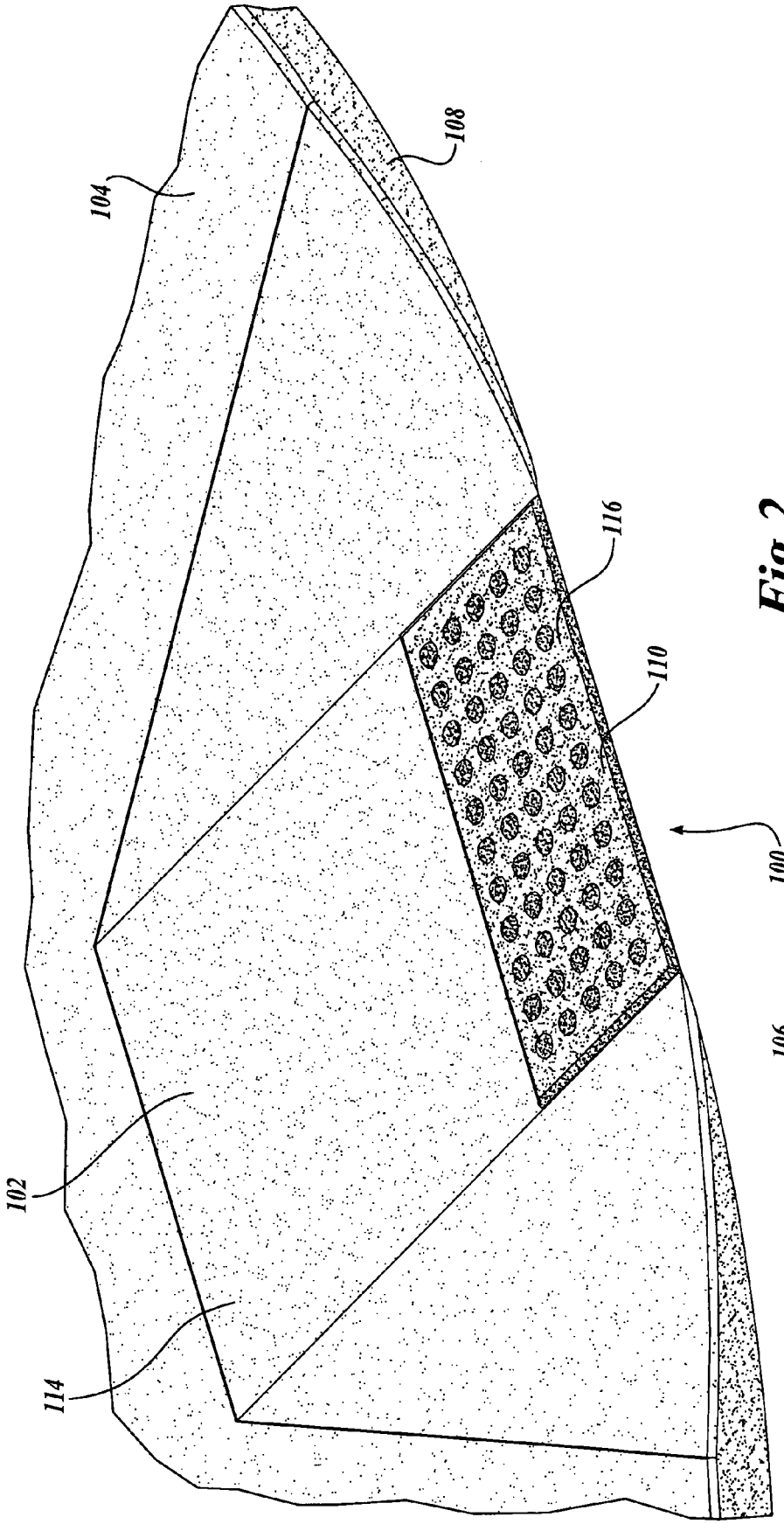


Fig. 2.

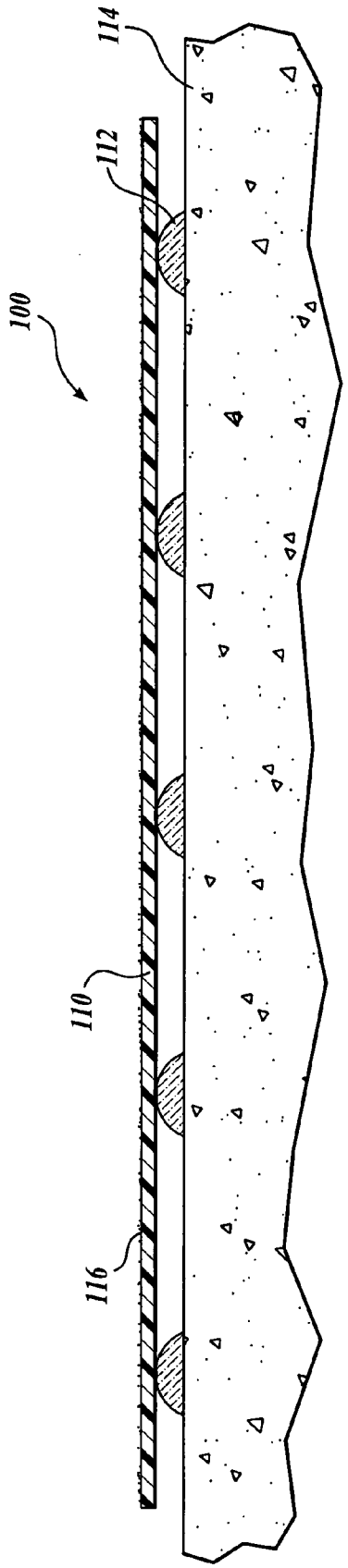


Fig.3.

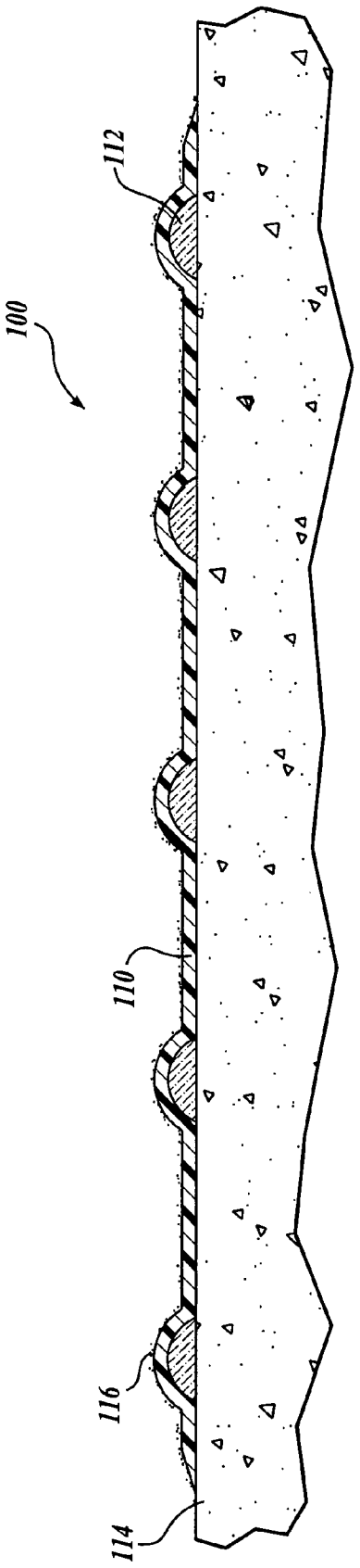


Fig.4.

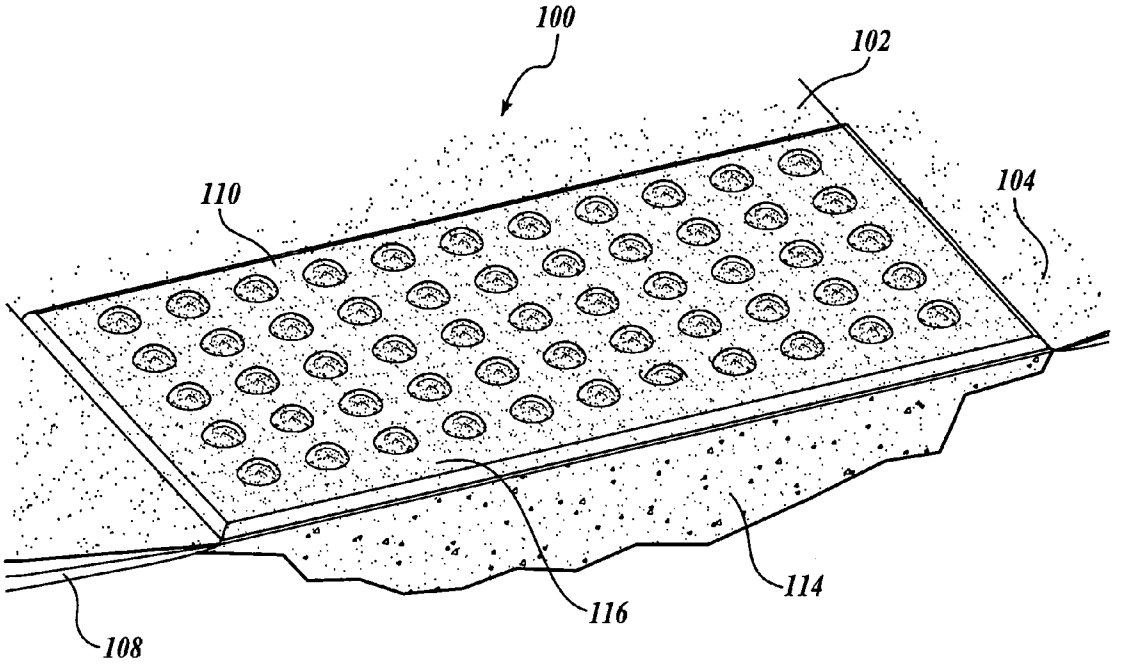


Fig.5.

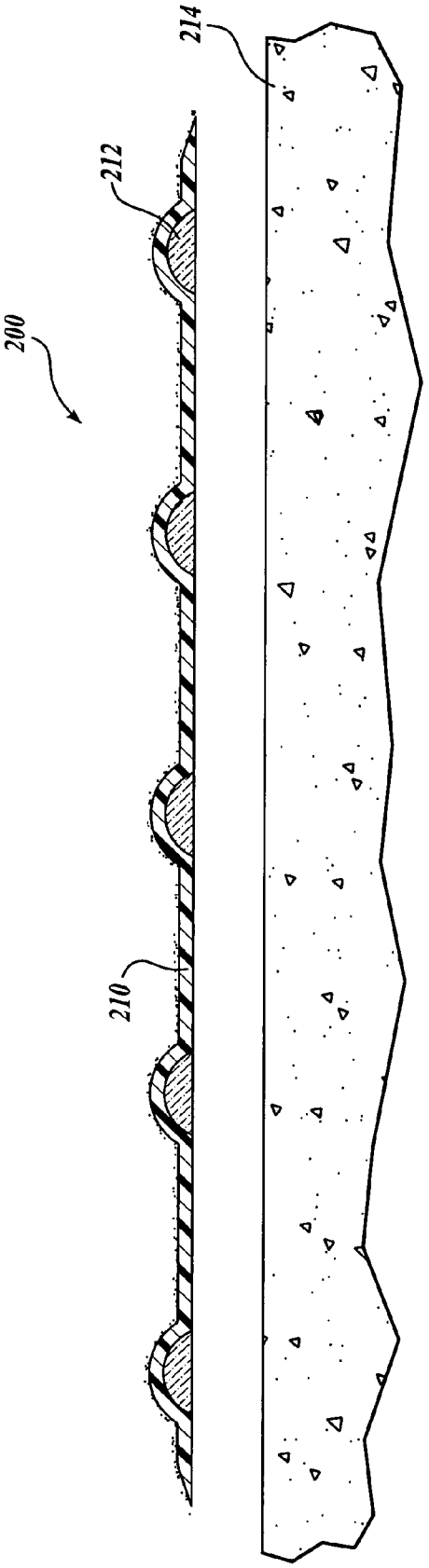


Fig. 6.

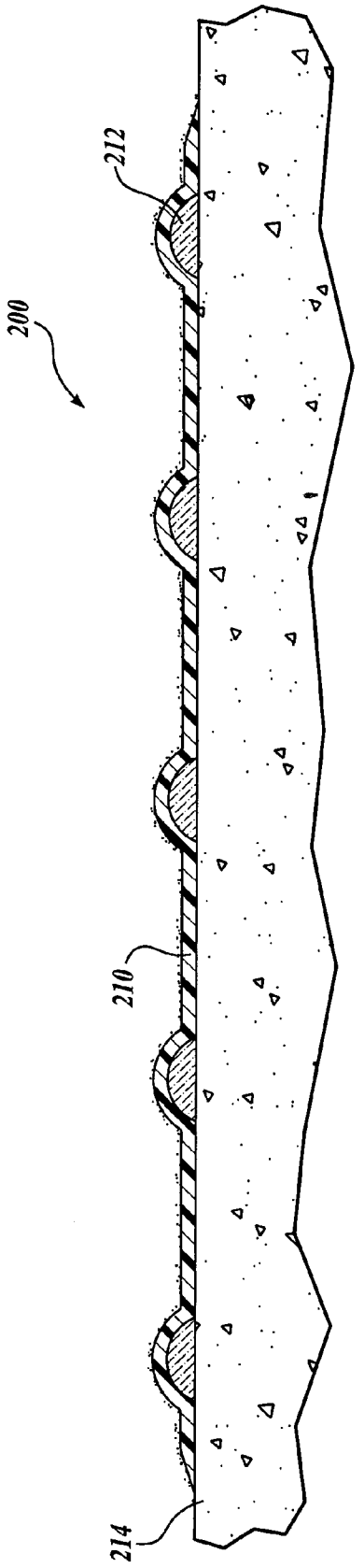


Fig. 7.

TACTILE WARNING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application hereby claims the benefit of U.S. Provisional Patent Application No. 60/598,250, filed on Aug. 2, 2004, entitled Tactile Warning System, the disclosure of which is hereby expressly incorporated by reference, and the priority from the filing date of which is hereby claimed under 35 U.S.C. § 119(e).

FIELD OF THE INVENTION

[0002] The present invention relates generally to tactile warning systems for indicating to sight impaired individuals the presence of a hazard and/or an obstacle.

BACKGROUND OF THE INVENTION

[0003] It is well known that persons with little or no usable vision depend upon environmental cues for safe and independent travel. A few examples of environmental cues are ambient sounds, buzzers, physical elements that may be sensed by a cane, such as a curb, and surface/floor texture changes that may be felt by a person's foot or cane. For instance, a sight impaired individual may use the edge of a curb of a raised sidewalk to help differentiate between a safe path provided by the raised sidewalk and a hazardous path provided by a roadway.

[0004] However, it has been found that transitions, which provide means for transitioning between safe pedestrian paths and obstacles and/or hazards, a few examples of transitions being curb ramps, vehicle drop-offs, and depressed corners providing means for transitioning between an elevated surface and a lower surface, although accommodating access to wheelchair bound individuals and others, provide a hazard to sight impaired individuals. Moreover, since the edge of the safe pedestrian path and the obstacle and/or hazard is eliminated by the transition, the ability of the sight impaired individual to differentiate between the safe pedestrian path and the obstacle and/or hazard is also eliminated. Therefore, a sight impaired individual may accidentally walk onto/into the obstacle or hazard, such as a roadway, since there is no raised curb to mark and separate the safe pedestrian route when there is a ramp providing a gradual transition from the elevated surface to the lower surface.

[0005] Because of the inherent danger caused by transitions, the Americans with Disabilities Act Accessibility Guidelines (ADAAG) require that tactile warning systems be installed onto pavement or ground surfaces at certain hazardous junctures. The tactile warning systems provide a contrasting texture that signals a hazardous condition to the pedestrian, and thereby informs the pedestrian to exercise care. In particular, the current regulation requires that the tactile warning system consist of truncated domes having a nominal diameter of 0.9 inches, protruding from the ground surface to a height of 0.2 inches, and having a center-to-center spacing of 2.35 inches. In addition, the tactile warning system should be of contrasting color to effectively warn whose who have greatly impaired vision.

[0006] In many cases, the tactile warning systems must be retrofitted onto existing ground surfaces. Several previously developed systems are in use for applying a tactile warning system onto existing ground surfaces. Although somewhat effective, these previously developed tactile warning systems are not without their problems. In the previously developed tactile warning systems, a sheet having truncated domes is adhered to an existing ground surface via an adhesive layer. The sheet and truncated domes are integrally formed together, i.e., the sheet is homogenous with the truncated domes. The sheet and truncated dome are made from either a preformed thermoplastic material, plastic, or rubber material. The adhesive layer is either a heat activated adhesive sheet or a liquid applied adhesive.

[0007] During application of the heat activated adhesive sheet tactile warning system, the surface receiving the tactile warning system is prepared by cleaning and preheating the surface with a propane heat gun. The heat activated adhesive sheet is applied to the heated surface. The heat activated adhesive layer is then heated with the propane heat gun until the adhesive layer becomes molten. Once the heat activated adhesive layer is molten, the homogeneous sheet of preformed thermoplastic material is carefully positioned on the heat activated adhesive layer. A specialty roller having channels to receive the truncated domes is rolled over the preformed thermoplastic material to aid the adherence of the thermoplastic material to the ground surface. The thermoplastic tactile warning system cannot be heated by the propane heat gun since the truncated domes would melt and spread out, thus losing their shape.

[0008] Although effective, this system is not without its problems. First, the thermoplastic material, even when properly applied by adhesives, has been found susceptible to delaminating due to adhesive failure, thereby presenting a tripping hazard. Second, the system requires a two-part system, wherein an adhesive layer must first be applied to the ground surface, heated, and the sheet applied upon the adhesive layer as accurately as possible. A special roller is then used to press the sheet onto the adhesive layer, the roller having channels to permit the truncated domes to pass through the channels as the roller is moved across the sheet. This process is cumbersome, prone to error, especially in the accurate placement of the sheet upon the adhesive layer.

[0009] When the sheet is not perfectly placed on the adhesive, two problems occur. First, some of the adhesive is exposed, producing an unsightly installation and causing a tripping hazard. Second, a portion of the sheet may not be in contact with the adhesive layer, permitting an edge of the sheet to roll up or catch a pedestrian's foot, creating a tripping hazard. Further, it has been found that the above described tactile warning system does not conform well to the surface it is applied to, leading to air pockets and/or permitting water and ice to make its way under the tactile warning system, leading to its deterioration and/or delamination and creating an unaesthetic appearance. Further, the two layers (i.e., the sheet and the adhesive layer) increase the overall height of the tactile warning system, increasing the tripping hazard of the installation.

[0010] The tactile warning systems utilizing liquid adhesives encounter the same problems mentioned above. Further, the adhesive application process these systems utilize is messy, labor intensive, and results in the release of volatile organic compounds (VOCs) to the atmosphere, and often requires more extensive surface preparation than for the heat activated adhesive layer systems described above.

[0011] Thus, there exists a need for a tactile warning system that is easy to install, does not require the use of an adhesive, resists delamination, does not present a tripping hazard, has a low profile, conforms well to the contours of the application surface, is durable, is cost effective to manufacture, and wherein installation does not result in the release of VOCs to the environment.

SUMMARY OF THE INVENTION

[0012] One embodiment of a tactile warning system for providing tactile warning sensations to a user, the tactile warning system attachable to an application surface and formed in accordance with the present invention is disclosed. The tactile warning system includes a top layer having a plurality of tactile warning members attached thereto. The top layer with attached tactile warning members form a single unit adherable to an application surface. The top layer is formed from a heat activated material adapted to be heated to a selected temperature at which the top layer becomes at least partially molten, resulting in the covering of the tactile warning members and adhering of the top layer to the application surface, sandwiching the tactile warning members between the top layer and the application surface. The top layer may be a preformed thermoplastic material and the tactile warning members may be shaped as truncated domes. The tactile warning members may be formed from a heat resistant material, such as a ceramic material. The tactile warning members may be adhered to the top layer prior to installation, such as by heating the tactile warning members and engaging them with the top layer to partially melt the top layer, resulting in the adherence of the tactile warning members to the top layer. The tactile warning system may be applied without the application of an adhesive or other intermediate layer disposed between the application surface and the tactile warning members.

[0013] Another embodiment of a tactile warning system for providing tactile warning sensations to a user, the tactile warning system attachable to an application surface and formed in accordance with the present invention is disclosed. The tactile warning system includes a plurality of tactile warning members formed from a selected material, the tactile warning members having a top surface and a bottom surface. The tactile warning system also includes a sheet coupled to the top surface of each of the plurality of tactile warning members. The sheet is formed from an activatable material activatable from a first state in which the sheet is resistant to adhering to an application surface to an application state. In the application state, the sheet is adapted to adhere to the application surface without use of an adhesive to sandwich the plurality of tactile warning members between the sheet and the application surface such that the bottom surface of each of the plurality of tactile warning members contacts the application surface.

[0014] Still another embodiment of a tactile warning system attachable to an application surface and formed in accordance with the present invention is disclosed. The tactile warning system includes a plurality of tactile warning members formed from a heat resistant material, the tactile warning members having a top surface and a bottom surface. The tactile warning system also includes a preformed thermoplastic sheet coupled to the top surface of each of the plurality of tactile warning members. The preformed thermoplastic sheet is activatible by application of heat to adhere the preformed thermoplastic sheet to the application surface such that the plurality of tactile warning members are sandwiched between the preformed thermoplastic sheet and the application surface. The bottom surface of each of the plurality of tactile warning members contacts the application surface without an adhesive or additional thermoplastic layer disposed therebetween.

[0015] A still yet another embodiment of a tactile warning system formed in accordance with the present invention is disclosed. The tactile warning system includes an application surface and a sheet formed from a predetermined material and adhered to the application surface. The tactile warning system further includes a plurality of tactile warning members formed from a selected material different from the predetermined material of the sheet. The plurality of tactile warning members are disposed between the sheet and the application surface, the plurality of tactile warning members contacting the application surface without an intermediate layer disposed therebetween.

[0016] One method performed in accordance with the present invention of applying a tactile warning system to an application surface, wherein the tactile warning system includes a sheet and a plurality of tactile warning members, is disclosed. The method includes placing a sheet and a plurality of tactile warning members upon the application surface such that the tactile warning members are disposed between the sheet and the application surface and such that the plurality of tactile warning members contact the application surface without an intermediate layer disposed therebetween. The method further includes activating the sheet such that the sheet is transformed from a substantially non-adhering state to an adhering state wherein the sheet adheres to the application surface sandwiching the tactile warning members between the application surface and the sheet.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The foregoing aspects and many of the attendant advantages of this invention will become better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

[0018] **FIG. 1** is a perspective view of one embodiment of a tactile warning system formed in accordance with the present invention depicting the tactile warning system prior to application to a sidewalk ramp;

[0019] **FIG. 2** is a perspective view of the tactile warning system of **FIG. 1** depicting the tactile warning system after application to a sidewalk ramp;

[0020] **FIG. 3** is a cross-sectional view of one embodiment of a tactile warning system formed in accordance with the present invention prior to adherence of the tactile warning system to an application surface;

[0021] **FIG. 4** is a cross-sectional view of the tactile warning system of **FIG. 3** as adhered to the application surface;

[0022] **FIG. 5** is a perspective view of the tactile warning system of **FIG. 4**;

[0023] **FIG. 6** is a cross-sectional view of an alternate embodiment of a tactile warning system formed in accor-

dance with the present invention depicting the tactile warning system prior to application to an application surface; and

[0024] **FIG. 7** is a cross-sectional view of the tactile warning system of **FIG. 6** depicting the tactile warning system after application to the application surface.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0025] Referring to **FIGS. 1-5**, one embodiment of a tactile warning system **100** formed in accordance with the present invention is disclosed. Turning to **FIG. 2**, the tactile warning system **100** provides a textural change to warn sight impaired individuals of a hazard or obstacle in the vicinity of the sight impaired individual. Moreover, the tactile warning system **100** provides a contrasting texture that signals a potentially hazardous condition to the pedestrian, and thereby informs the pedestrian to exercise care.

[0026] In the illustrated embodiment, the tactile warning system **100** is shown as applied to a ramp **102** of a sidewalk **104**. Normally, the raised height of the sidewalk **104** relative to the height of the adjacent roadway **106** provides a curb edge **108** which indicates to a sight impaired individual the presence of the roadway **106**. However, it has been found that transitions, such as curb ramps **102**, vehicle drop-offs, depressed corners, and the like, although accommodating access to wheelchair bound individuals, provide a hazard to sight impaired individuals since the curb edge **108** of the sidewalk **104** is eliminated, thereby also eliminating the ability of the sight impaired individual to detect the transition between the sidewalk **104** and the roadway **106**. Therefore, a sight impaired individual may accidentally walk onto the roadway **106** since there is no curb edge **108** to mark and separate the sidewalk **104** from the roadway **106** when there is a ramp **102** transitioning from the sidewalk **104** height to the surface of the roadway **106**. The illustrated embodiment of the tactile warning system **100** provides a contrasting texture that signals to a sight impaired user of the ramp **102** the presence of the roadway **106**.

[0027] Turning to **FIGS. 1 and 3**, the components of the tactile warning system **100** will be described in more detail. The tactile warning system **100** includes a sheet or top layer **110** and a plurality of tactile warning members **112**. The top layer **110** is preferably made of a heat activated material, such that when the heat activated material is heated above a predetermined activation temperature, one suitable example being 400° F., the heat activated material is able to bond to an application surface **114**, a few suitable examples being an asphalt, brick, or concrete surface of a sidewalk, platform, walkway, pedestrian path, floor, bike path, etc. One example of a suitable heat activated material is a preformed thermoplastic, skid resistant, night time visible, pavement marking material manufactured by Zumar Industries, Inc., of Tacoma, Wash., sold under the HOTTAPE trademark, part number 896278. The material is preferably 75 to 90 mils in thickness, however it should be apparent to those skilled in the art that other thicknesses, either thinner or thicker, are suitable for use with and are within the spirit and scope of the present invention. Preferably, the top layer **110** should be of a color which contrasts with the application surface **114** to effectively warn those who have some vision, but who's vision is greatly impaired.

[0028] In the illustrated embodiment, the tactile warning members **112** are formed from a heat resistant material able to withstand temperatures greater than the predetermined activation temperature of the top layer **110** such that when the top layer **110** is heated, the tactile warning members **112** are able to substantially retain their shape without deforming. In one embodiment, the tactile warning members **112** are formed from a porous material, such as a ceramic material, although it should be apparent to those skilled in the art that other materials are suitable for use with and are within the spirit and scope of the present invention. The tactile warning members **112** of the illustrated embodiment are formed as truncated domes **104** having a nominal diameter of 0.9 inches and a height of about 0.2 inches. The tactile warning members **112** are coupled to the top layer **110** in a grid pattern having a center-to-center spacing of about 2.35 inches.

[0029] Although the tactile warning members **112** of the illustrated embodiment are described as having a specific shape and being formed from a specific material, it should be apparent to those skilled in the art that other shapes and materials are suitable for use with and are within the spirit and scope of the present invention. Further, although the tactile warning members **112** are illustrated and described as being attached to the top layer **110** in a grid pattern having a specific center-to-center spacing, it should be apparent to those skilled in the art that other placement patterns and spacings are suitable for use with and are within the spirit and scope of the present invention.

[0030] Preferably, the tactile warning members **112** are coupled to the top layer **110** by heating the tactile warning members **112** to a temperature exceeding that of the predetermined activation temperature of the top layer **110**. The tactile warning members **112** are then pressed into the top layer **110** such that the top layer **110** melts at the points of contact with the tactile warning members **112**, then cools, forming bonds adhering the tactile warning members **112** to the top layer **110** without the need of adhesives or fasteners.

[0031] In light of the above description of the components of the tactile warning system **100**, the installation of the tactile warning system **100** will now be described. The first step in installation is the preparation of the application surface **114**. The application surface **114** should be clean, dry, and above 32° F. Preferably, the application surface **114** is free of longitudinal seams or joints, deterioration, loosely exposed aggregate, soil saturation areas, joint- or seal-crack filled areas, surface sealing compounds, or areas subject to repeated standing water. A broom or air sweeper may be used to clean the application surface **114**. The application surface **114** should be substantially free of loose particles, dust, and dirt. Markings, such as paint, thermoplastic, and preformed thermoplastic markings, may remain on the application surface **114** if the markings are in good condition. Loose, flaking, cracked, or adhesive-applied markings should be removed from the application surface **114**.

[0032] Moisture should be removed from the application surface **114**. One suitable method of moisture removal is through application of heat by a torch. Concrete application surfaces should be moisture free for 24 hours prior to application for best results. Oil and grease residue should be removed prior to application. New concrete, such as concrete less than three moths old, should be sandblasted to remove curing compounds. Chip seal surfaces should be cured and stable.

[0033] Next, the application surface **114** should be marked to clearly delineated, such as by the use of chalk or spray paint, the location wherein the tactile warning system **100** is to be placed upon the application surface **114**. Application of large segments of the tactile warning system **100** should be avoided, with a large tactile warning system **100** installation divided into more manageable installation sizes, such as segments less than or equal to about 2 feet by 4 feet.

[0034] The application surface **114** is then heated for application of the tactile warning system **100**. A torch may be used to heat the application surface **114**. The torch is preferably adjusted such that the flame is blue with an orange or yellow tip. The torch is adjusted to provide the maximum heat available. A circular motion may used to heat the application surface **114**, including heating the application surface **114** about 6 inches outward of where the tactile warning system **100** is to be applied.

[0035] After the application surface **114** is heated, the tactile warning system **100** is set down upon the application surface **114** with the reflective material **116**, such as exposed glass compounds, facing upward. The installer should discontinue squeezing the torch handle and utilize the pre-set pilot valve of the torch to heat the tactile warning system **100** while holding the torch nozzle approximately 6 inches above the tactile warning system **100**. If the tactile warning system **100** is splattering with the introduction of the torch, the torch nozzle may be too close to the tactile warning system **100** or the pilot valve may need to be adjusted to lower the intensity of the flame.

[0036] The torch nozzle should be held about 6 inches over the top layer **110** so that the flame is fully extended and heat evenly applied as the installer moves the torch in a continuous, circular motion across the tactile warning system **100**. The top layer **110** will begin to soften and change shape from the top layer's **110** initially flat profile (shown in **FIGS. 1 and 3**) to conform to the application surface **114** to which it is applied, and also conform to the shape of the tactile warning members **112** disposed between the top layer **110** and the application surface **114** as shown in **FIGS. 2, 4**, and **5**. As best shown in **FIG. 4**, the top layer **110** adheres directly to the application surface **114**, sandwiching the tactile warning members **112** between the top layer **110** and the application surface **114** without an adhesive layer or second layer of thermoplastic material being disposed therebetween.

[0037] During heating, the top layer **110** may bubble and discharge. The top layer **110** of the tactile warning system **100** may change color, turning slightly darker or pale yellow if white. If the top layer **110** changes color, the installer should quickly move the torch to another section to avoid burning or unnecessarily scorching the top layer **110** by overheating. A soft, "chewing-gum" consistency indicates proper heating when initially probed with a putty knife. The top layer **110** should return to its original color upon cooling and scorch marks will be removed by traffic.

[0038] Turning to **FIGS. 4 and 5**, during a preferred installation, the entire tactile warning system **100** is evenly heated. After the top layer **110** has melted and heat-fused to the application surface **114**, the installer may retrace the perimeter of the tactile warning system **100** and extend the heat to the application surface **114** adjacent to the perimeter of the tactile warning system **100** to ensure all edges have been sufficiently bonded. For best retro-reflective properties and skid resistance, the reflective material **116** should be embedded between 50-60% into the top layer **110**. While the tactile warning system **100** is hot, the edges of the top layer **110** may be feathered with a putty knife or beveled with the torch.

[0039] The tactile warning system **100** should be inspected after installation. After the tactile warning system **100** has cooled, a putty knife may be used to remove a portion of the top layer **110** to test the adherence of the tactile warning system **100** to the application surface **114**. Edges should be rounded and thoroughly bonded. If properly installed on asphalt, the top layer **110** should not pry off without removing some asphalt as evidenced by asphalt being embedded on the underside of the removed portion of the top layer **110**. If the top layer **110** pries off without any asphalt embedded on its underside, replace the removed portion of the top layer **110** and reheat that portion of the top layer **110**. If installed on concrete, the top layer **110** is bonded properly when it pulls away from itself, leaving a residual film on the application surface **114**. If the top layer **110** does not pull away from the application surface **114** without any residual film on the application surface **114**, reposition the tactile warning system **100** and reheat that portion of the top layer **110**. Typically, the tactile warning system **100** may be used about 15 minutes after installation.

[0040] As should be apparent to those skilled in the art, the illustrated embodiment of the present invention provides a tactile warning system **100** that does not require the use of an adhesive, providing for simplified installation, reduced costs, less mess, a lower profile due to the elimination of an adhesive layer or other such layer, such as a thermoplastic base layer, does not require the use of a primer, can be applied even in low temperature conditions, is retro-reflective, does not result in the release of VOCs, and does not require special or heavy equipment.

[0041] Referring to **FIGS. 6 and 7**, an alternate embodiment of a tactile warning system **200** formed in accordance with the present invention is depicted. The tactile warning system **200** of **FIGS. 6 and 7** is substantially similar to the embodiment described and illustrated with reference to **FIG. 1-5**. Therefore, for the sake of brevity, this detailed description will focus only upon those aspects of the embodiment of **FIGS. 6 and 7** which depart from the above described embodiment.

[0042] In the alternate embodiment of **FIGS. 6 and 7**, the method of attaching the tactile warning members **212** to the top layer **210** has been modified. More specifically, both the top layer **210** and the tactile warning members **212** are heated to allow the embedding of the tactile warning members **212** into the top layer **210** such that the bottom surfaces of the tactile warning members **212** are substantially flush with the bottom surface of the top layer **210**. Among other things, this configuration allows for greater ease in handling and shipping the tactile warning system **200** and reduces the potential that the tactile warning members **212** are damaged or dislodged during shipping and handling. The tactile warning system **200** is applied to the application surface **214** in the same manner as the above described embodiment.

[0043] Although the illustrated embodiments are described and illustrated as using a heat activated top layer, it should be apparent to those skilled in the art that other

materials here now know or to be developed which may be activated by other means are suitable for use with the present invention, such as infrared, sound, chemical, or pressure activated materials.

[0044] Although the illustrated embodiments are described and illustrated as using a top layer that exhibits retro-reflective properties while also being skid resistant, it should be apparent to those skilled in the art that the top layer may exhibit only one of these properties, both of these properties, or neither of these properties without departing from the spirit and scope of the present invention.

[0045] Although the illustrated embodiments are described and illustrated as being applied to a ramp to indicate to a sight impaired user the proximity of a potential hazard, it should be apparent to those skilled in the art that the tactile warning system may also be used any time tactile sensations are desired to be provided to a user whether sight impaired or not. For instance, the tactile warning systems may used to provide tactile sensations to individuals to provide positive guidance directing the user along a selected path through tactile sensations. For instance, the edges of a path may be lined with the tactile warning system to provide tactile guidance to a user to permit them to follow the path through tactile sensations alone. In another example, the tactile warning systems are used to provide tactile sensations to users indicating the edge of a passenger loading platform, such as a train, subway, or other passenger vehicle loading platform.

[0046] While the preferred embodiment of the invention has been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A tactile warning system for providing tactile warning sensations to a user, the tactile warning system attachable to an application surface comprising:

(a) a plurality of tactile warning members formed from a selected material, the tactile warning members having a top surface and a bottom surface; and

(b) a sheet coupled to the top surface of each of the plurality of tactile warning members, the sheet formed from an activatable material activatable from a first state in which the sheet is resistant to adhering to an application surface to an application state in which the sheet is adapted to adhere to the application surface without use of an adhesive to sandwich the plurality of tactile warning members between the sheet and the application surface such that the bottom surface of each of the plurality of tactile warning members contacts the application surface.

2. The tactile warning system of claim 1, wherein the activatable material of the sheet is a heat activated material activatable by heating the sheet above a predetermined temperature to configure the sheet from a solid state to at least a partially molten state.

3. The tactile warning system of claim 2, wherein the activatable material of the sheet is a preformed thermoplastic material.

4. The tactile warning system of claim 2, wherein the selected material of the plurality of tactile warning members is a heat resistant material able to withstand temperatures at least up to the predetermined temperature without melting.

5. The tactile warning system of claim 4, wherein the selected material of the plurality of tactile warning members is a porous material.

6. The tactile warning system of claim 1, furthering including a plurality of bonds coupling the plurality of tactile warning members to the sheet while the sheet is in the first state prior to adherence to the application surface, the plurality of bonds absent of adhesive.

7. The tactile warning system of claim 6, wherein the plurality of bonds each comprise a portion of the activatable material of the sheet hardened from a liquefied state to a solid state thereby bonding the plurality of tactile warning members to the sheet.

8. The tactile warning system of claim 1, wherein the sheet is in a substantially flat configuration when in the first state and wherein the sheet is adapted to be at least partially liquefied during transition between the first state and the application state so that the sheet conforms in shape to the application surface and the plurality of tactile warning members when in the application state.

9. The tactile warning system of claim 1, wherein the tactile warning members are embedded in the sheet when the sheet is in the first state such that a bottom surface of the sheet is substantially flush with the bottom surfaces of the tactile warning members.

10. A tactile warning system for providing tactile warning sensations to a user, the tactile warning system attachable to an application surface comprising:

(a) a plurality of tactile warning members formed from a heat resistant material, the tactile warning members having a top surface and a bottom surface; and

(b) a preformed thermoplastic sheet coupled to the top surface of each of the plurality of tactile warning members, the preformed thermoplastic sheet activatable by application of heat to adhere the preformed thermoplastic sheet to the application surface such that the plurality of tactile warning members are sandwiched between the preformed thermoplastic sheet and the application surface with the bottom surface of each of the plurality of tactile warning members contacting the application surface without an adhesive or additional thermoplastic layer disposed therebetween.

11. The tactile warning system of claim 10, wherein the preformed thermoplastic sheet is activated by heating the preformed thermoplastic sheet above a predetermined temperature to configure the preformed thermoplastic sheet from a solid state to at least a partially molten state.

12. The tactile warning system of claim 11, wherein the selected material of the plurality of tactile warning members is a heat resistant material able to withstand temperatures at least up to the predetermined temperature without melting.

13. The tactile warning system of claim 12, wherein the selected material of the plurality of tactile warning member is a porous material.

14. The tactile warning system of claim 10, furthering including a plurality of bonds coupling the plurality of tactile warning members to the preformed thermoplastic sheet while the preformed thermoplastic sheet is in the first state prior to adherence to the application surface, the plurality of bonds absent of adhesive.

15. The tactile warning system of claim 14, wherein the plurality of bonds each comprise a portion of the activatable material of the preformed thermoplastic sheet hardened from a liquefied state to a solid state bonding the plurality of tactile warning members to the preformed thermoplastic sheet.

16. The tactile warning system of claim 10, wherein the preformed thermoplastic sheet is in a substantially flat configuration when in the first state and wherein the preformed thermoplastic sheet is adapted to be at least partially liquefied during transition between the first state and the application state so that the preformed thermoplastic sheet conforms in shape to the application surface and the plurality of tactile warning members when in the application state.

17. The tactile warning system of claim 10, wherein the tactile warning members are embedded in the preformed thermoplastic sheet such that a bottom surface of the preformed thermoplastic sheet is substantially flush with the bottom surfaces of the tactile warning members prior to adhering of the preformed thermoplastic sheet to the application surface.

18. A tactile warning system for providing tactile warning sensations to a user, the tactile warning system comprising:

(a) an application surface;

(b) a sheet formed from a predetermined material and adhered to the application surface; and

(c) a plurality of tactile warning members formed from a selected material different from the predetermined material of the sheet, the plurality of tactile warning members disposed between the sheet and the application surface, the plurality of tactile warning members contacting the application surface without an intermediate layer disposed therebetween.

19. The tactile warning system of claim 18, wherein the predetermined material of the sheet is a preformed thermoplastic material.

20. The tactile warning system of claim 18, wherein the selected material of the plurality of tactile warning members is a heat resistant material.

21. The tactile warning system of claim 18, wherein the predetermined material of the sheet is a preformed thermoplastic material which begins to melt at a predetermined temperature and wherein the selected material of the plurality of tactile warning members is a heat resistant material able to withstand temperatures at least up to the predetermined temperature without melting.

22. The tactile warning system of claim 18, wherein the tactile warning system is free of an adhesive layer or additional sheet disposed between the tactile warning members and the application surface.

23. A method of applying a tactile warning for providing tactile warning sensations to a user to an application surface, wherein the tactile warning system includes a sheet and a plurality of tactile warning members, the method comprising:

(a) placing a sheet and a plurality of tactile warning members upon the application surface such that the tactile warning members are disposed between the sheet and the application surface and such that the plurality of tactile warning members contact the application surface without an intermediate layer disposed therebetween; and

(b) activating the sheet such that the sheet is transformed from a substantially non-adhering state to an adhering state wherein the sheet adheres to the application surface sandwiching the tactile warning members between the application surface and the sheet.

24. The method of claim 23, wherein activating the sheet includes heating the sheet to at or above a predetermined temperature.

25. The method of claim 24, further comprising using tactile warning members formed from a heat resistant material able to withstand temperatures at or above the predetermined temperature without melting.

26. The method of claim 23, further including transforming the sheet from a first configuration to a conformed configuration wherein the sheet is configured in a shape of the tactile warning members and application surface.

27. The method of claim 23, further including heating the tactile warning members and pressing them into the sheet to bond the tactile warning members to the sheet.

28. The method of claim 23, further including coupling the tactile warning members to the sheet prior to placing the sheet upon the application surface.

29. The method of claim 28, wherein the tactile warning members are coupled to the sheet by heating the tactile warning members and engaging them with the sheet to partially melt the sheet, resulting in the adherence of the tactile warning members to the sheet once the sheet cools.

* * * * *