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(54) **ANTI-SLIP FLOOR TILE AND METHOD OF MAKING AN ANTI-SLIP FLOOR TILE**

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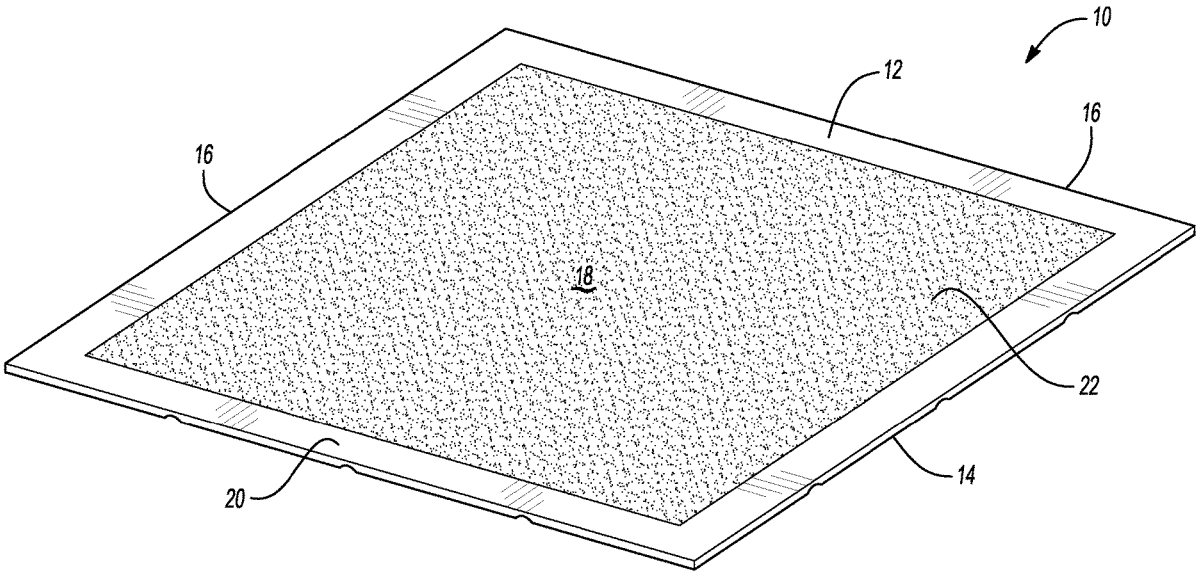
CPC ***E04F 15/02172*** (2013.01); ***E04F 15/06*** (2013.01)

(57) **ABSTRACT**

A floor tile is disclosed that comprises a plate having an anti-slip metal coating. The metal plate has an upper surface, a bottom surface and a plurality of edges provided on all sides of the metal plate that extend between the upper surface and the bottom surface. The anti-slip coating is applied to a central portion of the upper surface, wherein the anti-slip coating is not applied to the upper surface between the central portion and the plurality of edges. At least one recess is formed in the bottom surface that is adapted to receive a portion of an adhesive applied between the bottom surface and a floor. A method is also disclosed for making the anti-slip floor tile, wherein a metal plate is masked at a border provided around the edges of the plate and molten metal is sprayed on a central portion but not on the border.



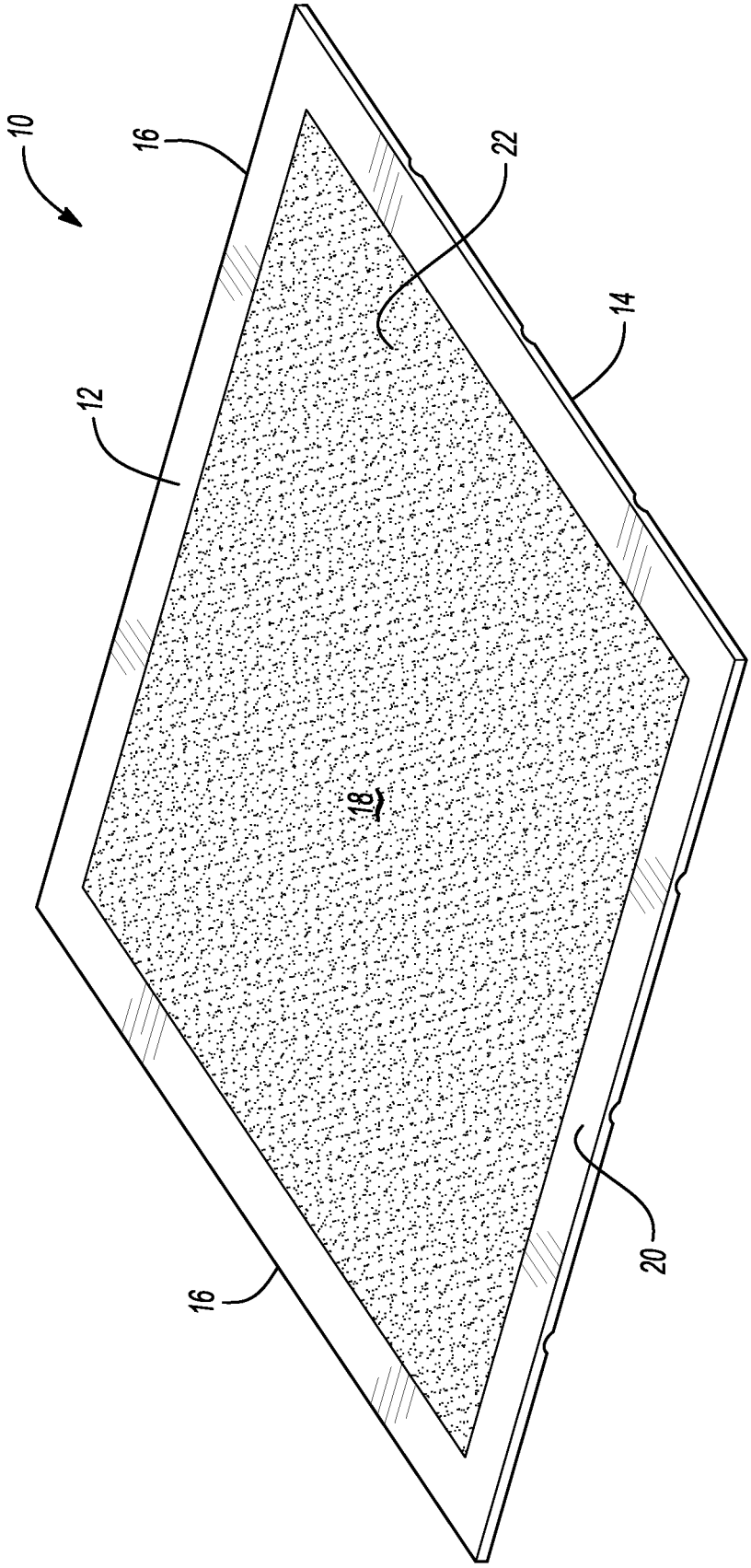


Fig-1

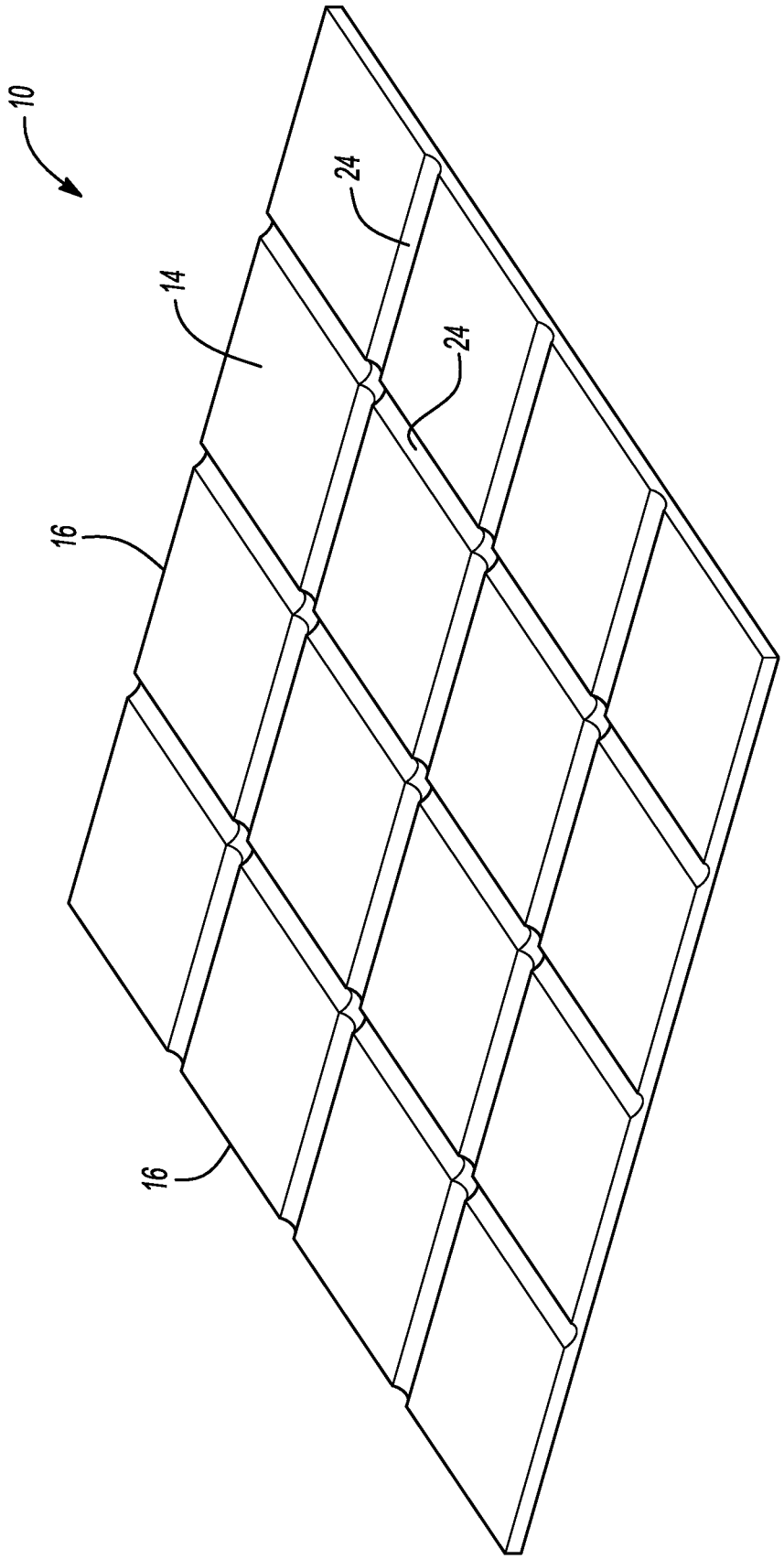


Fig-2

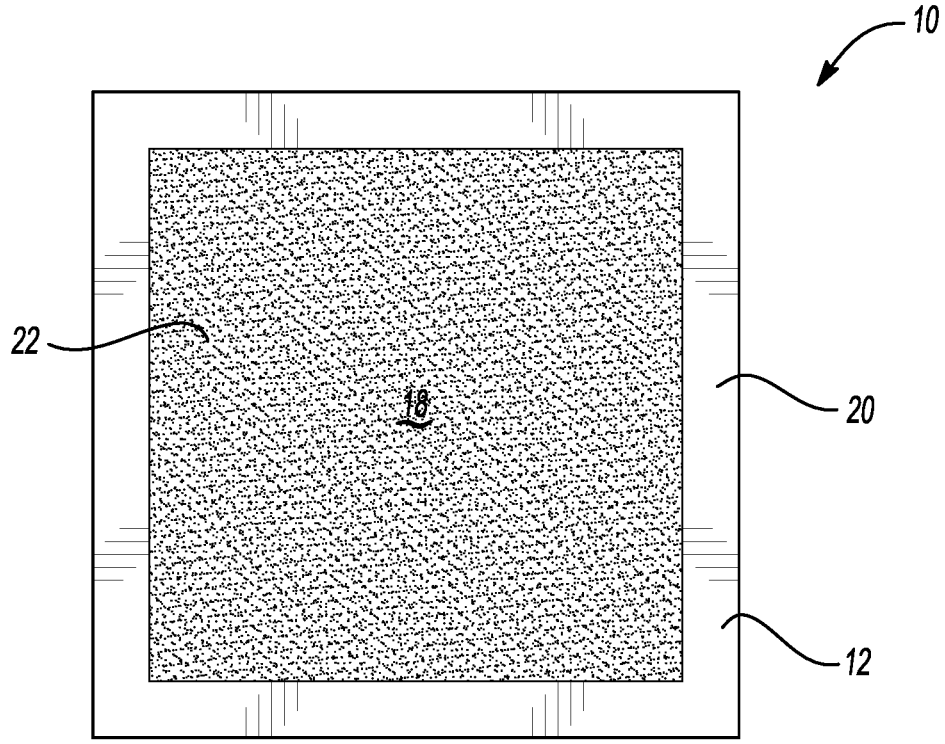


Fig-3

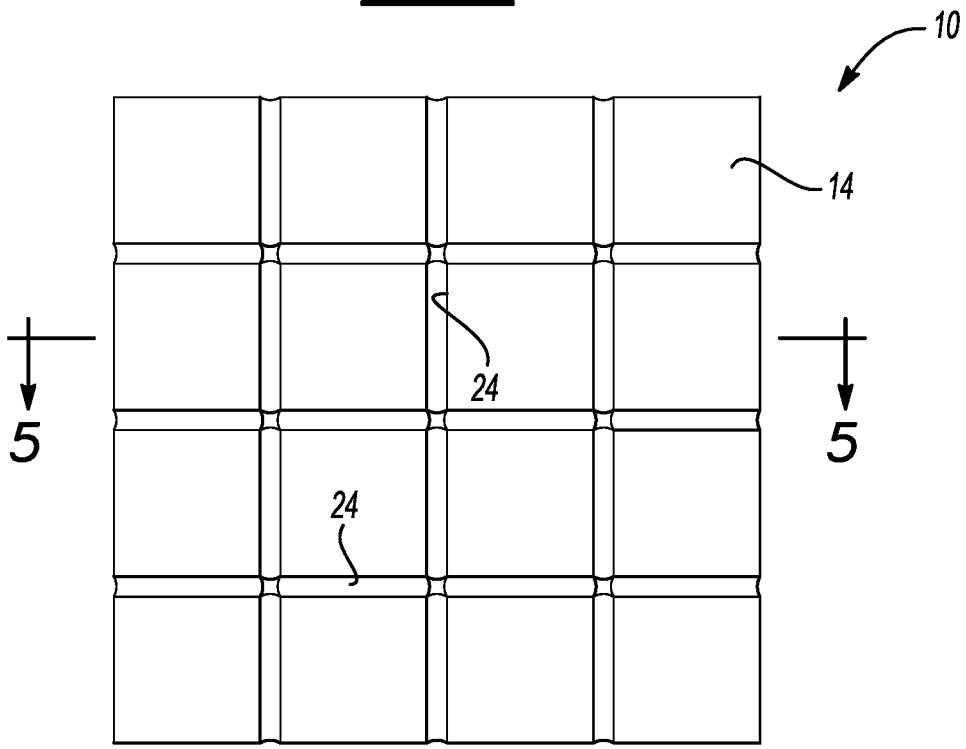


Fig-4

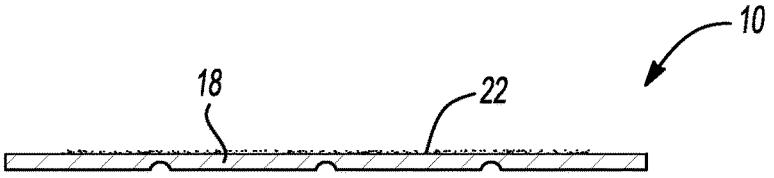

10
18
22

Fig-5

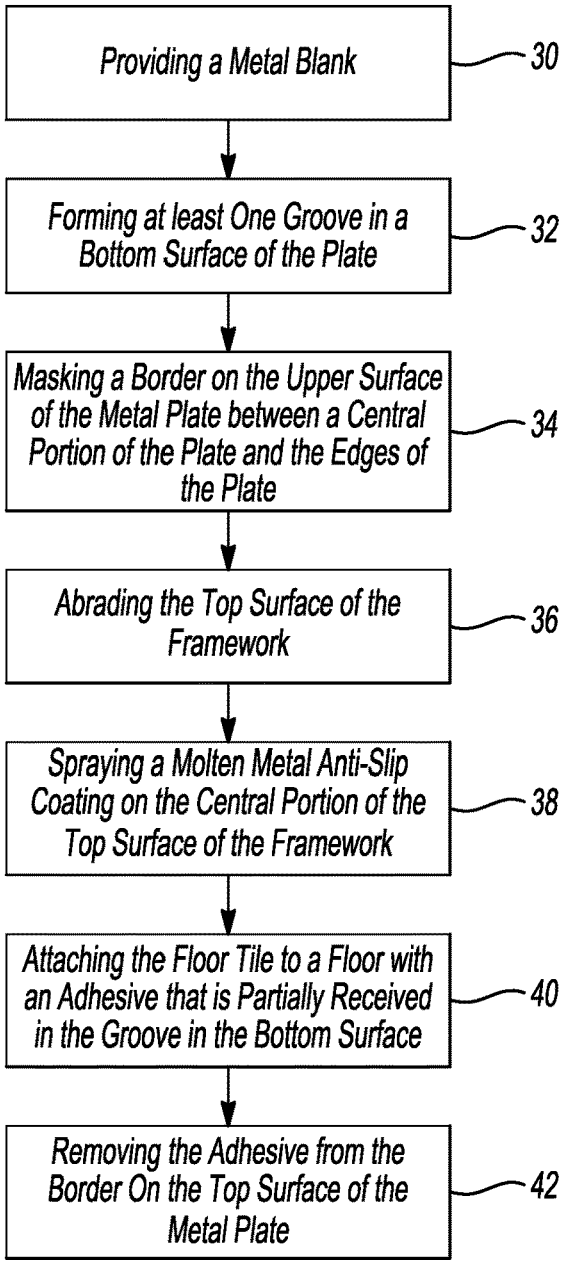

Providing a Metal Blank
30
Forming at least One Groove in a Bottom Surface of the Plate
32
Masking a Border on the Upper Surface of the Metal Plate between a Central Portion of the Plate and the Edges of the Plate
34
Abrading the Top Surface of the Framework
36
Spraying a Molten Metal Anti-Slip Coating on the Central Portion of the Top Surface of the Framework
38
Attaching the Floor Tile to a Floor with an Adhesive that is Partially Received in the Groove in the Bottom Surface
40
Removing the Adhesive from the Border On the Top Surface of the Metal Plate
42

Fig-6

ANTI-SLIP FLOOR TILE AND METHOD OF MAKING AN ANTI-SLIP FLOOR TILE

REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. provisional application Ser. No. 63/230,233 filed Aug. 6, 2021, the disclosure of which is hereby incorporated in its entirety by reference herein.

TECHNICAL FIELD

[0002] This disclosure is directed to a method of making an anti-slip floor tile and the floor tile made by the method.

BACKGROUND

[0003] Floor tiles are used in a wide variety of applications and are used for their aesthetic appeal, durability, and ease of installation. Floor tile products may be made of ceramic, glass, granite, marble, wood and other hard surface materials. One problem with such floors is that they may become slippery when wet when used in areas such as building lobbies or commercial kitchens. These types of flooring applications are frequently exposed to surface hazards such as water and spilled food, beverages, and cooking products.

[0004] This disclosure is directed to solving the above problems and other problems as summarized below.

SUMMARY

[0005] According to one aspect of this disclosure, a floor tile is disclosed that comprises a metal plate with an anti-slip coating applied to a central portion of the plate. The metal plate has an upper surface, a bottom surface and a plurality of edges provided on all sides of the metal plate that extend between the upper surface and the bottom surface. The anti-slip coating is applied to a central portion of the upper surface. The anti-slip coating is not applied to the upper surface between the central portion and the plurality of edges.

[0006] According to other aspects of this disclosure, the floor tile may include a recess formed in the bottom surface that is adapted to receive a portion of an adhesive applied between the bottom surface and a supporting structure, or floor. In addition to the recess formed in the bottom surface of the tile, a plurality of recesses may be formed in the bottom surface. The recesses may be cut into the bottom surface or embossed into the bottom surface.

[0007] The metal tile support panel is preferably made of aluminum, or an aluminum alloy, but may also be formed of another metal such as stainless steel, steel, copper, brass, or the like. The anti-slip coating is preferably stainless steel or a stainless steel alloy but may also be formed of another metal.

[0008] The anti-slip coating is a metal coating that is metalized (applied by plasma stream deposition) on the plurality of intersecting strips. The anti-slip coating may be applied by other metal-on-metal application technique provided that the coating provides a textured surface.

[0009] According to another aspect of this disclosure, a method is disclosed for making a floor tile. The method begins with the step of providing a metal plate having an upper surface, a bottom surface and a plurality of edges provided on all sides of the metal plate that extend between the upper surface and the bottom surface. Next, a border is masked on the metal plate on the upper surface between the central portion and the edges. Molten metal is then sprayed on the central portion of the metal plate to form an anti-slip coating on the central portion but not on the border.

[0010] According to other aspects of the method, the central portion of the metal plate is subjected to grit blasting after the masking step and before spraying molten metal on the central portion.

[0011] One or more grooves may be cut or embossed in the bottom surface of the metal plate. The groove or grooves are configured to receive a portion of an adhesive applied to the bottom surface and a supporting structure or floor.

[0012] The step of applying the anti-slip coating may be performed by spraying a molten metal coating on the top surface of the metal framework.

[0013] The metal framework is preferably aluminum or stainless steel and the anti-slip coating is preferably stainless steel.

[0014] According to another aspect of this disclosure, a floor tile is disclosed that includes a metal plate having an upper surface, a bottom surface and a plurality of edges provided on all sides of the metal plate that extend between the upper surface and the bottom surface. An anti-slip coating applied to the upper surface of the metal plate, and a plurality of grooves are provided in the bottom surface.

[0015] The plurality of grooves extend across the bottom surface and the grooves may intersect with each other. Alternatively, a plurality of recesses may be provided in the bottom surface in place of or in combination with the plurality of grooves.

[0016] The anti-slip coating may be applied to the upper surface at a location spaced from the plurality of edges.

[0017] The above aspects of this disclosure and other aspects will be described below with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] FIG. **1** is a top perspective view of a top of a floor tile made according to one embodiment of this disclosure.

[0019] FIG. **2** is a bottom perspective view of a floor tile.

[0020] FIG. **3** is a top plan view of the floor tile.

[0021] FIG. **4** is a bottom plan view of the floor tile.

[0022] FIG. **5** is a cross-section view taken along the line **5-5** in FIG. **4**.

[0023] FIG. **6** is a flow chart illustrating the steps of a method of making and installing the floor tile shown in FIGS. **1-5**.

DETAILED DESCRIPTION

[0024] The illustrated embodiments are disclosed with reference to the drawings. However, it is to be understood that the disclosed embodiments are intended to be merely examples that may be embodied in various and alternative forms. The figures are not necessarily to scale and some features may be exaggerated or minimized to show details of particular components. The specific structural and functional details disclosed are not to be interpreted as limiting, but as a representative basis for teaching one skilled in the art how to practice the disclosed concepts.

[0025] Referring to FIG. **1**, a metal floor tile **10** is illustrated that is a planar member having a top surface **12** and a bottom surface **14** and is bounded on all sides by edges **16**. The floor tile **10** has a central portion **18** and a border **20** between the central portion **18** and the edges **16**. An anti-slip

coating **22** is applied to the central portion **18** by spraying molten metal on the central portion **18**. The process used to spray the molten metal on the floor tile is disclosed in applicant's prior U.S. Pat. No. 5,711,118, the disclosure of which is incorporated by reference.

[0026] The metal floor tile **10** preferably includes an aluminum blank that is partially coated with the anti-slip coating **22** on the central portion **18**. The anti-slip coating **22** is preferably a stainless steel coating. The aluminum blank may be an aluminum alloy or may be another metal such as steel, stainless steel, copper, brass, or the like. The anti-slip coating **22** is a stainless steel alloy or may be another type of metal that can be heated to its melting point and sprayed on the central portion **18** of the floor tile **10**.

[0027] Referring to FIG. **2**, the floor tile **10** is illustrated from the bottom. The bottom surface **14** of the floor tile **10** defines at least one groove **24**. As illustrated six grooves **24** are formed on the bottom surface **14** that extend between opposite edges **16** in a direction normal to the edges **16**. The grooves **24** may be formed by a machining process or by embossing the grooves **24** in the bottom surface with a press forming process, as will be described in more detail with reference to FIG. **6**.

[0028] Referring to FIG. **3**, the metal floor tile **10** is illustrated and is shown to include the central portion **18** and the border **20**. The border **20** is provided around the central portion to facilitate installing the floor tile **10** on a floor with floor tile adhesive (not shown). When installing the floor tile some adhesive may accumulate on the top surface **12** of the tile that would be difficult to remove from the top surface **12** if the floor tile adhesive is applied to the portion of the floor tile **10** that is coated with the anti-slip coating **22**. The border **20** of the floor tile **10** is not coated with the anti-slip coating **22** and provides a smooth surface from which it is easy to remove any floor tile adhesive from after installation.

[0029] Referring to FIG. **4**, the bottom surface **14** of the floor tile **10** is shown to include three grooves **24** extending between the top and the bottom of the view and three grooves **24** extending between the right side to the left side of the view. The grooves **24** are formed in the bottom surface **14** to improve adhesion by receiving floor tile adhesive in the grooves **24** in addition to the adhesive applied to the bottom surface **14** when the tile **10** is installed on a floor.

[0030] Referring to FIG. **5**, the floor tile **10** is shown in cross-section. The anti-slip coating **22** is provided on the top surface **12** in the central portion **18** thereof. The grooves **24** as illustrated are semi-circular as would be formed by an embossing process but it should be understood that the grooves **24** may also be formed as slots having a base and sidewalls as would be formed in a machining process.

[0031] Referring to FIG. **6**, a flowchart is provided that illustrates the steps of a process of making and installing the floor tile **10**. The process begins by providing a metal blank at **30**. At **32**, a groove **24**, or set of grooves, is machined or embossed on the bottom surface **14** of the floor tile **10**. At **34**, the border **20** is masked by applying a masking compound, a physical masking member, or the like to the top surface **12** of the floor tile between the central portion **18** and the edges **16**. The top surface **12** is then abraded at **36** to form a rough surface on the central portion **18** of the floor tile **10**. At **38**, molten metal is sprayed on the central portion **18** to form the anti-slip coating on the central portion **18** of the floor tile **10**. After the floor tile **10** is manufactured it is transported to an installation site, at **40** and is attached to a floor with floor tile adhesive. The adhesive fills the grooves **24** and coats the bottom surface **14** of the floor tile **10**. After installation, any adhesive deposited on the top surface **12** of the floor tile **10** is expected to be on the border **20**. The border **20** is provided to facilitate removal of the adhesive from the border **20**, at **42**.

[0032] The embodiments described above are specific examples that do not describe all possible forms of the disclosure. The features of the illustrated embodiments may be combined to form further embodiments of the disclosed concepts. The words used in the specification are words of description rather than limitation. The scope of the following claims is broader than the specifically disclosed embodiments and also includes modifications of the illustrated embodiments. In addition, the features of various implementing embodiments may be combined to form further embodiments of the invention.

What is claimed is:

1. A floor tile comprising:

a metal plate having an upper surface, a bottom surface and a plurality of edges provided on all sides of the metal plate that extend between the upper surface and the bottom surface; and

an anti-slip coating applied to a central portion of the upper surface, wherein the anti-slip coating is not applied to the upper surface between the central portion and the plurality of edges.

2. The floor tile of claim **1** further comprising:

a recess formed in the bottom surface that is adapted to receive a portion of an adhesive applied between the bottom surface and a supporting structure.

3. The floor tile of claim **2** wherein the recess is one of a plurality recesses formed in the lower surface.

4. The floor tile of claim **3** wherein the recesses are cut into the bottom surface.

5. The floor tile of claim **3** wherein the recesses are embossed into the bottom surface.

6. The floor tile of claim **1** wherein the metal plate is aluminum and the anti-slip coating is stainless steel.

7. A method of making a floor tile comprising:

providing a metal plate having an upper surface, a bottom surface and a plurality of edges provided on all sides of the metal plate that extend between the upper surface and the bottom surface;

masking a border on the metal plate the upper surface between the central portion and the plurality of edges; and

spraying molten metal on the central portion of the metal plate to form an anti-slip coating on the central portion but not on the border.

8. The method of making a floor tile of claim **7** further comprising:

grit blasting the central portion of the metal plate after the masking step and before the step spraying molten metal.

9. The method of making a floor tile of claim **7** further comprising:

cutting at least one groove in the bottom surface of the metal plate that is configured to receive a portion of an adhesive applied to the bottom surface and a supporting structure.

10. A floor tile comprising:

a metal plate having an upper surface, a bottom surface and a plurality of edges provided on all sides of the metal plate that extend between the upper surface and the bottom surface;

an anti-slip coating applied to the upper surface; and

a plurality of grooves provided in the bottom surface.

11. The floor tile of claim **10** wherein the plurality of grooves extend across the bottom surface.

12. The floor tile of claim **10** wherein the plurality of grooves extend across the bottom surface of the metal plate and intersect with others of the plurality of grooves.

13. The floor tile of claim **10** wherein a plurality of recesses are formed on the bottom surface of the floor tile.

14. The floor tile of claim **10** wherein the anti-slip coating is applied to the upper surface at a location spaced from the plurality of edges.

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