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(54) **PREFABRICATED AGGREGATED FLOOR
PANEL DEVICE AND SYSTEM AND
METHOD FOR MAKING AND INSTALLING
AGGREGATED PANELS**

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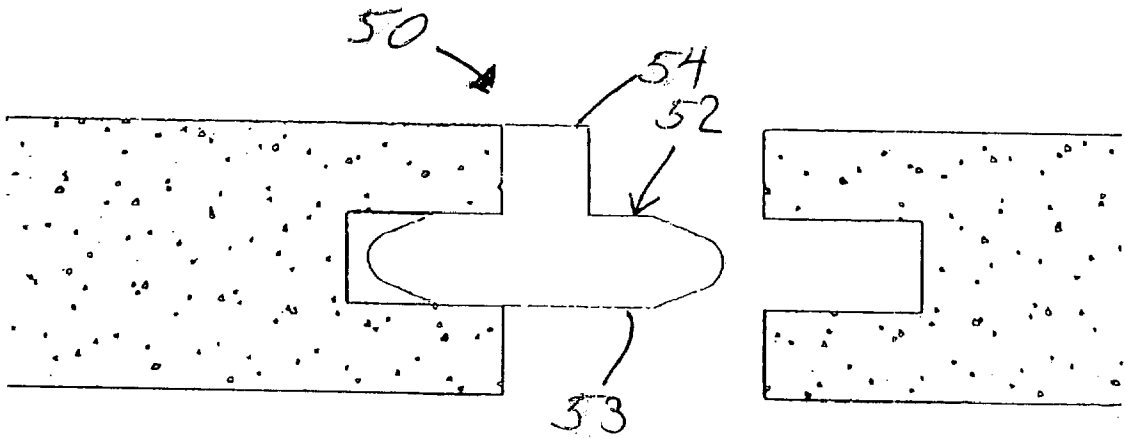
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(57) **ABSTRACT**

A prefabricated terrazzo panel and system, method for making terrazzo panels and method for installing terrazzo panels wherein the panels comprise terrazzo epoxy, a top surface, a bottom surface, sides and a groove along each side and the panel system comprises a plurality of panels, locking strips that join adjacent panels and terrazzo or terrazzo-like filler for joining and creating a seamless joint between adjacent panels. The method of manufacturing the panels generally includes providing, installing and, or preparing borders on a flat, level horizontal structure, applying an epoxy primer having a high viscous to the supporting structure to prevent adherence, introducing previously prepared epoxy terrazzo or comparable aggregate mixture into the border volume, leveling the pour mixture, allowing it to cure, grinding the surface of the cured aggregate to a desired thickness, sanding and polishing the top surface, and cutting the cured terrazzo into panels having predetermined dimensions. The method of installing prefabricated terrazzo panels comprises applying an epoxy primer to the selected floor surface, applying a coat of setting material to the floor surface with a notched trowel, aligning and setting panels and locking strips on the prepared floor surface in a manner that places the locking strip heads in the panel grooves, filling any with a terrazzo epoxy filler or similar filler, allowing setting time, grinding the filler flush with the top surface of the panels and polishing the top surface of the panels and joints.



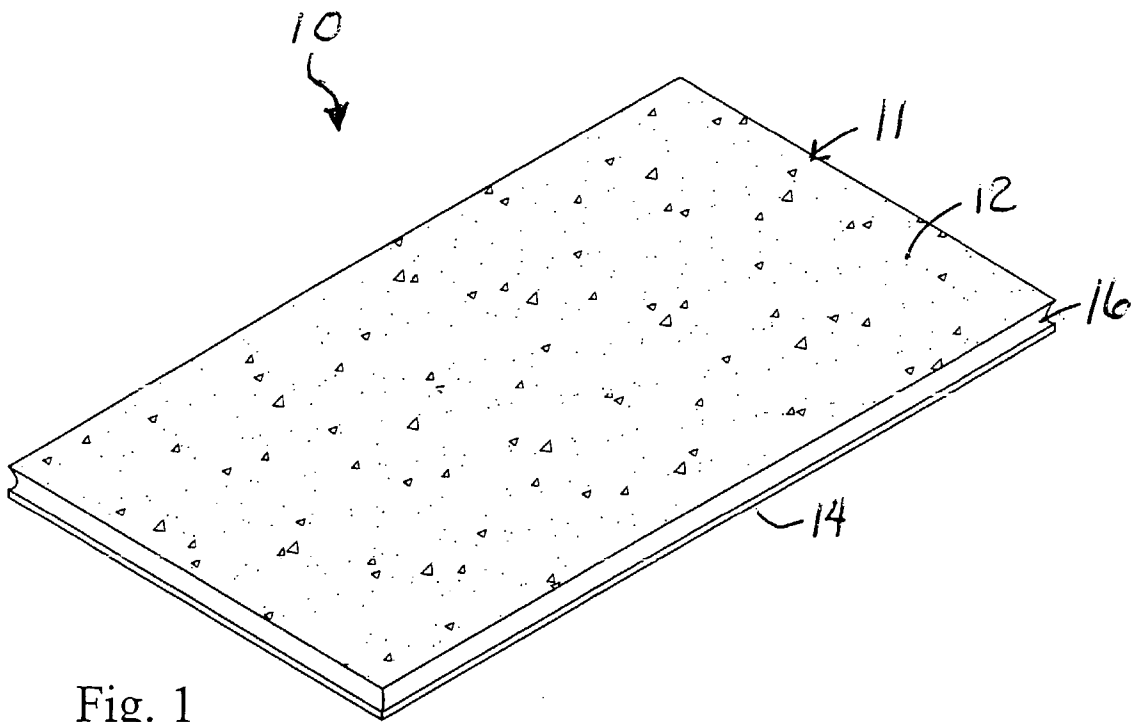


Fig. 1

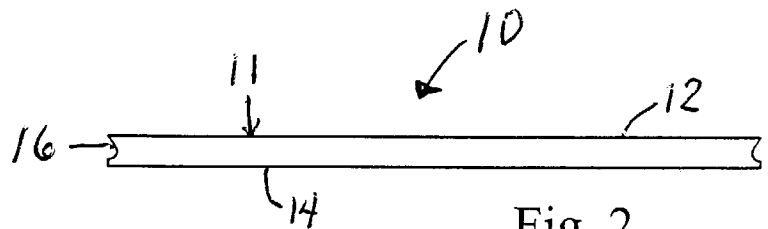


Fig. 2

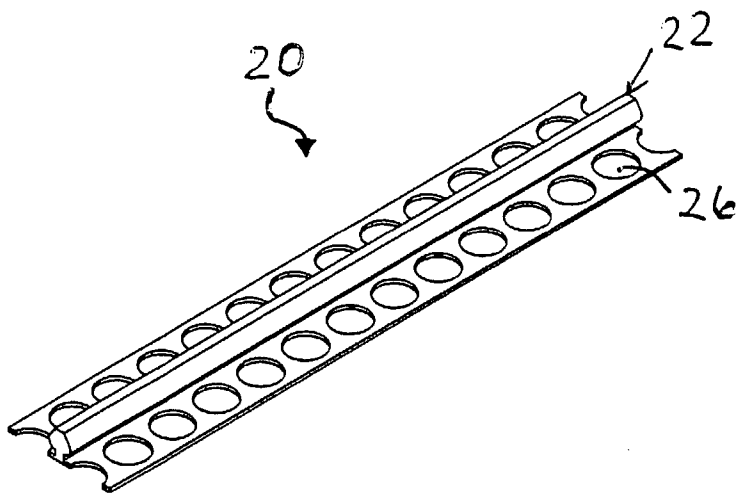


Fig. 3

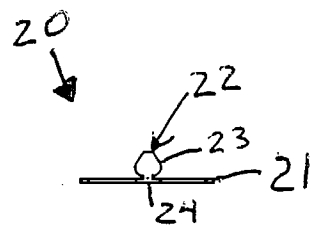
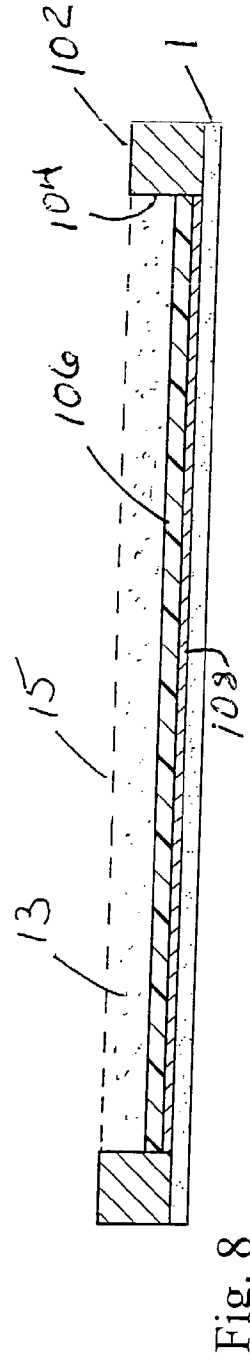
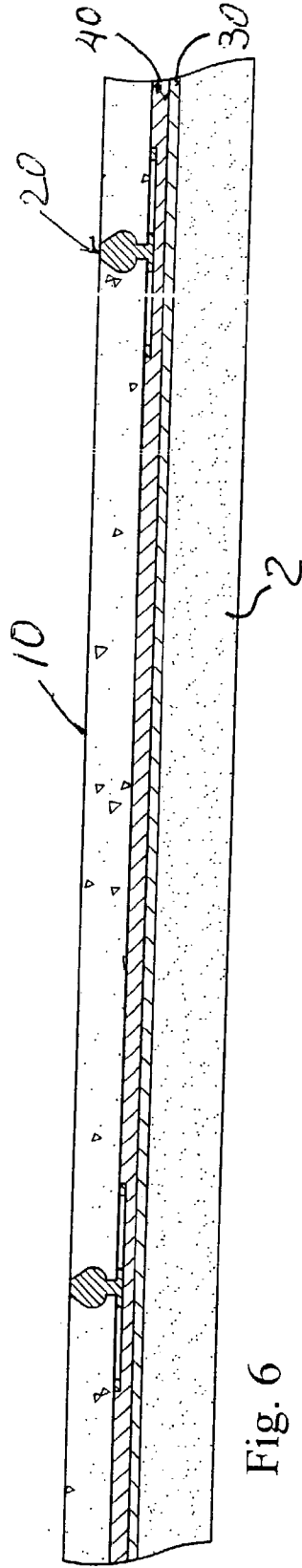
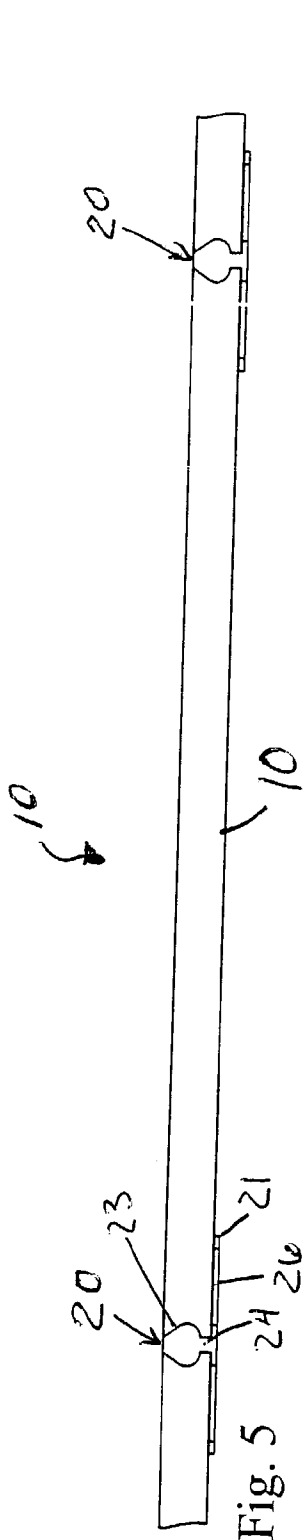


Fig. 4



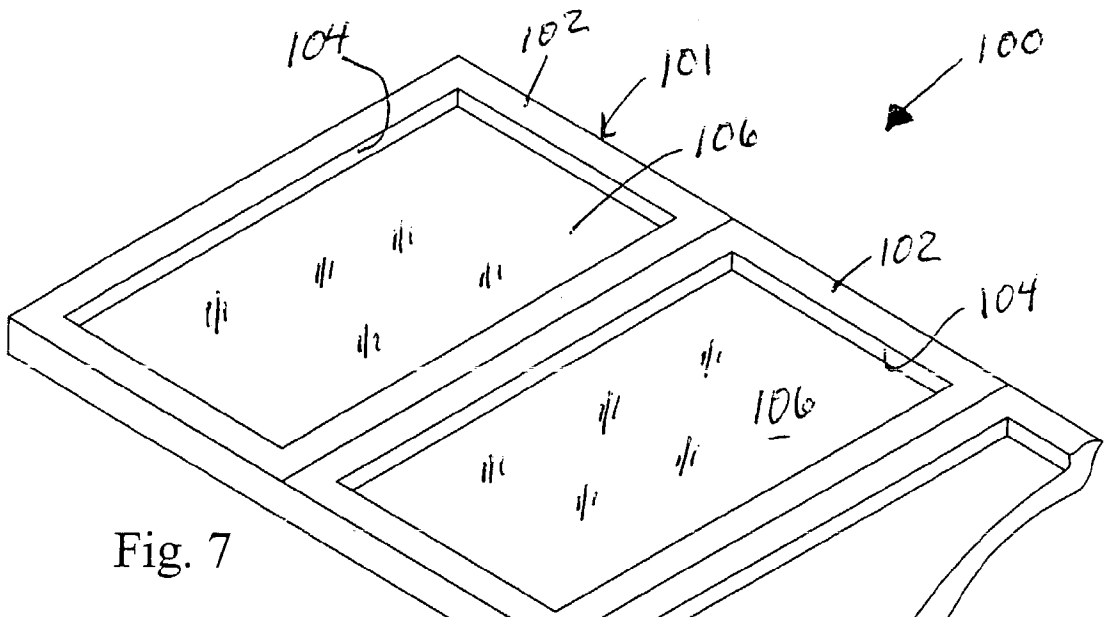


Fig. 7

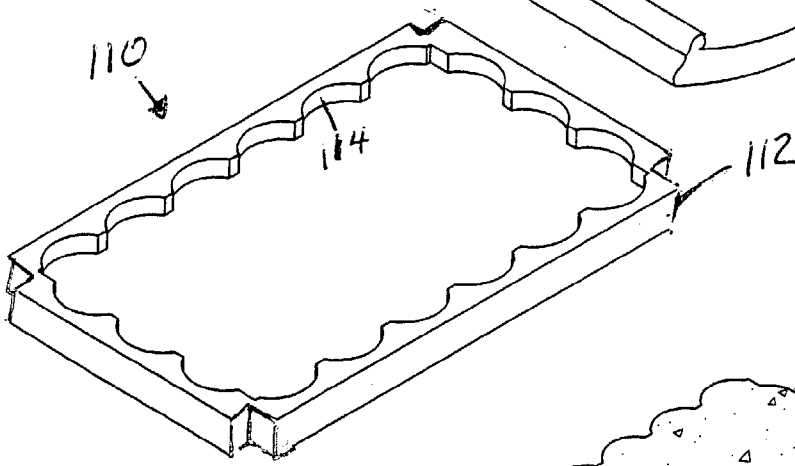


Fig. 9

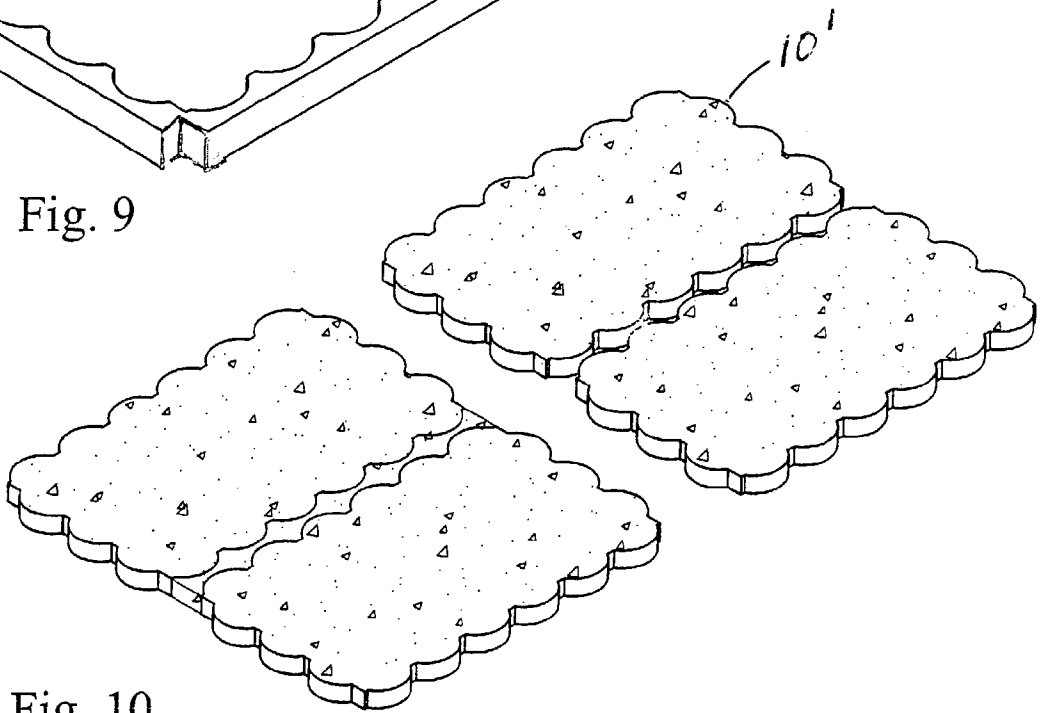
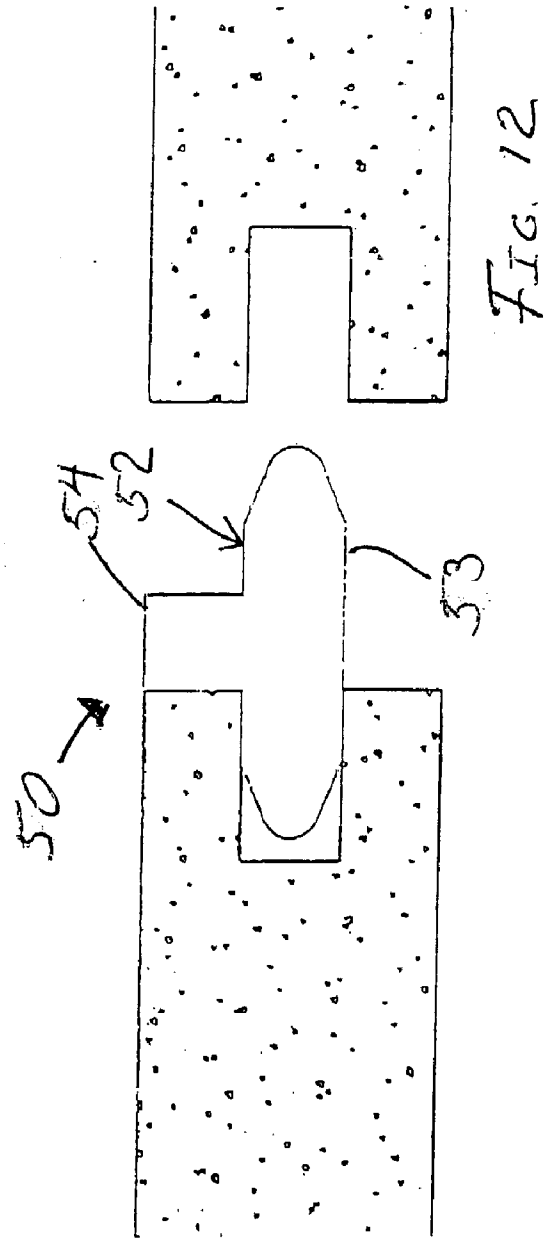
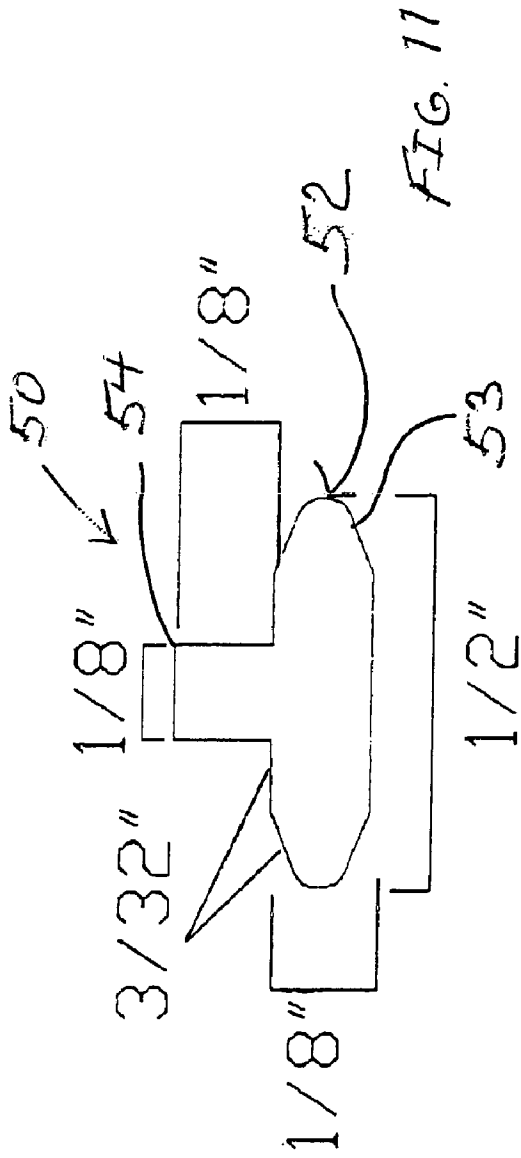


Fig. 10



**PREFABRICATED AGGREGATED FLOOR PANEL
DEVICE AND SYSTEM AND METHOD FOR
MAKING AND INSTALLING AGGREGATED
PANELS**

**CROSS REFERENCE TO RELATED
APPLICATIONS**

[0001] This application claims the benefit of provisional application Serial No. 60/388,993 filed Jun. 14, 2002.

**STATEMENT REGARDING FEDERALLY
SPONSORED RESEARCH OR DEVELOPMENT**

[0002] N/A

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BACKGROUND OF THE INVENTION

[0004] 1. Field of the Invention

[0005] This invention relates generally to prefabricated aggregated floor panels, and more particularly, to a prefabricated terrazzo panel device and system and method for making and installing prefabricated terrazzo panels.

[0006] 2. Description of the Background Art

[0007] Aggregate floors, such as terrazzo, are well known in the art. Terrazzo is a form of mosaic flooring that consists of small pieces of marble or granite set in mortar and given a high polish. Binding agents are used to anchor marble, granite or other aggregate chips in the terrazzo floor. Three types of binders are used, which include cement, cement with an acrylic additive, and epoxy.

[0008] Terrazzo floors known in the art are poured and set on a supporting floor structure at the desired site of installation within set boundaries. Conventional terrazzo flooring and methods for making same are expensive and time consuming. The costs and time involved in creating terrazzo flooring are high because the floors must be formed and poured at the site of installation. Conventional methods for creating terrazzo flooring do not include prefabricating terrazzo panels. Based on conventional techniques, terrazzo panels cannot be prefabricated because they adhere to the supporting substrate when curing and are difficult to join without seams. If, however, terrazzo panels could be prefabricated off-site into panels it would facilitate more cost and time effective installation. In addition, it would be even more attractive if prefabricated panels could be joined without seams between their edges.

[0009] As noted in U.S. Pat. No. 5,339,589, terrazzo floors are constructed in accordance with well-established principles and methods. Conventional methods include placing a foundation layer of material composed of concrete on the ground or floor. A screed bed having divider strips are then installed over the foundation layer forming panels into which a mixture of cement, water and terrazzo aggregate is

poured. A screed bed is a mixture of sand, cement and water and brings the foundation substrate layer closer to level, absorbs horizontal movement between the building structure and the aggregate surface, and serves as a setting bed for the panel forming divider strips. The divider strips serve as a gauge for leveling the floor and provide expansion joints and control paths for cracks. The resulting pour must be quickly leveled with a trowel to the top of strips. Thereafter matching aggregate is sprinkled over the surface, which is then compacted and compressed with static rollers. The rollers force out any trapped air and excess cement, and compact the aggregate to the greatest possible density. Once the mixture cures, it is polished so that the aggregate, usually marble, contained therein becomes decorative and formal in appearance.

[0010] This conventional process and similar processes have disadvantages. For instance, the leveling and compacting of the aggregate must be completed in a limited period of time before curing begins. Accordingly, a terrazzo floor must be poured in sections so that one section can be completed before a new section is started. In addition, the floor must be poured on site. Consequently, constructing terrazzo floors is slow and labor-intensive. Other attempts have been made to address the above noted drawbacks, but have failed to realize adequate success. If a device and system existed that was more reliable, more efficient and less expensive it would be well received. The instant invention addresses this unfulfilled need in the prior art.

BRIEF SUMMARY OF THE INVENTION

[0011] In light of the foregoing, it is an object of the present invention to provide a prefabricated terrazzo or terrazzo-like panel.

[0012] It is another object of the instant invention to provide a terrazzo panel that can be prefabricated prior to installation.

[0013] It is an additional object of the instant invention to provide a process for manufacturing prefabricated terrazzo or terrazzo-like panels that can be transported to and installed at a remote site.

[0014] It is also an object of the instant invention to provide a method for installing prefabricated terrazzo or terrazzo-like panels.

[0015] It is a further object of the instant invention to provide a method for manufacturing prefabricated terrazzo or terrazzo-like panels that alleviates the problem of adherence to the supporting substrate during the curing process.

[0016] It is an additional object of the instant invention to provide a method for installing prefabricated terrazzo or terrazzo-like panels with virtually no seams between adjacent panels.

[0017] It is another object of the instant invention to provide an oral pharyngeal evacuation endotracheal tube that has a central valve in communication with a vacuum source for aspirating pooled secretions above the cuff.

[0018] It is a further object of the instant invention to provide a locking strip that facilitates the joining and seamless joining of adjacent terrazzo or terrazzo-like panels.

[0019] In light of these and other objects, the instant invention comprises a prefabricated terrazzo panel and sys-

tem, method for making terrazzo panels and method for installing terrazzo panels. The panels comprise terrazzo epoxy, a top surface, a bottom surface, sides and a groove along each side. The panels are fabricated from a terrazzo epoxy or terrazzo like material. The panel system comprises a plurality of panels, locking strips that join adjacent panels and terrazzo or terrazzo-like filler for joining and creating a seamless joint between adjacent panels. The system of the invention generally comprises a plurality of panels, locking strips for joining adjacent panels and terrazzo, terrazzo-like and, or epoxy filler adapted for providing a seamless joint. The method of manufacturing the panels generally comprises providing, installing and, or preparing borders on a flat, level horizontal structure, applying an epoxy primer having a high viscous consistency similar to a paste to the supporting structure to prevent adherence of the terrazzo epoxy to the supporting structure during curing, preparing and, or introducing previously prepared epoxy terrazzo or comparable aggregate mixture into the border volume, leveling the pour mixture, allowing it to cure, grinding the surface of the cured aggregate to a desired thickness, sanding and polishing the top surface, and cutting the cured terrazzo into panels having predetermined dimensions and preparing the panels for installation. The method of installing prefabricated terrazzo panels comprises applying an epoxy primer to the selected floor surface, applying a coat of setting material having fine powder and, or marble dust fillers that achieve proper consistency to the floor surface with a notched trowel, aligning and setting panels and locking strips on the prepared floor surface in a manner that places the locking strip heads in the panel grooves, filling any voids including voids between panels with a terrazzo epoxy filler or similar filler, allow setting time, grinding the filler flush with the top surface of the panels and polishing the top surface of the panels and joints.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0020] FIG. 1 is a perspective view of the preferred embodiment of the prefabricated terrazzo panel in accordance with the instant invention.

[0021] FIG. 2 is an end view of the preferred embodiment of the prefabricated terrazzo panel in accordance with the instant invention.

[0022] FIG. 3 is a perspective view of the preferred embodiment of the locking strip in accordance with the instant invention.

[0023] FIG. 4 is an end view of the preferred embodiment of the locking strip in accordance with the instant invention.

[0024] FIG. 5 is an end view of the preferred embodiment of the prefabricated terrazzo panel and locking strip as joined in accordance with the instant invention.

[0025] FIG. 6 is an end view of the preferred embodiment of the prefabricated terrazzo panel and locking strip system in accordance with the instant invention.

[0026] FIG. 7 is a perspective view of the preferred embodiment of the system for making prefabricated terrazzo panels in accordance with the instant invention.

[0027] FIG. 8 is an end view of the preferred embodiment of the system for making prefabricated terrazzo panels in accordance with the instant invention.

[0028] FIG. 9 is a plan view of an alternative embodiment of the system for making prefabricated terrazzo panels in accordance with the instant invention.

[0029] FIG. 10 is a plan view of the alternative embodiment of the prefabricated terrazzo panel in accordance with the instant invention.

[0030] FIG. 11 is an end view of an alternative locking strip used in accordance with the system of the instant invention.

[0031] FIG. 12 is an end view of the preferred embodiment of the prefabricated terrazzo panel and alternative locking strip in accordance with the instant invention.

DETAILED DESCRIPTION OF THE INVENTION

[0032] With reference to the drawings, FIGS. 1-12 depict the preferred and alternative embodiments of the instant invention which is generally referenced as a prefabricated panel and, or system and, or method for making and, or method for installing prefabricated panels and, or by numeric character 10. Referring to FIGS. 1-12, the instant invention comprises a prefabricated panel or tile 10, panel system 10, 20, 30, 40, 50 process and system for making aggregated floor panels 100, 110 and process for installing the prefabricated aggregated floor panels 10. The prefabricated panels preferably comprise a terrazzo or terrazzo-based tile that may be installed on a floor surface, wall surface or other flat substrate. The panel system 10, 20, 30, 40, 50 comprises the components used to form and that facilitate installation of the panels 10, as shown in FIGS. 5, 6 and 12. The system for making the panels 10 comprises the components that facilitate the manufacture of the panels 10, as shown in FIGS. 7-9. The process for installing the prefabricated terrazzo panels 10 is described herein.

[0033] With reference to FIGS. 1 and 2, the prefabricated panels 10 comprise a tile substrate 11, top surface 12, bottom surface 14, sides 15 and at least one groove 16 formed in and along at least one side 15. The tile substrate 11 preferably comprises an aggregate or terrazzo mixture, such as epoxy terrazzo or aggregate having terrazzo-like specifications. The groove 16 preferably extends along each side and may extend completely across each side. Alternatively, the groove 16 may extend partially across one or more of the sides 15. The panels 10 are preferably at least substantially square or rectangular and have a thickness of approximately one-quarter inch (1/4") to three-eighths inch (3/8") or thicker. In an alternative embodiment, the panels 10 may comprise alternative geometric shapes and, or dimensions. The groove(s) 16 provide a track for receiving a portion of a locking strip 20 when interlocking adjacent panels 10 during the installation process. The panels 10 can be made in various sizes, such as four feet (4') by four feet (4'), five feet (5') by five feet (5'), six feet (6') by six feet (6'), or other dimensions. The bottom surface 14 of the cured aggregate panels 10 have a textured surface for facilitating bonding with a floor surface. The prefabricated panels 10 preferably comprise small pieces of marble, granite or other known substitutes set in mortar and having a high polish finish. The dimensions noted herein may vary without departing from the scope and spirit of the instant invention.

[0034] With reference to FIGS. 1-6, the panel system of the instant invention comprises a plurality of prefabricated

panels **10** and corresponding number of locking strips **20** that facilitate installation. The locking strip **20** comprises a base **21**, apertures **26** formed in the base **21**, and a vertically projecting elongated tongue structure **22**, as shown in FIGS. **3** and **4**. The tongue structure **22** comprises a head **23** that is joined to the base **21** by a stem structure **24** and has an approximate overall height of 0.325 P.I. The head **23** has an approximate width of 0.150 P.I. at the upper end and 0.250 P.I. at its lower or widest end and an approximate height of 0.210 P.I. The stem **24** has an approximate height of 0.125 P.I. and width of 0.063 P.I. The angle of curvature at the lower end of the head **23** is approximately twenty (20) degrees. These dimensions may vary in accordance with design specifications. The base has an approximate thickness of 0.125 P.I. and width of 1.850 P.I. The locking strip **20** is manufactured with a custom prefabricated die in an extrusion process using plastic or a plastic-like material, such as those comprising thermoplastic or thermosetting polymers that can be molded, cast or extruded. The die forms the overall shape of the strip **20**. The locking strip **20** may alternatively comprise zinc, aluminum or metals having properties similar to zinc and, or aluminum. A liquid, paste or pliable form of zinc or aluminum may be extruded through a die. The extrusion process produces the shape of the locking strip as shown in FIG. **4**. The apertures **26** are punched through the base **21**. The panel system may also comprise a coat of epoxy **40**, preferably of a high viscous consistency that is similar to a wet paste and an epoxy primer **30**. The epoxy primer **30** is placed on the installation surface prior to applying the epoxy **40**.

[0035] With reference to FIGS. **11-12**, the alternative locking strip **50** comprises a projecting elongated tongue structure **52**. The alternative tongue structure **52** comprises a head **53** that is joined to a stem structure **54**. The head **53** has an approximate width of 0.50 inches and an approximate height of 0.125 inches. The alternative stem structure **54** has an approximate height of 0.125 inches and width of 0.125 inches. These dimensions may vary in accordance with design specifications. The alternative locking strip **50** is also preferably manufactured with a custom prefabricated die in an extrusion process using plastic or a plastic-like material, such as those comprising thermoplastic or thermosetting polymers that can be molded, cast or extruded. The die forms the overall shape of the alternative strip **50**. The alternative locking strip **20** may also comprise zinc, aluminum or metals having properties similar to zinc and, or aluminum. A liquid, paste or pliable form of zinc or aluminum may be extruded through a die. The extrusion process produces the shape of the alternative locking strip as shown in FIG. **11**. Unlike the preferred locking strip **20**, the alternative locking strip's **50** head **53** is inverted and the stem **54** aligns at or near the top surface of the panels **10** when installed, as shown in FIG. **12**. Although the preferred method for installation of aggregated floor panels includes the use of the preferred locking strip **20** and is described with reference to using preferred locking strip **20**, the method of installation may include the use of the alternative locking strip **50** without departing from the scope and spirit of the instant invention.

[0036] With reference to FIGS. **7-10**, the process and technology for manufacturing the panels **10** generally comprises providing, installing and, or preparing the manufacturing system **100**, introducing the epoxy terrazzo or comparable aggregate mixture (generally referenced herein as an epoxy terrazzo mixture **13**) into the manufacturing system

100, allowing it to cure, grinding the surface of the cured aggregate to a desired thickness, polishing, cutting the cured terrazzo into panels **10** and preparing the panels **10** for installation. With reference to FIGS. **7-9**, the manufacturing system **100** comprises at least one frame **101** preferably formed by a plurality of forms or partitions **102** having an interior surface **104**, and a base layer **106** of urethane, Plexiglas or other type of plastic laminate with similar properties, such as Lexan, that is placed on the support substrate **1** within the frame structure **101**. The base layer **106** is preferably formed with a liquid urethane that is applied to the support substrate and cured. The liquid urethane is also used to fill in cracks that form in the base layer **106** when tile panels **10** are cut from the epoxy terrazzo deck **15**. The interior surface **104** is substantially flat. In an alternative embodiment the interior surface **104** may comprise an elongated, substantially horizontal contoured projection for forming the groove **16** in the panel **10** during the manufacturing process.

[0037] Still referring to FIGS. **7-10**, when making the aggregate panels **10** in accordance with the invention it is necessary that the support substrate **1** have a substantially or perfectly level and flat surface. The support substrate **1** is preferably made of a solid material such as concrete. The base layer **106** separates the epoxy terrazzo mixture **13** from the support substrate surface **1**, prevents it from adhering to the support substrate surface **1** and has properties that allow the epoxy terrazzo mixture **13** to temporarily adhere to the base layer surface such that it can be released therefrom without damaging the cured aggregate or panel **10**. The base layer **106** is adhered to the supporting substrate **1**, such as a concrete floor, and bonded thereto with an epoxy or adhesive **108** that prevents the base layer **106** from releasing.

[0038] Once the platform is secured on the support substrate **1**, the epoxy terrazzo mixture **13** in a liquid form and with the aggregate mixed therein can be applied to the base layer **106** within the frame structure **101** until the desired thickness is reached and, or as required. The aggregate mixture **13** preferably comprises a liquid form of epoxy terrazzo. Once the epoxy terrazzo mixture **13** has been poured and leveled, the mixture **13** cures for approximately eight (8) hours. Upon completing the curing process, the cured mixture **13** comprises one large sheet or deck-like structure **15**. In one embodiment, the deck **15** may comprise a thirty (30) foot by sixty (60) foot panel resulting in 1,800 square feet of cured terrazzo. The next step is to grind the top surface of the terrazzo deck **15** until achieving a consistent thickness. The terrazzo deck **15** is preferably grinded by an inline grinding and polishing machine. The machine travels above the deck **15**. After completing the grinding and polishing steps, the terrazzo aggregate **13** is cut into panels **10**. The panels **10** can be cut into various sizes and shapes depending upon request or installation requirements, such as 4'x4', 5'x5' or 6'x6'. Thereafter, the panels **10** are removed easily from the frame **101** and base layer **106**. The back of the panel **10** has a glossy finish after curing. To remove the glossy finish, the panels **10** are lightly sanded to give them a texture finished that facilitate bonding with the installation support surface, i.e. floor. After grinding, polishing and cutting the panels **10**, the edges of the panels **10** are profiled with a router bit specifically designed to form grooves **16** that correspond to the shape of the locking strip tongue structure. The grooves **16** mate with the locking strip **20** tongue structure **22** in a manner that locks the panels **10** together to facilitate installation in the field, as shown in FIGS. **5** and **6**.

[0039] The prefabricated panels **10** are installed after floor preparation at the installation site is completed. With reference to **FIG. 6**, the floor **2** is prepared with an epoxy primer **30** and then a coat of setting material, such as epoxy **40**, is applied to the floor **2** with a notched trowel. The setting material (epoxy) **40** preferably has a thick consistency, such as mayonnaise, to allow the epoxy **40** to stand vertical until the panel **10** is applied to the floor **2**. Proper consistency in the epoxy **40** is achieved by adding a fine type of powder, such as marble dust, to the epoxy **40** in its liquid form until the right consistency is met. The panel **10** is set over the epoxy **40** with a locking strip **40** in place. The panels **10** and strips **20** are installed simultaneously, which locks the system together.

[0040] With reference to **FIGS. 9 and 10**, an alternative panel **10'** is shown. The alternative panels **10'** are made with contoured edges to facilitate mating of adjacent panels **10'**. The contour edges provide more surface area and structure for enhanced surface tension to accommodate an epoxy filler. During installation, the alternative panels **10'** are set next to each other approximately one inch apart to form a gap. The gap between the panels **10'** are filled with an epoxy terrazzo, similar to that used to form the panels **10'** and grinded and polished such that the joined panels **10'** appear seamless. The alternative panels **10'** are made in an alternative frame structure **110** with alternative partitions **114**, as shown in **FIG. 9**, with virtually the same process disclosed herein with respect to the preferred embodiment. The partitions **114** are contoured to form the contoured edges in the panels **10'**.

[0041] The instant invention has been shown and described herein in what is considered to be the most practical and preferred embodiment. It is recognized, however, that departures may be made therefrom within the scope of the invention and that obvious structural and/or functional modifications will occur to a person skilled in the art.

What is claimed is:

1. An aggregated floor panel system, said system comprising:

at least one substrate comprising at least a terrazzo-like material;

said substrate having a top surface, bottom surface, a plurality of sides and predetermined dimensions; and

a groove formed in at least one of said sides to facilitate joining to an adjacent substrate.

2. A system as recited in claim 1, farther comprising:

a plurality of substrates; and

means for dividing and joining adjacent substrates.

3. A system as recited in claim 2, wherein said dividing and joining means comprises:

a locking strip having a projecting tongue adapted for mating with said groove.

4. A system as recited in claim 3, wherein said locking strip further comprises a stem having a width that is smaller than a width of said tongue.

5. A system as recited in claim 2, wherein said locking strip further comprises:

a perforated base.

6. A system as recited in claim 2, wherein said locking strip is elongated.

7. A system m as recited in claim 1, wherein said system comprises a plurality of substrates.

8. A method for making at least one terrazzo-based panel having at least one groove in at least one side, said method comprising the steps of:

employing a frame on a substantially flat and level surface having a volume and base layer of a plastic-based laminate therein, wherein said laminate has properties that prevent permanent adhesion of an aggregate terrazzo-based mixture thereto;

introducing a terrazzo epoxy based solution inside the volume and onto said base layer;

leveling said solution to a predetermined height and to establish a top surface;

allowing said solution to cure for a predetermined period of time so as to form a substrate; and

cutting said substrate into a plurality of panels having side edges and at least one predetermined shape.

9. A method as recited in claim 8, further comprising the steps of:

grinding said top surface until a desired thickness is achieved; and

polishing said top surface after said grinding step.

10. A method as recited in claim 9, further comprising the step of:

profiling at least one of said side edges so as to define at least one groove extending at least partially across said at least one side edge, said profiled side edge having a cross sectional shape that corresponds to a shape of a selected locking strip.

11. A method as recited in claim 9, further comprising the step of:

sanding said top surface.

12. A method for installing a plurality of terrazzo-based panels having grooves in at least one side edge, said method comprising the steps of:

(a) applying an epoxy primer to a surface on which panels are intended to be installed;

(b) applying an epoxy setting material over said epoxy primer, said setting material having a thick consistency similar to mayonnaise;

(c) installing a tongue portion of a locking strip in a corresponding groove in a panel;

(d) placing said panel and locking strip over and on said setting material;

(e) aligning a second panel side edge groove with said locking strip in said first panel, said second panel having a second locking strip installed in a second groove defined by said second panel;

(f) repeating steps a through e a predetermined number of times;

(g) filling in any gaps in or between said panels with a terrazzo epoxy corresponding the terrazzo epoxy used to make said panels; and

(h) sanding the top surface of said panels.

* * * * *