ARTIFICIAL STONE SLAB HAVING A LINING STRUCTURE

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ABSTRACT

An artificial stone slab having a lining structure is used as an internal framework of the artificial stone slab for reducing the consumption of artificial stone material and the total weight of the artificial stone slab, and thus the artificial stone slab of the invention can greatly lower the construction load when it is used as a construction or decoration material.
FIG. 2
FIG. 9

FIG. 11
ARTIFICIAL STONE SLAB HAVING A LINING STRUCTURE

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention generally relates to artificial stone slabs, and more particularly to an artificial stone slab having at least one lining structure for reducing the total weight of the artificial stone slab while maintaining the stability and strength of the artificial stone slab and preventing any deformation.

[0003] 2. Description of the Related Art

[0004] In general, an artificial stone slab primarily adopts a mixture of a resin, aluminum hydroxide (or calcium carbonate mineral powders), a catalyst, and a curing agent molded into a slab. The resin could be a mixed resin of an unsaturated resin, an acrylic resin or an acrylic, and the resin is cured for a specific time after the resin is mixed with the catalyst and the curing agent. The resin is reacted with aluminum hydroxide to improve the water resistance and hardness of the product. Therefore, the artificial stone slab so produced has the acid/alkali resisting, refractory, waterproof, moisture-resisting and pore-free features. These features make the artificial stone slab to be a material applicable for constructions or decorations. However, the shortcomings of a 100% artificial stone slab include a heavy weight, a high material cost, and a fragile structure.

SUMMARY OF THE INVENTION

[0005] Therefore, it is a primary objective of the invention to provide an artificial stone slab having a lining structure used as an internal framework of the artificial stone slab for reducing the consumption of the artificial stone material and the total weight of the artificial stone slab, and thus the artificial stone slab of the invention can greatly lower the construction load when it is used as a construction or decoration material.

[0006] A secondary objective of the present invention is to provide an artificial stone slab having a lining structure used as an internal framework of the artificial stone slab for improving the strength and shock resistance of the artificial stone slab as well as enhancing the sound and heat insulation effects.

[0007] Another objective of the present invention is to provide an artificial stone slab having a lining structure which has the lightweight, rigid, powerful, high bearing, soundproof, shock resisting, moisture resisting and refractory effects.

[0008] A further objective of the present invention is to provide an artificial stone slab having a lining structure capable of absorbing the contraction pressure occurred to the artificial stone slab and maintaining the integrity of the artificial stone slab.

[0009] The technical measures taken by the present invention to achieve the foregoing objectives include:

[0010] a grid core slab, having a plurality of grids penetrating its upper and lower surfaces;

[0011] an upper sheet, with its bottom surface coupled to a top surface of the grid core slab;

[0012] a lower sheet, with its top surface coupled to a bottom surface of the grid core slab;

[0013] a flexible pad, coupled around the periphery of the grid core slab, the top surface of the upper sheet and the bottom surface of the lower sheet; and

[0014] an artificial stone material, wrapped and coupled with the flexible pad to a predetermined thickness.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 is an exploded view of a grid core slab, an upper sheet and a lower sheet of a lining structure according to the present invention;

[0016] FIG. 2 is a perspective view of an assembled lining structure comprised of a grid core slab, an upper sheet and a lower sheet according to the present invention;

[0017] FIG. 3 is a perspective view of an assembled lining structure comprised of a grid core slab, an upper sheet and a lower sheet and wrapped with a foam material according to the present invention;

[0018] FIG. 4 is a schematic view of an artificial stone slab of the present invention;

[0019] FIG. 5 is another schematic view of an artificial stone slab of the present invention;

[0020] FIG. 6 is another further schematic view of an artificial stone slab of the present invention;

[0021] FIG. 7 is a perspective view of an artificial stone slab of the present invention;

[0022] FIG. 8 is a perspective view of the internal structure of an artificial stone slab of the present invention;

[0023] FIG. 9 is a cross-sectional view of the structure of an artificial stone slab of the present invention; and

[0024] FIG. 10 is an exploded view of a lining structure including a grid core slab, an upper sheet and a lower sheet according to the present invention, and a portion of the grid core slab is filled with a filler; and

[0025] FIG. 11 is a cross-sectional view of the lining structure of an artificial stone slab as depicted in FIG. 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0026] Referring to FIGS. 1 to 3 for a lining structure of the present invention, the lining structure 10 comprises:

[0027] a grid core slab 11;

[0028] an upper sheet 12, with its bottom surface 122 coupled to a top surface 111 of the grid core slab 11;

[0029] a lower sheet 13, with its top surface 131 coupled to a bottom surface 112 of the grid core slab 11; and

[0030] a flexible pad 14, coupled around the periphery 113 of the grid core slab 11, the top surface 121 of the upper sheet 12 and the bottom surface 132 of the lower sheet 13.

[0031] The upper and lower sheets 12, 13 of the grid core slab 11 could be made of metal, paper, or wood, and its structural characteristics include a plurality of grids 114 penetrating the top and bottom surfaces of the grid core slab 11, and these grids 114 are preferably distributed all over the
whole grid core slab 11. The upper and lower sheets 12, 13 can be connected to the grid core slab 11 by an appropriate method (including adhesion, nailing, and the like). The flexible pad 14 is made of a flexible material such as foam, corrugated paper, soft wood, or rubber, etc with a predetermined thickness and adhered with the upper sheet 12, the lower sheet 13 and the grid core slab 11.

[0032] Referring to FIGS. 4 to 6 for the method of producing an artificial stone slab 20 having a lining structure 10, the method comprises the steps of:

- [0033] Pouring an artificial stone material 30 into a mold 901 as shown in FIG. 4, and the dotted line in the figure indicates a pouring machine 900;
- [0034] Placing the artificial stone material 30 in the mold into the lining structure 10 after the solidification (solidified into a gel form) of the artificial stone material 30 as shown in FIG. 5;
- [0035] Pouring the artificial stone material 30 into the mold 901 again to wrap the whole lining structure 10, and waiting for all artificial stone materials to be solidified as shown in FIG. 6; and
- [0036] Removing the artificial stone slab 30 from the mold 901 as shown in FIG. 7 to complete the manufacture of the artificial stone slab 30 having the lining structure 10.

[0037] Refer to FIGS. 8 and 9 for the cross-sectional view of the artificial stone slab having a lining structure and the external and internal configurations of the whole artificial stone slab 20. The grid core slab 11, the upper sheet 12, the lower sheet 13, the flexible pad 14 and the artificial stone material 30 are shown in the figures.

[0038] The lining structure 10 has the lightweight, rigid, powerful, high load resistance, soundproof, shock resisting, moisture resisting and refractory features. The lining structure 10 is used as an internal framework of the artificial stone slab 20 for reducing the consumption of the artificial stone material 30 and the total weight of the artificial stone slab 20. Therefore, if the artificial stone slab 20 is used as a construction and decoration material, it can greatly reduce the construction load. In addition, the lining structure 10 further improves the strength and shock resistance and also enhances the sound and heat insulation effects.

[0039] It is noteworthy that the flexible pad 14 disposed on the outer section of the lining structure 10 can absorb the contraction produced during the solidification of the artificial stone material 30. The contraction presses against the flexible pad 14, and the flexible pad 14 provides a flexible effect to prevent the lining structure from being deformed, cracked, or broken. The flexible pad 14 of the invention is used to assure the complete structure which is very important to assure the integrity of the artificial stone slab 20. Thus, the flexible pad 14 can be used to avoid the lining structure 14 from being deformed, so as to maintain the integrity of the artificial stone slab 20.

[0040] Referring to FIG. 10 for an exploded view of the lining structure including the grid core slab 11, the upper sheet 12 and the lower sheet 13 according to the present invention, some portions of the grids 114 of the grid core slab 11 include a filler 115 made of a material with a predetermined hardness (such as wood). The filler 115 is filled at specific positions of the portions of the grids 114, such that the filled grid 114 becomes solid.

[0041] Referring to FIG. 11 for the cross-sectional view of an artificial stone slab having a lining structure, the artificial stone slab 20 uses at least one connecting means 40 to fix an external part 41 at the outermost surface corresponding to the specified position of the filler 115. The inner end of the connecting means 40 is fixed to the filler 115. In other words, the original hollow grid core slab 11 becomes solid by filling the filler 115 into the specified portions and serves as a foundation for coupling the connecting means 40. In the figure, the artificial stone slab 20 is used as a table top, and the filler 115 should be filled at the positions corresponding to the table legs. Basically, the positions for filling the filler 115 varies according to the locations of the external parts 41.

[0042] While the invention has been described by way of example and in terms of a preferred embodiment, it is to be understood that the invention is not limited thereto. To the contrary, it is intended to cover various modifications and similar arrangements and procedures, and the scope of the appended claims therefore should be accorded the broadest interpretation so as to encompass all such modifications and similar arrangements and procedures.

What is claimed is:

1. An artificial stone slab having a lining structure, comprising:
   - a grid core slab, having a plurality of grids disposed therein and penetrating its upper and lower surfaces;
   - an upper sheet, with its bottom surface coupled with the top surface of said grid core slab;
   - a lower sheet, with its top surface coupled with the bottom surface of said grid core slab;
   - at least one flexible pad, coupled with the top surface of said upper sheet and the bottom surface of said lower sheet; and
   - an artificial stone material, wrapped and coupled to said grid core slab and said flexible pad to a predetermined thickness.

2. The artificial stone slab of claim 1, wherein said grid core slab is filled with a solid filler disposed in a portion of said grids at predetermined positions of said grid core slab.

3. The artificial stone slab of claim 2, wherein said filler is made of a material with a predetermined hardness.

4. The artificial stone slab of claim 3, wherein said filler is a wooden block.

5. The artificial stone slab of claim 3, wherein said filler is filled into a portion of grids at predetermined positions.

6. The artificial stone slab of claim 2, wherein said artificial stone slab is coupled to an external part by at least one connecting device disposed at the position of said filler corresponding to the external surface of said artificial stone slab.

7. The artificial stone slab of claim 1, wherein said grids of said grid core slab are disposed all over said grid core slab.

8. The artificial stone slab of claim 1, wherein said flexible pad is coupled to the periphery of said grid core slab.
9. The lining structure of claim 8, wherein said flexible pad is adhered and fixed to the periphery of said grid core slab and the top and bottom surfaces of said upper and lower sheets.

10. The lining structure of claim 1, wherein said upper and lower sheets are adhered and fixed to the top and bottom surfaces of said grid core slab.

11. The lining structure of claim 1, wherein said grid core slab is a metal grid core slab.

12. The lining structure of claim 1, wherein said grid core slab is a paper grid core slab.

13. The lining structure of claim 1, wherein said grid core slab is a wood grid core slab.

14. The lining structure of claim 1, wherein said upper and lower sheets are metal sheets.

15. The lining structure of claim 1, wherein said upper and lower sheets are paper sheets.

16. The lining structure of claim 1, wherein said upper and lower sheets are wooden sheets.

17. The lining structure of claim 1, wherein said flexible pad is made of foam.

18. The lining structure of claim 1, wherein said flexible pad is made of corrugated paper.

19. The lining structure of claim 1, wherein said flexible pad is made of soft wood.

20. The lining structure of claim 1, wherein said flexible pad is made of rubber.

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