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(54) Sound absorbent panel and related manufacturing method

(57) A sound absorbent panel includes at least two facing plates (2), each of which provided with a plurality

of parallel grooves first (5) and second (6), carried out on opposite faces respectively first (3) and second (4) of each plate (2).

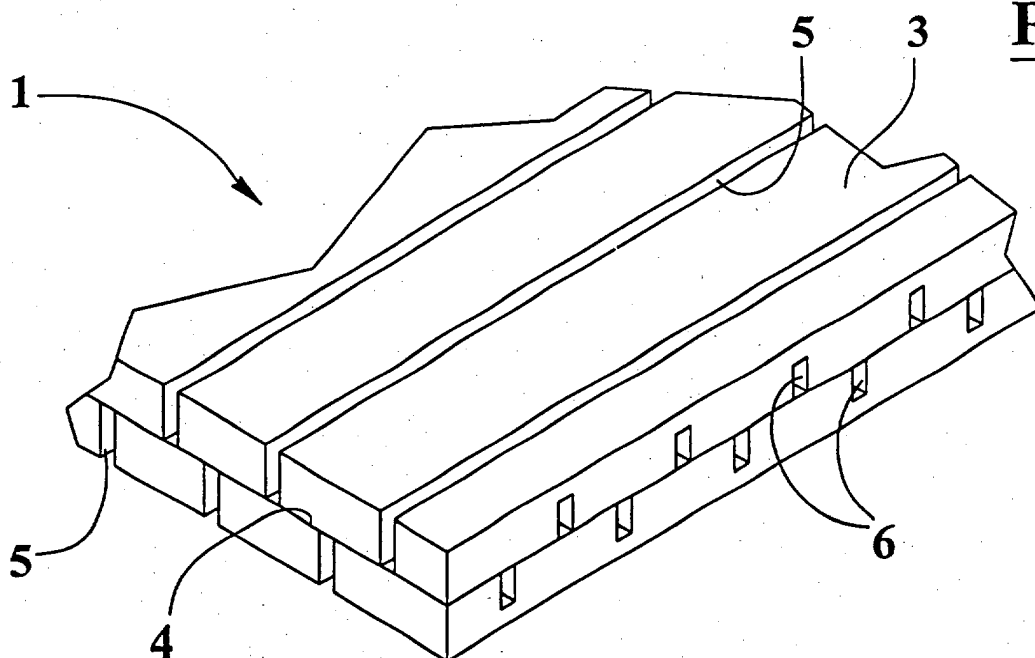


FIG.1

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Description

[0001] The present invention relates to soundproofing materials and particularly it refers to a sound absorbent panel for covering walls, ceilings and floors of rooms and premises and to a manufacturing method of said panel.

[0002] There are known soundproofing elements consisting of sheets of metallic material or asbestos cement or rock or glass wool, used for covering the walls of rooms to be soundproofed, by virtue of the reduced penetration of the sound waves through the material of which said elements are carried out.

[0003] The main drawback of said known elements consists in their weight and encumbrance, due to the high thickness required to achieve a suitable insulation and in the need to cover said elements to confer them an acceptable aesthetical aspect.

[0004] There are also known soundproofing panels made of composite material or wood, a face of which has a plurality of protrusions and/or a network of cavities or holes that, increasing the panel surface, cause deadening and absorption of sound waves.

[0005] The main drawback of said known panels consists in that they provide an inadequate sound proofing and insufficient reduction of the echo.

[0006] The drawback of the known panel manufacturing methods consists in that the known elements are very expensive, because of the manufacturing complexity for carrying out protrusion and/or cavities.

[0007] Other drawback of the above-mentioned known elements and panels consists in their stiffness and, thus, in the difficulty and/or impossibility to apply them to curved surface/walls having a complex geometries.

[0008] The main object of the present invention is to propose a sound absorbent panel, and a manufacturing method of said panel, having high soundproofing and echo reduction characteristic, the panel being easy and quick to be built.

[0009] Other object is to propose a flexible sound absorbent panel, which can be adjust to surfaces and/or walls curved or with complex geometries, which has a pleasant superficial aspect and is aesthetically agreeable, and which does not require covers or further decorative treatments.

[0010] The above-mentioned objects are achieved according to the claims' content.

[0011] The characteristics of the present invention are underlined in the following with particular reference to the attached drawings, in which:

- figure 1 show an axonometric partial view of the sound absorbent panel object of the present invention;
- figure 2 shows a front view of figure 1 panel;
- figure 3 shows a axonometric partial schematic view of a variant of figure 1 panel;
- figure 4 shows a front view of figure 3 panel;

- figure 5 shows a side view of figure 3 panel;
- figure 6 shows a front view of a further variant of figure 1 panel.

[0012] With reference to the figures 1 and 2, numeral 1 indicates a sound absorbent panel of the present invention, including two facing plates 2, each of which provided with a plurality of parallel grooves first 5 and seconds 6, respectively carried out in the opposed faces first 3 and second 4 of each plate 2. Particularly, the two plates are mutually fixed, by sticking the respective seconds faces 4.

[0013] The grooves first 5 and second 6 of each plate 2 are partially intersecting, or they are reciprocally interfering, and they carry out through openings 8 in said plate 2 at each intersection. Preferably, the first grooves 5 have a depth equal to the thickness of the corresponding plate 2, while the second grooves 6 have a depth ranging between around a fifth and around four fifths of the thickness of corresponding plate 2. The first 5 and second 6 grooves are almost orthogonal each to other and they have a cross section with rectangular or "V" or "U" or polygonal shape.

[0014] In the preferred embodiment the first grooves 5 of a plate 2 are off-set with respect to the first grooves 5 of the remaining plate 2. The grooves 5, 6 of a plate 2 can form with the corresponding grooves 5, 6 of the other plate 2 an angle ranging approximately between 0° and 90°. The two plates 2 are made of wood or its by-products and it is provided that at least the first face 3 of each plate 2 is covered with a sheet of faced material, or is lacquered or painted.

[0015] The figures 3, 4 and 5 show a variant of the sound absorbent panel 1 including a layer 7 of flexible material, interposed between the two plates 2 and fixed thereto through bonding agent.

[0016] The flexible material is constituted by fabric or nonwoven fabric or a plate made of rubbery or spongy material, or a lead sheet or an high density sheet.

[0017] It is provided that in this variant of panel 1, the first grooves 5 of a plate 2 fit together with the first grooves 5 of the remaining plate 2, in such a way to confer to panel 1 flexibility and therefore the capacity to be bent and adapted for an application on curved or shaped surfaces. In such variant the first grooves 5 have preferably a "V" cross-section.

[0018] The figure 6 shows a further variant of the sound absorbent panel constituted by three superimposed plates 2 having off-set grooves 5, 6.

[0019] The manufacturing method of a sound absorbent panel 1 provides:

- to carry out a plurality of second grooves 6 on a second face 4 of two plates 2;
- to superimpose and to join together by sticking the second faces 4 of the two plates;
- to carry out a plurality of first grooves 5 on a first face 3 of each plate 2.

[0020] The method further provides to carry out first grooves 5 of each plate 2 having a depth equal to the thickness of said plate 2 and positioned almost orthogonal with respect to the second grooves 6.

[0021] It is important to underline that the manufacturing method allows carrying out the grooves 5, 6 of each plate 2 in such a way to form an angle included between 0° and 90° with the corresponding grooves 5, 6 of the other plate 2.

[0022] The manufacturing method further provides to joint together the two plates 2 by means of a layer of flexible material 7 and to fix said layer of flexible material 7 to the two plates 2 by sticking. The first grooves 5 of a plate 2 are carried out facing the first grooves 5 of the other plate 2 in order to give flexibility to the panel 1.

[0023] The main advantage of the present invention is to provide a sound absorbent panel and a related manufacturing method having high sound absorbing characteristics and echo reduction, and easy and quick to be built.

[0024] Other advantage is to provide a flexible sound absorbent panel, which can be adjust to surfaces and/or walls curved or with complex geometries, which has a pleasant superficial aspect and is aesthetically agreeable, and which does not require covers or further decorative treatments

Claims

1. Sound absorbent panel **characterized in that** includes at least two facing plates (2), each of which provided with a plurality of parallel grooves first (5) and second (6), carried out on opposite faces respectively first (3) and second (4) of each plate (2).
2. Panel according to claim 1 **characterized in that** the second faces (4) of the two plates (2) are mutually fixed.
3. Panel according to claim 1 **characterized in that** includes at least a layer (7) of flexible material interposed between the plates (2).
4. Panel according to claim 1 **characterized in that** the grooves first (5) and second (6) of each plate (2) are partially intersected, carrying out, at each intersection, a corresponding through opening (8) on said plate (2).
5. Panel according to claim 1 **characterized in that** the grooves first (5) and second (6) of each plate (2) are almost orthogonal each to the other.
6. Panel according to claim 1 **characterized in that** each groove (5, 6) has a cross section with rectangular or "V" or "U" or polygonal shape.
7. Panel according to claim 1 **characterized in that** the first grooves (5) have depth equal to the thickness of the corresponding plate (2).
8. Panel according to claim 1 **characterized in that** the second grooves (6) have depth ranging between a fifth and four fifths of the thickness of the corresponding plate (2).
9. Panel according to claim 1 **characterized in that** the first grooves (5) of a plate (2) are off-set with respect to the first grooves (5) of the other plate (2).
10. Panel according to claim 3 **characterized in that** the first grooves (5) of a plate (2) are facing the first grooves (5) of the other plate (2).
11. Panel according to claim 1 **characterized in that** the grooves (5, 6) of a plate (2) form with the corresponding grooves (5, 6) of the other plate (2) an angle ranging between around 0° and around 90°.
12. Panel according to claim 3 **characterized in that** the layer (7) of flexible material is made of fabric, nonwoven fabric, plate of rubbery or spongy material, lead or similar.
13. Panel according to claim 1 or claim 3 **characterized in that** the at least two plates (2) are fixed at least by bonding agent.
14. Panel according to claim 1 **characterized in that** each plate (2) is made of wood or its by-products.
15. Panel according to claim 1 **characterized in that** at least an external face (3) of a plate (2) is covered with a sheet of faced material, or is lacquered or painted.
16. Manufacturing method of a sound absorbent panel (1) **characterized in that** provides:
 - to carry out a plurality of seconds grooves (6) on a second face (4) of two plates (2);
 - to superimpose and to join together by sticking the second faces 4 of the two plates;
 - to carry out a plurality of first grooves 5 on a first face 3 of each plate 2.
17. Manufacturing method according to claim 16 **characterized in that** provides:
 - to joint together the two plates (2) by means of at least a layer of flexible material (7);
 - to fix said layer of flexible material (7) to the two plates (2) by sticking.
18. Manufacturing method according to claim 16 **char-**

acterized in that provides to carry out first grooves (5) of each plate (2) having depth equal to the thickness of said plate (2).

19. Manufacturing method according to claim 16 **characterized in that** provides to carry out the grooves first (5) and second (6) of each plate (2) almost orthogonal each to other. 5
20. Manufacturing method according to claim 16 **characterized in that** provides to carry out the grooves (5, 6) of plate (2) to form an angle ranging between 0° and 90° with the corresponding grooves (5, 6) of the other plate (2). 10
21. Manufacturing method according to claim 17 **characterized in that** provides to carry out the first grooves (5) of a plate (2) facing the grooves (5) of the other plate (2). 15

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