(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 223 953 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.08.2023 Bulletin 2023/32

(21) Application number: **23154174.9**

(22) Date of filing: **31.01.2023**

(51) International Patent Classification (IPC):
E04B 1/86 *(2006.01)* *E04B 1/84* *(2006.01)*
E04B 1/82 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
E04B 1/86; E04B 1/8218; E04B 2001/8452

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **04.02.2022 IT 202200002012**

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(54) SOUND-ABSORBING PANEL FOR SOUNDPROOF CABIN

(57) A sound-absorbing panel (1) is described comprising a first layer (4) of sound-absorbing material, a second layer (5) of sound-absorbing material, and an integrated frame (6) supporting the first layer (4) of sound-absorbing material and the second layer (5) of sound-absorbing material; the first layer (4) of sound-absorbing material has a first front surface (7) apt to be directly exposed to an acoustic source for being struck by sound waves (3) without the interposition of grated elements or other parts, a first rear surface (8) opposite the first front surface (7), and a first lateral surface (10) delimited between the first front surface (7) and the first rear surface (8); the second layer (5) of sound-absorbing material has a second front surface (11) facing towards said first rear surface (8) and separated from the external environment by means of the first layer (4) of sound-absorbing material, a second rear surface (12) opposite the second front surface (11), and a second lateral surface (13) delimited between the second front surface (11) and the second rear surface (12); the frame (6) comprises: a support profile (14) laterally surrounding at least part of the first layer (4) of sound-absorbing material and of the second layer (5) of sound-absorbing material and having an abutment wall (15) for said first lateral surface (10) and second lateral surface (13) and a flange (16) projecting from the abutment wall (15); a protective sheet (17) resting against the flange (16) of the support profile (14) and defining, in turn, an abutment element for said second rear surface (12), so that the second layer (5) of sound-absorbing material is interposed between the first layer (4) of sound-absorbing material and the protective sheet (17) itself; and at least one containment bracket (18) having a fixing portion (18a) fixed to the support profile (14) and a containment portion (18b) cooperating with the first layer (4) of sound-absorbing material at said first front surface (7); the sound-absorbing material of the first layer (4) is made of natural or artificial resin-bonded fibres; the first layer (4) of sound-absorbing material and the second layer (5) of sound-absorbing material are releasably interposed and fitted between said containment portion (18b) and the protective sheet (17); the panel (1) further comprises a layer of anti-vibration material (19) interposed between the frame (6) and said first layer (4) of sound-absorbing material and second layer (5) of sound-absorbing material.

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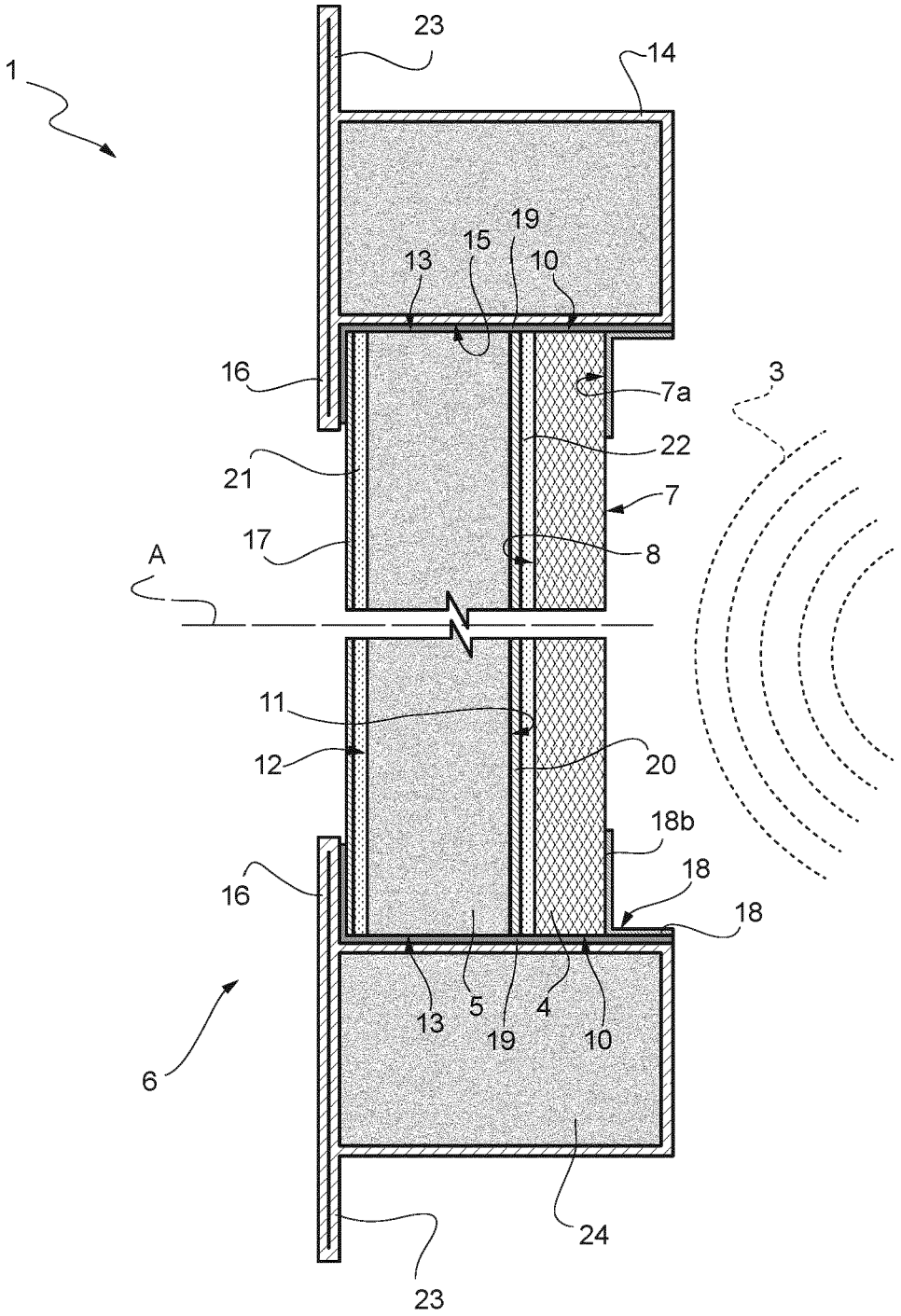
FIG. 2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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority from Italian Patent Application no. 102022000002012 filed on February 4, 2022, the entire disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The present invention relates to a sound-absorbing panel, in particular a sound-absorbing panel for use in acoustic barriers, such as soundproof cabins, preferably intended to be arranged in internal environments such as for example production areas, clean rooms, test laboratories, or the like, for the purpose of shielding or damping sound waves emitted by machinery arranged inside the cabin itself or for the purpose of soundproofing the interior of the cabin.

STATE OF THE ART

[0003] Sound-absorbing panels are known to include one or more layers of rock wool as a sound-absorbing material.

[0004] Although the excellent sound insulation properties provided by rock wool are well known, it is also known that this material suffers relatively rapid deterioration and degradation when exposed to weathering or under adverse operating conditions, such as high humidity.

[0005] In order to limit the above deterioration, it is known to cover the rock wool layer with two sheets, usually made of metal.

[0006] For example, this measure is widely used in the case of acoustic barriers for machinery intended to be arranged in an environment with adverse operating conditions, such as the external environment or an internal environment with high humidity. These acoustic barriers are made up of a series of panels of the type mentioned above, which are exposed to weathering or high humidity.

[0007] More precisely, a panel of the type mentioned above includes:

- a first front sheet fixed to the surface of the sound-absorbing material suitable to be directly exposed to the sound source, i.e., directly struck or hit by the sound waves; and
- a second rear sheet fixed to the opposite surface of the sound-absorbing material.

[0008] In practice, the front sheet faces the machine to be acoustically insulated and the rear sheet faces the opposite side.

[0009] Typically, each sheet is glued or nailed or riveted to the rock wool at its respective surface.

[0010] Conveniently, the front sheet is perforated, for example with a 35% void-to-full ratio, in order to allow the sound waves to strike the rock wool with the interposition of the front sheet itself.

[0011] In practice, the front sheet defines a grated element to protect the sound-absorbing layer. In fact, the grated element limits the deterioration of the rock wool.

[0012] This increases the service life of the sound-absorbing material.

[0013] However, the Applicant observed a significant decrease in the soundproofing properties of the panel thus made, precisely because of the presence of the perforated sheet.

[0014] In order to increase these soundproofing properties, there is a tendency to increase the thickness of the layers of the panel, resulting in increased encumbrance and cost.

[0015] In addition, since this sheet is glued or nailed or riveted to the rock wool, the maintenance of the panel, i.e., the replacement of this sound-absorbing layer, is somewhat difficult.

[0016] The Applicant also noted that the glue or the fixing means, such as nails or rivets, reduce the sound insulation properties of the panel.

OBJECT AND SUMMARY OF THE INVENTION

[0017] The object of the present invention is to provide a sound-absorbing panel, which is highly reliable and cost-effective, and allows at least some of the above-mentioned drawbacks related to sound-absorbing panels of the known type to be obviated.

[0018] According to the invention, this object is achieved by means of a sound-absorbing panel as claimed in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] For a better understanding of the present invention, some preferred non-limiting embodiments thereof are described below purely by way of example and with the aid of the accompanying drawings, wherein:

- Figure 1 is a schematic perspective view, with parts removed for clarity, of an acoustic barrier, in particular a soundproof cabin, comprising a plurality of sound-absorbing panels made according to the present invention; and
- Figure 2 illustrates, in enlarged scale and with parts removed for clarity, one of the sound-absorbing panels in Figure 1 in a sectional side view.

DETAILED DESCRIPTION

[0020] With reference to the accompanying drawings, the reference numeral 1 indicates, as a whole, a sound-absorbing panel, in particular a sound-absorbing panel 1 for use in acoustic barriers preferably intended to be arranged in internal environments such as for example production areas, clean rooms, test laboratories, or the

like, for the purpose of shielding or damping sound waves emitted by machinery arranged inside the cabin itself or for the purpose of soundproofing the interior of the cabin.

[0021] In particular, the present description will make explicit reference, without thereby losing generality, to an acoustic barrier shaped so as to define a soundproof cabin 2.

[0022] More particularly, as can be seen in Figure 1, the panel 1 is advantageously used for the construction of a soundproof cabin 2 of the modular type, in which each module is precisely defined by a panel 1, due to the peculiar configuration of the panel 1 itself according to the present invention, which will be explained in detail below.

[0023] Preferably, the soundproof cabin 2 is of the type used to shield or absorb or dampen sound waves 3 emitted by machinery (not shown) housed therein.

[0024] Alternatively, the soundproof cabin 2 is of the type used to absorb sound waves coming from the external environment, in order to insulate the internal environment of the cabin 2 itself, so as to acoustically protect people or machinery arranged therein.

[0025] Alternatively, the cabin 2 can be used to shield sound waves 3 coming from any acoustic source, either outside or inside the cabin itself.

[0026] As shown in Figure 1, the soundproof cabin 2 is formed by a plurality of panels 1 of different sizes. In the example described, each panel 1 is substantially rectangular in shape.

[0027] Alternatively, the panels 1 may have the same size and/or any other shape (triangular, circular, polygonal, curved, regular, or irregular) to suit the type of acoustic barrier to be made.

[0028] As can be seen in Figure 2, the sound-absorbing panel 1 according to the present invention comprises a first layer 4 of sound-absorbing material, a second layer 5 of sound-absorbing material and, according to an important aspect of the present invention, an integrated frame 6 supporting the first layer 4 and the second layer 5.

[0029] In detail, the first layer 4 has:

- a first front surface 7 designed to face an acoustic source (not shown, for example, the aforesaid machinery) so as to be struck by sound waves 3 coming from the latter;
- a first rear surface 8 opposite the first front surface 7; and
- a first lateral surface 10 delimited between the first front surface 7 and the first rear surface 8.

[0030] In practice, in this case, the first front surface 7 is designed to face the interior of the soundproof cabin 2, whereas the first rear surface 8 is designed to face the exterior of the soundproof cabin 2.

[0031] Similarly, the second layer 5 has:

- a second front surface 11 facing the first front surface 7 and separated from the interior of the soundproof cabin 2 (or, in any case, from the environment outside the panel 1) by the first layer 4;
- a second rear surface 12 opposite the second front surface 11; and
- a second lateral surface 13 delimited between the second front surface 11 and the second rear surface 12.

[0032] In greater detail, the first layer 4 and the second layer 5 are defined by respective mats of sound-absorbing material rectangular in shape (thin parallelepipeds), which are preferably substantially smooth.

[0033] Alternatively, these layers 4, 5 may have any other shape (triangular, circular, polygonal, curved, regular or irregular) to suit the type of acoustic barrier to be made and/or may include embossing or other surface machining.

[0034] According to an important aspect of the present invention, the frame 6 comprises:

- a support profile 14 laterally surrounding at least part of the first layer 4 and of the second layer 5 and having an abutment wall 15 for the first lateral surface 10 and for the second lateral surface 13, and a flange 16 projecting from the abutment wall 15;
- a protective sheet 17 resting against the flange 16 and defining, in turn, an abutment element for the second rear surface 12, so that the second layer 5 is interposed between the first layer 4 and the protective sheet 17 itself;
- at least one containment bracket 18 having a fixing portion 18a fixed to the profile 14 and a containment portion 18b cooperating with the first layer 4 at said first front surface 7.

[0035] Advantageously, the bracket 18 has an L-shaped profile, so that the fixing portion 18a defines a first wing of the L-shaped profile and the containment portion 18b defines a second wing of the L-shaped profile which cooperates exclusively with a peripheral portion 7a of the first front surface 7 to push the first layer 4 against the second layer 5 and against the protective sheet 17.

[0036] In this way, the bracket 18 keeps the first layer 4 in place without constituting an obstacle for the sound waves 3, which can strike the first front surface 7 directly, without the interposition of parts.

[0037] Conveniently, the bracket 18 is fixed to the profile 14 by threaded members (known per se and not shown) .

[0038] In the light of the above, the first layer 4 and the second layer 5 are arranged so that:

- the respective first and second lateral surfaces 10, 13 are arranged in abutment against the abutment wall 15;
- the second rear surface 12 is arranged in abutment against the protective sheet 17; and

- the containment portion 18b of the bracket 18 is arranged in abutment against the first front surface 7, or vice versa.

[0039] Therefore, according to the invention, the first layer 4 and the second layer 5 are releasably interposed and fitted between the containment portion 18b and the protective sheet 17.

[0040] In other words, the first layer 4 and the second layer 5 are simply "rested″ on each other under pressure, between the containment portion 18b and the protective sheet 17, which in turn is simply rested against the flange 16.

[0041] In greater detail, identifying an axis A of the panel 1 as illustrated in Figure 2, the second layer 5 is axially interposed between the protective sheet 1 and the first layer 4. In addition, the first layer 4 and the second layer 5 are axially interposed between the protective sheet 17 and the containment portion 18b of the bracket 18.

[0042] In other words, the first layer 4, the second layer 5, and the protective sheet 17 are "floating" and are either press-held or interlocked between the frame 6 (or rather, the flange 16) and the bracket 18 (or rather, the containment portion 18b).

[0043] According to one aspect of the present invention, the sound-absorbing material of the first layer 4 is made of natural or artificial resin-bonded fibres, and therefore different from rock wool.

[0044] Consequently, the first front surface 7 is designed to be directly exposed to the aforesaid acoustic source so as to be struck by the sound waves 3 directly, without the interposition of grated elements or other parts.

[0045] According to a further important aspect of the present invention, the panel 1 also includes a layer of anti-vibration material or ″anti-vibration layer″ 19 interposed between the frame 6 and said first layer 4 and second layer 5.

[0046] In particular, the anti-vibration layer 19 is interposed between the abutment wall 15 of the profile 14 and said first and second lateral surfaces 10, 13.

[0047] More precisely, the anti-vibration layer 19 is interposed between the abutment wall 15 of the profile 14 and each lateral surface 10, 13 relative to a direction transversal, in particular orthogonal, to the axis A, as can be seen in Figure 2.

[0048] Preferably, the anti-vibration layer 19 is also interposed (axially) between the flange 16 of the profile 14 and the protective sheet 17.

[0049] Preferably, the anti-vibration layer 19 is also interposed (in relation to the aforesaid direction transversal to the axis A) between the abutment wall 15 and the fixing portion 18a of the bracket 18.

[0050] According to this preferred, non-limiting embodiment, the anti-vibration layer 19 comprises polyethylene, in particular it is polyethylene-based, in particular it consists of polyethylene, preferably polyethylene having a reticular structure.

[0051] Preferably, the sound-absorbing material of the first layer 4 comprises natural resin-bonded fibres or natural fibres immersed in a resin matrix, the natural fibres being made of cotton fibres.

[0052] More preferably, the sound-absorbing material of the first layer 4 is defined by a resin-bonded cotton lint comprising 75% cotton and 25% resin.

[0053] The resin is preferably phenolic or epoxy resin.

[0054] Due to the combined synergistic effect given by the presence of the frame 6 according to the configuration described above, which keeps the first layer 4, the second layer 5, the protective sheet 17, and the anti-vibration layer 19 releasably coupled to each other, by the nature of the sound-absorbing material of the first layer 4 (i.e., of the layer directly exposed to the environment containing the machine to be insulated, i.e., the acoustic source), and by the presence of the anti-vibration layer 19 arranged in accordance with the present invention, it is possible to obtain a sound-absorbing panel 1 with improved sound insulation performance compared to known sound-absorbing panels with the same thickness, which is also easy to mount, maintain and assemble with other panels 1.

[0055] In detail, the Applicant noted that the presence and particular arrangement of the anti-vibration layer 19 allows the vibrations produced by the sound waves 3 to be dampened and gives a particular stiffness to the assembly thus formed, which increases the sound-absorbing performance of the panel 1.

[0056] In greater detail, the Applicant noted, through an extensive experimental campaign, that the peculiar configuration of coupling of the various components (first and second layers 4, 5, protective sheet 17, damping layers 21 and 22, inner sheet 20), which simply rest against each other and are ″pressure″-interlocked with each other thanks to the frame 6, results in a kind of ″elastic vibrational decoupling″ of these components, whereby the transmission of sound waves, in the form of vibrations, between one component and another is highly limited.

[0057] This results, with the same thickness, in a considerable increase in the soundproofing properties of the panel 1.

[0058] Advantageously, the panel 1 further comprises an inner sheet 20 interposed (axially) between the first layer 4 and the second layer 5.

[0059] The inner sheet 20 is preferably floating and made of a metal material, for example aluminium or iron.

[0060] The inner sheet 20 increases the total vibrating mass of the panel 1, with a small thickness. Therefore, its presence gives the panel 1 greater stiffness, while increasing the acoustic performance thereof.

[0061] Conveniently, the inner sheet 20 has two ribs (not shown) intersecting one another at a central point to define a diamond-point camber of the inner sheet 20 itself.

[0062] Preferably, the diamond-point camber is obtained on the surface of the inner sheet 20 facing the

second layer 5.

[0063] The presence of the diamond-point camber allows the stiffness of the inner sheet 20 to be increased, and therefore, the acoustic performance of the panel 1 is further improved.

[0064] Preferably, the panel 1 further comprises:

- a first layer of damping material or first damping layer 21 interposed between the protective sheet 12 and the second layer 5; and
- a second layer of damping material or second damping layer 22 interposed between the inner sheet 20 and the first layer 4.

[0065] Advantageously, each damping layer 21, 22 defines a layer of sound-deadening material, which increases the overall stiffness of the panel 1, thus improving its sound-absorbing performance, and is formed by a polymer-plastic-based bituminized element.

[0066] Preferably, each damping layer 21, 22 has a magnetic powder dispersed in the polymer-plastic base capable of interacting magnetically with the respective protective 17 or inner sheet 20, respectively. Thereby, the adhesion to the respective sheet 17, 20 is improved.

[0067] In an advantageous embodiment, the first layer 4 is covered by a layer of glass fibre (or "VeloGlass"), preferably resin-bonded.

[0068] Alternatively, the first layer 4 is covered by a layer of non-woven polyester fibre.

[0069] The Applicant noted that the soundproofing performance of the first layer 4, as well as the service life thereof, are thereby increased.

[0070] In the example described, the sound-absorbing material of the second layer 5 is based on, preferably consisting of, rock wool or glass wool.

[0071] In this way, it is possible to take advantage of the excellent soundproofing properties of rock wool or glass wool without rapid deterioration of this material, as the second layer 5 is separated from the external environment (in this case, from the interior of the cabin 2) by the first layer 4.

[0072] As can be seen in Figure 2, the profile 14 is defined by a hollow tubular (box-shaped) element laterally surrounding the first layer 4 and the second layer 5.

[0073] Conveniently, this tubular element is filled with a padding 24 of sound-absorbing material, preferably rock wool or glass wool.

[0074] This further increases the sound-absorbing properties of the panel 1, without reducing the service life thereof, as the rock wool is covered and protected.

[0075] As can be seen in Figure 1, in particular, the profile 14 defines a perimetral edge element of the panel itself 1, against which the first lateral surface 10 and the second lateral surface 13 are arranged in abutment, with the interposition of the anti-vibration layer 19.

[0076] This perimetral edge element, i.e., the tubular element defined by the profile 14, is advantageously configured to be releasably fixed to the perimetral edge element of another panel 1 of the acoustic barrier, in the illustrated case of the cabin 2.

[0077] For this purpose, the profile 14 comprises an additional flange 23 projecting from the profile 14 itself in the opposite direction with respect to the flange 16 and is configured to be fixed to a supporting structure (not shown) of the cabin 2. In light of the above, the cabin 2 defines a modular acoustic barrier, in which each module is defined by one said panel 1.

[0078] In this way, the process of assembling an acoustic barrier, for example of the soundproof cabin 2, is particularly simplified, thanks to the peculiar configuration of the integrated frame 6 of each panel 1.

[0079] The advantages enabled by the panel 1 manufactured according to the present invention will be apparent from an examination of the features thereof.

[0080] In particular, due to the combined synergistic effect given by the presence of the frame 6 according to the configuration described above, which keeps the first layer 4, the second layer 5, the protective sheet 17, and the anti-vibration layer 19 releasably coupled to each other, by the nature of the sound-absorbing material of the first layer 4 (i.e., of the layer directly exposed to the environment containing the machine to be insulated, i.e., the acoustic source), and by the presence of the anti-vibration layer 19 arranged in accordance with the present invention, it is possible to obtain a sound-absorbing panel 1 with improved sound insulation performance compared to known sound-absorbing panels with the same thickness, which is also easy to mount, maintain and assemble with other panels 1.

[0081] In detail, the Applicant noted that the presence and particular arrangement of the anti-vibration layer 19 allows the vibrations produced by the sound waves 3 to be dampened and gives a particular stiffness to the assembly thus formed, which increases the sound-absorbing performance of the panel 1.

[0082] In greater detail, the Applicant noted, through an extensive experimental campaign, that the peculiar configuration of coupling of the various components, which simply rest against each other and are "pressure"-interlocked with each other thanks to the frame 6, results in a kind of "elastic vibrational decoupling" of these components, whereby the transmission of sound waves, in the form of vibrations, between one component and another is highly limited.

[0083] This results, with the same thickness, in a considerable increase in the soundproofing properties of the panel 1.

[0084] Furthermore, due to the peculiar nature of the sound-absorbing material of the first layer 4, which increases the service life thereof, maintenance will be less needed and, in any case, maintenance operations will be easier: it shall suffice to disassemble the bracket 18, thus releasing the first layer 4 and the second layer 5, and replace one or both.

[0085] The absence of rigid couplings between the frame 6 and the layers 4, 5 of sound-absorbing material,

as in the case of the known panels made of rock wool covered with a glued or nailed or riveted sheet, also facilitates a reuse of the frame 6.

[0086] The presence of the anti-vibration material 19 arranged in the peculiar position according to the invention allows the sound-absorbing performance of the panel 1 to be enhanced compared to the known panels.

[0087] In addition, the absence of glue or fixing means further increases the sound insulation properties of the panel 1 according to the invention.

[0088] Lastly, the presence of the flange 23 enables a certain modularity of the panel 1 according to the invention.

[0089] It is clear that modifications and variations can be made to the panel 1 described and illustrated herein without thereby departing from the scope of protection defined by the claims.

Claims

1. - A sound-absorbing panel (1) comprising a first layer (4) of sound-absorbing material, a second layer (5) of sound-absorbing material, and an integrated frame (6) supporting the first layer (4) of sound-absorbing material and the second layer (5) of sound-absorbing material;

the first layer (4) of sound-absorbing material having a first front surface (7) apt to be directly exposed to an acoustic source for being struck by sound waves (3) without the interposition of grated elements or other parts, a first rear surface (8) opposite the first front surface (7), and a first lateral surface (10) delimited between the first front surface (7) and the first rear surface (8); the second layer (5) of sound-absorbing material having a second front surface (11) facing towards said first rear surface (8) and separated from the external environment by means of the first layer (4) of sound-absorbing material, a second rear surface (12) opposite the second front surface (11), and a second lateral surface (13) delimited between the second front surface (11) and the second rear surface (12);
wherein the frame (6) includes:

- a support profile (14) laterally surrounding at least part of the first layer (4) of sound-absorbing material and of the second layer (5) of sound-absorbing material and having an abutment wall (15) for said first lateral surface (10) and second lateral surface (13) and a flange (16) projecting from the abutment wall (15);
- a protective sheet (17) resting against the flange (16) of the support profile (14) and defining, in turn, an abutment element for said second rear surface (12), so that the second layer (5) of sound-absorbing material is interposed between the first layer (4) of sound-absorbing material and the protective sheet (17) itself; and
- at least one containment bracket (18) having a fixing portion (18a) fixed to the support profile (14) and a containment portion (18b) cooperating with the first layer (4) of sound-absorbing material at said first front surface (7);

wherein the sound-absorbing material of the first layer (4) is made of natural or artificial resin-bonded fibres;
wherein the first layer (4) of sound-absorbing material and the second layer (5) of sound-absorbing material are releasably interposed and fitted between said containment portion (18b) and the protective sheet (17) ;
and wherein the panel (1) further comprises a layer of anti-vibration material (19) interposed between the frame (6) and said first layer (4) of sound-absorbing material and second layer (5) of sound-absorbing material.

2. - The sound-absorbing panel as claimed in claim 1, wherein said layer of anti-vibration material (19) is interposed between the abutment wall (15) of the support profile (14) and said first lateral surface (10) and second lateral surface (13).

3. - The sound-absorbing panel as claimed in claim 2, wherein said layer of anti-vibration material (19) is further interposed between the flange (16) of the support profile (14) and said protective sheet (17); and/or wherein said layer of anti-vibration material (19) is further interposed between the abutment wall (15) of the support profile (14) and the fixing portion (18a) of the containment bracket (18).

4. - The sound-absorbing panel as claimed in any one of the preceding claims, wherein the layer of anti-vibration material (19) comprises polyethylene, in particular it consists of polyethylene, preferably polyethylene having a reticular structure.

5. - The sound-absorbing panel as claimed in any one of the preceding claims, wherein the containment bracket (18) has an L-shaped profile, said fixing portion (18a) defining a first wing of the L-shaped profile and said containment portion (18b) defining a second wing of the L-shaped profile configured to cooperate exclusively with a peripheral portion (7a) of said first front surface (7) to push the first layer (4) of sound-absorbing material against the second layer (5) of sound-absorbing material and against the protective sheet (17).

6. -The sound-absorbing panel as claimed in any one of the preceding claims, and comprising an inner sheet (20) interposed between the first layer (4) of sound-absorbing material and the second layer (5) of sound-absorbing material;
wherein the inner sheet (20) has two ribs intersecting one another at a central point to define a diamond-point camber of the inner sheet (20) itself.

7. - The sound-absorbing panel as claimed in claim 6, and comprising:

- a first layer of damping material (21) interposed between said protective sheet (17) and the second layer (5) of sound-absorbing material; and
- a second layer of damping material (22) interposed between said inner sheet (20) and the first layer (4) of sound-absorbing material;

wherein each layer of damping material (21, 22) defines a layer of sound-deadening material and is formed by a polymer-plastic-based bituminized element, preferably with a magnetic powder dispersed in the polymer-plastic base configured for interacting magnetically with said protective sheet (17) and inner sheet (20), respectively.

8. - The sound-absorbing panel as claimed in any one of the preceding claims, wherein:

- the sound-absorbing material of the first layer (4) comprises natural resin-bonded fibres or natural fibres immersed in a resin matrix, said natural fibres being made of cotton fibres; and/or
- the first layer (4) of sound-absorbing material is covered with a further layer of glass fibre, preferably resin-bonded or with a further layer of non-woven polyester fibre; and/or
- the second layer (5) of sound-absorbing material is made of rock wool or glass wool.

9. - The sound-absorbing panel as claimed in any one of the preceding claims, wherein the support profile (14) is defined by a hollow tubular element laterally surrounding the first layer (4) of sound-absorbing material and the second layer (5) of sound-absorbing material;
and wherein said tubular element is filled with sound-absorbing material (24), preferably rock wool or glass wool.

10. - The sound-absorbing panel as claimed in any one of the preceding claims, wherein said support profile (14) laterally surrounds the first layer (4) of sound-absorbing material and the second layer (5) of sound-absorbing material to define a perimetral edge element of the sound-absorbing panel (1) itself, against which the first lateral surface (10) and the second lateral surface (13) are arranged in abutment, with the interposition of the layer of anti-vibration material (19) ;
the support profile (14) comprising a further flange (23), extending in the opposite direction with respect to said flange (16) and configured to be releasably coupled to a supporting structure of an acoustic barrier (2) for defining a modular acoustic barrier (2), wherein each module is defined by one said sound-absorbing panel (1).

FIG. 1

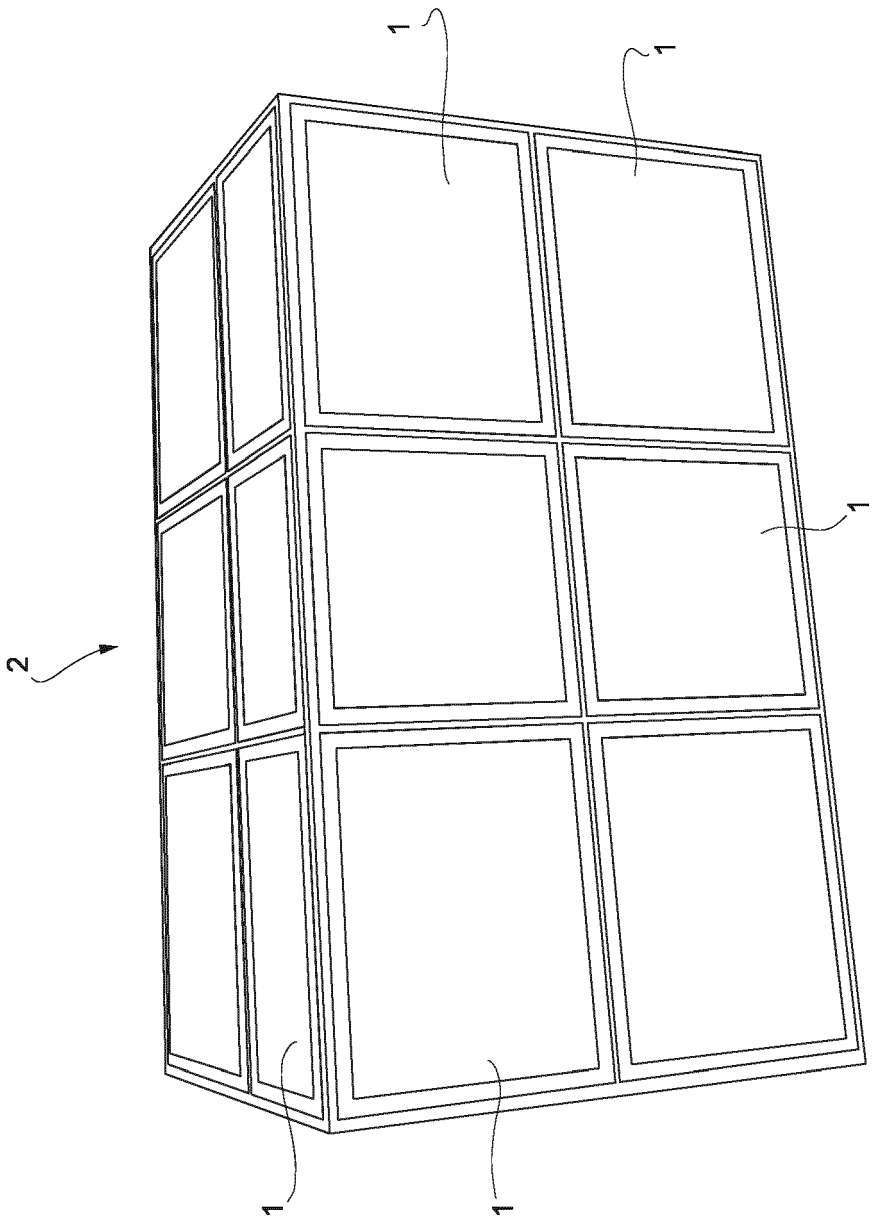
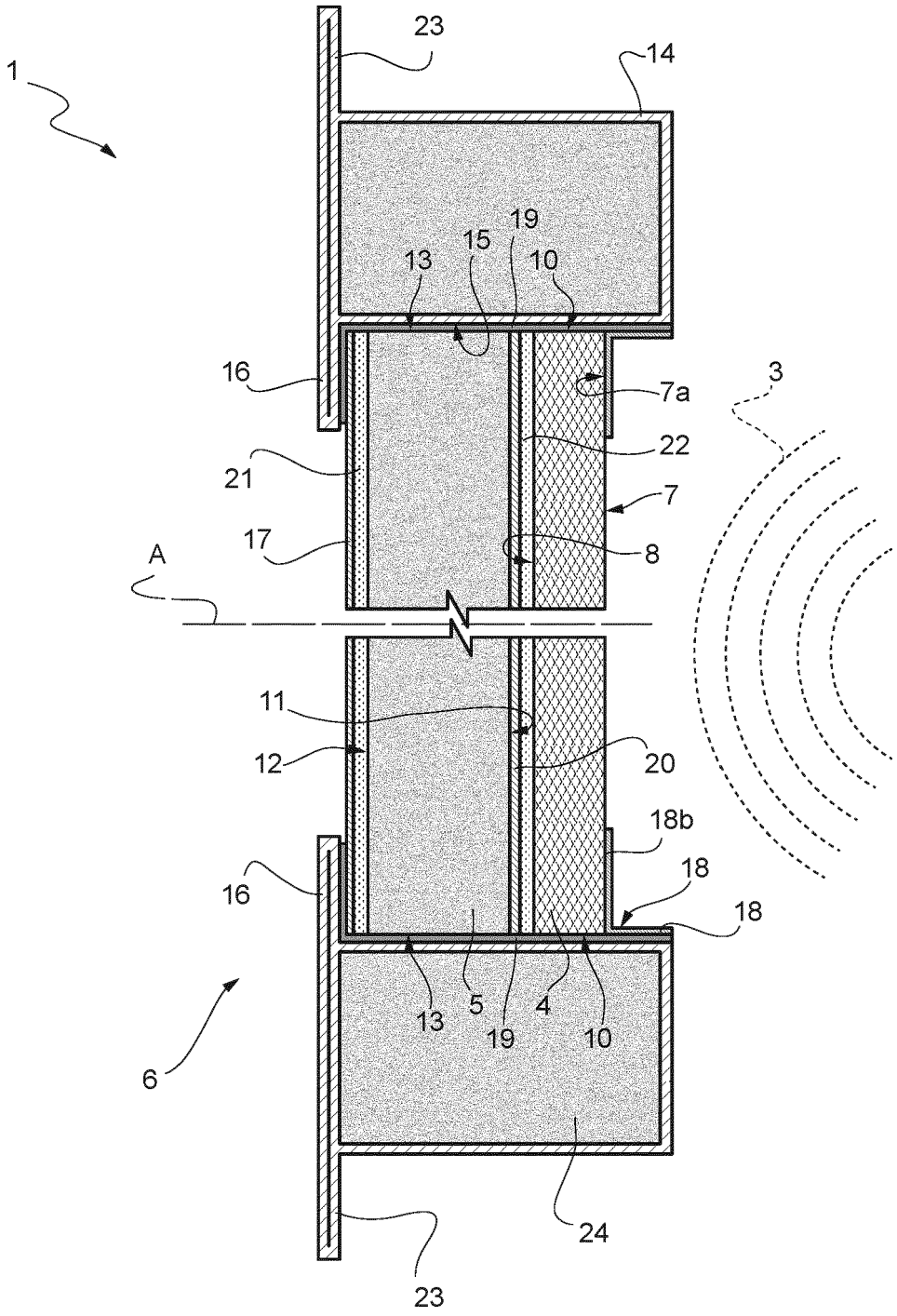


FIG. 2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EUROPEAN SEARCH REPORT

Application Number
EP 23 15 4174

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 10 2012 219222 A1 (SILENCERES GMBH [DE]) 24 April 2014 (2014-04-24) * paragraph [0032] - paragraph [0051]; figures 1, 2a, 3 * -----	1-10	INV. E04B1/86 ADD. E04B1/84 E04B1/82

TECHNICAL FIELDS SEARCHED (IPC)

E04B
G10K
H02K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 May 2023	Galanti, Flavio

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24-05-2023

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DE 102012219222 A1	24-04-2014	NONE	

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