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(54) **FIRE RETARDING AND ACOUSTIC BUILDING PANEL AND FIRE RETARDING AND ACOUSTIC BUILDING PANEL SYSTEM**

(57) The present invention relates to a fire retarding and acoustic building panel and a panel system for use as a cladding panel to cover at least a part of an existing building surface, such as an inner wall surface or a ceiling surface. The building panel comprises a number of elongated panel elements having a first elongated panel part and a second elongated panel part where the second elongated panel part extends parallel to the first elongated panel part and in a longitudinal direction and extending a predetermined distance from an inner surface of the first elongated panel part. The building panel further comprises a number of elongated insulation elements of sound absorbing and fire retarding material which are arranged in parallel between the second elongated panel parts of two neighboring panel elements. The surface of the elongated insulation element comprises a fire retardant sound cloth.

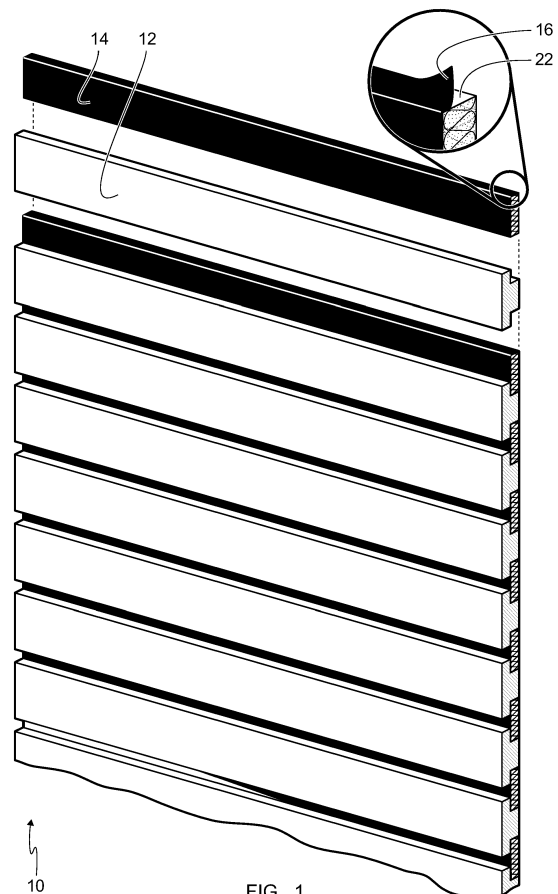


FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to a fire retarding and acoustic building panel, and a fire retarding and acoustic building panel system.

[0002] The Fire retarding and acoustic building panel according to the present invention provides a building structure with approved fire retarding as well as sound enhancing properties, which is flexible and can be adapted to various building construction surfaces.

BACKGROUND OF THE INVENTION

[0003] When constructing buildings, both for private and commercial use, it is known to construct the walls and ceilings of a building with fire retarding and sound enhancing properties, both when erecting the building and in a retrofitting process.

[0004] One example of prior art systems is disclosed in EP 2335916 B1. The referred document discloses an acoustic panel, which is constructed as a laminate and comprises a plurality of openings in contact with an intermediate space comprising a sound absorbing material. This acoustic panel is however premanufactured, time consuming to produce, and leaves the installation process with very limited degrees of variation, and further provides for limited fire protection.

[0005] Other ceiling/wall systems disclose acoustic panels in which wooden laths are attached to a mounting panel prior to installing the panel to the wall or ceiling, where the laths are fastened to the panels by screws extending from the back of the panel, through the panel and into the laths.

[0006] The above-mentioned systems are time consuming to construct and install, and therefore costly in terms of labour.

[0007] It is an object of the invention to provide a fire retardant and acoustic building panel, which is suitable for being mounted to a ceiling/wall surface, where the building panel is easy to mount, provides enhanced fire retarding properties, and creates a surface having visual and sound improving properties.

[0008] The above object and advantages, together with numerous other objects and advantages, which will be evident from the following description of the present invention, are according to a first aspect of the present invention obtained by:

A fire retarding and acoustic building panel for use as a cladding panel to cover at least a part of an existing building surface, such as an inner wall surface or a ceiling surface of a room, hereby enhancing the fire retarding and acoustic properties of the wall or ceiling, the building panel comprising:

a first main surface, defining an exterior surface for facing an interior of the room, and

a second main surface, defining an interior surface for facing the inner wall surface or the ceiling surface, and for defining a contact surface between the building panel and the inner wall surface or the ceiling surface, the building panel further comprising:

a first number of elongated panel elements having a first elongated panel part and a second elongated panel part, the first elongated panel part having an outer surface defining a part of the first main surface, and an inner surface facing the second main surface, the second elongated panel part extending parallel to the first elongated panel part and in a longitudinal direction and extending a predetermined distance from the inner surface of the first elongated panel part;

a second number of elongated insulation elements of sound absorbing and fire retarding material having an outer surface defining part of the first main surface, an inner surface facing the second main surface, and two side surfaces extending between the inner and outer surfaces of the insulation elements, the second number of elongated insulation elements being arranged between the second elongated panel parts of two neighboring panel elements such that the first number of elongated panel elements and the second number of elongated insulation elements are arranged in a parallel relationship and the first elongated panel part and the second number of elongated insulation elements partly overlap each other.

[0009] The fire retarding and acoustic building panel, which in the following description also will be referred to as "building panel", is in a preferred embodiment used in a retrofitting process, where fire retardant properties, also called flammability, and acoustic performance of a wall and/or ceiling need to be enhanced.

[0010] The elongated panel elements are in a preferred embodiment manufactured from a fire retardant wooden based material, such as a wood veneer, more specific a plywood material impregnated with a fire retardant substance. Such impregnation can be performed under both vacuum or pressure and in vacuum or pressure chambers, where the fire retardant substance is forced into the cell structure of the wooden material and not just coating the surface thereof. Hereby the best results in withstanding fire and extremely high temperatures are achieved. Other types of used wooden based materials may be Medium-density fiberboard (MDF) impregnated in the same fashion.

[0011] The elongated insulation elements are preferably manufactured from stone wool, and may form stable stone wool, but may in an alternative be expanded polystyrene, fire retardant impregnated paper wool or perlite covered with a sound cloth.

[0012] The second elongated panel part of the elongated panel elements may be arranged with any desired depth dimension, such that the building panel provides for a thicker dimension of the elongated insulation ele-

ment.

[0013] According to a further embodiment of the first aspect of the invention, the second number of elongated insulation elements comprises a fire retardant sound cloth on the outer surface and arranged between the elongated insulation elements and the inner surface of the first elongated panel part.

[0014] The insulation elements are in a preferred embodiment covered with a fire impregnated sound cloth.

[0015] Flammability standards for sound cloths are a matter of preventing fires and saving lives. Unfortunately, there is no single international flammability standard and instead a range of different standards, regulations and test methods are in force internationally.

[0016] The fire retarding and acoustic building panels according to the present invention meet the international flammability standards and are submitted to a range of test methods which cover the most important international flammability standards, including: European EN 13501-1E, German DIN 4102 - B1, French M1 NF P 92-503-507, Austrian ÖNORM A3800-1 and B 3825, Italian Class Uno - UNI 9175 Class 1.IM, British BS 5852, and USA - CA TB 117-2013.

[0017] The type of sound cloth used may be one ordinarily known to the skilled person and impregnated with a fire retardant, such as the one produced under the trademark "Burnblock". Other types of flame retardant substances may be used.

[0018] According to a further embodiment of the first aspect of the invention, the second number of elongated insulation elements comprises a sound cloth on the two side surfaces and arranged between the second number of elongated insulation elements and the second elongated panel parts.

[0019] Besides arranging the sound cloth on the outer surface of the insulation elements, the sound cloth is preferably also arranged covering the side surfaces of the insulation elements. Hereby, the sound cloth is arranged between the insulation elements and the second elongated panel parts of the neighboring elongated panel elements, which enhances the overall fire retardant properties of the building panel and further secures the sound cloth in place.

[0020] According to a further embodiment of the first aspect of the invention, the sound cloth is a continuous sheet of sound cloth, extending between the second number of elongated insulation elements and the first and second elongated panel parts and further extending between the individual elongated insulation elements, such that the sound cloth further covers the second elongated panel parts and an inner surface thereof, where the inner surface faces the second main surface.

[0021] This has the technical effect that the fire retarding properties of the building panel is further enhanced; but arranging the sound cloth between the elongated panel elements and the insulation elements has also proven to be especially suitable for damping vibrations between the individual elements.

[0022] According to a further embodiment of the first aspect of the invention, the sound cloth is adhesively connected to the first number of elongated panel elements and/or the second number of elongated insulation elements.

[0023] In order to arrange the sound cloth onto the insulation elements, and in an alternative embodiment to both the insulation elements and the elongated panel elements, the sound cloth is applied with a fire retardant adhesive material.

[0024] According to a further embodiment of the first aspect of the invention, the building panel further comprising a longitudinal backing panel arranged on the inner surface of the first number of elongated panel elements and the second number of elongated insulation elements, the backing panel defining part of the second main surface and having a longitudinal centerline which extends approximately perpendicular to longitudinal center lines of the first number of elongated panel elements and the second number of elongated insulation elements.

[0025] The building panel comprises a backing panel arranged on the inner surface of the elongated panel elements and insulation elements. The backing panels are preferably connected to the elongated panel elements via suitable fastening means, such as screws, nails, adhesives, etc., which arranges the insulation elements in a mechanical locked engagement between the elongated panel elements and the backing panels. In the situation where the sound cloth is non-continuous, this embodiment provides the possibility of interchanging the insulation elements simply by pulling them out in a longitudinal direction thereof. This has the technical effect that the insulation material can be changed and the fire retardant and acoustic performance of the building panel can be adopted to various needs. Further, as the sound cloth comes in a variety of colors, the visual appearance of the entire building panel can be changed accordingly.

[0026] According to a second aspect of the present invention, the above objects and advantages are obtained by:

A fire retarding and acoustic building panel system comprising a number of fire retarding and acoustic building panels.

[0027] The building panels in the above defined panel system comprise in a preferred embodiment four side edges, where a first edge comprises a projection, defined by part of the outermost arranged elongated insulation element, and the opposite side edge of the panels is arranged with a groove, defined by a spacing between the opposite and outer most arranged elongated panel element and the backing panel. Hereby, the defined panel system can be easily assembled, and as building panels may comprise a different number of elongated panel elements and elongated insulation elements, hereby providing the building panels in various sizes, the panel system can be adopted to a specific dimension of a wall or ceiling, on which the panel system is to be arranged.

Fig. 1 is a perspective and partly exploded view of the fire retarding and acoustic building panel.

Fig. 2 is a cross-sectional view of a fire retarding building panel system.

[0028] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. The invention may, however, be embodied in different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like reference numerals refer to like elements throughout. Like elements will thus not be described in detail with respect to the description of each figure.

[0029] Fig. 1 is a perspective and partly exploded view of the fire retarding and acoustic building panel 10. The building panel 10 is constructed from a number of elongated panel elements 12, preferably made from impregnated plywood, and a number of insulation elements 14 fabricated from a fire retardant material such as form stable stone wool. The elongated panel elements 12 and elongated insulation elements 14 are arranged in a parallel and overlapping relationship, and the elongated panel elements 12 are fastened to a backing panel 18 (not shown) via suitable fastening means. The building panel 10 preferably comprises two elongated backing panels 18 arranged at the inner surface of the building panel 10 and at either side thereof, such that the longitudinal direction of the elongated backing panel 18 is preferably substantially perpendicular to the longitudinal direction of the elongated panel elements 12. The building panel 10 may thus be connected to a building construction, such as a wall or ceiling surface, by driving suitable fastening means such as screws, nails, bolts, glue or similar means known to the skilled person through the backing panel 18 and into the construction. The fastening means are preferable driven through the backing panel 18 at ends thereof, such that the fastening means do not penetrate the elongated panel elements 12 or the elongated insulation elements 14.

[0030] In the shown example, each elongated insulation panel 14 comprises a layer of fire retardant sound cloth 16, which covers the outer surface and each side surface of an insulation material 22. The sound cloth 16 and the insulation material 22 together define the elongated insulation element 14. The sound cloth 16 improves the fire retarding and acoustic performance of the building panel 10, and as the sound cloth 16 comes in a variety of colours, the visual impression of the building panel 10 may be changed as desired. The sound cloth 16 in the illustrated embodiment does not cover the inner surface of the elongated insulation elements 14. However, the sound cloth 16 may in a further embodiment also cover the inner surface of the elongated insulation ele-

ments 14, or in an alternative embodiment also be arranged as a continuous sheet of sound cloth 16, which extends continuously between a plurality of elongated panel elements 12 and a plurality of elongated insulation elements 14. Hereby, the overall fire retardant properties of the building panel 10 is enhanced. Further, the continuous sound cloth 16 provides a mechanical damping of vibrations between the elongated panel elements 12 and the backing panel 18.

[0031] Fig. 2 is a cross sectional view of a fire retarding building panel system. The figure illustrates part of a building panel system comprising two building panels 10. The sound cloth 16 described in relation to figure 1 is also understood to be applied to the building panels 10 illustrated in figure 2.

[0032] Figure 2 shows a first lower building panel 10 and a lower part of an upper similar building panel 10. It is clearly illustrated that a lower edge of the upper building panel 10 comprises a groove 26, which is defined by a spacing between the backing panel 18 and the lowermost elongated panel element 12. The lower building panel comprises at an upper edge an insulation element projection 24 defined by part of the elongated insulation element 14. The lower and upper building panels 10 are mated by joining the groove 26 and insulation element projection 24, hereby creating a continuous unbroken building panel surface.

List of reference numbers

[0033]

10	Building panel
12	Elongated panel element
14	Elongated insulation element
16	Sound cloth
18	Backing panel
20	First main surface gap
22	Insulation material
24	Insulation element projection
26	Groove
28	First elongated panel part
30	Second elongated panel part

Claims

1. A fire retarding and acoustic building panel for use as a cladding panel to cover at least a part of an existing building surface, such as an inner wall surface or a ceiling surface of a room, hereby enhancing the fire retarding and acoustic properties of said wall or ceiling, said building panel comprising:

a first main surface, defining an exterior surface for facing an interior of said room, and
a second main surface, defining an interior surface for facing said inner wall surface or said

ceiling surface and for defining a contact surface between said building panel and said inner wall surface or said ceiling surface, said building panel further comprising:

a first number of elongated panel elements having a first elongated panel part and a second elongated panel part, said first elongated panel part having an outer surface defining part of said first main surface, and an inner surface facing said second main surface, said second elongated panel part extending parallel to said first elongated panel part and in a longitudinal direction and extending a predetermined distance from said inner surface of said first elongated panel part;

a second number of elongated insulation elements of sound absorbing and fire retarding material having an outer surface defining part of said first main surface, an inner surface facing said second main surface, and two side surfaces extending between said inner and outer surfaces of said insulation elements, said second number of elongated insulation elements being arranged between said second elongated panel parts of two neighboring panel elements such that said first number of elongated panel elements and said second number of elongated insulation elements are arranged in a parallel relationship and said first elongated panel part and said second number of elongated insulation elements partly overlap each other.

2. A fire retarding and acoustic building panel according to claim 1, wherein said second number of elongated insulation elements comprises a fire retardant sound cloth on said outer surface and arranged between said elongated insulation elements and said inner surface of said first elongated panel part.

3. A fire retarding and acoustic building panel according to claim 2, wherein said second number of elongated insulation elements comprises a sound cloth on said two side surfaces and arranged between said second number of elongated insulation elements and said second elongated panel parts.

4. A fire retarding and acoustic building panel according to claims 2 or 3, wherein said sound cloth is a continuous sheet of sound cloth extending between said second number of elongated insulation elements and said first and second elongated panel parts, and further extending between the individual elongated insulation elements, such that said sound cloth further covers said second elongated panel parts and

an inner surface thereof, said inner surface facing said second main surface.

5. A fire retarding and acoustic building panel according to any of claims 2-4, wherein said sound cloth is adhesively connected to said first number of elongated panel elements and/or said second number of elongated insulation elements.

6. A fire retarding and acoustic building panel according to any of the previous claims, wherein said building panel further comprises a longitudinal backing panel arranged on said inner surface of said first number of elongated panel elements and said second number of elongated insulation elements, said backing panel defining part of said second main surface and having a longitudinal centerline which extends approximately perpendicular to longitudinal center lines of said first number of elongated panel elements and said second number of elongated insulation elements.

7. A fire retarding and acoustic building panel system comprising a number of fire retarding and acoustic building panels according to any of claims 1-6.

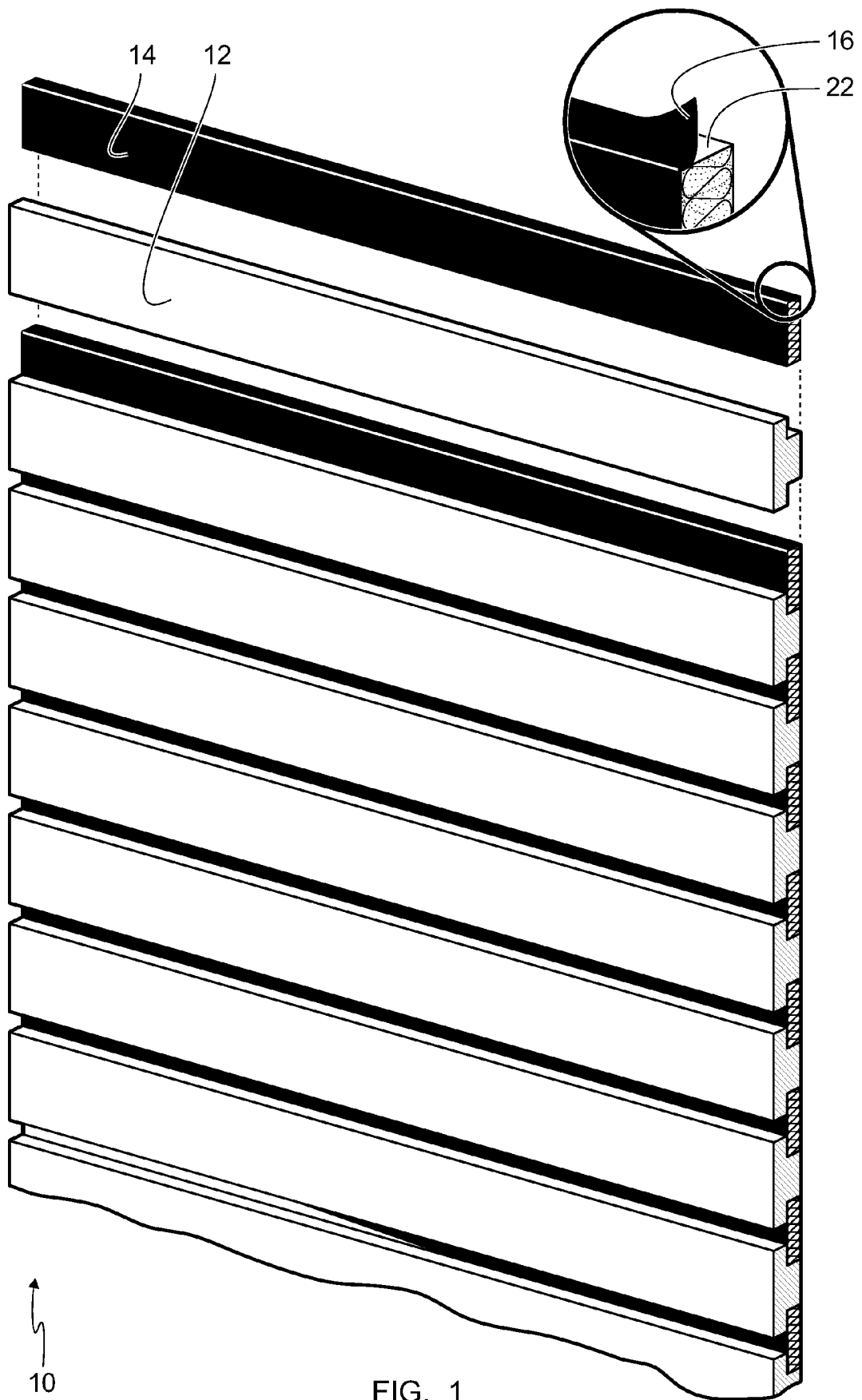
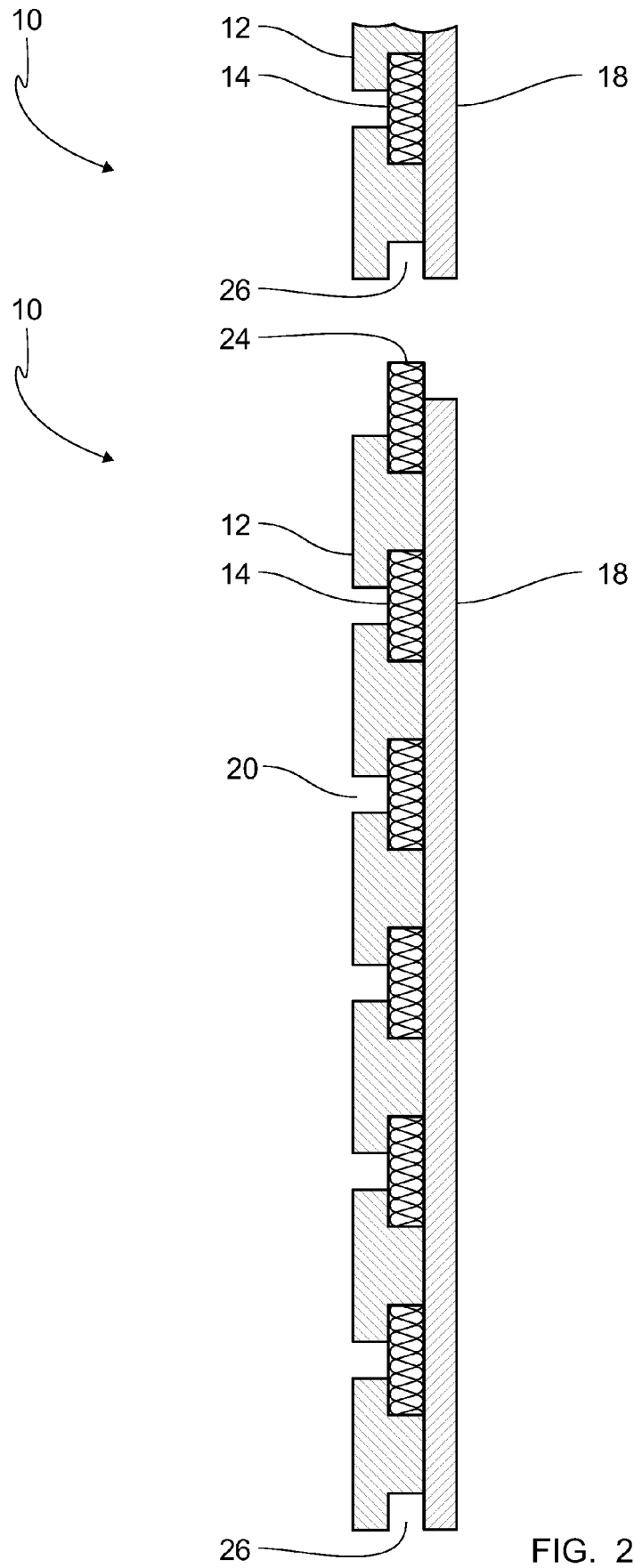


FIG. 1





EUROPEAN SEARCH REPORT

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EPO FORM 1503 03.02 (P04C01)

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 28 February 2020	Examiner Galanti, Flavio
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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