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(72) Inventor(s):
James Walsh

(73) Proprietor(s):
StudioAnyo Limited
Monohaus, Studio 21, 143 Mare Street, London, E8 3FW, United Kingdom

(74) Agent and/or Address for Service:
Gill Jennings & Every LLP
The Broadgate Tower, 20 Primrose Street, LONDON, EC2A 2ES, United Kingdom

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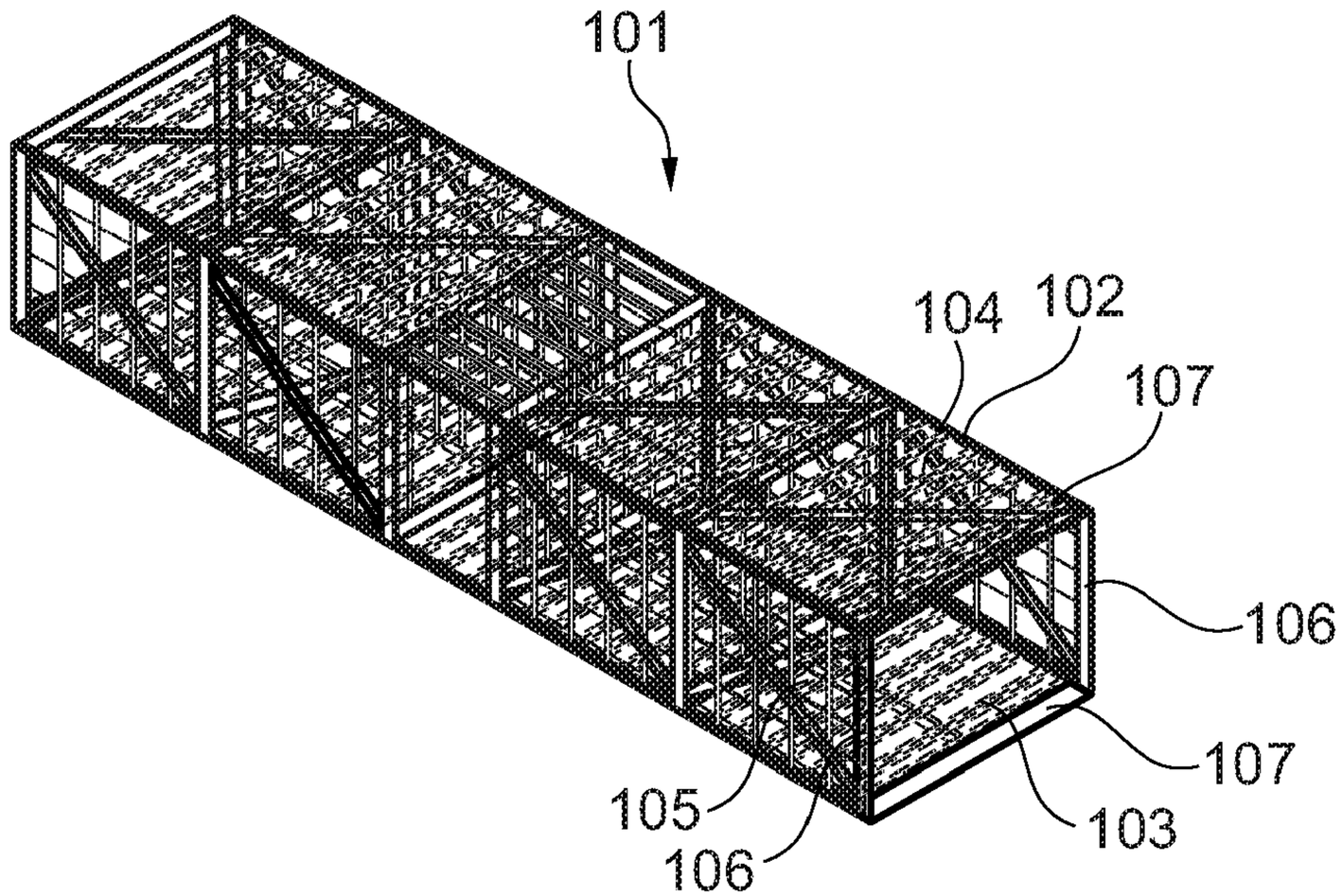


Fig. 1A

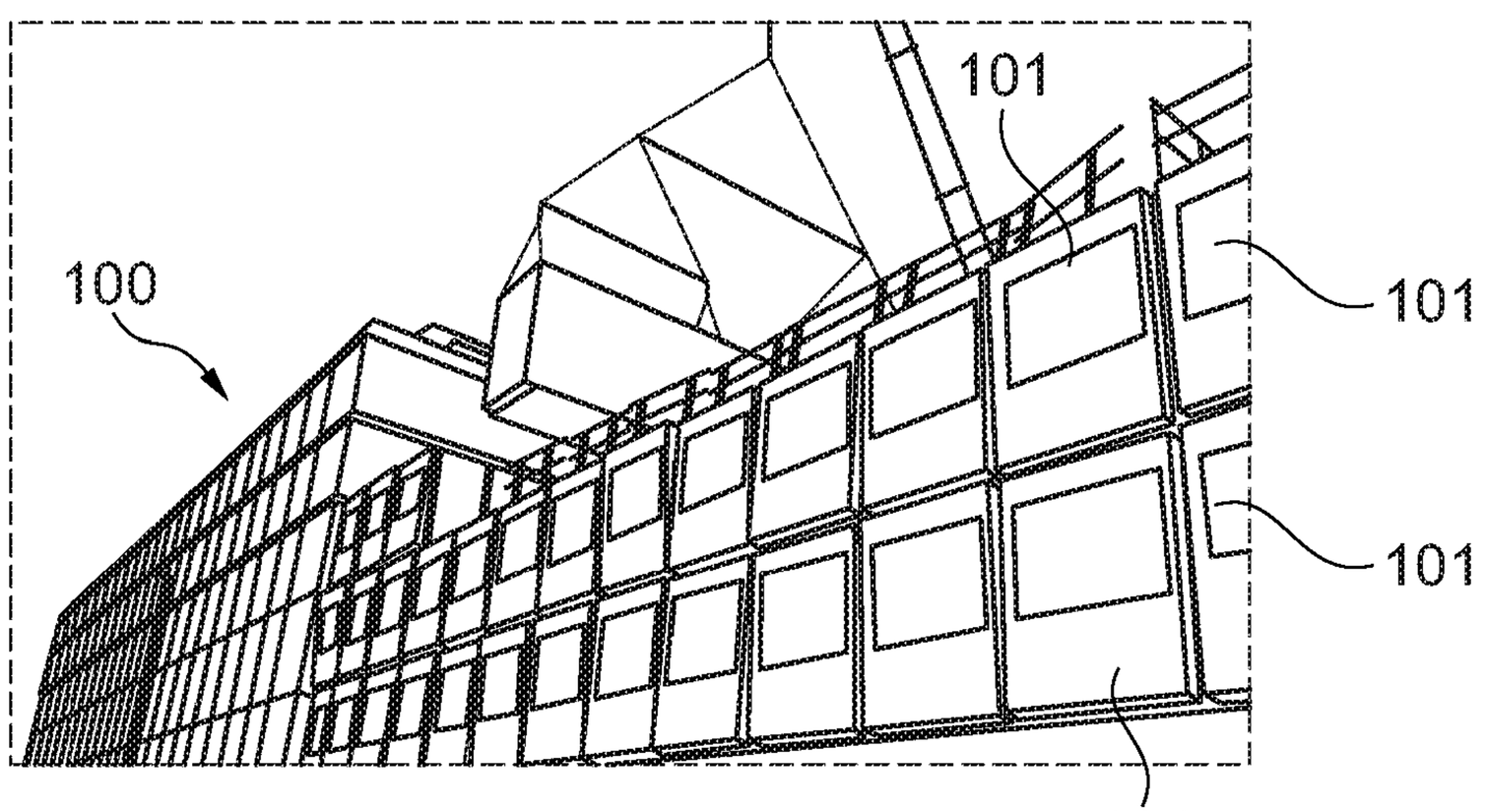


Fig. 1B

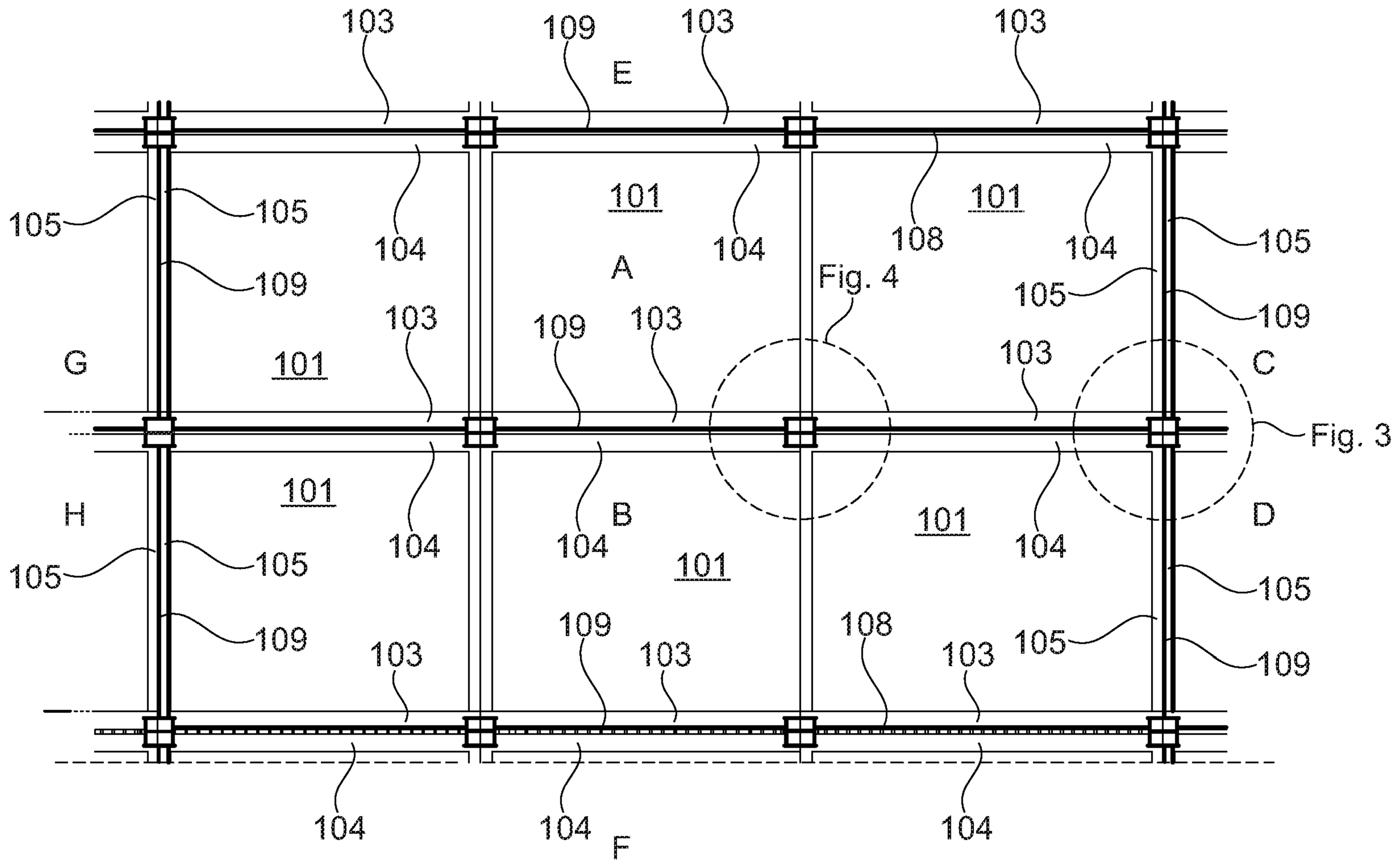

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Fig. 4
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Fig. 3
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Fig. 2

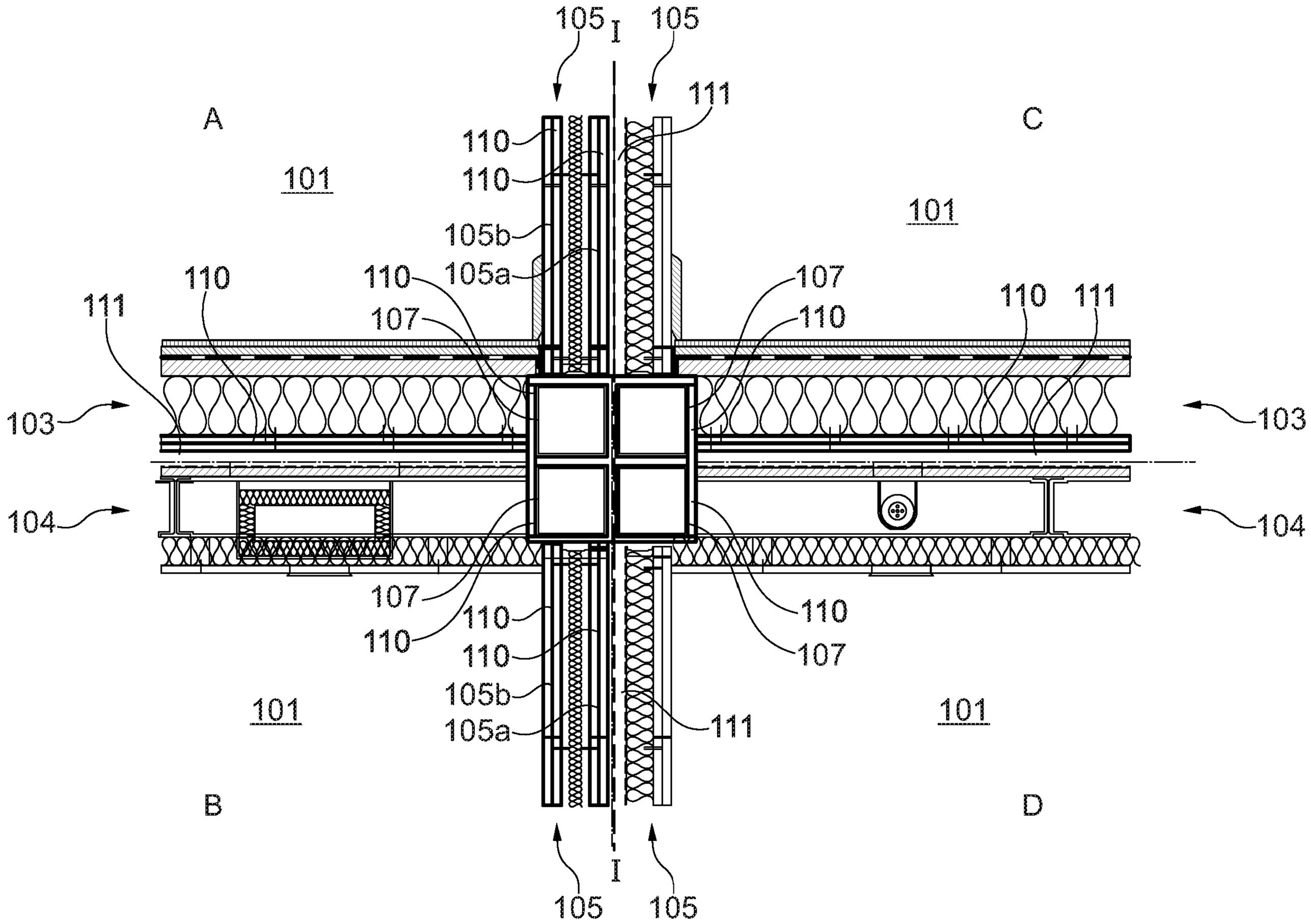

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Fig. 3

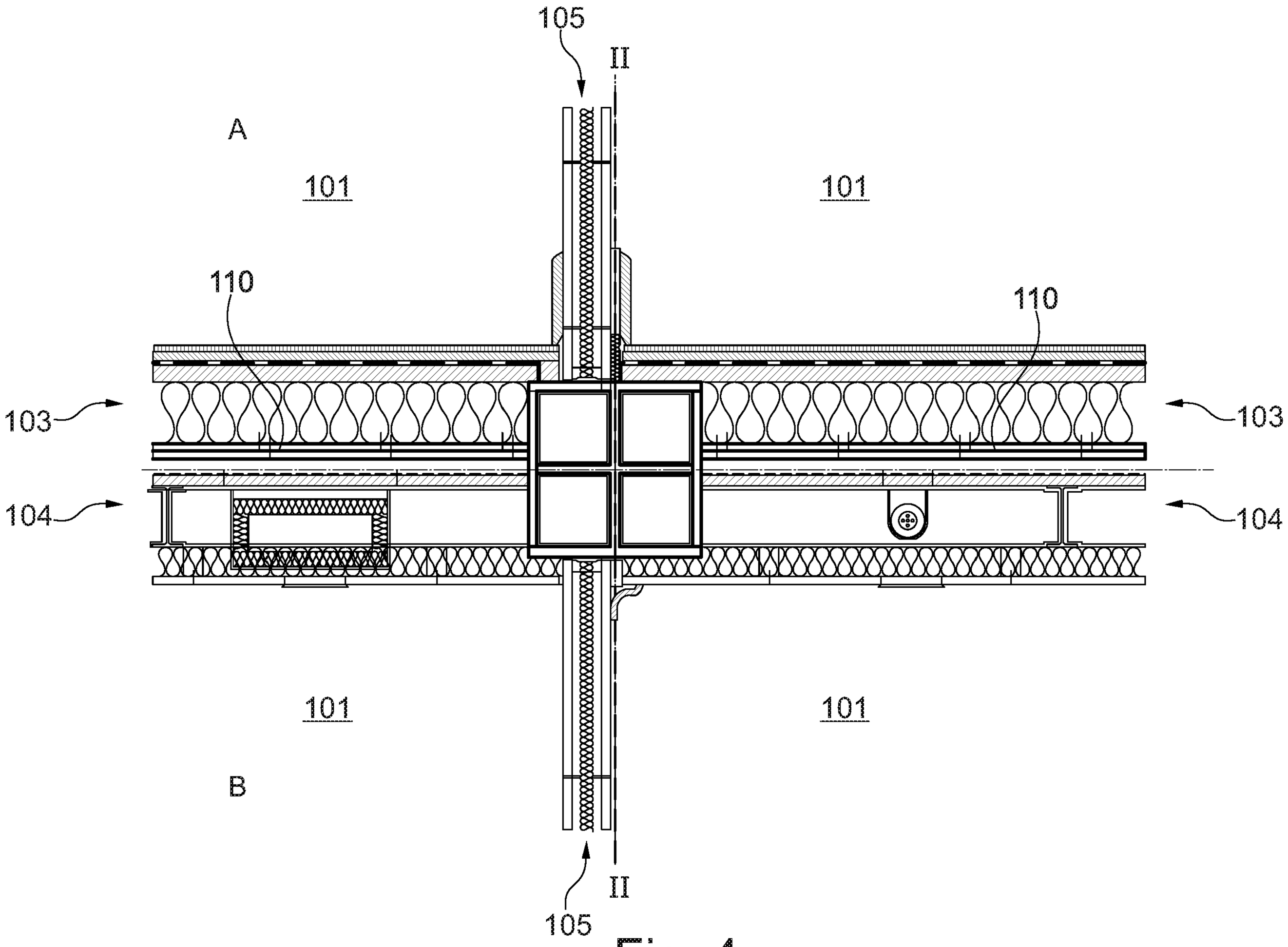


Fig. 4

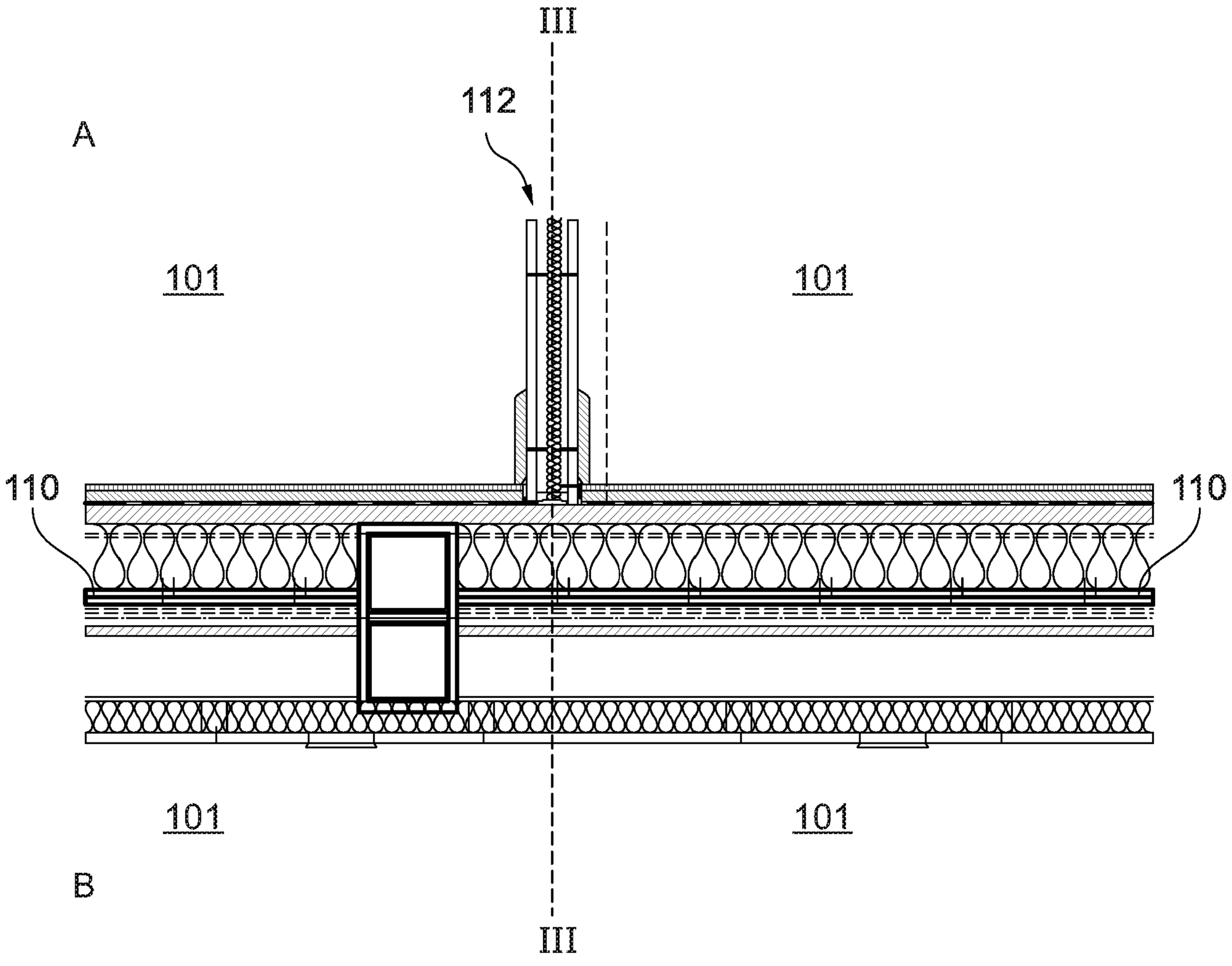


Fig. 5

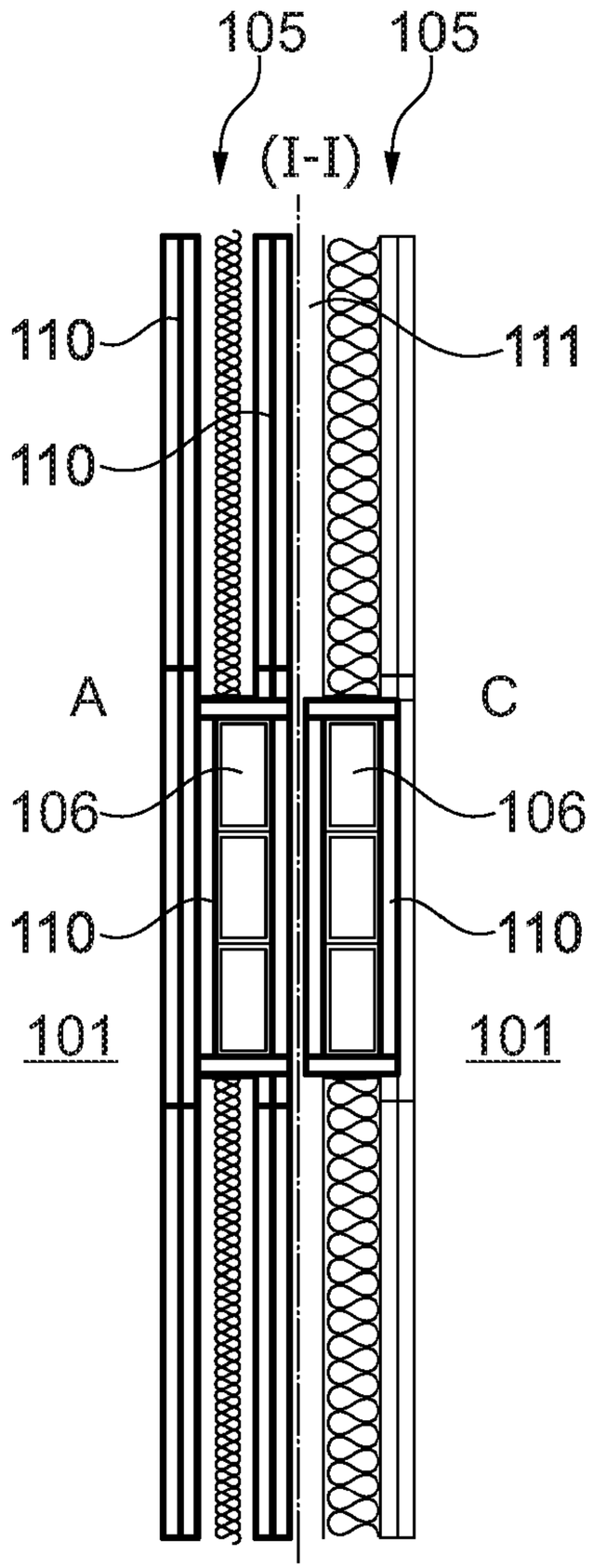


Fig. 6A

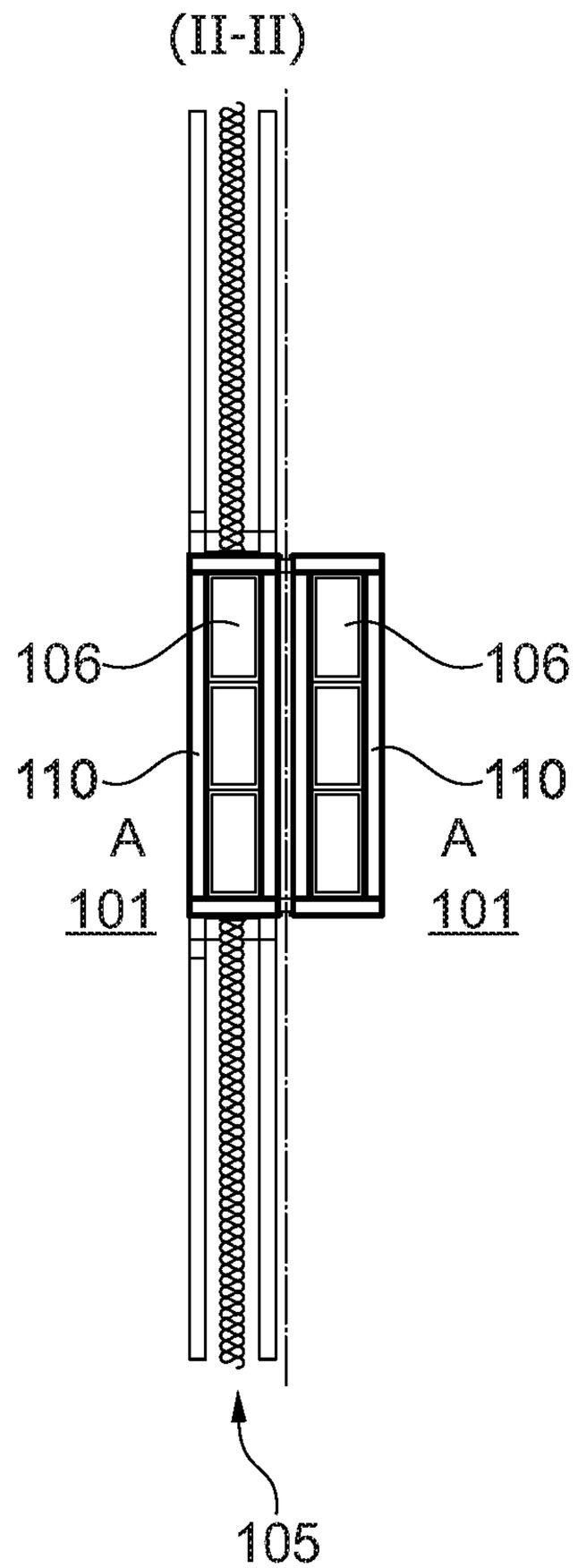


Fig. 6B

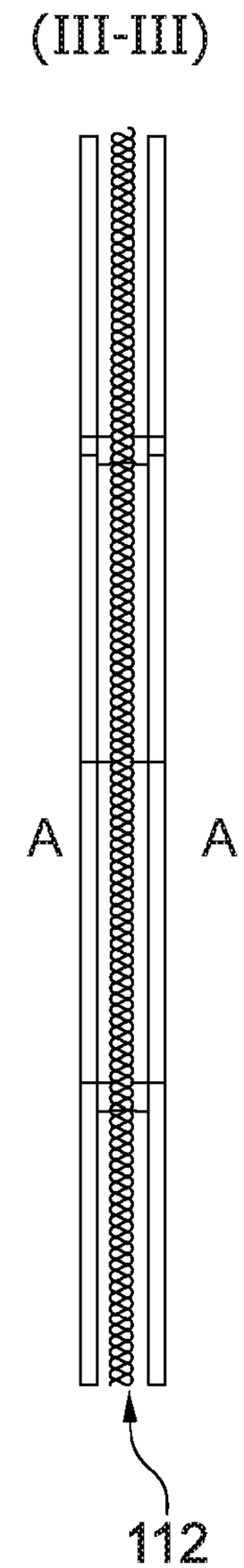


Fig. 6C

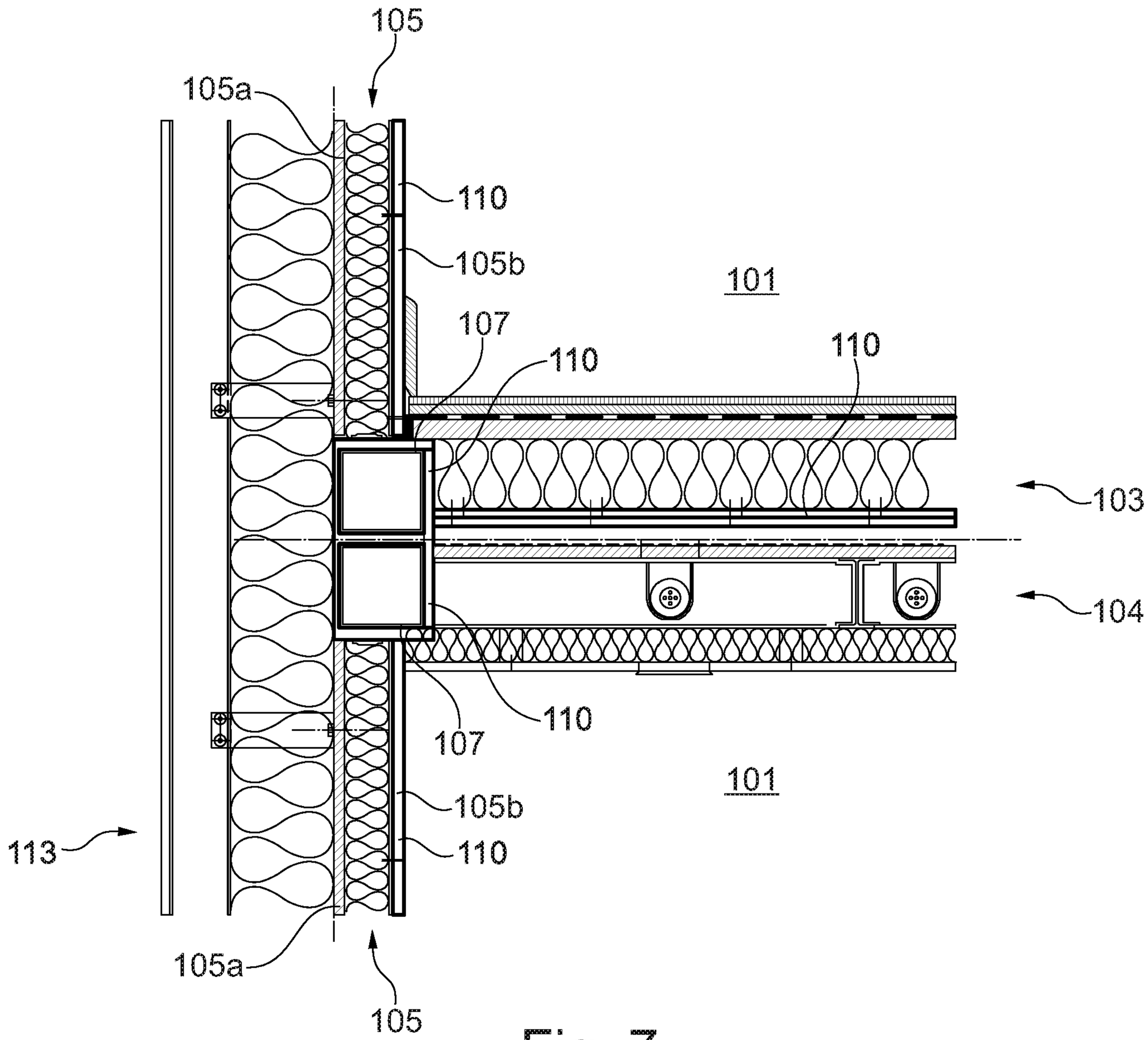

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Fig. 7

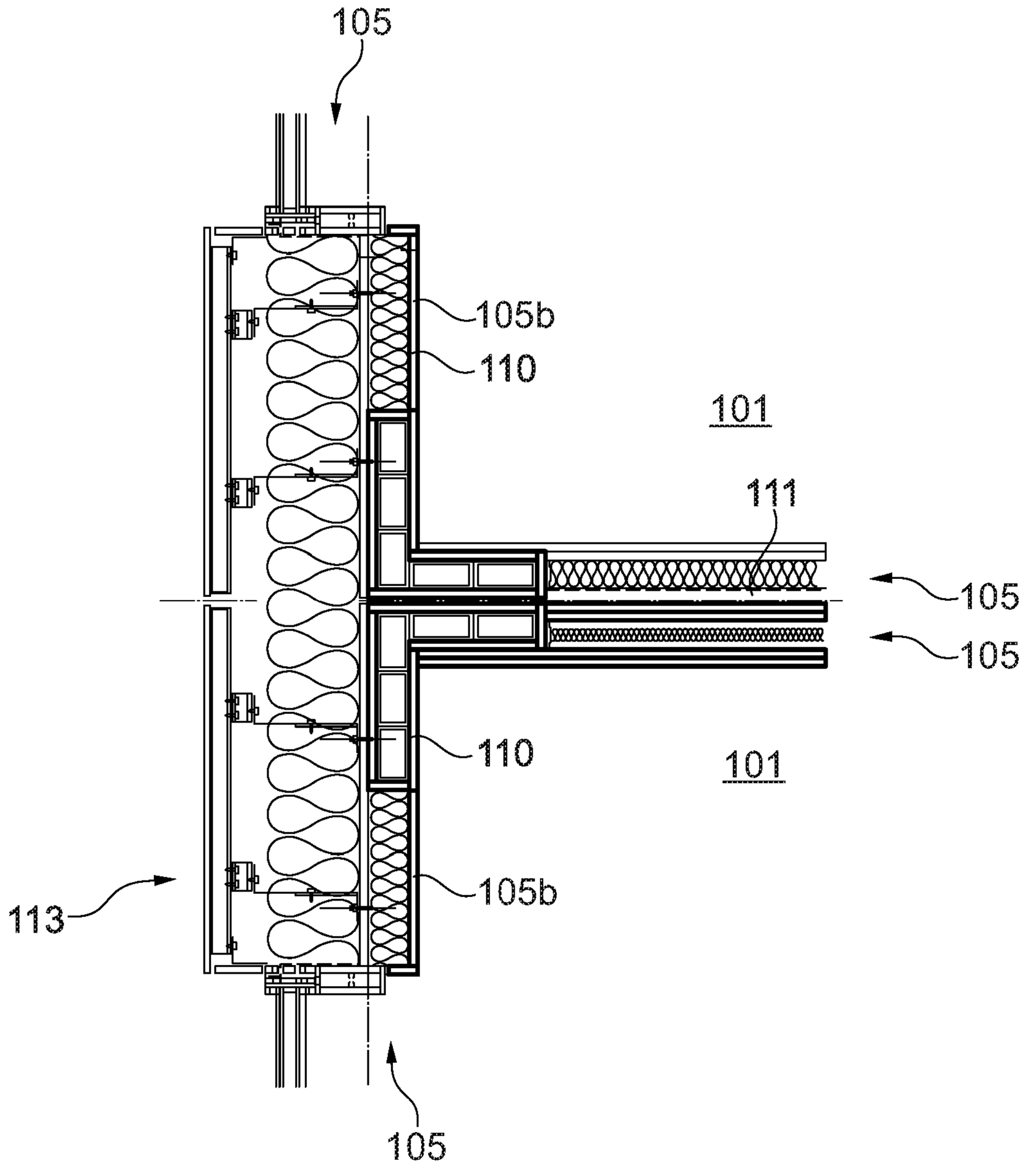


Fig. 8

Intellectual Property Office

Application No. GB1912017.9 RTM Date :14 February 2020

The following terms are registered trade marks and should be read as such wherever they occur in this document:

Gyproc
ROCKWOOL

IMPROVED FIRE COMPARTMENT STRATEGY FOR MODULAR BUILDINGS

FIELD OF THE INVENTION

This invention relates to modular buildings constructed using modular units. In particular, the invention relates to an improved fire compartment strategy for such modular buildings.

BACKGROUND

Modular buildings are constructed using a plurality of modular units. The modular units are typically fabricated "off-site", and often fitted out internally, before being shipped to the building site where they are assembled together "on-site" to construct a modular building. The modular units typically comprise a steel "box" frame comprising a plurality of external side walls, a floor, and a ceiling. The frame may be externally clad, as required. Such modular units are typically rectangular in shape, though other shapes are possible.

As with traditional buildings, modular buildings require systems for inhibiting the spread of fire within the building. This is typically achieved by sub-dividing the modular building into a number of discrete fire compartments, which contain one or more modular units. The fire compartments are formed by fire-resistant material provided on the walls, floors, and ceilings of the modular units, as necessary, which define fire compartment lines that separate (and isolate) the fire compartments. The fire-resistant material that defines the fire compartment lines thus inhibits the spread of fire from one fire compartment to another.

Fire compartments are usually provided around each dwelling in the modular building, which may comprise one or more modular unit. As used herein, the term "dwelling" may refer to any self-contained, discrete space with separate occupants or usage such as an apartment, hotel room, office, etc. A fire originating in one dwelling is thus contained within the fire compartment of that dwelling and the spread of the fire to other dwellings is inhibited by the fire-

resistant material that contain each fire compartment, thereby protecting the occupants of the other dwellings or at least providing additional time for the occupants to evacuate the building.

Conventionally, in modular buildings, each dwelling is self-contained within a discrete fire compartment formed by fire-resistant material provided on all of the external side walls, ceilings and floors that comprise the dwelling. Thus, in adjacent dwellings, the modular units of each dwelling that are thereby adjacently positioned are each contained within a separate, discrete fire compartment defined, at least in part, by a fire compartment line that is defined by fire-resistant material provided on the respective adjacent external side walls of the adjacent modular units.

In multi-storey buildings, the discrete fire compartments that contain each dwelling separately are thereby also defined, at least in part, by fire-resistant material provided on the floors and ceilings of the respective adjacent modular units (i.e. modular units that are stacked immediately one upon another). In other words, the upper modular unit is contained within a fire compartment defined, at least in part, by a fire compartment line that is defined by fire-resistant material provided in the floor of the upper modular unit, and the lower modular unit is contained within a fire compartment defined, at least in part, by a fire compartment line that is defined by fire-resistant provided on the ceiling of the lower unit.

A key concern with the design of such modular buildings is the provision of the same interior space as a conventional building, while retaining the same overall external footprint of the building. However, due to the “box” frame structure of each modular unit, internal floor space is taken up by the external side walls of the modular unit(s) that define a dwelling, each of which is provided with fire-resistant material. Similarly, the provision of fire-resistant material in both the ceiling and floor of each modular unit reduces the internal height of each dwelling.

Another concern is that when such modular units are connected together to construct the modular building, a cavity is formed between the external side walls of adjacent modular units that define each dwelling. The presence of such cavities presents a significant fire risk to the building because they are not contained within a fire compartment. Thus, if a fire originating in a dwelling were to breach a fire compartment into a cavity, the fire could spread between modular units undetected and potentially breach into another fire compartment without warning.

The present invention aims to address the above concerns by providing an improved fire compartment strategy for such modular buildings.

SUMMARY OF THE INVENTION

According to the invention, there is provided a modular building, comprising: a first modular unit having a plurality of external sides, including a floor, a ceiling and side-walls, defining an internal space; and a second modular unit having a plurality of external sides, including a floor, a ceiling and side-walls, defining an internal space; the first and second modular units being adjacently positioned such that their respective internal spaces are, at least, separated by an external side-wall of the first modular unit, wherein said external side-wall of the first modular unit has fire-resistant material provided on both an internal surface and an external surface thereof; wherein the fire-resistant material provided on the internal surface of said external side-wall of the first modular unit forms part of a first fire compartment line that defines a first fire compartment containing the internal space of the first modular unit; wherein the fire-resistant material provided on the external surface of said external side-wall of the first modular unit forms part of a second fire compartment line that defines a second fire compartment containing the second modular unit; and wherein the internal spaces defined by the first and second modular units are further separated by an external side-wall of the second modular unit such that a cavity is formed between the first and second modular units, said cavity and said external side-wall of the second modular unit also being contained, by said second fire compartment line, within the second fire compartment containing the second modular unit, such that the external side-wall of the second modular unit, configured to be positioned adjacent

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said external side-wall of the first modular unit, may be devoid of fire-resistant material or removed without compromising the second fire compartment containing the second modular unit.

As a result of this arrangement, there is no requirement for an adjacent external wall of the second modular unit, such that internal floor space can be increased within a dwelling comprising the second modular unit, without compromising the protection afforded by a fire compartment against fire risk to the building. This may simplify construction of modular units.

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Preferably, the external side-wall of the first modular unit comprises one or more supporting columns extending between the floor and the ceiling of the first modular unit, and one or more supporting beams extending between the columns, and wherein fire-resistant material is provided around said one or more columns and said one or more supporting beams to form part of said first and second fire compartment lines.

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Preferably, an external side of the first modular unit is arranged to provide at least part of an outer edge of the modular building, wherein fire-resistant material is provided on an interior surface of said external side of the first modular unit such that a façade may be attached to an exterior surface of said external side.

Preferably, the external sides of both the first and second modular units are substantially rectangular.

For example, the first modular unit may have a (second) external side arranged adjacent the (first) external side with fire-resistant material also being provided on a surface of said second external side to form part of another fire compartment line that defines another fire compartment containing a further (third) modular unit positioned adjacent the second external side of the first modular unit. The third modular unit may have an adjacent side or it may be removed such that a cavity formed therebetween is brought into the fire compartment containing the third modular unit (which is defined by said another compartment line).

The first modular unit may have a third and/or fourth external side that is/are devoid of fire-resistant material so that one or more another modular unit(s) such as the first modular unit, for example, may be positioned adjacent thereto. The external side(s) of (each of) said another such modular unit(s) having fire-resistant material provided on a surface thereof will thereby form (respectively) part of a fire compartment line that defines a fire compartment containing the first modular unit. Similar to described above, a cavity formed between the

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third/fourth external sides of the first modular unit and said external side(s) of said another such modular unit(s) is thereby brought into the fire compartment containing the first modular unit. Alternatively, the third and/or fourth external sides of the first modular unit may be removed.

Additionally, or alternatively, the first modular unit may be positioned immediately above another such modular unit as the first modular unit (or between two further such modular units), such that the fire-resistant material in the floor of the upper modular unit forms part of a fire compartment line that defines a fire compartment containing the lower modular unit.

Of course, it is not essential that the "another such" modular units are identical to the first modular unit. However, it is important that, when an external side of the first modular unit is devoid of fire-resistant material or is removed, the adjacent external side of the adjacent modular unit should have fire-resistant material provided thereon so as to form part of a fire compartment line that defines a fire compartment containing the first modular unit.

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As used herein, the term "first modular unit" preferably connotes a particular modular unit around which other similar modular units are adjacently positioned within the modular building. A skilled person will readily understand that the configuration described herein can be adapted and applied to modular units throughout a modular building and the modular units in a modular building can therefore be configured as required to provide the advantage of the present invention.

As used herein, the term "fire-resistant material" is intended to include materials and/or composites (e.g. in the form of boards) that are configured to inhibit the penetration of fire therethrough, and also fire barrier systems, both of which are well-known in the art. Such materials and barrier systems are produced and sold by companies including Gyproc (RTM) and Rockwool (RTM), for example.

Also described herein is a modular unit for constructing a modular building as described herein, comprising: a framework structure having

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a plurality of external sides, defining an internal space; wherein at least one external side has fire-resistant material provided on both an internal surface and an external surface thereof.

According to the present invention there is also provided a method of forming fire compartments in a modular building, the method comprising: providing a first modular unit having a plurality of external sides defining an internal space, at least one of the external sides of the first modular unit being a side-wall provided with fire-resistant material on both an internal surface and an external surface thereof; and arranging the first modular unit to be adjacent a second modular unit that also has a plurality of external sides, at least one of which is a side-wall, defining an internal space such that the internal spaces defined, respectively, by said first and second modular units are, at least, separated by said external side-wall of the first modular unit that has fire-resistant material provided on both an internal surface and an external surface thereof; wherein the fire-resistant material provided on the internal surface of said external side-wall of the first modular unit forms part of a first fire compartment line that defines a first fire compartment containing the internal space of the first modular unit; wherein the fire-resistant material provided on the external surface of said external side-wall of the first modular unit forms part of a second fire compartment line that defines a second fire compartment containing the second modular unit, and wherein the internal spaces defined by the first and second modular units are further separated by an external side-wall of the second modular unit such that a cavity is formed between the first and second modular units, said cavity and said external side-wall of the second modular unit also being contained, by said second fire compartment line, within the second fire compartment containing the second modular unit, such that the external side-wall of the second modular unit, arranged to be adjacent said external side-wall of the first modular unit, may be devoid of fire-resistant material or removed without compromising the second fire compartment containing the second modular unit.

Any apparatus feature described herein may be provided as a method feature, and vice versa. Moreover, it will be understood that the present invention will be

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described herein purely by way of example, and modifications of detail can be made within the scope of the invention.

For example, any feature in a particular aspect described herein may be applied to another aspect, in any appropriate combination. It should also be appreciated that particular combinations of the various features described and defined in any aspects described herein can be implemented and/or supplied and/or used independently.

BRIEF DESCRIPTION OF FIGURES

An example of the invention will now be described with reference to the accompanying drawings, in which:

Figures 1A and 1B show an example of a modular unit for constructing a modular building, and a schematic diagram of a modular building constructed using of a plurality of such modular units.

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Figure 2 is a schematic diagram of part of a modular building which shows a cross-sectional side-view of six modular units arranged to form two separate dwellings.

Figure 3 shows a close-up cross-sectional side-view of a junction between four modular units arranged to form four separate dwellings in a modular building, as shown in Figure 2.

Figure 4 shows a close-up cross-sectional side-view of a junction between four modular units arranged to form part of two separate dwellings in a modular building, as shown in Figure 2.

Figure 5 shows a cross-sectional side-view of a floor and a ceiling of two modular units in a modular building.

Figures 6A, 6B and 6C show cross-sectional plan views through section I-I, section II-II and section III-III of Figures 3, 4 and 5, respectively.

Figure 7 shows a cross-sectional side-view of two modular units adjacently positioned such that one modular unit is immediately above the other, each modular unit being located at an outer edge of a modular building.

Figure 8 shows a cross-sectional plan view of two modular units positioned side-by-side, each modular unit being located at an outer edge of a modular building.

DETAILED DESCRIPTION

In the following description and accompanying drawings, corresponding features of different embodiments are, preferably, identified using corresponding reference numerals.

An example of a modular unit 101 is shown in Figure 1A. The modular unit 101 is formed of a structural frame 102 comprising a plurality of external sides, including a floor 103, a ceiling 104 and walls 105. In the example shown,

supporting columns 106 extend between the floor 103 and the ceiling 104, and supporting beams 107 extend between the columns 106.

The modular unit 101 is suitable for constructing a modular building 100 such as that illustrated in Figure 1B, which shows a modular building 100 formed from a plurality of modular units 101 adjacently positioned in both a horizontal and a vertical direction. Prior to constructing the modular building 100, the modular units 101 are typically fitted out internally and external cladding is provided on the sides. The external cladding on certain sides of the modular unit 101 may include fire-resistant material, as will be described in more detail below.

Figure 2 is a cross-sectional side-view of part of a modular building which shows six modular units 101 arranged to form an upper dwelling A and a lower dwelling B. While not shown in Figure 2, it will be appreciated that there are additional modular units 101 positioned adjacent to those depicted, in both a horizontal and vertical direction, to form further dwellings C, D, E, F, G, and H, etc.

Each of dwellings A to H is separately contained within a discrete fire compartment 108. Each fire compartment 108 is formed by fire-resistant material that is provided on one or more external sides of each modular unit 101, the fire-resistant material being configured to inhibit the spread of fire between the fire compartments 108, in particular via the external sides of the modular units 101. The fire-resistant material provided on certain external sides of each modular unit 101 forms fire compartment lines 109 which together define the fire compartments 108.

At the junction between each adjacent dwelling, fire-resistant material is provided on only one of the adjacent external sides of the two adjacent modular units 101. For example, at the junction between dwellings A and C, fire-resistant material is provided on only one of the adjacent external side walls 105 of the two modular units 101 to form a fire compartment line 109 with the fire-resistant material in this example being provided on the adjacent modular unit 101 of dwelling C. The fire compartment line 109 defines part of two separate fire

compartments 108 which contain dwellings A and C respectively. This arrangement is shown in more detail in Figure 3.

A similar configuration is provided between dwellings which are vertically adjacent. For instance, fire-resistant material is provided on the floors 103 of the modular units 101 which form dwelling A to define a fire compartment line 109. However, the ceilings 104 of the modular units 101 which form dwelling B are devoid of fire-resistant material. The fire compartment line 109 formed from the fire-resistant material provided on the floors 103 of dwelling A therefore defines part of a fire compartment 108 containing dwelling A and part of a separate fire compartment 108 containing dwelling B. This arrangement is show in more detail in Figures 3 and 4.

Figure 3 is a close-up cross-sectional side-view showing the junction between four modular units 101, which may each form part of a separate dwelling A to D, similar to what is shown in Figure 2. Here, the arrangement of fire-resistant material 110 on the external side walls 105 is a mirror-image of the arrangement shown in Figure 2. The same effect is nonetheless provided, as will be appreciated by a skilled person.

As can be seen in Figure 3, fire resistant material 110 (shown in red) is provided on the external side wall 105 of the modular unit 101 of dwelling A. However, the external side wall 105 of the modular unit 101 of dwelling C is devoid of fire-resistant material. As such, the fire-resistant material 110 provided on the external side-wall 105 of the modular unit 101 of dwelling A forms part of a fire compartment line 109 that defines separate fire compartments 108 containing dwellings A and C respectively.

As a result of this configuration, a cavity 111 formed between the adjacent external side-walls 105 of the modular units 101 of dwellings A and C is also brought into the fire compartment 108 that contains dwelling C. Furthermore, the external side-wall 105 of the modular unit 101 of dwelling C may be considered to be a “dummy” side, which may be removed to increase the internal space of dwelling C, for example.

Fire-resistant material 110 may be provided on an external surface 105a and/or an internal surface 105b of the external side-wall 105 (of the modular unit 101) that forms part of a fire compartment line 109.

Fire-resistant material 110 is also provided around the horizontal supporting beams 107 of the modular units 101 of dwellings A and C that are adjacently positioned. This further fire-resistant material 110, ideally, also forms part of the fire compartment line 109 that defines the fire compartments 108 containing dwellings A and C.

A similar configuration can be seen to be present between two further such modular units 101 that are adjacently positioned immediately below the modular units 101 of dwellings A and C, respectively, and which form part of dwellings B and D.

Furthermore, it can be seen from Figure 3 that fire-resistant material 110 is provided on the floors 103 of the modular units 101 of dwellings A and C. However, the ceilings 104 of the modular units 101 of dwellings B and D are devoid of fire-resistant material. The fire-resistant material 110 provided on the floor 103 of the modular unit 101 of dwelling A therefore forms part of a fire compartment line 109 that defines a fire compartment 108 containing dwelling B as well as part of a separate fire compartment 108 containing dwelling A. Likewise, the fire-resistant material provided on the floor 103 of the modular unit 101 of dwelling C forms part of a fire compartment line 109 that defines a fire compartment 108 containing dwelling D as well as part of a separate fire compartment 108 containing dwelling C. As a result of this configuration, the internal height of the modular units 101 may be increased due to the absence of fire-resistant material in the ceiling 104. Further, cavities 111 are formed between the floors 103 of the modular units 101 of dwellings A and C and the ceilings 104 of the modular units 101 of dwellings B and D. As a result of the ceilings 104 being devoid of fire-resistant material, the cavities 111 are brought inside the fire compartments 108 containing dwellings B and D.

For ease of understanding, it may be assumed in this instance that the four modular units 101 shown are identical such that Figure 3 shows each of the upper and lower edges of such a modular unit 101. A fire compartment 108 that contains the modular unit 101, and the location of the fire-resistant material 110 that forms each part of a fire compartment line 109 that defines said fire compartment 108, may therefore be understood.

Figure 4 is a close-up cross-sectional side-view showing a junction between four modular units 101, which are configured to define two separate dwellings A and B, as shown in Figure 2. As described above, fire-resistant material 110 provided on the floor 103 of the modular units 101 of dwelling A forms part of a fire compartment line 109 that defines a fire compartment 108 containing dwelling B as well as a separate fire compartment 108 containing dwelling A. However, an external side-wall 105 of one of the adjacent modular units 101 in each dwelling A and B has been removed to increase internal space in each dwelling A, B, and the remaining external side-walls 105 of the other modular units 101 in each dwelling A, B are devoid of fire-resistant material as they are only providing internal walls within dwellings A and B.

Figure 5 shows a similar arrangement to Figure 4, described above, in relation to the fire-resistant material 110 forming part of a fire compartment line 109 that defines separate fire compartments 108 around dwellings A and B, respectively. Here, the external side-walls 105 of both of the modular units 101 of dwelling B have been removed to create an open internal space in dwelling B. The external side-walls 105 of the modular units 101 forming dwelling A have also been removed. An internal wall 112 (or partition) has been installed elsewhere within dwelling A, instead.

Figures 6A, 6B and 6C are sectional plan-views taken through section I-I, section II-II and section III-III in Figures 3, 4 and 5, respectively.

In Figure 6A it can be seen that fire-resistant material 110 is provided on an external side-wall 105 of the modular unit 101 of dwelling A. Fire-resistant material 110 is also provided on the adjacently positioned supporting columns

106 of the modular units 101 of both of dwellings A and C. It can be seen that a cavity 111 formed between the external side-walls 105 of the modular units 101 of dwellings A and C has been brought into the fire compartment 108 which contains dwelling C.

In Figure 6B, fire-resistant material 110 is provided on each of two adjacently positioned columns 106 of both modular units 101 of dwelling A. Furthermore, an external side-wall 105 of one of the modular units 101 has been removed to increase internal space. However, as the remaining external side-wall 105 of the other modular unit 101 is serving only as an internal wall, it is devoid of fire-resistant material.

In Figure 6C, the internal wall 112 (or partition) is devoid of fire-resistant material as it does not form part of any fire compartment line. As noted above, this internal wall 112 is remote from the columns 106 in the modular unit 101.

Figure 7 shows a sectional side-view of two modular units 101 that are adjacently positioned, with one modular unit 101 immediately above the other modular unit 101, at an outer edge of the modular building. As described above, fire-resistant material 110 is provided on the floor 103 of the upper modular unit 101, with the ceiling 104 of the lower modular unit 101 being devoid of fire-resistant material, such that the fire-resistant material 110 provided on the floor 103 of the upper modular unit 101 forms part of a fire compartment line 109 that defines a fire compartment 108 containing the lower modular unit 101. Of course, the fire-resistant material 110 provided on the floor 103 of the upper modular unit 101 also forms part of a fire compartment line 109 that defines a fire compartment 108 containing the upper modular unit 101.

As these two modular units 101 are positioned at an edge of the modular building, rather than being devoid of fire-resistant material, fire-resistant material 110 is provided on an interior surface 105b of the external side-walls 105 located on the outer edge of each modular unit 101. This fire-resistant material 110 thereby forms part of fire compartment lines 109 that define the respective fire compartments 108 that contain each modular unit 101.

By providing fire-resistant material 110 on only the interior surface 105b of the external side-walls 105 that are located at the edge of the modular building, an external façade 113 may be attached to the exterior surface 105a of the modular unit 101 to provide the modular building with a desired external appearance.

Furthermore, it can be seen that the supporting beams 107 that extend between supporting columns 106 of each modular unit 101 are also provided with fire-resistant material 110 to form part of the fire compartment lines 109 that define the fire compartments 108 containing each modular unit 101.

Figure 8 shows a sectional plan view of two modular units 101 that are adjacently positioned, side-by-side. Similar to the arrangement described for Figure 7, fire-resistant material 110 is provided on the interior surface 105b of the external side-walls 105 that are located at the edge of the modular building to form part of fire compartment lines 109 that define the fire compartments 108 containing each modular unit 101.

Similar to the previously-described arrangements above, fire resistant material 110 is provided on only one of the external side-walls 105 of the two modular units 101 that are adjacently positioned, side-by-side. As such, the fire-resistant material 110 provided on the external side-wall 105 of one of the modular units 101 forms part of a fire compartment line 109 that defines separate fire compartments 108 containing each modular unit 101. Again, a cavity 111 formed between the adjacent external side-walls 105 of the modular units 101 is also brought into the fire compartment 108 of one of the modular units 101. The external side-wall 105 of the modular unit 101 which is devoid of fire-resistant material may be considered to be a “dummy” side, which may be removed to increase the internal space of the dwelling of which the modular unit 101 forms a part, for example.

Although a particular embodiment of the present invention has been shown and described to facilitate understanding of the present invention, this embodiment is not intended to limit the scope of protection afforded by this patent. For

example, the dimensions shown in the accompanying figures, and other superfluous details, such as insulation material and façades, have been included in the accompanying figures simply to provide context to the exemplary embodiment of the invention described herein.

One skilled in the art will understand that present invention is not limited to the embodiment disclosed herein, or to any details shown in the accompanying figures that are not described in detail herein or defined in the claims. Indeed, such superfluous features may be removed from the figures without prejudice to the present invention.

Moreover, one skilled in the art will understand that various changes and modifications may be made without departing from the scope of the present invention as defined in the following claims.

CLAIMS

1. A modular building, comprising:

a first modular unit having a plurality of external sides, including a floor, a ceiling and side-walls, defining an internal space; and

a second modular unit having a plurality of external sides, including a floor, a ceiling and side-walls, defining an internal space;

the first and second modular units being adjacently positioned such that their respective internal spaces are, at least, separated by an external side-wall of the first modular unit;

wherein said external side-wall of the first modular unit has fire-resistant material provided on both an internal surface and an external surface thereof;

wherein the fire-resistant material provided on the internal surface of said external side-wall of the first modular unit forms part of a first fire compartment line that defines a first fire compartment containing the internal space of the first modular unit;

wherein the fire-resistant material provided on the external surface of said external side-wall of the first modular unit forms part of a second fire compartment line that defines a second fire compartment containing the second modular unit; and

wherein the internal spaces defined by the first and second modular units are further separated by an external side-wall of the second modular unit such that a cavity is formed between the first and second modular units, said cavity and said external side-wall of the second modular unit also being contained, by said second fire compartment line, within the second fire compartment containing the second modular unit,

such that the external side-wall of the second modular unit, configured to be positioned adjacent said external side-wall of the first modular unit, may be devoid of fire-resistant material or removed without compromising the second fire compartment containing the second modular unit.

2. The modular building of claim 1, wherein the external side-wall of the first modular unit comprises one or more supporting columns extending between the floor and the ceiling of the first modular unit, and one or more supporting beams

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extending between the columns, and wherein fire-resistant material is provided around said one or more columns and said one or more supporting beams to form part of said first and second fire compartment lines.

3. The modular building of any preceding claim, wherein an external side of the first modular unit is arranged to provide at least part of an outer edge of the modular building, wherein fire-resistant material is provided on an interior surface of said external side of the first modular unit such that a façade may be attached to an exterior surface of said external side.

4. The modular building of any preceding claim, wherein the external sides of both the first and second modular units are substantially rectangular.

5. A method of forming fire compartments in a modular building, the method comprising:

providing a first modular unit having a plurality of external sides defining an internal space, at least one of the external sides of the first modular unit being a side-wall provided with fire-resistant material on both an internal surface and an external surface thereof; and

arranging the first modular unit to be adjacent a second modular unit that also has a plurality of external sides, at least one of which is a side-wall, defining an internal space such that the internal spaces defined, respectively, by said first and second modular units are, at least, separated by said external side-wall of the first modular unit that has fire-resistant material provided on both an internal surface and an external surface thereof;

wherein the fire-resistant material provided on the internal surface of said external side-wall of the first modular unit forms part of a first fire compartment line that defines a first fire compartment containing the internal space of the first modular unit;

wherein the fire-resistant material provided on the external surface of said external side-wall of the first modular unit forms part of a second fire compartment line that defines a second fire compartment containing the second modular unit; and

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wherein the internal spaces defined by the first and second modular units are further separated by an external side-wall of the second modular unit such that a cavity is formed between the first and second modular units, said cavity and said external side-wall of the second modular unit also being contained, by said second fire compartment line, within the second fire compartment containing the second modular unit,

such that the external side-wall of the second modular unit, arranged to be adjacent said external side-wall of the first modular unit, may be devoid of fire-resistant material or removed without compromising the second fire compartment containing the second modular unit.

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