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(54) **Board fixture**

(57) A board fixture (1, 9, 11, 14, 17, 29) for flush joining of a first building board (19) and a second building board (24), said board fixture (1, 9, 11, 14, 17, 29) comprising a first, front flange portion (2), a second, rear flange portion (3), and a web portion (4) connecting the flange portions (2, 3), wherein the flange portions (2, 3) and the web portion (4) form a first open space (5) for receiving an edge portion (20) of the first building board (19) and a second open space (6) for receiving an edge portion (25) of the second building board (24). The web portion (4) exhibits a plurality of through openings (7, 15) for allowing an adhesion agent (22) to spread between the first open space (5) and the second open space (6) for the formation of an adhesion joint (26) between the edge portions (20, 25) of the building boards (19, 24). The rear flange portion (3) exhibits openings (10) for allowing the adhesion agent (22) to form an adhesion joint between the board fixture (9) and an underlying structure. Also a method for joining building boards is disclosed.

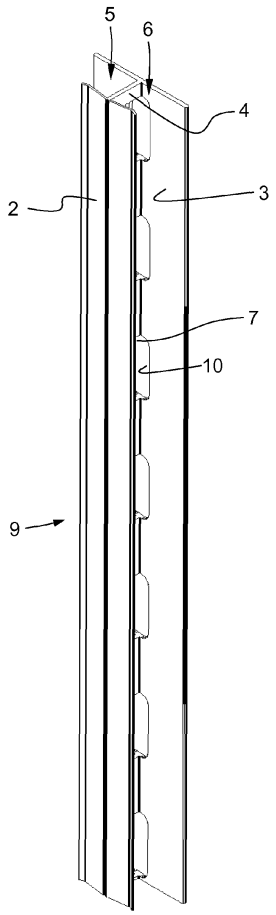

Fig. 4

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Description

[0001] The present invention relates to a board fixture for flush joining of a first building board and a second building board, said board fixture comprising a first, front flange portion, a second, rear flange portion, and a web portion connecting the flange portions, wherein the flange portions and the web portion, on the one hand, form a first open space for receiving an edge portion of the first building board and, on the other hand, a second open space for receiving an edge portion of the second building board.

[0002] The present invention also relates to a method for flush joining of a first building board and a second building board by means of a board fixture, which comprises a first, front flange portion, a second, rear flange portion, and a web portion connecting the flange portions, wherein the flange portions and the web portion, on the one hand, form a first open space for receiving an edge portion of the first building board and, on the other hand, a second open space for receiving an edge portion of the second building board.

[0003] Today, building boards of various materials and sizes are used to a very large extent on building sites. As used herein, building boards refers to boards both for indoor and for outdoor use. The use of building boards provides a smooth and, in principle, "ready" surface, i.e. a surface which requires comparatively little extra work before painting or wallpaper hanging can take place, and a tight and durable surface on external walls, respectively. Common materials for building boards are plaster, MDF (Medium Density Fibre), OSB (Oriented Strand Board), chips, wood particles, composite, cement, and glass fibres. Building boards are used in floors, walls and ceilings. The support, onto which the building boards are normally mounted, can be studs of steel or wood, or a combination of these, but also a wall of concrete, or a plastered surface, or the like, can be subjected to covering with building boards. A very common use of building boards is in so called light building, where a framework of wood and/or steel constitutes the support. The studs in the framework are mounted vertically between top and bottom joists (rails), with a centre-centre distance (C-C distance) of 450-600 mm, said studs forming a building skeleton. Frames for the ceiling and floor are assembled in a similar way. After that, the boards are mounted on the joist structure, most often by screwing.

[0004] Commonly occurring building boards are of plaster and have a width of 900-1200 mm and a length of 2400-2500 mm. It takes about 50 screws to install a building board. The screwing of plasterboards is time-consuming and work-intensive. The screw heads must be drawn so far into the building board that they do not leave a bump on the board surface, but the smoothness thereof must be possible to restore by filling screw head depressions and board joints. Here, there is a risk that the screw thread crushes the plaster material, which will jeopardize a cohesive force acting on the building board or building boards.

[0005] Another problem when installing interior walls is that the building boards do not end up flush-mounted, i.e. that they end up at different levels in the joints. This occurs mainly when using sheet metal studs. The reason is often creasing of the sheet metal flange caused by the screwing when the first building board in screwed into position, which causes the next building board, sharing stud with the first building board and forming a joint therewith, to end up non-flush with the already mounted first building board. Another reason why joined building boards end up at different levels may be that the thickness of the building boards varies somewhat. The costs for necessary correction of building boards which are joined non-flush are large, since this is difficult to detect during the actual installation, but is often not discovered before the wall is finished.

[0006] A problem which recently has attracted more and more attention is air leakage in external wall structures, where building boards have been used as wind and water barriers. This is, on the one hand, because movements in the board material, caused by building boards swelling and shrinking due to variations in air humidity, create gaps between the screw attachments, and, on the other hand, because the screws cause damages to the moisture repellent coating of the building boards. This results in unnecessary energy losses. Furthermore, there is an obvious risk of moisture damage and mould growth arising in the structure.

[0007] It can be mentioned that, as a consequence of the monotonous and repetitive work operations during screwing, just 2-3% of the individuals working daily with wall installation are able to work until retirement. A building board installer can install about 7 building boards an hour. Each board is screwed with about 50 screws. This means that the installer performs about 350 monotonous work operations each hour, resulting in 2800 work operations per working day. Therefore, repetitive strain injuries to shoulders, neck, and back are common among installers. It is also common that installers get white fingers, caused by vibrations from screw machines.

[0008] Recently, one has started to glue building boards, at the same time as the number of screws used during the installation has decreased. This development has primarily taken place in order to facilitate for the installers. Screws are still needed, however, in order to retain the building board in position while the adhesive used cures. There have also been attempts to use double-stick tape for this purpose. The tape method, however, has the disadvantage that the building boards cannot be fine-adjusted during the installation. It has also been found that a tape joint is not sufficiently durable in time, for which reason taping is not applied to any considerable extent.

[0009] One object of the present invention is to produce a board fixture and a method for such a board fixture enabling a flush, i.e. level, and air and moisture proof jointing or joining of two building boards.

[0010] Another object of the present invention is to produce a board fixture and a method, enabling the production of a very strong and flush joint between building boards, without any use of penetrating fixing devices, also when the building boards are not joined over an underlying support/stud.

[0011] Another object of the invention is to specify a technique which makes it possible to use an arbitrary width of boards, which reduces board waste. This becomes possible since the board fixture allows reliable joining and adherence/gluing also to a previously existing board support. More precisely, the invention relates to a technique, where a board fixture is used in the joint between adjacent boards. The invention is advantageously used together with building boards having recessed edge portions for joint finishing.

[0012] Another object of the present invention is to specify a technique which makes it possible to easily assemble several layers of building boards, in order to create a strong shell structure, and this without joining the boards over an underlying joist structure.

[0013] Another object of the invention is to achieve retaining of building boards to a hard and/or uneven support during the time an adhesive applied to the support cures.

[0014] Still another object of the invention is to specify a technique which facilitates alignment of building boards, and an easy application of the board fixture before it is attached to a support.

[0015] Another object is to be able to use environmentally friendlier adhesives.

[0016] Still another object is to be able to simply and reliably seal external walls against draught and moisture.

[0017] Another object is to specify a technique for joining building boards, where the board fixture used reduces the consumption of joint filler in the joint and, furthermore, acts like a reinforcement for the filler.

[0018] Another object is to reduce the number of studs.

[0019] Still another object is to glue at least three parts together simultaneously with only one application of adhesive, wherein two of the parts are the edges of the boards.

[0020] The board fixture according to the invention is **characterized in that** the web portion exhibits a plurality of through openings for allowing an adhesion agent to spread between the first open space and the second open space for the formation of an adhesion joint between the edge portions of the building boards.

[0021] The method according to the invention is characterized in the steps of:

- spreading and distributing an adhesion agent applied in the board fixture into the open spaces via openings in the web portion, so that a body is formed from the adhesion agent, which body extends between the edge portions of the building boards; and
- causing the adhesion agent to dry or cure, so that a solid adhesion joint is formed between the edge portions of the building boards.

[0022] Accordingly, the openings in the web portion makes it possible for the adhesion agent to spread to the two open spaces, and the web portion forms a distance element, which ensures that there is at least a minimum space between the edge portions of the building boards, which space can be filled by the adhesion agent.

[0023] By utilizing a board fixture with an adhesive channel which reliably presses and retains a first building board against the support, and which not receives the edge of a second building board until adhesive has been applied adjacent to the board fixture, one of the building boards will exert a pressing and distributing action on the adhesive and spreads it through the recesses to the edge portion of the second (first) board and to a possible underlying support (stud, board, wall, etc.). Of course, the adhesive also spreads to the board fixture, which can also be regarded as a support.

[0024] The board fixture is fixed to the support, which can be a stud, reinforcement profile, board, or existing wall, by means of tape, screws, nails, clips or rivets. In normal cases, the transverse force, which is applied to a board placed vertically against a support, must be so large that the frictional grip, created against the support, is able to support the weight of the board. By means of the present invention, the board fixture will create this retaining action through the clamping force exerted on the edge portions of the board by the adhesive channels. It is also possible to achieve an enhancement of the frictional force retaining the board by means of special friction devices, or friction enhancing agents (coating). This means that a less aggressive and less rapidly curing adhesive can be used, i.e. an adhesive which allows a certain readjustment of the board if this is necessary. A board fixture with double-stick tape can be attached to, for example, a concrete wall, wherein the formed tape joint is reinforced by the gluing. In principle, it can be stated that a shape-bound locking is obtained between boards, joint fixture and support, alternatively also including bending stiffening means.

[0025] Because the board fixtures have recesses or openings along their length, an adhesive string applied in the board fixture will be uniformly distributed via these openings to the adjacent board and to the support, and possibly to an underlying bending stiffener.

[0026] The board fixture and the method according to the invention can advantageously be used together with the magnetic gluing method according to WO 2008/026982 A1, corresponding to Swedish patent SE530693, when the design requires a support for the middle portion of the boards. The present invention, applied together with said patent, implies that the magnetic rulers do not have to be used to the same extent, and that fewer magnetic rulers are needed. This becomes possible because the board fixture is able to support the weight of the board, for which reason the adhesive does not have to cure that long, since the load is reduced. Depending on the choice of adhesive, air moisture and temperature, the magnetic rulers press the middle portion

of the board against the support until the adhesive has cured/solidified. When the adhesive has cured/solidified, the rulers are removed and used again. There are many advantages with this method.

[0027] The installation is almost noiseless/vibration-free and offers the installers a good working environment with a very low stress to the body. No filling of screw heads is required, which saves time and money. Furthermore, the method offers the possibility of new types of more refined boards to the market, since the surface layer of the boards is not damaged. By means of the present invention, it might be sufficient to use magnetic rulers only in the middle of the board, i.e. not over the joints, which is an advantage.

[0028] Because, by means of the invention, one does not necessarily have to join over a stud, neither has the width of the stud to be dimensioned in order to provide a joining space for adjacent boards against the stud, i.e. the width of the stud can be made smaller, and fewer studs are needed since the C-C distance can be increased. If the C-C distance is increased from 450 mm to 600 mm, it means a saving in studs of about 25%. This also implies that the sound dampening ability of the wall is increased, since a lot of the sound through walls is transported via the studs.

[0029] When installing several layers of boards, large savings are made because the installation goes much faster, since the board fixture is placed on an underlying board and without regard to the position of studs. When screwing, the joining of the boards has to be done in the middle of studs, wherein the installers first have to "find" the stud, and moreover the first board in each layer has to be cut to length. For long walls, tolerances of the width measures of the boards, which can be allowed to vary, for example, from +0 to -3 mm, can result in the boards missing the stud. The fact that joining over studs is not required also means a saving in board material, since the waste piece of the last board, regardless of board width, can be used as a starting piece in the second layer.

[0030] The invention can advantageously also be used for building a wall with several board layers, preferably a wall with two board layers mutually glued together, wherein a board fixture between underlying boards can preferably be of a magnetic material, which then can act as a "holding-up tool" for magnetic rulers applied on an applied, additional board layer. When building walls with only one board layer, or when installing a final board layer, it is convenient to select boards with a recess, a so-called joint finishing edge, in the longitudinal edge portion, and then to dimension the material in the outer flange of the board fixture so that it is equal to, or smaller than, the depth of the recess. Making of holes or slitting can be done in the board fixture so that the joint filler can adhere to the board fixture. Here, it can be mentioned that the board fixture advantageously can be made from expanded metal.

[0031] The problem that adjacent building boards end up at different levels when joined together disappears completely when using the board fixture. Furthermore, possible deviations in board thickness between different boards is eliminated by the adhesive ridge on the back side of the fixture and fixes the surface sides of the boards in correct positions.

[0032] One variant of the board fixture can be used as a starting and finishing fixture. These variants have the same function and are, in principle, one half of a board fixture as described above. One advantage is that boards with recessed edge can be used inward against another wall, without having to remove that portion, since a filler support can be integrated into the fixture so that smooth finishing of the recess is facilitated.

[0033] By means of the board fixture according to the invention, the adhesive joint will end up so that the edges of the boards are glued against each other, which gives a considerably stronger joint than when boards are glued separately to a support adjacent to each other, i.e. where only the surfaces of the board edge portions abutting against the support are glued. In particularly sensitive applications, it might be an advantage to use a transparent material in the fixture and a coloured adhesive, in order to be able to visually ensure sealing, for example when installing boards intended as a vapour barrier.

[0034] External wall boards which, inter alia, are to seal the wall against draught, are advantageously installed by means of the board fixture according to the invention. Today, different types of boards, such as plaster based, cement based, wood based boards, and boards in different forms of composite material are used. Many of these are difficult to screw into, in addition several board types are relatively moisture sensitive, for which reason they tend to shrink or swell. This can sometimes be seen when swelling of the boards has created gaps between the screw attachments, and air can then easily blow through the wall. This impairs the insulation value of the walls, with increased energy costs as a consequence. Furthermore, there is a risk of moisture penetrating and causing other types of problems in the wall, for example mould growth. Furthermore, the protecting surface layer of the boards is damaged by the screw engagement, which impairs the properties of the boards against moisture and air draught.

[0035] By using a board fixture according to the invention, there is no need to damage the surface of the board with screws to the same extent, but its structure and any surface finish is intact also after the installation. The adhesive joint efficiently glues and seals the board against the joist structure and between the boards, resulting in a tight and dry wall. Furthermore, the adhesive joint is protected from possible water splashes or UV light by its position in the board fixture, which strongly promotes the long-time action of the adhesive. There are many environmentally friendly adhesives on the market which are resistant to cold and moisture. The UV radiation is a bigger problem.

[0036] In the following, the invention will be described more closely with reference to the attached drawings, in

which:

Figure 1 shows a first embodiment of a board fixture according to the invention in a perspective view;

Figure 2 shows the board fixture of Figure 1 in a side view;

Figure 3 shows the board fixture of Figure 1 in an alternative perspective view;

Figure 4 shows a second embodiment of a board fixture according to the invention in a perspective view;

Figure 5 shows the board fixture of Figure 4 in an alternative perspective view;

Figure 6 shows a third embodiment of a board fixture according to the invention in a perspective view;

Figure 7 shows the board fixture of Figure 6 in an alternative perspective view;

Figure 8 shows a fourth embodiment of a board fixture according to the invention in a perspective view;

Figure 9 shows the board fixture of Figure 1 in a side view;

Figure 10 shows the board fixture of Figure 8 in an alternative perspective view;

Figure 11 shows a fifth embodiment of a board fixture according to the invention in a perspective view;

Figure 12 shows, in perspective, a board fixture having an adhesion layer in accordance with the invention, in a position to be pushed in over an edge portion of a building board;

Figure 13 shows the building board and the board fixture in position for application to a stud;

Figure 14 shows the building board and the board fixture in the correct position against the stud, and wherein a protective layer is removed to expose an adhesion layer on the back side of the board fixture;

Figure 15 shows the building board and the board fixture in position attached to the stud, and wherein an adhesive string is applied in the board fixture;

Figure 16 shows an additional building board being pushed into the joining fixture;

Figure 17 shows the finished joint between the building boards;

Figure 18 shows a board fixture according to the invention which has been attached to a stiffening profile;

Figure 19 shows how the board fixture of Figure 18 is used for the preparation of reinforced joining/jointing of an additional building board;

Figure 20 shows the joint/assembly realized according to Figure 19;

Figure 21 shows the reinforced joint/assembly of Figure 19, with an additional building board and board fixture at an additional profile stud;

Figure 22 shows a board fixture according to the invention for the preparation of joining/jointing of an additional building board without underlying support;

Figure 23 shows the joint/assembly realized according to Figure 22;

Figure 24 shows the joint/assembly of Figure 22, with an additional building board and board fixture at an additional profile stud;

Figure 25 shows the joining of building boards outside studs by means of a reinforced board fixture;

Figure 26 shows the joining of building boards outside studs; and

Figure 27 shows a sixth embodiment of a board fixture according to the invention in a perspective view.

[0037] A first embodiment of a board fixture 1 according to the invention is shown in Figures 1-3.

[0038] The board fixture 1 is elongated and comprises a first, front flange or flange portion 2, and a second, rear flange or flange portion 3. The flanges 2, 3 are substantially rectangular, and the front flange 2 has a width which is slightly smaller than the width of the rear flange 3. However, the flanges 2, 3 are substantially equally long. The board fixture further comprises a web or web portion 4, connecting the flanges 2, 3 to each other. The flanges 2, 3 extend substantially in parallel with each other and are connected at their centre lines by the web 4, which is also substantially rectangular. The web 4 forms a substantially right angle with the flanges 2, 3. Accordingly, the board fixture 1 exhibits a cross-section which is substantially H-shaped. Accordingly, the board fixture 1 exhibits a first elongated, open space or channel 5, which is adapted to receive an edge of a first building board, and a second elongated, open space or channel 6, which is adapted to receive an edge of a second building board, wherein the web 4 forms the bottom of the respective channel 5, 6 and the flanges 2, 3 form the sides of the respective channel 5, 6.

[0039] The web 4 exhibits a plurality of through recesses or openings 7, which are all identical and arranged along the longitudinal direction of the web 4. The openings 7 are adapted to allow spreading of an adhesion agent, for example an adhesive, a sealing agent or a caulking compound, between the channels 5 and 6 and between the edges of the building boards, so that a fluid-tight adhesion joint can be formed between the edges of the building boards. As used herein, fluid-tight joint refers to a joint which is gas-tight, i.e. impermeable to gases, and then especially to air, and liquid-tight, i.e. impermeable to liquids, and then especially to water and moisture.

[0040] Thus, each of the openings 7 should, on the one hand, exhibit such a size and, on the other hand, together exhibit such a distribution across the surface of the web 4, that an efficient spreading of the adhesion agent is achieved between the channels 5, 6, as well as between the edges of the two building boards. In the shown embodiment, each opening 7 is about 6 mm wide and about 25 mm long, and together they cover about 25% of the area of the web 4. The openings 7 are rectangular and, in this case, each opening 7 extends from the rear flange 3 and across only part of the width of the web 4. It is appreciated, however, that the shape, size and distribution of the openings across the surface of the web can vary, on the condition that a spreading of the adhesion agent between the channels 5 and 6 is achieved. Preferably, however, the openings should cover or occupy at least 5% of the area of the web 4, more preferably at least 10% of the area of the web 4, and even more preferably at least 20% of the area of the web 4. As a matter of fact, the openings in the web should preferably cover as large a part of the area of the web 4 as possible, however, on the condition that the structural integrity of the board fixture is maintained, and on the condition that the shape stability of the board fixture is not jeopardized during the installation. Furthermore, the openings 7 should preferably be uniformly distributed across the surface of the web 4, so that a uniform distribution of the adhesion agent along the length of the respective channel 5, 6 is ensured.

[0041] In the board fixture 1, the web portion 4 is planar, implying that the web portion forms a planar distance element for the building boards, said distance element ensuring that there is at least a minimum space between the edge portions of the building boards, which space can be filled by the adhesion agent.

[0042] As is evident from Figures 1 and 3, the front flange 2 is not completely planar, but slightly bent inwardly along its centre line, so that the channels 5 and 6, in the transverse direction of the board fixture 1, narrow in a direction from the web 4 and out towards the opening of the respective channel 5, 6. This implies that the edges of the building boards, when they are placed in the channels 5 and 6, are subjected to a retaining clamping action between the flanges 2 and 3, said clamping action contributing to fixing the building boards in the board fixture until the adhesion agent has been applied and solidified or cured.

[0043] Furthermore, as is evident from Figures 1-3, the long edges 8 of the front flange 2 are slightly bent outwardly, which facilitates the insertion of the edges of the building boards into the channels 5, 6.

[0044] Figures 4 and 5 show a second embodiment of a board fixture 9 according to the invention. The board fixture 8 is substantially similar to the previously described board fixture 1, but in this case the rear flange 3 of the board fixture 9 exhibits a plurality of identical recesses or openings 10. The openings 10 also allow the adhesion agent to spread to the back side 28 of the rear flange 3, which also constitutes the outside of the flange 3, whereby the adhesion agent is allowed to form an adhesion joint between the board fixture 9 and an underlying structure, for example a stud. In order to obtain an efficient spreading of the adhesion agent to the back side of the rear flange 3, it is preferred that the openings 10 are arranged at regular intervals along the centre line of the rear flange 3, so that the openings 10 connect to, open into, or transition into the openings 7 in the web 4. Furthermore, it is preferred that the openings 10, per unit of length of board structure, exhibit a total area substantially corresponding to the total area of the openings 7. In the shown embodiment, the openings 10 have a substantially rectangular shape and the dimensions 10 mm by 24 mm.

[0045] Figures 6 and 7 show a third embodiment of a board fixture 11 according to the invention. The board fixture 11 is substantially similar to the board fixture 1 described above, but in this case the front flange 2 of the board fixture 11 is completely planar and exhibits a plurality of recesses or openings 12. When the joint between the building boards is finished, the joint filler is adapted to penetrate through the openings 12 and in behind the front flange 2, whereby a good adherence between the joint filler and the board fixture 11 is obtained. Accordingly, through the agency of the openings 12, the front flange 2 constitutes a reinforcement for the filler. In the shown embodiment, the openings 12 are identical, circular, and arranged in two parallel rows along the front flange 2, said rows being centered about the centre line of the flange 2. It is appreciated, however, that other shapes of the openings 12 are possible within the scope of the invention. It is also appreciated that the openings 12, within the scope of the invention, can be placed in other positions in the flange 2.

[0046] As is evident from Figures 6 and 7, the rear flange 3 is slightly wider than the rear flange of the board fixture 1. In contrast to the rear flange of the board fixture 1, the rear flange in this case exhibits long edges 13 which are slightly thinner than the rest of the rear flange 3. This facilitates the insertion of the edges of the building boards into the channels 5, 6, and makes the channels 5, 6 tapering in a direction toward their respective bottom, which contributes to a retaining clamping action between the flanges 2 and 3, said clamping action contributing to

fixing the building boards in the board fixture until the adhesion agent has been applied and solidified or cured.

[0047] Figures 8-10 show a fourth embodiment of a board fixture 14 according to the invention. The front flange 2 exhibits openings 12, in accordance with the board fixture 11, and the rear flange 3 exhibits openings 10, in accordance with the board fixture 9. In this case, the web 4 exhibits recesses or openings 15, which extend across the entire width of the web 4 and even through the front flange 2. Accordingly, in addition to the first set of openings 12, the front flange 2 also exhibits a second set of openings 16, which are thus arranged along the centre line of the front flange 2, directly opposite the openings 15. The purpose of the openings 15 is the same as the purpose of the previously described openings 7, i.e. to allow spreading of an adhesion agent between the channels 5 and 6 and between the edges of the building boards, so that a fluid-tight adhesion joint can be formed between them.

[0048] The purpose of the openings 16 is to allow application of the adhesive agent in the channels 5, 6 when the edges of the building boards already are in position in the channels 5, 6. It is appreciated that this purpose can be achieved with openings in the front flange 2 having a different shape or a different position than the openings 16 disclosed in Figures 8-10. However, it is preferred that these openings are arranged at, or in close vicinity to, the extension of the web 4, i.e. in this case at the centre line of the flange 2, so that they connect to, open into, or transition into the openings in the web 4, which ensures that the adhesion agent being applied in the openings in the front flange 2 immediately ends up in the openings in the web 4, and thereby between the edges of the building boards.

[0049] Figure 11 shows a fifth embodiment of a board fixture 17 according to the invention. The board fixture 17 is substantially similar to the previously described board fixture 9, but in this case comprises an adhesion layer, for example an adhesive or adherent layer in the form of a double-stick tape (not visible), which is arranged on the external side of the rear flange 3. The board fixture 17 also comprises a detachable protective film 18, which covers and protects the adhesion layer and which is intended to be removed in connection with use of the board fixture 17.

[0050] In the following, a method for joining a first building board and a second building board over a vertical stud by means of a board fixture according to the invention will be described more closely with reference to Figures 12-17, where a board fixture 17 of the type shown in Figure 11 is used.

[0051] The first step in the method is that the board fixture 17 is pushed over the first building board 19, so that that the edge portion 20 of the first building board 19 is brought into the first channel 5 of the board fixture 17. Thereby, the board fixture 17 is retained in this position owing to the clamping force exerted on the edge portion 20 by the flanges 2 and 3.

[0052] Thereafter, the first building board 19 and the attached board fixture 17 are brought into position in front of the stud 21 over which the joining is to take place, said step being shown in Figure 13.

[0053] Thereafter, the protective film 18 is removed, as is shown in Figure 14, so that the adhesion layer (not visible) on the outside of the rear flange 3 is exposed, whereupon the board fixture 17 is applied against the stud 21 in the desired position, so that the adhesion layer forms an adhesion joint between the board fixture 17 and the stud 21. Since this adhesion joint is sufficient to at least temporarily fix the board fixture 17 to the stud 21, this joint generally has a limited working life.

[0054] Thereafter, an adhesion agent 22 is applied in the second channel 6 of the board fixture 17, as is shown in Figure 15. This adhesion agent 20 is preferably a suitable adhesive, for example a water-based silicate adhesive, which is applied with a suitable tool, for example a caulking gun 23. In connection with the application of the adhesion agent in the second channel 6, the adhesion agent is pressed through the openings 7 in the web 4, on the one hand, and through the openings 10 in the rear flange 3, one the other hand (see Figure 11).

[0055] Thereafter, the second building board 24 is brought into the board fixture 17, as is shown in Figure 16, so that the edge portion 25 of the second building board is brought into the second channel 6 of the board fixture 17. In connection with this step, an additional pressing of the adhesion agent 22 out through the openings 7 of the web 4 takes place, so that the adhesion agent 22 is distributed between the channels 5 and 6, and so that a preferably substantially continuous body of adhesion agent is formed, which body extends between the edge portions 20, 25 of the building boards 19, 24. Accordingly, the adhesion agent 22 is spread and distributed via the openings 7 in the web 4, in this case through an action exerted by the edge portion 25 of the second building board 24.

[0056] The last step in the joining method is that the adhesion agent is allowed to dry or cure, so that a durable adhesion joint 26 is formed, on the one hand, between the edge portions 20, 25 of the building boards 19, 24 and, on the other hand, between the respective edge portion 20, 25 and the stud 21. During this drying or curing step, the building boards 19, 24 can advantageously be fixed in their positions by means of the magnetic ruler disclosed in WO 2008/026982 A1.

[0057] Owing to the fact that the adhesion agent, by the agency of the openings 7, is allowed to spread in the channels 5 and 6 and form a continuous body between the edge portions 20, 25 of the building boards 19, 24, an air and water-tight joint can be achieved between the building boards 19, 24 in a simple and reliable way. It is appreciated, however, that the spreading of the adhesion agent can occur in alternative ways. For example, as an alternative to the above-described application of the adhesion agent 20 in the second channel 6, or as a complement to this application, the adhesion agent can be

applied in the first channel 5 of the board fixture 17, before the board fixture 17 is pushed over the edge portion 20 of the first building board 19.

[0058] In the case when a board fixture of the type shown in Figures 8-10 is used, the application of the adhesion agent can even take place subsequently to the two building boards having been placed in the board fixture. In this case, the installer applies the adhesion agent through the openings 16 in the front flange 2 (see Figures 8-10), wherein the adhesion agent is pressed into the two channels 5 and 6 simultaneously and brought into contact with the building board edges arranged in the channels 5, 6. Accordingly, in this case, the spreading and distribution of the adhesion agent 22 is brought about through an action exerted directly by the installer.

[0059] It is appreciated that the board fixture according to the invention can also be used for joining a first building board and a second building board without underlying stud or support.

[0060] Figures 18-21 illustrate such a method, where a board fixture 17 according to figure 11 is used. The method is substantially the same as the method described in connection with Figures 12-17, but in this case the board fixture 17 is attached to a bending resistance increasing member in the form of a stiffening profile 27, instead of to a stud. In other respects, the method is the same.

[0061] Figures 22-24 illustrate another method for joining a first building board and a second building board without underlying stud or support. In this case, no stiffening profile is used and, in such a case, preferably a board fixture lacking openings in the rear flange is used. In this case, a board fixture 1 according to Figures 1-3 has been used, which board fixture 1 only exhibits openings 7 in the web 4 (see Figures 1-3).

[0062] The first step in this method is shown in Figure 22, where the board fixture 1 is pushed over the first building board 19, so that the edge portion 20 of the first building board 19 is brought into the first channel 5 of the board fixture 1. Thereby, the board fixture 1 is retained in this position owing to the clamping force exerted by the flanges 2 and 3 on the edge portion 20, as is shown in Figure 23.

[0063] Thereafter, an adhesion agent is applied in the second channel 6 of the board fixture 1, as has been described above, wherein adhesion agent is pressed through the openings 7 in the web 4 and into the first channel 5 of the board fixture 1.

[0064] Thereafter, the edge portion 23 of the second building board 22 is brought into the second channel 6 of the board fixture 1, wherein an additional pressing of the adhesion agent out through the openings 7 of the web 4 takes place, so that the adhesion agent is distributed between the channels 5 and 6, and so that a continuous body of adhesion agent is formed, which body extends between the edge portions 20, 25 of the building boards 19, 24.

[0065] Finally, the adhesion agent is allowed to dry or cure so that a durable adhesion joint 26 is formed between the edge portions 20, 25 of the building boards 19, 24. During this drying or curing step, the building boards 19, 24 can advantageously be fixed in their positions through fixing them to studs, as is shown in Figure 24, which preferably takes place by means of the magnetic ruler disclosed in WO 2008/026982 A1.

[0066] Figures 25 and 26 illustrate additional joining methods according to the invention. In Figure 25, the joining takes place substantially in the same way as has been described above in connection with Figures 18-21, and in Figure 26 the joining takes place substantially in the same way as has been described above in connection with Figures 22-24. In both these cases, however, the attachment to adjacent studs 21 takes place without any joining, wherein the building boards 19, 24 preferably are glued to the studs 21.

[0067] The board fixture according to the invention can be made from, for example, metal or plastic. The fixtures can, for example, be manufactured by making the desired recesses or openings in lengths of extruded plastic. Alternatively, the fixtures can be manufactured by bending sheet metal into a suitable shape. In those cases when the board fixture comprises an adhesive layer on the outside of the rear flange 3, which layer is preferably formed by a double-stick tape, the adhesive layer is preferably attached to the outside of the flange 3 before the openings 10 are punched, cut out, or created in another way. Thereby, also the adhesive layer will exhibit openings, corresponding to the openings 10 in the flange 3.

[0068] By arranging the adhesion layer on the outside of the rear flange 3, preferably in the form of a double-stick tape also being provided with openings, it becomes possible to attach the board fixture to a support, for example a stud or a concrete or wooden wall. Even though the tape joint in itself does not have a long working life, it is sufficient to retain the board fixture with attached building board as long as needed for an applied adhesion agent to pass through the openings 7 to the adjacent building board and through the openings 10 to the support and start its curing there.

[0069] As far as the board fixture shown in Figures 18-21 and 25 is concerned, which has been provided with a stiffening profile 27, it is appreciated that even though this profile, in principle, could have been arranged at the board fixture in advance, or even been integrated in one piece with the rest of the board fixture, the use of a separate stiffening profile is preferable, since such a profile only is used in a first building board layer, and when there is sufficient space behind the building boards.

[0070] The recesses or openings in the channels can of course be designed in several ways in the board fixture, depending on desired effect. Smaller apertures can for example be arranged in rows in the vertical direction complementing each other, in order to make the adhesion agent cover each part of the joint, for example when sealing external walls.

[0071] The fixtures are preferably made for the most

common building board thicknesses present on the market, and in the standard lengths in which building boards normally are supplied, which lengths can be 2500 mm, 2700 mm or 3000 mm. It is appreciated, however, that the board fixture according to the invention can be made in other desired dimensions. Other materials, for example expanded metal, can be used for the entire or parts of the board fixture, which then automatically provides adhesion agent-transmitting openings. Figure 27 shows such a board fixture 29, where the front flange exhibits portions 30 made of expanded metal. It is appreciated that other parts of the board fixture, for example the web, can be made of expanded metal, in which case the openings exhibited by the expanded metal can constitute said openings for the adhesion agent.

[0072] The embodiment of the board fixture 29 shown in Figure 27 also exhibits a bending resistance forming portion 31 in the form of bent sheet metal portions, which extend from the long edges of the inner flange outwardly from the back side of the inner flange, in parallel with the web. Accordingly, in this case, the bending resistance forming portion 31 forms an integrated part of the board fixture 29. In this case, the portion 31 exhibits openings 32 for drawing electricity, water, or other installations.

[0073] Also the channels in the board fixture can be created in different ways. Both, but preferably only one of the channels, can be formed by means of a surface on the support onto which the board fixture is mounted. The channel, of course, still has its adhesion agent-transmitting openings, and the channel formed with the support functions in the same way, i.e. it retains the board against the outer flange and creates a flush joint with the adjacent building board.

[0074] The adhesive is applied in the fixture, the board is placed inside/adjacent to the fixture and in the position desired. A board lift facilitates the installation, since by means of it the board is easily regulated and fixed in the vertical direction during fitting in or installation. A second fixture is placed on the other board edge, the board now serves as a template for the attachment of the fixture to the support. This makes double-stick tape possible to use, because the fit becomes exact by means of this operation, and the need for later adjustment is eliminated, since the protective tape is not removed until both fixture and board edge are in exactly the correct position.

[0075] When installing building boards on steel studs, in applications where the steel studs are movable in ceiling and floor mounted rails, it might be easier to first mount the board fixture on the stud, and to then move the stud with the mounted fixture towards and into position on the edge of the board, where the board is already in its correct position for installation, and in its first fixture.

[0076] In accordance with one method according to the invention, which is for mutually flush installation of building boards against a support, a board fixture, which can also constitute the support, and a longitudinal edge of a first building board are brought into mutual interaction, wherein an adhesive applied in the fixture is spread and distributed via openings in the fixture through an action exerted by the building board, in order create a solid connection between the board and the support after curing.

[0077] In accordance with another method according to the invention, a longitudinal edge of a second building board is brought into the board fixture and presses out applied adhesive through recesses in the board fixture, wherein the adhesive is spread and distributed to adjacent parts/building elements.

[0078] In accordance with another method according to the invention, the board edges are adhesive-joined together by means of the board fixture.

[0079] In accordance with another method according to the invention, the board fixture is fixed to a support, which is a stud, a reinforcement profile, a board, or an existing wall.

[0080] In accordance with another method according to the invention, the fixture is fixed to a stud, whereupon it is moved to its final position where it is brought to enclose the longitudinal edge of the building board.

[0081] In accordance with another method according to the invention, a magnetic means is applied to the front side of the building board, in connection with underlying magnetic material on the support, wherein the magnetic fields from said magnetic means pass through the building board and said magnetic material in connection with the support, or constituting the support, for example in the form of a steel stud, and thus exerts a pressing force on the board and towards the support.

[0082] One embodiment of a board fixture according to the invention, which is for mutually flush fixing of building boards against a support, comprises at least one open, edge-receiving channel having web and flange portions, and is provided with several adhesive-transmitting openings.

[0083] Another embodiment of a board fixture according to the invention comprises an adhesive or adherent surface on the back side of one of the flange portions.

[0084] Another embodiment of a board fixture according to the invention comprises a protective paper, covering the adhesive or adherent surface.

[0085] In another embodiment of the board fixture, the front flange constitutes a reinforcement for filler.

[0086] In another embodiment of the board fixture, a bending resistance increasing body, preferably a profile body, is arranged on the back side of the board fixture.

[0087] In another embodiment of the board fixture, the material in the fixture is transparent or translucent.

[0088] The invention is not limited to the above-described exemplary embodiments, but modifications and variants can be made within the scope of the following specific claims. For example, in the foregoing, the board fixture according to the invention has been described based on installation of wall boards. It is appreciated, however, that the board fixture according to the invention also can be used when installing building boards in ceilings or floors. It is also appreciated that the board fixture

can form an integrated part of a stud.

[0089] It is also appreciated that the board fixture according to the invention, owing to the fact that it enables faster and easier joining of building boards, enables the use of building boards which are less wide than the ones conventionally used. In certain situations, this can be preferred from a cost or work ergonomics perspective.

Paragraphs corresponding to claims in parent application

[0090]

1. A board fixture (1, 9, 11, 14, 17, 29) for flush joining of a first building board (19) and a second building board (24), said board fixture (1, 9, 11, 14, 17, 29) comprising a first, front flange portion (2), a second, rear flange portion (3), and a web portion (4) connecting the flange portions (2, 3), wherein the flange portions (2, 3) and the web portion (4), on the one hand, form a first open space (5) for receiving an edge portion (20) of the first building board (19) and, on the other hand, a second open space (6) for receiving an edge portion (25) of the second building board (24), **characterized in that** the web portion (4) exhibits a plurality of through openings (7, 15) for allowing an adhesion agent (22) to spread between the first open space (5) and the second open space (6) for the formation of an adhesion joint (26) between the edge portions (20, 25) of the building boards (19, 24).

2. The board fixture (1, 9, 11, 14, 17, 29) according to paragraph 1, **characterized in that** the openings (7, 15) occupy at least 5% of the area of the web portion (4).

3. The board fixture (1, 9, 11, 14, 17, 29) according to any one of the paragraphs 1 and 2, **characterized in that** the openings (7, 15) are uniformly distributed across the surface of the flange portion (2).

4. The board fixture (1, 9, 11, 14, 17, 29) according to any one of the paragraphs 1-3, **characterized in that** the web portion (4) is planar.

5. The board fixture (14) according to any one of the paragraphs 1-4, **characterized in that** the front flange portion (2) exhibits openings (16) for the application of the adhesion agent (22).

6. The board fixture (14) according to paragraph 5, **characterized in that** the openings (16) in the front flange portion (2) at least partially open into the openings (15) in the web portion (4).

7. The board fixture (9, 14, 17) according to any one of the paragraphs 1-6, **characterized in that** the rear flange portion (3) exhibits openings (10) for allowing the adhesion agent (22) to spread to the outside (28) of the rear flange portion (3).

8. The board fixture (9, 11, 14, 17) according to paragraph 7, **characterized in that** the openings (10) in the rear flange portion (3) at least partially open into the openings (7, 15) in the web portion (4).

9. The board fixture (1, 9, 11, 17) according to any one of the paragraphs 1-8, **characterized in that** the openings in the web portion (4) only extend across part of the width of the web portion (4).

10. The board fixture (14) according to any one of the paragraphs 1-8, **characterized in that** the openings (15) in the web portion (4) extend across the entire width of the web portion (4).

11. A method for flush joining of a first building board (19) and second building board (24) by means of a board fixture (1, 9, 11, 14, 17, 29), which comprises a first, front flange portion (2), a second, rear flange portion (3), and a web portion (4) connecting the flange portions (2, 3), wherein the flange portions (2, 3) and the web portion (4), on the one hand, form a first open space (5) for receiving an edge portion (20) of the first building board (19) and, on the other hand, a second open space (6) for receiving an edge portion (25) of the second building board (24), **characterized in** the steps of:

- spreading and distributing and adhesion agent (22) applied in the board fixture (1, 9, 11, 14, 17, 29) into the open spaces (5, 6) via openings (7, 15) in the web portion (4), so that a body is formed from the adhesion agent (22), which body extends between the edge portions (20, 25) of the building boards (19, 24); and
- causing the adhesion agent (22) to dry or cure so that a solid adhesion joint (26) is formed between the edge portions (20, 25) of the building boards (19, 24).

12. The method according to paragraph 11, **characterized in that** the adhesion agent (22) applied in the board fixture (9, 14, 17) is spread to and distributed on the outside (28) of the rear flange portion (3) via openings (10) in the rear flange portion (3), so that the adhesion agent (22) is also brought into contact with a support (21) arranged behind the board fixture (9, 14, 17).

13. The method according to any one of the paragraphs 11 and 12, **characterized in that** the adhesion agent (22), when drying or curing, also forms a solid adhesion joint between the edge portions (20, 25) of the building boards (19, 24) and the board fixture (1, 9, 11, 14, 17, 29).

14. The method according to any one of the paragraphs 12 and 13, **characterized in that** the adhesion agent (22), when drying or curing, also forms a solid adhesion joint between said support (21) and the board fixture (9, 14, 17).

15. The method according to any one of the paragraphs 11-14, characterized in the steps of:

- bringing the edge portion (20) of the first building board (19) into the first open space (5) of the board fixture (17);
- applying the adhesion agent (22) in the second open space (6) of the board fixture (17); and
- bringing the edge portion (25) of the second building board (24) into the second open space (6) of the board fixture (17), so that said spreading and distribution of the adhesion agent (22) occurs through an action exerted by the edge portion (25) of the second building board (24).

16. The method according to any one of the paragraphs 11-14, **characterized in** the steps of:

- bringing the edge portion (20) of the first building board (19) into the first open space (5) of the board fixture;
- bringing the edge portion (25) of the second building board (24) into the second open space (6) of the board fixture; and
- applying the adhesion agent (22) in openings (16) in the front flange portion (2) to bring about said spreading and distribution of the adhesion agent (22).

Claims

1. A board fixture (1, 9, 11, 14, 17, 29) for flush joining of a first building board (19) and a second building board (24), said board fixture (1, 9, 11, 14, 17, 29) comprising a first, front flange portion (2), a second, rear flange portion (3), and a web portion (4) connecting the flange portions (2, 3), wherein the flange portions (2, 3) and the web portion (4), on the one hand, form a first open space (5) for receiving an edge portion (20) of the first building board (19) and, on the other hand, a second open space (6) for receiving an edge portion (25) of the second building board (24), **characterized in that**
the web portion (4) exhibits a plurality of through openings (7, 15) for allowing an adhesion agent (22) to spread between the first open space (5) and the second open space (6) for the formation of an adhesion joint (26) between the edge portions (20, 25) of the building boards (19, 24), and
the rear flange portion (3) exhibits openings (10) for allowing the adhesion agent (22) to form an adhesion joint between the board fixture (9) and an underlying structure.

2. The board fixture of claim 1, **characterized in that** the openings (10) in the rear flange portion (3) exhibit a total area substantially corresponding to the total area of the openings (7) in the web portion (4).

3. The board fixture according to claim 1 or 2, **characterized in that** the openings (7) in the web portion (4) occupy at least 20% of the area of the web portion (4).

4. The board fixture according to any of the preceding claims, **characterized in that** the front flange portion (2) is slightly bent inwardly for fixing the building boards (19, 24) by clamping action.

5. The board fixture according to any of the preceding claims, **characterized in that** long edges (8) of the front flange portion (2) are slightly bent outwardly.

6. The board fixture according to any of the preceding claims, **characterized in that** the web portion (4) is planar.

7. The board fixture according to any of the preceding claims, **characterized in that** the front flange portion (2) exhibits a plurality of openings (12) through which a joint filler can penetrate.

8. The board fixture according to any of the preceding claims, **characterized in that** the front flange portion (2) exhibits openings (16) for the application of the adhesion agent (22).

9. The board fixture according to claim 8, **characterized in that** the openings (16) in the front flange portion (2) at least partially open into openings (15) in the web portion (4).

10. A method for flush joining of a first building board (19) and a second building board (24) by means of a board fixture (1, 9, 11, 14, 17, 29), which comprises a first, front flange portion (2), a second, rear flange portion (3), and a web portion (4) connecting the flange portions (2, 3), wherein the flange portions (2, 3) and the web portion (4), on the one hand, form a first open space (5) for receiving an edge portion (20) of the first building board (19) and, on the other hand, a second open space 6) for receiving an edge portion (25) of the second building board (24), **characterized in** the steps of:

spreading and distributing and adhesion agent (22) applied in the board fixture (1, 9, 11, 14, 17, 29) into the open spaces (5, 6) via openings (7, 15) in the web portion (4), so that a body is

formed from the adhesion agent (22), which body extends between the edge portions (20, 25) of the building boards (19,24),
spreading and distributing the adhesion agent (22) applied in the board fixture (9, 14, 17) through openings (10) in the rear flange portion (3), so that the adhesion agent (22) is also brought into contact with a support (21) arranged behind the board fixture (9, 14, 17), and
causing the adhesion agent (22) to dry or cure so that a solid adhesion joint (26) is formed between the edge portions (20, 25) of the building boards (19, 24) and between said support (21) and the board fixture (9, 14, 17).

11. The method according to any claim 10, **characterized in that** the adhesion agent (22), when drying or curing, also forms a solid adhesion joint between the edge portions (20, 25) of the building boards (19, 24) and the board fixture (1, 9, 11, 14, 17, 29).

12. The method according to claim 10 or 11, **characterized in** the steps of:

bringing the edge portion (20) of the first building board (19) into the first open space (5) of the board fixture (17);
applying the adhesion agent (22) in the second open space (6) of the board fixture (17); and
bringing the edge portion (25) of the second building board (24) into the second open space (6) of the board fixture (17), so that said spreading and distribution of the adhesion agent (22) occurs through an action exerted by the edge portion (25) of the second building board (24).

13. The method according to any of claims 10-12, **characterized in** the steps of:

bringing the edge portion (20) of the first building board (19) into the first open space (5) of the board fixture;
bringing the edge portion (25) of the second building board (24) into the second open space (6) of the board fixture; and
applying the adhesion agent (22) in openings (16) in the front flange portion (2) to bring about said spreading and distribution of the adhesion agent (22).

14. The method according to any one of the claims 11-14, **characterized in** the step of fixing the board fixture to the support by means of tape, screws, nails, clips or rivets.

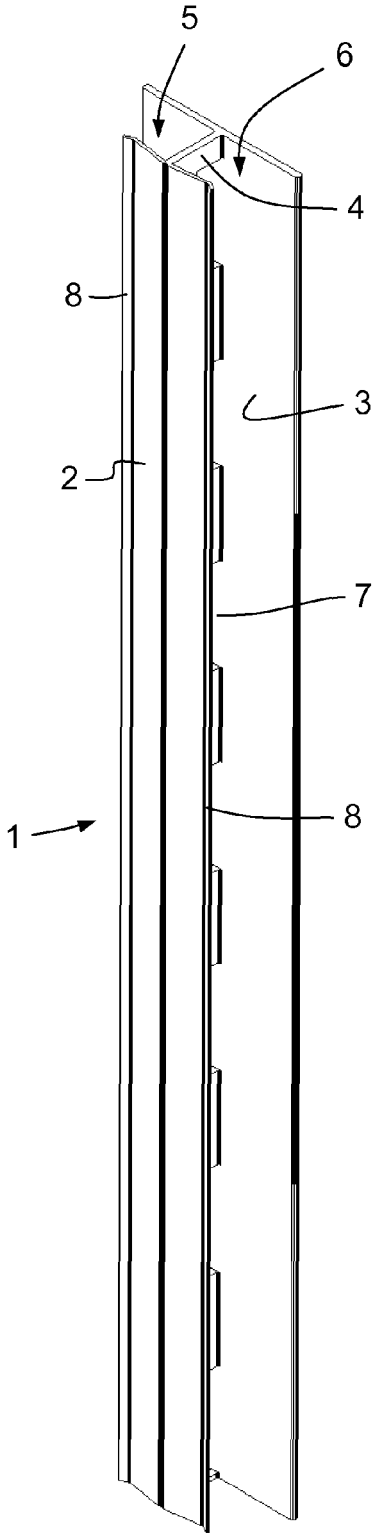

Fig. 1

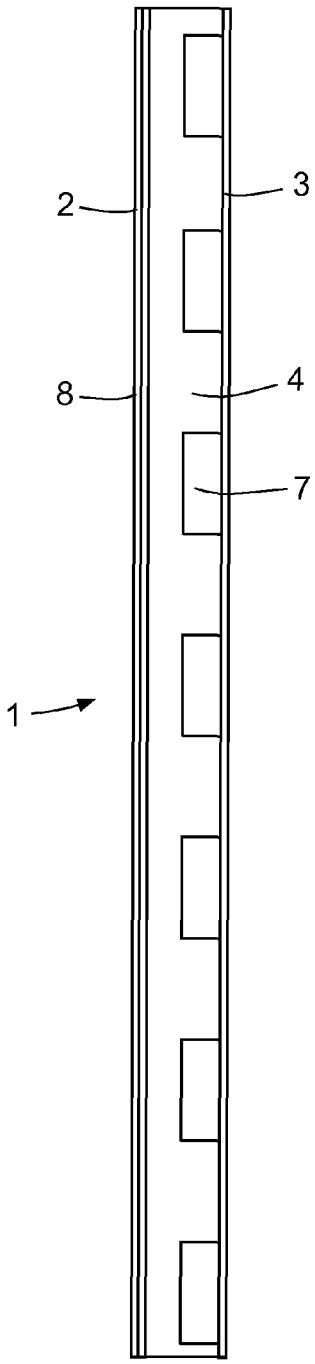

Fig. 2

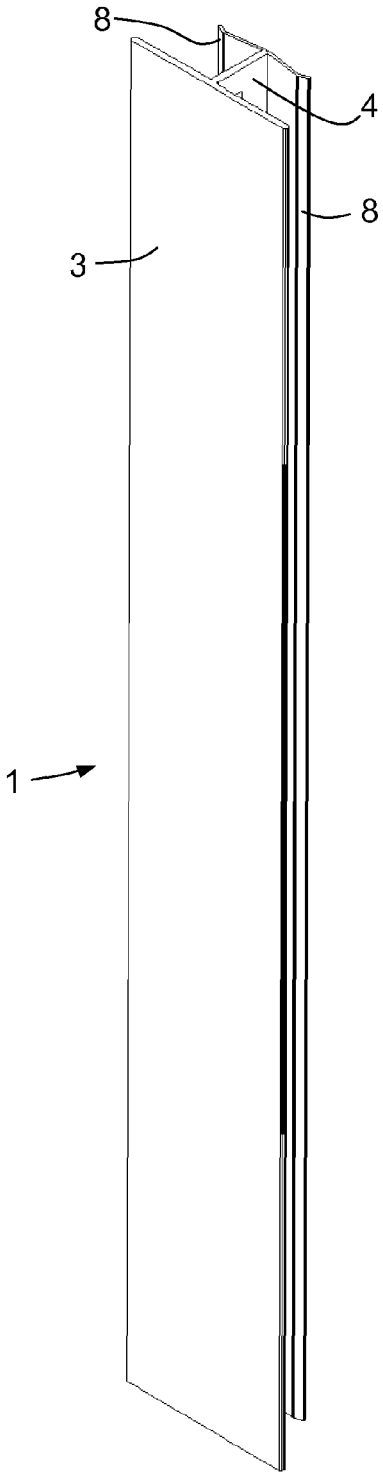

Fig. 3

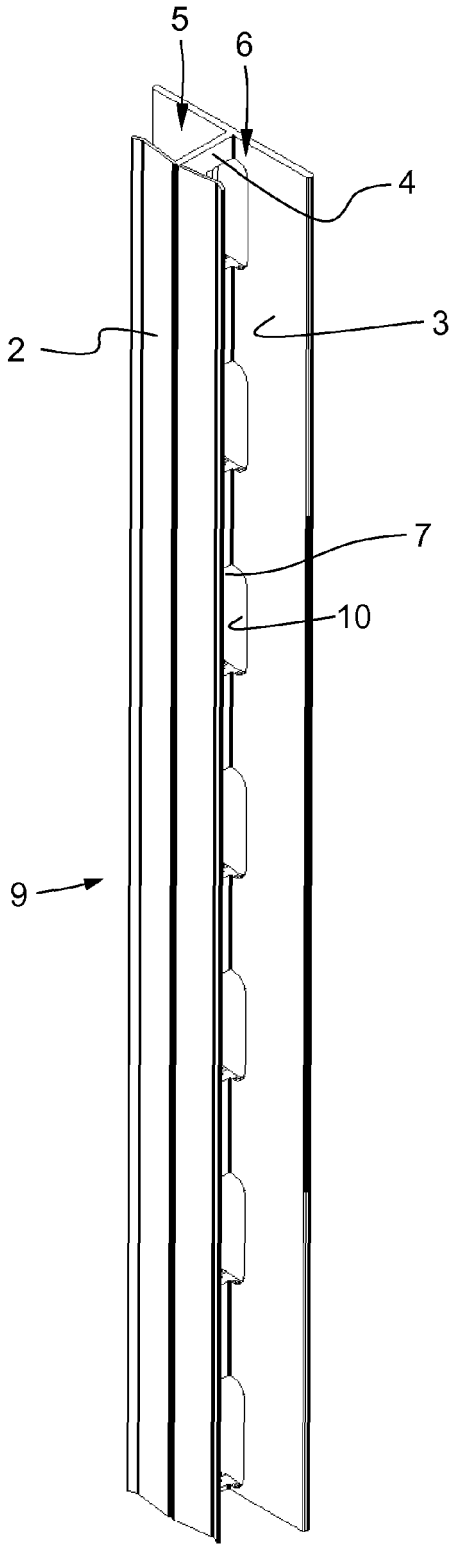

Fig. 4

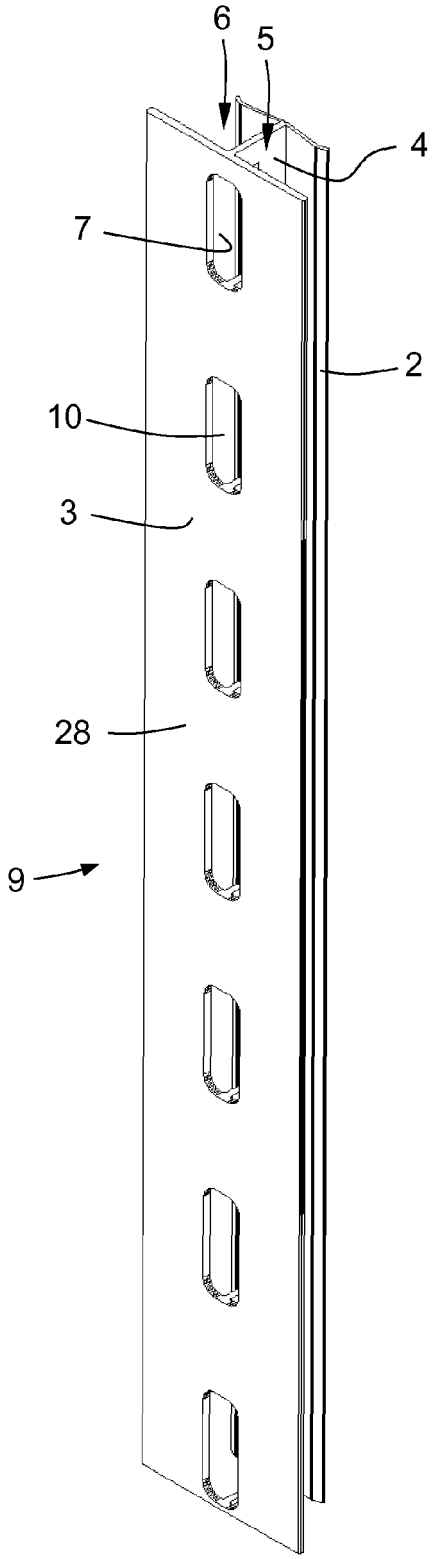

Fig. 5

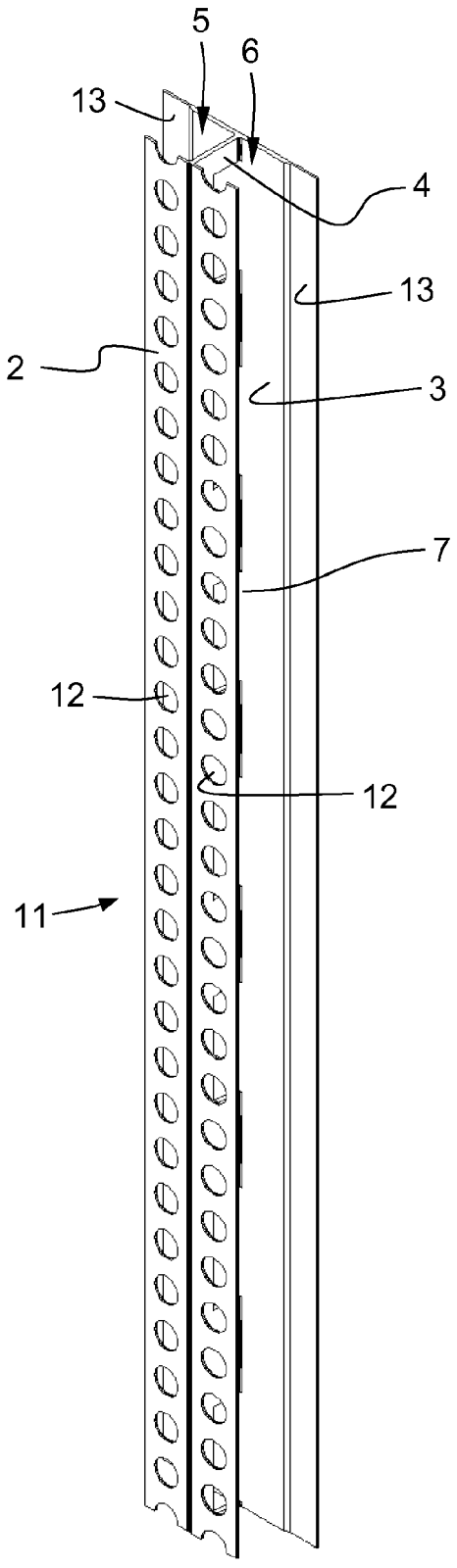

Fig. 6

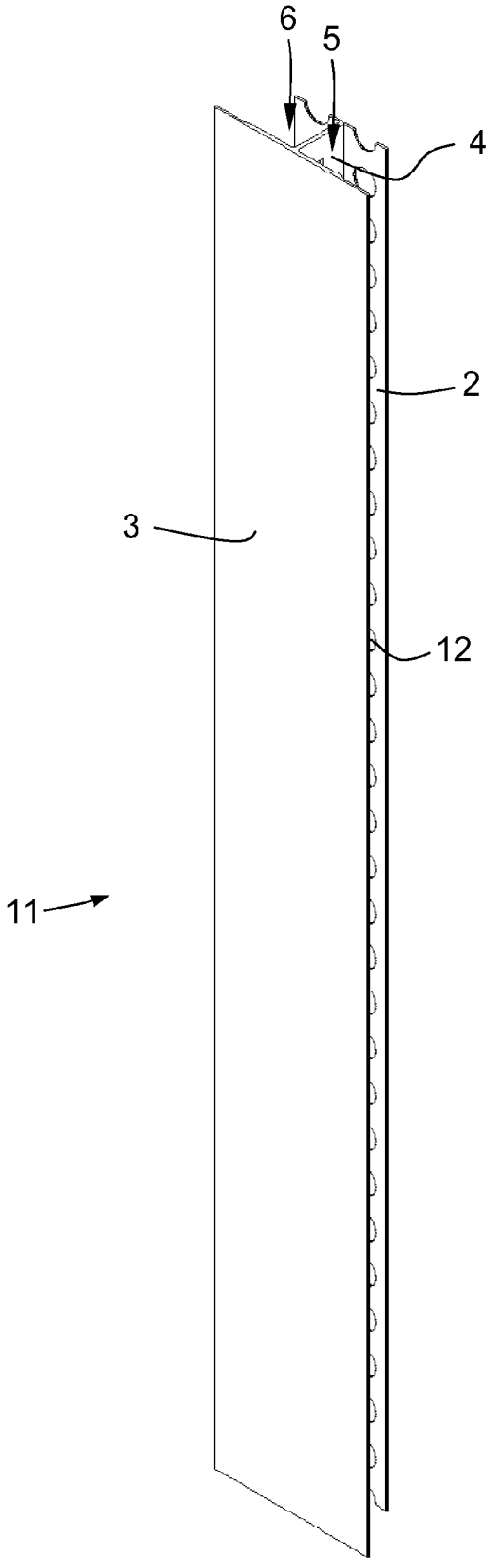

Fig. 7

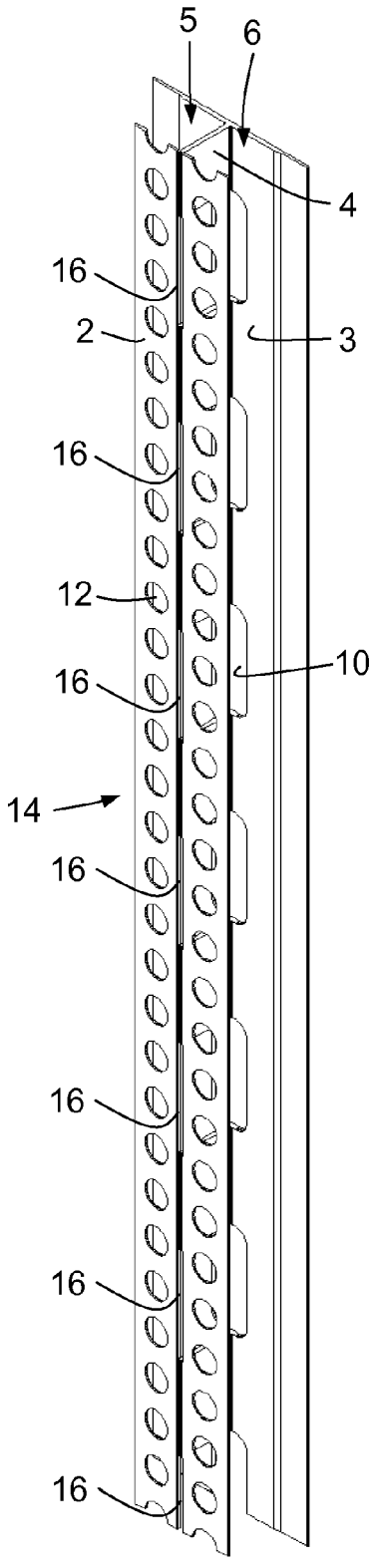

Fig. 8

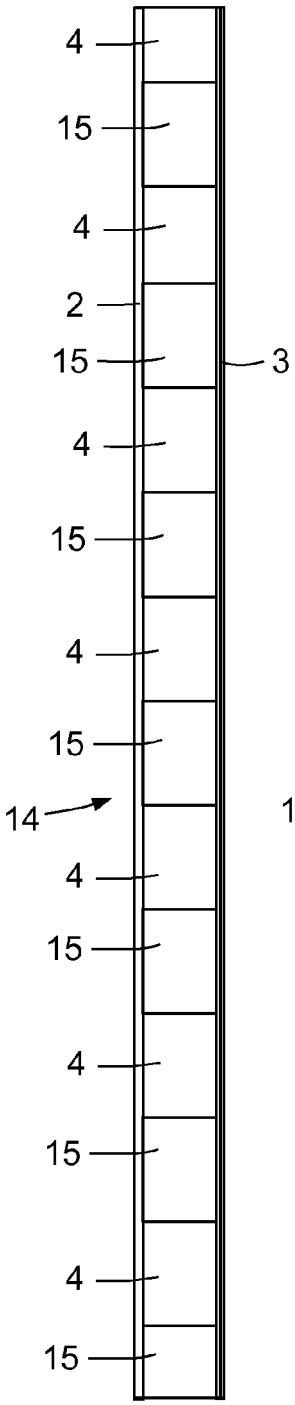

Fig. 9

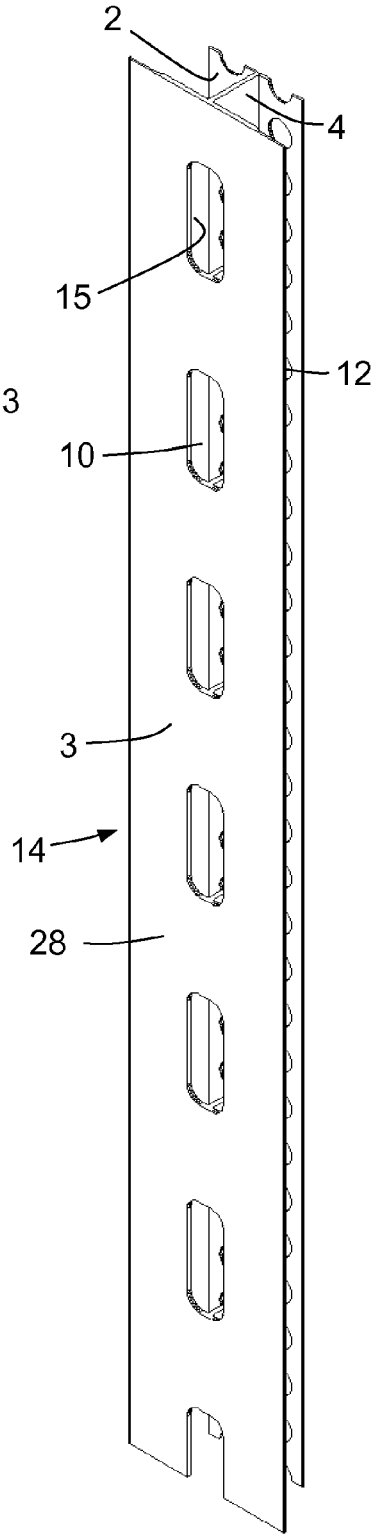

Fig. 10

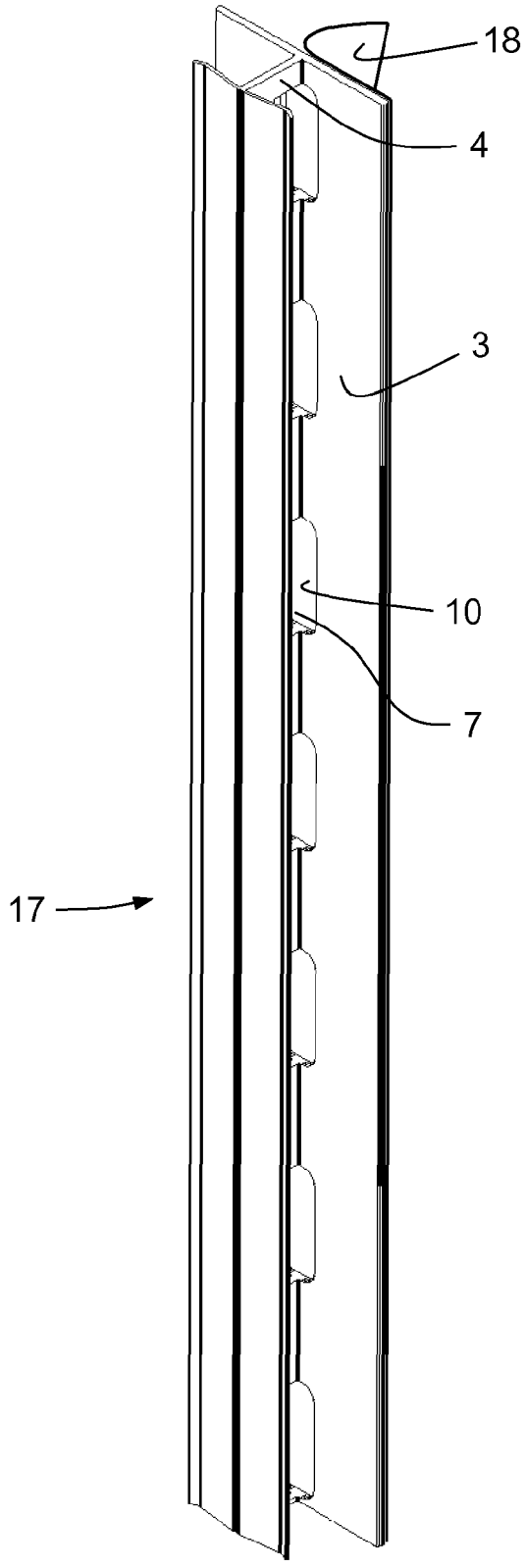

Fig. 11

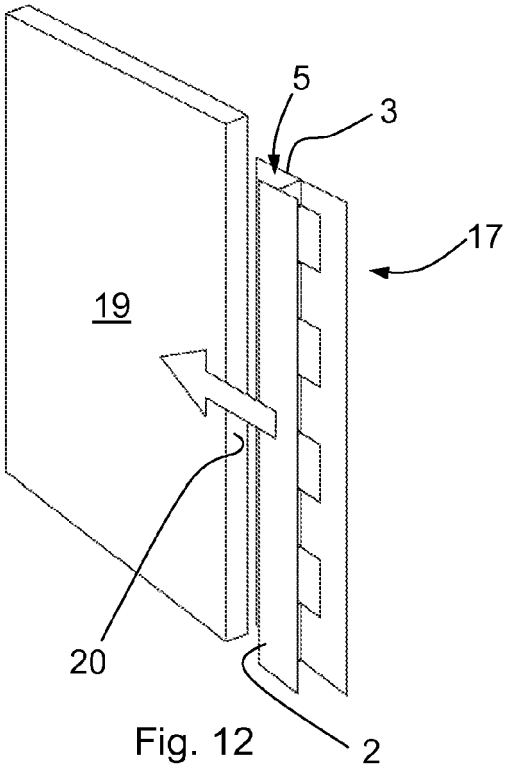

Fig. 12

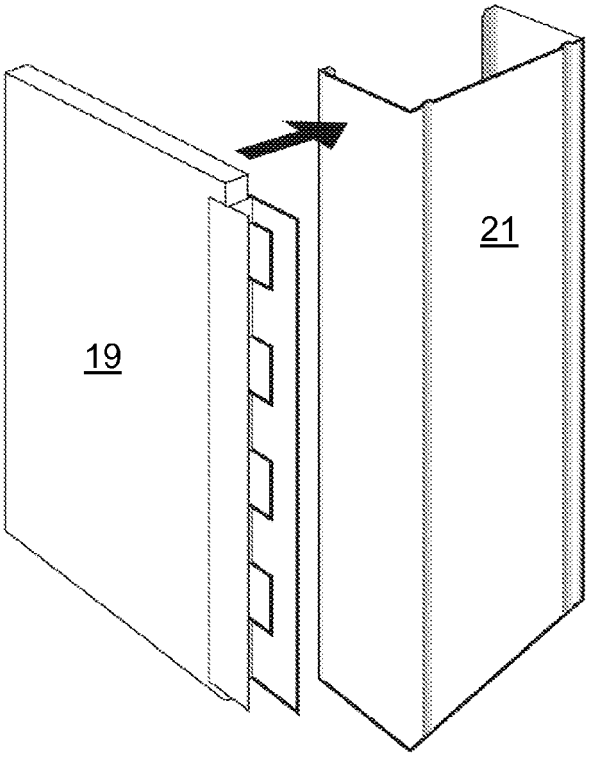

Fig. 13

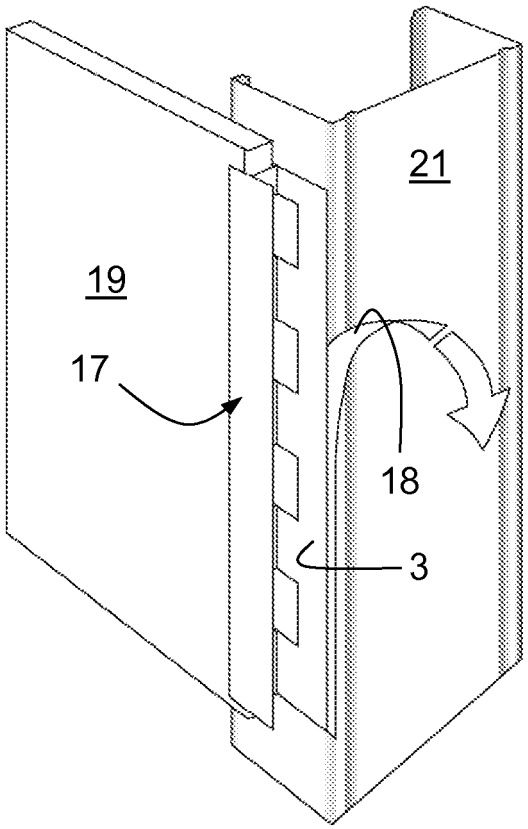

Fig. 14

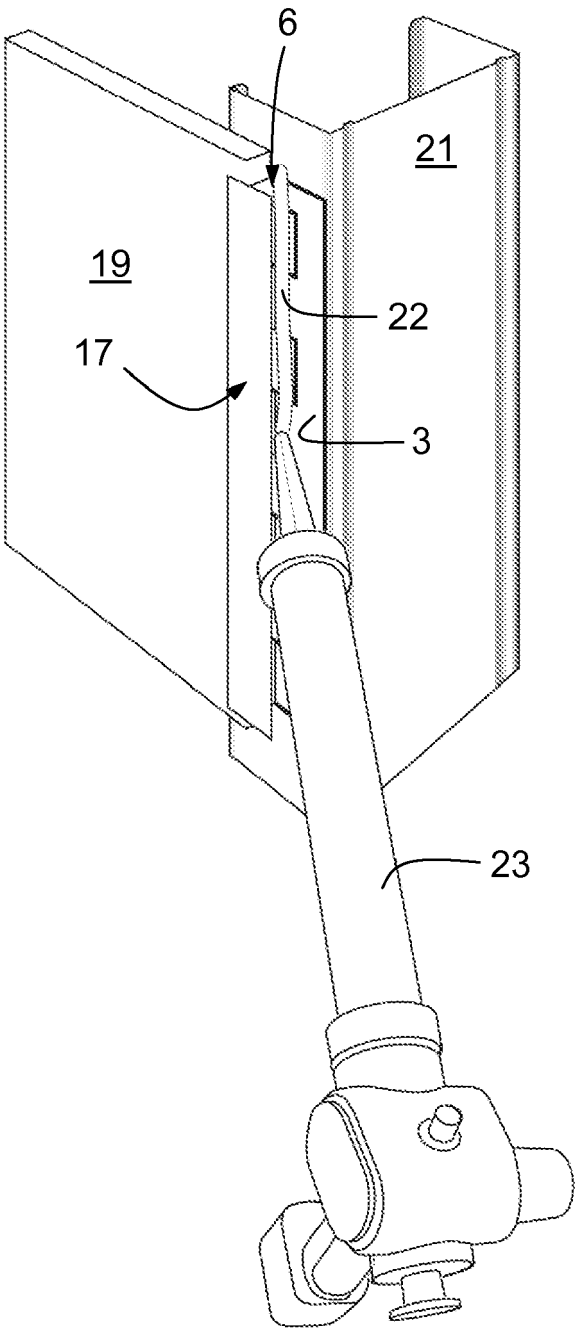

Fig. 15

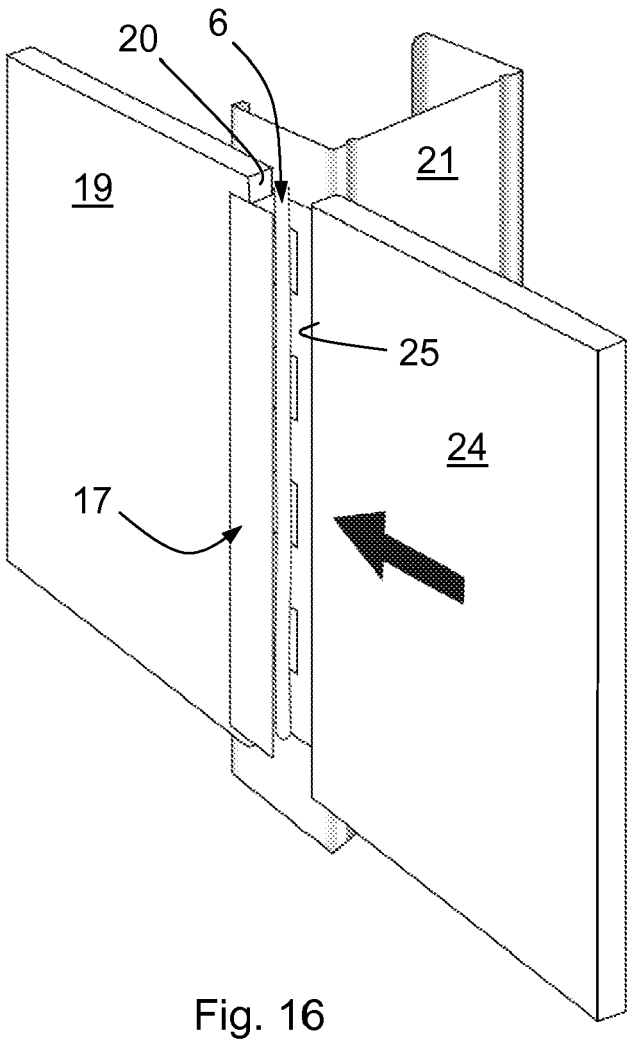

Fig. 16

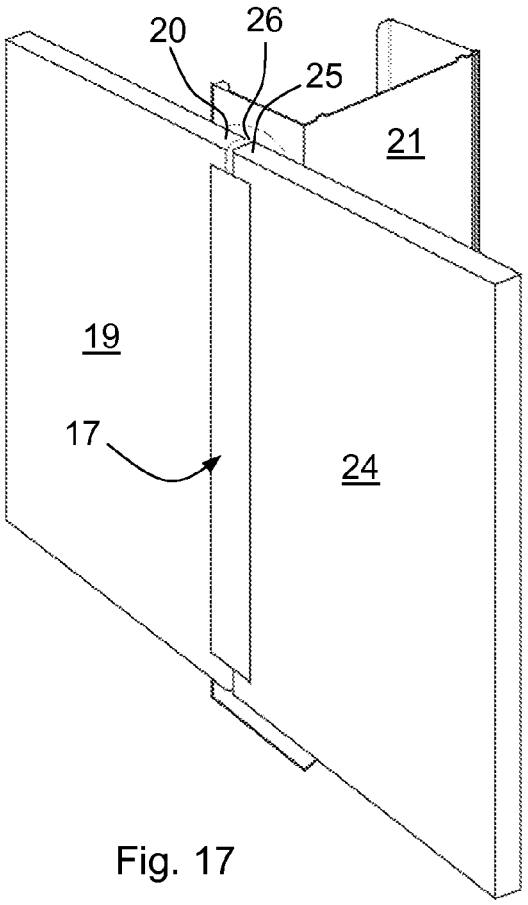

Fig. 17

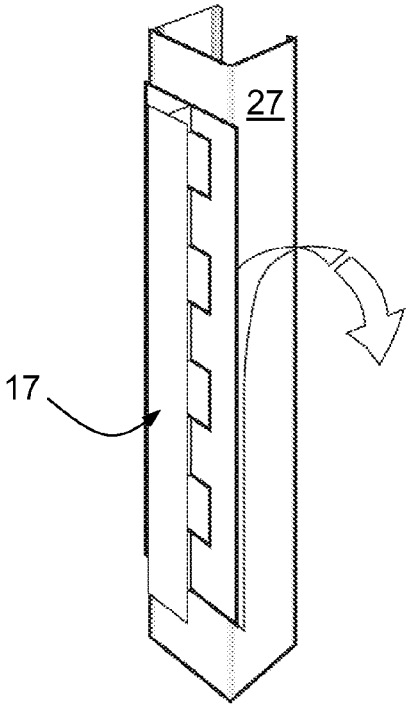

Fig. 18

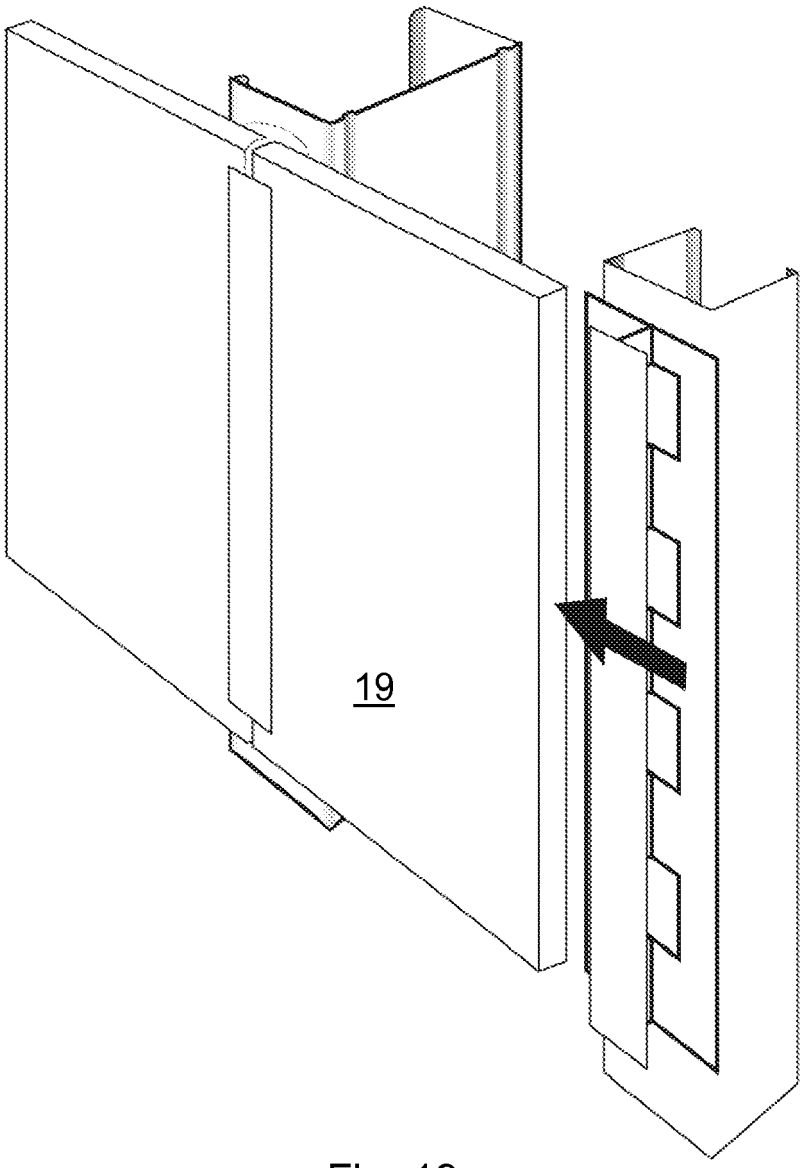

Fig. 19

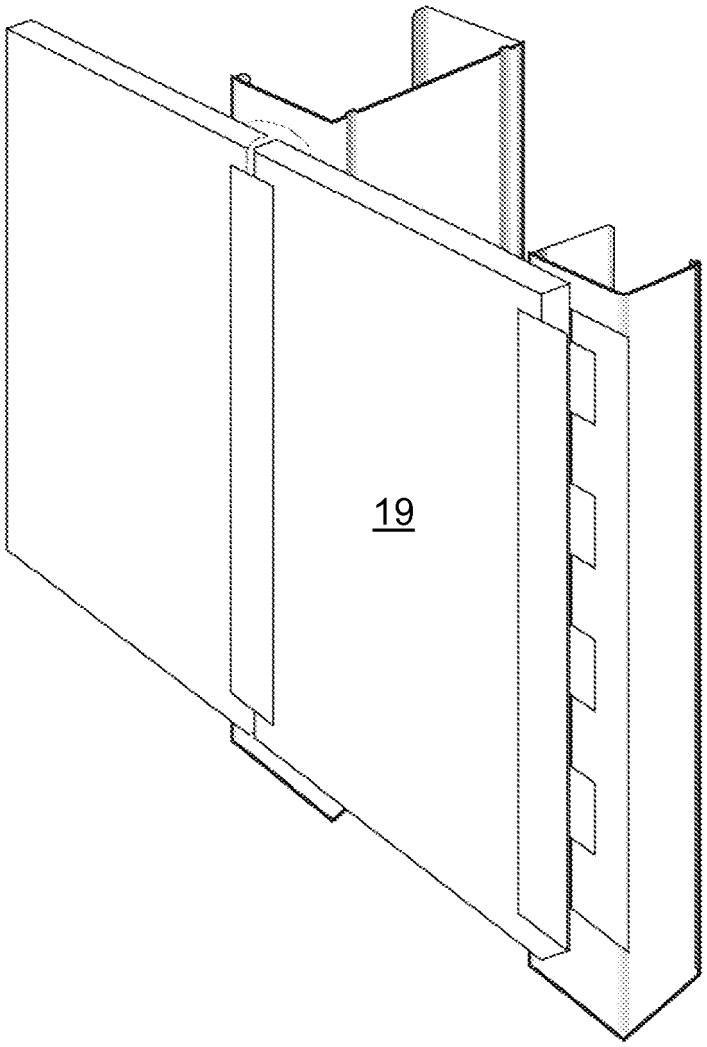

Fig. 20

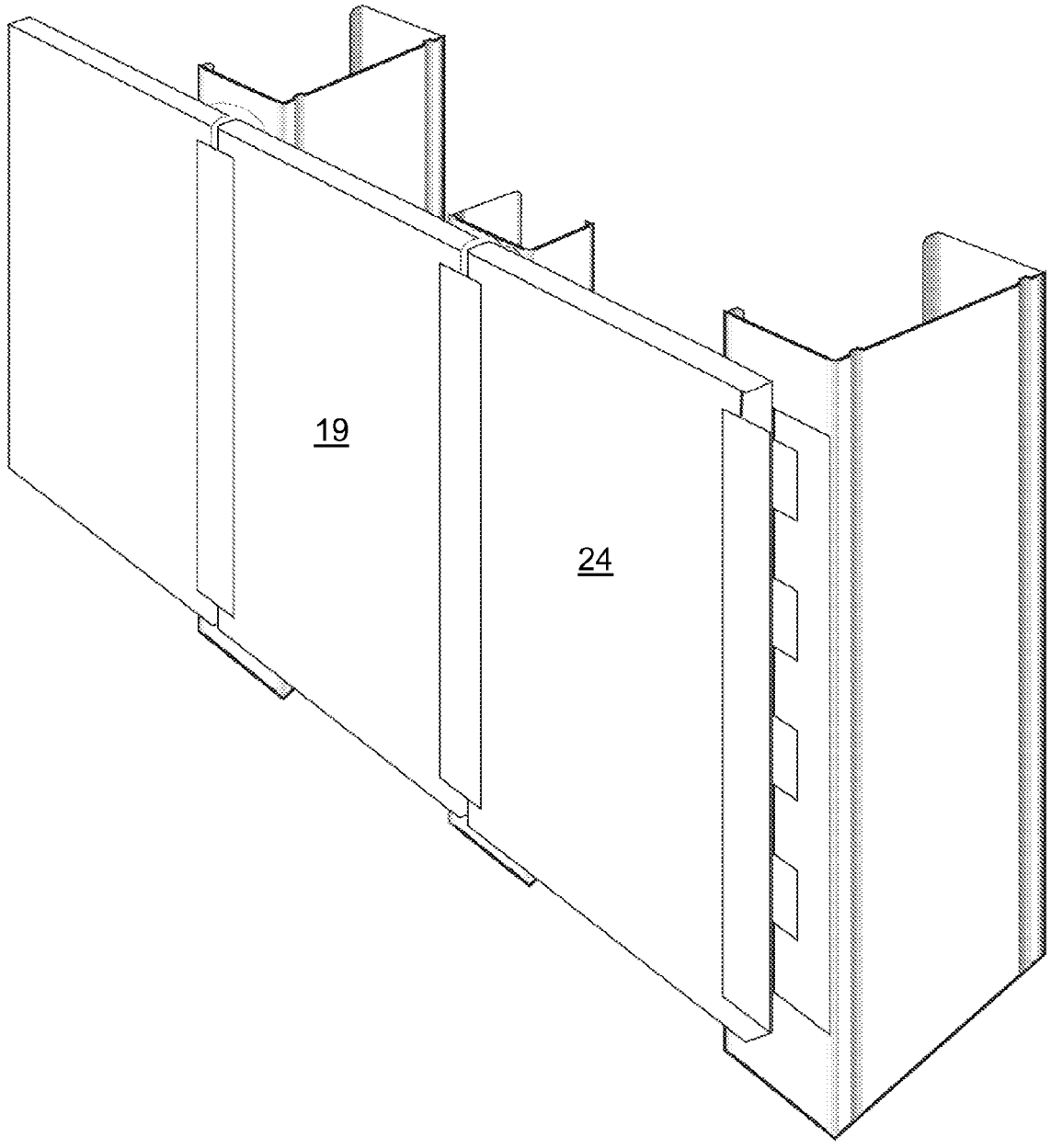

Fig. 21

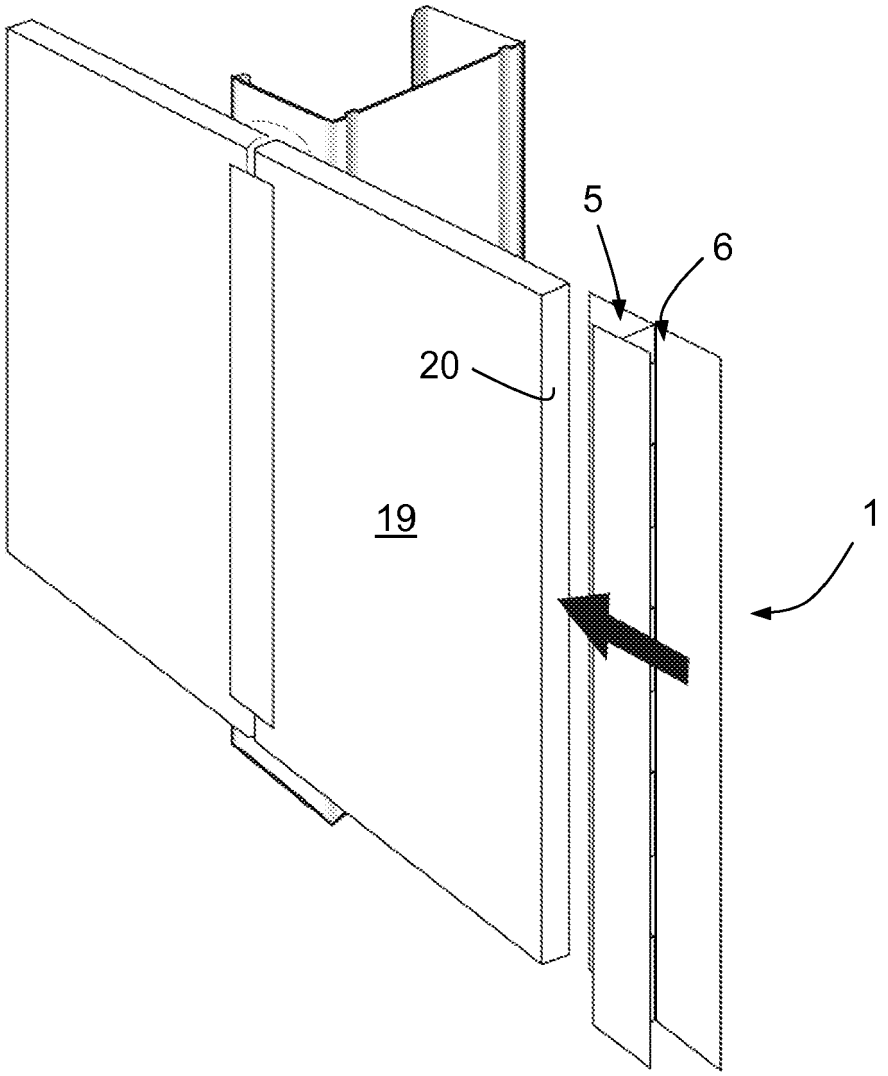

Fig. 22

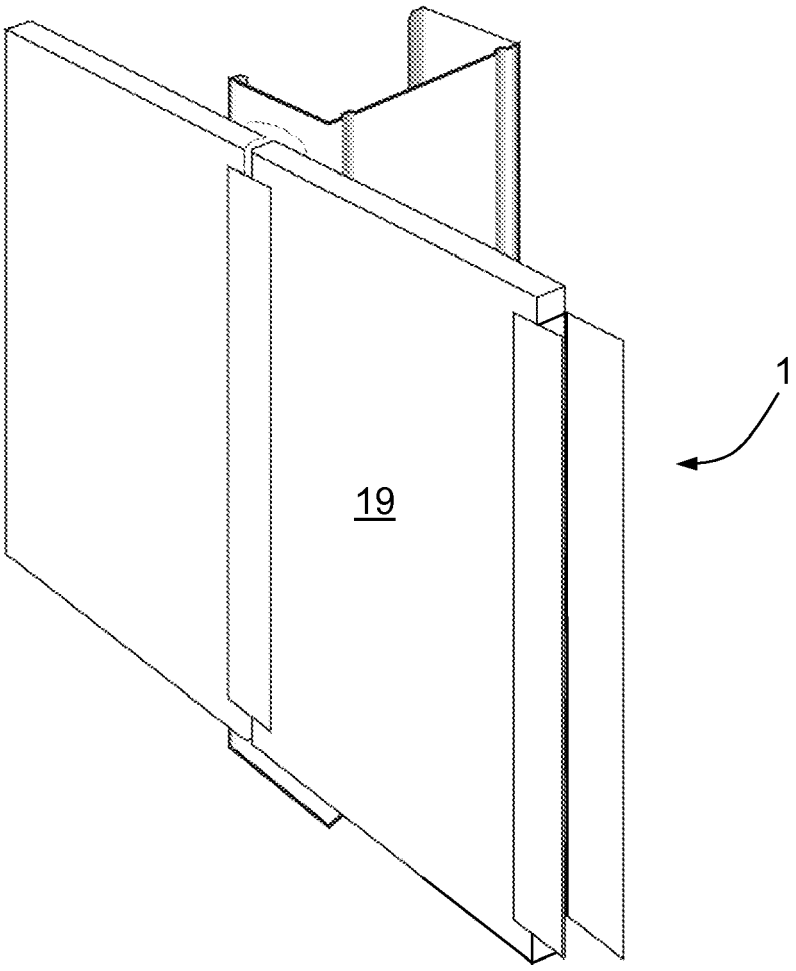

Fig. 23

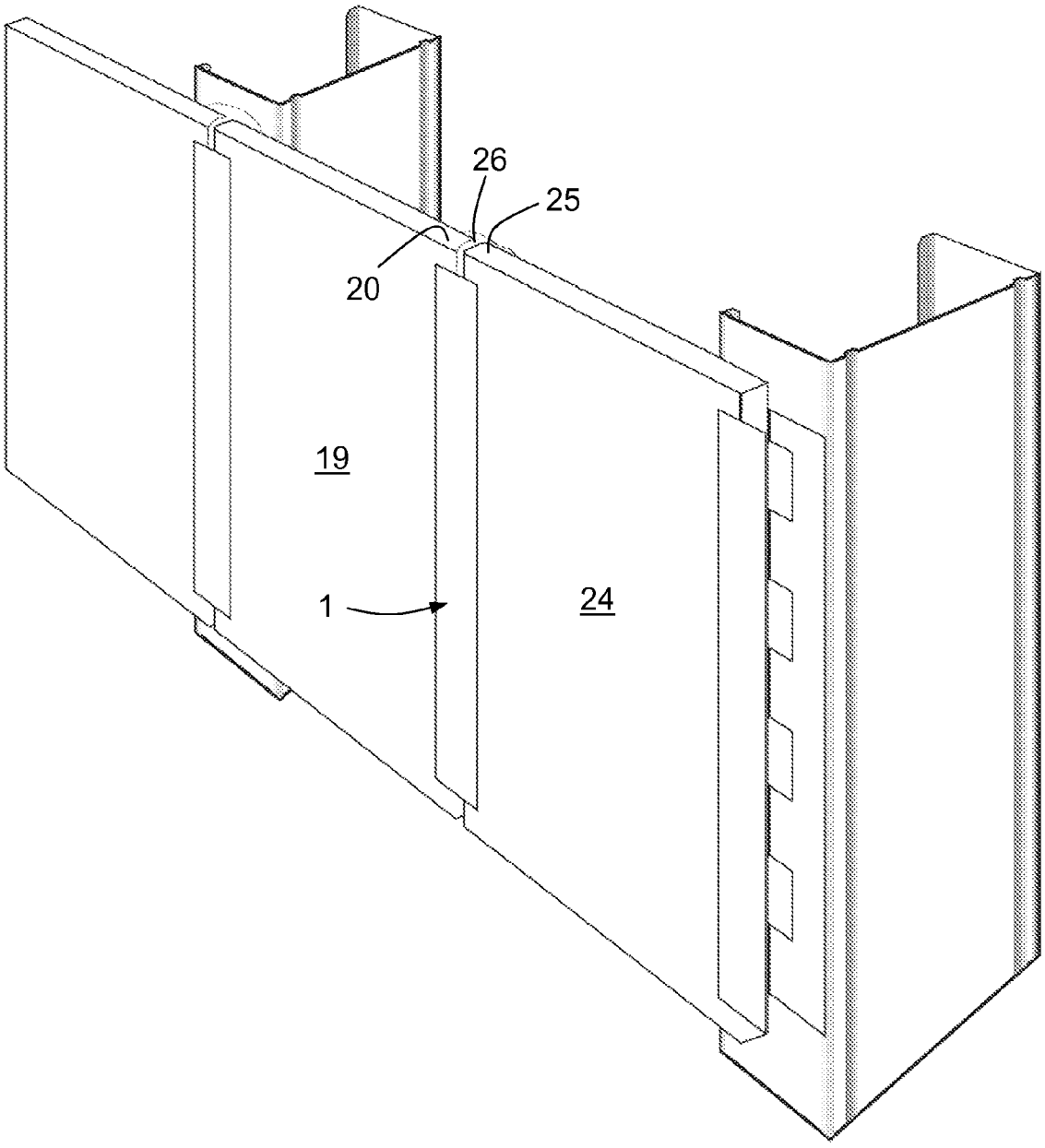

Fig. 24

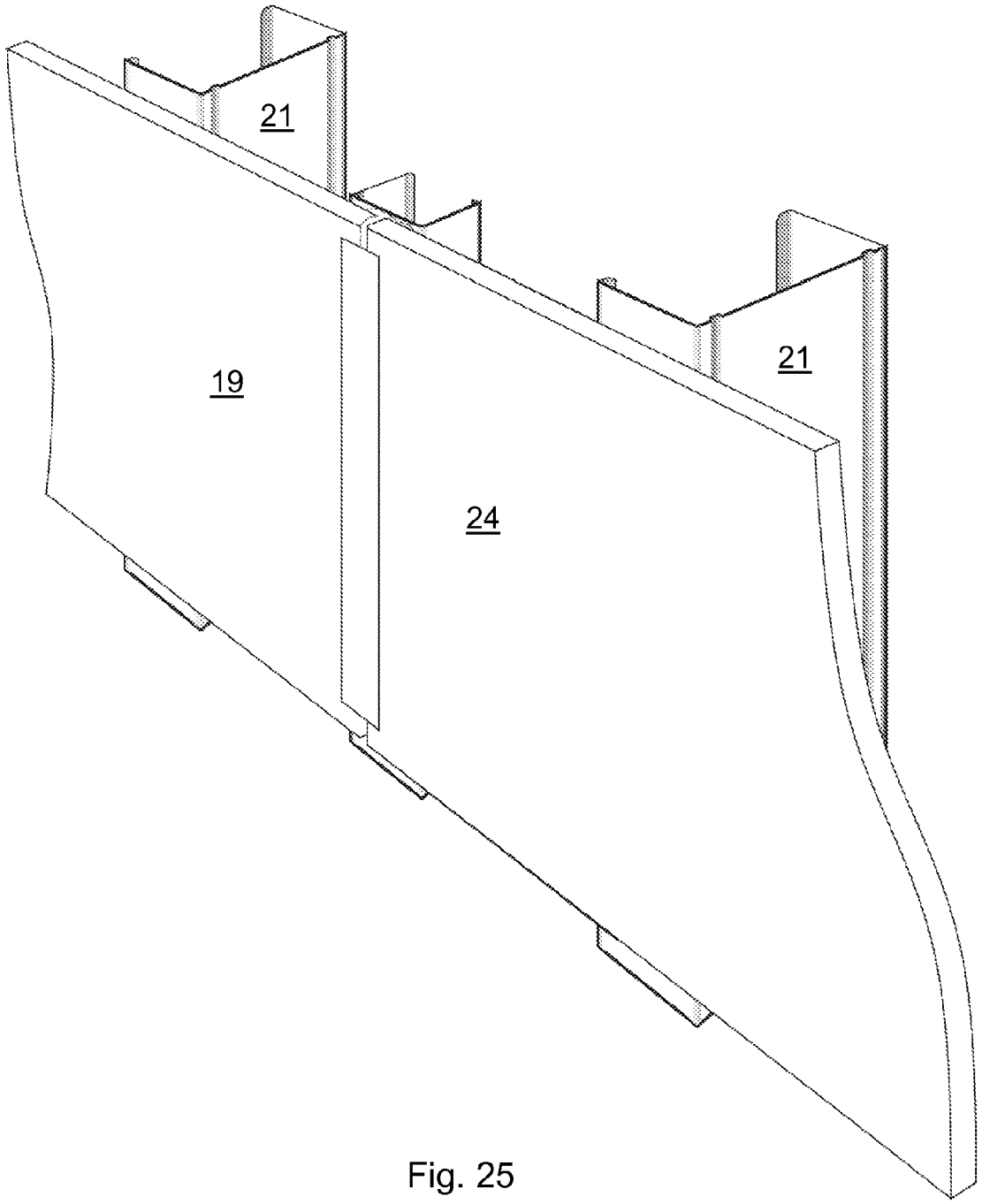

Fig. 25

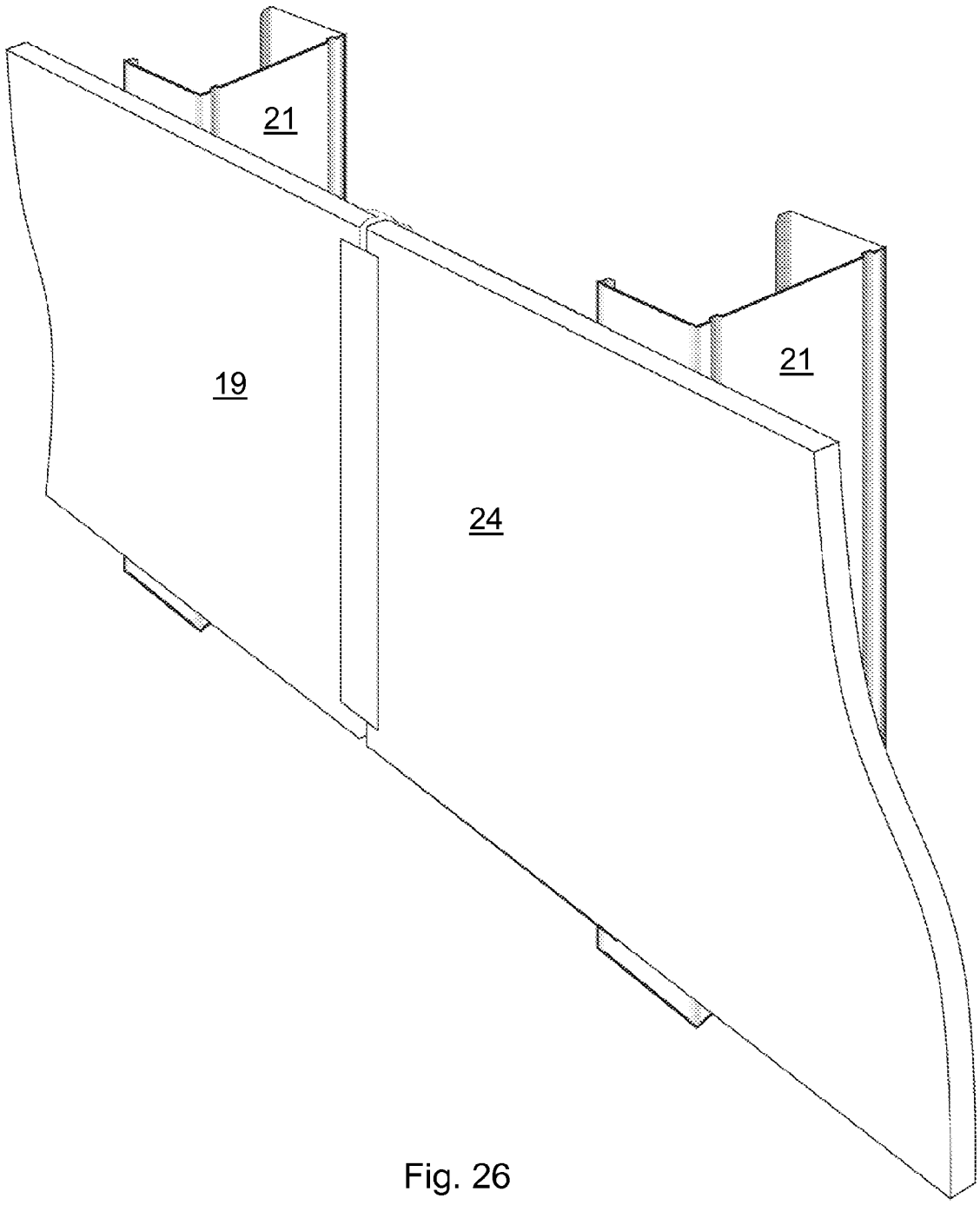

Fig. 26

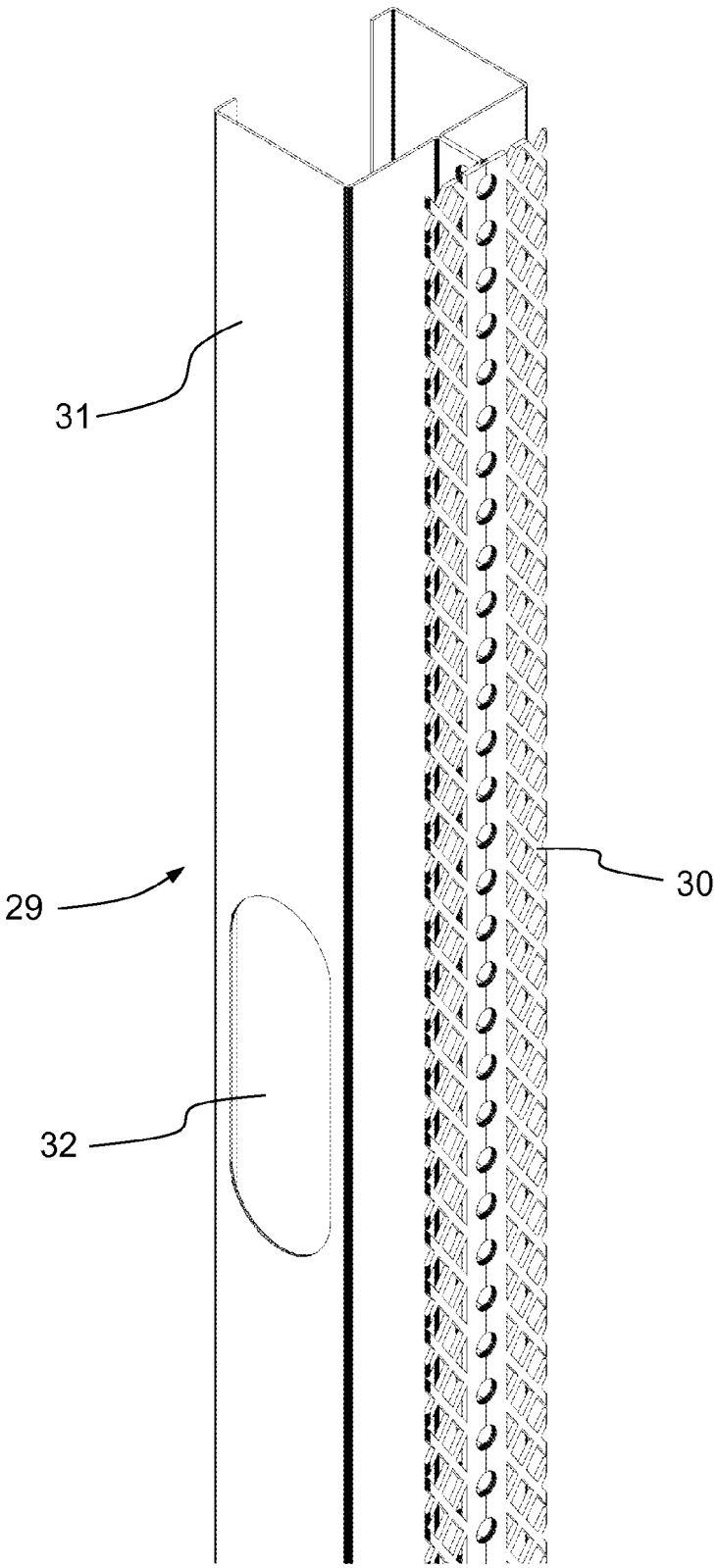

Fig. 27

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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