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(54) **SET OF HONEYCOMB PANELS FOR COVERS AND WALLS**

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(57) **ABSTRACT**

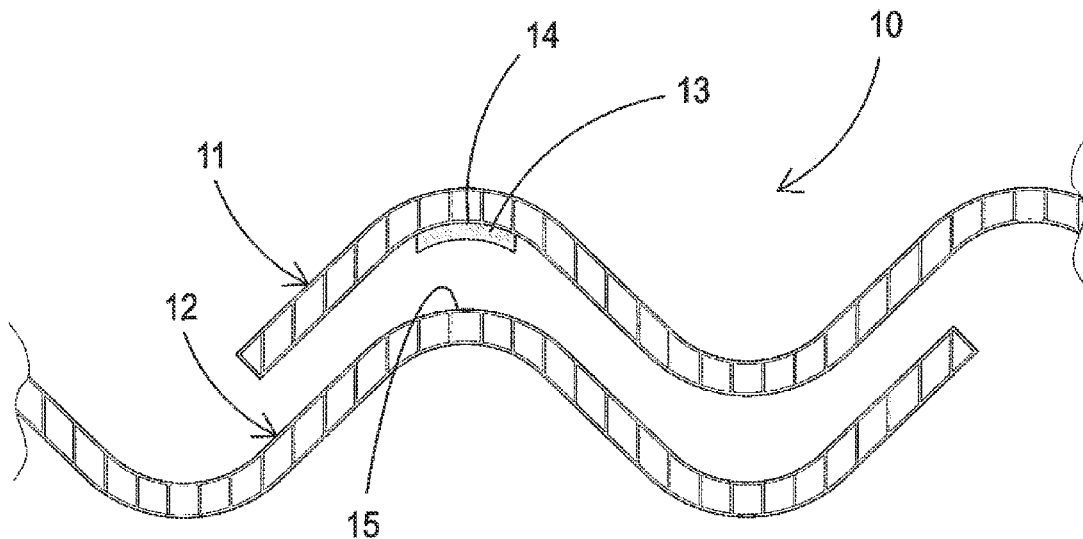
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A set of honeycomb panels for producing covers and walls includes a first honeycomb panel and a second honeycomb panel which are positioned adjacently, to be joined to each other at end-sections, wherein the end-section of the first honeycomb panel defines a groove and the end-section of the second honeycomb panel includes a protuberance, which has a substantially complementary form to that of the groove and is configured to be housed in the groove. In one embodiment, each of the first and second honeycomb panels of the set is made of a plastic material and has a sealing element firmly applied during production of an individual honeycomb panel at the groove.

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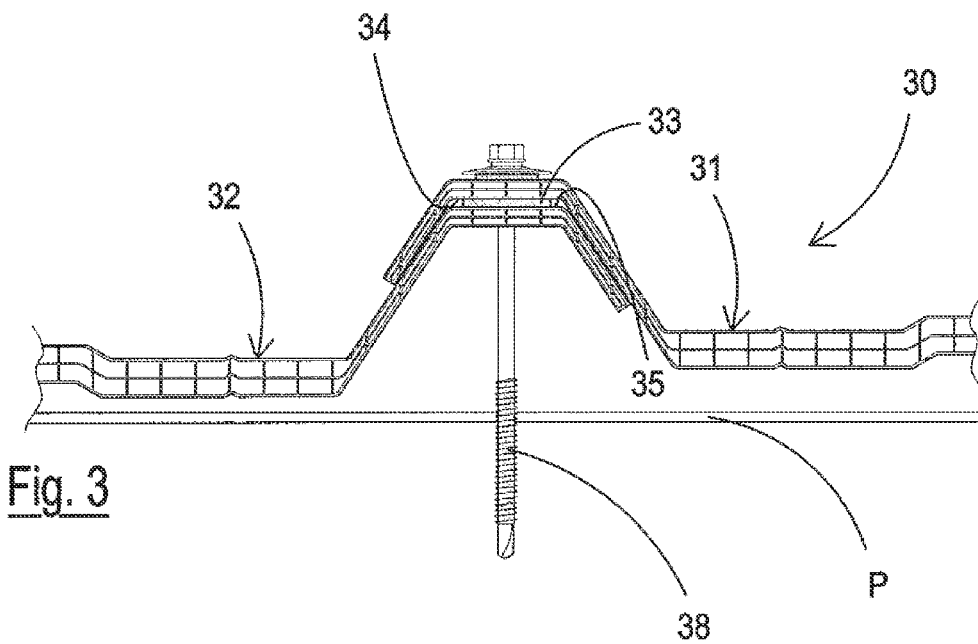
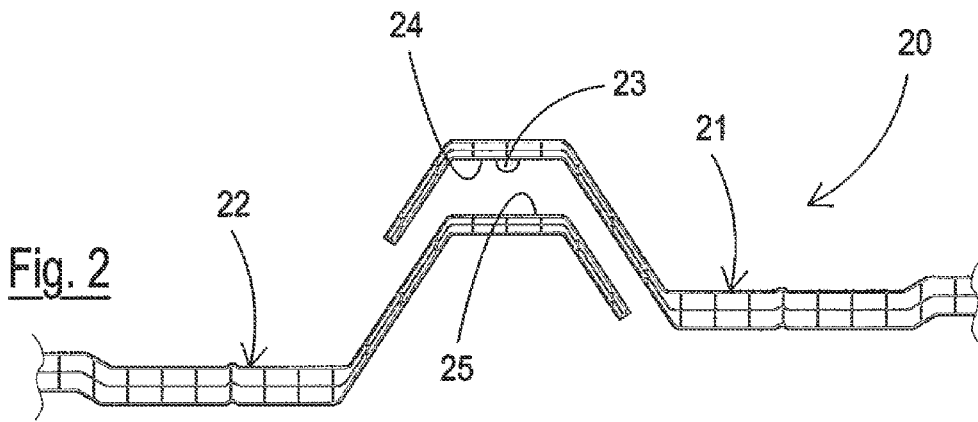
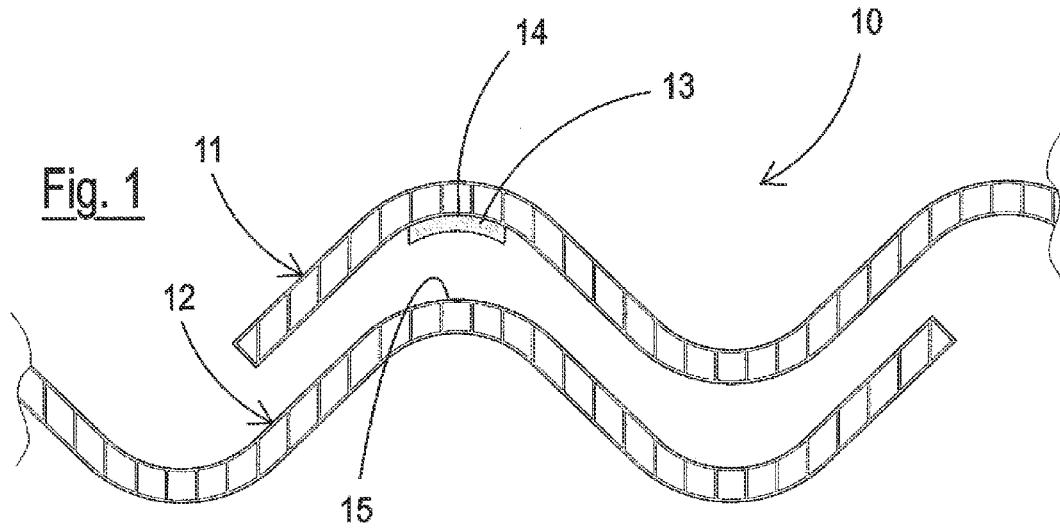


Fig. 4

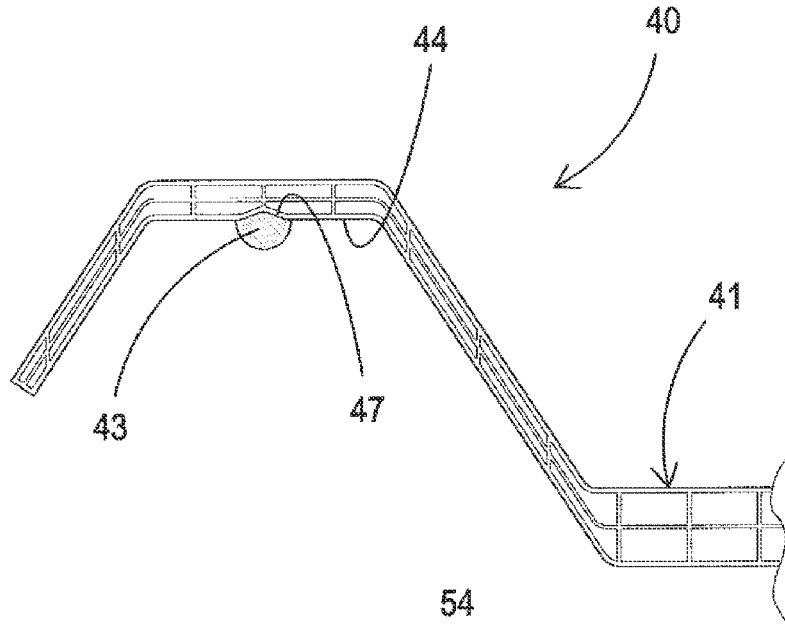


Fig. 5

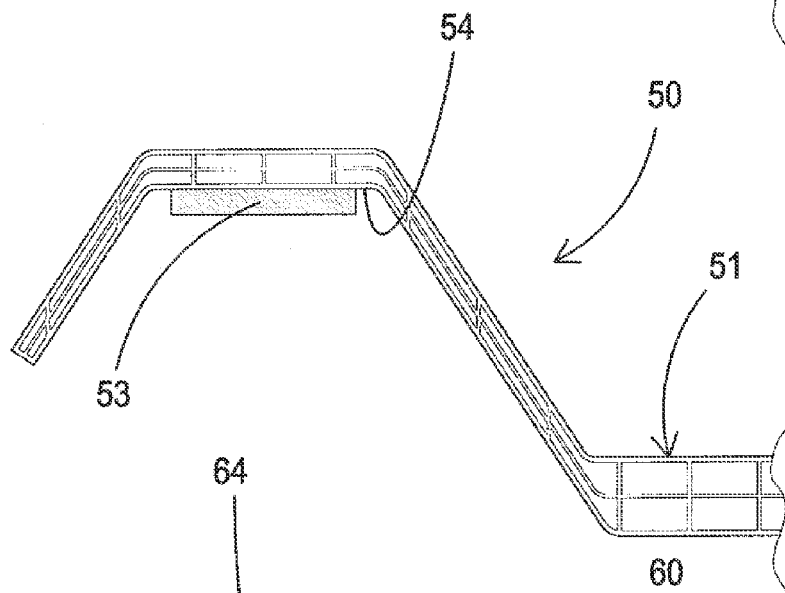
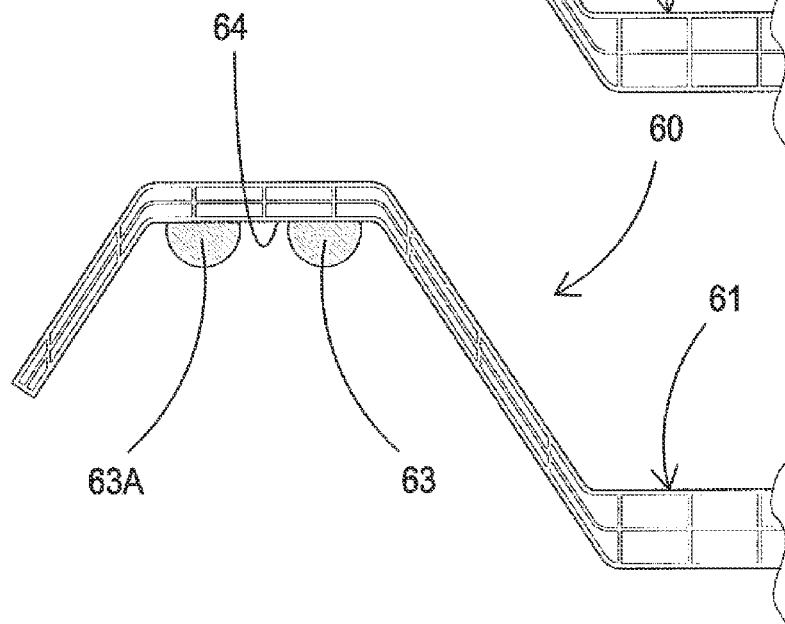


Fig. 6



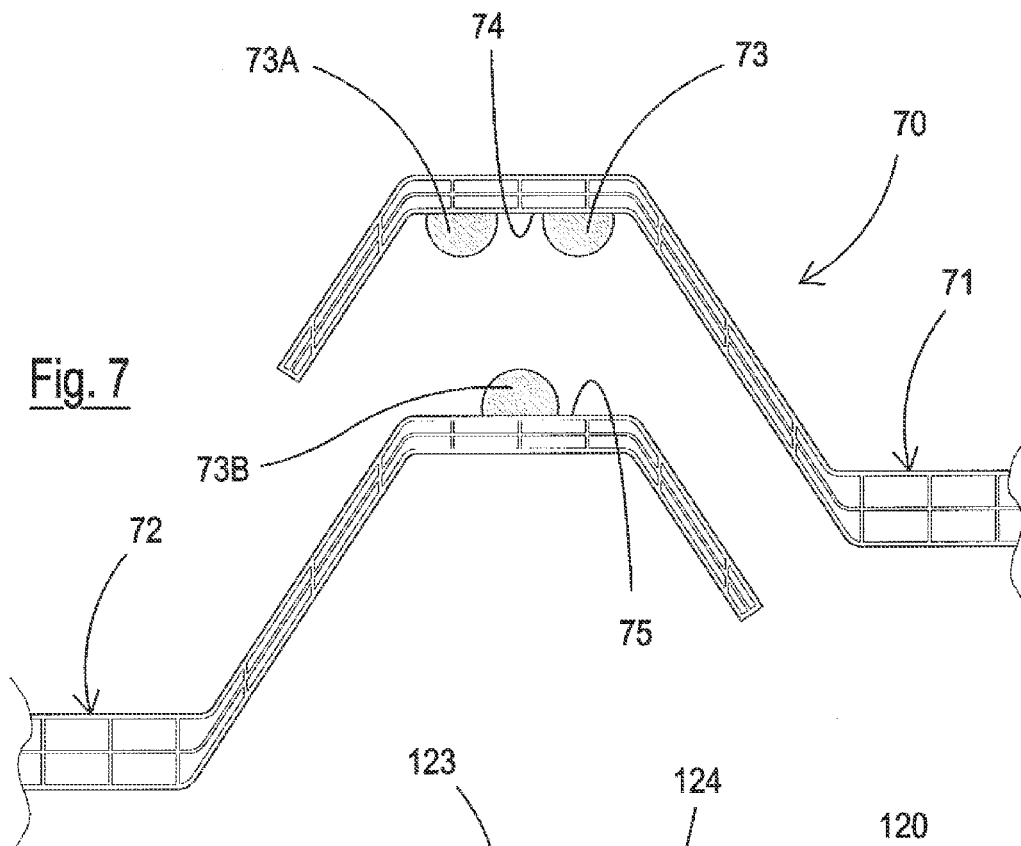


Fig. 7

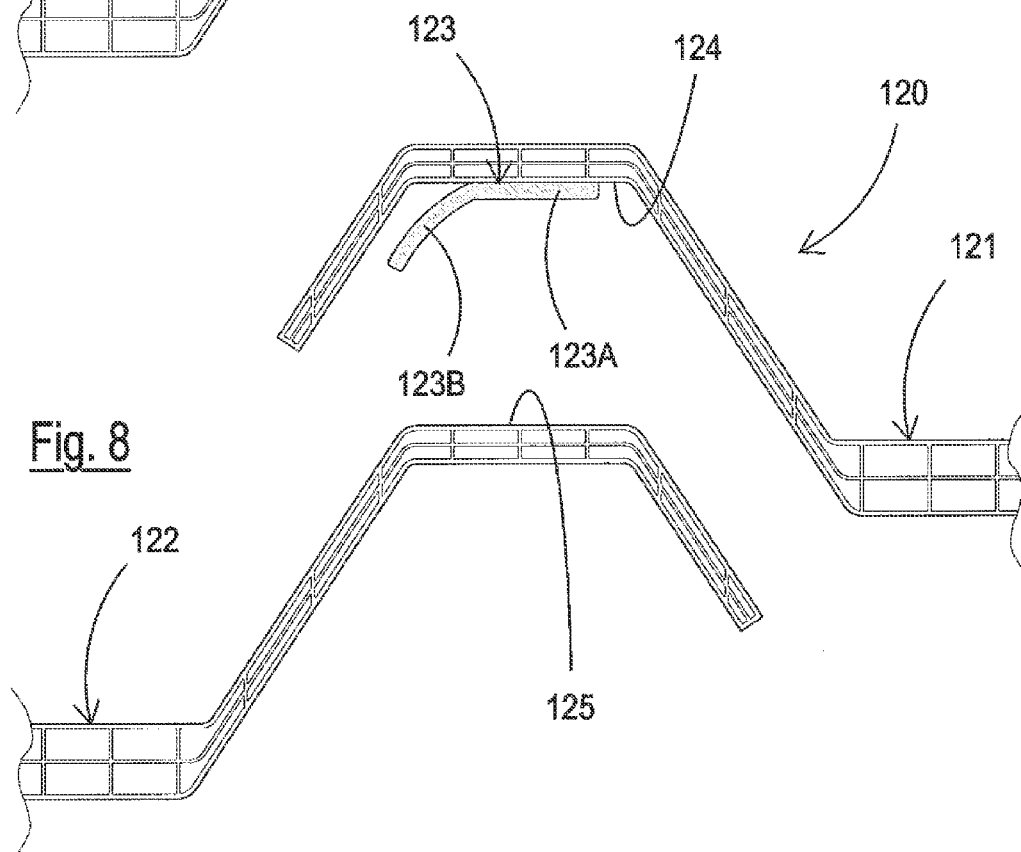
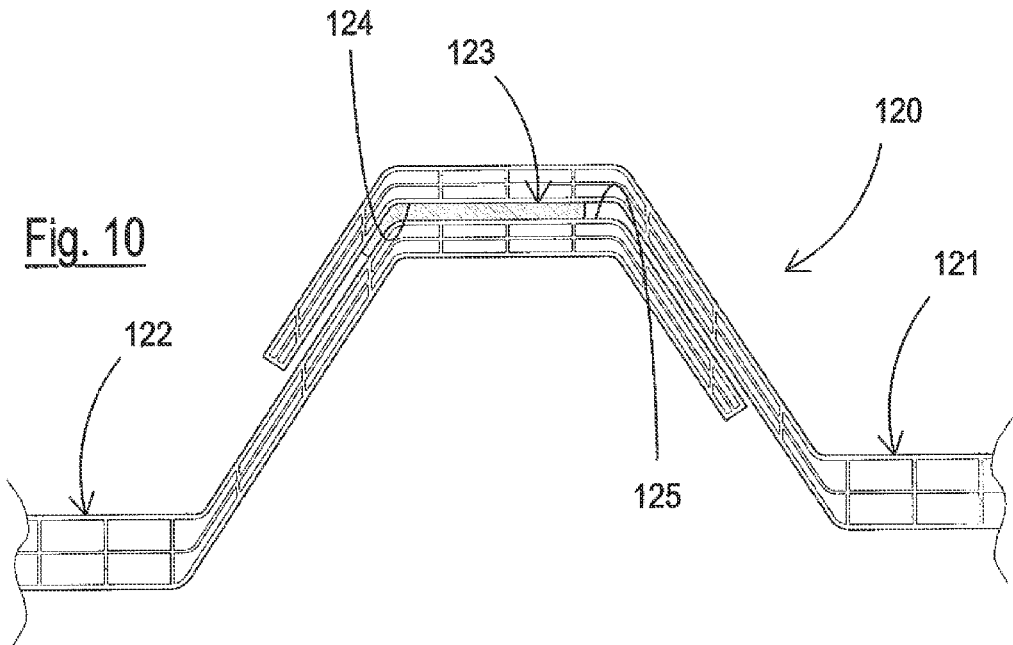
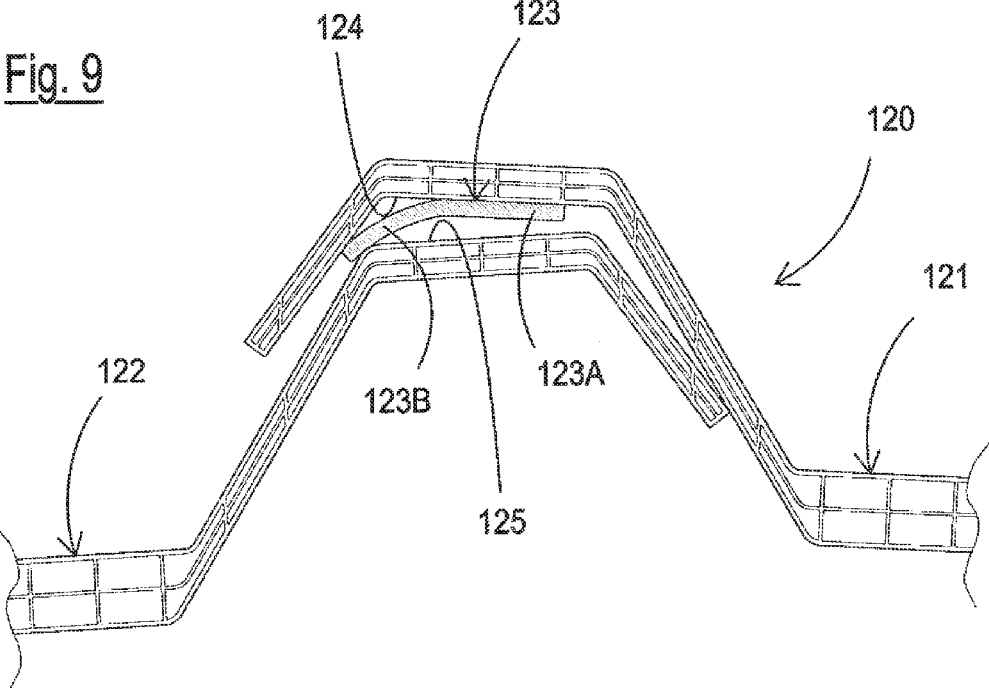
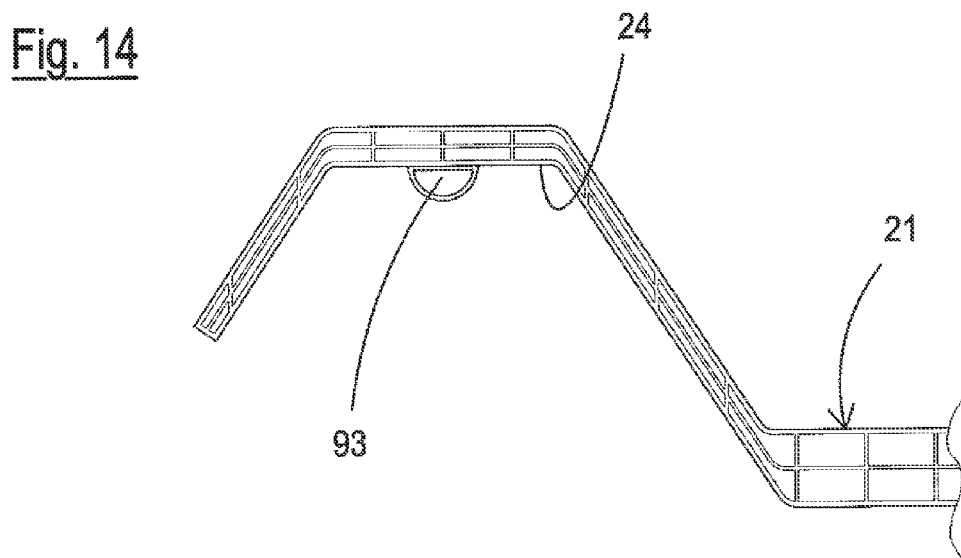
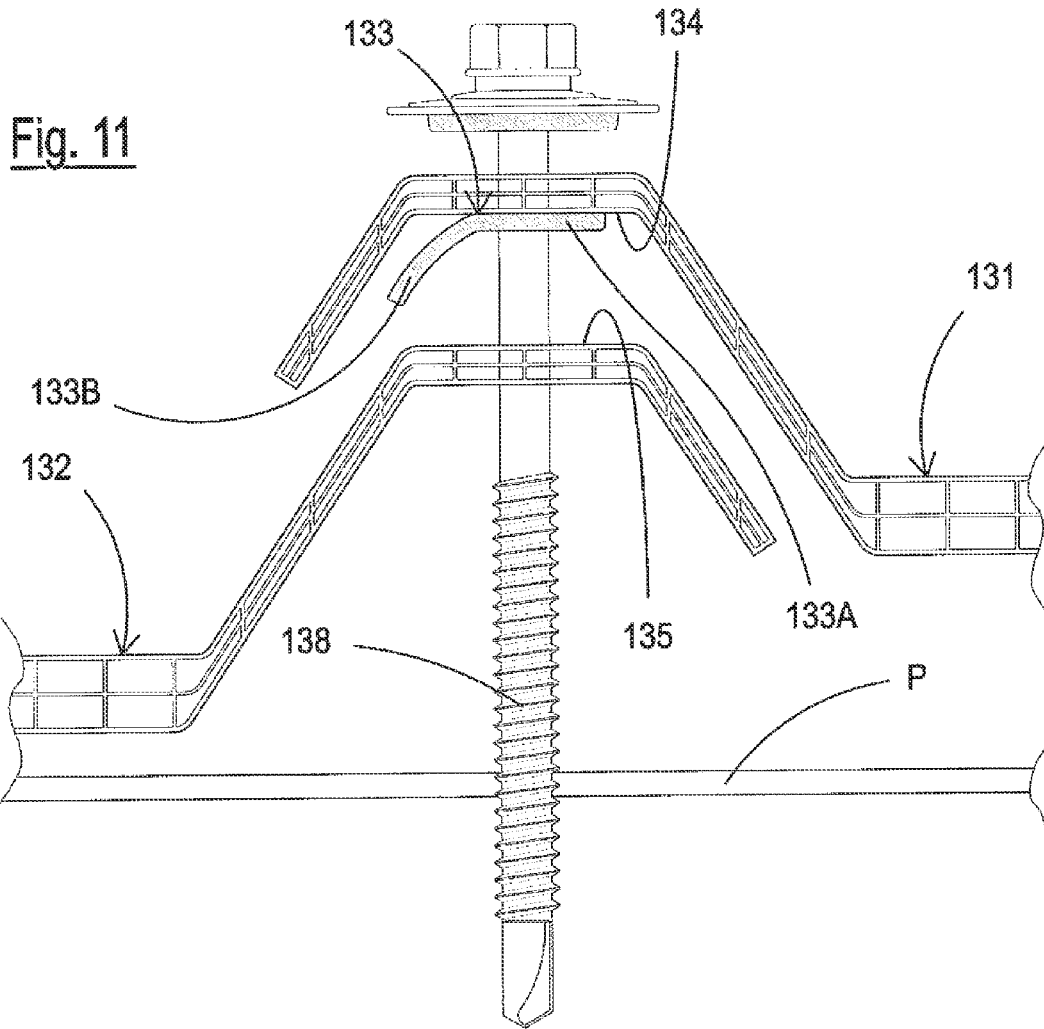


Fig. 8





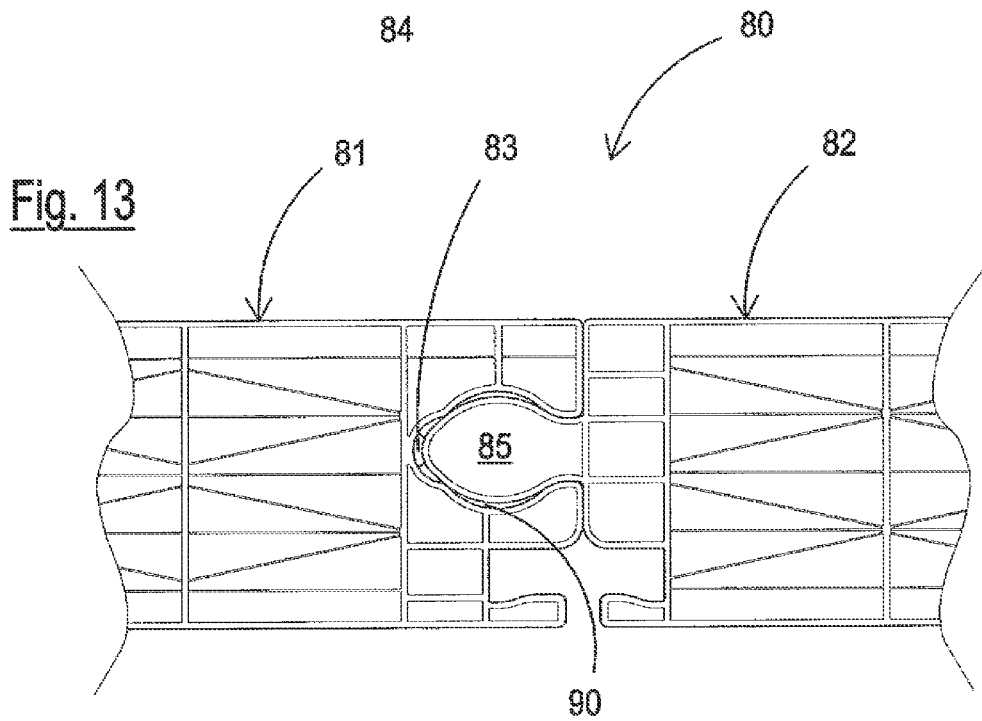
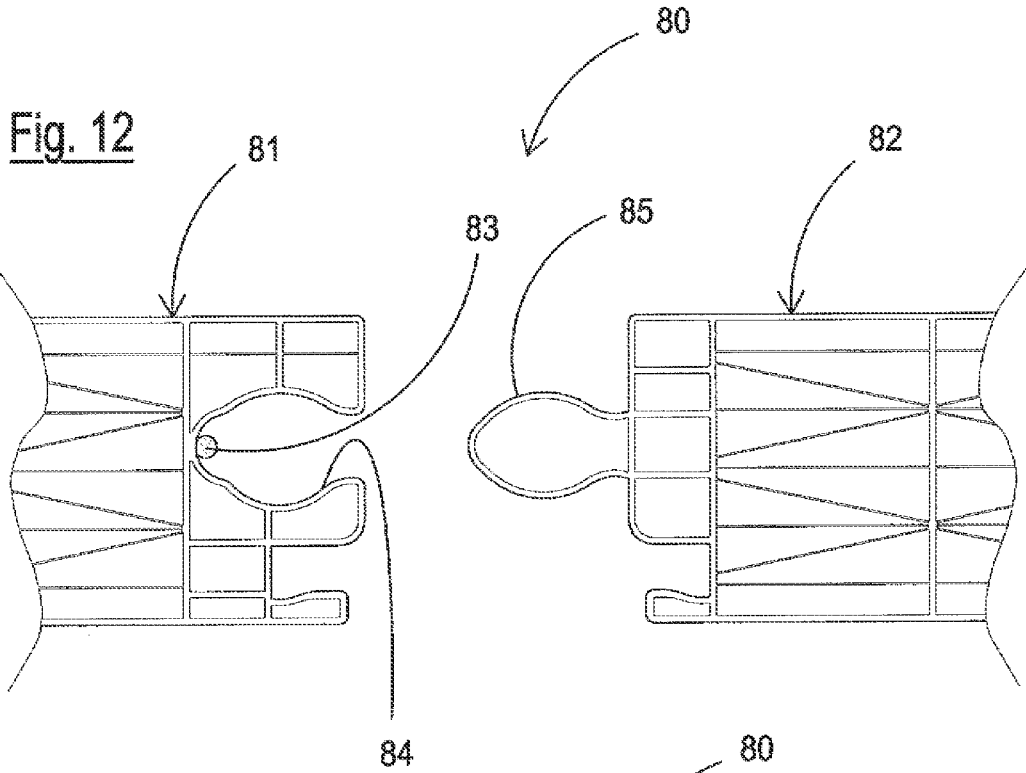


Fig. 15

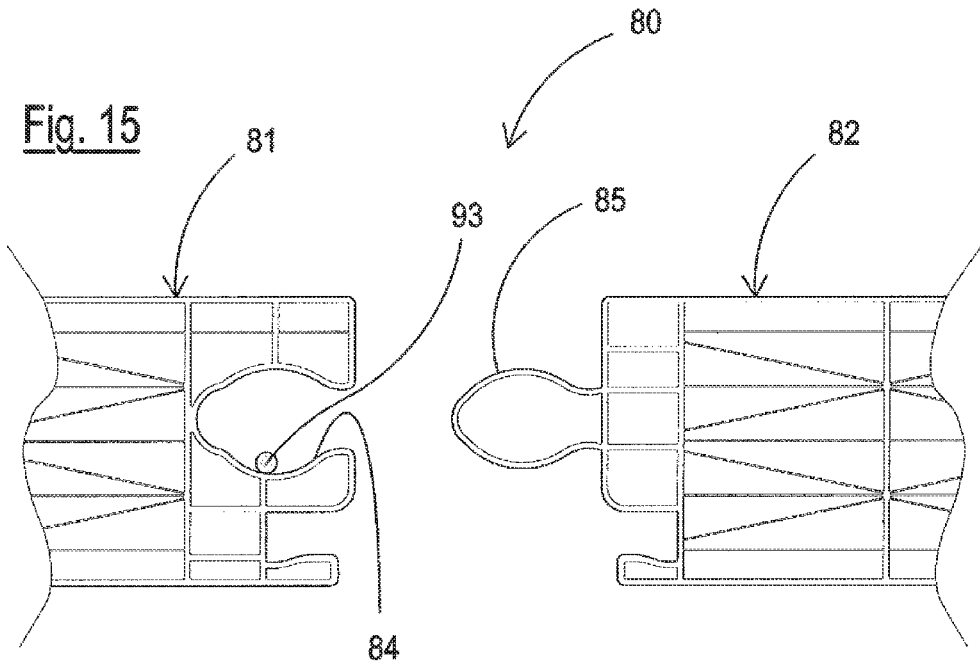
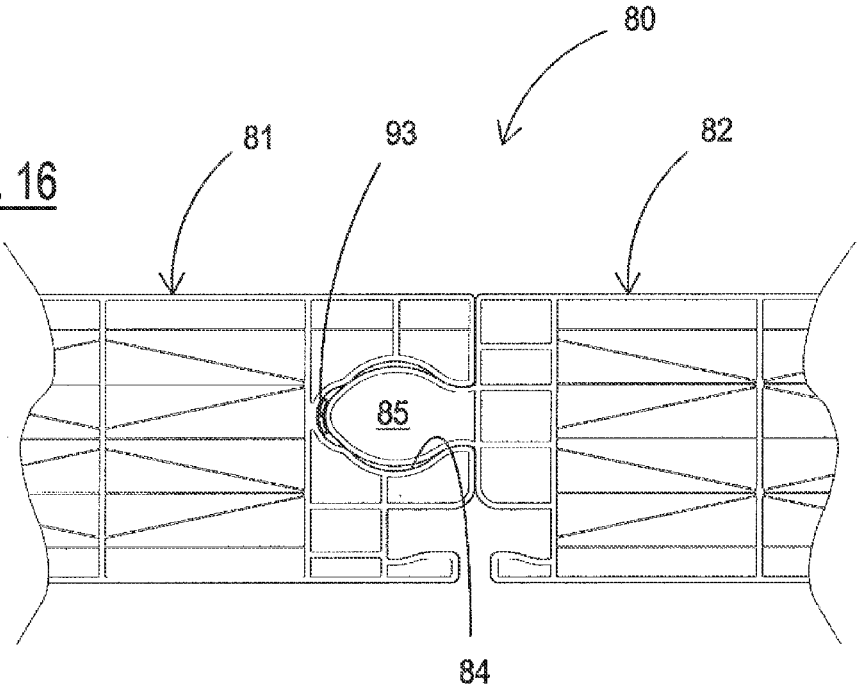


Fig. 16



SET OF HONEYCOMB PANELS FOR COVERS AND WALLS

FIELD OF THE INVENTION

[0001] The present invention relates to a set of honeycomb panels for producing covers and walls.

[0002] The covers to which the present invention relates are produced by means of a plurality of honeycomb panels made of a plastic material, which are joined together at superimposed, facing or interpenetrated end-sections.

BACKGROUND OF THE INVENTION

[0003] These types of covers are normally used as roofs for verandas, warehouses or the like, and are therefore in either a horizontal or tilted position.

[0004] Alternatively (even if very rarely), these sets of honeycomb panels can also be positioned vertically, to create perimetric buffers or dividers of a building structure or part of it, such as walls.

[0005] In these solutions, the end-section of a first honeycomb panel comprises a groove and the end-section of a second honeycomb panel comprises a protuberance configured to be housed in such groove, so as to create a coupling of the two panels with interpenetrated parts when arranged adjacently to form the cover or wall.

[0006] In some types of panels, the grooves and protuberances are adjacent and substantially extend for the entire surface of the panel, creating a corrugated or undulating conformation, depending on whether the grooves are square (or rectangular) or rounded.

[0007] Although they should be produced at a low cost, when these sets of honeycomb panels form covers, they must provide a high insulation against both water and air infiltrations, in order to keep the area delimited by the panels as insulated as possible from the outside.

[0008] FR-A-2401288 very simply discloses a joining system between panels created by means of an outer metal shell containing an expanded product. In this type of composite panel, facing ends of two coupled panels, composed of the material of the outer shell, are curved and/or wound over each other to form the junction. An insulating tape or sealing tape is inserted between the parts of the shell to improve the coupling and seal. This technique is definitely unsuitable for use with honeycomb panels.

[0009] The panels are in fact produced with an outer sheet containing an insulating core, such as a polyurethane foam. The complexity in construction and application of these panels, with coupling borders that must be folded over each other and blocked, is evident.

[0010] An additional example of a set of panels for covers is illustrated in U.S. Pat. No. 4,759,165. This patent discloses a set produced by coupling corrugated metal panels with shaped ends. One end of these metallic panels comprises a sealing washer in one of its curved portions, assembled during production of each panel, before forming the curved end. In any case, the curved portion is shaped so as to hold the washer and occupies the entire curved portion. Again, this application cannot be used in the case of honeycomb panels.

[0011] U.S. Pat. No. 3,841,094 illustrates a panel structure in which an insulating or sealing material is inserted in spaces created between the panels only at the moment of assembly.

[0012] Specific connectors are actually used for joining the panels as taught by GB-A-2238808. This patent, in fact, dis-

closes panel connectors made of an expanded material that must be specifically constrained to the end of the panel and sealed between the junction parts. In this document, specific connectors made of a drawn or extruded material are constrained or immersed in the ends of outer metallic sheet shells forming the panels. These shells contain an expanded or similar material. A series of sealing elements, having an appropriate form for the seats situated in the connectors, are arranged between the end connectors of the panels.

[0013] Again, this solution cannot be adopted in the case of honeycomb panels.

[0014] In this case, in fact, the panels are made of an extruded plastic material in a single piece, without any outer metallic shell and without insulating material immersed in the interior, where they are produced directly in the extrusion phase of the honeycombs. In this case, in fact, the production of panels is normally performed by extruding a plastic material and creating so-called honeycomb panels completely made of plastic material without the need for a filling material. This production process, which considerably simplifies the construction of panels, does not provide a perfect complementarity between grooves and protuberances, with the result that both rainwater and outside air can filter through by falling into the empty spaces created in the joining areas of two adjacent panels. Furthermore, even when the grooves and protuberances are complementary, water is still able to filter through between two adjacent panels due to the capillarity.

[0015] The presence of sealing elements between one panel and another in the assembly phase, as in the case of known composite panels composed of a metallic shell and an expanded or insulating filling, is equally complicated, with a considerable time consumption and increase in costs. This operation does not guarantee the production of a perfect seal between one panel and another as the sealing element thus arranged can move to a position not conformant to the user's requirements.

SUMMARY OF THE INVENTION

[0016] A general objective of the present invention is therefore to provide a set of honeycomb panels, which comprises at least a first and a second adjacent panel and is capable of overcoming all the drawbacks of the prior art.

[0017] A further objective of the present invention is to provide a set of honeycomb panels, which provides a safe and stable seal between the panels directly at the joining phase of two consecutive panels forming a cover or wall.

[0018] Another objective of the present invention is to provide a set of honeycomb panels, which provides for a sealed coupling between consecutive panels also in the presence of blockage means between subsequent panels.

[0019] These and other objectives are achieved by a set of honeycomb panels according to the enclosed claims.

[0020] In one embodiment, a set of panels includes at least a first and a second adjacent honeycomb panel made of a plastic material, which are joined to each other at end-sections, wherein the end-section of the first honeycomb panel has a groove and the end-section of the second honeycomb panel has a protuberance with a substantially complementary to said groove and is adapted for being housed in the groove, and wherein the set comprises at least one sealing element which is situated at an intermediate portion of said groove.

[0021] The presence of this sealing element advantageously solves the above mentioned problems of insulation from air and water, which are common to covers and walls of the prior art.

[0022] The sealing element can be a raised curb made of a suitable material, which juts from the surface of the panel for a certain distance. It can, for example, be a curb having a thickness ranging from 1 mm to 4 mm or a greater thickness.

[0023] The sealing element also consists of a flap arranged in a protruding and tilted position during production with respect to the internal profile of the single honeycomb panel, which is automatically positioned in a sealing arrangement between the two end portions of honeycomb panels when coupled.

[0024] In this embodiment, possible deficiencies in the complementarity between adjacent honeycomb panels at their end-sections can be resolved.

[0025] In principle, the sealing element could (in certain embodiments) be applied during extrusion of the honeycomb panel or in an immediately subsequent step, before the extruded honeycomb panel is cooled.

[0026] The sealing element is generally situated at an intermediate portion of the groove to protect it during the movement and transportation of the individual honeycomb panels, therefore also during steps preceding assembly and joining.

[0027] It should in fact be noted that the application of a sealing element having a significant thickness (necessary for the above mentioned reasons) creates a problem, that the sealing element is of such a considerable dimensions and juts from the surface of the panel to such a great extent that it may be damaged during the movement of the honeycomb panels by contact with the ground, a transport pallet or the like.

[0028] Positioning the sealing element at the intermediate portion of a groove, on the other hand, provides for its protection during the movement of the honeycomb panel. For example, when resting on the ground, the sealing element remains protected by the shoulders of the groove.

[0029] This way, sealing elements having a significant thickness can be adopted, to improve the seal between one honeycomb panel and another when the cover or wall has been assembled.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] The structural and functional characteristics of the invention and its advantages with respect to the prior art will appear more evident from the following description, referring to the enclosed drawings, which show an embodiment of the invention.

[0031] In the drawings:

[0032] FIG. 1 illustrates a first example of a section of a covering unit according to the present invention in a non-assembled condition of the honeycomb panels;

[0033] FIG. 2 illustrates a second example of a covering section according to the present invention in a non-assembled condition of the honeycomb panels;

[0034] FIG. 3 illustrates a third example of a section of a covering unit according to the present invention in an assembled condition of the honeycomb panels;

[0035] FIG. 4 illustrates a fourth example of a section or single covering honeycomb panel according to the present invention;

[0036] FIG. 5 illustrates a fifth example of a section or single covering honeycomb panel according to the present invention;

[0037] FIG. 6 illustrates a sixth example of a section or single covering honeycomb panel according to the present invention;

[0038] FIG. 7 illustrates a seventh example of a section of a covering unit according to the present invention in an exploded view, in a non-assembled condition of the honeycomb panels;

[0039] FIG. 8 illustrates an eighth example of a covering unit according to the present invention in a non-assembled condition of the honeycomb panels;

[0040] FIG. 9 illustrates an example of the cover of FIG. 8 in a partially assembled condition of the honeycomb panels forming the set;

[0041] FIG. 10 illustrates an example of the cover of FIG. 8 in a completely assembled condition of the honeycomb panels forming the set;

[0042] FIG. 11 illustrates a further example of a section of a covering unit according to the invention similar to that of FIGS. 8-10 in an assembled condition of the honeycomb panels;

[0043] FIGS. 12 and 13 illustrate a further example of a unit of a covering section according to the invention in a non-assembled condition of the honeycomb panels and in a completely assembled condition;

[0044] FIGS. 14, 15 and 16 illustrate examples of single honeycomb panels or sections of covering units according to the invention with hollow or tubular sealing elements arranged in different positions.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0045] With reference to FIG. 1, there is shown a portion of a cover 10 composed of two honeycomb panels 11 and 12.

[0046] According to the present invention, the two honeycomb panels 11 and 12, all made of a plastic material and extruded, may be positioned adjacent to each other and are designed for joining to each other at end-sections.

[0047] In FIG. 1, the honeycomb panels 11 and 12 are shown in a non-assembled condition (i.e. not in contact) for a clearer understanding of the drawing. On the other hand, in an operative condition of the cover 10, the honeycomb panels are close to each other.

[0048] As it can be observed, the end-section of the first honeycomb panel 11 comprises a groove 14 and the end-section of the second honeycomb panel 12 comprises a protuberance 15 having a form, which is substantially complementary to the groove 14 and is configured for being housed in the groove when the honeycomb panels are in an operative or assembled condition.

[0049] The cover 10 also comprises a sealing element 13 applied at an intermediate portion of the groove 14, thus providing the above discussed advantages, to which no further reference will be made.

[0050] In this embodiment, the sealing element 13 has a substantially rectangular and curved transversal section and a thickness preferably ranging from 1 mm to 4 mm.

[0051] The sealing element 13 can be continuous and applied to the entire transversal length of the honeycomb panel 11, or non-continuous, even if, in order to obtain a better seal, the first solution is preferable.

[0052] The sealing element 13 is applied after production (for example by extrusion) of the honeycomb panel 11 on which it is applied, or by adhesive bonding, but in any case before it leaves the factory.

[0053] The sealing element **13** is advantageously composed of a thermo-reactive material (also called hot-melt), which is deposited in the molten state onto the surface of the honeycomb panel **11** in the form of the sealing element **13**, in order to avoid a preliminary bonding operation which would prolong production times.

[0054] In short, the sealing element **13** is composed of a simple curb (having a predetermined form and dimensions) which is applied in the molten state onto the surface of the honeycomb panel **11**, where it reacts, solidifying and creating the sealing element **13**.

[0055] In this sense, a material of a polyurethane type can be used, such as a thermo-adhesive polyurethane (for example, of an aliphatic or aromatic nature such as HDI or IPDI and polyols of a polyester, polyether, caprolactone or polycarbonate nature) or a material of an acrylic type based on mixtures of polymers, copolymers or thermopolymers with an acrylic functionality, which that can comprise hydrogenated hydrocarbon resins, terpene phenolic resins and polyterpene resins or structuring polymers such as PMMA, MBS, SIS/SBS, EVA or TPE, depending on the requirements.

[0056] As a valid alternative, the sealing element **13** can also be applied in an expanded version, for example by introducing into the formulation one or more suitable additives of the type generally known to persons skilled in the art.

[0057] A further alternative consists of forming the sealing element as a tubular element or hollow element, which allows a crushing effect and therefore a better seal between the honeycomb panels where it is applied right from production, as it can be seen hereunder.

[0058] In this respect, it can be noted that the application may also be performed during extrusion of the honeycomb panel **11**, using the heat supplied in this step to cause expansion of the sealing element **13** following the production (under the action of heat) of gas that creates microbubbles, giving the sealing element **13** the desired expanded conformation.

[0059] It should be pointed out that the sealing element **13**, due to its thickness and positioning, also exerts an important soundproofing and prevention function of assessment noises of the cover or wall. It provides, in fact, for two adjacent honeycomb panels **11**, **12** to be mainly, or solely, in contact by the interpositioning of the sealing element **13**.

[0060] Possible deformations of one or both of the adjacent honeycomb panels **11**, **12**, for example due to the effect of ambient temperature, may produce undesired noises, such as creaking or the like, which in the cover **10** of the present invention, on the contrary, are avoided thanks to the specific action of the sealing element **13**.

[0061] The damping action of the sealing element **13** also provides benefits in the case of atmospheric precipitations (rain, hail) on the cover by preventing the honeycomb panels **11**, **12** from causing an unpleasant percussive noise or, more generally, this noise is reduced.

[0062] The honeycomb panels **11**, **12** can generally have various configurations.

[0063] In the example of FIG. 1, the panels **11**, **12** are of the honeycomb type and undulating. Based on the disclosure provided so far, a series of variants are available, which illustrated in the figures.

[0064] In alternative embodiments, the base features of the present invention that have been described so far can also be seen, for example: absence of additional connection elements between two consecutive honeycomb panels; absence of specific extensions of the honeycomb panels to be twisted or

connected to form a single unit; absence of expanded material inside a shell of the panel; absence of a shell of the single panel; simple assembly operations between honeycomb panels.

[0065] The embodiment of FIG. 2, for example, has a covering unit **20** comprising two honeycomb panels **21**, **22** having a corrugated form with straight sections. In this cover or covering unit, a sealing element **23** analogous to the above described element is situated at a groove **24** of a honeycomb panel **21**, configured for contacting a protuberance **25** of the other honeycomb panel **22** and creating a seal with it.

[0066] The differences with the first embodiment 10, therefore, lie in the fact that the honeycomb panels **21** and **22** are of the corrugated type.

[0067] A further difference is that the sealing element **23** has the form of an actual curb with a semicircular section, rather than flattened, which can also be used in the first example shown in FIG. 1 and vice versa. The material and type of application of the sealing element **23** are analogous to what is described above.

[0068] Another embodiment of the covering unit is indicated with **30** in FIG. 3. In this embodiment, honeycomb panels **31** and **32** are respectively provided, one with a groove **34**, and the other one with a protuberance **35**, similarly to the above described honeycomb panels **21** and **22**, with the addition of a clamping screw **38**.

[0069] In this case, a sealing element **33**, also analogous to the above described sealing elements **13** and **23**, is positioned in correspondence with fixing elements, for example a screw **38**, which engages the end-sections of the honeycomb panels **31** and **32**, fixes them to each other and possibly also fixes them to an optional supporting wall P.

[0070] Also in this case, the material and type of application of the sealing element **33** are analogous to what has been specified above and therefore no further reference will be made to them, except that it should be noted that its positioning at the fixing element **38** allows its preliminary compression, providing a better airtight and waterproof seal.

[0071] "Self-sealing" is in fact a created situation, i.e. the creation of an airtight and waterproof seal and sealing between the two panels without the addition of further devices suitable for creating said seal.

[0072] Referring now to FIG. 4, there is shown a honeycomb panel **41** of a covering unit **40** according to the present invention. Also in this case, the important features are the same as those described above for the covers **10**, **20**, **30** and therefore no further reference will be made to these. It should also be noted that, in this case, a throat **47** is situated at a groove **44** of the honeycomb panel during extrusion or formation, in which a sealing element **43** is partly housed in order to prevent its undesired displacement during movement, stacking or installation and a stable positioning.

[0073] In this example, the throat **47** has a substantially "V"-shaped transversal section, but it may equivalently be rounded, rectangular or have other forms.

[0074] The "V"-shape of the throat **47** is particularly suitable for use in combination with a sealing element **43** having a substantially semi-circular section.

[0075] In this respect, it has already been mentioned that the sealing element can have any section. In the case of a covering unit **50** (FIG. 5) produced with honeycomb panels or corrugated sheets **51**, of which only one is illustrated, a groove **54** could have a bottom with a flat section (see FIG. 5).

[0076] In this case, the sealing element 53 advantageously has a rectangular section which extends to substantially occupy the entire extension of the flat bottom part of the groove 54, thus exploiting the maximum surface available and improving the seal.

[0077] Multiple sealing elements can also be envisaged, alternatively or in combination, as shown in the example of FIG. 6. In FIG. 6, part of a covering unit 60 can be observed that includes a honeycomb panel 61 in a groove 64 in which two sealing elements 63 and 63A are positioned. Said sealing elements 63 and 63A, in this case, have a substantially semi-circular section, but they can also have other sections.

[0078] Also in these cases, the sealing elements 53, 63, 63A are produced analogously to what has been described above and no further reference will be made to this.

[0079] An additional sealing element 73B can also be envisaged, as in a covering unit 70 shown in FIG. 7. In this example, a first honeycomb panel 71 comprises two sealing elements 73, 73A positioned in a groove 74 and an additional sealing element 73B positioned on a protuberance 75 of a second consecutive honeycomb panel 72 and partially superimposed and facing in the terminal part.

[0080] In order to improve the seal, the additional sealing element 73B is positioned on a honeycomb panel 72 so that with the covering unit 70 assembled, it is in an offset position with respect to the two facing sealing elements 73, 73A of the other honeycomb panel 71.

[0081] In principle, there can obviously be only one sealing element instead of two sealing elements 73, 73A, without substantially changing the arrangement. The additional sealing element 73B, as also the sealing elements 73, 73A, is produced analogously to what has been described above.

[0082] FIGS. 8, 9 and 10 illustrate a further example of a section of a covering unit according to the present invention in a non-assembled condition of the honeycomb panels, in a partially assembled condition, and finally, in a completely assembled condition.

[0083] In this embodiment, a set of honeycomb panels for a cover 120 comprises at least two honeycomb panels 121, 122 having a corrugated form with straight sections. In this covering unit, there is a sealing element 123 in correspondence with a groove 124 of the honeycomb panel 121, disposed for entering into contact with a protuberance 125 of the honeycomb panel 122 and creating a seal with this.

[0084] In particular, this sealing element 123 is produced in the form of a flap positioned in a part 123A integral with the groove 124 of the honeycomb panel 121, and in a detached part 123B, protruding and tilted, again with respect to the groove 124.

[0085] This way, said flap-shaped sealing element 123 is, in the production phase, at least partially protruding and detached from the groove 124 or internal profile of the single honeycomb panel 121. When the first honeycomb panel 121 is brought into contact with the second honeycomb panel 122, the flap-shaped sealing element 123 is automatically positioned in a sealing arrangement between the two end-portions of honeycomb panels coupled with each other.

[0086] In this way, any possible deficiencies in the complementarity (visible in FIG. 9) between the two adjacent honeycomb panels 121, 122, superimposed at least at their end section, can be overcome. A perfect sealing arrangement of the two honeycomb panels 121 and 122 is therefore obtained, forming a covering unit, as shown in FIG. 10.

[0087] In a further embodiment of the covering unit (see FIG. 11), there are also fixing elements, for example, in the form of a screw 138, which engages end-sections of the corrugated honeycomb panels 131 and 132, passing through them and into a flap-shaped sealing element 133, such as that described above.

[0088] According to this embodiment, the honeycomb panels 131 and 132 are respectively provided with a groove 134 and a protuberance 135 analogous to those in the above described honeycomb panels, with the addition of a clamping screw 138. The flap-shaped sealing element 133 is situated at the clamping screw 138 and, therefore, engages the end-sections of the honeycomb panels 131 and 132, connects them to each other and may connect them to an optional supporting wall P.

[0089] The clamping screw 138 passes into a part 133A of the flap-shaped sealing element 133, integral with the groove 134 of the honeycomb panel 131. A detached part 133B of the flap-shaped sealing element 133, protruding and tilted, again with respect to the groove 134, forms the seal when the panels are packed against each other.

[0090] Also in this case, the flap-shaped sealing element 133 with its two integral 133A and protruding 133B parts from the groove 134, is automatically positioned in a sealing arrangement between the two end-portions of honeycomb panels 131, 132 coupled to each other.

[0091] An apparently different embodiment, but which incorporates the disclosures provided herein, is shown in FIGS. 12 and 13, which, with reference to number 80, illustrate a part of an overall covering unit, also functioning as a vertical wall for specific applications.

[0092] Two consecutive honeycomb panels 81 and 82, instead of being simply superimposed, as in the previous examples, are provided with an actual wedge-insertion. This wedge-insertion consists of a groove 84 positioned in the honeycomb panel 81 and a protuberance 85 which extends or juts from the honeycomb panel 82.

[0093] A sealing element 83 is applied to the interior of the groove 84, in a substantially intermediate position to the groove 84.

[0094] The groove 84 is also produced similarly to the previous description and can have any form.

[0095] The protuberance 85 is configured to cooperate with the groove 84 to form an actual wedge-insertion, as shown in the assembled condition shown in FIG. 13.

[0096] Also in this case, there can be a combination of additional sealing elements situated on the protuberance 85, which are not shown in the figures for the sake of brevity and which are generally analogous to what is shown in FIG. 7.

[0097] Finally, it should be observed that the groove 84 and protuberance 85 do not have a perfect complementary form, but an insulating chamber 90 is defined between the two in a coupled condition (see FIG. 13), forming a horizontal cover. This insulation chamber 90 separates the facing walls of the panels 81 and 82 and helps in preventing a capillarity phenomenon, should water penetrate this area.

[0098] As previously indicated, in a further alternative, the sealing element is produced as a tubular or hollow element as shown for example in FIGS. 14, 15 and 16, which are similar in their general conformation to examples that have been already illustrated, and show the tubular or hollow sealing element 93. In FIG. 14, the tubular or hollow sealing element 93 is positioned in the groove 24 of the panel 21, whereas in FIGS. 15 and 16 it is positioned in the groove 84 of the panel

81 and is shown in both a non-assembled and assembled condition on both the bottom and on a side of the groove **84**. FIG. 16 illustrates a crushing effect of the tubular and hollow sealing element **93**, which provides for an improved seal between the honeycomb panels where it is applied right from their production.

[0099] It can generally be noted that the sealing element **13**, **23**, **33**, **43**, **53**, **63**, **63A**, **73**, **73A**, **73B**, **83**, **93**, **123**, **123A**, **123B** can be completely transparent or at least partly colored to assist a user during assembly, especially when the panels **11**, **21**, **31**, **41**, **51**, **61**, **71**, **81**, **121** and/or **12**, **22**, **32**, **42**, **52**, **62**, **72**, **82**, **122** are at least partly transparent or translucent.

[0100] It should be repeated that in a set of honeycomb panels for forming covers and walls according to the invention, complex connection elements between the individual honeycomb panels, the folding of the shells of the individual honeycomb panels, the presence of an expanded filling product for minimizing noise, the passage of heat, insulation, transparency, etc., have been eliminated.

[0101] Additional variants and/or combinations of the solutions that have been described above and illustrated in the enclosed figures are also possible, and should be considered as being equivalent to the examples described so far and, therefore, within the scope of the present invention.

[0102] The objectives mentioned in the preamble of the description have therefore been achieved.

[0103] The scope of the invention is defined by the following claims.

[0104] While the invention has been described in connection with the above described embodiments, it is not intended to limit the scope of the invention to the particular forms set forth, but on the contrary, it is intended to cover such alternatives, modifications, and equivalents as may be included within the scope of the invention. Further, the scope of the present invention fully encompasses other embodiments that may become apparent to those skilled in the art and the scope of the present invention is limited only by the appended claims.

The invention claimed is:

1. A set of honeycomb panels configured to produce covers or walls comprising:

a first honeycomb panel;

a second honeycomb panel positioned adjacently to the first honeycomb panel, the first and the second honeycomb panel being configured to be joined at end-sections,

wherein an end-section of the first honeycomb panel comprises a groove and an end-section of the second honeycomb panel comprises a protuberance having substantially complementary shapes, the protuberance being configured to be housed in the groove, and

wherein each of the first honeycomb and second honeycomb panels are made of a plastic material; and

a sealing element stably coupled to the first or the second honeycomb panel during production thereof, such to be disposed within the groove during coupling of the first to the second honeycomb panel.

2. The set of honeycomb panels according to claim 1, wherein the sealing element juts from an outer surface of the groove for a thickness ranging from 1 mm to 4 mm.

3. The set of honeycomb panels according to claim 1, wherein the sealing element is made from a thermo-reactive material which is deposited in molten state on the first honeycomb panel where it reacts, solidifying and forming the sealing element.

4. The set of honeycomb panels according to claim 3, wherein the sealing element is made from a polyurethane material.

5. The set of honeycomb panels according to claim 4, wherein the polyurethane material comprises a thermo-adhesive polyurethane, HDI (hexamethylene diisocyanate), IPDI (isophorone diisocyanate), or polyols of polyester, polyether, caprolactone or polycarbonate.

6. The set of honeycomb panels according to claim 3, wherein the sealing element is made from an acrylic material based on mixtures of polymers, copolymers or thermopolymers with an acrylic functionality.

7. The set of honeycomb panels according to claim 3, wherein the acrylic material based on mixtures of polymers, copolymers or thermopolymers with an acrylic functionality comprises one or more of hydrogenated hydrocarbon resins, terpene phenolic resins, polyterpene resins, structuring polymers, PMMA (poly(methyl methacrylate)), MBS (methylmethacrylate-butadiene-styrene), SIS/SBS (styrene-isoprene-styrene/styrene-butadiene-styrene), EVA (ethylene vinyl acetate), or TPE (thermoplastic elastomer).

8. The set of honeycomb panels according to claim 3, wherein the sealing element is made from an expanding material and comprises one or more additives that cause expansion in relation to a quantity of received heat.

9. The set of honeycomb panels according to claim 1, wherein the sealing element is configured for exerting a damping action.

10. The set of honeycomb panels according to claim 1, wherein one or both of the first and the second honeycomb panels have a compact or expanded product therein.

11. The set of honeycomb panels according to claim 1, wherein there are two or more sealing elements disposed within the groove.

12. The set of honeycomb panels according to claim 1, further comprising a fixing element for fixing at least two adjacent panels, wherein the sealing element is disposed such to be compressed by the fixing element.

13. The set of honeycomb panels according to claim 1, wherein a throat is defined in the groove, and wherein the sealing element is at least partly housed in the throat.

14. The set of honeycomb panels according to claim 1, wherein the sealing element is tubular or hollow.

15. The set of honeycomb panels according to claim 1, wherein the sealing element is shaped as a flap having a first part securely coupled to the groove and in a second part that is detached, protruding and tilted with respect to the groove.

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