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

(11) **EP 4 545 728 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
**30.04.2025 Bulletin 2025/18**

(21) Application number: **24192206.1**

(22) Date of filing: **31.07.2024**

(51) International Patent Classification (IPC):
***E04F 13/08*** *(2006.01)* ***E04F 13/18*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
**E04F 13/18; E04F 13/0894;** E04F 2201/0505; E04F 2203/04

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

(30) Priority: **25.10.2023 EP 23205783**

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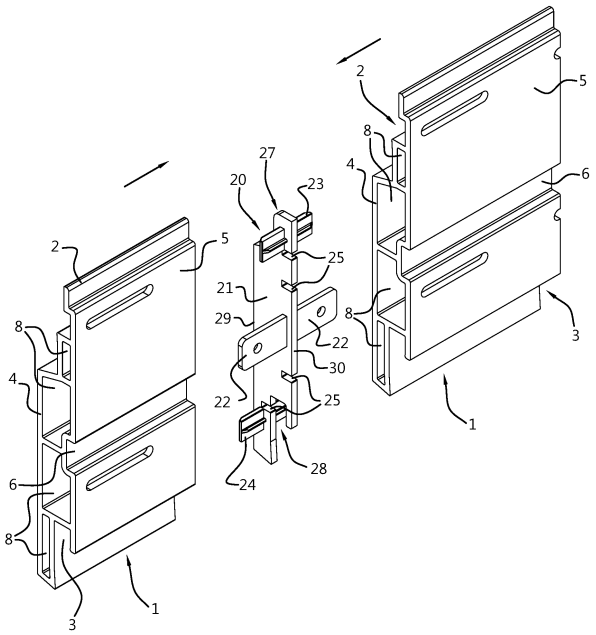
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# (54) A COUPLING ELEMENT FOR COUPLING TWO SIMILAR EXTRUDED BOARDS AND AN END CAP FOR AN EXTRUDED BOARD

(57) The invention provides a coupling element for but end-to-end coupling of two similar extruded boards each having at least one longitudinal board chamber, a board front face and a board rear face, and a board cross section, the coupling element comprising a plate matching the cross section of the extruded boards and having two opposite substantially flat faces, the coupling element further comprising at least one clamping extensions extending from each face of the plate and positioned and shaped for clampingly fitting in the at least one respective longitudinal chamber, and a connection tab extending from the plate and positioned and shaped for abutting the respective board rear face allowing connecting to the rear face of the respective extruded board, and wherein the plate comprises at least one notch in an edge at the rear face of the extrusion board when mounted on the extrusion board, for ventilating an aligned longitudinal board chamber.

There is further provided an end cap for attaching to an end of the extruded board.

Fig. 2




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## Description

### Field of the invention

**[0001]** The invention relates to a coupling element for but end-to-end coupling of two similar extruded boards, and an assembly comprising a coupling element for but end-to-end coupling of two similar extruded boards and at least two extruded boards, a method for but end-to-end coupling of two similar extruded boards, and a kit of parts comprising a coupling element and an end cap for an extruded board. The invention further relates to an end cap for an extruded board.

### Background of the invention

**[0002]** NL2004495 of applicant describes examples of facade elements. Usually, these elements are extruded and from a polymer material.

**[0003]** EP2497873 of applicant according to its abstract "relates to an assembly, particularly a facade cladding element assembly comprising:- a synthetic element, particularly a facade element, with an end and at least one hollow chamber that is continuous in the longitudinal direction;- a clamping part of a substantially strip-shaped resilient material, comprising at least one opening with on the edge lips that are situated opposite each other and extend from the strip and in a neutral position extend towards the opening, and which lips are provided with first hook members that extend outward from the lips, and second hook members that extend inward in the opening, and- an end part provided with at least one projecting part for attachment to the end of the synthetic element to provide its finish, wherein the clamping part with the lips extending in the hole is arranged on the end of the synthetic element, and the end part is subsequently arranged on the clamping part wherein the projecting part extends in the hole and through the opening, having mutual dimensions adapted such that the projecting part pushes the lips apart with the outward hook members clamping in the walls of the continuous hollow chamber and with the inward hook members clamping in the projecting part.". The end of a facade element is closed with an clamping part and an end part. This provided an end that stays on the facade element after years outdoors.

**[0004]** On the basis of these known facade elements and additional elements, applicant developed additional, versatile elements that provide additional use.

**[0005]** Incidentally, KR20100020294A recites a connection device of a panel for construction provided to minimize the noise and dust by integrating flooring panel.

### Summary of the invention

**[0006]** The prior art shows several elements that can be applied to facade elements. It is an aspect of the invention to provide an additional and/or alternative element that provide new functionality. Preferably, the element further at least partly obviates one or more of above-described drawbacks.

**[0007]** There is provide a coupling element of claim 1.

**[0008]** There is furthermore provided an assembly according to claim 8.

**[0009]** There is furthermore provided an end cap according to claim 13.

**[0010]** It was proven a challenge to keep holding boards together and end caps attached to the board under changing climate conditions.

**[0011]** The extruded board and coupling element usually comprise polymer material. In some embodiments this polymer material comprises additional elements like fillers, colorants, pigments, and other know additions. Some of these additional elements may make even more than 50% by weight of the material from which the boards and coupling element is made.

**[0012]** Usually, the board and coupling element and end cap comprise, in particular largely are made of, thermoplastic polymer. In particular, the board is often from polyvinylchloride (PVC) because of its durability. Alternative and suitable polymers are known to the skilled person, and may comprise polyethylene (PE), polypropylene (PP), polyester, nylon, and similar polymers and polymer mixtures. The end caps and coupling elements often comprise polyvinylchloride (PVC), polyethylene, polypropylene, nylon and other polymers and polymer mixtures.

**[0013]** The board is usually extruded and has continuous, longitudinal chambers or hollow chambers. The coupling elements and the end caps are usually injection moulded, but may also be produced using additive manufacturing, like for instance 3D printing.

**[0014]** The board in embodiments is adapted for tongue-groove coupling with similar boards. Usually, to that end, the board on one longitudinal side comprises a tongue and on the opposite longitudinal side comprises a corresponding groove. Many types and designs of tongue-and-groove are known to the skilled person. These types of boards are also referred to as laths, and a covering of these boards is also referred to as panelling.

**[0015]** The current coupling element and end cap have a plate shaped such that it at least functionally closes off an end of the at least one longitudinal board chamber at the end of the extrusion board or boards. In embodiments, there is a small notch providing controlled ventilation of the longitudinal board chamber. In particular, the plate functionally matched the cross section of the extrusion board of boards. Matching in this respect means that the plate can have a front edge that may be flush with the front surface of the extrusion board or boards. Also within this scope is that the front edge extends a little from the front surface. In particular the front edge extends less than 2 mm. In particular the front edge extends less than 1 mm. Also within this scope is that the front edge is indenting a little with respect the front surface. In parti-

cular, it indents less than 2 mm. In particular the front edge indents less than 1 mm. For the coupling element, this means that where two similar extrusion boards are but end-to-end coupled, as for instance illustrated in the attached drawings, to be discussed in detail below, at least the front face of the extrusion boards (or board in case of an end cap) continuous. This will keep a flush front face of the coupled extrusion boards. The colour of the coupling part and end cap will often match the coupler of at least the front face of the extrusion board. For design purposes, it may also be desirable to make at least one of the end cap and coupling element in contrasting colours.

**[0016]** The coupling element can couple or connect the boards in line. In such an in-line coupling, the longitudinal axes of coupled boards will be at a coupling angle of 180 degrees. In other words, they will be on one line. Usually, the front faces of boards will be substantially in one plane.

**[0017]** In a particular embodiment, the coupling element can also be designed to connect or couple boards at a coupling angle differing from 180 degrees. The longitudinal axes of coupled boards will thus be at the coupling angle differing from 180 degrees. Usually, the longitudinal axes of the coupled boards will be in one plane. In such an embodiment of a coupling angle differing from 180 degrees, the at least one clamping extension extending from each face will be at that coupling angle. When the boards are in line, each clamping extension will extend at substantially, in particular functionally, rectangular angle from the plate. When the angle differs from 180 degrees, the clamping extensions extend at halve the coupling angle.

**[0018]** When the boards are coupled in line, the plate in a cross section will have a rectangular cross section. When the coupling angle differs from 180 degrees, an end that in mounted state is near the front faces of the coupled board may have a tip at the front edge that is functionally the coupling angle.

**Detailed description of the invention**

**[0019]** In an embodiment of the coupling element, the plate comprises at least one notch in an edge at the rear face of the extrusion board when mounted on the extrusion board, for ventilating an aligned longitudinal board chamber.

**[0020]** In an embodiment, the clamping extension at one face extends in line with another clamping extension on an opposite plate face.

**[0021]** In an embodiment, the coupling element comprises at least two clamping extensions extending from each plate face.

**[0022]** In an embodiment, the coupling element comprises one of the connection tab extending from one of the faces of the plate, and a second of the connection tab extending opposite of the first connection tab from the other of the faces of the plate. In a particular embodiment, the extrusion boards comprise a groove in the rear face and having a cross section shape, wherein the connection tabs are shaped to clampingly fit in the respective rear face groove.

**[0023]** In an embodiment, the connection tab comprises a provision for connecting it to the rear face of the extrusion board. In an embodiment it comprises a through hole for allowing a screw to attach the connection tab to the extrusion board.

**[0024]** In an embodiment, the coupling element is injection moulded of additive manufacturing produced. In an embodiment, the coupling element is a substantially polymer coupling element.

**[0025]** In an embodiment, the extrusion board is of the tongue-and-groove type. In an embodiment each extrusion board comprise a tongue and a groove, each extrusion board along one longitudinal side provide with a tongue and on an opposite longitudinal side provided with a corresponding groove. More in particular the plate matches the cross section of the extrusion board to provide a flush front face of the two coupled extrusion boards.

**[0026]** In an embodiment of the assembly, the extrusion boards comprise a rear face groove in the rear face and having a cross section groove shape, wherein the connection tabs are shaped to clampingly fit in the respective rear face grooves. This will keep the coupling elements attached. In an embodiment, the coupling element comprises at least two connection tabs extending from each face of the plate. The boards may comprises two rear face grooves each for clampingly receiving a tab. In this way, hinging of the boards may be prevented better.

**[0027]** The term "substantially" herein or in "substantially consists", will be understood by the person skilled in the art. The term "substantially" may also include embodiments with "entirely", "completely", "all", etc. Hence, in embodiments the adjective substantially may also be removed. Where applicable, the term "substantially" may also relate to 90% or higher, such as 95% or higher, especially 99% or higher, even more especially 99.5% or higher, including 100%. The term "comprise" includes also embodiments wherein the term "comprises" means "consists of'.

**[0028]** The term "functionally" will be understood by, and be clear to, a person skilled in the art. The term "substantially" as well as "functionally" may also include embodiments with "entirely", "completely", "all", etc. Hence, in embodiments the adjective functionally may also be removed. When used, for instance in "functionally parallel", a skilled person will understand that the adjective "functionally" includes the term substantially as explained above. Functionally in particular is to be understood to include a configuration of features that allows these features to function as if the adjective "functionally" was not present. The term "functionally" is intended to cover variations in the feature to which it refers, and which variations are such that in the functional use of the feature, possibly in combination with other features it relates to in the invention, that combination of features

is able to operate or function. For instance, if an antenna is functionally coupled or functionally connected to a communication device, received electromagnetic signals that are receives by the antenna can be used by the communication device. The word "functionally" as for instance used in "functionally parallel" is used to cover exactly parallel, but also the embodiments that are covered by the word "substantially" explained above. For instance, "functionally parallel" relates to embodiments that in operation function as if the parts are for instance parallel. This covers embodiments for which it is clear to a skilled person that it operates within its intended field of use as if it were parallel.

**[0029]** Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. It is to be understood that the terms so used are interchangeable under appropriate circumstances and that the embodiments of the invention described herein are capable of operation in other sequences than described or illustrated herein.

**[0030]** It should be noted that the above-mentioned embodiments illustrate rather than limit the invention, and that those skilled in the art will be able to design many alternative embodiments without departing from the scope of the appended claims. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim. Use of the verb "to comprise" and its conjugations does not exclude the presence of elements or steps other than those stated in a claim. The article "a" or "an" preceding an element does not exclude the presence of a plurality of such elements. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

**[0031]** The invention further applies to an element comprising one or more of the characterising features described in the description and/or shown in the attached drawings. The invention further pertains to a method or process comprising one or more of the characterising features described in the description and/or shown in the attached drawings.

**[0032]** The various aspects discussed in this patent can be combined in order to provide additional advantages. Furthermore, some of the features can form the basis for one or more divisional applications.

## Brief description of the drawings

**[0033]** Embodiments of the invention will now be described, by way of example only, with reference to the accompanying schematic drawings in which corresponding reference symbols indicate corresponding parts, and in which:

Figure 1 schematically depicts an example of two of these extrusion boards that are tongue-groove coupled;

Figure 2 shows an exploded view of two similar extrusion boards that are positioned in-line;

Figure 3 shows a view from the rear faces of two but-coupled and end-to-end coupled extrusion boards;

Figure 3A a view from the front of figure 3;

Figures 4 and 5 show two perspective view of examples of the current coupling elements;

Figure 6 shows an example of two tongue-groove coupled extrusion boards having end cap attaches to the left ends, and

Figure 7 and 8 show an example of two end caps for opposite ends of an extrusion board.

**[0034]** The drawings are not necessarily on scale

## Description of preferred embodiments

**[0035]** As mentioned in the background of the invention, the current invention relates coupling elements and end caps for extrusion boards. These extrusion boards 1 have at least one longitudinal board chamber 8, a board front face 4 and a board rear face 5, and a board cross section. Figure 1 shows such a cross section.

**[0036]** Figure 1 schematically depicts an example of two of these extrusion boards that are tongue-groove coupled with a respective tongue 2 and groove 3 extending along the longitudinal sides of each extrusion board 1. Many designs for such cooperating or matching tongue and groove (2 and 3) are known. Usually, the tongue-groove coupling is such that it leaves a interspace or joint 7

**[0037]** In figure 1, the ends of the extrusion boards 1 are provided with end caps 40. These will be discussed below.

**[0038]** Figure 2 shows an exploded view of two similar extrusion boards 1 that are positioned in line, longitudinally in line with respect to one another. In between the two extrusion board 1 is a coupling element 20. The extrusion boards 1 are depicted seen from their rear side, looking onto the rear faces 5.

**[0039]** In figure 3, the extrusion boards 1 of exploded view figure 2 are mounted onto the coupling element 20. Thus, a view from the rear faces of two but-coupled and end-to-end coupled extrusion boards 1 is provided. Connection tabs 22 clampingly fit in a rear face groove 6 of the extrusion boards 1. Figure 3A shows the situation of figure 3 seen from the front. It shows how in this embodiment the plate front edge 29 of the coupling element 20 is flush with the front faces 4 of the extrusion boards 1. It may indent with respect to the front face 4 just a little, usually less then the wall thickness of the extrusion board 1. In most cases, if present such indent will be less then 50% of the wall thickness. In millimetres, such indent can be between 0 and 2 mm, in particular 0-1.5 mm, more in particular 0-1 mm. There may even be instances where the plate front edge extends beyond the front face/faces

4. Usually, such an extension will be limited, often less then or under 2 mm, in particular under 1.5 mm, more in particular under 1 mm. In an embodiment, the

**[0040]** Figures 4 and 5 show two perspective view of examples of the current coupling elements 20 also presented in figures 2 and 3.

**[0041]** The coupling elements 20 comprise a plate 21. The shape of the plate 21 is provided to match the cross section of the extrusion boards 1. In particular, the plate front edge 29 is shaped to allow matching of the front face 4 of the extrusion boards 1. In such a way, the plate 21 can provide a flush front face of coupled extrusion boards. A front edge of the plate 21 when mounted on/between two extrusion boards 1 is flush with the front faces 4 of the extrusion boards 1. As explained above, the front edge 29 of plate 21 may be indenting or extending. In an embodiment, the plate 21 may be of a material that is a little softer or more compressible then the material of the extrusion boards. Thus when mounded the extrusion board end edge may compress the plate 21 a little, for instance less then 0.5 mm.

**[0042]** In an embodiment, plate 21 (end plate 41 of the end cap) have a thickness of between 1 and 10 mm. Usually, the thickness is between 1 end 5 mm. More in particular the thickness is between 1.5 and 3 mm.

**[0043]** The coupling element 20 comprises mounting parts 23, 22, 24 extending from the plate 21. These mounting parts are positioned on the plate 21 in such a way that when the plate 21 is on the end of the extrusion board, the mounting parts are aligned with longitudinal board chambers 8 or with other mounting provisions on the extrusion boards, like a matching rear face groove 6 on/in the rear face 5.

**[0044]** In particular, the coupling element 20 in the current design comprises clamping extension 23 and clamping extension 24. The clamping extensions 23, 24 extend from opposite sides of plate 21. Here these two sets of clamping extensions 23, 24 extend in line. The clamping extensions 23, 24 are positioned on the plate 21 to align with the longitudinal board chambers 8 when the coupling element 20 is mounted on extrusion boards. In particular, in the current embodiment these are coupling extensions 23 on one end of the extrusion boards 1 and coupling extensions 24 on the opposite end of the plate 21, to provide secure positioning on the ends of extrusion boards 1. In particular, the coupling elements 23, 24 are designed to clampingly fit into the longitudinal board chambers 8. In fact, they can be designed to fit so tight that the coupling element 20 may need to be mounted onto a board 1 using a hammer or the like.

**[0045]** The coupling element 20 furthermore comprises a connection tab 22. The connection tab 22 allows connecting to the rear face 5 of the extrusion board 1. In particular, in the current embodiment the extrusion board 1 comprises a groove 6. In this embodiment, the groove cross section and the connection tab 22 cross section are mutually designed such that the connection tab 22 clampingly fits in the groove 6 as illustrated in figure 3.

**[0046]** For connection to the extrusion board rear face 5, here the connection tab 22 is provided with a through hole 26 to accommodate a screw. Other connections may be possible, but often more complex, like barbs for instance.

**[0047]** In its plate rear edge 30, there is at least one ventilation notch. In this embodiment, there is a ventilation notch 25 for each longitudinal extrusion board chamber 8. In this way, proper ventilation is provided, for instance preventing ice in the longitudinal chambers. The ventilation notches are on the plate rear edge 30 to be out of sight.

**[0048]** Now, the end caps 40 will be discussed in more detail.

**[0049]** Figure 6 shows an example of two tongue-groove coupled extrusion boards 1 having end caps 40 attached to the left ends and in exploded view two end caps 40 in line with the right ends.

**[0050]** Figure 7 and 8 show an example of two end caps 40 for opposite ends of an extrusion board 1. Here, the end caps 40 are plane mirror images of one another.

**[0051]** Just like the coupling elements 20, the end cap 40 has an end cap plate 41 that is designed like the plate 21 of the coupling element 20. Here, however, the clamping tab 45 and end cap clamping extensions 43, 44, 46, 47 extend only from one face of the end cap plate 41. In figures 7 and 8 it is illustrated that there are two opposite end caps 40.

**[0052]** Extension 42 in this embodiment has a cross section matching the cross section of its corresponding board chamber and fits clampingly in it.

**[0053]** In the end caps 40, there are also ventilation provisions provided. In the end caps 40, the are end cap ventilation grooves 48. These ventilation grooves 48 do not run all the way through the end cap plate 41. Furthermore, the ventilation groove 48 is positioned at the end cap plate rear edge 50. Thus, when mounted on the end of an extrusion board 1, the ventilation groove 48 provides a ventilation opening that is only visible from the rear face of the extrusion board 1, thus when the extrusion board 1 is mounted, the ventilation openings provided by the ventilation grooves 48 are not visible. The ventilation groove 48 provides a ventilation opening at the rear edge of the end cap plate. Furthermore, it provides a ventilation channel fluidly connecting the ventilation opening with the inside of a corresponding longitudinal chamber 8 of the extrusion board 1. In combination with for instance the ventilation notch of a coupling element 20, this provides full ventilation of the longitudinal chamber 8.

**[0054]** In the current embodiment, the end cap 40 has an end cap plate 41 with a perimeter that falls functionally a fraction within the outer perimeter of the extruded board 1. The end cap plate 41 is a fraction smaller than the cross section of the extruded board. It was found that for the indicated tongue-and-groove board, which is usually about 10-20 cm high and 1-2 cm thick, the indention of the end cap plate 41 is around 0.1-2 mm, in particular

0.2-1.5 mm, more in particular 0.4-1.2 mm.

**[0055]** In this way, with an indented end cap plate 41, the end cap cannot be pushed off an extruded board 1 when surrounding extruded boards 1 extend in length, for instance.

**[0056]** It will also be clear that the above description and drawings are included to illustrate some embodiments of the invention, and not to limit the scope of protection. Starting from this disclosure, many more embodiments will be evident to a skilled person. These embodiments are within the scope of protection and the essence of this invention and are obvious combinations of prior art techniques and the disclosure of this patent.

Reference numbers

**[0057]**

| | |
|---|---|
| 1 | board |
| 2 | tongue |
| 3 | groove |
| 4 | front face of the board |
| 5 | rear or building face of the board |
| 6 | rear face groove |
| 7 | front face joint |
| 8 | hollow longitudinal board chamber |
| 20 | coupling element |
| 21 | plate |
| 22 | connection tab |
| 23 | clamping extension |
| 24 | clamping extension |
| 25 | ventilation notch |
| 26 | connection provision |
| 27 | coupling element tongue end |
| 28 | coupling element groove end |
| 29 | plate front edge |
| 30 | plate rear edge |
| 40 | end cap |
| 41 | end cap plate |
| 42 | end cap clamping extension |
| 43 | end cap clamping extension |
| 44 | end cap clamping extension |
| 45 | end cap connection tab |
| 46 | end cap clamping extension |
| 47 | end cap clamping extension |
| 48 | end cap ventilation groove |
| 49 | end cap plate front edge |
| 50 | end cap plate rear edge |

## Claims

**1.** A coupling element (20) for but end-to-end coupling of two similar extruded boards (1) each having at least one longitudinal board chamber (8), a board front face (4) and a board rear face (5), and a board cross section, the coupling element comprising a plate (21) functionally matching the cross section of the extruded boards and having two opposite substantially flat faces, the coupling element further comprising at least one clamping extensions (23, 24) extending from each face of the plate and positioned and shaped for clampingly fitting in the at least one respective longitudinal chamber (8), and a connection tab (22) extending from the plate (21) and positioned and shaped for abutting the respective board rear face (5) allowing connecting to the rear face of the respective extruded board, and wherein the plate (21) comprises at least one notch (25) in an edge at the rear face of the extrusion board (1) when mounted on the extrusion board, for ventilating an aligned longitudinal board chamber.

**2.** The coupling element according to claim 1, wherein the clamping extension (23, 24) at one face extends in line with another clamping extension (23, 24) on an opposite plate face.

**3.** The coupling element according to claim 1 or 2, comprising at least two clamping extensions (23, 24) extending from each plate face.

**4.** The coupling element according to any one of the preceding claims, comprising one of the connection tab extending from one of the faces of the plate, and a second of the connection tab extending opposite of the first connection tab from the other of the faces of the plate, wherein in particular the extrusion boards comprise a groove in the rear face and having a cross section shape, wherein the connection tabs are shaped to clampingly fit in the respective rear face groove.

**5.** The coupling element according to any one of the preceding claims, wherein the connection tab (22) comprises a provision (26) for connecting it to the rear face of the extrusion board (5), in particular comprising a through hole for allowing a screw to attach the connection tab to the extrusion board.

**6.** The coupling element according to any one of the preceding claims, wherein the coupling element is injection moulded of additive manufacturing produced, in particular the coupling element is a substantially polymer coupling element.

**7.** The coupling element according to any one of the preceding claims, wherein the extrusion board is of the tongue-and-groove type, in particular each extrusion board comprise a tongue (2) and a groove (3), each extrusion board along one longitudinal side provide with a tongue and on an opposite longitudinal side provided with a corresponding groove, and wherein the plate matched the cross section of the extrusion board to provide a flush front face of the two coupled extrusion boards.

8. A assembly comprising at least similar two boards each having at least one longitudinal board chamber (8), a board front face (4) and a board rear face (5), and a board cross section and a coupling element (20) comprising a plate (21) matching the cross section of the extruded boards and having two opposite substantially flat faces, the coupling element further comprising at least one clamping extensions (23, 24) extending from each face of the plate and positioned and shaped for clampingly fitting in the at least one respective longitudinal chamber, and a connection tab extending from the plate and positioned and shaped for abutting the respective board rear face allowing connecting to the rear face of the respective extruded board, and
wherein the plate (21) comprises at least one notch (25) in an edge at the rear face of the extrusion board (1) when mounted on the extrusion board (1), for ventilating an aligned longitudinal board chamber (8).

9. The assembly of claim 8, wherein the extrusion boards comprise a rear face groove (6) in the rear face and having a cross section groove shape, wherein the connection tabs are shaped to clampingly fit in the respective rear face grooves.

10. A method for end-to-end butt-coupling of two similar extruded boards (1) each having at least one longitudinal board chamber (8), a board front face (4) and a board rear face (5), and a board cross section, comprising providing two similar extrusion boards, providing a coupling element (20) according to any one of the preceding claims 1-7, attaching the coupling element to one extrusion board end, and attaching the other extrusion board end on the opposite end of the coupling element.

11. The method of claim 10, further comprising attaching the connection tabs (22) to the respective extrusion board.

12. Use of a coupling element according to any one of claims 1-7 for butt end-to-end coupling of two similar extrusion boards.

13. An end cap (40) for attaching to an end of an extruded board (1) having at least one longitudinal board chamber (8), a board front face (4) and a board rear face (5), and a board cross section, the end cap comprising a plate (41) matching the cross section of the extruded boards and having two opposite substantially flat faces, the end cap further comprising at least one clamping extensions (42, 43, 44, 46, 47) extending from a face of the plate and positioned and shaped for clampingly fitting in the at least one respective longitudinal chamber, and a connection tab (45) extending from the plate and positioned and shaped for abutting the respective board rear face allowing connecting to the rear face of the respective extruded board, wherein the plate (41) comprises a groove (48) or trough aligned with a longitudinal chamber (8) for ventilating the corresponding longitudinal chamber (8).

14. A kit of parts comprising an end cap of claim 13 and a coupling element of any one of claims 1-7.

Fig. 1

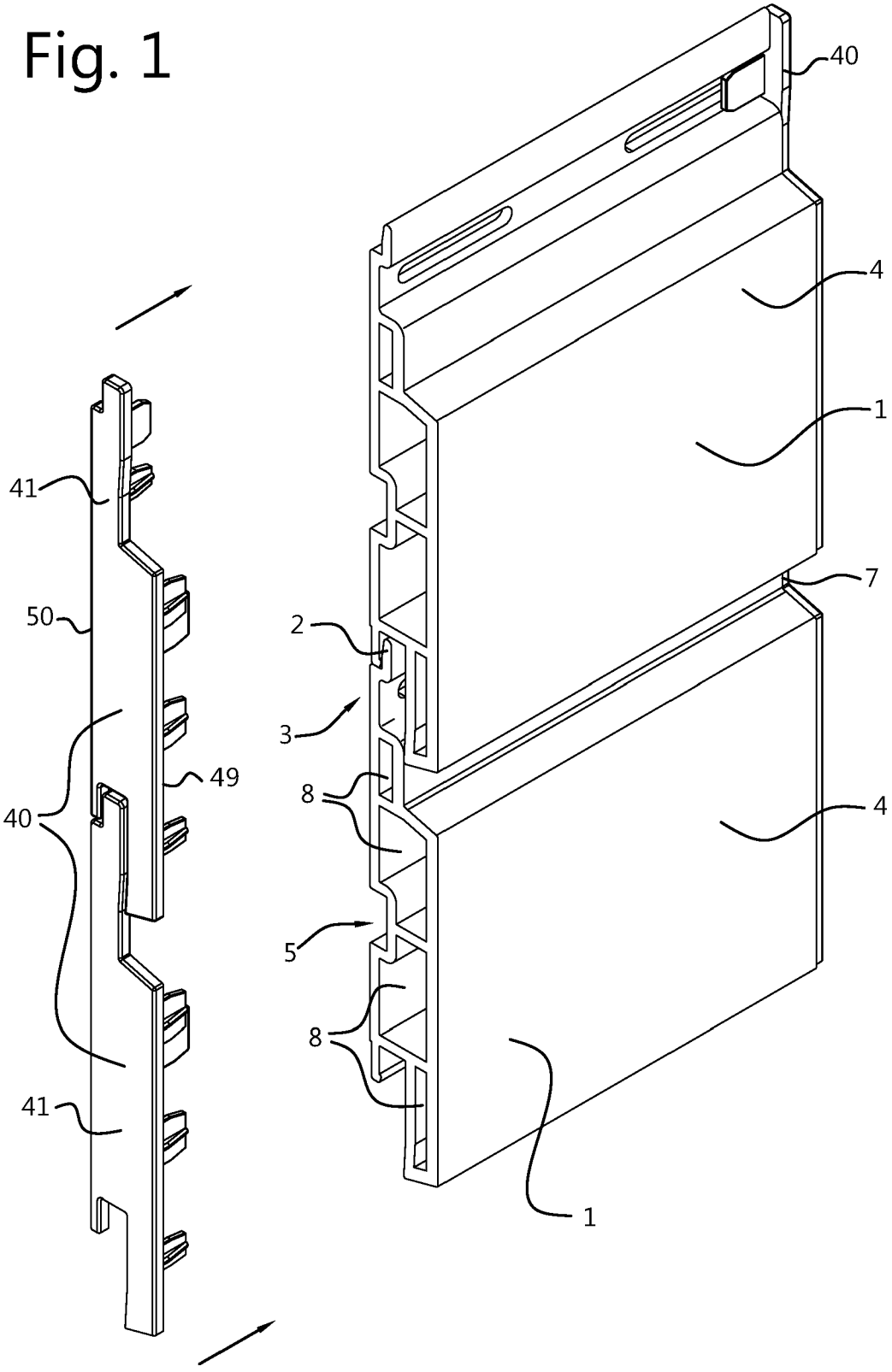


Fig. 2

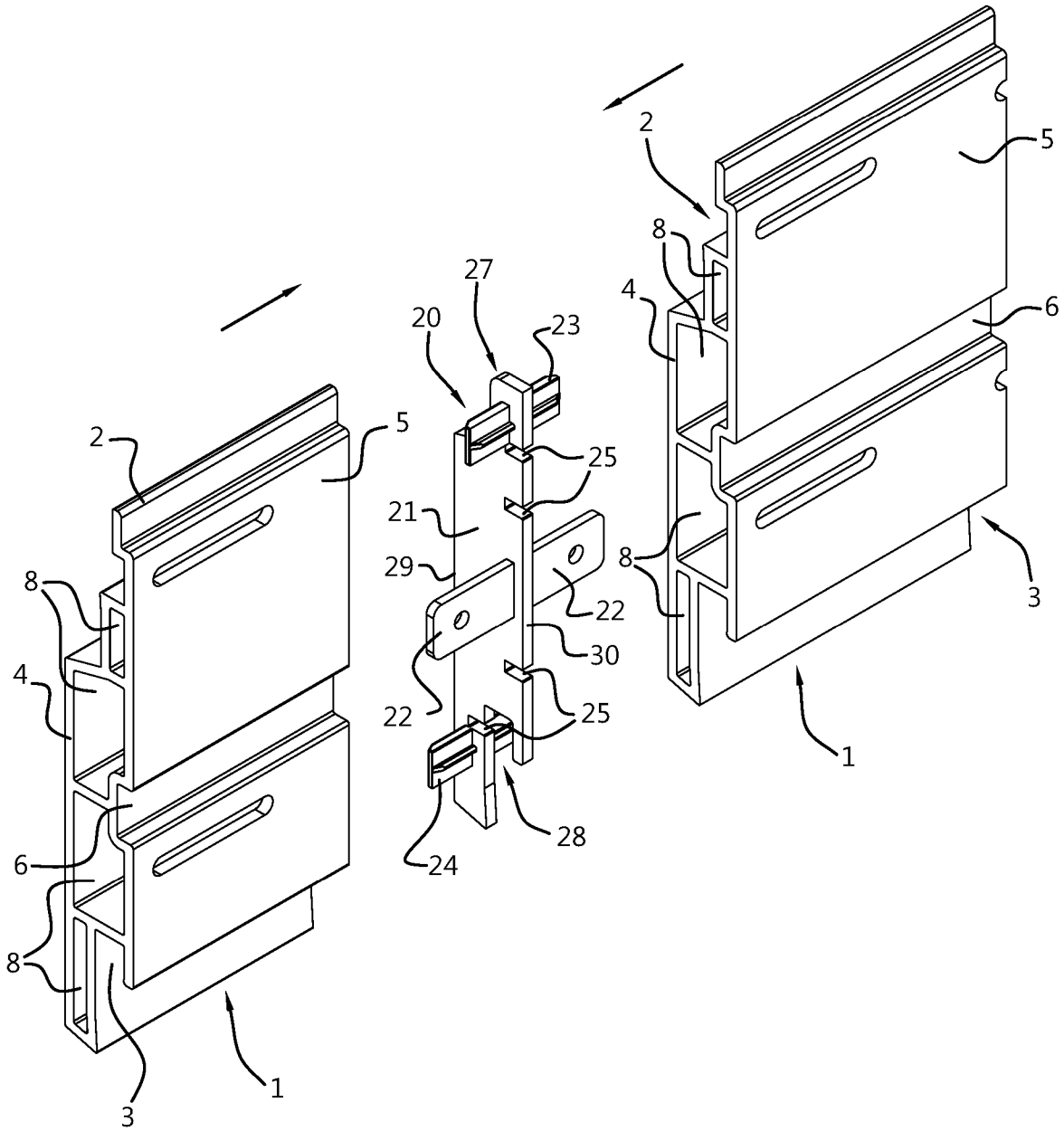


Fig. 3

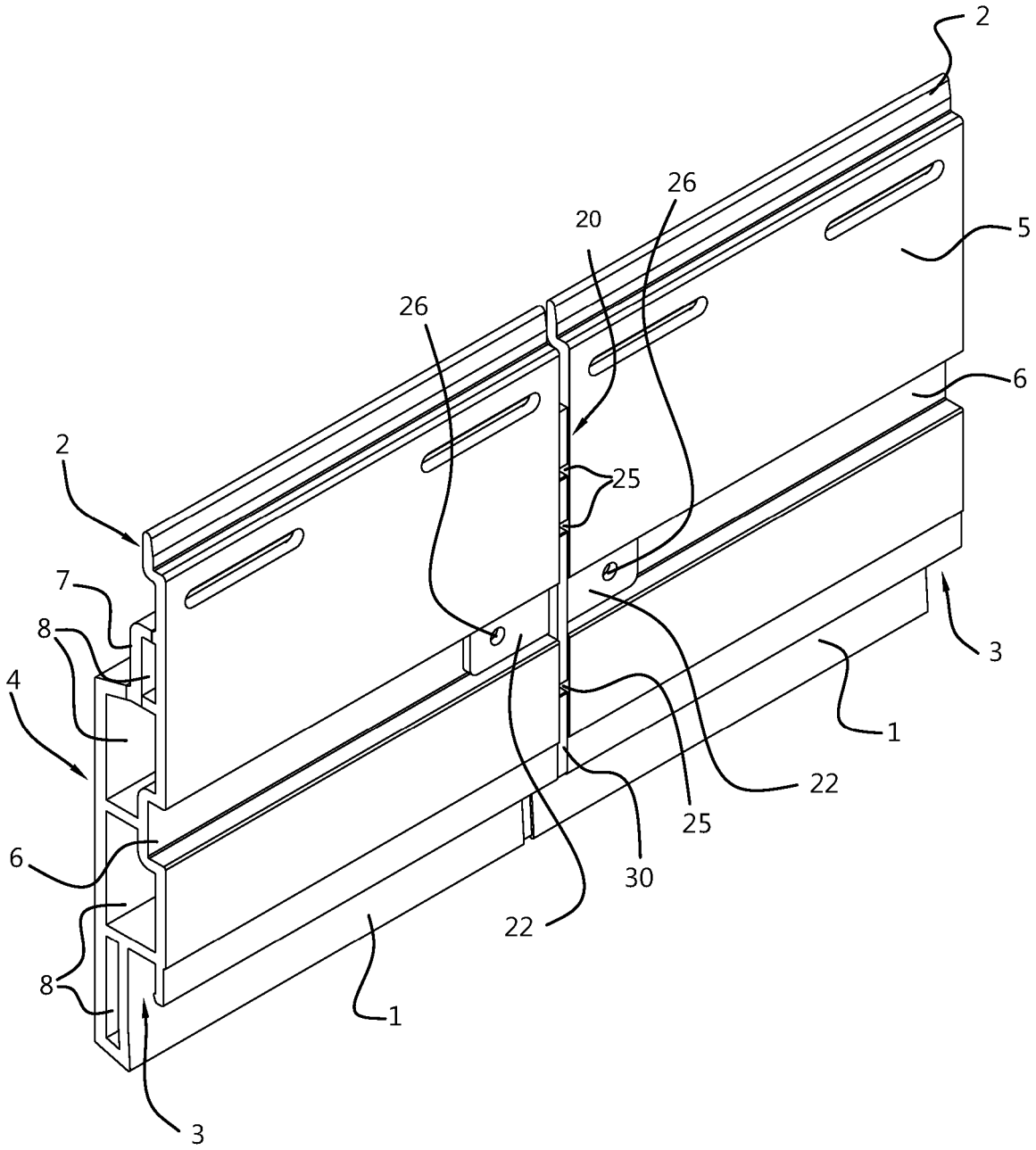


Fig. 3A

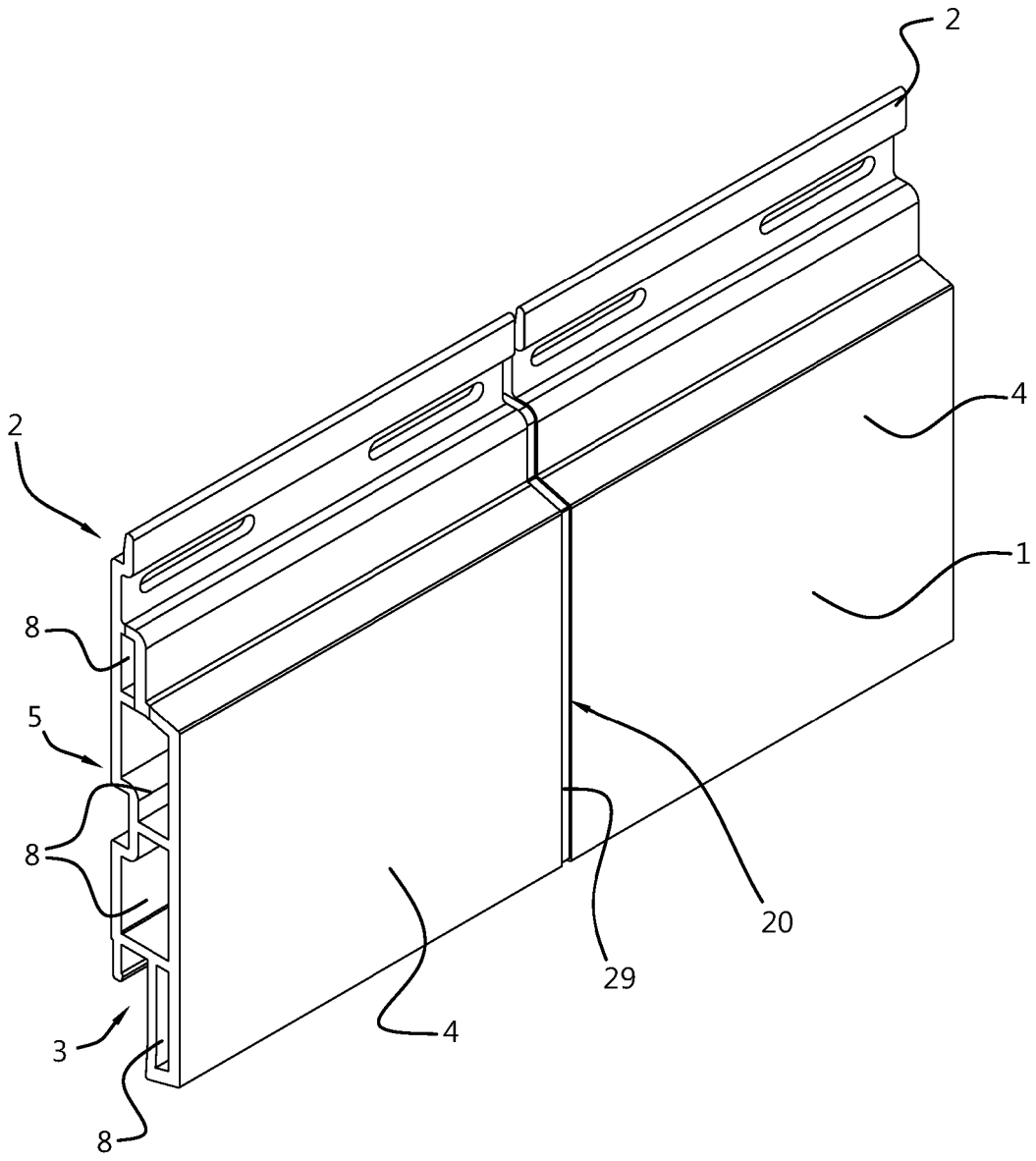


Fig. 4

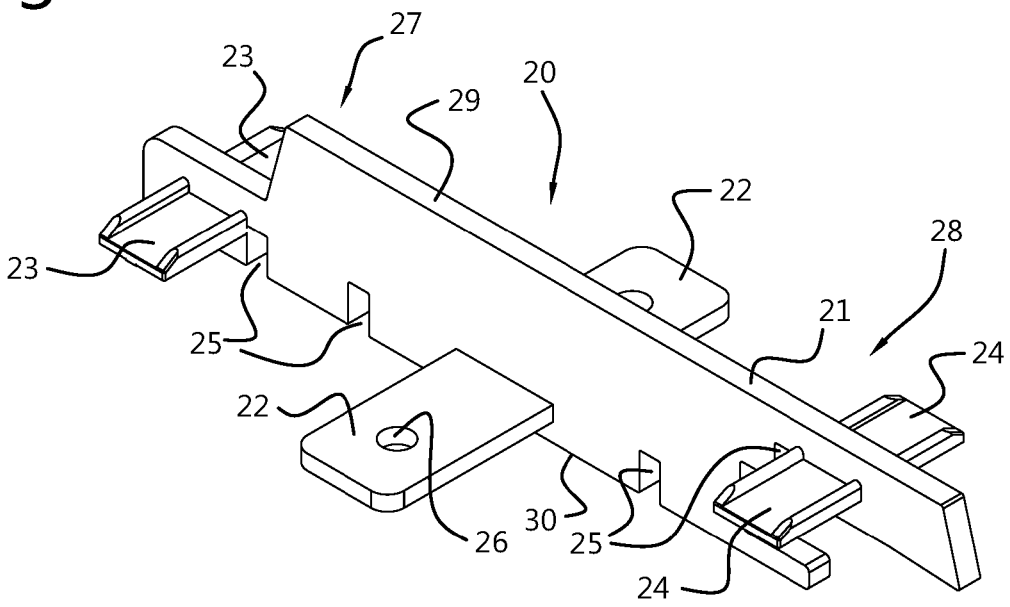

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Fig. 5

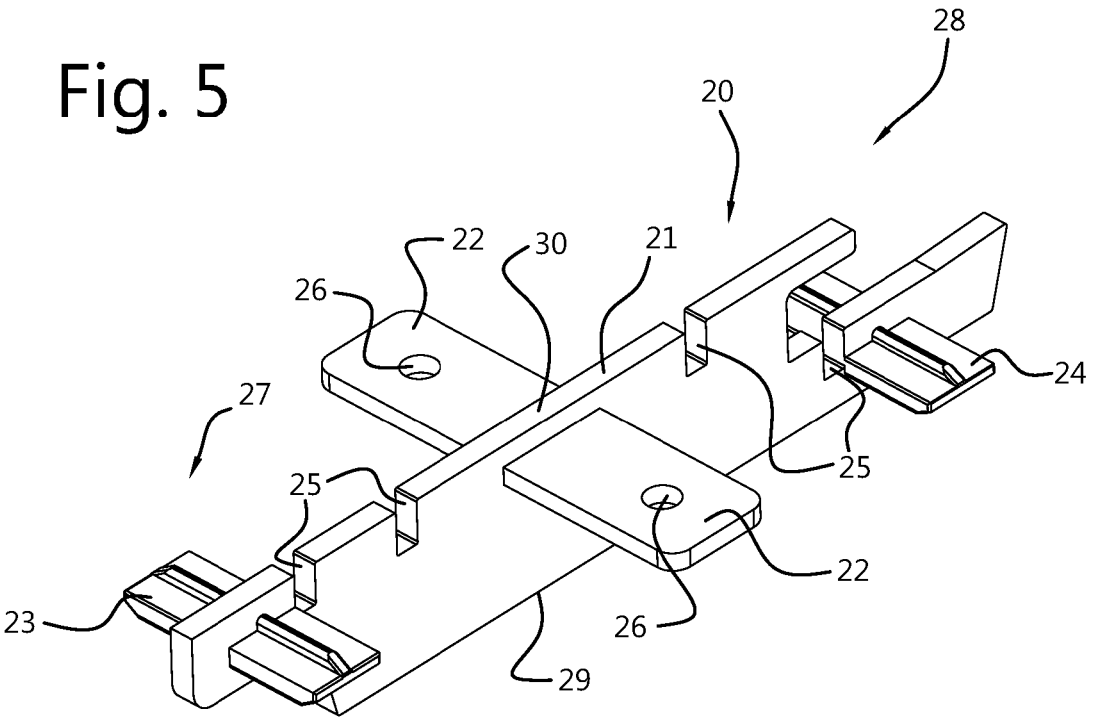

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Fig. 6

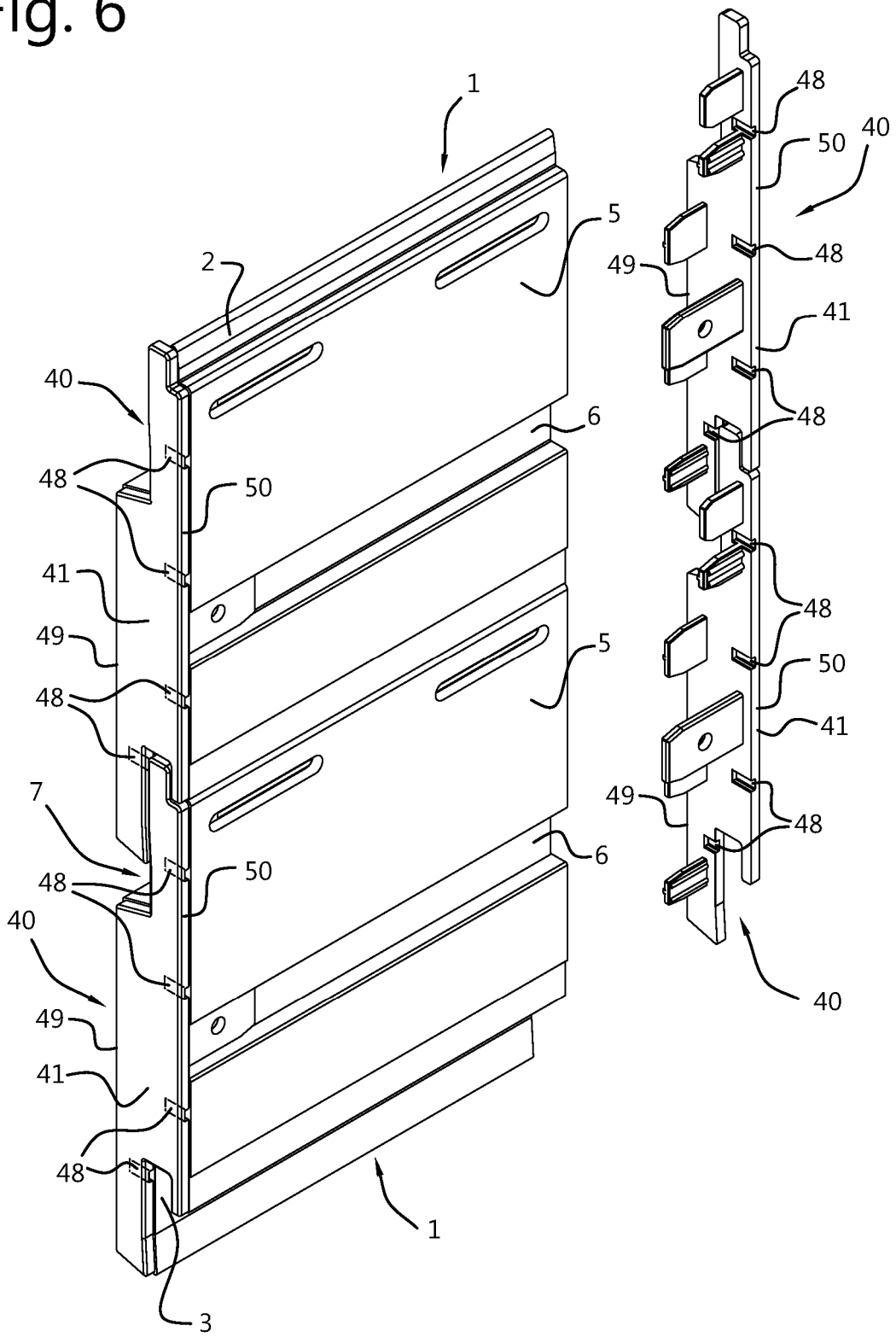


Fig. 7

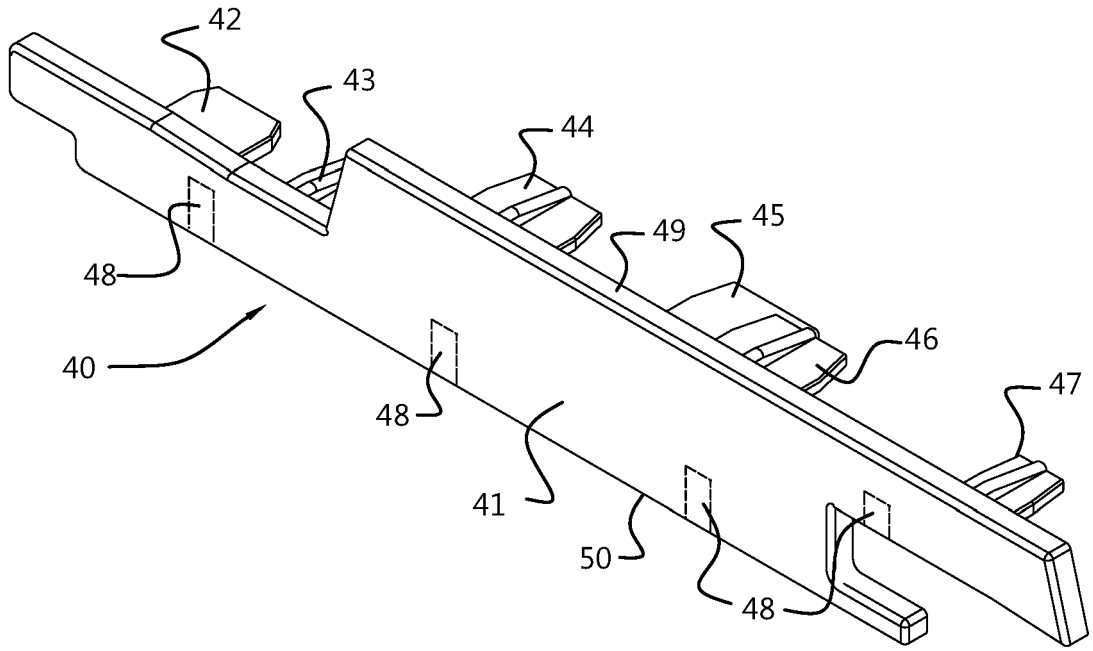
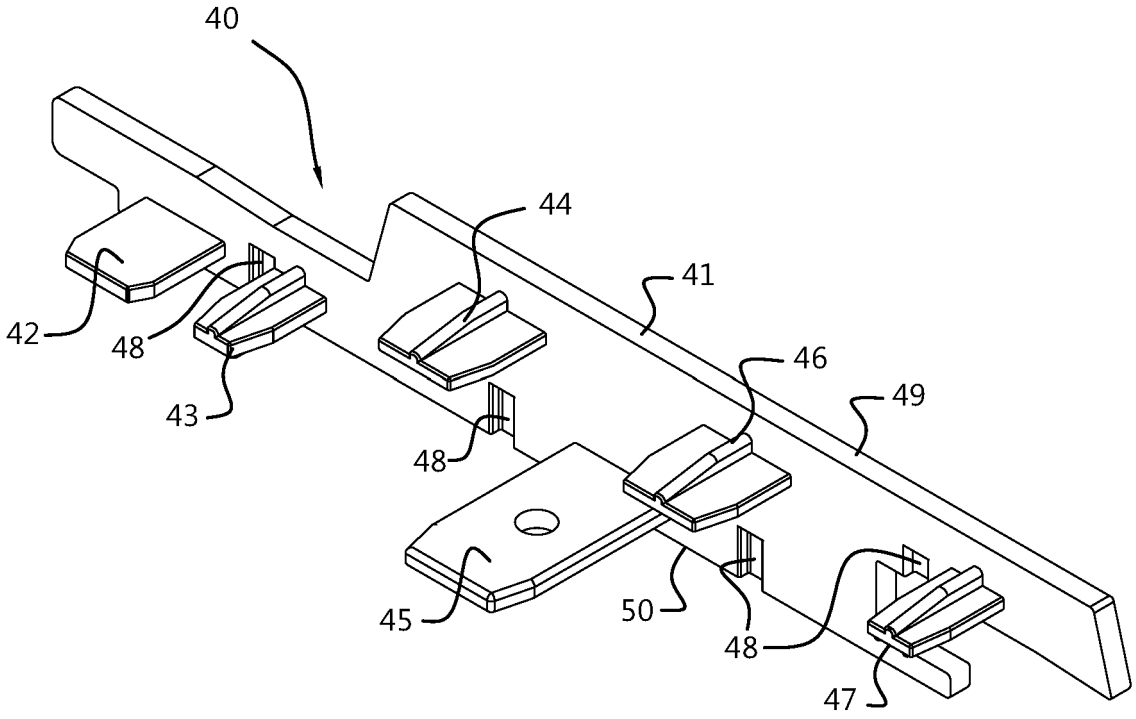

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Fig. 8


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# EUROPEAN SEARCH REPORT

Application Number
EP 24 19 2206

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E04F

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| Munich | 18 December 2024 | Fournier, Thomas |

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