



(11)

EP 4 488 468 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.01.2025 Bulletin 2025/02

(51) International Patent Classification (IPC):
E04D 13/03 ^(2006.01) **E06B 1/34** ^(2006.01)

(21) Application number: **24186857.9**

(52) Cooperative Patent Classification (CPC):
E06B 1/342; E04D 13/031

(22) Date of filing: **05.07.2024**

(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

(72) Inventors:
• **Jab o ski, Zbigniew**
33-326 Paszyn (PL)
• **Mucha, ukasz**
33-330 Grybów (PL)

(74) Representative: **Bukanska, Alicja**
Fakro PP Sp. z o.o.
ul. Wegierska 144a
33-300 Nowy Sacz (PL)

(30) Priority: **05.07.2023 PL 44547023**

(71) Applicant: **FAKRO PP Sp. z o.o.**
33-300 Nowy Sacz (PL)

(54) **ROOF WINDOW LINING ASSEMBLY CONNECTOR, LINING ASSEMBLY UNIT AND METHOD FOR ASSEMBLING LINING AROUND A ROOF WINDOW USING THE ASSEMBLY UNIT**

(57) The subject of the invention comprises roof window lining assembly connector (1), designed to be seated in jamb groove (20), and assembly connector (1) is an elastic element, which once seated in jamb groove (20) exerts constant pressure on its opposite walls, and assembly connector (1) is constructed out of base (11), with at least one ridge (12) and stop face (13), which is at an angle relative to base (11), so that stop face (13) features top edge (133), with the axis of rotation (0') of the stop face first arm (131) and second arm (132) passing through it, and the distance between the two stop face arms is d_1 wherein $d_1 > 0$.

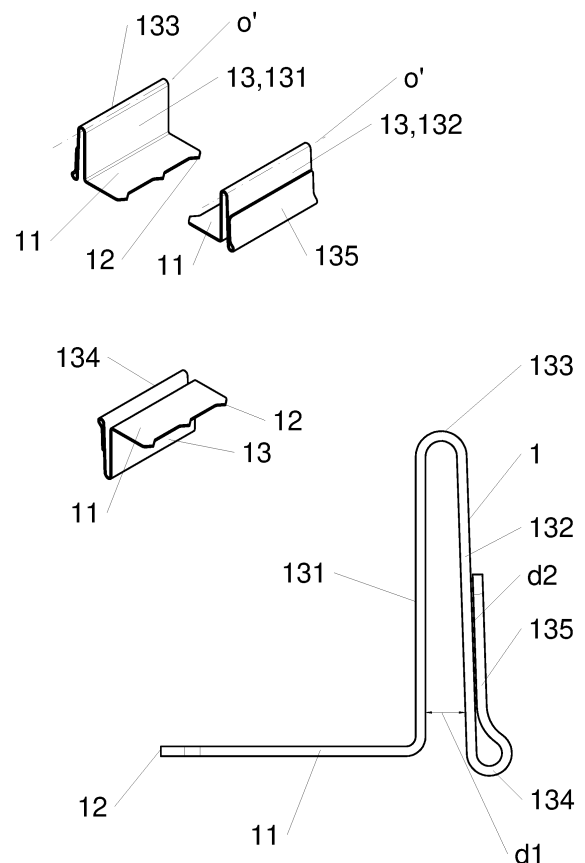


Fig. 6

Description

[0001] The subject of the invention comprises a roof window lining assembly connector, a lining assembly unit and a method for assembling lining around a roof window using the assembly unit.

[0002] A lining for a window constructed out of a frame which defines the frame plane, wherein the aforementioned lining contains a panel unit and numerous fittings designed to ensure a connection between the window frame and the lining has been disclosed under EP3792438B1. Each fitting features a frame fitting section and a lining fitting section, so that the frame fitting section is configured to be connected to the window frame. The frame fitting section features a flange for attaching to a window frame, so that it stretches along the first plane parallel to the frame plane and a bottom section which stretches from the flange at an angle to the frame and which features coupling measures oriented towards the lining in its assembled position. The lining fitting section works with the lining and is configured to be connected to an appropriate lining panel. The lining fitting section features an essentially flat base which abuts the lining outer surface and coupling measures which protrude from the base oriented away from the lining panel, wherein the lining fitting section coupling measures are configured for coupling with frame fitting section coupling measures during assembly of the lining around a window. The frame fitting section bottom section features at least two coupling segments and the base features a single coupling segment in order to make it possible to maintain each lining panel using connectors in the first, partially inserted position and in a completely inserted assembly position relative to the window frame.

[0003] The disclosed solution entails attaching a lining around a roof window using a two-part fitting. One section is attached in a lining plate and the other in a jamb groove. The other fitting section is attached in a groove using screws. Both these sections establish a catch type connection. The disclosed solution is complicated and difficult to carry out due to limited assembly space. Assembly connector according to claim 1 solves the aforementioned problem through a non-invasive assembly of the lining, which does not require the application of additional assembly measures in the form of screws or similar.

[0004] The aim of the invention is a roof window lining assembly connector. The assembly connector is an elastic element, which once seated in a jamb groove exerts constant pressure on its opposite walls. Whereas the roof window jamb is constructed out of four stiles: upper stile, lower stile and two side stiles, connected to each other to form a closed frame. Each stile features a jamb groove for a lining plate, oriented towards a room interior in which the roof window has been installed. The assembly connector is constructed out of a base with at least one ridge and a stop face, which is at an angle relative to the base. The base ridge and the stop face abut opposite lining groove side walls exerting the aforementioned pressure

upon them. The stop face features a top edge, with the axis of rotation of the stop face first and second arm passing through it, making it possible to elastically tilt them relative to one another. Wherein the distance between the stop face first and second arm is d_1 , and $d_1 > 0$. Once the assembly connector has been seated in the jamb groove, distance d_1 is less than the distance before it was seated in the jamb groove. In order to limit the maximum distance d_1 reduction, there is a spacer plate between the stop face first and second arms, which defines the minimum distance d_1 between the arms in their assembled position in the jamb groove.

[0005] Preferably the distance plate is an extension of the assembly connector base. The stop face also features a bottom edge which connects the stop face second arm with its third arm, and in the region of the largest parallel area between the stop face third arm and second arm, the distance between the second arm and the third arm is d_2 , and $d_2 \geq 0$. Similar to distance d_1 , distance d_2 decreases or remains the same once the assembly connector has been seated on the jamb groove. In the preferable embodiment, the assembly connector also features a coupling element to initially support the lining plates in the jamb groove. Preferably the coupling element is a lip protruding from the stop face first arm, and its crest is oriented towards the assembly connector base.

[0006] The roof window lining assembly unit according to the invention comprises an assembly connector as described above and a lining. Preferably the assembly unit also includes attachment measures, and screws in particular. The assembly unit lining is constructed out of four plates: top plate, bottom plate and two side plates, so that the length of one edge of each plate, referred to as the adjacent edge, is appropriate for the length of a corresponding roof window jamb stile which it is adjacent to in its assembled state. A top strip, bottom strip and two side strips are attached to each corresponding protective frame plate, and each strip features an attachment arm, so that there is a recess between the attachment arm and strip edge, wherein an edge of an appropriate protective frame plate is seated.

[0007] Method for assembling the lining around a roof window using the assembly unit described above entail the following:

- preparation of an assembly unit
- insertion of at least one assembly connector into each jamb groove. Before inserting an assembly connector into a jamb groove, it is in an expanded position, where distance d_1 reaches its maximum value. When inserted into the jamb groove, it is in a tensioned position, where distance d_1 is smaller than distance d_1 in the expanded position of the assembly connector. Once the assembly connector is seated in the jamb groove, it partially expands so that its base ridges and stop face push against the jamb groove opposing inner side walls. In that position, distance d_1 is smaller than distance d_1 in the

expanded position of the assembly connector and greater than or equal to distance d_1 in the assembly connector tensioned position. An analogous process of changing the distance occurs for distance d_2 between the stop face second and third arms.

- push-in insertion of the top, bottom and two side lining plates into corresponding jamb grooves with an assembly connector so that the edge of each lining plate abuts against the assembly connector base. Preferably during the insertion of lining plates into jamb grooves, they are initially supported by the jamb using a coupling element. The coupling element constitutes the connector lip which establishes a catch type connection with the lining plate, which preferably features a groove which the lip crest is inserted into. Optionally, the next element of the assembly entails attaching each plate to the jamb using attachment measures, such as screws. Then attachment measures are inserted into each lining plate from the lining plate outer wall side, so that the attachment measures pass through the appropriate lining plate, assembly connector stop face at an angle relative to the assembly connector base all the way to the jamb. In another embodiment, the attachment screw passes in an essentially perpendicular direction through the lining plate and connector stop face all the way to the wall of the room by the jamb or the jamb itself.

[0008] In a preferable version of the solution, the assembly unit also comprises a vapour-tight membrane, which in its assembled state shields the inside of the room around the window under the lining, and during assembly its edges are inside a jamb groove. Preferably, a sealing and bonding agent is also present in the jamb groove, and in particular butyl, so that it is located between the connector and the lining groove bottom, and in the embodiment with the vapour-tight membrane, the vapour-tight membrane edge is located between the connector and the sealing agent. In another embodiment, the sealing and bonding agent is applied to the lining plate edge being inserted into a jamb groove.

[0009] The assembly connector and the lining assembly unit according to the invention, means that the lining assembly method around the roof window jamb is quick and simple, without the need to use additional attachment measures. The connector is held in the jamb groove by the pressure exerted on the groove walls resulting from connector tension. The connector structure also allows for an initial assembly of the lining by supporting its plates next to the jamb in the connector before it is permanently attached around the window. The connector is also a non-invasive measure for attaching the vapour-resistant film to the jamb.

[0010] The illustration depicts the invention, with given figures depicting the following:

Fig. 1 window and lining

Fig. 2 cross section of jamb stile with connector and lining plate and enlarged-view C of lining plate assembly location by the jamb.

Fig. 3 cross section of jamb stile with connector and vapour-tight membrane as well as sealing and bonding agent and lining plate and enlarged-view D of lining plate assembly location by the jamb.

Fig. 4 cross section of jamb stile with connector and lining plate and enlarged-view F of lining plate assembly location by the jamb without screws.

Fig. 5 cross section of jamb stile with connector and vapour-tight membrane as well as sealing and bonding agent and lining plate and enlarged-view E of lining plate assembly location by the jamb without screws and with coupling element.

Fig. 6 cross section and perspective views of connector without spacer plates.

Fig. 7 cross section and perspective views of connector with spacer plates.

Fig. 8 cross section and perspective views of connector without spacer plates and with coupling element.

Fig. 9 cross section and perspective views of connector with spacer plates and with coupling element.

Embodiment 1

[0011] The assembly connector is a metal element, with the help of which the roof window lining is assembled around jamb 2. Assembly connector 1 is constructed out of base 11, with at least one ridge 12 and stop face 13. The stop face features elastic properties and is constructed out of first arm 131 and second arm 132. Rotation axis O' runs along top edge 133 which connects the said arms, and both the arms tilt slightly from their initial position i.e. prior to the assembly connector being seated in the jamb groove, so that distance d_1 between these arms in their assembled position is smaller than in their initial position, before assembly, when it is in a relaxed position. The assembly connector also features bottom edge 134 which connects stop face 13 second arm 132 with its third arm 135, and the distance between second arm 131 and third arm 135 is d_2 , and $d_2 \geq 0$. Distance d_2 decreases or remains the same once the assembly connector has been seated on the lining assembly groove.

Embodiment 2

[0012] In the second embodiment, the assembly connector according to the first embodiment, in order to limit the maximum reduction of distance d_1 between first arm

131 and second arm 132, also features spacer plate 14, which preferably is an extension of assembly connector base 11.

Embodiment 3

[0013] In the third embodiment, the assembly connector according to the first or second embodiments features a coupling element to initially support lining plates 16, 17, 18 by the jamb during lining assembly. The coupling element constitutes lip 136 protruding from stop face 13 first arm 131, and its crest is oriented towards assembly connector base (11). In the initial lining plate support position, lip 136 is in a catch type connection with plate 16, 17, 18. In the proposed embodiment, the catch type connection is established between a plate and lip 136.

[0014] The roof window lining assembly unit comprises an assembly connector according to any one of the embodiments 1-3, attachment measures, in particular screws 15 and a lining. The lining is constructed out of four plates: top plate 16, bottom plate 17 and two side plates 18, so that the length of one edge of each plate, referred to as the adjacent edge, is appropriate for the length of a corresponding roof window jamb stile which it is adjacent to in its assembled state. A top strip, bottom strip and two side strips are attached to each corresponding protective frame plate 16, 17, 18. Each strip features an attachment arm, so that there is a recess between the attachment arm and strip edge, wherein an edge of an appropriate protective frame plate is seated.

[0015] Method for assembling the lining around a roof window entails preparing an assembly unit and then the following:

- application of a layer of sealing and bonding agent 19 in jamb groove 20,
- positioning ends of vapour-tight membrane 21 in each jamb groove 20, on sealing and bonding agent 19, so that vapour-tight membrane 21 in its assembled state shields the inside of the room around the window under the lining,
- insertion of at least one assembly connector according to any one of the embodiments 1-3 into each jamb groove 20 onto vapour-tight membrane 21,
- push-in method insertion of the top 16, bottom 17 and two side lining plates 18 into corresponding jamb grooves 20 so that the edge of each lining plate abuts against assembly connector base 11, and each plate is initially supported in a jamb groove. Initial support in the proposed embodiment is performed using an assembly connector coupling element in the form of lip 136 protruding from stop face 13 first arm 131. Lip 136 establishes a catch type connection with a lining plate.

[0016] In another embodiment, where the assembly connector does not feature a coupling element, lining plate 16, 17, 18 is additionally attached to the jamb using attachment measures 15. During assembly, attachment measures 15 are inserted into each jamb plate from plate jamb inner wall 162 side, so that attachment measures 15 pass through appropriate lining plate 16, 17, 18, assembly connector stop face 13 at an angle relative to assembly connector base 11 all the way to the jamb. Then lining plates 16, 17, 18 are attached using screws as attachment measures to the wall around the jamb.

Claims

1. Roof window lining assembly connector (1), designed to be seated in a jamb groove (20), **characterized in that** it is an elastic element, which once seated in jamb groove (20) exerts constant pressure on its opposite walls.
2. Assembly connector according to claim 1 **characterized in that** it comprises a base (11), with at least one ridge (12) and a stop face (13), which is at an angle relative to the base (11), so that the stop face (13) comprises a top edge (133), with the axis of rotation (O') of a stop face first arm (131) and a second arm (132) passing through it, and the distance between the two stop face arms is d_1 wherein $d_1 > 0$.
3. The assembly connector according to claim 1 or 2 **characterized in that** the stop face (13) comprises a bottom edge (134) which connects the stop face (13) second arm (132) with its third arm (135), and the distance between the second arm (132) and the third arm (135) is d_2 , and $d_2 \geq 0$.
4. The assembly connector according to claim 1 or 2, or 3 **characterized in that** there is a spacer plate (14) between the stop face (13) first arm (131) and the second arm (132), which defines the minimum distance d_i between the arms.
5. The assembly connector according to claim 4 **characterized in that** the spacer plate (14) is an extension of assembly connector base (11).
6. The assembly connector according to claim 1 or 2, or 3, or 4, or 5 is **characterized in that** it features a coupling element to initially support lining plates (16, 17, 18) in jamb groove (20).
7. The assembly connector according to claim 6 **characterized in that** the coupling element constitutes a lip (136) on the stop face (13) first arm (131), and its crest is oriented towards assembly connector base (11).

8. The roof window lining assembly unit **characterized in that** it comprises the assembly connector (1) according to claims 1-7, and a lining.
9. The assembly unit according to claim 8 **characterized in that** it comprises an attachment measures, in particular a screws.
10. The assembly unit according to claim 6 or 7 **characterized in that** it comprises a vapour-tight membrane (21).
11. The assembly unit according to claim 6 or 7, or 8 **characterized in that** it comprises a sealing and a bonding agent (19) to be placed between the connector (1) and a jamb groove (20) bottom.
12. The assembly unit according to claim 6 or 7, or 8, or 9 **characterized in that** the lining comprises a four plates: a top plate (16), a bottom plate (17) and two side plates (18), so that the length of one edge of each plate, referred to as the adjacent edge, is appropriate for the length of a corresponding roof window jamb (2) stile which it is adjacent to in its assembled state and a top strip, a bottom strip and two side strips are attached to each corresponding protective frame plate, and each strip features an attachment arm, so that there is a recess between the attachment arm and the strip edge, wherein an edge of an appropriate protective frame plate is seated.
13. Method for assembling the lining around a roof window using the assembly unit according to claims 8-12, wherein the roof window is constructed out of the jamb (2) and a sash with a glazing unit, and the jamb (2) is a frame constructed out of a stiles, so that each jamb (2) stile features jamb groove (20), **characterized in that** the method entails the following:
- preparation of the assembly unit according to claims 8-12,
 - insertion of at least one assembly connector (1) according to claims 1-7 into each jamb groove (20),
 - push-in method insertion of the top (16), the bottom (17) and the two side lining plates (18) into corresponding jamb grooves (20) so that the edge of each lining plate abuts against assembly connector (1) base (11), and the lining plates (16, 17, 18) are initially supported in the jamb groove.
14. The assembly method according to claim 13 is **characterized in that** during push-in method insertion of the lining plates (16, 17, 18) into jamb groove (20), assembly connector (1) coupling element initially supports the lining plates (16, 17, 18) in the jamb groove (20) .
15. The assembly method according to claim 14 **characterized in that** the connector (1) lip (136) is the coupling element and it establishes a catch-type connection with lining plate (16, 17, 18).
16. The assembly method according to claim 13 or 14, or 15 **characterized in that** the next stage entails inserting attachment measures (15) into each lining plate from the plate lining outer wall side, so that the attachment measures (15) pass through the appropriate lining plate, assembly connector (1) stop face (13) at an angle relative to assembly connector base (11) all the way to the jamb.
17. The assembly method according to claim 13 or 14, or 15, or 16 **characterized in that** following preparation of an assembly unit, a layer of sealing and a bonding agent (19) is applied in the jamb groove (20).
18. The assembly method according to claim 13 or 14, or 15, or 16 **characterized in that** the sealing and bonding agent (19) is located on the lining plate edges (16, 17, 18) .
19. The assembly method according to claim 13 or 14, or 15, or 16, or 17, or 18 **characterized in that** before placing the connector (1) in the jamb groove (20), ends of vapour-tight membrane (21) are positioned in the jamb groove (20), preferably on the sealing and bonding agent (19), and the vapour-tight membrane (21) in its assembled state shields the inside of the room around the window under the lining.
20. The assembly method according to claim 13 or 14, or 15, or 16, or 17, or 18, or 19 **characterized in that** the lining plates (16, 17, 18) are attached to walls around the jamb using the attachment measures.

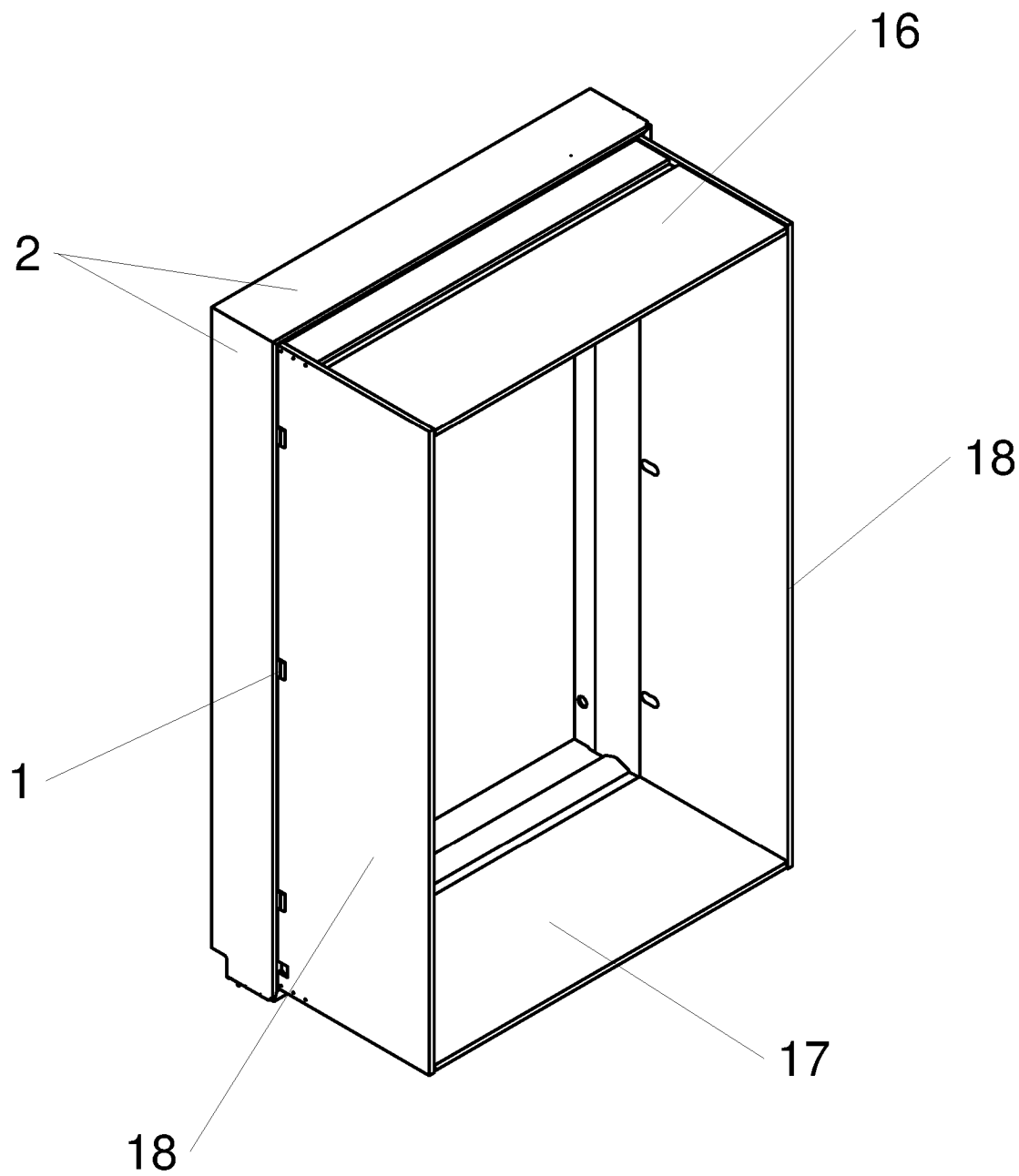


Fig. 1

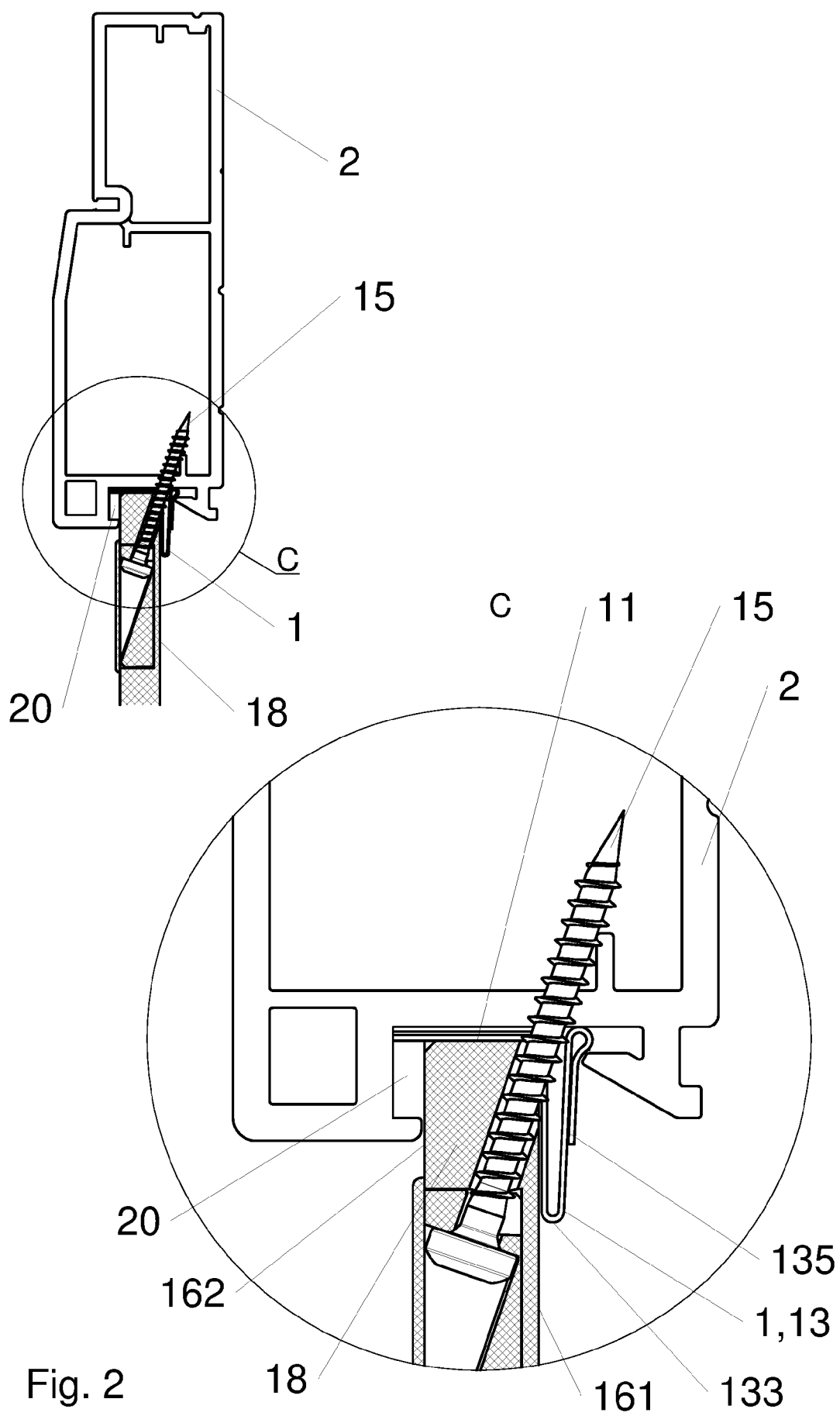


Fig. 2

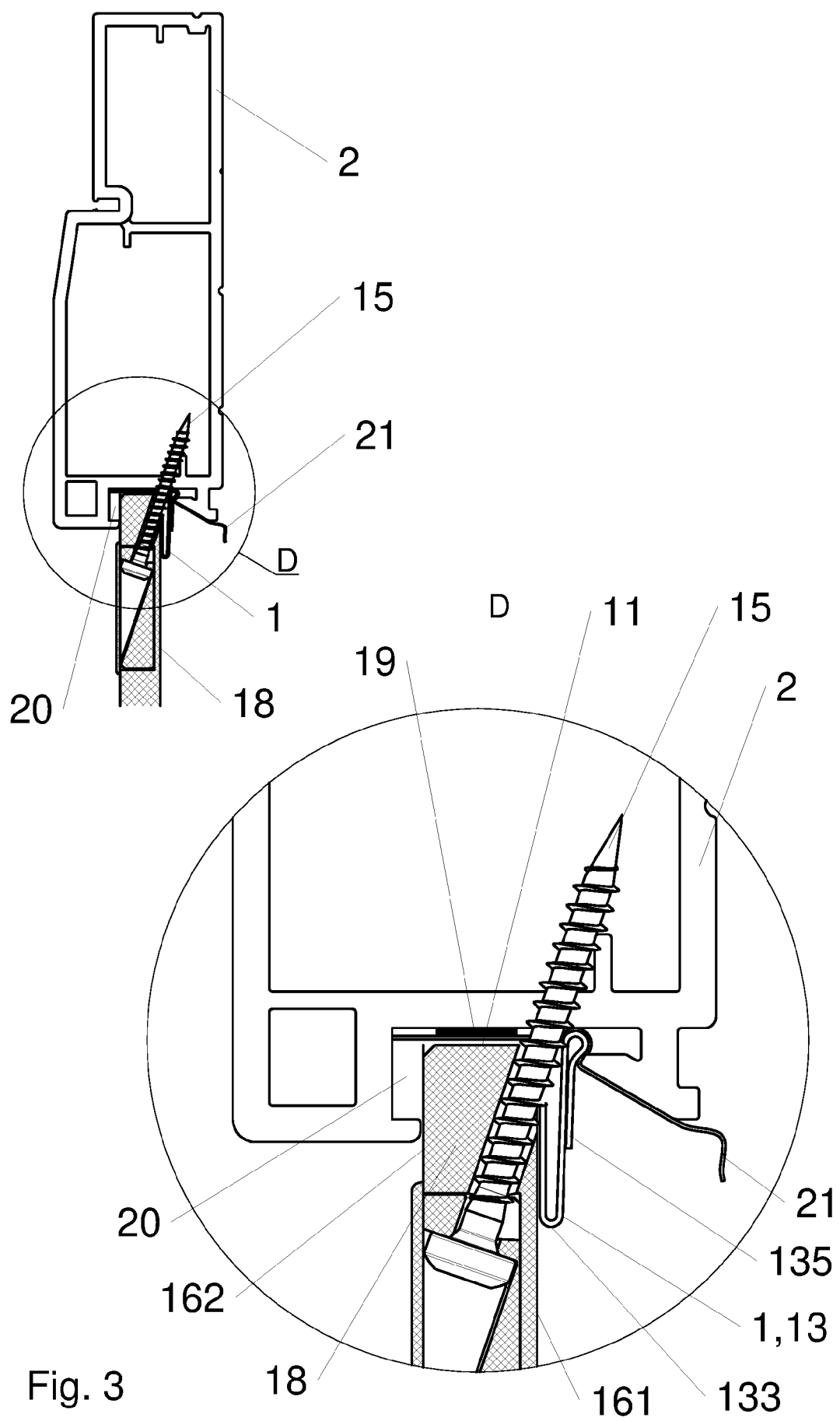


Fig. 3

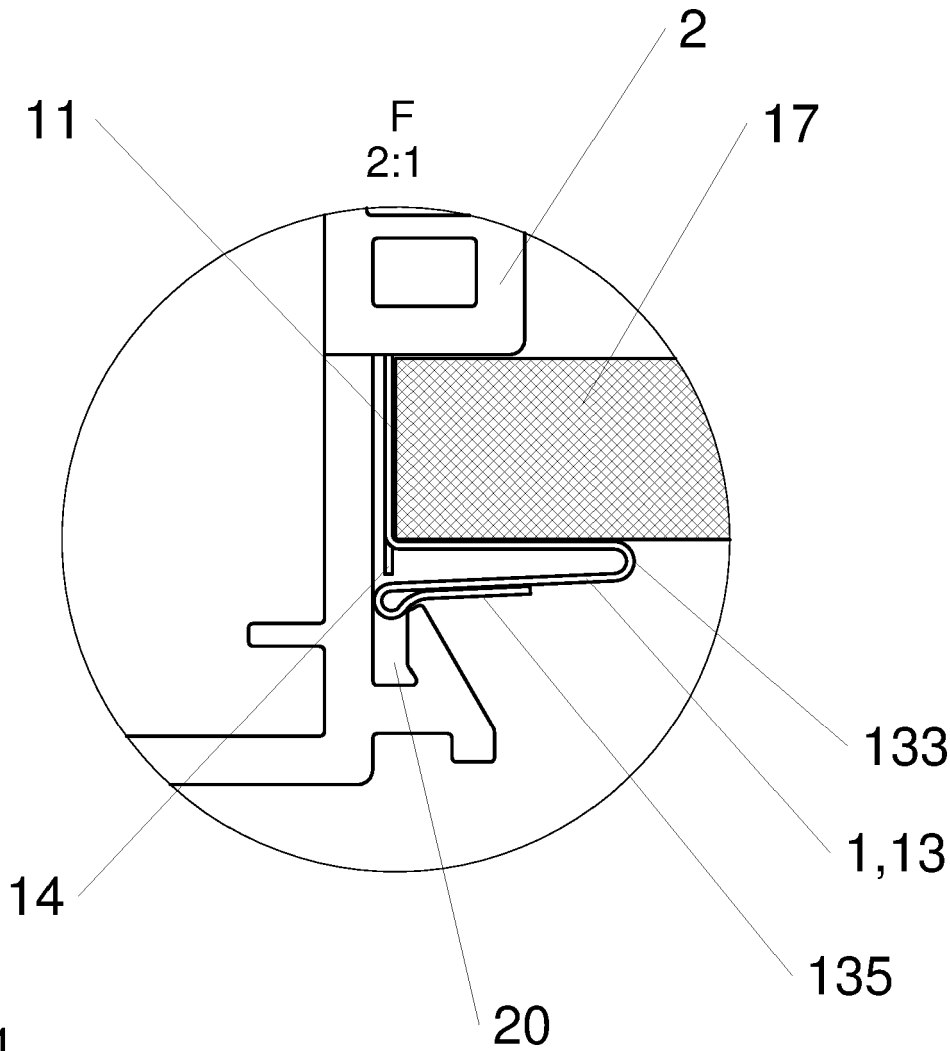
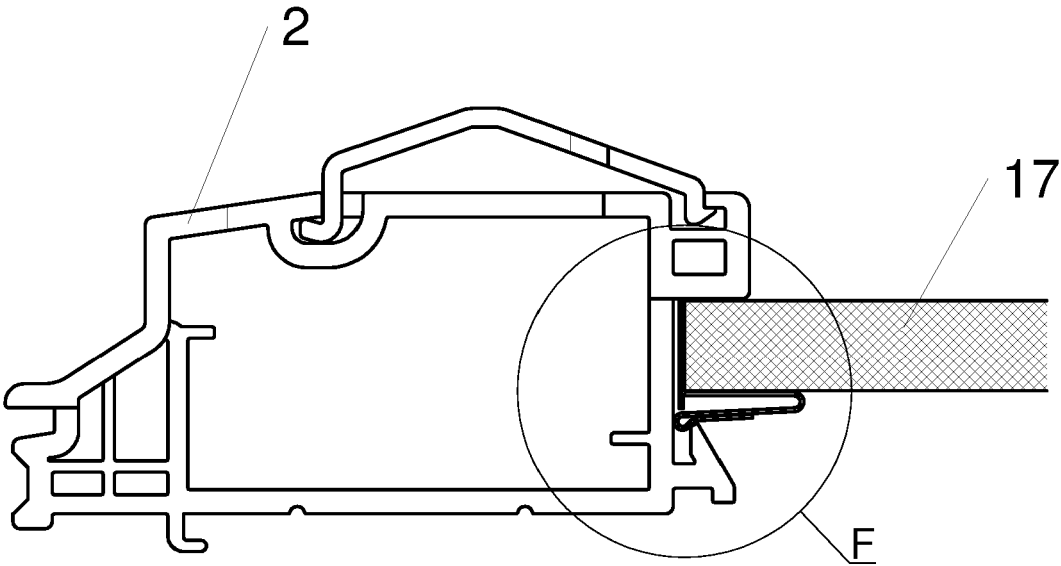


Fig. 4

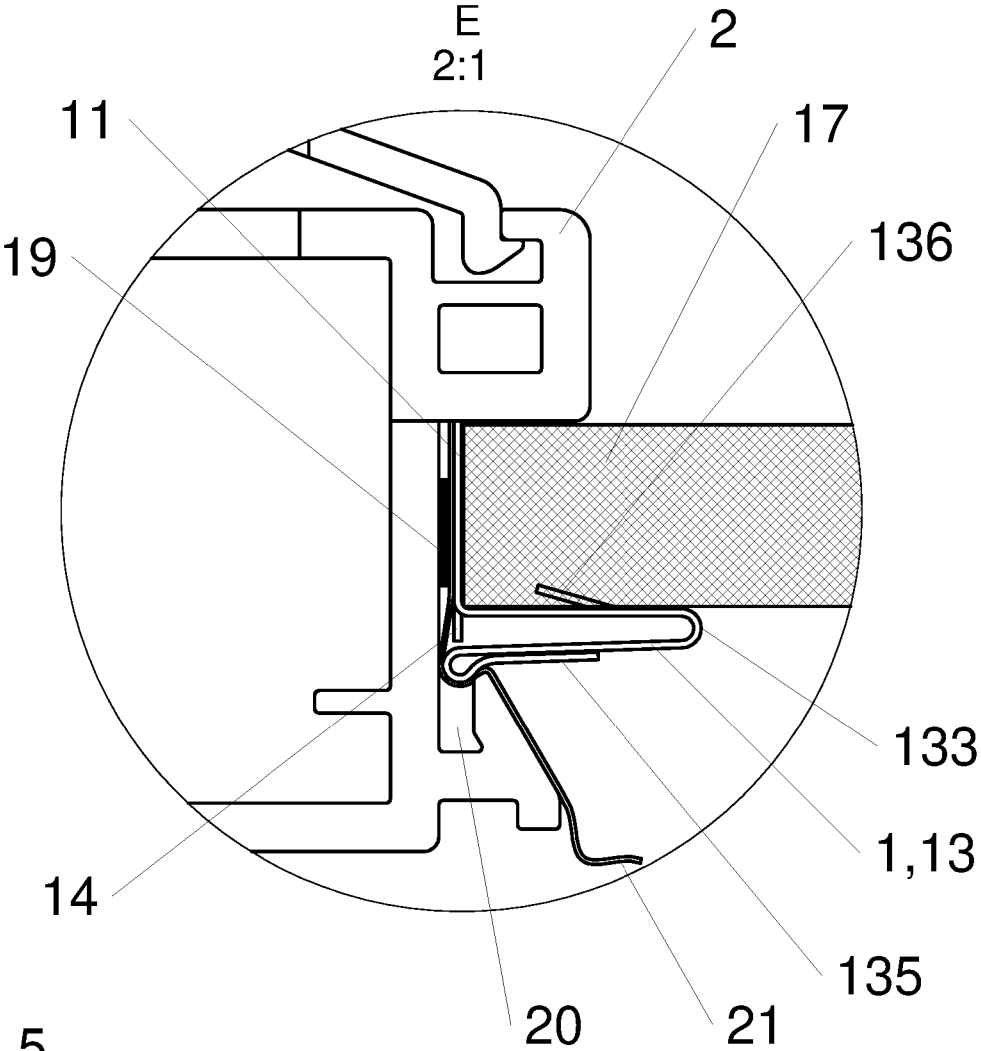
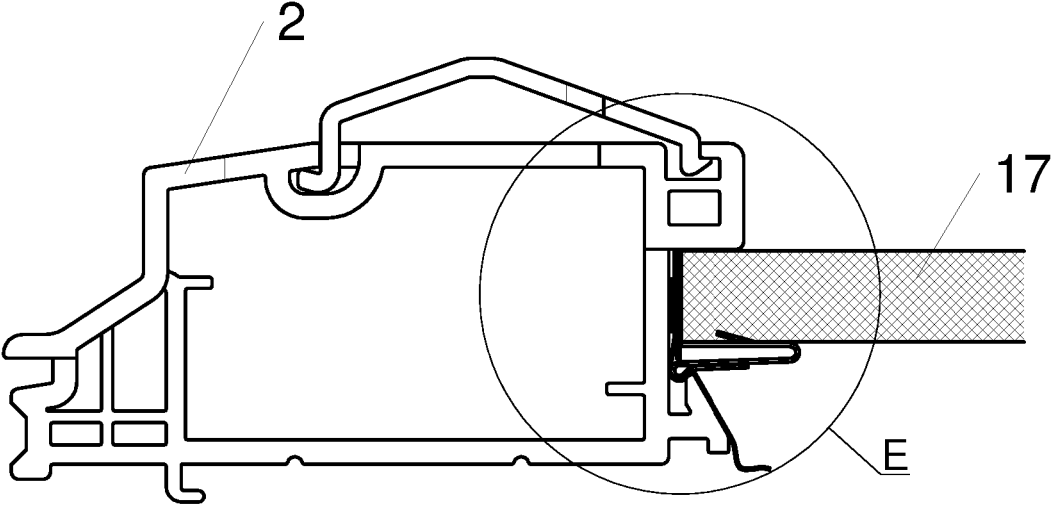


Fig. 5

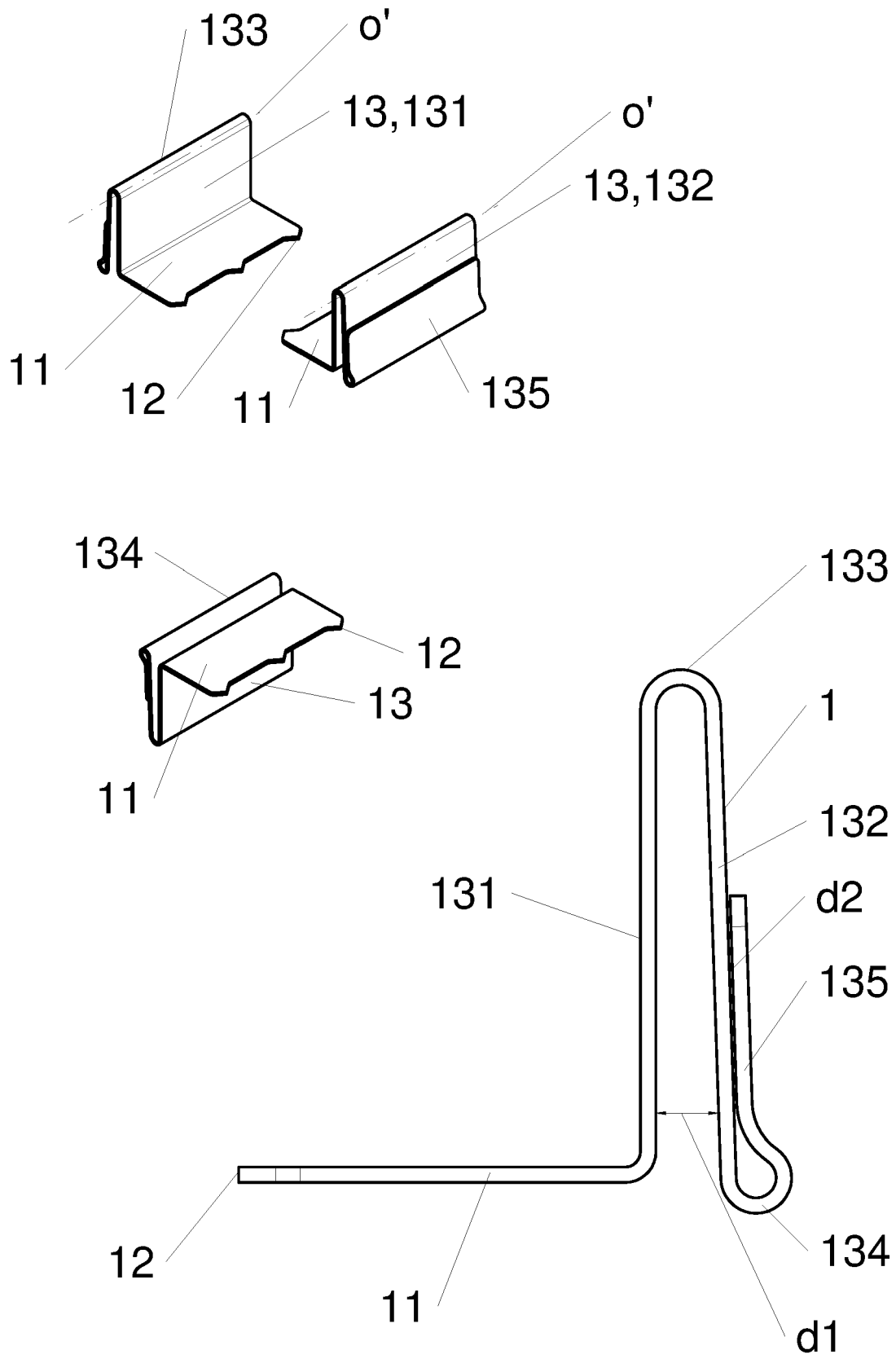


Fig. 6

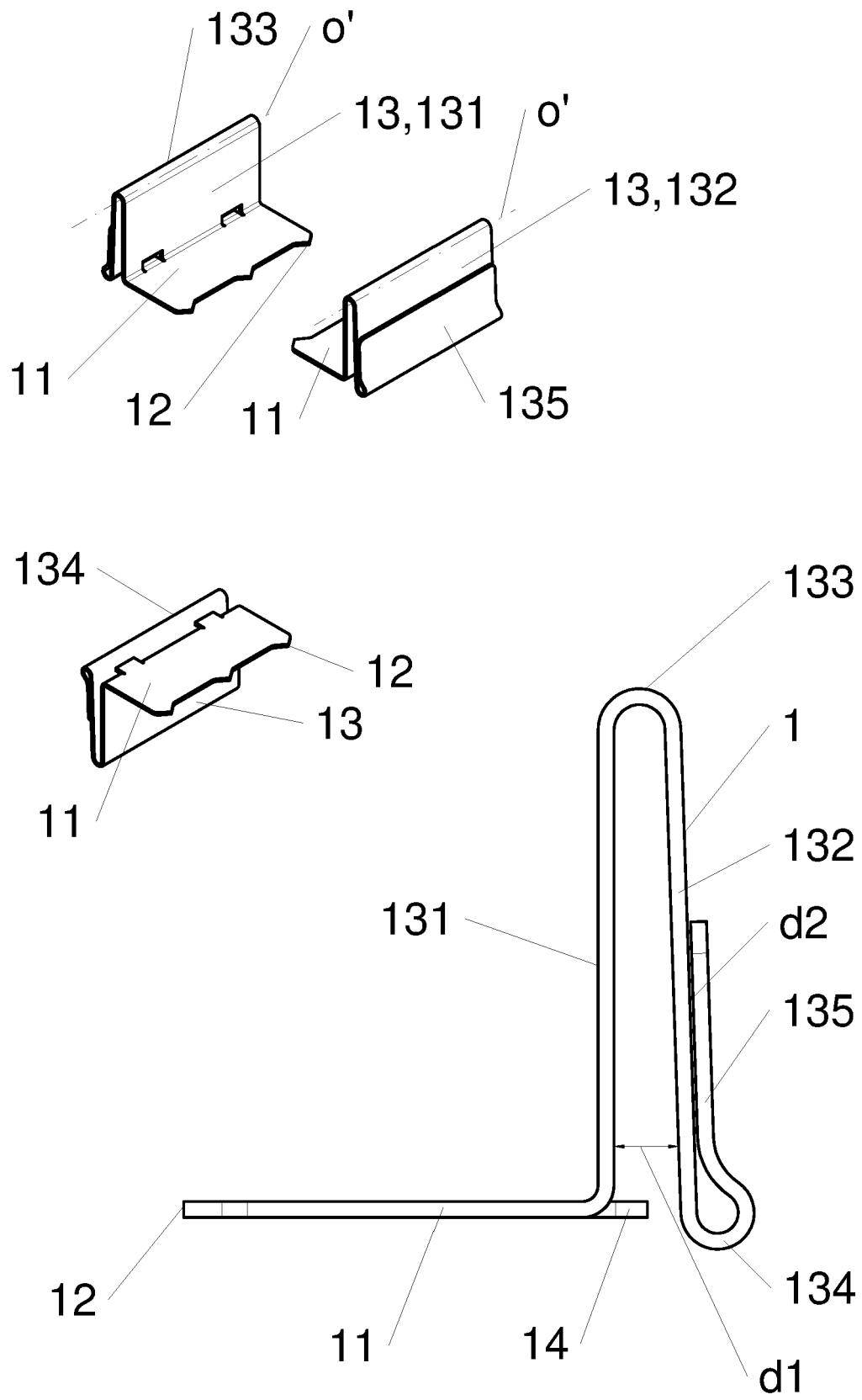


Fig. 7

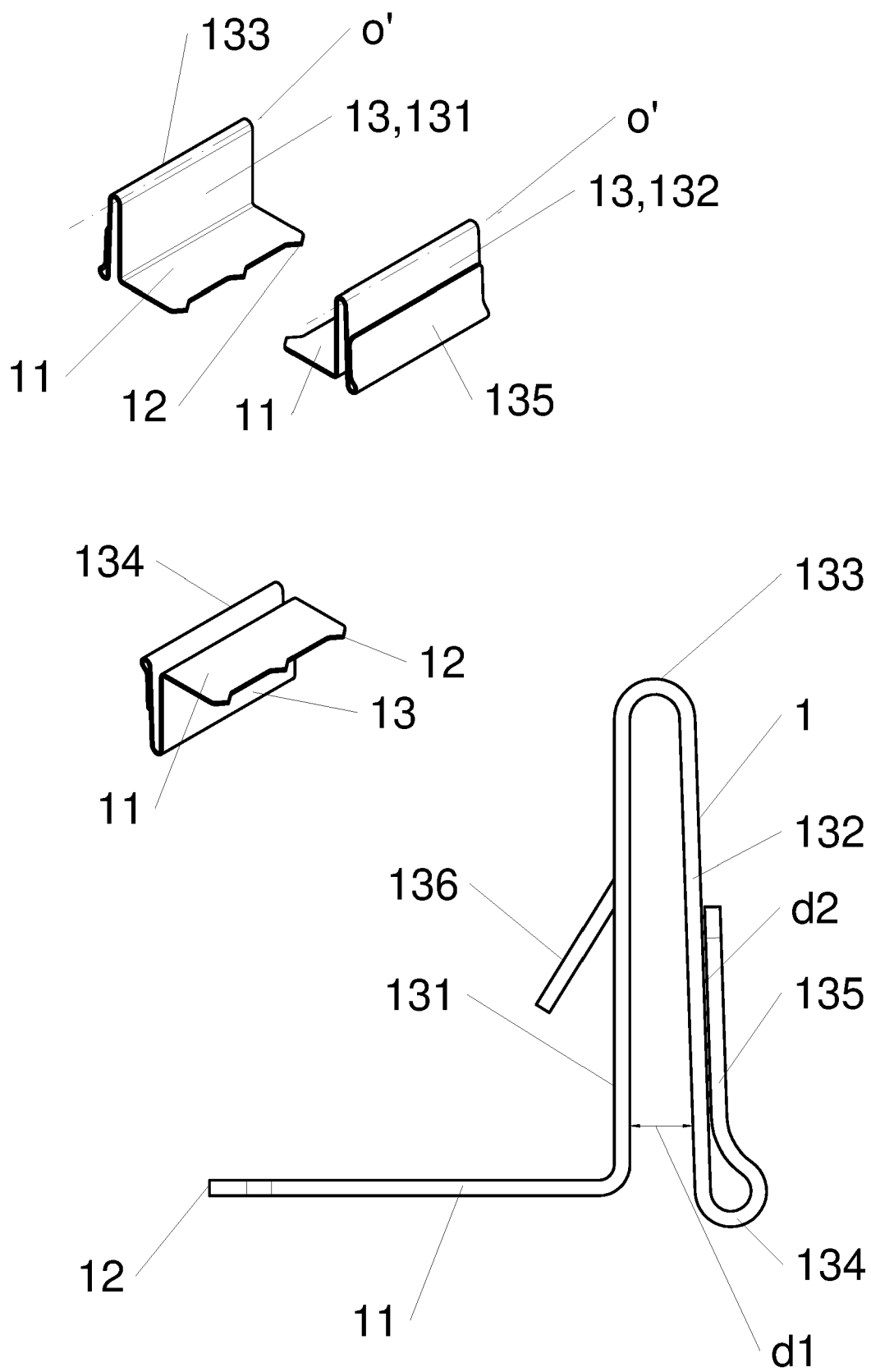


Fig. 8

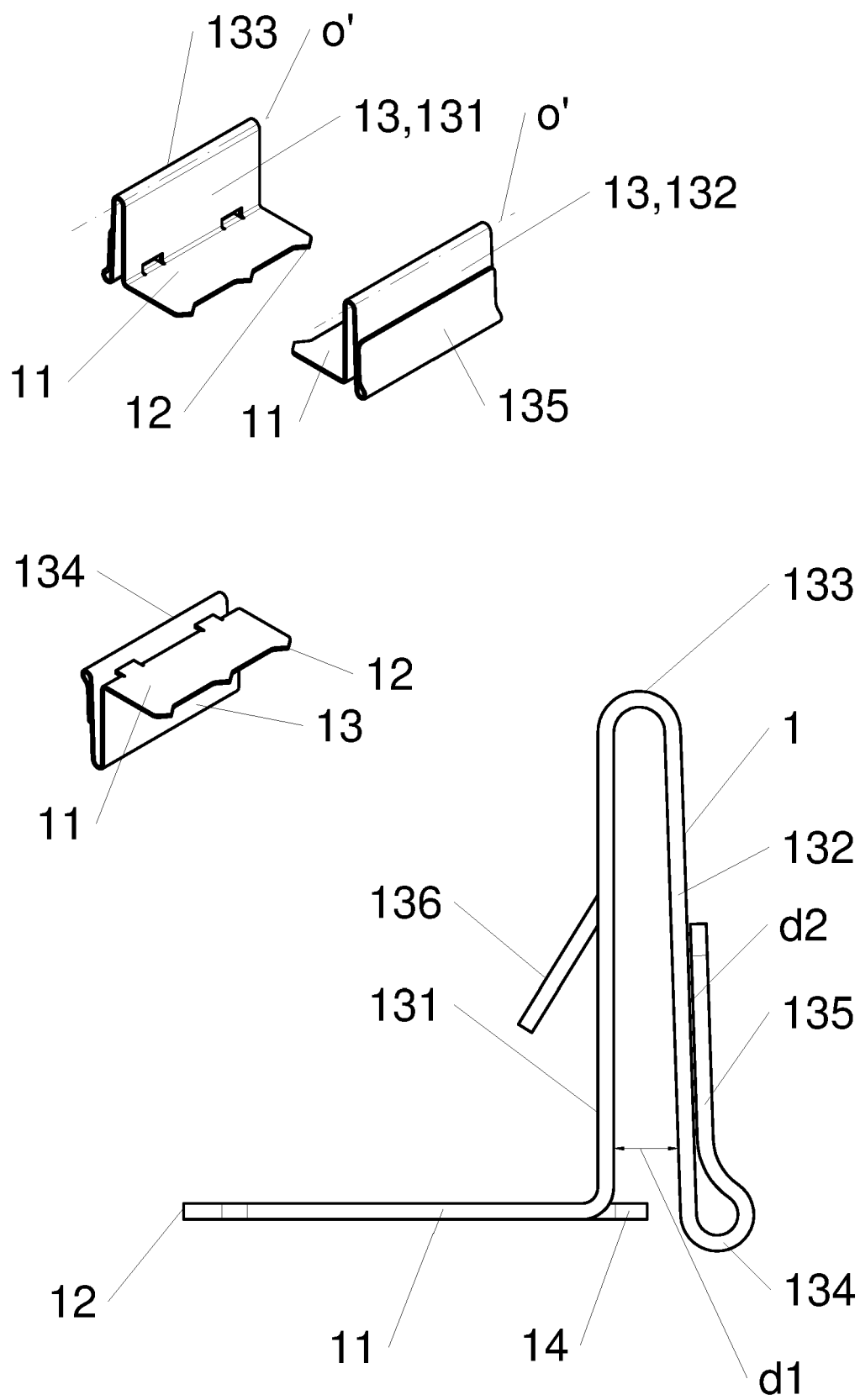


Fig. 9



EUROPEAN SEARCH REPORT

Application Number

EP 24 18 6857

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2008/138334 A1 (VKR HOLDING AS [DK]; OESTERGAARD ULLA TOFT [DK]) 20 November 2008 (2008-11-20)	1, 2, 4-15, 17-20	INV. E04D13/03 E06B1/34
A	* figures 7-0 * * page 8, line 20 - page 9, line 9 *	16	
X	FR 3 063 099 A1 (M C FRANCE [FR]) 24 August 2018 (2018-08-24) * figures 4-6 *	1, 13	
X	DE 28 56 401 A1 (GRUBER HERMANN) 3 July 1980 (1980-07-03)	1-5, 8, 11-13, 17, 18, 20	
A	* figure 3 *	16	
			TECHNICAL FIELDS SEARCHED (IPC)
			E04D E06B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		6 November 2024	Tran, Kim Lien
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 24 18 6857

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-11-2024

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2008138334 A1	20-11-2008	EP 2145068 A1 WO 2008138334 A1	20-01-2010 20-11-2008
FR 3063099 A1	24-08-2018	NONE	
DE 2856401 A1	03-07-1980	NONE	

15

20

25

30

35

40

45

50

55

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 3792438 B1 [0002]