



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
05.10.2022 Bulletin 2022/40

(51) International Patent Classification (IPC):
E04F 11/18 (2006.01)

(21) Application number: **22020135.4**

(52) Cooperative Patent Classification (CPC):
E04F 11/1834; E04F 11/1853

(22) Date of filing: **28.03.2022**

(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 MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **Pescini, Eddy**
25034 Orzinuovi (BS) (IT)
• **Bonometti, Gianluca**
25035 Ospitaletto (BS) (IT)
• **Pimazzoni, Simone**
25030 Castel Mella (BS) (IT)

(30) Priority: **29.03.2021 IT 202100007622**

(74) Representative: **Montebelli, Marco**
Brema SRL
Piazza Enriquez, 22/c
47891 Dogana (SM)

(71) Applicant: **Aluvetro S.r.l.**
25034 Orzinuovi (BS) (IT)

(54) **SYSTEM FOR ADJUSTING AND FIXING SHEET-SHAPED ELEMENTS FOR RAILINGS**

(57) A system for adjusting and fixing sheet-shaped elements for railings comprising containment means (10) for a protective sheet-shaped element (160) which are provided with a channel (140) for housing the sheet-shaped element (160) and adjusting means (20) for adjusting the position of the sheet-shaped element (160), wherein the adjusting means (20) comprise at least one resting and retaining element (180) with substantially L-shaped cross-section provided with seats for the passage of two pins (29) and with two planes (28) for the sliding of adjusting elements (240), in such a way that the combination of the movements of the adjusting elements (240) caused by the pins (29) generates a rotation of the resting and retaining element (180) which in turn causes a rotation of the sheet-shaped element (160).

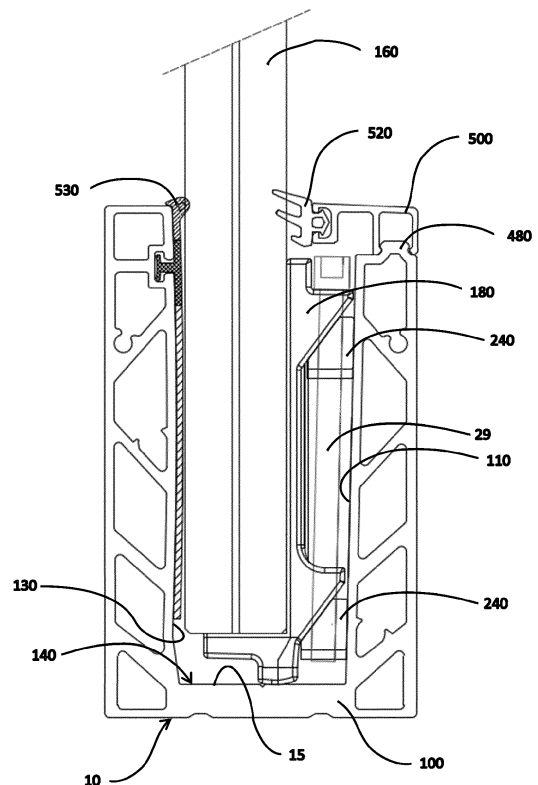


Fig. 2

Description

[0001] The present invention relates to a system for fixing and adjusting sheet-shaped elements for rails, balustrades, dividers and railings in general, wherein the sheet-shaped elements are the protective elements of said rails, balustrades, dividers and railings.

[0002] As known, the railing is a protective structure to avoid the free fall of people and objects from a balcony or a terrace and, in general, from every place where there are surfaces that have a difference in height. The railings differ substantially in the type of respective protective elements. For example, the balustrades are typically constituted of column-shaped elements, named "balusters", resting on a base and connected above by an horizontal element, called "cymatium". The rails are instead constituted of vertical pillars, usually made of metal, which support closing elements which are covered on the top by an handrail.

[0003] Moreover, there are railings and dividers whose protective elements are sheet-shaped and in many cases are made of glass plates. In general, the railings provided with protective sheet-shaped elements include a plurality of base elements which are able to retain and support the plates, combined or not combined with a plurality of vertical pillars. The elements or base bodies of the railings are configured to be fixed permanently to the ground or to the generic installation surface of the railing, like for example the walking area of a balcony or a terrace.

[0004] As known, the walking areas of balconies and terraces are built with a slope, in the order of around 1-2 degrees (approx. 2%-3%) in relation to an horizontal plane, to allow the appropriate runoff of rainwater. Moreover, it often happens that the walls to which the railings have to be connected are not perfectly parallel to the ground due to construction defects. As a result, also the elements or base bodies of the railings, once they have been installed on the above mentioned surfaces, are slightly inclined from the horizontal and vertical planes.

[0005] On the other hand, the protective elements of the railings, in particular when they are made in the form of sheet-shaped elements, have to be perfectly vertical due to aesthetic and safety reasons. Some elements or base bodies of the railings are then provided with mechanisms for adjusting the inclination of the respective protective elements.

[0006] An example of embodiment of a system for fixing and adjusting sheet-shaped elements for rails, balustrades and railings of known type is illustrated in the European patent no. 3009580, from which figure 1 is taken. The system comprises a plurality of base bodies (10) configured to be placed and fixed on a generic installation surface, like for example the walking surface of the balcony of a building, and such that they can receive the lower surface of a protective sheet-shaped element (16). Each base body (10) is made in the form of a box profile with substantially U-shaped cross-section, open in the upper part and in the lower part provided with one or

more fixing means (12), like for example bolts, on the system installation surface. Inside the box profile at least one channel (14) is defined in which the lower part of a protective sheet-shaped element (16) is inserted. On the inner lower surface of the channel (14) is fitted at least one lower resting element (18) of the protective sheet-shaped element (16), while on both inner lateral surfaces (20, 22) of said channel (14) are fitted respective resting, retaining and adjusting lateral elements (24, 26) of the protective sheet-shaped elements (16). The resting, retaining and adjusting lateral elements (24) provided on the inner lateral surface (20) of the channel (14) are equipped with adjusting and setting means (30) for adjusting the position and/or the inclination of the sheet-shaped element (16) which operate in a direction substantially perpendicular to the developing plan of the sheet-shaped element (16). The fixing, adjusting and setting element (30) is accessible from a first outer side (34) of the channel (14) and by means of a specific adjustment tool (36) it is possible to obtain the correct position and/or inclination of the protective sheet-shaped element (16). In this way it is possible to obtain the correct position and/or inclination of the protective sheet-shaped element (16) working only from the inner side of a balcony or a terrace. Each base body (10) is provided laterally and above with shaped grooves (48) to receive one or more longitudinal covering plates (50) configured to completely cover the base bodies (10) and the relative inner components, allowing out only the protective sheet-shaped elements (16) in the system fitted configuration. The system for fixing and adjusting protective sheet-shaped elements (16) built according to the known art foresees the use of a plurality of base bodies (10) which have to be correctly aligned during assembly. To reduce the aesthetic impact of said system for fixing and adjusting sheet-shaped elements (16) it is necessary to use specific covering plates or slabs (50) which, being mounted on a plurality of base bodies (10), may not be perfectly aligned and therefore may compromise the aesthetic appearance. Moreover, the installation of protective sheet-formed elements through systems according to the known art requires the repetition of adjustment and control phases to adjust the inclination until the sheet-shaped element is not correctly aligned. Finally the operator is forced to stay in an uncomfortable position for the entire duration of his work, since he must work on the lower part of the sheet-shaped element in a direction perpendicular to the same element. This entails also the extension of the laying time, and consequently an increase in the costs related to this procedure.

[0007] The aim of the present invention is to provide a system for fixing and adjusting sheet-shaped elements for rails, balustrades, dividers and railings in general, which is able to prevent the above mentioned problems.

[0008] An aim of the present invention is to allow the adjustment and control of the correct inclination of the sheet-shaped element at the same time in such a way as to accelerate the installation phases.

[0009] Another aim of the present invention is to provide a system for fixing and adjusting sheet-shaped elements for rails, balustrades, dividers and railings in general, that allows to fit one or more sheet-shaped elements using a single base body.

[0010] A further aim of the present invention is to provide a system for fixing and adjusting sheet-shaped elements for rails, balustrades, dividers and railings in general, which allows to adjust the position and/or inclination of the protective sheet-shaped elements from the inner side of the balcony and without affecting the appearance of the frontal surface of the base body.

[0011] Moreover, the possibility to make the adjustment from above allows the operator to stay in a more comfortable position for the entire duration of the adjustment procedure.

[0012] Another aim of the present invention is to provide a system for fixing and adjusting sheet-shaped elements for rails, balustrades, dividers and railings in general, that does not require the use of protective casings on the frontal surfaces of the base body.

[0013] These and other aims according to the present invention are achieved providing a system for fixing sheet-shaped elements for rails, balustrades, dividers and railings in general as explained in claim 1.

[0014] Further characteristics of the invention are highlighted by the dependent claims, which are integral part of the present description.

[0015] The characteristics and advantages of a system for fixing sheet-shaped elements for rails, balustrades and railings in general according to the present invention will become more evident in the following description, given as an example and not for limiting purposes, referring to the attached schematic drawings in which:

- figure 1 is a perspective exploded view and a longitudinal section view of a system for fixing and adjusting sheet-shaped elements of known type;
- figure 2 illustrates the invention according to a longitudinal section view;
- figure 3 illustrates a detail of the invention according to a lateral view and a frontal view;
- figure 4 illustrates a further detail of the invention according to a lateral view and a frontal view.

[0016] With reference to the figures, an example of preferred embodiment of a system for adjusting and fixing sheet-shaped elements for rails, balustrades, dividers and railings in general is shown according to the present invention. The system comprises containment means (10), consisting for example of a base body (100) for at least one sheet-shaped element (160), configured to be placed and fixed on a generic installation surface of the same system, such as for example the walking surface of the balcony of a building or one of its vertical walls.

[0017] Each base body (100) is made in the form of box profile with substantially U-shaped cross-section, open in the upper part and in the lower part or laterally provided with one or more fixing means known to an industry expert. Inside the box profile it is defined at least one channel (140) into which adjusting means (20) are inserted, on which rests the lower part of at least one protective sheet-shaped element (160) that may consist of, for example, one glass plate.

[0018] The adjusting means (20) comprise at least one resting and retaining element (180) with substantially L-shaped cross-section and that is provided with two inclined surfaces (28) not aligned with each other and with a convex lower surface (190). Each inclined surface (28) is provided with an opening with substantially vertical axis for the passage of one adjusting pin (29) which in turn is coupled to an adjusting element (240), for example by means of an idle screw or a male-female screw type coupling. The adjusting element (240) has substantially triangle-shaped cross-section with one surface (31) parallel to a first inner surface (110) of the channel (140) of the base body (100) and one inclined surface (27) shaped to match the inclined surface (28) of the resting and retaining element (180).

[0019] The adjusting means (20) are fitted in such a way that are movable inside the channel (140), in such a way that the first inner surface (110) is in contact with the surface (31) of the adjusting element (240). The adjustment of the pins (29) generates an axial displacement of the adjusting element (240) which brings into contact the inclined surfaces (27, 28) shaped to match each other of the adjusting element (240) and of the resting and retaining element (180), causing a displacement in a substantially horizontal direction of the resting and retaining element (180). The combined adjustment of two adjusting elements (240) of a single resting and retaining element (180) causes two different displacements which generate a rotation of the resting and retaining element (180) about a substantially vertical plane and also a translation in such a way as to obtain the engagement by contrast of the sheet-shaped element (160) with a second inner surface (130) of the channel (140).

[0020] The second inner surface (130) of the channel (140) has a convex shape in such a way as to provide a support base for fixing the protective sheet-shaped element (160) when said element is inclined from the first inner surface (110) of the channel (140). On said convex surface there is at least one yielding element (530) to prevent the direct contact and the resulting damage of the sheet-shaped element (160) with the base body (100). The yielding element (530) may also comprise a sealing gasket configured to abut against the sheet-shaped element (160) and to prevent infiltrations of water inside the base body (100).

[0021] Each pin (29) comprises one head (320) accessible from the upper side of the base body (100): in this way it is possible, by means of a specific adjustment tool, to adjust and fix the sheet-shaped element (160). The

position of the heads (320) of the pins (29) allows the operator that installs the sheet-shaped element (160) to adjust and fix said element at the same time since during the procedure it is possible to check the plumbing of the sheet-shaped element (160), for example, by means of a bubble level placed on the upper surface of said element. Moreover, the position of the head (320) of the pin (29) allows the operator to perform the adjustment and fixing in a much more comfortable position compared to known solutions.

[0022] The base body (100) is provided above with shaped grooves (480) for receiving, with sliding or snap coupling, one or more longitudinal covering profiles (500) configured to completely cover the upper part of the base body (100) and the relative inner components, allowing out only the protective sheet-shaped elements (160) in the system fitted configuration. Each longitudinal covering profile (500) can be provided with a respective sealing gasket (520) configured to abut against the protective sheet-shaped elements (160) and thus to prevent infiltrations of water inside the base bodies (100).

[0023] The assembly of the system for fixing and adjusting sheet-shaped elements for railings according to the present invention takes place as follows. A first step foresees the resting and then the fixing of one or more base bodies (100) on the system installation surface. The number and the arrangement of the base bodies (100) to be installed will depend on the design conditions of the railing. After the installation of the base bodies (100) on the surface, takes place the introduction in sequence, inside the channel (140) of the base body (100), of the yielding element (530), of one or more systems of adjusting means (20) and lastly of the protective sheet-shaped elements (160) necessary for completing the railing. Once a single protective sheet-shaped element (160) has been inserted inside the channel (140) and rests on the lower surface of the resting and retaining element (180), then the adjustment and the fixing are carried out. The action of the adjustment tools on the heads of the pins (29) allows to adjust the relative position of the protective sheet-shaped element (160) in relation to the base body (100), thanks to the axial displacement of the adjusting elements (240).

[0024] The particular shapes and functionalities of these components of the system allow a corresponding oscillation of the protective sheet-shaped element (160) about a vertical plane, thus obtaining the inclination and the plumbing of said protective sheet-shaped element (160) with a minimum effort on the adjusting tools and allowing it to be fixed creating an engagement by contrast of the sheet-shaped element (160) against the convex surface (130) of the base body (100). The fixing and adjusting operation can be performed by the operator staying standing by means of a specific tool provided with an extension. In this working position, the operator is able to check the plumbing of the sheet-shaped element (160) and to perform the fixing of the same.

[0025] It has thus been seen that the system for fixing

sheet-shaped elements (160) for railings in general according to the present invention achieves the purposes highlighted above. The system for fixing sheet-shaped elements (160) for railings in general according to the present invention allows to insert and fix every single sheet-shaped element (160) in a corresponding base body (100), adjusting completely its inclination and performing the fixing at the same time, as well as allowing the operator to work in a comfortable position.

Claims

1. A system for adjusting and fixing sheet-shaped elements for railings and dividers comprising:

- containment means (10) for a protective sheet-shaped element (160) which are provided with a channel (140) for housing the sheet-shaped element (160);
- adjusting means (20) for adjusting the position of the sheet-shaped element (160);

characterised in that:

- the adjusting means (20) comprise at least one resting and retaining element (180) with substantially L-shaped cross-section provided with seats for the passage of two pins (29) and with two planes (28) for the sliding of adjusting elements (240), in such a way that the combination of the movements of the adjusting elements (240) caused by the pins (29) generates a rotation of the resting and retaining element (180) which in turn causes a rotation of the sheet-shaped element (160).
2. The system according to claim 1, **characterised in that** the containment means (10) comprise at least one base body (100) with length equal to or greater than the length of the sheet-shaped element (160) in the longitudinal direction.
 3. The system according to the preceding claims, **characterised in that** the base body (100) comprises a convex inner surface (130) to allow adjusting and clamping of the sheet-shaped element (160).
 4. The system according to claim 3, **characterised in that** the convex lateral surface (130) comprises at least one yielding element (530) suitable for preventing direct contact between the sheet-shaped element (160) and the convex inner surface (130).
 5. The system according to claim 1, **characterised in that** the resting and retaining element (180) comprises a convex lower surface (190) such that it allows a rotation of the resting and retaining element

(180) about a substantially vertical plane.

6. The system according to the preceding claims, **characterised in that** the adjusting element (240) comprises a flat surface (31), parallel to an inner surface (110) of the channel (140) of the base body (100), and an inclined surface (27). 5
7. The system according to the preceding claims, **characterised in that** the resting and retaining element (180) comprises at least one inclined surface (28) shaped to match the inclined surface (27) of the adjusting element (240). 10
8. The system according to claim 1, **characterised in that** the pins (29) are operatively coupled to the adjusting element (240) by means of a male - female screw type coupling and are provided with a head (320) accessible from the upper side of the channel (140). 15 20
9. The system according to claim 1 or 6, **characterised in that** the axis of the pin (29) lies in a plane parallel to the inner surface (110) of the channel (140). 25
10. The system according to claim 1, **characterised in that** the base body (100) is made of metal material, for example aluminium.
11. The system according to claim 1, **characterised in that** the resting and retaining element (180) is fitted in such a way that it is movable on the inner lower surface of the channel (140). 30
12. The system according to the preceding claims, **characterised in that** the top of each base body (100) is provided with a shaped profile (480) for receiving one or more longitudinal covering profiles (500) configured to completely cover the upper surface of the base body (100) and the relative inner components, allowing out only the sheet-shaped elements (160) in the system fitted configuration. 35 40
13. The system according to the preceding claim, **characterised in that** the longitudinal covering profile (500) is provided with a respective sealing gasket (520) configured to abut against the sheet-shaped elements (160) and to prevent infiltrations of water inside the base body (100). 45 50
14. The system according to the preceding claims, **characterised in that** the base body (100) is provided with a sealing gasket (530) configured to abut against the sheet-shaped elements (160) and to prevent infiltrations of water inside the base body (100). 55
15. A method for fitting railings with a system for fixing and adjusting sheet-shaped elements (160) accord-

ing to any one of the preceding claims, comprising the steps of:

- resting and then fixing one or more base bodies (100) on a generic system installation surface;
- inserting a gasket (530) on the base bodies (100);
- inserting a plurality of resting and retaining elements (180) inside the channels (140) of the base bodies (100) complete with adjusting elements (240);
- introducing sheet-shaped elements (160) inside the resting and retaining elements (180) which are necessary for completing the railing;
- adjusting and clamping the adjusting elements (240) for the sheet-shaped element (160) by acting on the heads (320) of the pins (29) in such a way that the rotation of the resting and retaining element (180) about the convex surface (190) allows the plumbing of the sheet-shaped element (160);
- inserting one or more longitudinal covering profiles (500) which are complete with sealing gaskets (520).

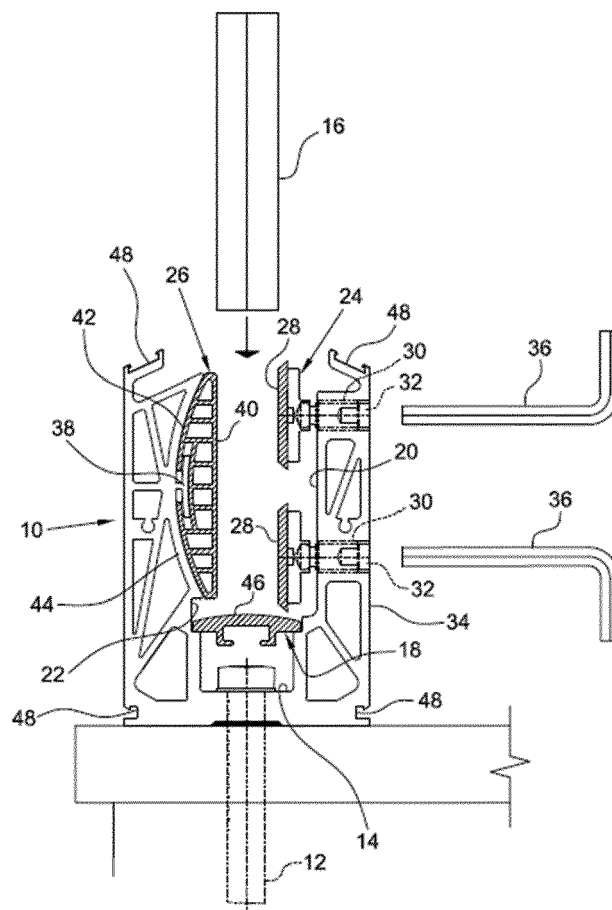
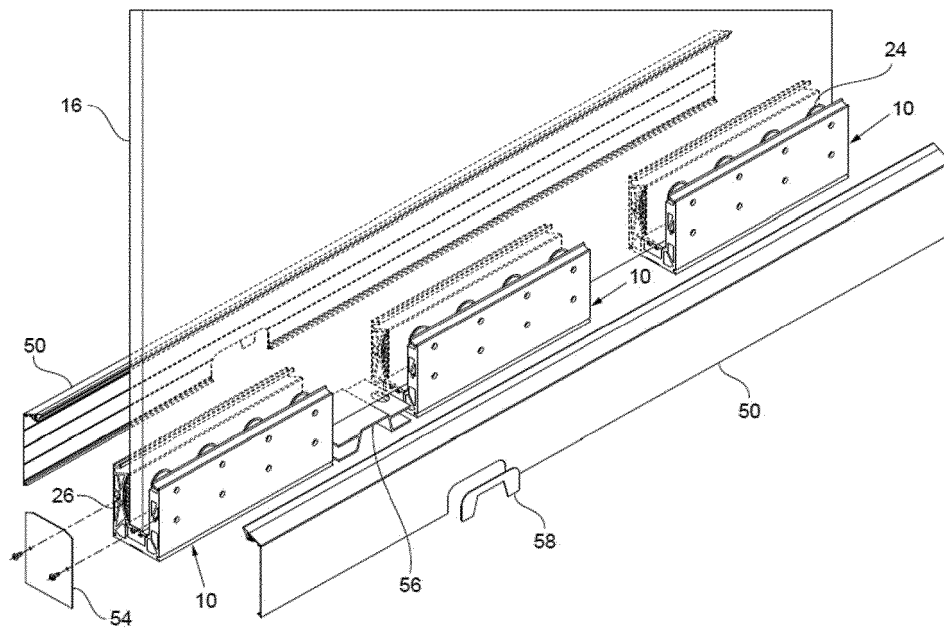


Fig.1

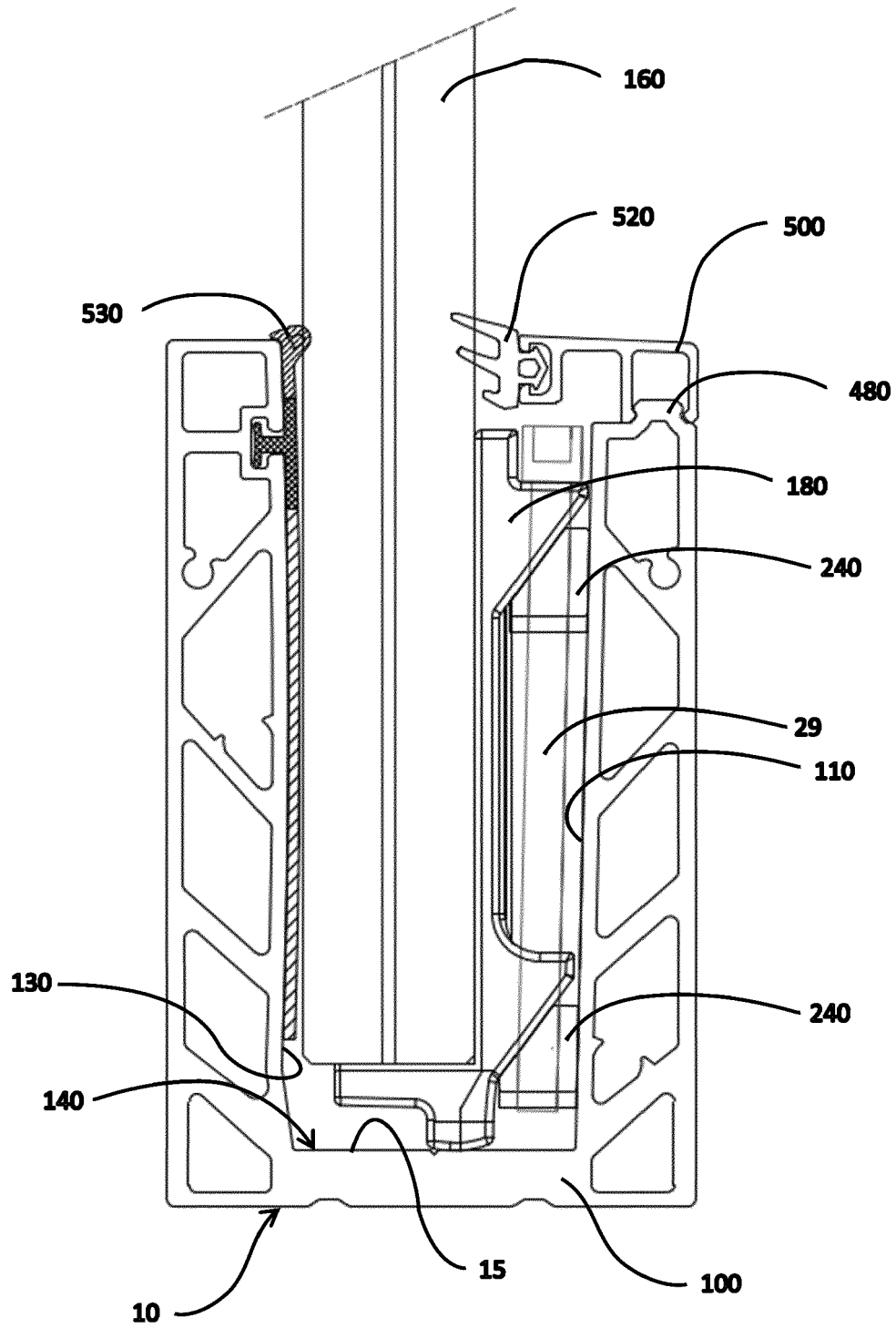


Fig. 2

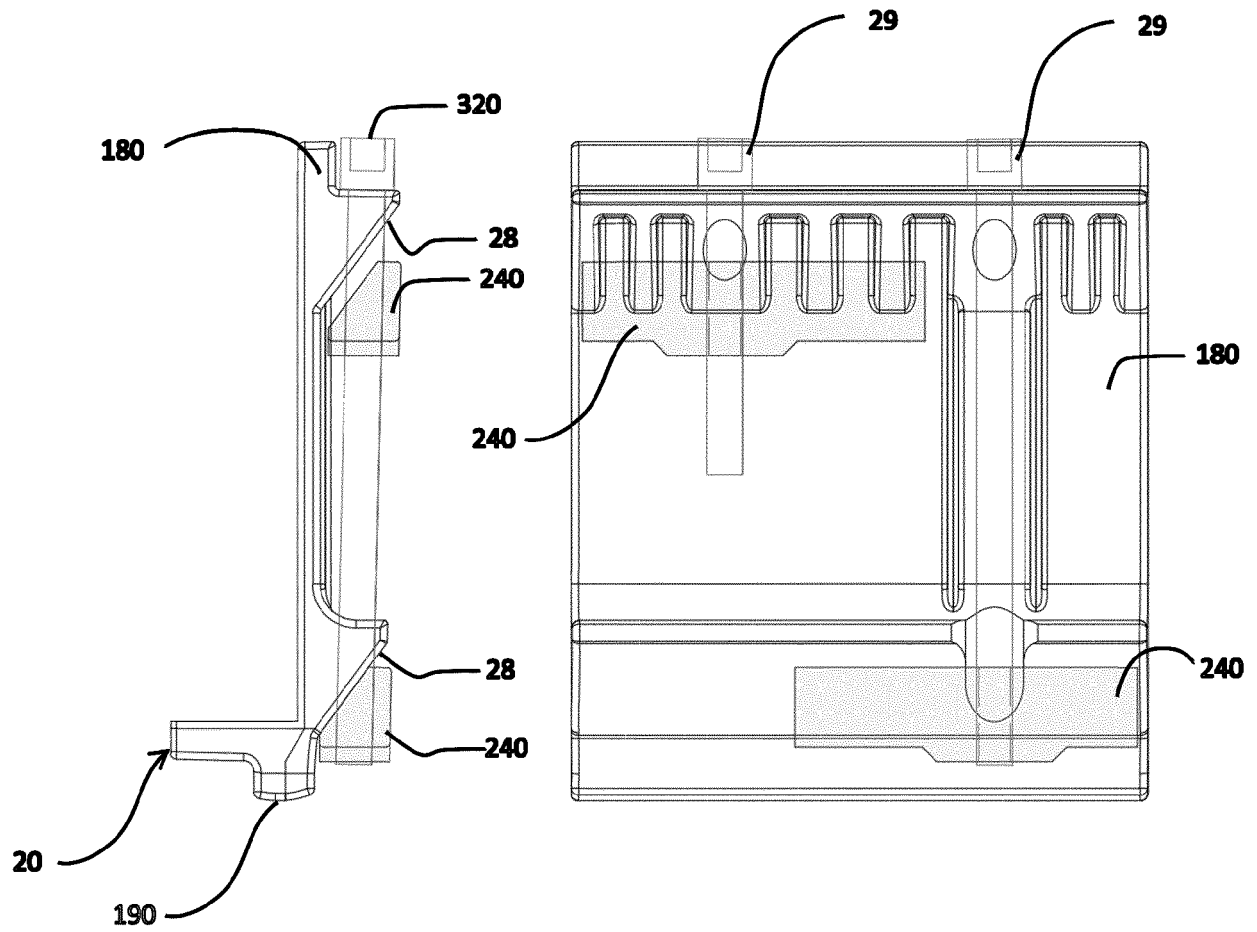


Fig. 3

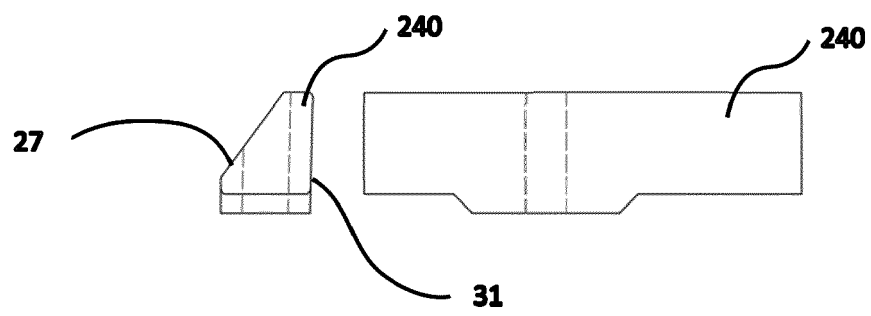


Fig. 4



EUROPEAN SEARCH REPORT

Application Number

EP 22 02 0135

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 528 147 A (PURE VISTA LTD [GB]) 13 January 2016 (2016-01-13) * figures 2-4 * -----	1-15	INV. E04F11/18
A	WO 2016/024299 A1 (VETRERIA PESCINI S R L [IT]) 18 February 2016 (2016-02-18) * figure 2 * -----	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

E04F

The present search report has been drawn up for all claims

1

Place of search

Munich

Date of completion of the search

6 July 2022

Examiner

Topcuoglu, Sadik Cem

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 22 02 0135

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.

06-07-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2528147 A	13-01-2016	AU 2016201375 A1	29-09-2016
		DK 3067487 T3	08-01-2018
		EP 3067487 A1	14-09-2016
		ES 2656064 T3	23-02-2018
		GB 2528147 A	13-01-2016
		NO 3067487 T3	24-03-2018
		NZ 717661 A	26-05-2017
		PL 3067487 T3	29-06-2018
		PT 3067487 T	30-01-2018
		US 2016265232 A1	15-09-2016
WO 2016024299 A1	18-02-2016	NONE	

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 3009580 A [0006]