



(11)

EP 4 273 346 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.11.2023 Bulletin 2023/45

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

(21) Application number: **22020245.1**

(52) Cooperative Patent Classification (CPC):
E04F 11/1812; E04F 11/1853

(22) Date of filing: **30.05.2022**

(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

(71) Applicant: **Lacko, Vladimir**
082 35 Hendrichovce (SK)

(72) Inventor: **Lacko, Vladimir**
082 35 Hendrichovce (SK)

(74) Representative: **Vasil, Martin**
Advokátska kancelária
VASIL & partners, s.r.o.
Zizkova 4D
040 01 Kosice (SK)

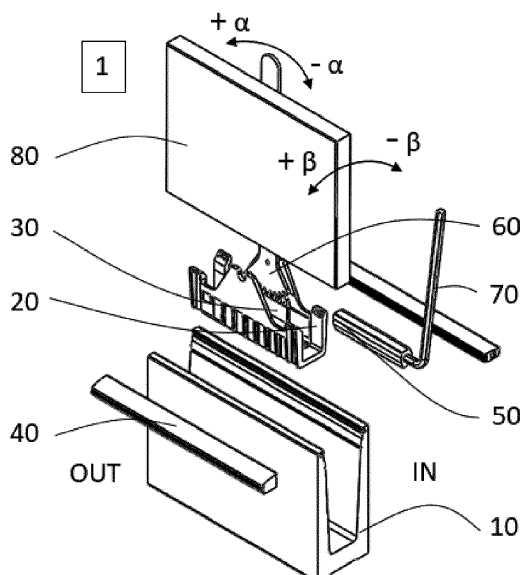
(30) Priority: **02.05.2022 SK 442022**

(54) **TILTING SLIDING SYSTEM**

(57) The tilting sliding system (1) for mounting glass railings with simple adjustment of the tilting of the glass panel (80) in a vertical plane in both directions has the following main parts - the supporting U-profile (10), which has a groove in its upper part for the support seal (40) and a clamp seat (11) for the eccentric clamp (50), and a slider (20) and a bed (30) inserted in the cavity of the supporting U-profile (10). The bed (30) has two outer longitudinal helical surfaces (32), a toothing (34), a cavity of the bed (31) for the glass panel (80) and a cylindrical surface (33) at the bottom. The support seal (40) on the

outer (OUT) side of the supporting U-profile (10) forms a bearing surface of the seal (41) for the outer side of the glass panel (80). By turning the service key (60) by the setting angle α , the slider (20) moves longitudinally on the bearing surfaces of the slider (21) in the cavity of the supporting U-profile (10) and the bed (30) rotates through the longitudinal helical surfaces of the slider (22) and the helical surfaces of the bed (32) by the tilt angle β on the cylindrical surface of the bed (33) and the lower surface of the cavity of the supporting U-profile (10) around the axis of the bearing surface of the seal (41).

Figure 1



Description

Field of Technology

[0001] Construction and installation of railings, installation of panels made of glass, plastic, plexiglass, or fillings of other materials.

Current State of the Art

[0002] Various systems are currently being used to adjust the inclination of the glass railing filling, which must be achieved in the exterior glass railing applications in order to eliminate the inclination or unevenness of the building structure. The adjustable sliding system usually comprises a basic U-profile, tilting beds for accommodating the glass panel, the tilting mechanism itself, and fixing elements to fix the glass panel in.

[0003] Figure 2 shows the solution according to DE202017105703U1 of the German Patent and Trademark Office (Deutsches Patent- und Markenamt). It is a system for adjusting the vertical inclination of the railing panels in the railing panel U-holder by a support part, which slides into the U-holder of the railing panel. The part in the U-holder that can be longitudinally slid in the direction of the railing forms an inner contact surface, which determines the vertical inclination of the railing panel, and one outer contact surface, which provides support in the U-holder of the railing panel.

[0004] Another solution for adjusting the inclination of the clamping systems in the glass railings is shown in Figure 3 according to AU 2020100403 A4 of the Australian Patent Office. The adjustable glass railing system includes a support profile with a glass carrier at the bottom. The upper part of the glass carrier is provided with a clamping groove for the glass; there is a connecting shaft rotatably mounted below the glass carrier, which connects the side fan-shaped guides with gradual thicknesses. The tilt angle of the glass is adjusted by turning the guides to the left (right), moving the lower part of the glass forwards (backwards), and thus tilting the glass around the longitudinal axis located in the upper part of the support profile.

The Essence of the Invention

[0005] The invention represents a tilting sliding system intended for holding and adjusting the inclination of a glass or other panel filling of a railing in the area of the structural clamping of the railing. In the exterior applications of glass railings, it is necessary to eliminate the inclination or unevenness of the building structure (terrace, balcony, etc. - water drainage). The assembly of the glass railing with inclination adjustment consists in clamping the supporting U-profile to the building structure and, subsequently, from inserting the required number of tilting sliding systems and inserting the glass panel. Simple turning of the service key sets the required tilting

of the glass panel in the vertical plane. After adjusting the tilt, the glass panel is secured with an eccentric clamp.

[0006] The tilting sliding system is inserted into a supporting U-profile, which has a cavity inside to accommodate individual parts for adjusting the inclination and securing the position of the glass panel. The tilting sliding system has two main parts - the slider and the bed. The slider is inserted into the cavity of the supporting U-profile; the bearing surfaces of the slider are in contact with the side surfaces of the supporting U-profile cavity. The slider has two internal helical surfaces, and a seat for the service key at the bottom of the cavity. The bed has two outer helical surfaces, a toothing, a bearing surface for the lower edge of the glass panel, and a cylindrical surface at the bottom. In the upper part of the cavity of the supporting U-profile on the outer (OUT) side, a support seal is inserted, which forms a bearing surface for the outer side of the glass panel. An eccentric clamp is inserted in the upper part of the cavity of the supporting U-profile on the inner (IN) side, which secures the glass panel in the set position. The essence of the present invention - Tilting Sliding System - lies in the design of the shape and mutual positions of several parts and their contact functional surfaces (Figure 1). The slider is inserted into the cavity of the supporting U-profile and the bearing surfaces of the slider are leaned onto the side surfaces of the supporting U-profile cavity. The slider has two internal helical surfaces, and a seat for the service key and the cavity. It is slidably mounted in the U-profile cavity and does not touch the bottom of the U-profile cavity. The bed is inserted into the slider cavity and the glass panel is inserted into the bed cavity. The cylindrical surface of the bed touches the bottom of the cavity of the U-profile. There is a comb toothing on the inside of the bed. The service key is rotably mounted in the slider seat and the toothing of the service key fits into the toothing of the bed. By turning the service key, the slider is moved via the toothing; the bed on the cylindrical surface turns around the axis of the seal bearing surface via the pairs of helical surfaces on the slider and the bed. This tilts the glass panel within the U-profile cavity. The set position of the glass panel is fixed by inserting and turning the eccentric clamp in.

Overview of Figures in the Drawings

[0007]

Figure 1, which is also a figure for annotation, shows the tilting sliding system with reference marks.

Figure 2 shows an adjustable system (according to DE202017105703U1) currently used as a current state of the art.

Figure 3 shows an adjustable system (according to AU 2020100403 A4) currently used as a current state of the art.

Figure 4 shows a tilting sliding system, geometry and the tilt range of the glass panel.

Figure 5 shows a tilting sliding system also with reference marks; the principle of tilting the glass panel; possible movements of individual parts.

Figure 6 shows a tilting sliding system also with reference marks; the orientation of the parts of the tilting sliding system for extending the tilting range.

Figure 7 shows a tilting sliding system also with reference marks; the functional areas of the slider.

Figure 8 shows a tilting sliding system also with reference marks; the functional areas of the bed.

Figure 9 shows a tilting sliding system also with reference marks; the position of the eccentric clamp.

Examples of Embodiments of the Invention

[0008] It is to be understood that the various embodiments of the invention are presented by way of illustration and not by way of limitation. Those skilled in the art will find, or will be able to ascertain using no more than routine experimentation, many equivalents to specific embodiments of the invention. Such equivalents will also fall within the scope of the following patent claims. It is not a problem for those skilled in the art to optimally design the structure and its elements. Such optimized solutions will also fall within the scope of the following patent claims.

[0009] Example of an embodiment of the invention - the tilting sliding system 1 - designed for clamping and adjusting the inclination of a glass panel 80 or other railing panel filling (Figure 1). The assembly of the glass railing consists in attaching the supporting U-profile 10 to the building structure, then inserting the required number (depending on the length of the U-profile) of sliders 20 with beds 30 into the cavity of the U-profile 10, inserting a support seal 40 into the groove on the outer (OUT) side of the U-profile 10 (from the service point of view - behind the glass panel), inserting the glass panel 80 into the bed cavity 31, and inserting the eccentric clamps 50 in the mounting position 51 into the clamp seat 11. The shapes of the slider 20, the bed 30 and the U-profile 10 allows sliding the slider 20 along the U-profile 10 and pivoting the bed 30 along the cylindrical surface 33. By turning the service key 60 (Figure 5), the slider 20 moves through the toothing 34; the bed 30 on the cylindrical surface 33 rotates through the helical surfaces 32 on the slider and the bed around the axis of the bearing surface of the seal 41 (Figures 7 and 8). Simple turning of the service key 60 by the setting angle α sets the desired tilting of the glass panel 80 in the vertical plane by the tilt angle β . The tilting sliding system 1 (Figure 6) is used in the range of the tilt angle β

$$\beta = -0.5^{\circ} + 1.1^{\circ};$$

The β range changes after rotating the slider around the vertical axis by 180°

$$\beta = -1.1^{\circ} + 0.5^{\circ}.$$

After adjusting the tilt, the glass panel 80 is secured with eccentric clamps 50. Due to the greater manufacturing tolerance of the glass panel thickness 80, there are two clamp positions 52, 53 for securing the glass panel 80 (Figure 9).

10 List of Reference Marks

Legend to the attached drawings - Figure 1 to 9:

[0010]

- | | |
|----|-----------------------------------|
| 1 | Tilting sliding system |
| 10 | U-profile |
| 11 | Clamp seat |
| 20 | Slider |
| 20 | 21 Bearing surface of the slider |
| | 22 Helical surface of the slider |
| | 23 Slider seat |
| | 24 Slider cavity |
| 30 | Bed |
| 25 | 31 Bed cavity |
| | 32 Helical surface of the bed |
| | 33 Cylindrical surface of the bed |
| | 34 Bed toothing |
| 40 | Support seal |
| 30 | 41 Bearing surface of the seal |
| | 50 Eccentric clamp |
| | 51 Mounting position |
| | 52 1 st clamp position |
| | 53 2 nd clamp position |
| 35 | 60 Service key |
| | 70 Clamp wrench |
| | 80 Glass panel |
| | α Setting angle |
| | β Tilt angle |

40 Industrial Applicability

[0011] The tilting sliding system finds application mainly in the construction industry, in the installation of railings made of glass or other panel panels, and also in the installation of decorative or advertising panels.

Claims

1. The tilting sliding system (1) consists of a supporting U-profile (10), a slider (20) and a bed (30) inserted into its cavity (20); a glass panel (80) inserted into the U-profile cavity (10) is supported on the outer (OUT) side by a support seal (40) and inserted by its bottom edge into the bed cavity (31), and an eccentric clamp (50) inserted on the inner (IN) side into the clamp seat (11) and supported on the inside of

the glass panel (80); **and characterized in that** the required β tilt angle of the glass panel (80) is achieved by turning the service key (60) inserted in the slider seat (23) and the bed toothing (34) on the inner (IN) side of the supporting U-profile (10) and by sliding the slider (20) in the U-profile cavity (10) through the helical surfaces to rotate the bed (30) on the cylindrical surface of the bed (33) around the axis of the bearing surface of the seal (41).

2. The tilting sliding system (1) according to Claim 1 **characterized in that** there is a groove in the upper part of the cavity of the supporting U-profile (10) for accommodating a support seal (40) and a clamp seat (11); that a support seal (40) is inserted in the groove on the outer (OUT) side of the supporting U-profile (10); that the bearing surfaces of the slider (21) form surfaces for the longitudinal sliding and support of the slider (20) against the walls of the cavity of the supporting U-profile (10) and are parallel with them; that the longitudinal helical surfaces of the slider (22) are on the inner sides of the slider (20) to rest on the longitudinal helical surfaces of the bed (32) on the outer walls of the bed (30); that a bed (30) is inserted in the cavity of the slider (24); that longitudinal helical surfaces of the bed (32) are on the outer walls of the bed (30) to rest on the longitudinal helical surfaces of the slider (22) on the inner walls of the slider (20); that the bed (30) is leaned with its cylindrical surface of the bed (33) on the lower surface of the supporting U-profile cavity (10); that the axis of the cylindrical surface of the bed (33) is identical to the axis of the bearing surface of the seal (41).

3. The tilting sliding system (1) according to Claims 1 and 2 **characterized in that** the service key (60) is inserted on the inner (IN) side of the supporting U-profile (10) into the slider seat (23) and the bed toothing (34); that by turning the service key (60) by the setting angle α the slider (20) is moved longitudinally on the bearing surfaces of the slider (21) in the cavity of the supporting U-profile (10), and the bed (30) is rotated through the longitudinal helical surfaces of the slider (22) and the helical surfaces of the bed (32) by the tilt angle β on the cylindrical surface of the bed (33) and the lower surface of the cavity of the supporting U-profile (10) around the axis of the bearing surface of the seal (41).

4. The tilting sliding system (1) according to Claims 1 to 3 **characterized in that** the range of the tilt angle $\beta = -0.5^\circ + 1.1^\circ$ and, after rotating the slider around the vertical axis by 180° , the range of the tilt angle is $\beta = -1.1^\circ + 0.5^\circ$.

5. The tilting sliding system (1) according to Claims 1 to 4 **characterized in that** an eccentric clamp (50) is inserted into inner (IN) side of the U-profile (10) to

the seat of the clamp (11); that, after adjusting the tilt by the tilt angle β , the position of the glass panel (80) in the U-profile cavity (10) is secured by turning the eccentric clamp (50) with the clamp wrench (70); and that due to the greater manufacturing tolerance of the glass panel thickness (80), there are two clamp positions (52), (53) to fix the glass panel (80) in.

Figure 1

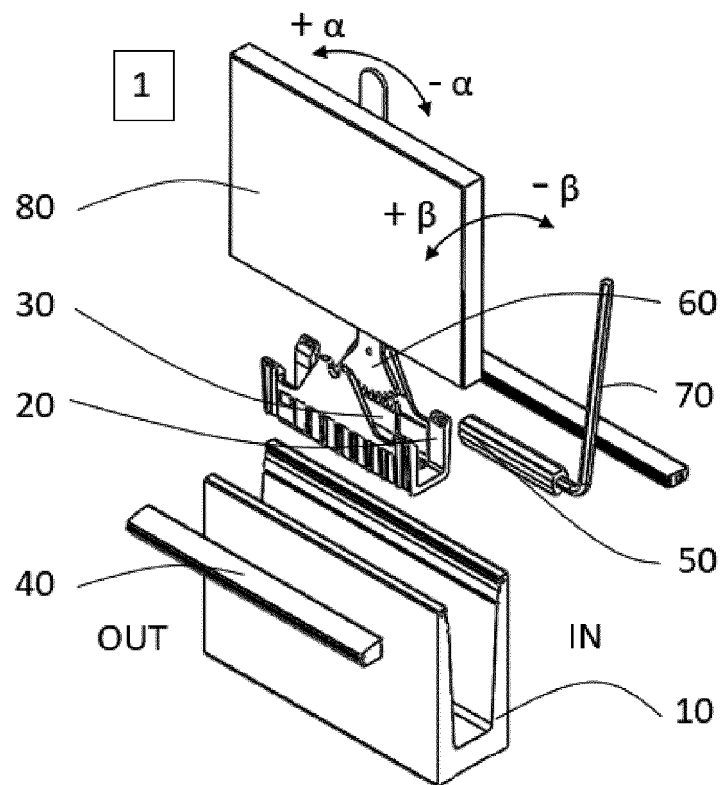


Figure 2

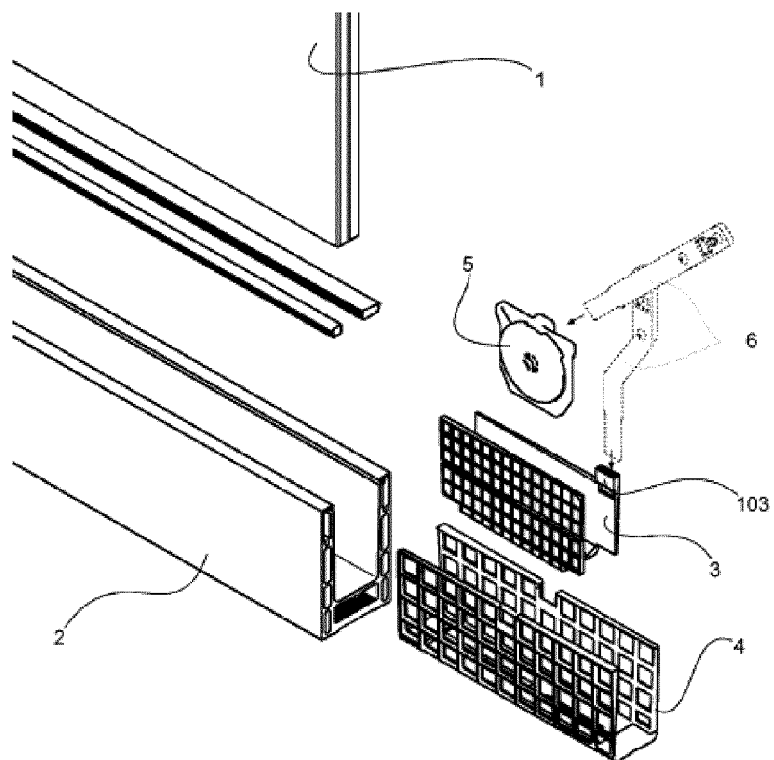


Figure 3

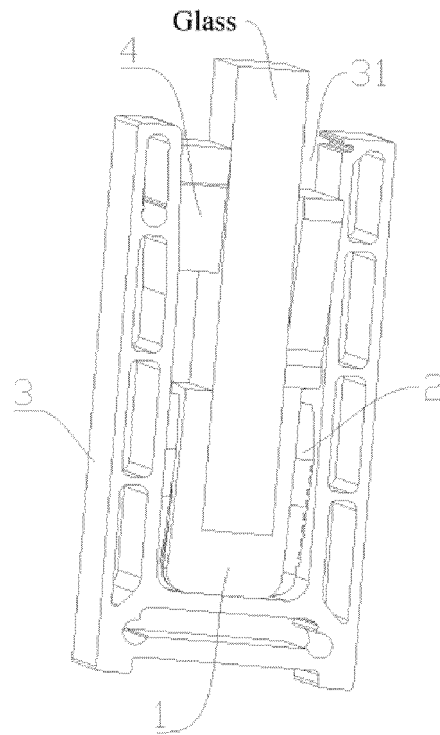


Figure 4

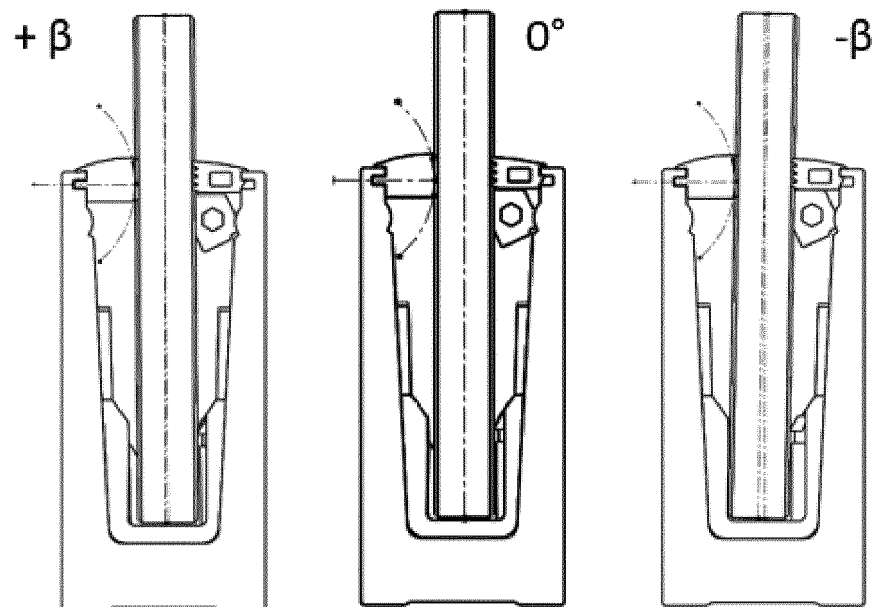


Figure 5

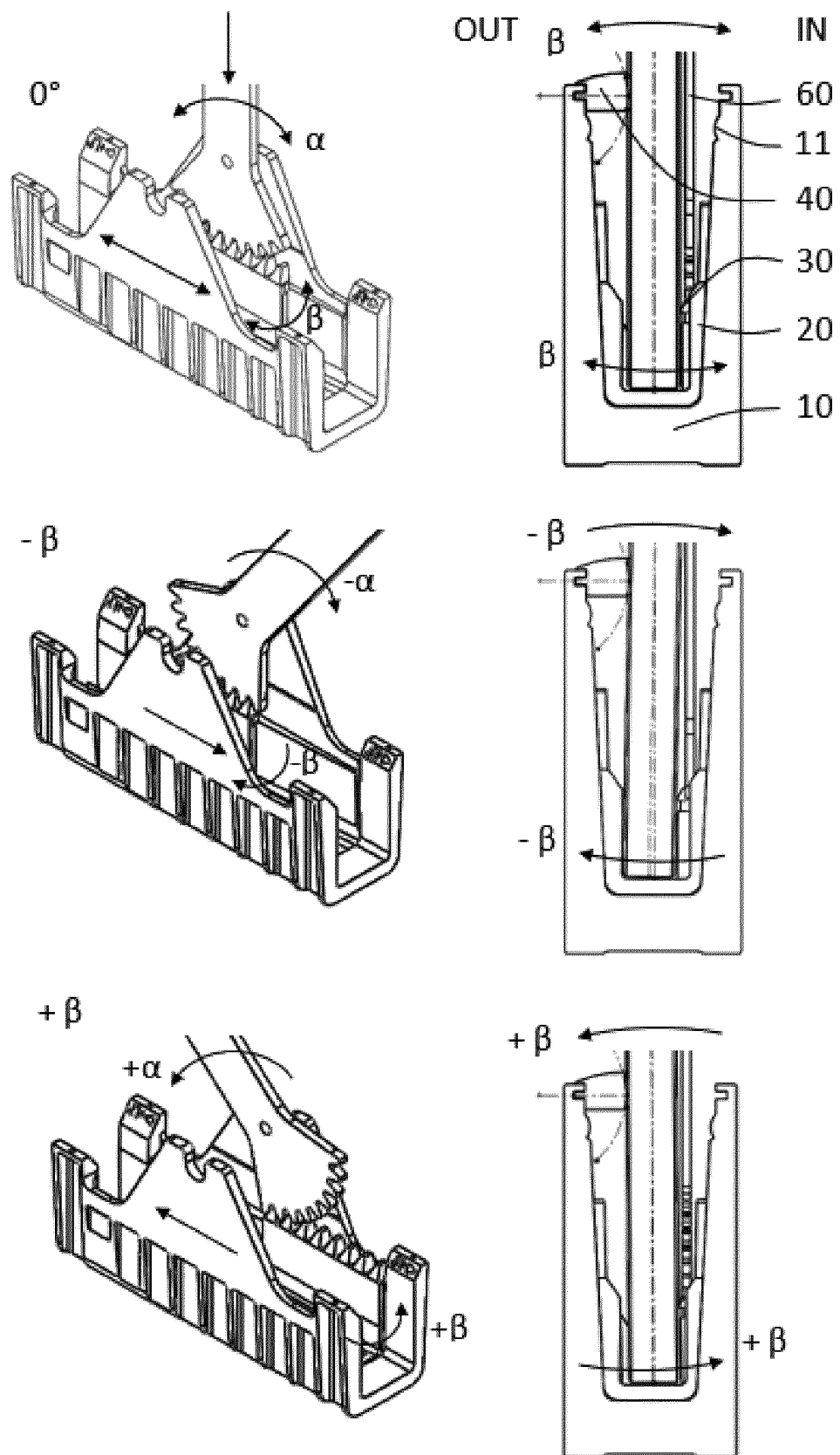


Figure 6

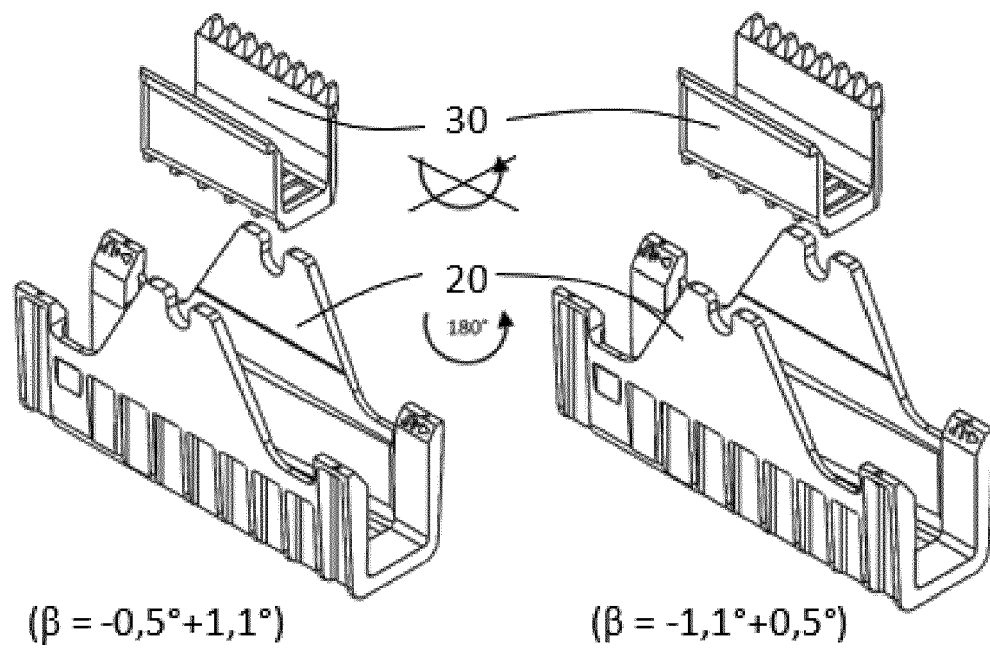


Figure 7

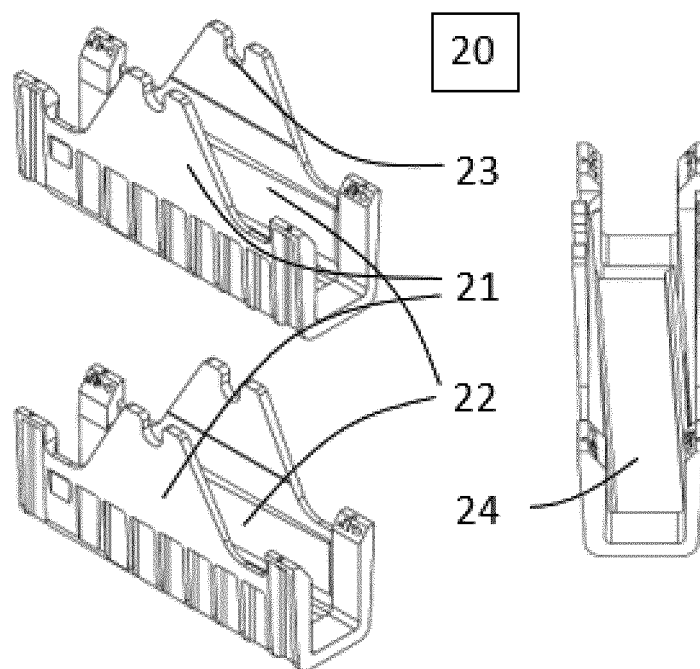


Figure 8

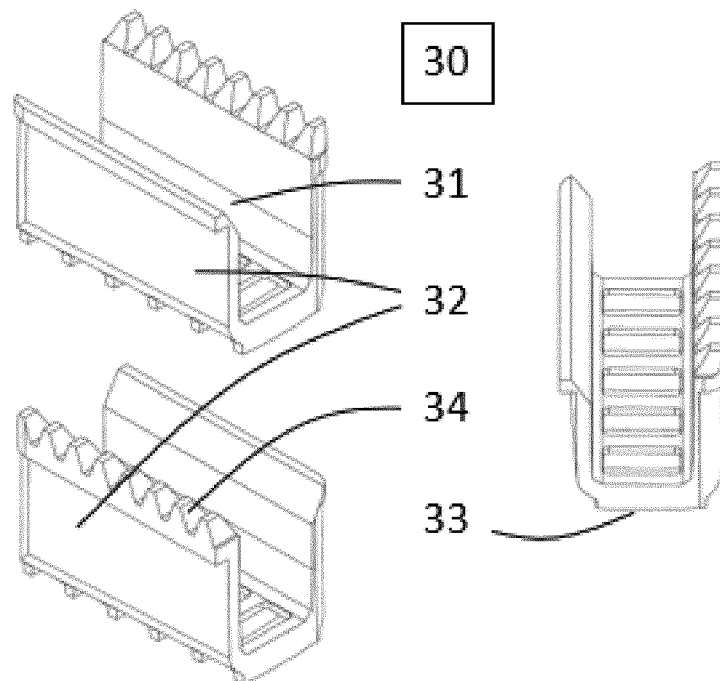
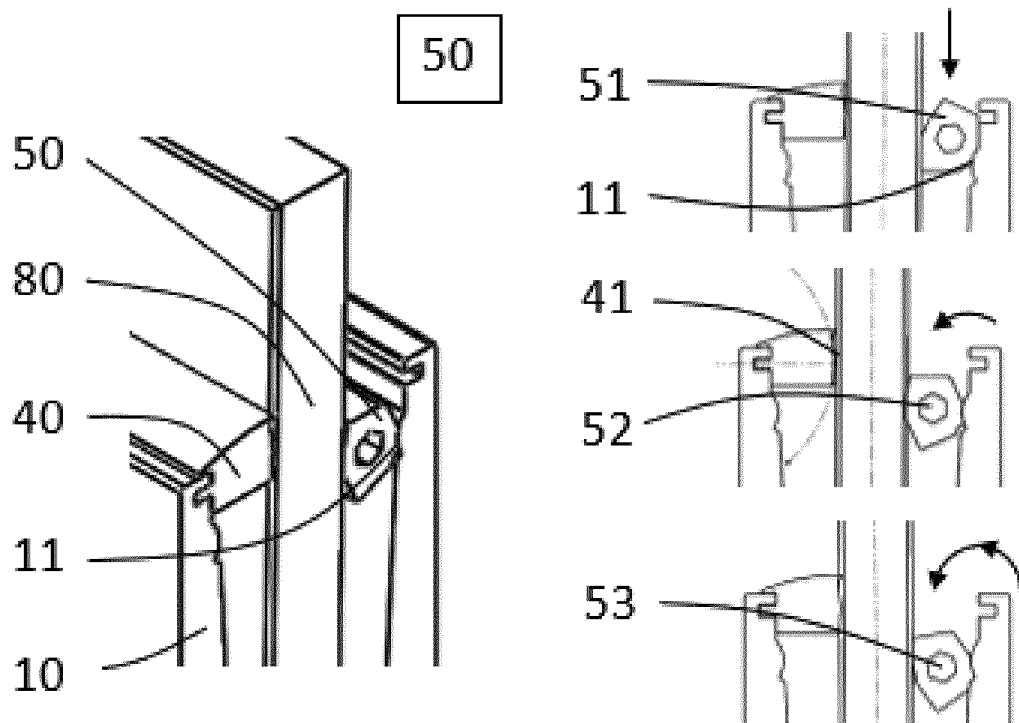


Figure 9





EUROPEAN SEARCH REPORT

Application Number

EP 22 02 0245

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	WO 2018/047179 A1 (TOMAK LTD [IL]) 15 March 2018 (2018-03-15) * figures 2C, 3A *	1-5	INV. E04F11/18
A	EP 3 816 362 A1 (LOGLI MASSIMO S P A [IT]) 5 May 2021 (2021-05-05) * figures 1, 3, 5, 8 *	1-5	

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

7 August 2023

Examiner

Fournier, Thomas

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 0245

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.

07-08-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2018047179 A1	15-03-2018	EP 3510231 A1	17-07-2019
		US 2019218786 A1	18-07-2019
		WO 2018047179 A1	15-03-2018
EP 3816362 A1	05-05-2021	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

- DE 202017105703 U1 [0003] [0007]
- AU 2020100403 A4 [0004] [0007]