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

(11) **EP 3 561 206 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
30.10.2019 Bulletin 2019/44

(21) Application number: **19164516.7**

(22) Date of filing: **22.03.2019**

(51) Int Cl.:
E05D 5/02 *(2006.01)* ***E05D 7/10*** *(2006.01)*
E05D 7/12 *(2006.01)* *E05D 5/14* *(2006.01)*

(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

(30) Priority: **26.04.2018 FI 20185391**

(71) Applicant: **Polaria Oy**
52700 Mäntyharju (FI)

(72) Inventors:
- **KOSKINEN, Jouni**
  FI-19700 SYSMÄ (FI)
- **TOIVONEN, Tuomas**
  FI-52700 MÄNTYHARJU (FI)
- **KARHULA, Timo**
  FI-52700 MÄNTYHARJU (FI)

(74) Representative: **Papula Oy**
P.O. Box 981
00101 Helsinki (FI)

(54) HINGE ARRANGEMENT FOR A MIRROR CABINET AND A MIRROR CABINET

(57) A hinge arrangement for installing a mirror door of a mirror cabinet onto the frame (1) of the mirror cabinet, which hinge arrangement comprises a part to be fastened to the frame (1) of the mirror cabinet, i.e. a hinge support (3), and a part to be fastened to the mirror door (6) of the mirror cabinet, i.e. a hinge (4). The invention is implemented in such a way that an aperture (2) is made in the frame (1) of the mirror cabinet, into which aperture the hinge support (3) is fastened in a shape-locking manner, and that in the hinge support (3) are fixed pins in its top end and bottom end, which pins sink into the corresponding holes of the hinge (4).

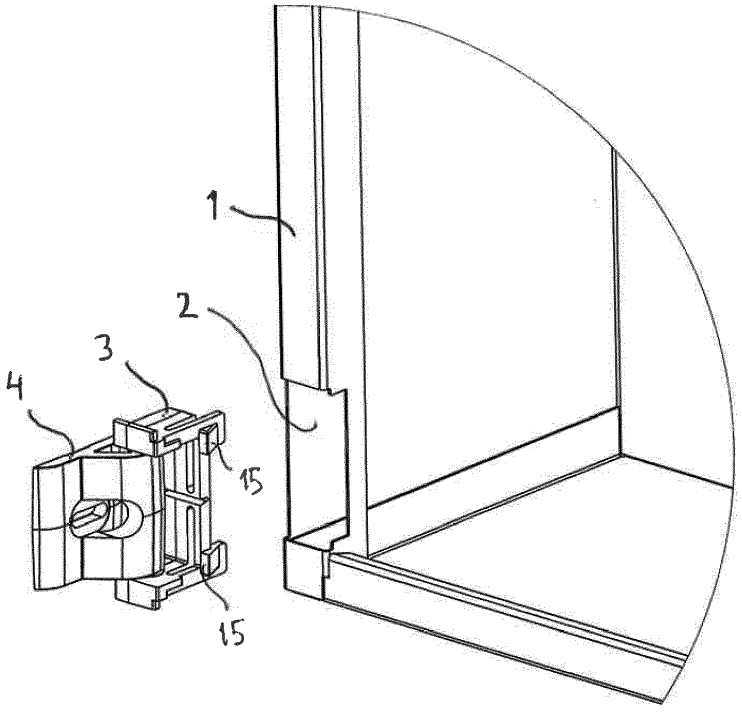

Fig.1

EP 3 561 206 A1

Description

[0001] The object of the present invention is a hinge arrangement for installing a mirror door of a mirror cabinet onto the frame of the mirror cabinet, which hinge arrangement comprises a part to be fastened to the frame of the mirror cabinet, i.e. a hinge support, and a part to be fastened to the mirror door of the mirror cabinet, i.e. a hinge, in the frame of which mirror cabinet an aperture is made, into which aperture a hinge support is fastened in a shape-locking manner, and in which hinge support are fixed pins in its top end and bottom end, which pins sink into the corresponding holes of the hinge. The object of the invention is also a mirror cabinet.

[0002] Mirror cabinets are typically used in bathrooms, washrooms and toilets. It is called a mirror cabinet because its doors are glass mirrors. Mirror doors are very typically fastened to the cabinet frame with so-called 'kitchen hinges', which are usually glued to the mirror part and fixed to the cabinet frame with screws, the frame being manufactured from wood material. Another widely used method is to wedge the mirror into a U-shaped wall of the hinge with a blunt-tipped, usually plastic, screw fastening.

[0003] A so-called 'kitchen hinge' typically comprises many parts. A U-shaped wedge hinge can comprise just one part plus fastening screws, but this solution achieves only a limited number of properties.

[0004] Both methods are susceptible to accidents because if the gluing fails, or when fastening screws that may loosen over time are used, the mirror is in danger of falling.

[0005] In solutions known in the art, installation and detachment of a mirror requires tools. For example, in the installation phase of the cabinet, it is best to detach the mirrors so that they are not broken in the installation.

[0006] The opening angle of mirror doors generally ranges between 95° and up to even more than 200°.

[0007] Current hinge solutions are generally those to be glued or those to be screwed, but it is not possible to use both options with one hinge solution.

[0008] In kitchen hinges, vertical and horizontal adjustment of a mirror door is possible by turning the hinge screws. In a wedging hinge, adjustment is also possible steplessly within the limits of the surface area of the hinge. This, however, increases the risk of an accident when the mirror is slid closer to the edges of the hinge.

[0009] Kitchen hinges are generally 'non-handed', i.e. they are suited for use on both sides. U-shaped wedging hinges are typically 'handed'.

[0010] The aim of the present invention is to provide a hinge for a mirror cabinet, which hinge is not conjoined with the problems occurring in prior-art solutions. The hinge according to the invention is characterized in that the hinge support has a joint, that divides the hinge support in the vertical direction into a top part and a bottom part, and which joint enables the joining together of the hinge and the hinge support by turning the top and bottom part of the hinge support around the joint in relation to each other.

[0011] One preferred embodiment of the hinge according to the invention is characterized in that the joint is situated in essentially the center of the hinge support in the height direction of the hinge support.

[0012] Another preferred embodiment of the hinge according to the invention is characterized in that the fastening of the hinge support onto the frame of the mirror cabinet flexibly and in a shape-locking manner is implemented with flexible claws, that lock behind the counterpart of the frame of the mirror cabinet.

[0013] Yet another preferred embodiment of the hinge according to the invention is characterized in that the door of the mirror cabinet is fastened to the hinge by gluing.

[0014] In addition, the invention is characterized by what is mentioned in the other dependent claims 5-8.

[0015] The mirror cabinet that is an object of the invention is characterized by what is defined in independent claim 9.

[0016] One advantage of the invention that can be mentioned is that the hinge arrangement is both installable and also detachable quickly and reliably without tools. The hinge arrangement is also extremely safe also in possible fault situations.

[0017] In the following, the invention will be described in more detail by the aid of some preferred embodiments with reference to the attached drawings, wherein

Fig. 1 presents the bottom corner of a mirror cabinet in which the hinge arrangement according to the invention is used.

Fig. 2 presents a hinge installed into position and the opening angle of the door of the mirror cabinet.

Fig. 3 presents a hinge according to one preferred embodiment of the invention.

Fig. 4 presents a hinge support according to the invention.

Fig. 5 presents a hinge according to another preferred embodiment of the invention.

Fig. 6 presents a hinge according to Fig. 4 and a hinge counterpart fastenable to it, between which the mirror is fastenable.

Fig. 7 presents a hinge support as viewed from the side.

Fig. 8 presents a hinge support as viewed from above.

[0018] Fig. 1 presents the bottom corner of a mirror cabinet, to which corner a hinge arrangement according

to the invention is fastened. A mirror cabinet typically has four hinges, two on each edge, one above and the other below. In the frame part 1 of the mirror cabinet an aperture 2 is made, into which aperture the hinge support 3 of the hinge arrangement is fastened. The actual hinge 4 is fastened to the hinge support 3, the mirror door 6 of the mirror cabinet in turn being fastened to the hinge in the manner presented in Fig. 2. The mirror door 6 in this embodiment is fastened between the hinge 4 and its counterpart 5. The joint is locked with a screw (not presented) that extends through a hole in the mirror door from the hinge 4 into the counterpart 5.

[0019] The hinge support 3 is therefore pushed into the aperture 2 of the frame 1 of the mirror cabinet, to which frame it locks with a shape-closing and spring-like locking method in the manner described later. Thus, neither tools nor extra parts are needed for fastening the hinge support to the frame.

[0020] It can be seen from Fig. 2 that the opening angle of the mirror door of the mirror cabinet is in this case approx. 135°, but this of course can vary.

[0021] Fig. 3 presents a hinge 4 according to one embodiment of the invention. In this embodiment, toothing 7 is formed on that surface of the hinge that comes against the mirror door 6. Fig. 6 also presents the counterpart 5 of the hinge 4, which likewise has toothing 8. These toothings come face-to-face and enable horizontal adjustment of the mirror in 1.0 mm steps. The toothing 8 of the counterpart 5 is formed on the pin 9. The fastening of the mirror to the hinge is locked with a screw, which is screwed through the hinge 4 and mirror into the pin 9.

[0022] Figures 4 and 7 present a hinge support 3, in which are fixed pins 10 and 11 that sink into the corresponding holes 12 and 13 of the hinge 4, in which case a joint rotating around the center line of the pins 10, 11 is produced. The separate joint pin or joint shaft typical to hinges is thus replaced by the shaping of the parts. A feature special to the solution is the joint 14 in the center of the hinge support 3 in the height direction, the joint dividing the hinge support in the vertical direction into a top part and a bottom part, and which joint enables the putting together of the parts 3 and 4 in such a way that only two parts are needed for the functional assembly. When this assembly is installed in the frame 1 of the mirror cabinet, the frame being especially shaped and apertured for it, the frame prevents the opening of the joint of the hinge support 3. What is extremely essential is the positioning of the joint and the dimensioning of the entity in such a way that functionality is not lost even if the hinge 4 and hinge support 3 were damaged when in their position. This feature enables dimensioning of the joint of a hinge support functioning sufficiently easily with the force of a finger. The hinge support 3 and hinge 4 are preferably plastic. Presented above is an embodiment wherein the joint 14 is situated in essentially the center of the hinge support 3 in the vertical direction. It could, however, also be at another point in the vertical direction of the hinge support 3.

[0023] The hinge support 3 is locked to the frame 1 of the mirror cabinet with a shape-closing and spring-like locking shape without separate additional parts. The locking is openable with a finger and without tools. The locking facilitates assembly because the assembly can be performed simply, by pressing the preassembled subassembly formed by the hinge 4 and hinge support 3 into the aperture 2 in the frame. In practice, shape-closing and spring-like locking is achieved with flexibly installed claws 15 that in a locking situation lock behind the counterpart 15' in the frame 1, e.g. in the manner shown by Fig. 2. The claws 15 can also be seen in Figs. 1, 4 and 8.

[0024] In the above, the fastening of a mirror door 6 to a hinge 4 by means of a counterpart 5 is described by referring e.g. to Figs. 2 and 6. Another option is to glue the mirror door to the hinge 4. In this case, the hinge is according to Fig. 5, i.e. it does not have toothing and a screw hole. The surface of the hinge 4 coming against the mirror door 6 is then as even as possible for ensuring the success of the gluing.

[0025] What is special to the solution are the two locking pins and two locking shapes. In this way the certainty is increased that an accident dangerous to the user does not occur in the event of yet one more fault. Having two locking shapes also eliminates unintentional detachment of the hinge support 3.

[0026] The counterpart 5 of the hinge 4 is shaped in such a way that hinge and hinge support combinations installed onto two counterparts 5 installed on the same mirror are not able to turn into a position in which their installation into the frame 1 of a mirror cabinet would not succeed in a straightforward manner.

[0027] The essential parts of the hinge arrangement according to the invention, such as the hinge support, can be shaped symmetrically in relation to the horizontal center plane in such a way that from the same parts both the right-hand and the left-hand version are obtained for the mirror cabinet by turning the parts around in relation to the horizontal plane.

[0028] It is obvious to the person skilled in the art that the invention is not limited to the embodiments described above, but that it can be varied within the scope of the claims presented below.

[0029] The characteristic features possibly presented in the description in conjunction with other characteristic features can also, if necessary, be used separately to each other.

Claims

1. A hinge arrangement for installing a mirror door (6) of a mirror cabinet onto the frame (1) of the mirror cabinet, which hinge arrangement comprises a part to be fastened to the frame (1) of the mirror cabinet, i.e. a hinge support (3), and a part to be fastened to the mirror door (6) of the mirror cabinet, i.e. a hinge (4), in the frame (1) of which mirror cabinet an aper-

ture (2) is made, into which aperture the hinge support (3) is fastened in a shape-locking manner, and in which hinge support (3) are fixed pins (10, 11) in its top end and bottom end, which pins sink into the corresponding holes (12, 13) of the hinge (4), **characterized in that** the hinge support (3) has a joint (14) that divides the hinge support in the vertical direction into a top part and a bottom part, and which joint (14) enables the joining together of the hinge (4) and the hinge support (3) by turning the top and bottom part of the hinge support (3) around the joint (14) in relation to each other.

2. A hinge arrangement according to the claim 1, **characterized in that** a joint (14) is situated in essentially the center of the hinge support (3) in the height direction of the hinge support (3).

3. A hinge arrangement according to either claim 1 or 2, **characterized in that** the fastening of the hinge support (3) onto the frame (1) of the mirror cabinet flexibly and in a shape-locking manner is implemented with flexible claws (15) that lock behind the counterpart (15') of the frame (1) of the mirror cabinet.

4. A hinge arrangement according to any of claims 1-3, **characterized in that** the door (6) of the mirror cabinet is fastened to the hinge (4) by gluing.

5. A hinge arrangement according to any of claims 1-3, **characterized in that** the door (6) of the mirror cabinet is fastened to the hinge (4) by shape-locking it between the hinge (4) and the counterpart (5) of the hinge, and **in that** the fastening is locked with a screw that extends through the hinge (4) and mirror door (6) into the counterpart (5).

6. A hinge arrangement according to claim 5, **characterized in that** on the hinge (4) and on its counterpart (5) is toothing (8, 9), which intermesh with each other and enable stepped horizontal adjustment of the mirror door (6).

7. A hinge arrangement according to claim 6, **characterized in that** the adjustment step is 1.0 mm.

8. Hinge arrangement according to any of claims 1-7, **characterized in that** the essential parts of the hinge arrangement, such as the hinge support (3), are made to be symmetrical in relation to the horizontal center plane, in which case the same part is fittable onto the left-hand side or onto the right-hand side by turning the part around.

9. Mirror cabinet, **characterized in that** in the mirror cabinet is a hinge arrangement according to any of claims 1-8.

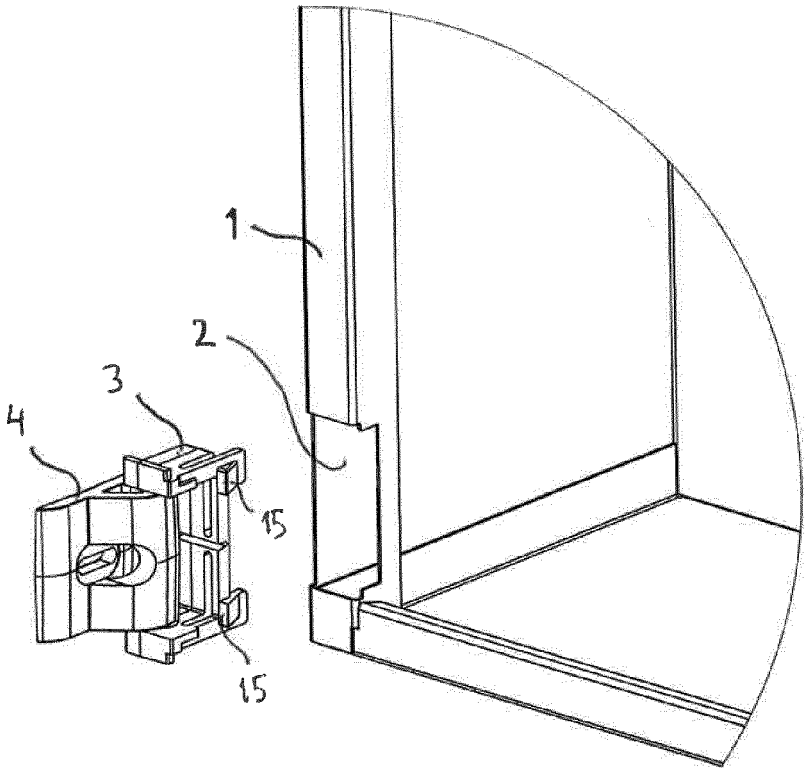

Fig.1

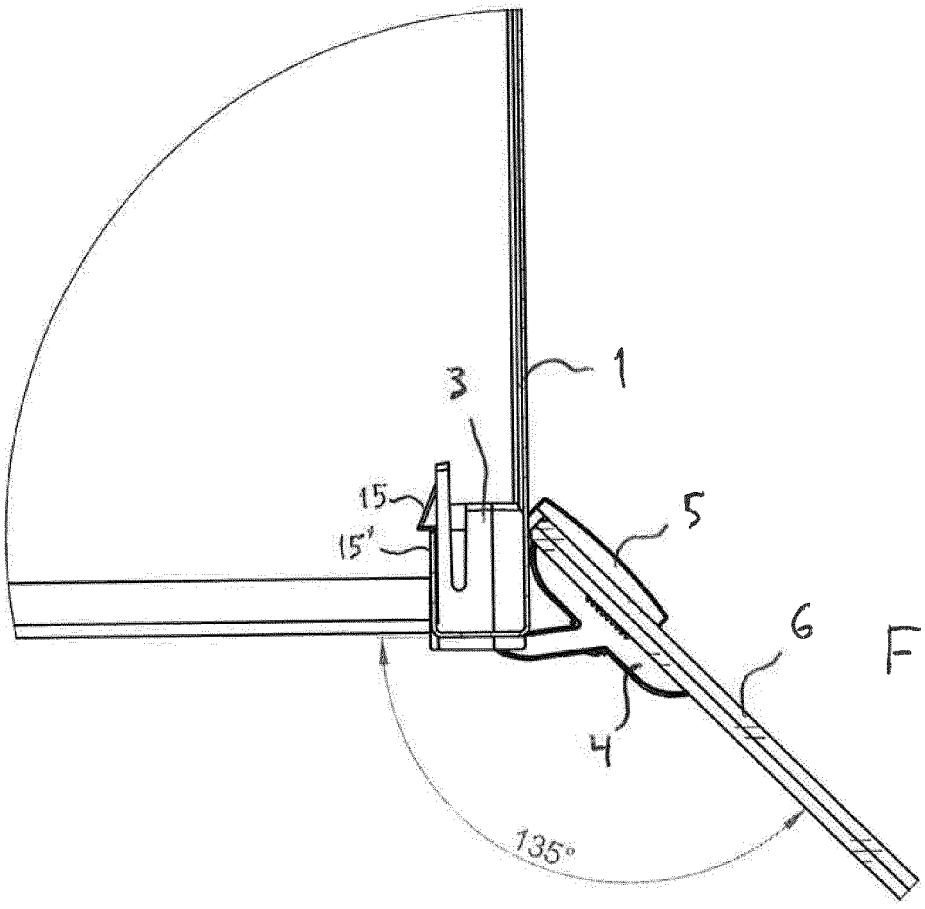

Fig.2

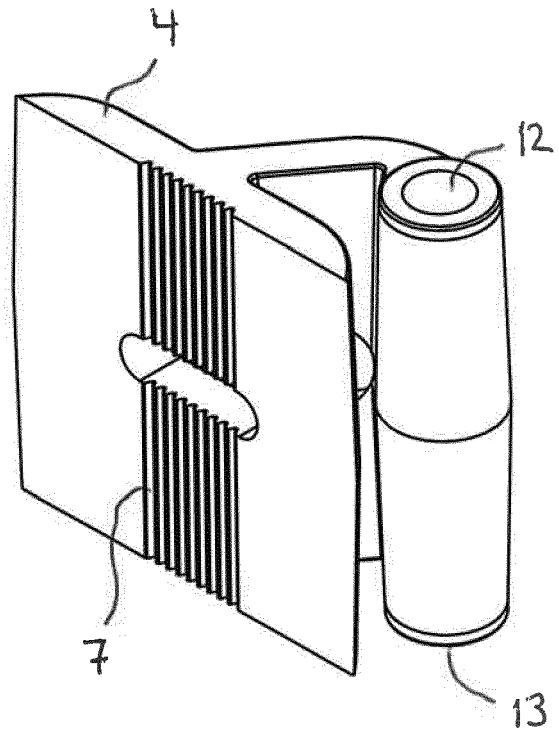

Fig.3

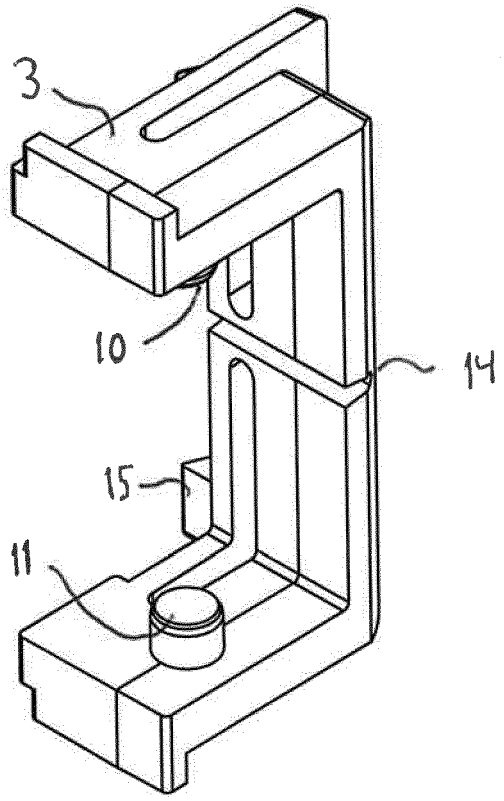

Fig.4

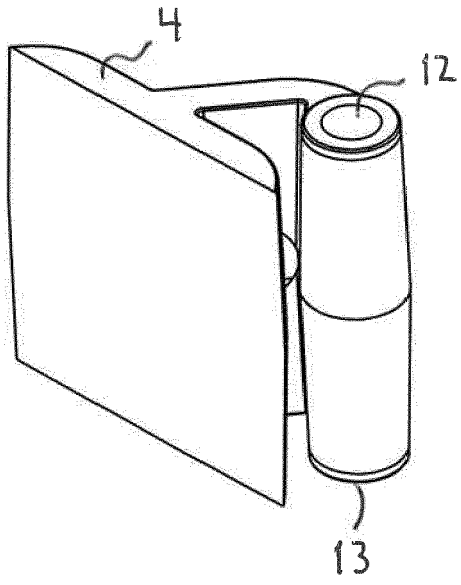

Fig.5

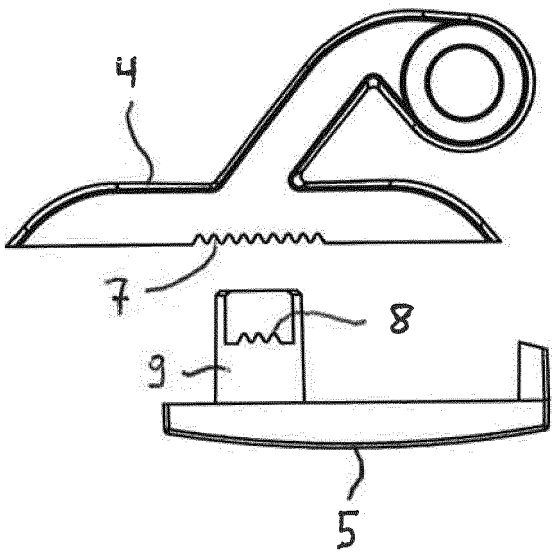

Fig.6

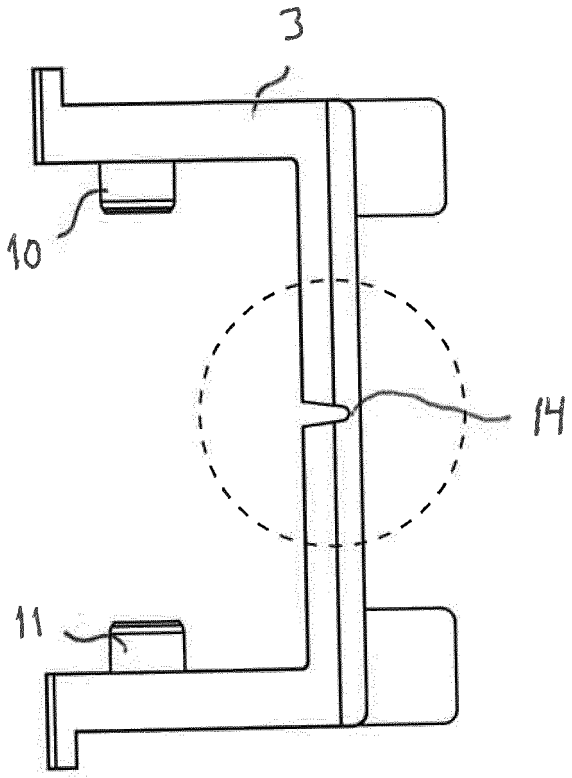

Fig. 7

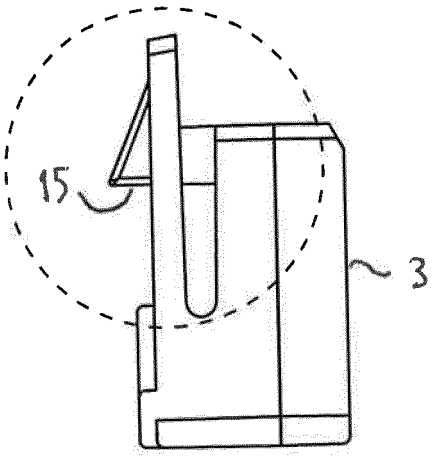

Fig. 8

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 19 16 4516

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	US 5 255 971 A (AISLEY W J [US]) 26 October 1993 (1993-10-26) * figures 1, 2, 8, 17-20 * * column 4, lines 35-45 * * column 6, line 15 - column 7, line 16 * -----	1-9	INV. E05D5/02 E05D7/10 E05D7/12 ADD. E05D5/14
X	GB 2 203 191 A (BORAM F [GB]) 12 October 1988 (1988-10-12) * figures 1-3 * * page 4, paragraph 3 - page 5, paragraph 2 * -----	1-9	
A	DE 295 10 348 U1 (GLAS BUESCHER GMBH [DE]) 7 September 1995 (1995-09-07) * claim 1 * * figures 1, 2 * -----	4	
A	DE 198 58 709 A1 (KERMI GMBH [DE]) 29 June 2000 (2000-06-29) * figure 2 * -----	5	
A	GB 2 520 951 A (METSA WOOD UK LTD [GB]) 10 June 2015 (2015-06-10) * page 7, line 31 - page 9, line 15 * * figures 5-7 * -----	6,7	TECHNICAL FIELDS SEARCHED (IPC) E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 September 2019	Mund, André

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 19 16 4516

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.

20-09-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5255971 A	26-10-1993	NONE	
GB 2203191 A	12-10-1988	NONE	
DE 29510348 U1	07-09-1995	NONE	
DE 19858709 A1	29-06-2000	NONE	
GB 2520951 A	10-06-2015	CN 204299350 U	29-04-2015
		GB 2520951 A	10-06-2015

EPO FORM P0459

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