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

(11) **EP 3 896 212 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
20.10.2021 Bulletin 2021/42

(51) Int Cl.:
D06F 57/04 *(2006.01)*

(21) Application number: **21167988.1**

(22) Date of filing: **13.04.2021**

(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: **14.04.2020 DE 102020110211**

(71) Applicant: **Carl Freudenberg KG**
69469 Weinheim (DE)

(72) Inventors:
- **Hem, Sudhana**
  36020 Solagna (IT)
- **Molon, Tommaso**
  35020 Pernumia (IT)
- **Flath, Johannes**
  68519 Viernheim (DE)

(74) Representative: **Reiser & Partner**
Patentanwälte mbB
Weinheimer Straße 102
69469 Weinheim (DE)

(54) ROTARY CLOTHES DRYER

(57) Rotary clothes dryer (1) having support arms (2) which are hingedly arranged on a slide sleeve (4) which can be relocated along a mast (3) and can be moved selectively into a resting position and into an expanded position, wherein a first latching means (5) into which the slide sleeve (4) latches in the expanded position is assigned to the mast (3), wherein a second latching means (6) for latching is assigned to the slide sleeve (4), wherein the second latching means (6) has at least one pawl (7) for expanding the support arms (2), wherein the pawl (7) automatically latches into the first latching means (5) in such a manner that an automatic movement of the slide sleeve (4) from the expanded position into the resting position is prevented, characterized in that a ratchet lever (8) is assigned to the slide sleeve (4), which latching lever is arranged on the slide sleeve (4) so as to be tiltable between a resting position and an operating position, wherein the ratchet lever (8) has a grip section (9) and a projection (10), wherein the projection (10) latches into the first latching means (5) when the ratchet lever (8) moves into the operating position and the slide sleeve (4) moves towards the expanded position by the leverage of the ratchet lever (8).

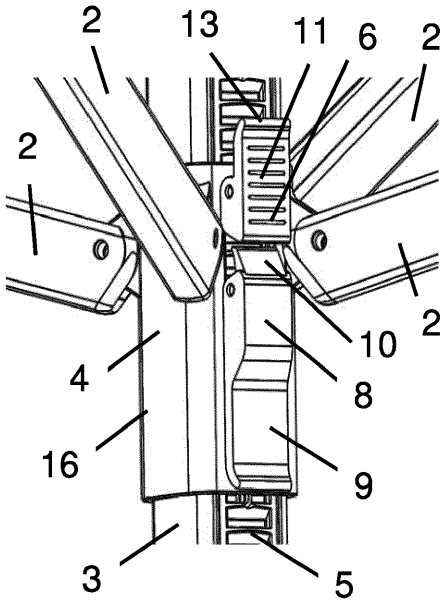

Fig. 3

EP 3 896 212 A1

Description

[0001] The invention relates to a rotary clothes dryer with support arms which are hingedly arranged on a slide sleeve which can be relocated along a mast and can be transferred selectively into a resting position and into an expanded position, wherein the mast has a first latching means assigned to it, into which the slide sleeve latches in the expanded position, wherein the slide sleeve has a second latching means assigned to it for latching, wherein the second latching means has at least one pawl for expanding the support arms, wherein the pawl latches automatically into the first latching means in such a way that automatic movement of the slide sleeve from the expanded position into the resting position is prevented.

[0002] Such a rotary clothes dryer is known, for example, from EP 2 354 297 B1. In the aforementioned rotary clothes dryer, the slide sleeve has a pull cable assigned to it, which is assigned to the slide sleeve via a pulley arrangement assigned to the mast and the slide sleeve. To expand the support arms, a tension is applied to the pull cable so that the slide sleeve is set in motion relative to the mast, and the support arms are transferred from the resting position to the expanded position. The pawl continuously latches into the first latching means during expansion, thereby preventing the slide sleeve from moving automatically from the expanded position to the resting position when no pulling force is applied to the pull cable.

[0003] At least one line is arranged between the support arms in such a way that several line sections arranged parallel to each other are stretched over the length of the support arms in the expanded position of the support arms.

[0004] The problem with the prior art rotary clothes dryer is that the arrangement consisting of the mast, slide sleeve, pulley arrangement and pull cables is often very stiff, or becomes increasingly stiff over time due to wear and contamination of the components involved. This means that a high pulling force is required to transfer the support arms from the resting position to the expanded position. Another disadvantage is that to achieve the highest line tension, the highest pulling force must be applied at the furthest distance from the mast. This is unfavourable from a safety point of view and also from an ergonomic point of view.

[0005] In addition to the aforementioned rotary clothes dryer, rotary clothes dryers are also known which do not have a pull cord for opening. With these, however, the slide sleeve with the support arms on the mast must be pushed vertically upwards by hand, which involves an increasing amount of effort with increasing height and line tension and which is ergonomically unfavourable for this reason alone.

[0006] The object of the invention is to provide a rotary clothes dryer whose support arms can be transferred from the resting position to the expanded position with little effort and which, in addition, enables the lines to be tensioned in a simple and easy manner.

[0007] This object is achieved using the features of claim 1. The dependent claims make reference to advantageous embodiments.

[0008] To achieve the objective, the slide sleeve has a ratchet lever assigned to it, which is arranged on the slide sleeve so as to be tiltable between a resting position and an operating position, wherein the ratchet lever has a grip section and a projection, wherein the projection latches into the first latching means when the ratchet lever moves to the operating position. The pawl prevents backward movement of the slide sleeve when it is transferred from the resting position to the expanded position. The pawl latches into the first latching means in such a way that the slide sleeve can be gradually transferred from the resting position to the expanded position, wherein the slide sleeve cannot move automatically from the expanded position to the resting position. The rotary clothes dryer is expanded by the ratchet lever latching into the first latching means during movement from the resting position to the operating position. Once the ratchet lever latches into the first latching means, the slide sleeve moves toward the expanded position when the ratchet lever is moved further toward the operating position. Thus, the ratchet lever forms a climbing means or climbing aid by which the slide sleeve moves from the resting position to the expanded position along the mast. When the ratchet lever is moved from the operating position to the resting position, the pawl latching into the first latching means prevents the slide sleeve from moving in the opposite direction. By repeatedly moving the ratchet lever between the resting position and the operating position, the rotary clothes dryer is expanded and the support arms move in the direction of the expanded position. As it does so, the slide sleeve climbs upwards along the mast and the rotary clothes dryer expands gradually. The movement of the ratchet lever corresponds to the movement of a ratchet.

[0009] The pawl may have a locking lever assigned to it. By means of the locking lever, the pawl can be actuated and, in doing so, spaced away from the first latching means. This makes it possible to transfer the slide sleeve from the expanded position to the resting position.

[0010] The pawl may have a spring element assigned to it which automatically pushes the pawl into the first latching means. This can prevent the pawl from inadvertently disengaging from the first latching means and the slide sleeve from automatically moving from the expanded position to the resting position.

[0011] The locking lever may have a pusher section, wherein, when the pusher section is actuated, the pawl is spaced away from the first latching means so that the slide sleeve moves from the expanded position to the resting position. The locking lever is preferably hinged to the slide sleeve. The pusher section is preferably formed from a free end of the locking lever, which is opposite the pawl. When a compressive force is applied to the pusher section, the pawl moves out of the first latching means

and the slide sleeve can move from the expanded position to the resting position.

[0012] The first latching means may be in the form of a toothed rack. In this embodiment, it is possible to fix the slide sleeve in various positions along the mast. Furthermore, the pawl of the slide sleeve can latch into the first latching means at such an early stage that further expanding of the support arms up to the maximum line tension can be achieved with particularly low effort.

[0013] The ratchet lever can be attached to the slide sleeve via a swivelling lever. The ratchet lever preferably performs a circular movement around the hinged connection of the ratchet lever during movement between the resting position and the operating position. To prevent the ratchet lever from jamming in the first latching means during the circular motion, the ratchet lever may be attached to the slide sleeve via the swivelling lever. The swivelling lever in turn is hinged at one end to the slide sleeve. The ratchet lever is hinged to the other end of the swivelling lever. When the ratchet lever is moved between the resting position and the operating position, the swivelling lever can swivel out, thereby spacing the ratchet lever from the slide sleeve in such a way that the ratchet lever cannot jam in the first latching means.

[0014] A second spring element can be assigned to the ratchet lever, which automatically moves the ratchet lever into the resting position. This ensures that the ratchet lever is spaced from the first latching means when the expansion of the rotary clothes dryer is complete. In this case, the second spring element is preferably arranged between the ratchet lever and the swivelling lever.

[0015] A handle can be assigned to the slide sleeve. This makes the slide sleeve particularly ergonomic to operate.

[0016] At least one line may be assigned to the support arms. Preferably, the line is arranged between the support arms in such a way that several line sections which are arranged parallel to each other are stretched in the expanded position. The line, or the line arrangement, is tensioned when the support arms are transferred from the resting position to the expanded position. The slide sleeve can be positioned in such a way that the line, or the line arrangement, has the desired tension.

[0017] Some embodiments of the rotary clothes dryer according to the invention are explained in more detail below with reference to the figures. These show, in each case schematically:

Fig. 1 a rotary clothes dryer in the expanded position;
Fig. 2 a rotary clothes dryer in the resting position;
Fig. 3 the slide sleeve in detail;
Fig. 4 the slide sleeve in detail with folded-out latching means;
Fig. 5 the slide sleeve in detail with the locking lever actuated;
Fig. 6 the slide sleeve (without locking lever and ratchet lever);
Fig. 7 front and rear sides of locking lever and ratchet lever.

[0018] Figures 1 and 2 show a rotary clothes dryer 1 with support arms 2, which are hingedly arranged on a slide sleeve 4, which is relocatable along a mast 3. A line 17 is assigned to the support arms 2, wherein the line 17 is assigned to the support arms 2 in such a way that a plurality of line sections, which are arranged parallel to one another, are obtained. The support arms 2 can optionally be moved into a resting position (Fig. 2) and into an expanded position (Fig. 1).

[0019] Figures 3 to 6 show the slide sleeve 4 arranged on the mast 3 in detail. A first latching means 5 is assigned to the mast 3, into which the slide sleeve 4 latches in the expanded position. The first latching means 5 is designed as a toothed rack. For this purpose, the mast 3 has a groove which accommodates the first latching means 5 in the form of the toothed rack.

[0020] A second latching means 6 is assigned to the slide sleeve 4 for latching into the first latching means 5, the second latching means 6 having a pawl 7 for expanding the support arms 2, wherein the pawl 7 automatically latches into the first latching means 5 in such a way that an automatic movement of the slide sleeve 4 from the expanded position into the resting position is prevented.

[0021] A ratchet lever 8 is hingedly assigned to the slide sleeve 4, wherein the ratchet lever 8 is arranged on the slide sleeve 4 so as to be tiltable between a resting position and an operating position. The ratchet lever 8 has a grip section 9 and a projection 10, wherein the projection 10 latches into the first latching means 5 when the ratchet lever 8 moves to the operating position.

[0022] The ratchet lever 8 is attached to the slide sleeve 4 via a swivelling lever 14, wherein a second spring element 15 is assigned to the ratchet lever 8, which automatically transfers the ratchet lever 8 into the resting position. The second spring element 15 is arranged between the ratchet lever 8 and the swivelling lever 14.

[0023] The expanding of the rotary clothes dryer 1 is happens by the latching lever 8 latching into the first latching means 5 during the movement from the resting position to the operating position. Once the ratchet lever 8 latches into the first latching means 5, the slide sleeve 4 moves towards the expanded position when the ratchet lever 8 is moved further towards the operating position. Thus, the ratchet lever 8 forms a climbing aid by which the slide sleeve 4 moves from the resting position to the expanded position along the mast 3.

[0024] When the ratchet lever 8 is moved from the operating position to the resting position, the pawl 7, which automatically latches into the first latching means 5, prevents the slide sleeve 4 from moving in the opposite direction. By repeatedly moving the ratchet lever 8 between the resting position and the operating position, the rotary clothes dryer 1 is expanded and the support arms 2 move in the direction of the expanded position. In doing so, the slide sleeve 4 climbs upward along the mast 3 and the rotary clothes dryer 1 expands gradually. The movement

of the ratchet lever 8 corresponds to the movement of a ratchet.

[0025] A locking lever 11 is assigned to the pawl 7. Furthermore, a first spring element 12 is assigned to the pawl 7, which automatically presses the pawl 7 into the first latching means 5.

[0026] The locking lever 11 has a pusher section 13, wherein, when the pusher section 13 is actuated, the pawl 7 is spaced apart from the first latching means 5 so that the slide sleeve 4 can move from the expanded position to the resting position. The locking lever 11 is hinged to the slide sleeve 4. The pusher section 13 is formed from a free end of the locking lever 11, which is opposite to the pawl 7. When a compressive force is applied to the pusher section 13, the pawl 7 is spaced apart from the first latching means 5 and the slide sleeve 4 is allowed to move from the expanded position to the resting position.

[0027] In the present embodiment, the slide sleeve 4 is formed as a handle 16 on the outer circumferential side.

[0028] In the representation according to figure 3, the pawl 7 of the second latching means 6 latches into the first latching means 5 and the slide sleeve 4 is locked, in the present representation in the expanded position. The ratchet lever 8 is located on the slide sleeve 4 and is in the resting position.

[0029] In the representation according to figure 4, the ratchet lever 8 is extended from the slide sleeve 4 and is in the operating position. During the transfer of the ratchet lever 8 from the resting position to the operating position, the projection 10 of the ratchet lever 8 has latched into the first latching means 5 of the mast 3 and the slide sleeve 4 has moved along the mast 3 towards the expanded position as the ratchet lever 8 has been actuated further.

[0030] In the representation according to figure 5, the pusher section 13 of the locking lever 11 is actuated so that the pawl 7 is spaced from the first latching means 5, and the slide sleeve 4 can be transferred from the expanded position to the resting position.

[0031] Figure 6 shows the previously described slide sleeve 4, wherein for better illustration the second latching means 6 and the ratchet lever 8 are not shown.

[0032] Figure 7 shows in detail the second latching means 6 with locking lever 11 and ratchet lever 8 with projection 10.

Claims

1. Rotary clothes dryer (1) having support arms (2) which are hingedly arranged on a slide sleeve (4) which can be relocated along a mast (3) and can be moved selectively into a resting position and into an expanded position, wherein a first latching means (5) into which the slide sleeve (4) latches in the expanded position is assigned to the mast (3), wherein a second latching means (6) for latching is assigned to the slide sleeve (4), wherein the second latching means (6) has at least one pawl (7) for expanding the support arms (2), wherein the pawl (7) automatically latches into the first latching means (5) in such a manner that an automatic movement of the slide sleeve (4) from the expanded position into the resting position is prevented, **characterized in that** a ratchet lever (8) is assigned to the slide sleeve (4), which is arranged on the slide sleeve (4) so as to be tiltable between a resting position and an operating position, wherein the ratchet lever (8) has a grip section (9) and a projection (10), wherein the projection (10) latches into the first latching means (5) when the ratchet lever (8) moves into the operating position and the slide sleeve (4) moves towards the expanded position by the leverage of the ratchet lever (8).

2. Rotary clothes dryer according to claim 1, **characterized in that** a locking lever (11) is assigned to the pawl (7).

3. Rotary clothes dryer according to claim 1 or 2, **characterized in that** the pawl (7) is assigned a first spring element (12) which automatically presses the pawl (7) into the first latching means (5).

4. Rotary clothes dryer according to claim 2 or 3, **characterized in that** the locking lever (11) has a pusher section (13), wherein the pawl (7) is spaced apart from the first latching means (5) when the pusher section (13) is actuated so that the slide sleeve (4) moves from the expanded position to the resting position.

5. Rotary clothes dryer according to any one of claims 1 to 4, **characterized in that** the first latching means (5) is in the form of a toothed rack.

6. Rotary clothes dryer according to any one of claims 1 to 5, **characterized in that** the ratchet lever (8) is attached to the slide sleeve (4) via a swivelling lever (14).

7. Rotary clothes dryer according to any one of claims 1 to 6, **characterized in that** a second spring element (15) is assigned to the latching lever (8), which automatically transfers the latching lever (8) into the resting position.

8. Rotary clothes dryer according to claim 7, **characterized in that** the second spring element is arranged between the ratchet lever (8) and the swivelling lever (14).

9. Rotary clothes dryer according to any one of claims 1 to 8, **characterized in that** a handle (16) is formed from the slide sleeve (4).

10. Rotary clothes dryer according to any one of claims 1 to 9, **characterized in that** at least one line (17) is assigned to the support arms (2).

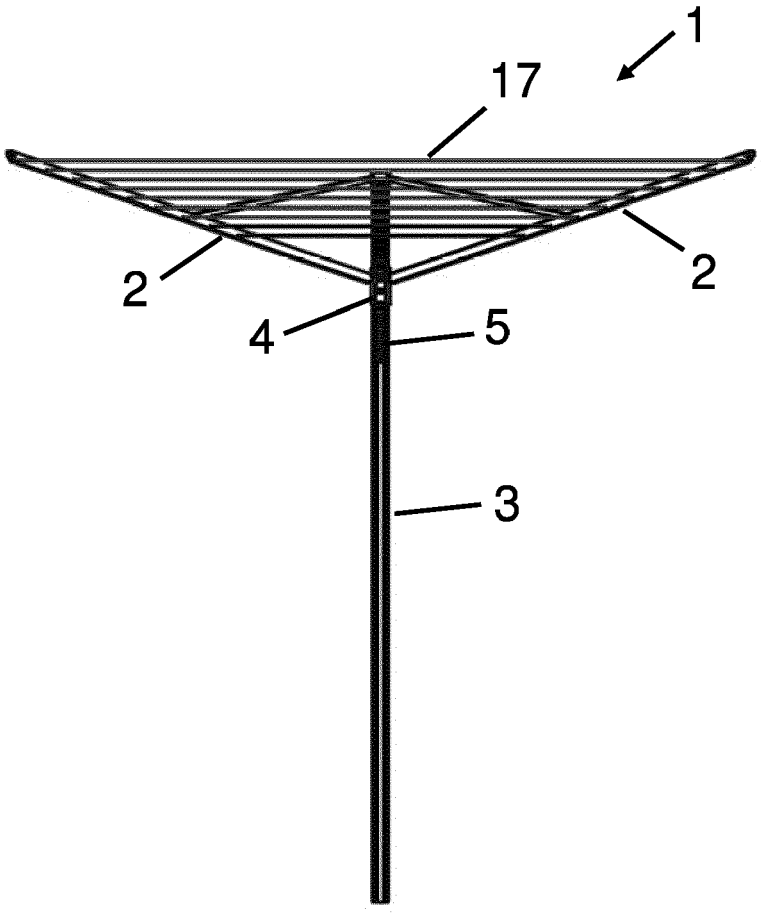

Fig. 1

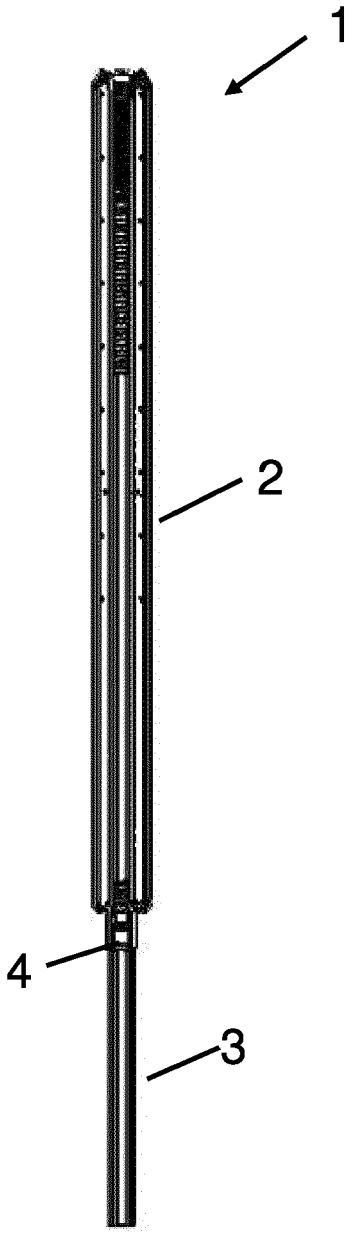

Fig. 2

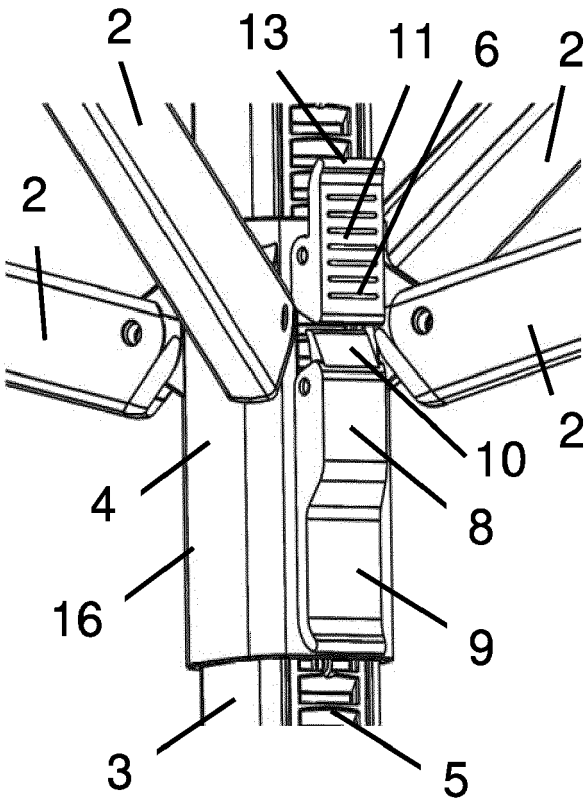

Fig. 3

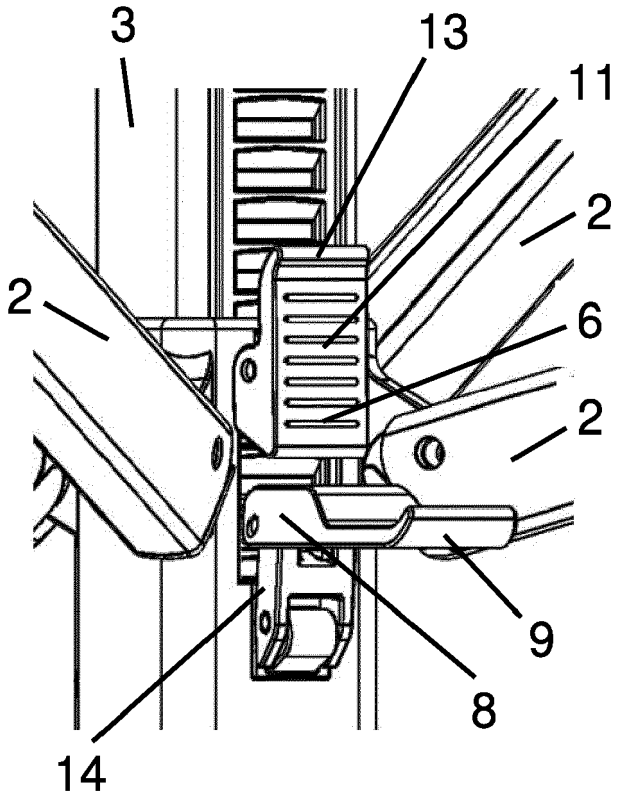

Fig. 4

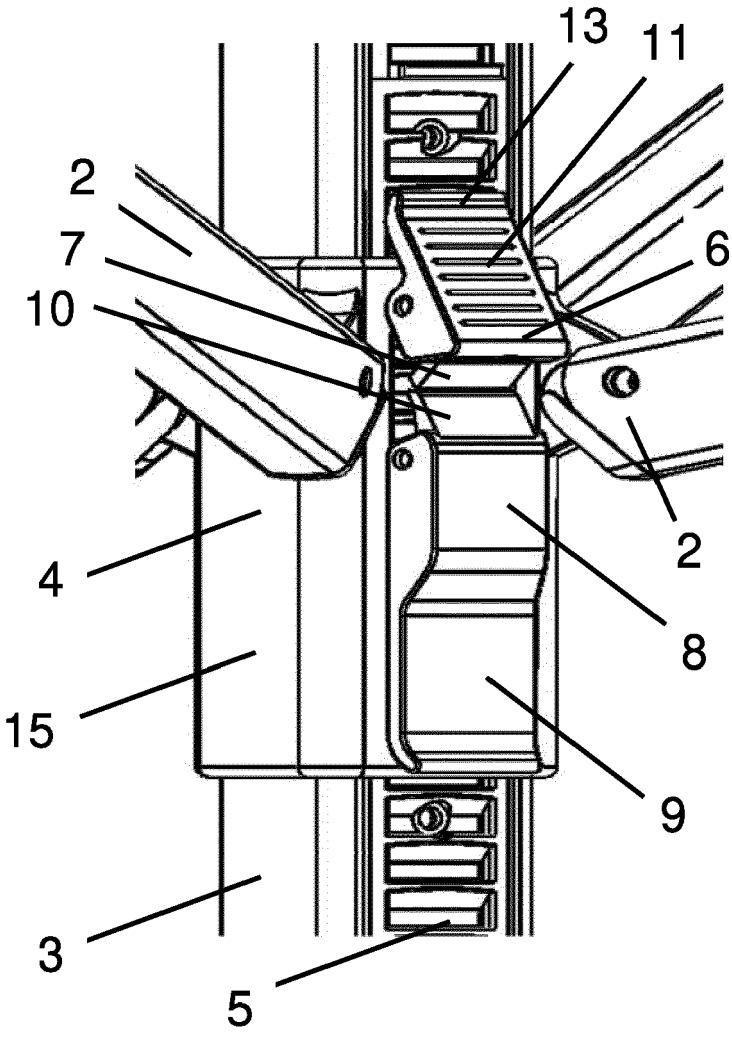

Fig. 5

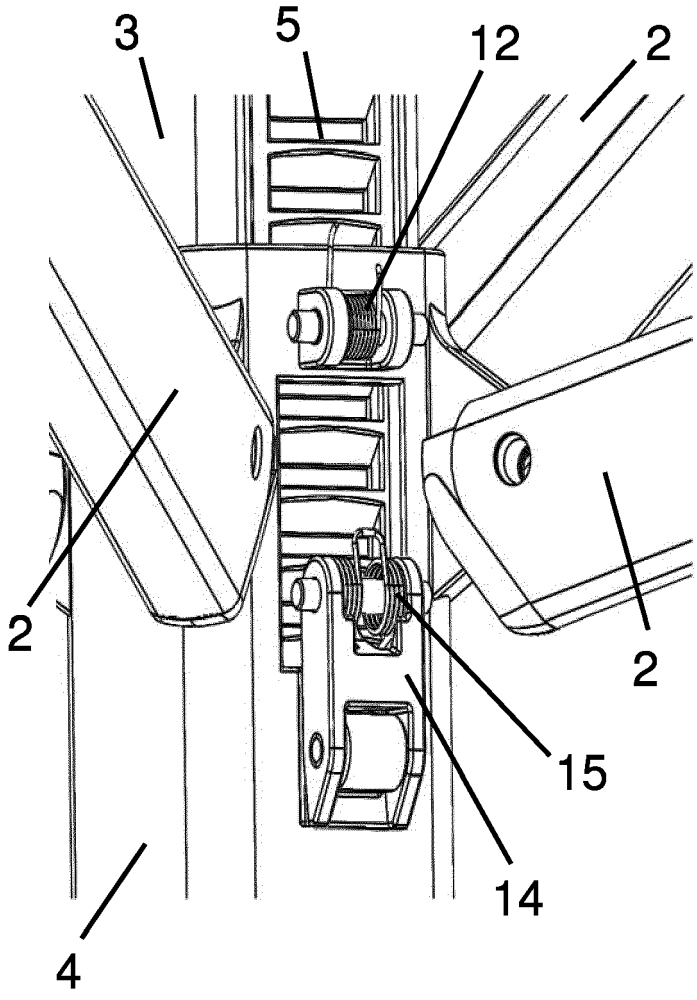

Fig. 6

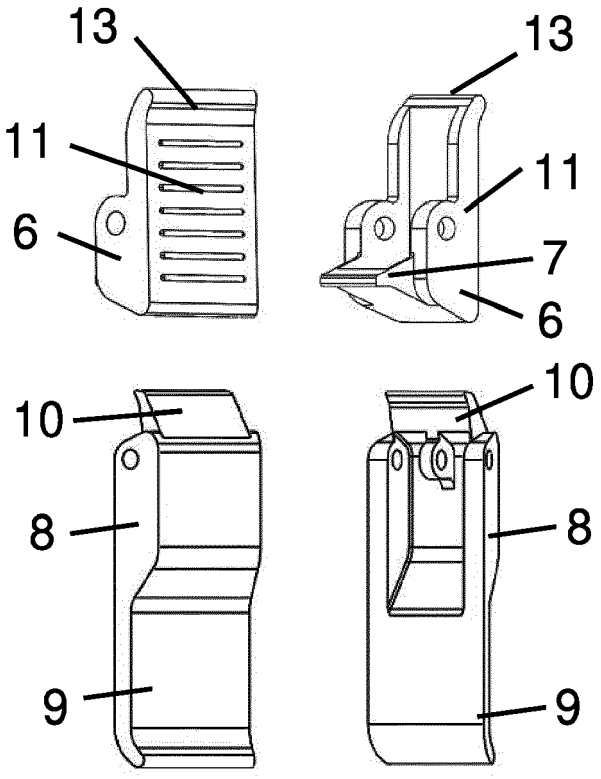

Fig. 7

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 21 16 7988

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 Y	US 2006/180687 A1 (WUSTER HEINRICH [AT]) 17 August 2006 (2006-08-17) * paragraph [0017] * * paragraph [0053] - paragraph [0058] * * claims; figures * -----	1-8,10 6,9	INV. D06F57/04
X A	US 1 616 097 A (ALBERT WALLACE) 1 February 1927 (1927-02-01) * the whole document * -----	1-5,10 6-9	
Y	US 116 232 A (JAMES U. SMITH) 20 June 1871 (1871-06-20) * the whole document * -----	6	
Y	DE 20 2004 021340 U1 (BRABANTIA NEDERLAND BV [NL]) 23 August 2007 (2007-08-23) * paragraph [0024] * * claims; figures * -----	9	
A	US 2 896 792 A (BODINE WILLIAM L) 28 July 1959 (1959-07-28) * figures * -----	1-10	

TECHNICAL FIELDS SEARCHED (IPC)
D06F B66F A45B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	9 August 2021	Popara, Velimir

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 21 16 7988

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.

09-08-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006180687 A1	17-08-2006	AT 413987 B	15-08-2006
		AT 483053 T	15-10-2010
		EP 1658400 A1	24-05-2006
		US 2006180687 A1	17-08-2006
		WO 2005024114 A1	17-03-2005
US 1616097 A	01-02-1927	NONE	
US 116232 A	20-06-1871	NONE	
DE 202004021340 U1	23-08-2007	DE 202004021340 U1	23-08-2007
		EP 1694186 A2	30-08-2006
		NL 1025063 C2	21-06-2005
		WO 2005058116 A2	30-06-2005
US 2896792 A	28-07-1959	NONE	

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 2354297 B1 **[0002]**