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

(11) EP 3 306 026 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
11.04.2018 Bulletin 2018/15

(51) Int Cl.:
E06B 9/174 *(2006.01)*

(21) Application number: **17190515.1**

(22) Date of filing: **12.09.2017**

(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:
MA MD

(30) Priority: **05.10.2016 DE 202016105520 U**

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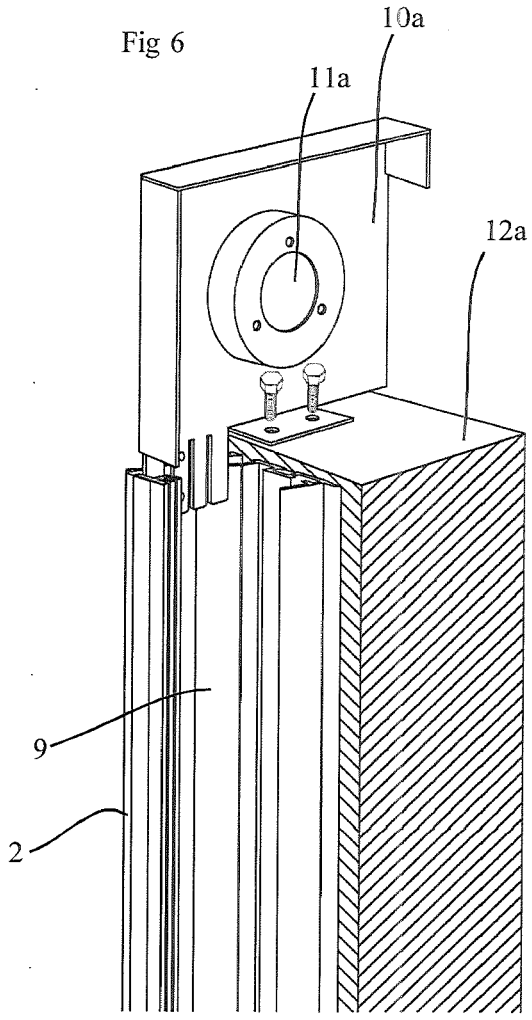
(54) ROLL DOOR

(57) A roll door (1) includes a flexible door panel (5), a roll bar, side frames (2), mounting flanges (10a) for mounting the roll bar on the side frames (2), a motor (6), and a top roll cover (3). The mounting flanges (10a) are arranged vertically above supporting beams (12a) supporting the side frames (2), respectively.

Fig 6



EP 3 306 026 A1

Description

TECHNICAL FIELD

[0001] The invention concerns a roll door including a flexible door panel, a roll bar, side frames, mounting flanges for mounting the roll bar above the side frames, a motor, and a top roll cover.

PRIOR ART

[0002] Roll doors with flexible door panels have been used worldwide for several decades in many applications, such as warehouses, cold stores, clean rooms etc. In applications where people or industrial trucks need to pass the door frequently, high speed roll doors are an excellent option, since they open and close quickly, they are durable and easy to maintain and repair after a collision.

[0003] Roll doors according to the prior art are suitable for mounting against a wall, around an opening therein, and the surface facing the wall is flat, with the roll bar, onto which the flexible door panel is rolled, mounted on the front of the door. At the front of the door, there may hence be a theoretical risk for injury if a hand etc. were to be inserted in the gap between the door panel and the roll, when the door panel is rolled up on the roll bar. However, most doors are more than 2.5 meters high, and the gap is out of reach, so there is no actual risk of injury.

[0004] In later years, high speed roll doors have been used with machine guards, i. e. as doors into enclosures around welding robots, robots for assembly, or other machines where there is a risk of injury if persons were to access the immediately surrounding area when the equipment is moving.

[0005] In the side frames of the roll door, there are switches, which detect if the door is open, and they may be connected with a safety system which disables the operation of the machines in the enclosure, if the door is open.

[0006] The door panel and the side frames may also be designed to prevent the rolled down door panel from being pushed away from the frame, which would otherwise allow unauthorized access into the enclosure.

[0007] When a roll door is used for machine guard enclosures, they are usually mounted on the outside of the enclosure, with their flat side facing the enclosure.

[0008] The present use of roll doors for machine guard enclosures poses some problems. As the enclosures often are fairly low, the possibility of reaching the gap between the door panel and the roll bar is increased, and accidental injuries may ensue. The low height will also result in an increased risk of head injuries, as the roll bar and its cover project outside the enclosure. Also, the projecting roll bar and its cover may obstruct access to the cell e.g. for industrial trucks.

[0009] Mounting the roll door with the roll cover and its frames inside the enclosure would solve some of these problems, at least when there is enough space inside the enclosure. However, it is desirable to mount the side frames on the outside of the enclosure, so that they are accessible from the outside for service and adjustment of the safety switches in the side frames.

PROBLEM OF THE INVENTION

[0010] It is hence desirable to invent a roll door that eliminates the risk of injuries outlined above, while the roll door is kept as compact as possible.

SOLUTION

[0011] The object of the invention is attained if the roller door described in the introduction is characterized in that the mounting flanges are arranged vertically above supporting beams supporting the side frames, respectively.

DRAWINGS

[0012] The invention will now be described with reference to the enclosed drawings. In the drawings:

Fig 1 is a perspective view of a roll door according to the prior art;

Fig. 2 is a view according to Fig 1 of a door according to the present invention;

Fig 3 is a side view of a roll door according to the prior art, mounted on an enclosure;

Fig 4 is a view according to fig. 3 of a door according to the present invention;

Fig 5 is a perspective view of a part of the side frame and a mounting flange according to the prior art; and

Fig 6 is a view according to fig. 5 of the side frame and a mounting flange according to the present invention.

PREFERRED EMBODIMENT

[0013] Fig. 1 shows a roll door 1 according to the prior art. The roll door 1 is provided with two side frames 2, and a top roll cover 3 surrounding an opening 4 in a wall 7 of an enclosure. A flexible door panel 5 is provided on a roll inside the top roll cover 3. The sides of the flexible door panel 5 are arranged in guides 9 in the side frames 2, in order to keep the door panel 5 in its position even when objects or persons push against the door panel 5.

[0014] A motor 6 is arranged at the side of the top roll cover 3, in order to open and close the door 1 by spinning of the roll, so that the door panel 5 is raised or lowered, respectively. Next to the door 1, there may be operating

and safety switches for opening or closing the door 1 and for stopping the door panel 5 immediately in an emergency.

[0015] As seen in Fig 1, the top roll cover 5 extends outwards a distance from the wall 7. Depending on the amount of available space, this fact could be a problem if the available space in front of the enclosure is limited. Depending on the height of the roll door 1, vehicles or people moving closely past the door 1, risk colliding with the protruding top roll cover 5.

[0016] Also, depending on the height of the roll door 1, a person may be able to reach into the gap between the door panel 5 and the roll bar onto which the door panel 5 is rolled. When the door panel 5 is moving towards a raised position, there would be a risk of injury if a person simultaneously reaches into the gap and their hands or other body parts are dragged upwards and get stuck between the door panel 5 and the roll bar.

[0017] In Fig. 2 a roll door 1a according to the invention is shown. The side frames 2, the door panel 5, the motor 6, and the operating switches correspond to that of the prior art. However, the top roll cover 3a according to the invention is no longer positioned so as to protrude in front of the enclosure. Instead the top roll cover 3a and the roll bar inside are both arranged just behind the side frames 2, with the side frames 2 still arranged on the outside of the enclosure, and with the door panel 5 still running in the guides 9.

[0018] The gap between the door panel 5 and the roll bar is now positioned behind the door panel 5, which means that it is not accessible from the outside of the roll door 1, when it is closed. The risk of injury is hence eliminated, as the gap would be very hard to reach even when the roll door 1 is open. The gap could only be reached by a person standing directly under the door panel 5, in which case all movement of the door panel would be blocked by the safety systems, and all injuries would be prevented for this reason.

[0019] In Fig 3 and Fig 4, the roll door 1 according to the prior art and the roll door 1a according to the invention are shown from the side, and the respective positions of the top roll cover 3, 3a and the motor 6 are clearly visible. At each outer end of the top roll cover 3, 3a, there are mounting flanges 10, which on one hand are connected to vertical beams 12, 12a, which support the side frames 2, and on the other hand include attachments 11, 11a for the roll bar. The attachments 11, 11a, which are visible in Fig. 3 and Fig 4 correspond to the respective positions of the axes of the roll bars.

[0020] According to the prior art in Fig 3, the attachments 11 and the axis of the roll bar are positioned a short distance in front of the side frames 2. The mounting flanges 10 are connected at their sides with beams 12 whereon the respective side frames 2 are mounted. As the roll bar carries the weight of the door panel 5, there will be a torque force acting on the connection of each mounting flange 10. This means that there is a certain risk of fatigue in the connection and vibrations when the door panel 5 is moving.

[0021] According to the invention in Fig 4, the axis of the roll bar is positioned in alignment with the beams 12a, which also support the side frame 2. The mounting flanges 10a, at the outer ends of the top roll cover 3a, are connected at their bottom sides with the upper ends of the beams 12a with the side frames 2. Since the attachments 11 and the roll bar are centered above the beams 12a, slightly behind the the side frames 2, there is no torque acting on the connections between the mounting flanges 10a and the side frames 2.

[0022] The roll door 1 according to the invention takes up considerably less space in front of the enclosure. This is an advantage in most locations, and especially if the enclosure is mobile, since it will be easier to store and transport the enclosure.

[0023] Fig 5 shows the side frame 2 and the mounting flange 10 according to the prior art mounted on a vertical beam 12. The connection between the mounting flange 10 and the vertical beam 12 is on the side of the vertical beam 12. It is clear that the center of gravity of the roll bar will be in front of the beam 12 and the side frame 2 mounted thereon, as the position of the attachments 11 of the roll bar implies. A torque A will act on the mounting flanges 10.

[0024] Further, the inner part of the periphery of the attachment 11 and hence of the roll bar is aligned with the guide 9 in the side frame 2. The door panel 5 will extend below and behind the roll bar, and the gap between the door panel 5 and the roll bar risk being accessible below from the outside.

[0025] In fig. 6 it is clear how the mounting flange 10a according to the invention is attached on top of the vertical beam 12a. The center of gravity of the roll bar will be aligned with the beams 12a, and there will be no torque forces acting on the connection between the mounting flange 10a and the beam 12a. The life span of the roll door 1 is most likely extended. The operation of the roll door 1 will be even smoother than in the prior art, due to the absence of vibrations

[0026] Also, the outer periphery of the attachment 11a is aligned with the guide 9 in the side frame 2. This means that the door panel 5 will extend in front of the roll bar, and the gap between them is not accessible, and the risk of injuries is thus eliminated.

[0027] On the whole, the roll door 1 according to the invention is advantageous over the prior art, due to the eliminated risk of injury, the decreased amount of space needed, and the longer life span of the roll door 1.

[0028] The invention may be varied within the scope of the claims.

Claims

1. Roll door including a flexible door panel (5), a roll bar, side frames (2), mounting flanges (10a) for mounting the roll bar above the side frames (2), a

motor (6), and a top roll cover (3a), **characterized in that** the mounting flanges (10a) are arranged vertically above supporting beams (12a) supporting the side frames (2), respectively.

2. Roll door according to claim 1, **characterized in that** a mass center of the roll bar is centered above each of the supporting beams (12a).

3. Roll door according to claim 1 or claim 2, **characterized in that** the axis of the roll bar is positioned centered behind the side frames, and its periphery is approximately aligned with guides (9) for the door panel (5) in the side frames (2).

4. Roll door according to any of claims 1 to 3, **characterized in that** means for fastening the mounting flanges (10a) are arranged below the roll bar in its mounted position.

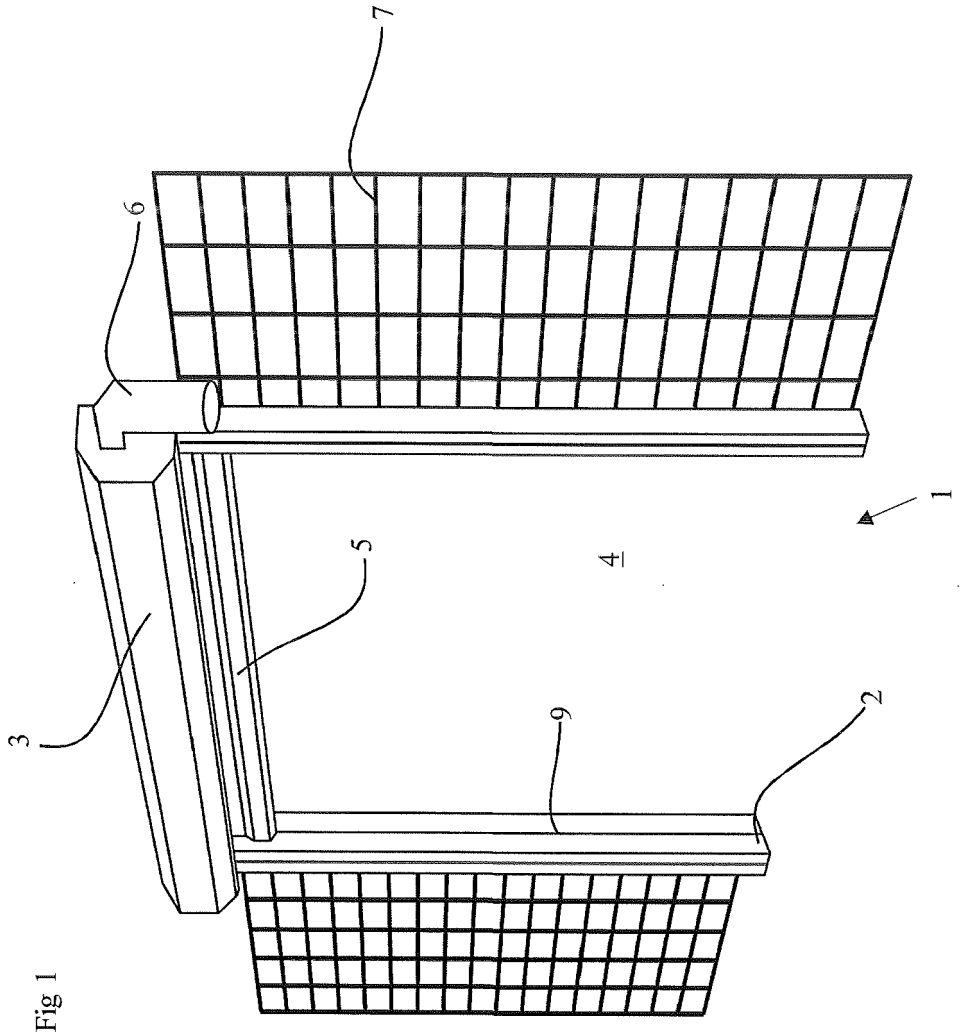


Fig 1

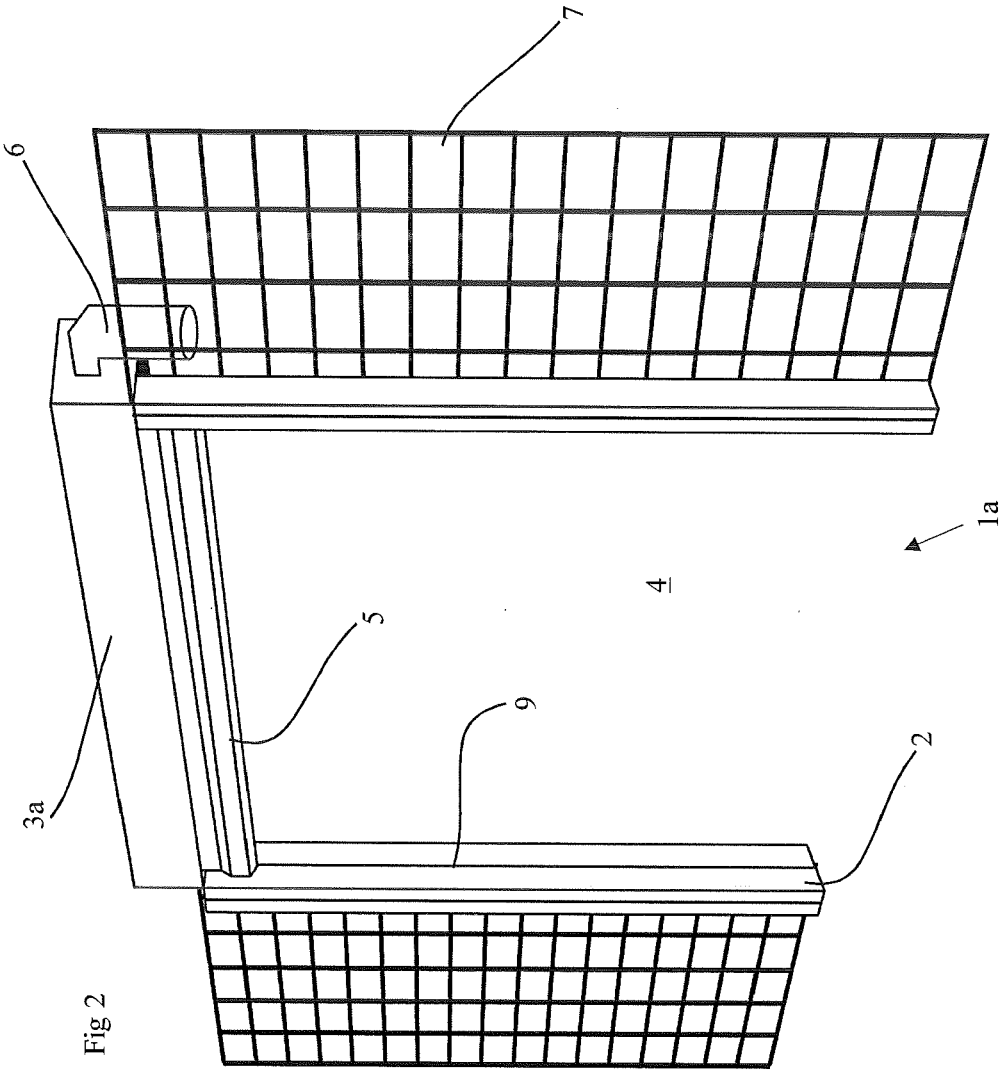


Fig 2

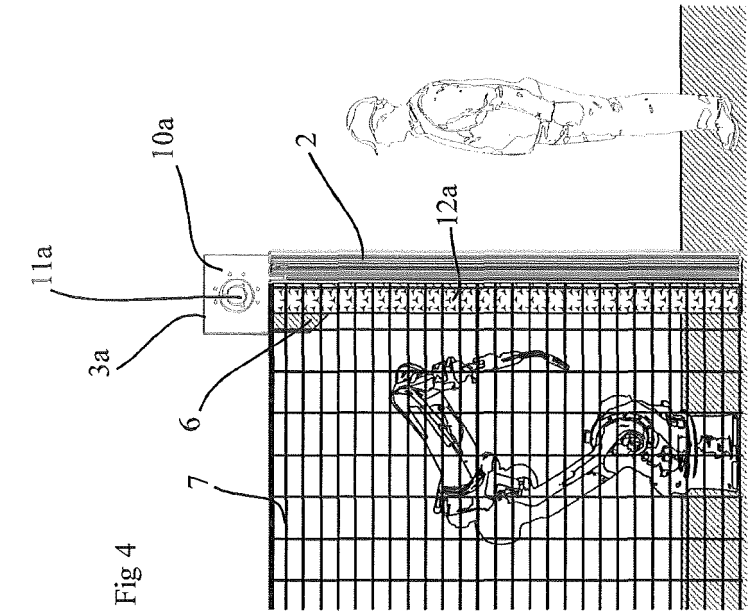


Fig 4

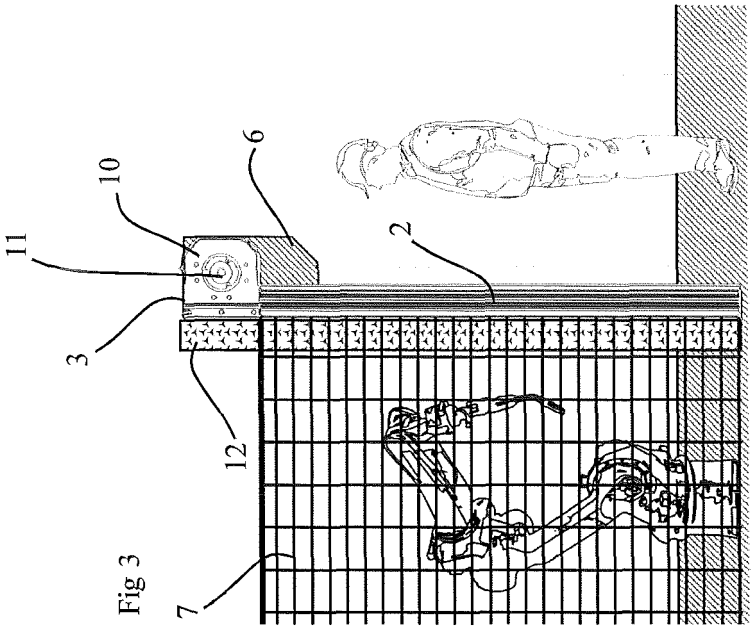


Fig 3

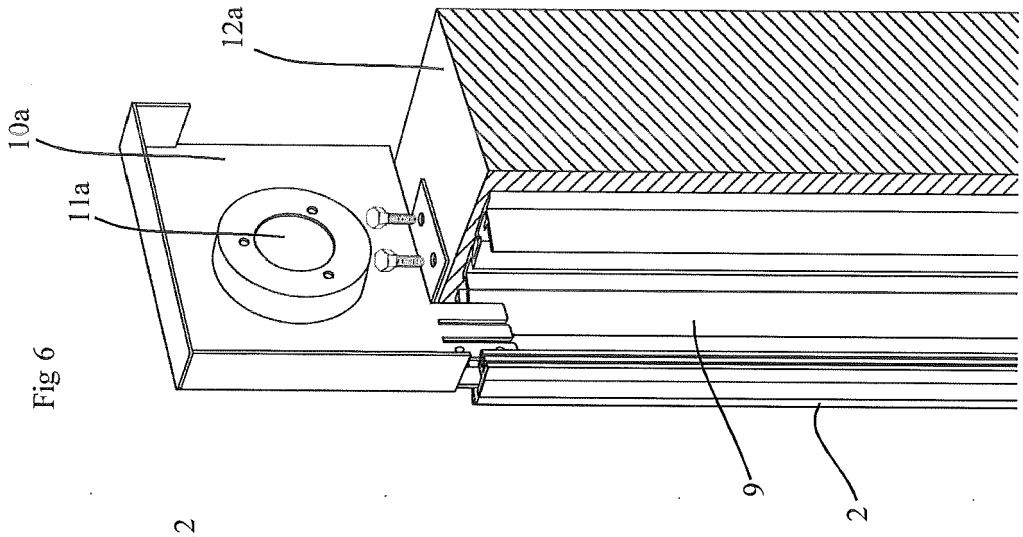


Fig 6

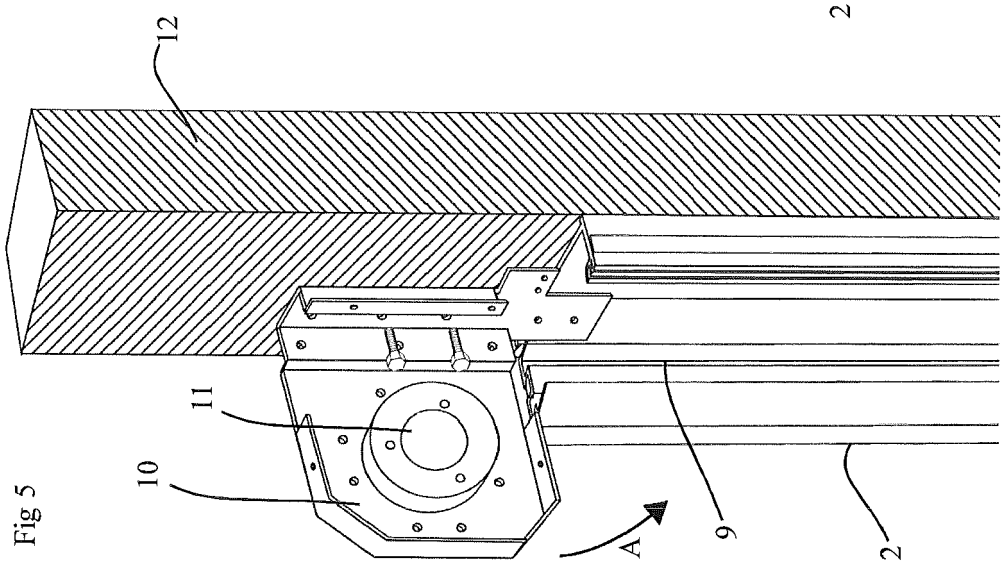


Fig 5

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EUROPEAN SEARCH REPORT

Application Number
EP 17 19 0515

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	DE 10 2009 052010 A1 (ROMA ROLLADENSYSTEME GMBH [DE]) 12 May 2011 (2011-05-12) * paragraphs [0042] - [0046]; figures 4--11 *	1-4	INV. E06B9/174
X	DE 195 21 752 A1 (D & M ROLLADENTECHNIK GMBH [DE]) 19 December 1996 (1996-12-19) * column 3, line 15 - column 7, line 31; figures 1,2,3 *	1-4	
X	EP 1 916 378 A2 (ZURFLUH FELLER [FR]) 30 April 2008 (2008-04-30) * paragraphs [0020] - [0030]; figures 1-4 *	1,2,4	

TECHNICAL FIELDS SEARCHED (IPC)
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 February 2018	Kofoed, Peter

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 19 0515

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23-02-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102009052010 A1	12-05-2011	AT 12095 U1	15-10-2011
		DE 102009052010 A1	12-05-2011
		FR 2952116 A1	06-05-2011
DE 19521752 A1	19-12-1996	AT 176515 T	15-02-1999
		DE 19521752 A1	19-12-1996
		EP 0832342 A1	01-04-1998
		WO 9700367 A1	03-01-1997
EP 1916378 A2	30-04-2008	EP 1916378 A2	30-04-2008
		FR 2907834 A1	02-05-2008

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