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(54) **HIGH SPEED SLIDING ROLL-UP DOOR COMPRISING AN UPPER SHELTER AREA FOR ACCOMMODATING A FLEXIBLE CURTAIN IN THE OPEN CONFIGURATION OF THE DOOR**

(57) A high speed sliding roll-up door comprises a flexible curtain to close or open an opening in a wall (13) delimited by a portal structure (12) including two lateral uprights (14) provided with hollow rails (24) for guiding the curtain (20), and an upper crosspiece (16). The lateral edges of the curtain (20) are provided with projections (22) adapted to be engaged by the teeth of respective control gear wheels (32) for controlling the movement of the curtain (20). The curtain (20) is intended to be received, in the open condition of the door (10), above the portal structure (12) in a shelter area (26) delimited, at the opposite axial ends, by a pair of specular guide paths (30, 30a, 30b) formed in respective guide panels (28; 28a). Each guide panel (28; 28a) is carried by a respective support plate (36) fast with said wall (13), with the possibility of relative displacement to and from the opposite guide panel (28; 28a).

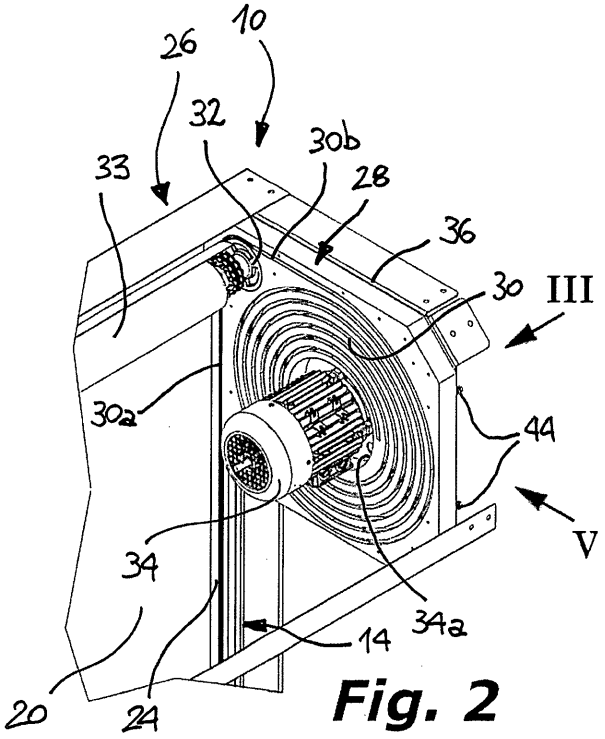

Fig. 2

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Description

[0001] The present invention relates in general to high speed sliding roll-up doors for industrial use which comprise a flexible curtain intended to be stored, in the open condition of the door, in a shelter area located above a portal structure of the door itself.

[0002] Usually, in roll-up doors of the type defined above, the flexible curtain is wound on a winding shaft located above the portal structure, which crosses a shelter area for the curtain. Before being wound onto the winding shaft, the curtain is deflected from its vertical path by a transmission shaft parallel to the winding shaft. This known solution is however complex and relatively expensive to be implemented, because it usually requires the use of a counterweight connected to a cable which is also wound on the winding shaft, in order to drag the latter in rotation as a result of the movement of the curtain.

[0003] More particularly, the invention relates to a roll-up door of the type defined in the preamble of the attached claim 1.

[0004] WO-2010/101836 describes a roll-up door of the type defined above, in which the curtain, during the opening and closing movements thereof, is dragged by a pair of driving gear wheels which engage projections of its lateral edges. These gear wheels are associated with a pair of specular guide paths formed in respective panels fixed to the opposite axial ends of the curtain shelter area, in a position immediately above the upper end of the respective guide rails of the lateral edges of the curtain. The guide paths of the panels are made by means of respective guide grooves, which may have a spiral configuration, in which the opposite lateral edges of the curtain and the relevant projections engage. However, this solution does not involve an optimal operation because the curtain, owing to its high speed of movement, is subjected to a high centrifugal force during winding in the shelter area if the latter has curved, in particular spiral-shaped, guide paths, as a result of which the curtain is subjected to a tension which stresses the projections of the lateral edges of the curtain and causes a high friction between these projections and the grooves of the guide paths during sliding of the curtain. This friction reduces the winding speed of the curtain and causes an uneven operation thereof, as well as the risk of subjecting the edges of the curtain to excessive stress which could cause damage to the curtain.

[0005] In order to solve these drawbacks, the subject of the invention is a roll-up door of the type defined in the attached claims.

[0006] In particular, each guide panel is carried by a respective support plate integral with said wall, with the possibility of relative displacement to and from the opposite guide panel.

[0007] By virtue of these characteristics, the distance between the two specular guide panels is adjustable to allow the curtain to adapt to the tension to which it is subjected, which allows the friction generated between the projections of the edges of the curtain and the paths defined by the guide panels during sliding of the curtain to be reduced, while the two support plates of the guide panels, which are anchored to the wall to which the portal structure is associated, remain stationary.

[0008] According to a preferred feature, each guide panel is mounted on the respective support plate in an elastic manner, to adjust automatically the distance between each guide panel and the respective support plate. In this manner, the distance between the two opposite guide panels adapts in a simple and automatic manner to adjust the tension of the curtain during its winding in the shelter area.

[0009] According to another preferred feature, a plurality of rods are fixed to each guide panel, which pass through respective through holes of the support plates, a return spring for returning the guide panel to a position adjacent to the respective support plate being associated with each of said rods.

[0010] Conveniently, each of said rods consists of the threaded shank of a screw having one end engaged in a threaded hole of the respective guide panel, said spring being interposed between the head of the respective screw and the support plate, on the side opposite to the guide panel with respect to the relative support plate. In this manner, both the opposite support panels carry a respective guide panel which can be moved elastically with respect to the relevant support plate.

[0011] According to yet another preferred feature, each guide panel has an integral structure obtained by milling a single solid panel, preferably of plastic material, so as to include the relative guide path and a seat for a respective control gear wheel for controlling the movement of the curtain. This makes it possible to make the structure of the guide panels inexpensive to be manufactured, and the operating efficiency of the door to be improved.

[0012] According to a further preferred feature, the seat of said control gear wheel is formed in each guide panel in its part most adjacent to said wall and furthest away from the upper crosspiece of said portal structure. By virtue of this configuration and to the position of the seats of the gear wheels, between each gear wheel and the respective guide rail of the curtain there is already a vertical space above the portal structure, which corresponds to a vertical section of the relevant guide path, which may facilitate re-entry of the projections of the lateral edges of the curtain in the event of their accidental escape from the guide rails, so that the shelter area of the curtain does not require additional space for this function, and its height dimension can be kept relatively compact.

[0013] Further characteristics and advantages of the invention will become more clear from the following detailed description, provided by way of non-limiting example and referred to the attached drawings in which:

Figure 1 is a schematic perspective view of a roll-up closure according to the invention in its lowered con-

figuration in which it closes a portal opening associated with a wall, there being a shelter area for the curtain above the portal structure,

Figure 2 is an enlarged perspective view of a detail of the shelter area of the curtain indicated by arrow II of Figure 1, a cover of this shelter area having been removed,

Figure 3 is a perspective view of a detail of the shelter area of the curtain from the side of arrow III of Figure 2,

Figure 4 is an enlarged perspective view of a detail indicated by arrow IV of Figure 1, which schematically shows its main elements,

Figure 5 is a side elevational view from the side of arrow V of Figure 2,

Figure 6 is a perspective view of a guide panel having a spiral-shaped guide path for the curtain,

Figure 7 is an elevational view from the side of arrow VII of Figure 6,

Figure 8 is a perspective view of another embodiment of a guide panel that defines a portion of a guide path of the curtain, and

Figure 9 is an enlarged perspective view of a detail indicated by arrow IX of Figure 3.

[0014] With reference to the figures, a roll-up closure according to the invention is indicated 10 as a whole. The roll-up closure 10, of the so-called "high speed sliding" type, allows a rectangular opening defined by a stationary portal structure 12 of a wall 13 to be closed by means of a flexible curtain 20, typically made of a plastic material or a plasticized textile material, which opening is delimited laterally by a pair of opposite vertical uprights 14, as well as above and below by a crosspiece 14 and by a base plane 18, respectively.

[0015] The curtain 20 has opposite lateral edges provided with projections 22 of substantially rigid plastic material, typically made like the teeth of a slide fastener so as to be close together and substantially in mutual contact. The projections 22, during the movement of the curtain 20, slide into the cavities of guide rails 24 associated with the uprights 14, the cross section of these cavities being shaped correspondingly to the projections 22.

[0016] Above the portal structure 12 there is a shelter area for the curtain 20, indicated by the reference numeral 26, in which the curtain 20 is stored in the open condition of the door 10. This shelter area 26 extends parallel to and above of the crosspiece 16, and its axial extension corresponds to the distance between the uprights 14.

[0017] The shelter area 26 is delimited, at its opposite axial ends, by a pair of guide panels 28 in each of which a respective guide path 30 is formed, the guide paths 30 of the two panels 28 being specular and opposed, and whose cross section corresponds to that of the cavity of the rails 24 to allow the projections 22 of the edges of the curtain 10 to slide.

[0018] Conveniently, each guide panel 28 has an integral structure obtained by milling a single solid block, preferably of plastic material. In particular, each guide panel 28 comprises the relevant guide path 30 which includes rectilinear portions 30a and 30b, respectively vertical and horizontal, which extend on opposite sides of a circular hollow seat 32a intended to rotatably accommodate a respective control gear wheel 32. The teeth of each gear wheel 32 are adapted to engage the recesses arranged between subsequent projections 22 of each lateral edge of the curtain 20, to control the movement of the latter in both directions, according to the direction of rotation of both gear wheels 32.

[0019] In particular, the seat 32a of the gear wheel 32 of a guide panel 28 is formed in its part intended to be arranged more adjacent to the wall 13 and farthest from the crosspiece 16 of the portal structure 12, that is in the highest part of each panel 28, in such a manner that the rectilinear portion 30a of the guide path, which extends between the respective guide rail 24 and the seat 32a, has a length such as to allow automatic retraction of the projections 22 of the lateral edge of the curtain 20 in the case of their accidental release from the rail 24 during the movement of the curtain 20, without requiring an additional height of the shelter area 26.

[0020] Although the preferred shape of the guide path 30 of the panels 28 is of the spiral type, as shown in Figures 2, 6 and 7, which also includes elliptical spiral configurations with the major axis oriented horizontally or vertically (not shown), the invention also extends to different configurations of the panels and of the relative guide path, such as for example to the configuration shown in Figure 8 which illustrates a panel 28a substantially including only the seat 32a and the vertical and horizontal sections 30a and 30b. In this case, a further rectilinear guide path (not shown), intended to be arranged vertically or horizontally, or of a different shape, can be connected to the horizontal section 30b of a panel 28a.

[0021] In the preferred case of a spiral guide path 30, it has a central part in which a through cavity 34a is formed for the purpose which will be clarified in greater detail in the description below.

[0022] Each guide panel 28, or 28a, is carried by a respective support plate 36 fixed or in any case made integral with the wall 13, with the possibility of relative displacement to and from the opposite guide panel 28 or 28a. In particular, each guide panel 28 or 28a is mounted on the respective support plate 36 in an elastic manner to allow the distance between the two opposite panels 28 or 28a, as well as the distance between each panel 28 or 28a and the respective support plate 36, to be automatically adjusted.

[0023] For this purpose, a plurality of parallel rods are fixed to each panel 28 or 28a, preferably in the form of screws 44, which extend towards the outside of the shelter area 26, therefore towards the support plate 36 of the respective guide panel 28 or 28a, so as to pass through respective through holes formed in the support plates 36. Each screw 44 has a threaded end which engages in a corresponding threaded hole of the panel 28 or 28a, and

is associated with a return spring 46 interposed between its head and the plate 36, so that the springs 46 of the various screws 44 tend to elastically urge each panel 28 or 28a towards a contact position with or adjacent to the respective plate 36.

[0024] An electric motor 34 is fixed to one of the two plates 36, in particular to the plate 36 located to the right with respect to the shelter area 26, with reference to the figures, for the actuation of the curtain 20 by means of the rotation of the control gear wheels 32. The electric motor 34 extends axially into the shelter area 26 and is conveniently positioned inside the cavity 34a of the guide path 30 if this has a spiral configuration, so as not to require additional space to arrange said motor.

[0025] The motion output shaft of the electric motor 34 extends beyond the respective plate 36 and a driving gear wheel 38 is coupled to it, which meshes with a chain 40 which is in turn engaged by a driven gear wheel 42 which is connected in rotation with one of the control gear wheels 32, both gear wheels 32 being mutually connected in rotation by a transmission shaft 33 which extends from one end to the other of the shelter area 26 of the curtain 20, above the upper crosspiece 16 of the portal structure 12.

Claims

1. High speed sliding roll-up door comprising a flexible curtain to close or open an opening of a wall (13) delimited by a portal structure (12) that includes a pair of lateral uprights (14) provided with hollow guide rails (24) for guiding the curtain (20), and an upper crosspiece (16), the curtain (20) having lateral edges provided with projections (22) the cross section of which corresponds to the cross section of the cavity of said guide rails (24), which projections (22) are adapted to be engaged by the teeth of respective control gear wheels (32) for controlling the movement of the curtain (20), the curtain (20) being intended to be received, in the open condition of the door (10), above the portal structure (12) in a shelter area (26) delimited, at the opposite axial ends, by a pair of specular guide paths (30, 30a, 30b) formed in respective guide panels (28; 28a),
characterized in that each guide panel (28; 28a) is supported by a respective support plate (36) fast to said wall (13), a possibility of relative movement being provided to and from the opposite guide panel (28; 28a).

2. Roll-up door according to claim 1, **characterized in that** each guide panel (28; 28a) is mounted on the respective support plate (36) in an elastic manner, in order to adjust automatically the distance between each guide panel (28; 28a) and the respective support plate (36).

3. Roll-up door according to claim 2, **characterized in that** a plurality of rods (44) are fixed to each guide panel (28; 28a), which rods pass through respective through holes of the support plates (36), a return spring (46) of the guide panel (28; 28a) for returning it towards a position adjacent to the respective support plate (36) being associated with each of said rods (44).

4. Roll-up door according to claim 3, **characterized in that** each of said rods consists of the threaded stem of a screw (44) having one end engaged in a threaded hole of the respective guide panel (28; 28a), said spring (46) being interposed between the head of the relevant screw (44) and the support plate (36), on the side opposite to the guide panel (28; 28a) with respect to the respective support plate (36).

5. Roll-up door according to any one of claims 1 to 4, **characterized in that** each guide panel (28; 28a) has an integral structure obtained by milling a single solid panel, preferably of plastic material, so as it comprises the respective guide path (30) and a seat (32a) of a respective control gear wheel (32) for controlling the movement of the curtain (20).

6. Roll-up door according to claim 5, **characterized in that** the seat (32) of said control gear wheel (32) is formed in each guide panel (28; 28a) in its part more adjacent to said wall (13) and farthest from the upper crosspiece (16) of said portal structure (12).

7. Roll-up door according to claim 6, **characterized in that** a portion of vertical path (30a) and a portion of horizontal path (30b) extend from the seat (32a) of said control gear wheel (32) at opposite sides of said seat (32).

8. Roll-up door according to claim 7, **characterized in that** said guide path (30) is spiral-shaped.

9. Roll-up door according to any one of claims 1 to 8, **characterized in that** said projections (22) are substantially rigid and project from both sides of the curtain (20), being fixed to the curtain (20) according to a close configuration similar to the teeth of a slide fastener, substantially in mutual contact.

10. Roll-up door according to claim 8 or 9, **characterized in that** said guide path (30) has a central hollow part (34a), an electric motor (34) fixed to the respective support plate (36) being arranged in the central hollow part (34a) of one of the guide panels (28; 28a), for driving in rotation said control gear wheels (32).

11. Roll-up door according to claim 8, **characterized in that** said electric motor (34) has an output shaft on which a driving gear wheel (38) is coupled, which

driving gear wheel meshes with a chain (40) that engages a driven gear wheel (42) connected in rotation with said two control gear wheels (32) by means of a transmission shaft (33) rotatably mounted above the upper crosspiece (16) of the portal structure (12).

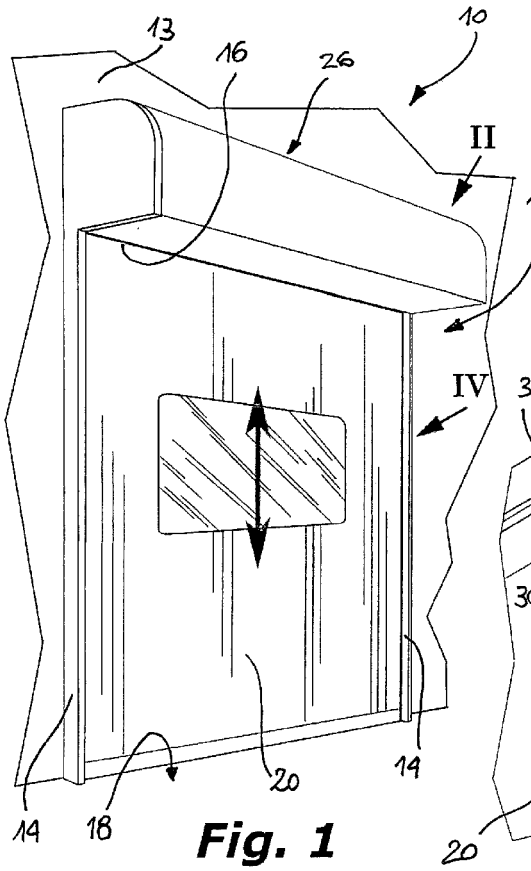


Fig. 1

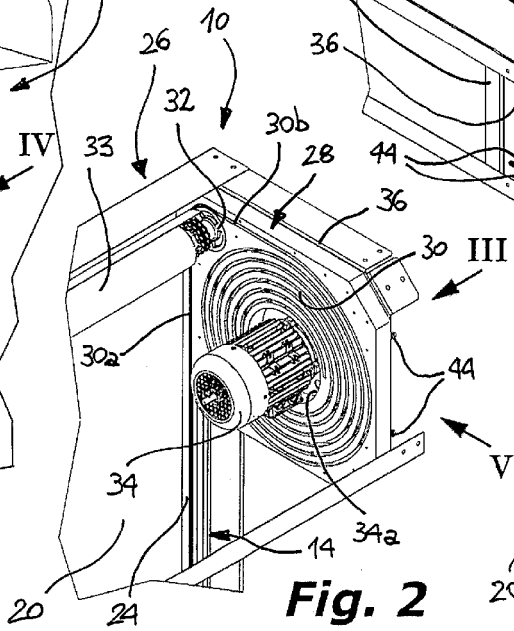
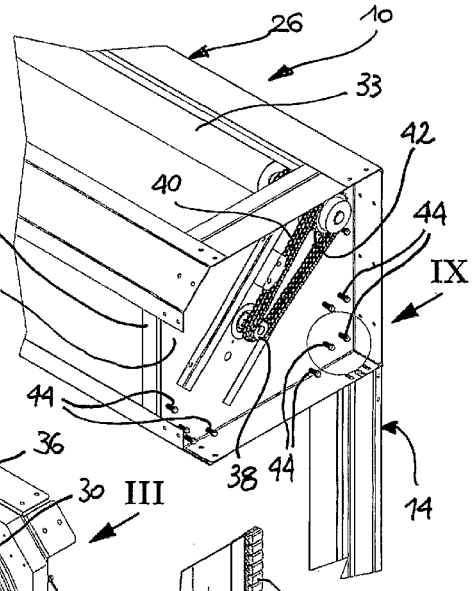


Fig. 2

Fig. 3



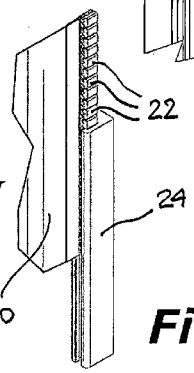


Fig. 4

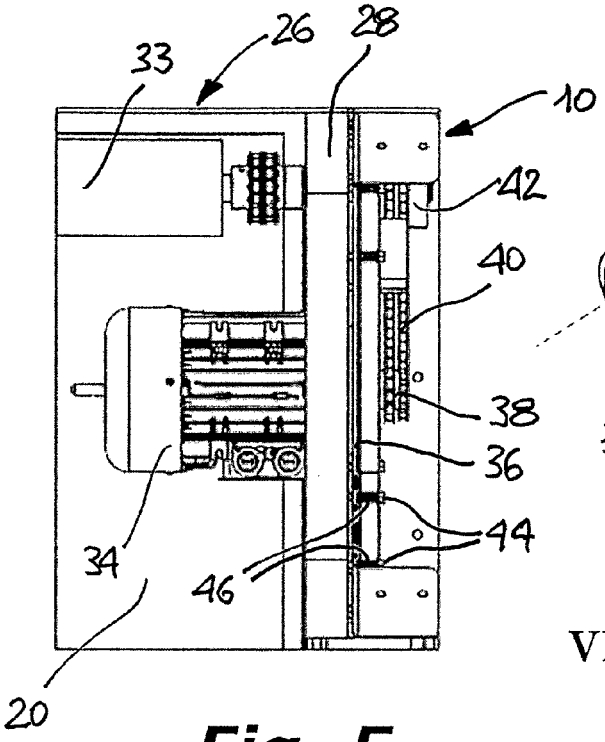


Fig. 5

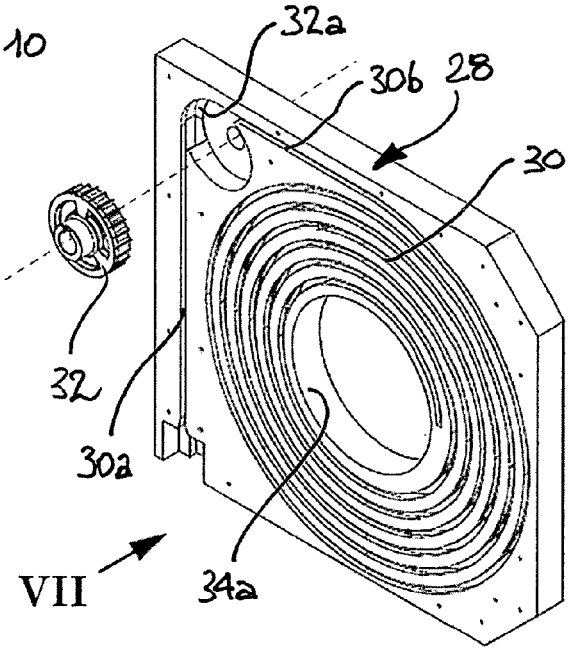


Fig. 6

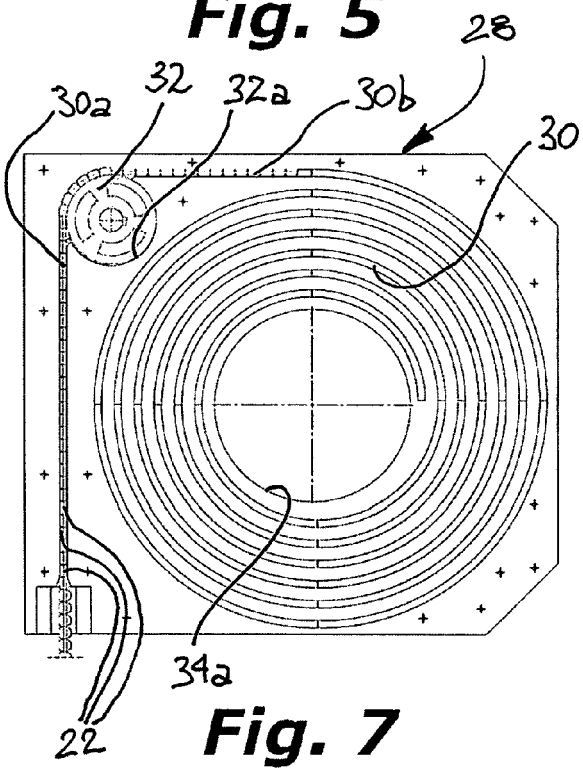


Fig. 7

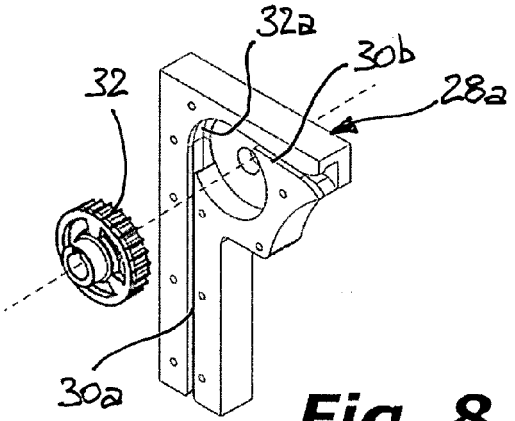


Fig. 8

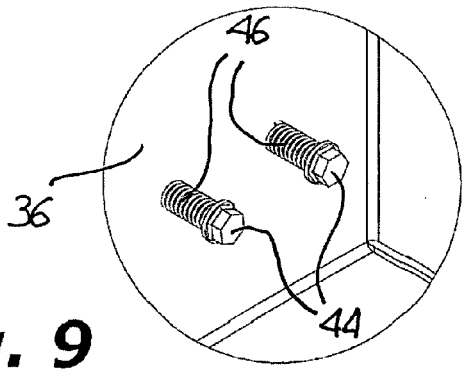


Fig. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 21 00 0148

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 A	US 2007/277942 A1 (DONDLINGER JASON [US] ET AL) 6 December 2007 (2007-12-06) * the whole document * -----	1,2 5-11 3,4	INV. E06B9/174 E06B9/13 E06B9/58 E06B9/68
Y A	WO 2010/101836 A2 (RITE HITE HOLDING CORP [US]; HARDISON CARL DAVID [US] ET AL.) 10 September 2010 (2010-09-10) * the whole document * -----	5-11 1-4	
A	US 2005/067118 A1 (COENRATES BENOIT [BE]) 31 March 2005 (2005-03-31) * the whole document * -----	1-11	
A	US 2014/345812 A1 (CASEY NICHOLAS J [US] ET AL) 27 November 2014 (2014-11-27) * paragraphs [0002] - [0005], [0075]; figures 20-22 * -----	1-11	
A	US 2011/146920 A1 (MAZEJ ANDREJ [SI] ET AL) 23 June 2011 (2011-06-23) * the whole document * -----	1-11	
A	US 2011/108214 A1 (KOMATSU AKIO [JP] ET AL) 12 May 2011 (2011-05-12) * paragraph [0002]; figures 5-7, 14-16 * -----	1-11	

TECHNICAL FIELDS SEARCHED (IPC)
E06B
E05D
E05G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 October 2021	Altamura, Alessandra

CATEGORY OF CITED DOCUMENTS

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18-10-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007277942 A1	06-12-2007	US 2007277942 A1	06-12-2007
		US 2011067307 A1	24-03-2011
WO 2010101836 A2	10-09-2010	AU 2010221571 A1	25-08-2011
		BR PI1009222 A2	15-03-2016
		CN 102348863 A	08-02-2012
		EP 2404021 A2	11-01-2012
		NZ 594439 A	20-12-2013
		US 2010218431 A1	02-09-2010
		WO 2010101836 A2	10-09-2010
US 2005067118 A1	31-03-2005	AR 037431 A1	10-11-2004
		AU 2002347225 A1	17-06-2003
		BE 1014506 A3	04-11-2003
		DK 1454027 T3	01-08-2016
		EP 1454027 A1	08-09-2004
		ES 2575920 T3	04-07-2016
		JP 4512366 B2	28-07-2010
		JP 2005511927 A	28-04-2005
		MY 136303 A	30-09-2008
		PT 1454027 E	23-06-2016
		TW 552345 B	11-09-2003
		US 2005067118 A1	31-03-2005
		WO 03048498 A1	12-06-2003
US 2014345812 A1	27-11-2014	NONE	
US 2011146920 A1	23-06-2011	DE 102009044492 A1	19-05-2011
		US 2011146920 A1	23-06-2011
US 2011108214 A1	12-05-2011	CN 102052049 A	11-05-2011
		KR 20110050366 A	13-05-2011
		KR 20130087458 A	06-08-2013
		TW 201135042 A	16-10-2011
		US 2011108214 A1	12-05-2011

EPO FORM P0459

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2010101836 A **[0004]**