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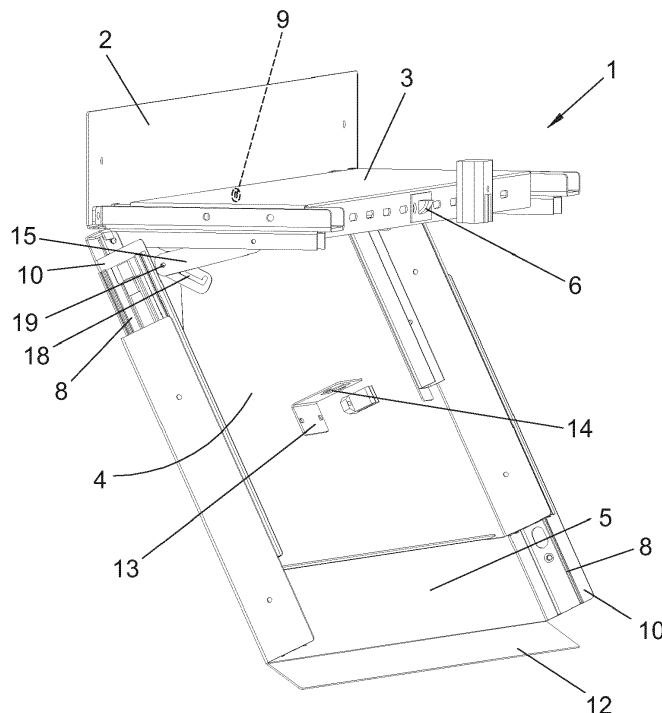
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(54) **A safety toe guard for lifts**

(57) A safety toe guard for lifts that prevents people from falling into the shaft of a lift that comprises: one fixing surface (2) joined to the base of the lift cabin and to a bridge structure (3), said bridge structure (3) is located perpendicular to said fixing surface (2); an initial section (4) and a final section (5) joined together by guiding means. The initial section is joined to the bridge structure (3) by at least one hinged bracket (7), allowing the fold-

ed/unfolded of the sections (4,5) with regard to the bridge structure (3). The safety toe guard (1) comprises a folded position, in which sections (4,5) are gathered in a horizontal position, wrapped around the bridge structure (3) and parallel to the base of the lift cabin arranged; and an unfolded position, in which sections (4, 5) are fully extended and vertical with regard to the floor of the lift cabin.



**FIG. 2b**

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**Description****OBJECT OF THE INVENTION**

[0001] The object of the present invention refers to a safety toe guard for lifts the configuration and design of which improve its manoeuvrability and use.

[0002] It is particularly applicable in the lift industry area.

**TECHNICAL PROBLEM TO BE SOLVED AND BACKGROUND OF THE INVENTION**

[0003] Currently, lift regulations require, to prevent falls of users into the lift shaft when it is stopped anomalously between floors: breakdown, power cut, etc., that a vertical safety toe guard is installed across the entire width of the cabin base to prevent said falls into the shaft.

[0004] For this reason, this metal vertical safety toe guard, fixed to the cabin base has by Regulations a minimum vertical height of 750 mm, and sufficient rigidity to withstand horizontal forces from 300 N on any point on its surface.

[0005] To make this safety toe guard compatible with the lift operation, the height of the lift shaft must be such that when the lift cabin is at its lowest level and with its buffers compressed, the bottom edge of the vertical toe guard is at an obligatory distance from the floor of the lift pit and, above all, does not collide with it in order not to be damaged.

[0006] In lifts installed in new buildings, the pit height, among other things, is designed to be compatible with the vertical height of the safety toe guard. However, in existing buildings is often impossible to obtain this necessary height, so it is necessary to use retractable articulated toe guards so that the height when the safety toe guard is in folded position (standby), is compatible with the pit height and that, when the cabin is stopped outside the floor level and there is a need to rescue people shut inside the lift cabin, a rescue protocol is activated that starts by unlocking and unfolding the safety toe guard in its vertical position so that the minimum vertical safety height of 750 mm is operative.

[0007] The safety toe guard object of the invention has a configuration and design that clearly minimises, with respect to currently known systems, the minimum pit height necessary for this element and that also offers a very simple adaptation to any cabin on the market. Additionally, it simplifies currently known mechanisms, resulting in reducing costs and that at the same time makes it easier for the operator to use.

**DESCRIPTION OF THE INVENTION.**

[0008] The present invention refers to a safety toe guard for lifts that prevents people from falling into the lift shaft when it is immobilised between two floors.

[0009] To do so, the safety toe guard comprises at

least: a fixing surface attached at one end to the base of the lift cabin, and at the other end to a bridge structure, wherein said bridge structure is located perpendicular to said fixing surface remaining under the base of the lift cabin; an initial section and a final section, joined together by guiding means, to be able to move between each other; the initial section is linked to the bridge structure by at least one hinged bracket, preferably two hinged brackets, where one of the ends of the hinged brackets is fixed to the bridge structure and the other end to the initial section, with said brackets allowing the folding/unfolding, with an angular rotation of 90°, of the sections with respect to the bridge structure.

[0010] It has been foreseen that the safety toe guard comprises two positions: a folded position, in which the sections, through retaining means, are gathered in a horizontal position, wrapped around the bridge structure and laid out parallel to the base of the lift cabin; and an unfolded position in which the sections are fully extended and in a vertical position with regard to the floor of the lift cabin.

[0011] In a preferred embodiment of the invention, the retaining means are a latch, located on the bridge structure, and a support located in the initial section, wherein said support comprises a hole in which said latch is inserted. However, said retaining means may be of any other type.

[0012] Moreover, the safety toe guard comprises a cable transmission system operated from a lock with obligatory triangular key, accessible from the outside of the fixing surface to unlock the retaining means that keep the sections in the horizontal folded position and enable the unfolding of the sections to the vertical unfolded position. The locking of latch in the support is done automatically by an elastic snap.

[0013] The initial and final sections comprise side walls, so that the guiding means of the initial section comprise telescopic guides located on the outside of the side walls, while the final section comprises supplementary telescopic guides located on the inside of the side walls, to move telescopically between each other.

[0014] The hinged brackets include:

- a first plate, articulated at one end to the bridge structure, and at the other end to a second plate via a common connecting shaft,
- the second plate, is articulated at one end to the first section, and by the other end to the first plate by said common connecting shaft, and
- a third plate which comprises an angled slot, hinged at one end to a corner of at least one hinged bracket, and at the other end to the common connecting shaft with the first and the second plate,
- wherein the common connecting shaft moves through the angled slot.

[0015] The hinged brackets have two positions of use:

- a locking position, automatic, in which the first plate and the second plate are fully aligned with one another, wherein the common connecting shaft is fitted in an elbow of the angled slot, so that, in this position, the hinged bracket folding cannot be folded, and
- an unlocking position, manual, in which the first plate and the second plate are not aligned with each other, where the common connecting shaft is now not fitted into the elbow of the angled slot, so that, in this position, the hinged bracket can be folded.

**[0016]** According to another possible particular embodiment of the hinged bracket, said hinged bracket comprises the first plate and the second plate joined by the common connecting shaft, wherein said first plate comprises a tab, as a stop, to fix the first plate and the second plate when they are fully aligned between each other.

**[0017]** Once the sections have been unfolded and are vertical (perpendicular with regard to the floor of the lift cabin base), the locking position allows said sections to be in vertical fixed position, even applying a horizontal force of 300 N at any point of the surface, so ensuring the preventing people from falling into the shaft.

**[0018]** Additionally, in the case of needing to reduce the height of the initial section and the final section due to space problems for coupling the safety toe guard under the base of the cabin, the possibility of incorporating at least one intermediate section between the initial and final sections exists for the unfolded safety toe guard to reach the minimum height required by Regulations. At least one intermediate section comprises side walls with telescopic slides, with said telescopic guides located on the inside and the outside of said side walls, to be located and telescopically move between the initial section and the final section.

**[0019]** The final section comprises a chamfered end, as established by the Regulations, which helps the operator to accompany the fall of the sections by hand.

**[0020]** The fact that the final section and the intermediate section are arranged in front of the initial section allows them to be controlled and manipulated directly from the lift landing.

### BRIEF DESCRIPTION OF THE FIGURES

**[0021]** To complete the description and in order to help to get a better understanding of the characteristics of the invention, this descriptive report is accompanied by, as an integral part thereof, a set of drawings where in an illustrative and not restrictive manner, the following has been represented:

Figure 1 shows the safety toe guard for the lift in unfolded and operating position, i.e., with the sections fully extended and in vertical position with regard to the floor of the lift cabin.

Figure 2a shows the safety toe guard for the lift in folded and non-operating position, i.e., with the sec-

tions gathered in horizontal position, laid out parallel to the base of the lift cabin.

Figure 2b shows the safety toe guard for the lift in partially unfolded position.

Figure 2c shows the safety toe guard for the lift in operating position, fully unfolded and vertical with respect to the floor of the lift cabin.

**[0022]** A list of the various elements represented in the figures that integrate the invention is provided below:

1. Safety toe guard.
2. Fixing surface to the base of the lift cabin.
3. Bridge structure.
4. Initial Section.
5. Final section.
6. Retractable latch.
7. Hinged brackets.
8. Telescopic guides.
9. Lock with obligatory triangular key.
10. Side walls of the sections.
11. Intermediate section.
12. Chamfered end.
13. Support for the latch.
14. Hole of the support.
15. First plate.
16. Second plate.
17. Third plate.
18. Angled slot.
19. Common connecting shaft.

### DETAILED DESCRIPTION

**[0023]** The safety toe guard (1) for lifts object of the invention has a configuration and design that allow improving its manoeuvrability and therefore its use compared to currently existing ones, in addition to lowering costs in its manufacturing. It also allows the space occupied by said safety toe guard (1) in the standby position, i.e., folded, to be reduced to the maximum, so allowing smaller pit heights and easy attachment to any cabin in the market.

**[0024]** The safety toe guard (1) prevents people falling down the lift shaft when it is immobilised between two floors. This can happen when the occupants of the lift have to be evacuated due to a malfunction of it.

**[0025]** Said safety toe guard (1) is positioned vertically at the bottom of the lift cabin, more specifically under the cabin door, from the floor of the cabin downwards. The width of the safety toe guard (1) is similar to that of the cabin door and the vertical length after unfolding this safety toe guard (1) has to be at least the length required by regulations.

**[0026]** The safety toe guard (1) for lifts comprises at least:

- one fixing surface (2) joined at one end to the base of the lift cabin, and at the other end to a bridge struc-

ture (3), wherein said bridge structure (3) is located perpendicular to said fixing surface (2) which is under the base of the lift cabin,

- an initial section (4) and a final section (5) joined together by guiding means, wherein both sections (4, 5) comprise side walls (10), so that the guiding means of the initial section (4) comprise telescopic guides (8) located on the outside of the side walls (10), while the final section (5) comprises supplementary telescopic guides (8) located on the inside of the side walls (10), to move telescopically between each other,
- the initial section (4) is joined to the bridge structure (3) by means of two hinged brackets (7), wherein one end of the hinged brackets (7) is fixed to the bridge structure (3) and the other end to the initial section (4), allowing said hinged brackets (7) to fold/unfold, with an angular rotation of 90°, of sections (4, 5) with respect to the bridge structure (3),

wherein the safety toe guard (1) for lifts comprises two positions:

- a folded, non-operating position, occupying very little space, in which the sections (4, 5), through retaining means, are gathered in a horizontal position, wrapped around the bridge structure (3) and arranged parallel to the base of the lift cabin, and
- an unfolded and operating position, in which the sections (4, 5) are fully extended and in vertical position with regard to the floor of the lift cabin.

**[0027]** As can be seen in the figures, the guiding means mentioned are preferably telescopic guides (8). However, the guiding means may be of any other type.

**[0028]** Each hinged bracket (7) comprises:

- a first plate (15), articulated at one end to the bridge structure (3), and at the other end to a second plate (16) through a common connecting shaft (19),
- the second plate (16), articulated at one end to the initial section (4) and at the other end to the first plate (15) through said common connecting shaft (19), and
- a third plate (17), that comprises an angled slot (18), articulated at one end to the corner of the hinged brackets (7) and by the other end to the common connecting shaft (19) with the first plate (15) and the second plate (16), wherein the common connecting shaft (19) moves through the angled slot (18). The hinged brackets (7) have two positions of use:
- a locking position, automatic, in which the first plate (15) and the second plate (16) are fully aligned with one another, wherein the common connecting shaft (19) is fitted in the elbow of the angled slot (18), so that, in this position, the hinged bracket (7) cannot be folded, and
- an unlocking position, manual, in which the first plate (15) and the second plate (16) are not aligned with

each other, where the common connecting shaft (19) and is not now fitted in the elbow of the angled slot (18), so that, in this position, the hinged bracket (7) can be folded.

**[0029]** According to another possible particular embodiment of the hinged bracket (7), said hinged bracket (7) comprises the first plate (15) and the second plate (16) joined by the common connecting shaft (19), wherein said first plate (15) comprises a tab, as a stop for fixing the first plate (15) and the second plate (16) when they are fully aligned between each other.

**[0030]** When the sections are unfolded and left in vertical position (perpendicular with respect to the floor of the base of the lift cabin), the locking position allows said sections to remain in fixed position and even applying a force of 300 N, the sections continue to be vertical, ensuring preventing people from falling into the shaft.

**[0031]** Additionally, the safety toe guard (1) comprises a cable transmission system operated from a lock with obligatory triangular key (9), where the operator, through said lock with obligatory triangular key (9) accessible from the outside of the fixing surface (2) unlocks the retaining means, so allowing the safety toe guard (1) to go from its folded and non-operating horizontal position (standby) to the fully unfolded and operative position. Said retaining means are, preferably a latch (6), located on the bridge structure (3), and a support (13), located in the initial section (4), where said support (13) comprises a hole (14) where said latch (6) is introduced.

**[0032]** For the lift to work normally, obviously, the safety toe guard (1) should be in the folded position, and for this the latch (6) must be locked in the hole (14) of the support (13) so that the sections are maintained together with the bridge structure (3) in the folded and horizontal position.

**[0033]** However, when the lift stops between floors and people have to be rescued from the cabin, the operator must change the position of the safety toe guard (1) to the unfolded position. To do this, the operator is responsible for unlocking the latch (6) of the support (14) by rotating the lock with obligatory triangular key (9). Logically, when the latch (6) of the support (14) is unlocked, thanks to the hinged brackets (7), the sections are unfolded, and arranged in a vertical position. Then the operator helps the telescopic movement of the sections, and the sections become locked in that vertical position, due to the locking position of the hinged brackets (7).

**[0034]** After the rescue operation is over, the operator has to leave the safety toe guard (1) in the folded position for the lift to be able to work again in normal operation. The change of position from unfolded to folded (gathering of sections) must be cabin ried out from the lift pit, as indicated by current regulations, for which the hinged brackets (7) are manually unlocked, until they are gathered and horizontal, parallel to the floor of the lift cabin. Again, thanks to the locking of the latch (6) in the support (13), the safety toe guard (1) will remain in the folded

position.

**[0035]** The joints between the fixing surface (2) to the base of the lift cabin, and the bridge structure (3), or the joints of the hinged brackets (7) to the bridge structure (3) and to the initial section (4) are made in a conventional manner, such as screws, etc.

**[0036]** In a preferred embodiment, the safety toe guard (1) for lifts comprises an initial section (4) and a final section (5). However, in the case of having to reduce the height of the initial section (4) and of the final section (5) due to problems of space for connecting the safety toe guard (1) under the lift cabin base, the possibility exists for incorporating at least one intermediate section (11), between the initial (4) and final (5) sections, so that the unfolded safety toe guard (1) obtains the minimum height required.

**[0037]** As can be seen in the figures, the final section (5) comprises a chamfered end (12) as established by the Regulations, which helps the operator when accompanying the fall of the section by hand.

**[0038]** At least one intermediate section (11), which also comprises a side wall (10) comprises telescopic guides (8) located on the inside and the outside of said side wall (10) to be able to move telescopically between the initial section (4) and the final section (5).

**[0039]** As can be seen in Figure 2c, the width of the sections increases progressively from the initial section (4) to the final section (5), which is because the telescopic guides (8) are located on the outside of the side walls (10) of the initial section (4). Additionally, the operator can accompany the fall of the sections by hand, and thus manually control the positioning of the sections and therefore using stops and/or buffers to prevent possible noises and knocks as in current systems is not necessary. The telescopic guides (8) are responsible for abutting and limiting the spreading out of the safety toe guard (1).

**[0040]** In current systems, the sections are very heavy or are not accessible and therefore the falling movement of the safety toe guard (1) cannot be controlled, and the use of auxiliary devices is necessary (buffers, pulleys, etc.), which prevent an excessive knocking when the safety toe guard (1) is unfolded.

**[0041]** The fact that the end section (5) and the intermediate section (11) are arranged ahead of the opening section (4) allows them to be controlled and manipulated directly from the lift landing.

**[0042]** The present invention should not be limited to the embodiment described herein. Other configurations may be made by experts in this field in light of the present description. Accordingly, the scope of the invention is defined by the following claims.

## Claims

1. A safety toe guard (1) for lifts that prevents people from falling into the shaft of a lift **characterised in**

**that it comprises at least:**

- one fixing surface (2) joined at one end to the base of the lift cabin, and at the other end to a bridge structure (3), wherein said bridge structure (3) is located perpendicular to said fixing surface(2) remaining under the base of the lift cabin,

- an initial section (4) and a final section (5) joined together by guiding means, to be able to move between each other,

- the initial section (4) is joined to the bridge structure (3) by at least one hinged bracket (7), wherein one of the ends of the at least one hinged bracket (7) is fixed to the bridge structure (3) and the other end to the initial section (4), allowing said at least one hinged bracket (7) to fold/unfold the sections (4, 5) with regard to the bridge structure (3),

wherein the safety toe guard (1) for lifts comprises two positions:

- a folded position, in which sections (4,5), through retaining means, are gathered in a horizontal position, wrapped around the bridge structure (3) and parallel to the base of the lift cabin arranged, and

- an unfolded position, in which sections (4, 5) are fully extended and vertical with regard to the floor of the lift cabin.

2. The safety toe guard (1) for lifts according to claim 1, **characterised in that** the sections (4, 5) comprise side walls (10), so that the guiding means of the initial section (4) comprise telescopic guides (8) situated on the outside of the side walls (10), while the final section (5) comprises the complementary telescopic guides (8) situated on the inside of the side walls (10), so that they can telescopically move between each other.

3. The safety toe guard (1) for lifts according to claim 1, **characterised in that** it comprises a cable transmission system activated from a lock with obligatory triangular key (9) accessible from the outside of the fixing surface (2) to unlock the retention means, changing from the folded to the unfolded position.

4. The safety toe guard (1) for lifts according to claim 3, **characterised in that** the retaining means is a latch (6) located on the bridge structure (3), and a support (13), located on the initial section, where said support (13) comprises a hole (14) in which said latch is entered (6).

5. The safety toe guard (1) for lifts according to claim 1, **characterised in that** the at least one hinged bracket (7) comprises:

- a first plate (15), articulated at one end to the bridge structure (3), and at the other end to a second plate (16) through a common connecting shaft (19),
  - the second plate (16) is hinged at one end to the initial section (4) and at the other end to the first plate (15) via said common connecting shaft (19), and
  - a third plate (17) comprising an angled slot (18), hinged at one end to a corner of the at least one hinged bracket (7) and by the other end to the common connecting shaft (19) with the first plate (15) and the second plate (16), where the common connecting shaft (19) moves through the angled slot (18).
6. The safety toe guard (1) for lifts according to claim 5, **characterised in that** the at least one hinged bracket (7) has:
- a locking position, in which the first plate (15) and the second plate (16) are fully aligned with one another, where the common connecting shaft (19) is fitted into an elbow of the angled slot (18), so that, in this position, the hinged bracket (7) cannot be folded, and
  - an unlocking position in which the first plate (15) and the second plate (16) are not aligned with each other, where the common connecting shaft (19) is disengaged from the elbow of the angled slot (18), so, in this unlocked position, the hinged bracket (7) folds.
7. The safety toe guard (1) for lifts according to claim 1, **characterised in that** the at least one hinged bracket (7) comprises a first plate (15) joined by a common connecting shaft (19) to a second plate (16), where said first plate (15) comprises a tab, as a stop, to fix the first plate (15) and the second plate (16) when they are fully aligned together.
8. Safety toe guard (1) for lifts according to claim 5 or 7, **characterised in that** once the sections (4,5) have been unfolded and are in the vertical position, the locking position maintains said sections (4,5) in a fixed position withstanding forces up to 300 N, preventing people from falling.
9. Safety toe guard (1) for lifts according to any of the previous claims, **characterised in that** it comprises two hinged brackets (7).
10. Safety toe guard (1) for lifts according to any one of the preceding claims, **characterised in that** it comprises at least one intermediate section (11) that comprises side walls (10) with telescopic guides (8), with said telescopic guides (8) located inside and outside said side walls (10) to be located and move telescopically between the initial section (4) and the final section (5).
11. Safety toe guard (1) for lifts according to claim 10, **characterised in that** the end section (5) and the intermediate section (11) are located in front of the initial section (4) to be controlled and handled from a lift landing.

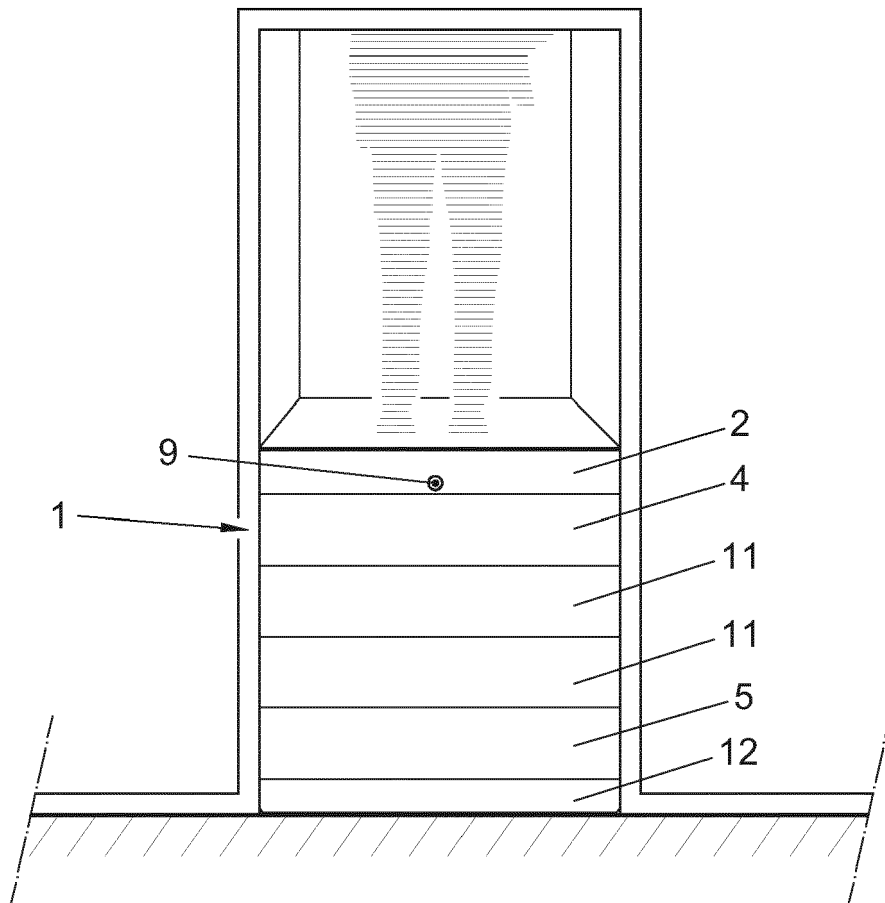


FIG. 1

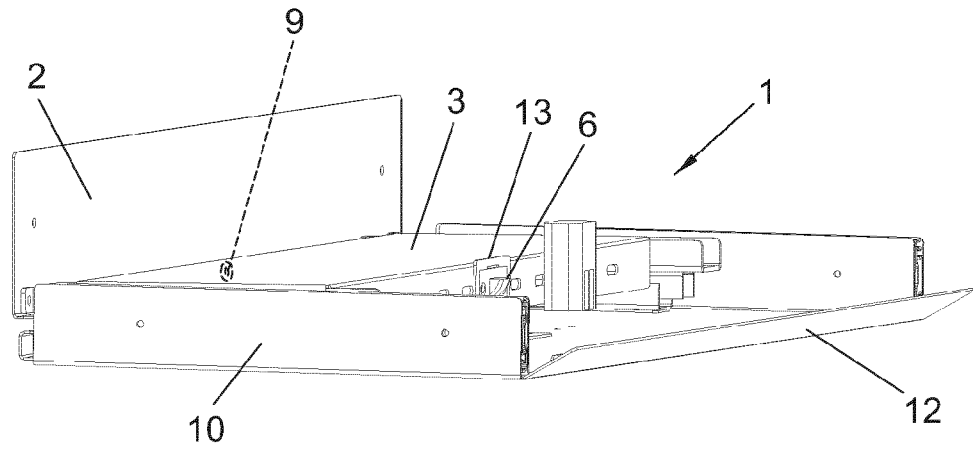


FIG. 2a

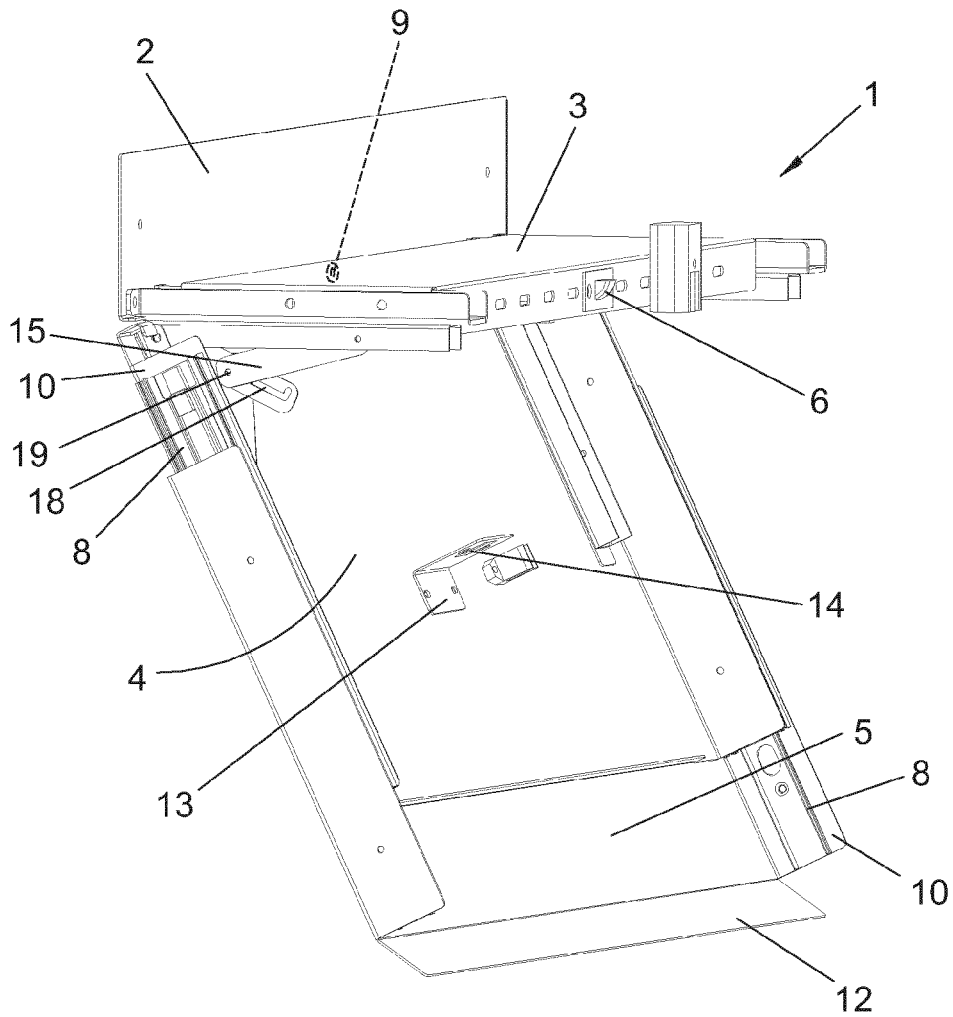


FIG. 2b

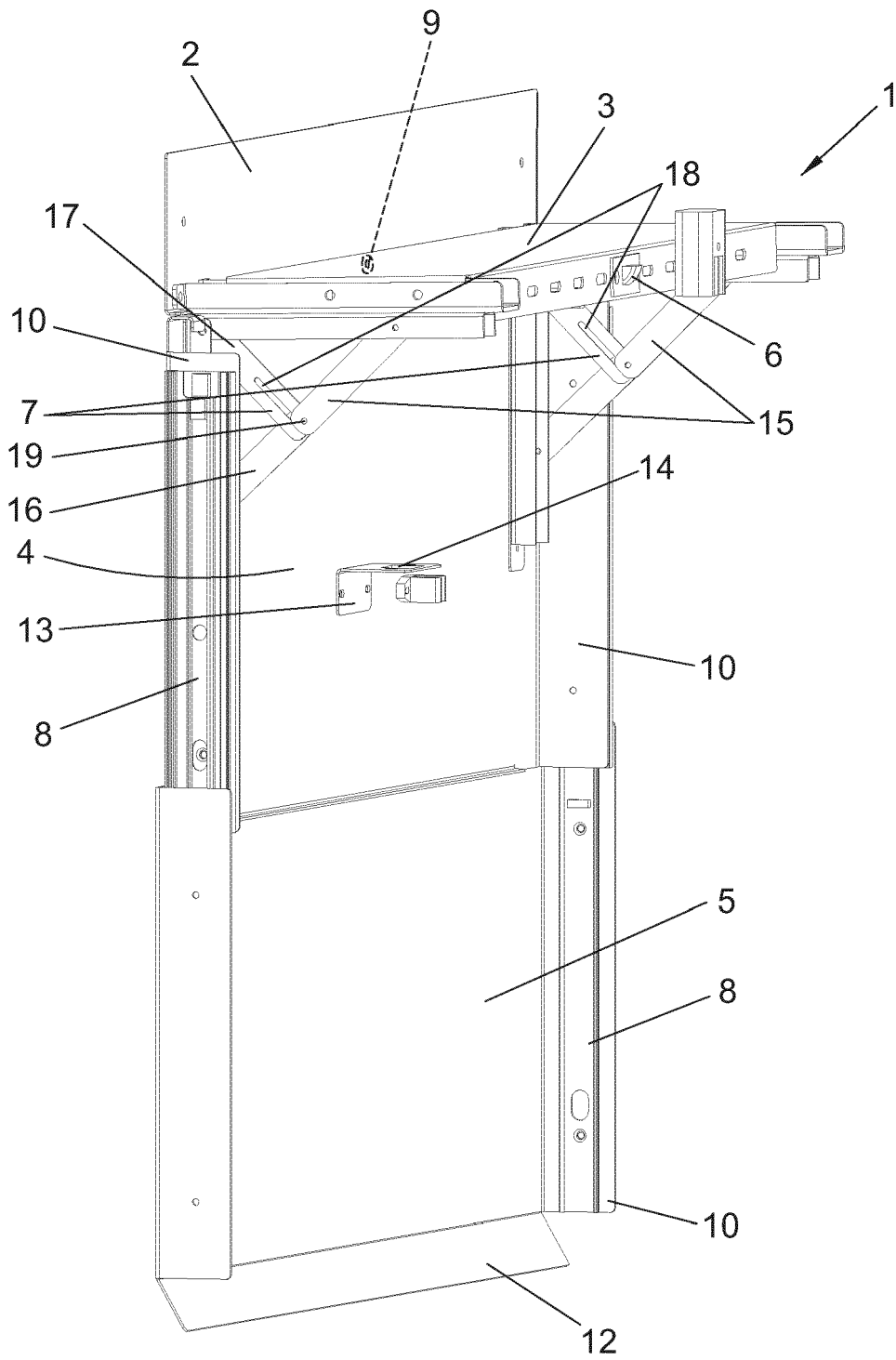


FIG. 2c



EUROPEAN SEARCH REPORT

Application Number  
EP 15 16 1873

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y A	EP 2 308 789 A1 (PRUDHOMME SAS [FR]) 13 April 2011 (2011-04-13) * abstract * * paragraph [0006] - paragraph [0058] * * figures 1-7 *	1,7-10 2-6,11	INV. B66B13/28
Y A	----- WO 02/10053 A1 (SELCOM SPA [IT]; GIORGIONI PAOLO [IT]) 7 February 2002 (2002-02-07) * abstract * * page 2, line 12 - page 4, line 3 * * figures 1-5 * -----	1,7-10 2-6,11	
			TECHNICAL FIELDS SEARCHED (IPC)
			B66B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 25 February 2016	Examiner Dijoux, Adrien
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	

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

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25-02-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2308789 A1	13-04-2011	EP 2308789 A1 FR 2951148 A1	13-04-2011 15-04-2011
-----	-----	-----	-----
WO 0210053 A1	07-02-2002	AU 4681301 A IT PR20000014 U1 WO 0210053 A1	13-02-2002 28-01-2002 07-02-2002
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