

(19)



(11)

EP 4 497 649 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
29.01.2025 Bulletin 2025/05

(51) International Patent Classification (IPC):
B61D 19/02 (2006.01) B61D 49/00 (2006.01)

(21) Application number: **23306281.9**

(52) Cooperative Patent Classification (CPC):
B61D 19/02; B61D 49/00

(22) Date of filing: **25.07.2023**

(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 ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

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(54) **SYSTEM FOR ASSEMBLING A DOORFRAME IN A DOOR OPENING OF A STRUCTURAL PART OF A RAILWAY VEHICLE**

(57) An assembling system (10) for assembling a doorframe (18) in a door opening (20) of a structural part (22) of a railway vehicle, comprising a holding device (12) intended to hold the doorframe (18). The assembling system (10) comprises a positioning reference plate

(14) intended to be adjustably mounted on the structural part (22) near to the door opening (20), the holding device (12) and the positioning reference plate (14) comprising complementary solidarizing means (34).

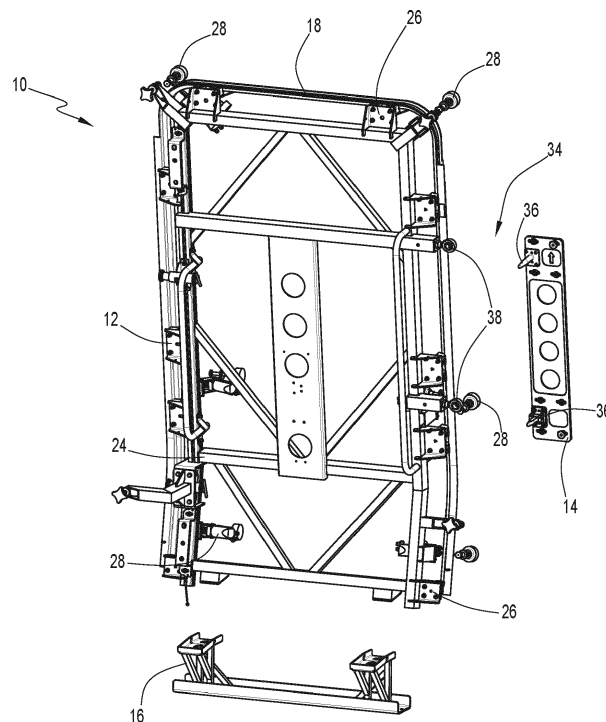


FIG.1

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Description

[0001] The present invention relates to a system for assembling a doorframe in a door opening of a structural part of a railway vehicle.

[0002] Usually, a doorframe is assembled by gluing to the structural part. To this end, the doorframe is held by a holding device which is connected to the structural part to hold the doorframe during the drying of the glue.

[0003] This is a complex operation, because the holding device have to be precisely adjusted while the doorframe is provided with glue.

[0004] The invention is intended to allow an easy and precise positioning of the doorframe during gluing.

[0005] To this end, the invention relates to an assembling system for assembling a doorframe in a door opening of a structural part of a railway vehicle, comprising a holding device intended to hold the doorframe, characterized in that the assembling system comprises a positioning reference plate intended to be adjustably mounted on the structural part near to the door opening, the holding device and the positioning reference plate comprising complementary solidarizing means.

[0006] The reference plate allows making a reference position of the holding device. Thus, the holding device is precisely set in position, then the reference plate saves this position, so the holding device can be removed from the door opening for applying the glue on the doorframe, and the holding device is then put back on the same precise position by having the complementary solidarizing means solidarizing the holding device with the plate.

[0007] This system is particularly adapted for railway vehicle where the doorframes are mounted from the interior of the railway vehicle.

[0008] A system according to the invention may contain any of the following features, taken alone or in any technically possible combination.

- The complementary solidarizing means comprise at least two pins protruding from one of the holding device or the positioning reference plate, and at least two complementary openings arranged in the other of the holding device or the positioning reference plate.
- One of the pins is connected to the plate or holding device via a pivot.
- The pins are arranged on the plate and the holes are arranged in the holding device.
- The positioning reference plate comprises elongated holes extending in horizontal direction, intended to receive screws for the adjustable mounting on the structural part.
- The assembling system comprises a base support, the holding device being intended to rest on the base support.
- The holding device comprises a main frame, holding parts intended to hold the doorframe, and adjustment parts intended to precisely adjust the position

of the holding device in the door opening and to maintain it into position.

[0009] The invention also relates to a method for assembling a doorframe in a door opening of a structural part of a railway vehicle, using an assembling system as specified above, comprising the following steps:

- adjustably mounting the plate on the structural part, the plate being movable relating to the structural part,
- arranging the doorframe on the holding device,
- bringing the holding device into the door opening, and having the holding device solidarized with the plate by means of the solidarizing means,
- adjusting the holding device position in the door opening,
- fixing the position of the plate,
- removing the holding device from the door opening,
- applying glue on the doorframe,
- having the holding device back in the door opening, and having the holding device solidarized with the plate.

[0010] Preferentially, the positioning reference plate comprises elongated holes extending in horizontal direction, intended to receive screws for the adjustable mounting on the structural part, the plate being adjustably mounted on the structural part with screws not tighten, and the plate being fixed in position by tightening the screws.

[0011] Several aspects and advantages of the invention will be enlightened in the following disclosure, given only as a non-limitative example, and made in reference to the attached figures, in which:

- Figure 1 shows a perspective view of an assembling device according to an example of embodiment of the invention;
- Figure 2 shows a perspective view of a positioning reference plate of the assembling device of Figure 1;
- Figure 3 shows a perspective view of a door opening intended to receive a doorframe assembled with the assembling device.

[0012] Figure 1 shows an assembling system 10 according to an example of embodiment of the invention.

[0013] The assembling system 10 comprises a holding device 12, a positioning reference plate 14 and a base support 16.

[0014] The holding device 12 is intended to hold a doorframe 18 in order to assemble it in a door opening 20 of a structural part 22 (shown on Figure 3) of a railway vehicle.

[0015] The holding device 12 classically comprises a main frame 24, holding parts 26 intended to hold the doorframe 18, and adjustment parts 28 intended to precisely adjust the position of the holding device 12 in the

door opening 20 and to maintain it into position.

[0016] The holding parts 26 and the adjustment parts 28 are classical and they will not be disclosed more in details.

[0017] The base support 16 is intended to be placed at a lower part of the door opening 20. The holding device 12 is intended to rest on the base support 16, at a height that is imposed by the base support 16. In other words, the vertical position of the holding device 12 is simply set by placing the holding device on the base support 16.

[0018] The reference plate 14 is intended to be adjustably mounted on the structural part 22, near the door opening 20, as shown on figure 3.

[0019] To this end, the positioning reference plate 14 comprises elongated holes 30 extending in horizontal direction when the plate 14 is arranged on the structural part 22, each elongated hole 30 being intended to receive a respective screw 32 for the adjustable mounting on the structural part 22.

[0020] The structural part 22 comprises holes for receiving the screws 32. When the screws 32 are not tightened, the plate 14 can move horizontally, in the limit of the horizontal size of the elongated holes 30.

[0021] The holding device 12 and the positioning reference plate 14 comprise complementary solidarizing means 34.

[0022] The complementary solidarizing means 34 comprises at least two pins 36a, 36b protruding from one of the holding device 12 or the positioning reference plate 14, and at least two complementary openings 38 arranged in the other of the holding device 12 or the positioning reference plate 14. In the example shown, the pins 36a, 36b are arranged on the plate 14 and the openings 38 are arranged in the holding device 12, for example each in a respective bar fixed on the main frame 24.

[0023] When each pin 36a, 36b is in the corresponding opening 38, the holding device 12 and the plate 14 are bind in a horizontal direction perpendicular to a pin direction, and parallel to the elongated holes 30.

[0024] Preferentially, one of the pins 36b is connected to the plate 14 via a pivot 37 having an axis parallel to the direction of elongation of the elongated holes 30.

[0025] The reference plate 14 also preferentially comprises an indicator 40 of the upper end of the plate 14, so that the plate can be arranged in a predefined direction.

[0026] A method for assembling the doorframe 18 in the door opening 20 will now be disclosed.

[0027] In a first step, the plate 14 is adjustably mounted on the structural part 22, near the door opening 20, with the screws 32 not tightened. The holes in the structural part 22 receiving the screws 32 are set at a predefined height.

[0028] As indicated before, the vertical position of the holding device 12 depends only of the base support 16. Thus, the height of the holes in the structural part 22 is predefined knowing the height of the openings 38 of the holding device 12 when the holding device 12 rests on the

base support 16.

[0029] It is reminded that the plate 14 stays horizontally movable along the elongated holes 30 when the screws are not tightened.

[0030] In another step, before or after the step above, the doorframe 18 is arranged on the holding device 12.

[0031] Then, the holding device 12 is brought into the door opening 20, and it is put down on the base support 16.

[0032] The holding device 12 is solidarized with the plate 14 by means of the complementary solidarizing means 34. In other words, the pins 36 are inserted in the corresponding openings 38.

[0033] At this stage, the vertical position of the holding device 12 is set by the base support 16, and the horizontal position parallel to the elongated holes 30 is still free since the screws 32 are not tightened.

[0034] The position of the holding device 12 is then adjusted in the door opening 20 in a classical way, using the adjustment parts 28 in a known manner. This adjustment aims to precisely adjust to position of the doorframe 18 relating to the door opening.

[0035] When the doorframe 18 is in a good position, the position of the plate 14 is fixed by tightening the screws 32. When the screws 32 are tightened, the horizontal position of the plate 14, therefore also the horizontal position of the holding device 12, are fixed.

[0036] Then the holding device 12 can be removed from the door opening 20.

[0037] In a next step, a glue is applied on the doorframe 18.

[0038] In a next step, the holding device 12 is set back in the door opening 20. The holding device 12 is positioned at the same position as the previously set position, because the vertical position is the same because of the base support 16, and the horizontal position is the same when the holding device 12 is solidarized again with the plate 14.

[0039] Thus, there is no need to search for the good position at this stage, because this good position was previously found.

[0040] Because of the system of the invention, the doorframe 18 is easily and quickly set into position while being provided with glue.

Claims

1. A assembling system (10) for assembling a doorframe (18) in a door opening (20) of a structural part (22) of a railway vehicle, comprising a holding device (12) intended to hold the doorframe (18), **characterized in that** the assembling system (10) comprises a positioning reference plate (14) intended to be adjustably mounted on the structural part (22) near to the door opening (20), the holding device (12) and the positioning reference plate (14) comprising complementary solidarizing means (34).

2. The assembling system (10) of claim 1, wherein the complementary solidarizing means (34) comprise at least two pins (36a, 36b) protruding from one of the holding device (12) or the positioning reference plate (14), and at least two complementary openings (38) arranged in the other of the holding device (12) or the positioning reference plate (14). 5
3. The assembling system (10) of claim 2, wherein one of the pins (36b) is connected to the plate (14) or holding device (12) via a pivot (37). 10
4. The assembling system (10) of claim 2 or 3, wherein the pins (36a, 36b) are arranged on the plate (14) and the openings (38) are arranged in the holding device (12). 15
5. The assembling system of any of preceding claims, wherein the positioning reference plate (14) comprises elongated holes (30) extending in horizontal direction, intended to receive screws (32) for the adjustable mounting on the structural part (22). 20
6. The assembling system (10) of any of preceding claims, comprising a base support (16), the holding device (12) being intended to rest on the base support (16). 25
7. The assembling system (10) of any of preceding claims, wherein the holding device (12) comprises a main frame (24), holding parts (26) intended to hold the doorframe (18), and adjustment parts (28) intended to precisely adjust the position of the holding device (12) in the door opening (20) and to maintain it into position. 30
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8. A method for assembling a doorframe (18) in a door opening (20) of a structural part (22) of a railway vehicle, using an assembling system (10) according to any of the preceding claims, comprising the following steps: 40
 - adjustably mounting the plate (14) on the structural part (22), the plate (14) being movable relating to the structural part (22), 45
 - arranging the doorframe (18) on the holding device (12),
 - bringing the holding device (12) into the door opening (20), and having the holding device (12) solidarized with the plate (14) by means of the solidarizing means (34), 50
 - adjusting the holding device (12) position in the door opening (20),
 - fixing the position of the plate (14), 55
 - removing the holding device (12) from the door opening (20),
 - applying glue on the doorframe (18),
 - having the holding device (12) back in the door opening (20), and having the holding device (12) solidarized with the plate (14).
9. The method of claim 8, wherein the positioning reference plate (14) comprises elongated holes (30) extending in horizontal direction, intended to receive screws (32) for the adjustable mounting on the structural part (22), the plate (14) being adjustably mounted on the structural part (22) with screws (32) not tighten, and the plate (14) being fixed in position by tightening the screws (32).

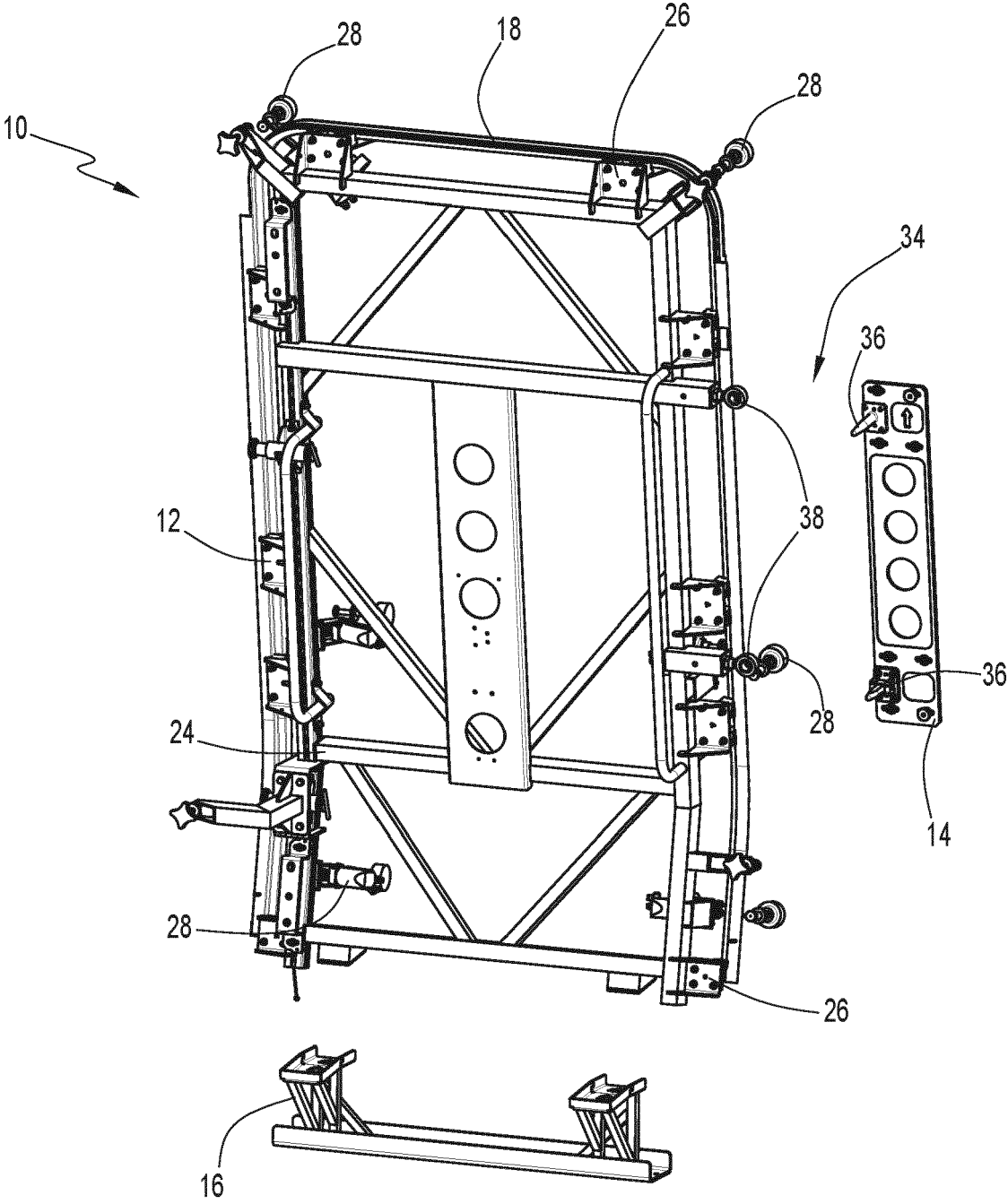


FIG.1

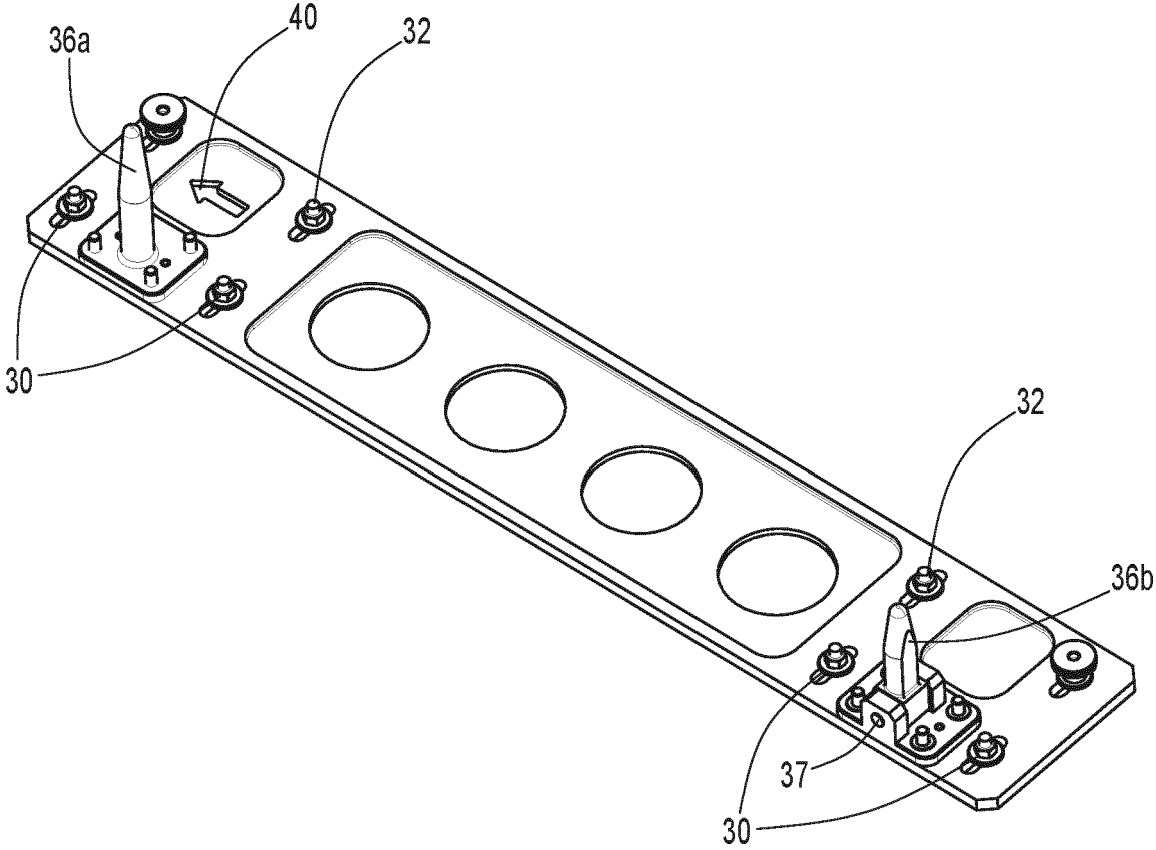


FIG.2

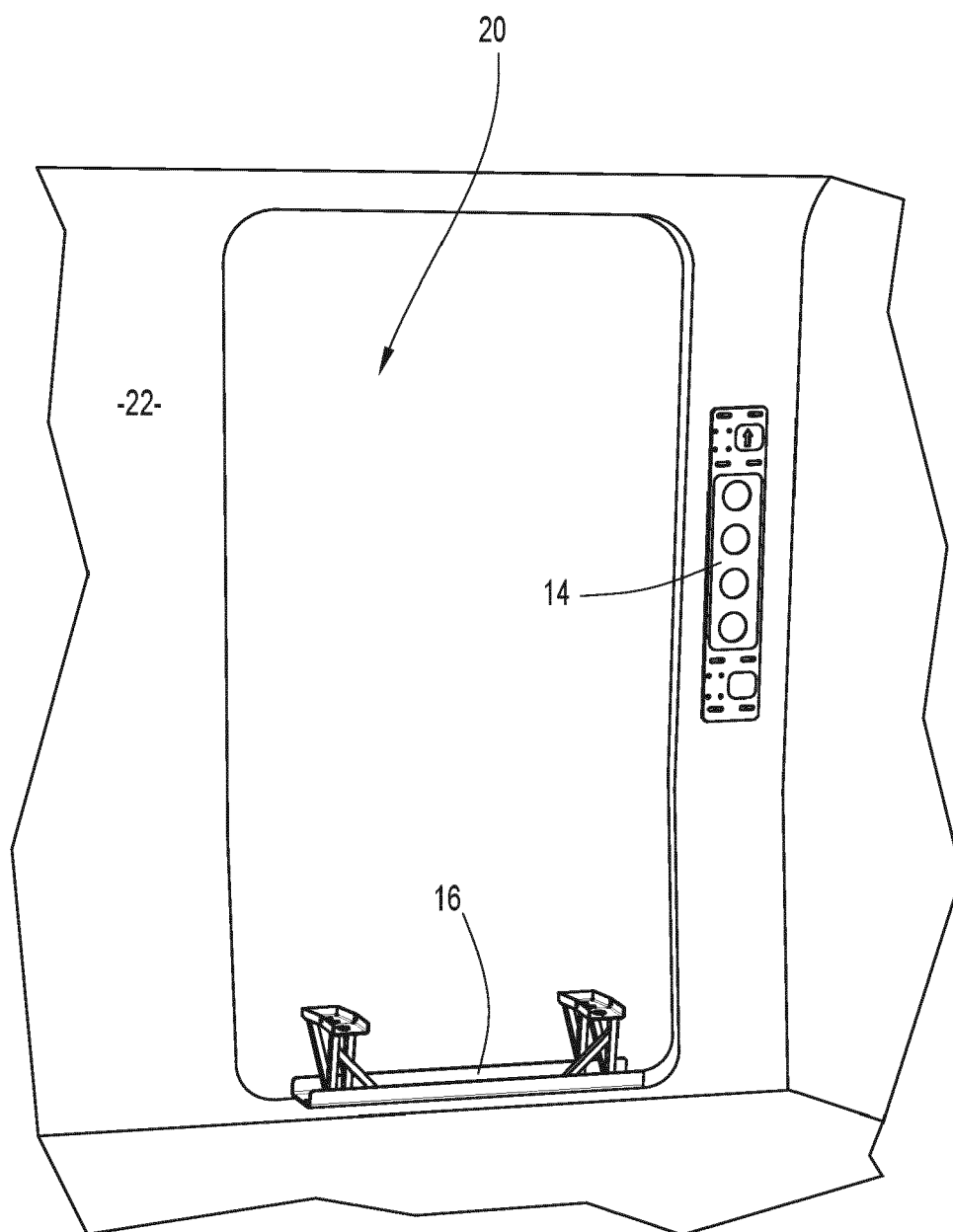


FIG.3



EUROPEAN SEARCH REPORT

Application Number

EP 23 30 6281

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	CN 108 406 647 B (TIANJIN ZHITONG INFORMATION SYSTEM INTEGRATION CO LTD) 28 April 2023 (2023-04-28) * figures 1, 5 *	1-9	TECHNICAL FIELDS SEARCHED (IPC) B61D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 November 2023	Examiner Denis, Marco
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.

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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
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