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(54) ELEVATOR SHAFT

(57) Elevator shaft (10), comprising

- a plurality first, in particular horizontal, beams (11),
 - a plurality second, in particular vertical, beams (12),
 - a plurality of panels (13), each located in a window between the plurality of beams (11, 12),

wherein the plurality of panels (13) and the plurality of beams (11, 12) (not exclusively) constituting side walls (14) of the shaft,

wherein a rubber gasket (20) arranged at least between one of the beams (11, 12) and one of panel (13).

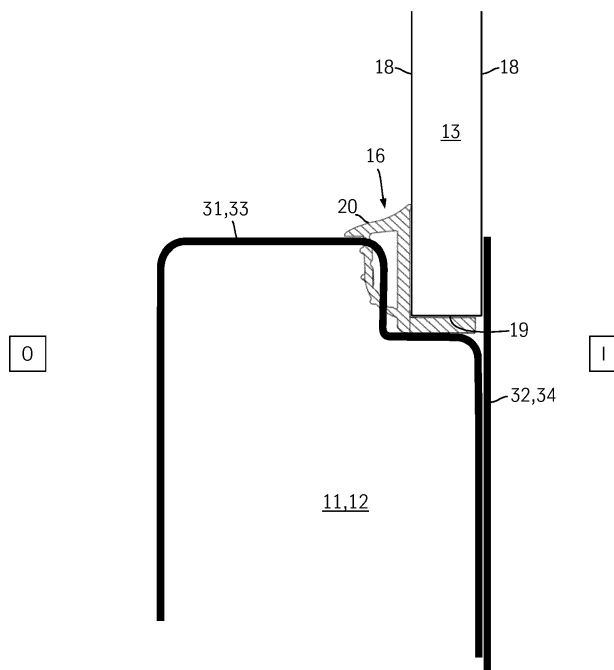


Fig. 3

Description

[0001] The invention refers to an elevator shaft and a method of manufacturing this shaft.

[0002] European patent application 16 161 691.7 (not published yet) shows a elevator shaft a method of manufacturing the same. The shaft is built up by a number of beams. Panels can be attached to the beams. Usually a gap between the elevator shaft structure and the panels is sealed by an adhesive sealant.

[0003] In particular the sealant is to be applied to the outer side of the elevator shaft (the weather side), however the outer side may be difficult to access due to narrow installation space.

[0004] It is the object of the invention to provide an improved elevator shaft. The object of the invention is solved by an elevator shaft and a method according to the main claims; preferred embodiments are subject of the subclaims and the description.

[0005] The inventive elevator shaft comprises

- a plurality of first, in particular horizontal, beams,
- a plurality of second, in particular vertical, beams,
- a plurality of panels (13), each located in a window between the plurality of beams.

The plurality of panels and the plurality of beams constitute side walls of the shaft. "Constituting" means in this context, that the side wall comprises these components and may comprise other components (not mentioned here) as well. A **rubber gasket is** arranged at least between one of the beams and one of the panels.

[0006] The rubber gasket provides the capability of sealing a gap between the components of the shaft without the need to use any adhesive sealer like silicon sealant. The gasket can be fitted simply to the beams and the panel, material pollution by the sealant is reduced.

[0007] Preferably one of the beams comprises

- a **first**, in particular outer, **bracket** and
- a **second**, in particular inner, **bracket**, separate to the first bracket.

The first bracket and the second bracket forms a **receiving slot**, wherein the panel is partially accommodated within said receiving slot (15). The slot in particular extends parallel to a main direction of the respective Brackets and/or the respective beam. In particular that the rubber gasket is partially accommodated within said receiving slot.

[0008] Preferably the rubber gasket comprises a **spring section**. The spring section is compressed between one of said brackets and the panel. In particular the spring section is compressed between one of the outer brackets and a side face of the panel. The spring section is in particular elastically deformable. The spring section may provide a holding force to hold the gasket in between the panel and the one of the beams, in particular within the receiving slot or with a gap between the panel and one of the brackets. The spring section may compensate variations in the dimension of the panel and/or the brackets.

[0009] Preferably the rubber gasket comprises a roof section. A gap between the panel and one of the brackets is covered by the roof section. In particular the roof section has an overlapping extension, which is partially covering the respective panel. The roof section may be adapted to avoid any flow of water into the gap between the gasket and the brackets. Further the roof section may have a similar appearance as a silicone sealing.

[0010] Preferably the rubber gasket comprises a **transverse plane section**. The transverse plane is adapted to contact a circumferential edge of the panel. The circumferential edge of the panel and the transverse plane may have complementary surfaces, in particular planar surfaces. The transverse plane may be pressed between the circumferential edge and the beam, so that the gasket is securely fixed by the panel itself.

[0011] Preferably the rubber gasket comprises **parallel plane section**. The parallel plane section is adapted to contact a side face of the panel, thus in particular providing a defined attachment between the plane side face and the gasket. The parallel plane section may be of a planar shape, i.e. complementary shaped to the side face of the panel.

[0012] Preferably, the elevator shaft is adapted to provide one or more of the following features:

- the spring section is located parallel to the first second section;
- the transversal plane section is located rectangular to the parallel plane section;
- the parallel plane section is located adjacent to the roof section;
- that the spring section is located adjacent to the roof section;
- that the spring section and/or the parallel plane section is located between the roof section and the transversal plane section.

[0013] Preferably the rubber gasket is glued to the panel. This is in particular for the purpose of prefixing the gasket

to improve easy manufacturing; a durable fixation is in particular established by clamping the gasket between the panel and the beam.

[0014] The inventive Method comprising the following method steps:

- providing a plurality of first brackets of the beams attached to each other,
- subsequently attaching a panel and a rubber gasket to the first brackets,
- subsequently attaching a plurality of second brackets of the beams to the first brackets.

[0015] Fixing the panels and the gasket is thus a integral part of manufacturing the structure of the elevator shaft. By attaching the gasket between the panel and the brackets, the spacing between the panels and the beams are already sealed, without the need of using an adhesive sealant.

[0016] Preferably the rubber gasket is prefixed, in particular glued, to the panel prior to attaching the panel to the first brackets.

[0017] Preferably the rubber gasket, in particular a spring section of the rubber gasket, is compressed during attaching the panel to the brackets and/or during attaching the second brackets to the first brackets.

[0018] Preferably no adhesive sealer is used to seal a spacing between the beams and the panel. Any adhesive between the gasket and panel is not suitable to seal a spacing between beams and panel; consequently this is according to the invention not considered as an adhesive sealer.

[0019] The invention is described in more detail with the help of the attached figures; it shows:

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|----------|--|
| figure 1 | an inventive elevator shaft in perspective view; |
| figure 2 | the beams of the shaft of figure 1 in exploded view; |
| figure 3 | the attachment of a panel and the shaft beams in the shaft of figure 1 in cross section; figures 4 and 5 |
| figure 6 | the components of figure 3 separately; |
| figure 6 | method steps in the process of manufacturing the inventive elevator of figure 1. |

[0020] Figure 1 shows an inventive elevator shaft. The elevator shaft comprises a plurality of first, vertical beams 11 and second, horizontal beams 12, which constitute mechanically carrying parts of the shaft 10. The beams 11, 12 are arranged in a foursquare formation and form windows there between, in which panels are embedded. In particular the panels 13 are glass panels 13 made of glass or other transparent material; alternatively the panels 13 may be of nontransparent material. In some positions a door assembly 17 may be installed of instead of panels 13. The beams 11, 12, the panels 13, and in some instances the door assemblies 17 form a sidewall 14 (here four sidewalls) of the elevator shaft 10. In this elevator shaft 10 a non-shown elevator cabin can travel in a vertical direction V.

[0021] Figure 2 shows details of the elevator shaft 10. Each beam 11, 12 comprise a number of brackets 31 to 34. Each first, horizontal beam 11 has a first, horizontal outer bracket 33 and a second, horizontal inner bracket 34. Each second, vertical beam 12 has a first, vertical outer bracket 31 and a second, vertical inner bracket 32. The terms "inner" and "outer" indicates the relative orientation of the brackets with respect to the inner area I and outer area of the shaft, which are marked in the figures 3 to 6. Vertically adjacent vertical beams 11 are connected to each other by means of a connecting bracket 35. The brackets of one beam are fixed to each other by means of hooks of screws. The horizontal beams are fixed to the vertical beams by means of hooks or screws.

[0022] The panel 13 has a (main) side face 18 and a circumferential edge 19.

[0023] In the following reference is made to figures 3 to 5. Figure 3 shows the arrangement of the brackets 31 to 34 and the panels 13 in cross section and fixed together in the shaft 10. Figures 4 and 5 shows the components separately. The shape of the cross sections is in main similar for the bracket 31, 32 of the first vertical beams 11 as well as the brackets 33, 34 for the second vertical beams 12. So figure 3 is valid for both kinds of beams 11, 12.

[0024] Here the first bracket 31, 33 are fixed to the second brackets 32, 34 in particular by a hooked or screwed connection. In the area of the circumferential edge 19 the brackets 31 - 34 are shaped to form a receiving slot 15 for the edge panel, which is in particular also arranged circumferentially around the panel 13. The receiving slot 15 is formed in particular by a first parallel surface 37 at the first bracket 31, 33 and a second parallel surface 38 at the second bracket 32, 34. The parallel surfaces 37, 38 are parallel to the side face 18 of the panel 13. Further a transverse surface 36 at least one of the brackets (here exemplary at the first bracket 11, 12), which is arranged parallel to the circumferential border 19 of the panel 13. It is preferred that the transverse surface 36 is provided at that bracket (here 31, 33), which is attached earlier to the panel 13 than the other bracket (here 32, 34).

[0025] Between the outer bracket (here the first brackets 31, 33) and the panel a rubber gasket 20 is provided to seal a gap 16 between the panel 13 and the beam 11, 12. The rubber gasket 20 as several sections:

[0026] A transversal plane section 21, which is parallel to the circumferential edge 19: The first, transversal section 21 may glued to the edge 19 before the panel 13 is attached to on the brackets 31-34.

[0027] A parallel plane section 22, which is parallel to the side face 18. The parallel plane section may be glued to the

side face 18.

[0028] A spring section 23 is arranged parallel to the parallel plane section 22. The spring section 23 is adapted to be compressed during manufacturing between the side face and one of the brackets, here first bracket 31, 33. The compression produces a resilient clamping of the gasket 20 between in the slot 15, which keeps the panel 13 in place. In main the spring section is spaced apart from the parallel plane section 22 to enable deformation of the spring section. The spring section may have protrusions on its bracket facing surface. This protrusions 25 locally increase the surface pressure, thus increasing the holding force of the gasket 20 against the bracket 31, 33. The springs section 23 comprises on its other side, facing the parallel plane section 22, cutouts 26. These cutouts 26 selectively increases flexibility of the spring section 23.

[0029] A roof section 24, covering a gap 15 between the panel 13 and the first bracket 31, 33. The roof section 24 connects the parallel plane section 22 with the spring section 23. In the direction of the bracket 31, the roof section has an overlapping extension 24o, which prevents an access of water into the gap area between the bracket and the spring section 23.

[0030] Figure 6 illustrates method steps during manufacturing the elevator shaft 10. At first several first brackets 31a, 31b, 33c are connected to each other to form a window. Figure 6 shows exemplarily a first bracket 31a of an upper beam 12a, a first beam 31b of a lower beam 12b and in the background in dotted lines a first bracket 33c of a vertical beam 11c, in a cross sectional according to section line VI-VI of figure 1. Highlighted are also the respective transversal surfaces 36a, 36b 36c and the first parallel surfaces 37a, 37b, 37c of the first brackets 31a, 31b, 33c.

[0031] In a subsequent step (arrow A) the panel 13 is attached to the first bracket 31a, 31b, 33c. Here a number of gasket (only tow 20a and 20b are shown) are already prefixed to the panel 13 as described above e.g. by gluing. Thus the spring sections 23 of the gaskets 20 get in contact with the respective first parallel surfaces 37a, 37b, 37c of the first brackets 31a, 31b, 33c. Additionally the transversal surfaces 36a, 36b 36c of the gaskets 20 get in contact with the transverse surfaces 36a, 36.

[0032] In a subsequent step (arrows B) the second brackets 32a, 32b 34c of the respective beam 12a, 12b, 11c are attached to the respective first brackets 31a, 31b 33c of the respective beam 12a, 12b, 11c. The second beams are fixed e.g. by hooks or screwed connection. Consequently the panel 13 is pressed by the second brackets against the first brackets.

[0033] The panels 13 are attached to brackets from the inside I of the shaft. This is advantageous, since the shaft may be located in a narrow environment; so access to the shaft from the outside can not be ensured at all positions. In particular the shaft may be located in a building shaft, which is merely slightly larger than the elevator shaft. Attaching a panel from the outside 0 is completely impossible.

List of reference signs

[0034]

- 10 elevator shaft
- 11 first, vertical beam
- 12 second, horizontal beam
- 13 panel, in particular glass panel
- 14 side wall
- 15 receiving slot
- 16 gap
- 17 door assembly
- 18 side face of panel
- 19 circumferential edge of panel
- 20 rubber gasket
- 21 transverse plane section
- 22 parallel plane section
- 23 spring section
- 24 roof section
- 24o overlapping extension
- 25 protrusion
- 31 first, vertical outer bracket
- 32 second, vertical inner bracket
- 33 first, horizontal outer bracket
- 34 second, horizontal inner bracket
- 35 connecting bracket

- 36 transverse surface
 37 first parallel surface
 38 second parallel surface
 V vertical direction

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Claims

1. Elevator shaft (10), comprising

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- a plurality of first, in particular horizontal, beams (11),
- a plurality of second, in particular vertical, beams (12),
- a plurality of panels (13), each located in a window between the plurality of beams (11, 12),

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wherein the plurality of panels (13) and the plurality of beams (11, 12) constituting side walls (14) of the shaft, **characterized by**
 a **rubber gasket (20)** arranged at least between one of the beams (11, 12) and one of the panels (13).

2. Elevator shaft (10) according to the preceding claim,

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characterized in,
that one of the beams (11, 12) comprises

- a **first**, in particular outer, **bracket (31, 33)** and
- a **second**, in particular inner, **bracket (32, 34)**, separate to the first bracket (31, 33), wherein the first bracket (31, 33) and the second bracket (32, 34) forms a **receiving slot (15)**,

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wherein the panel (13) is partially accommodated within said receiving slot (15).

3. Elevator shaft (10) according to the preceding claim,

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characterized in,
that the rubber gasket (20) is partially accommodated within said receiving slot (15).

4. Elevator shaft (10) according to any claims 2 or 3,

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characterized in,
that the rubber gasket (20) comprises a **spring section (24)**,
 wherein the spring section (24) is compressed between one of said brackets (31-34) and the panel (13),
 in particular wherein the spring section (24) is compressed between one of the outer brackets (31, 33) and a side face (18) of the panel (13).

5. Elevator shaft (10) according to any of the preceding claims,

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characterized in,
that the rubber gasket (20) comprises a **roof section (24)**
 wherein a **gap (16)** between the panel (13) and one of the brackets (31-34) is covered by the roof section (24),
 in particular wherein the roof section (24) has an overlapping extension (24o), partially covering the respective panel (31,33).

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6. Elevator shaft (10) according to any of the preceding claims,

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characterized in,
that the rubber gasket (20) comprises a **transverse plane** section (21),
 wherein the transverse plane section (21) contacting a circumferential edge (19) of the panel (13).

7. Elevator shaft (10) according to any of the preceding claims,

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characterized in,
that the rubber gasket (20) comprises **parallel plane section (22)**,
 wherein the parallel plane section (22) contacting a side face (18) of the panel (13).

8. Elevator shaft (10) according to any of claims 4 to 7,

characterized in,

- **that** the spring section (23) is located parallel to the first second section (22), and/or
- **that** the transversal plane section (21) is located rectangular to the parallel plane section (21), and/or
- **that** the parallel plane section (22) is located adjacent to the roof section (22), and/or
- **that** the spring section (23) is located adjacent to the roof section (22), and/or
- **that** the spring section (23) and/or the parallel plane section (22) is located between the roof section (24) and the transversal plane section (21).

9. Elevator shaft (10) according to any of the preceding claims,
characterized in,

that the rubber gasket (20) is glued to the panel (13).

10. Method of manufacturing an elevator shaft (10) according to any of the preceding claims, comprising the following method steps:

- providing a plurality of first brackets (31, 33) of the beams (11, 12) attached to each other,
- subsequently attaching a panel (13) and a rubber gasket (20) to the first brackets (31, 33),
- subsequently attaching a plurality of second brackets (32, 34) of the beams (11, 12) to the first brackets (31, 33).

11. Method according to the preceding claim,

wherein the rubber gasket (20) is prefixed, in particular glued, to the panel (13) prior to attaching the panel (13) to the first brackets (31, 33).

12. Method according to claim 10 or 11,

wherein the rubber gasket (20), in particular a spring section (24) of the rubber gasket (20), is compressed during attaching the panel (13) and/or during attaching the second brackets (32, 34) to the first brackets (31, 33).

13. Method according to any of claims 10 to 12,

wherein no adhesive sealer is used to seal a spacing between the beams (11, 12) and the panel (13).

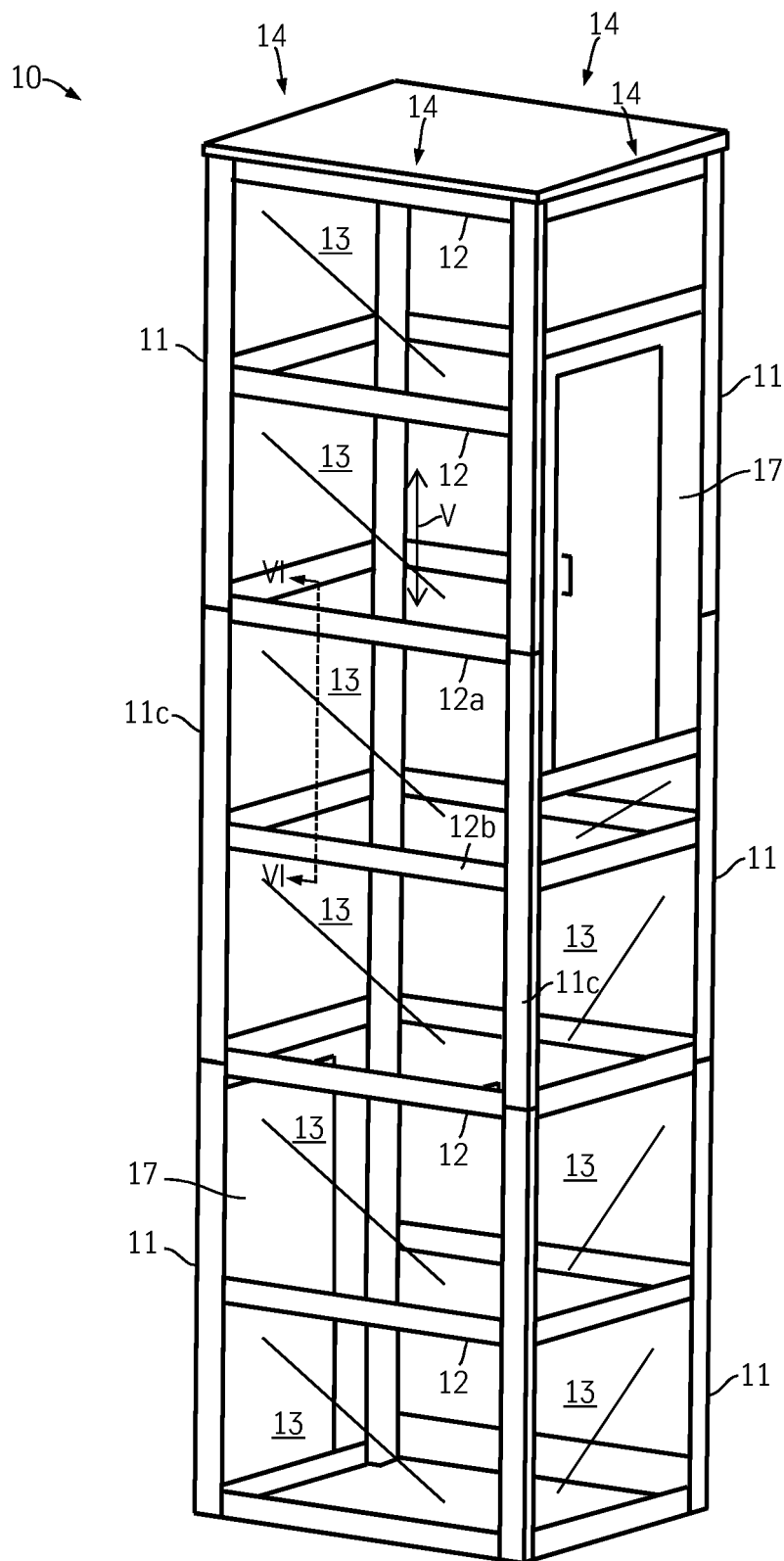


Fig. 1

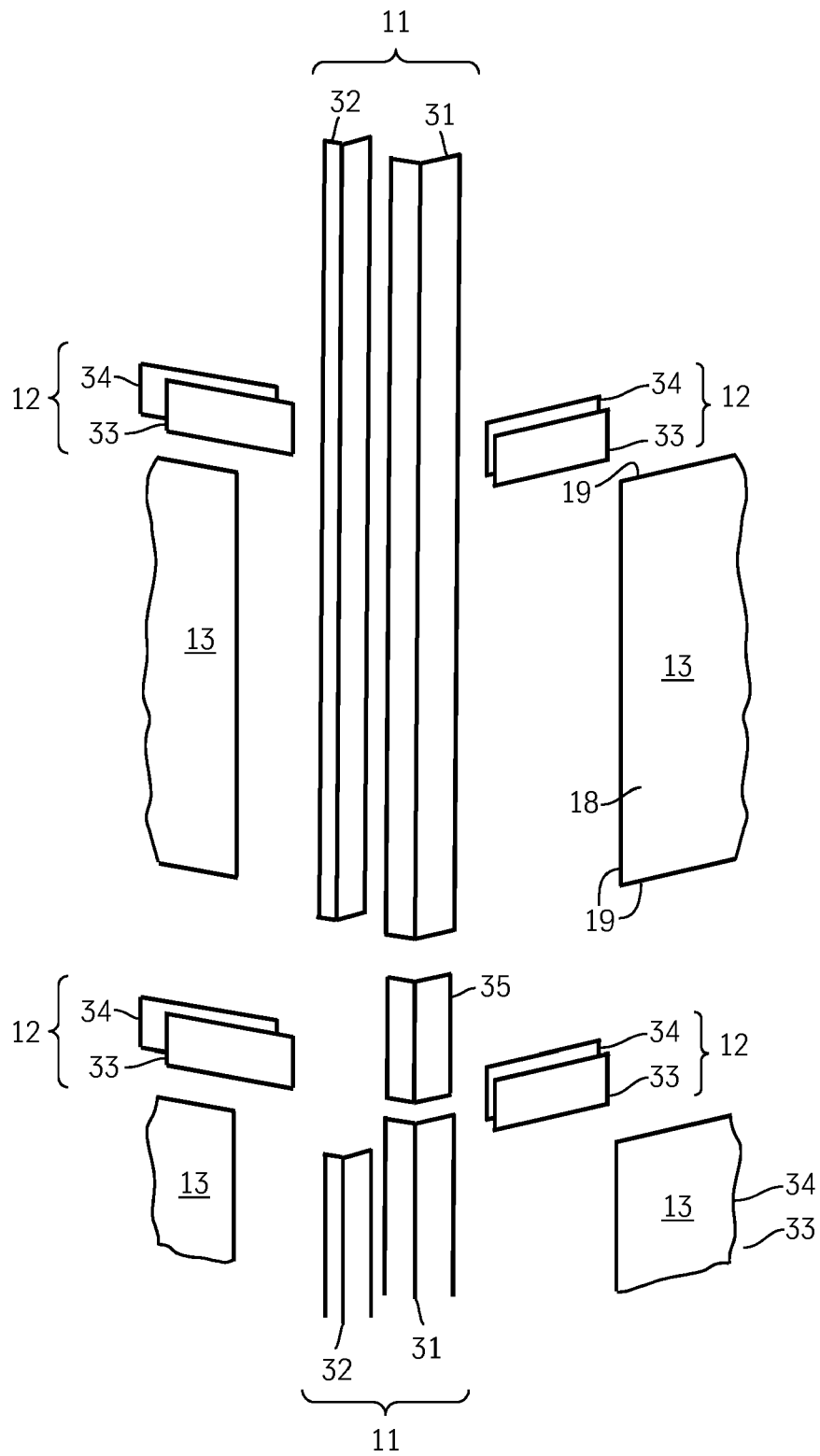


Fig. 2

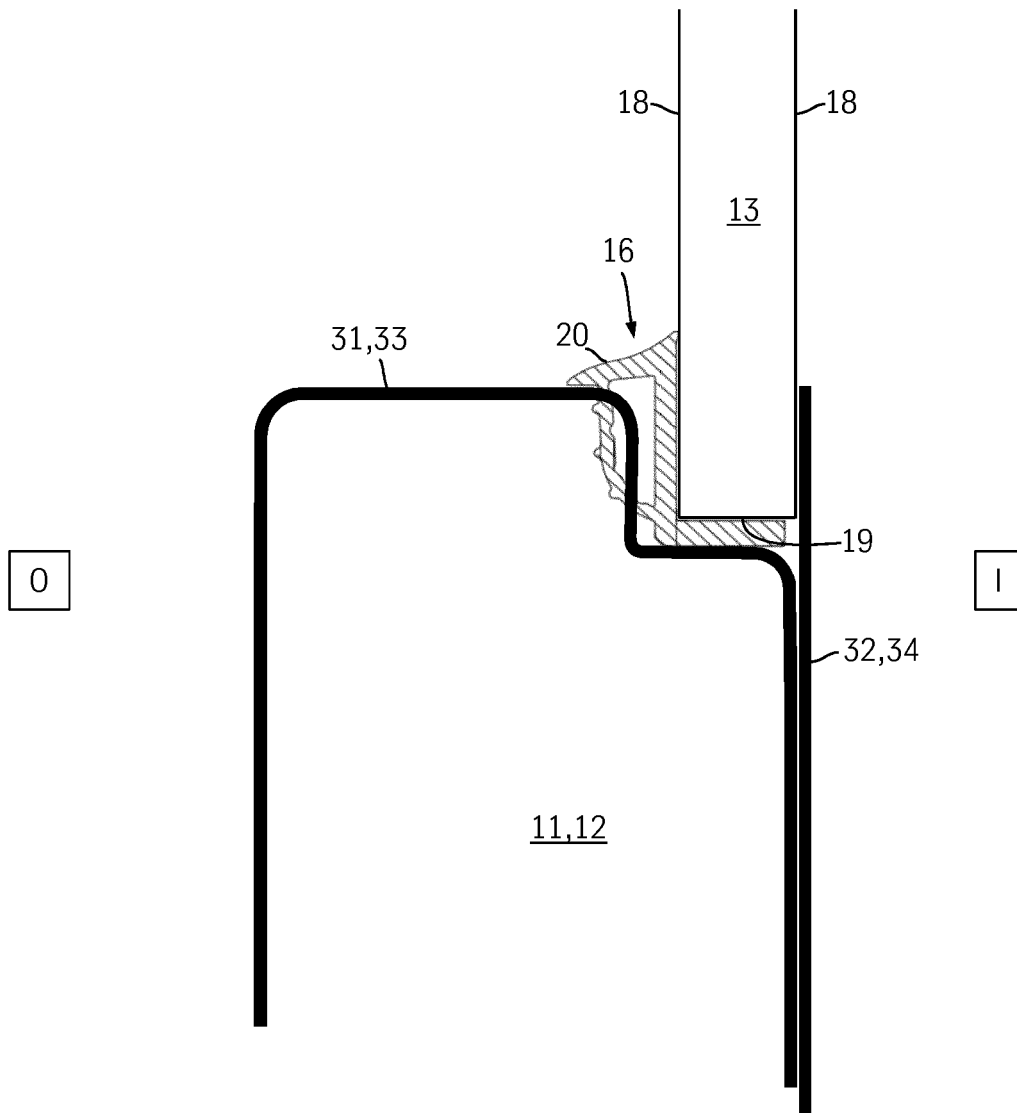


Fig. 3

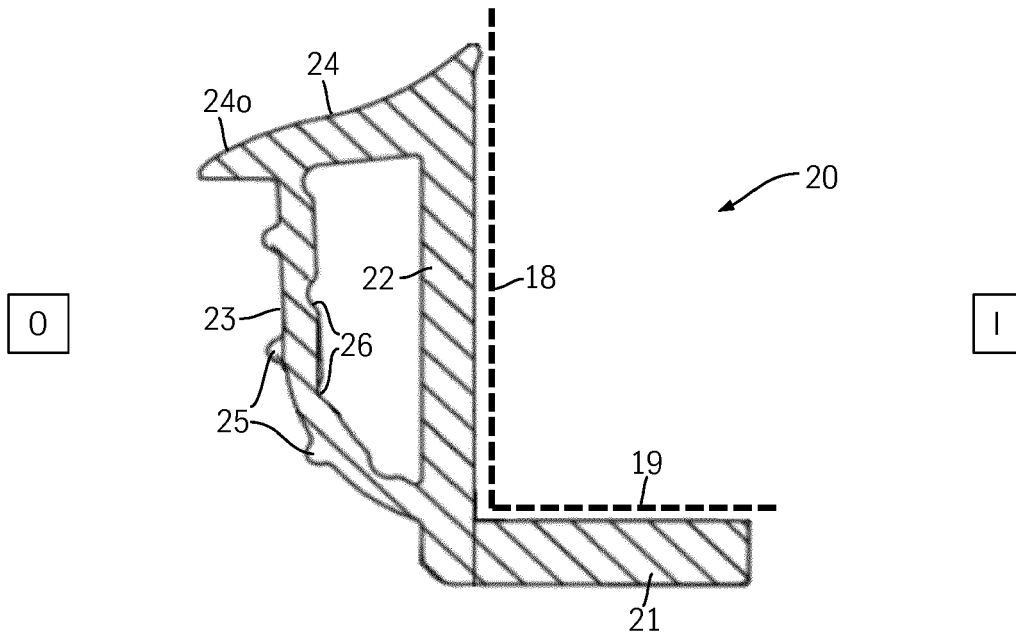


Fig. 4

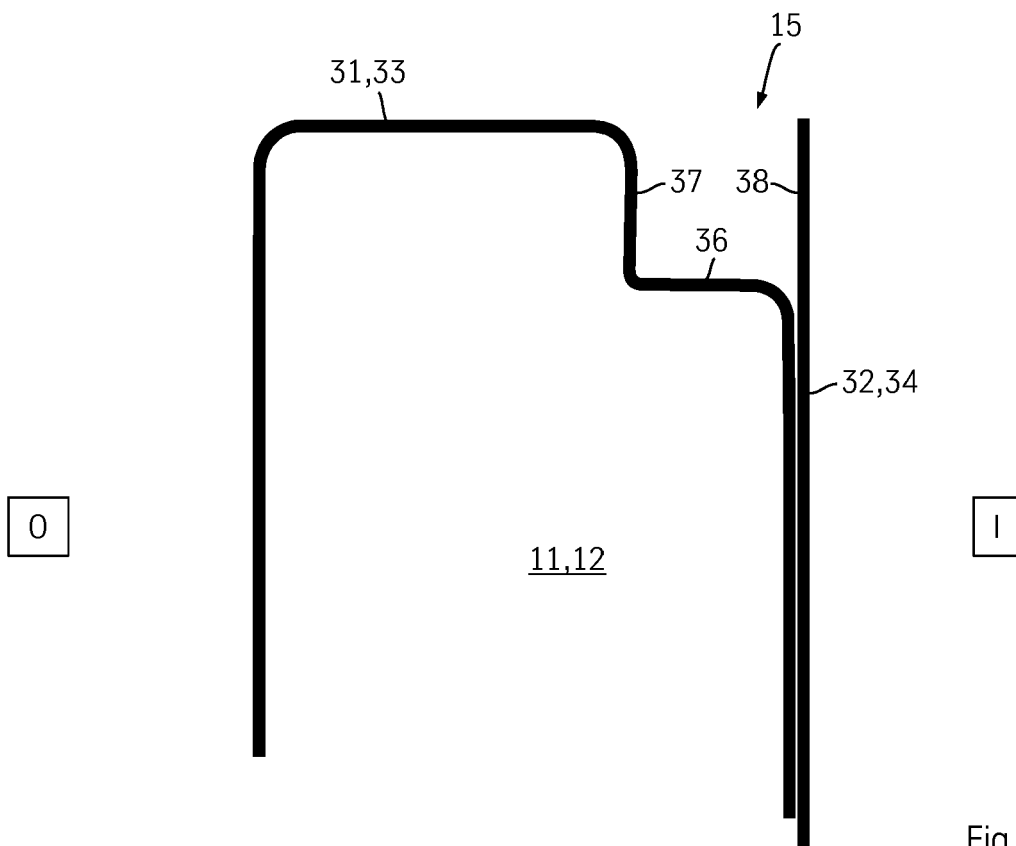


Fig. 5

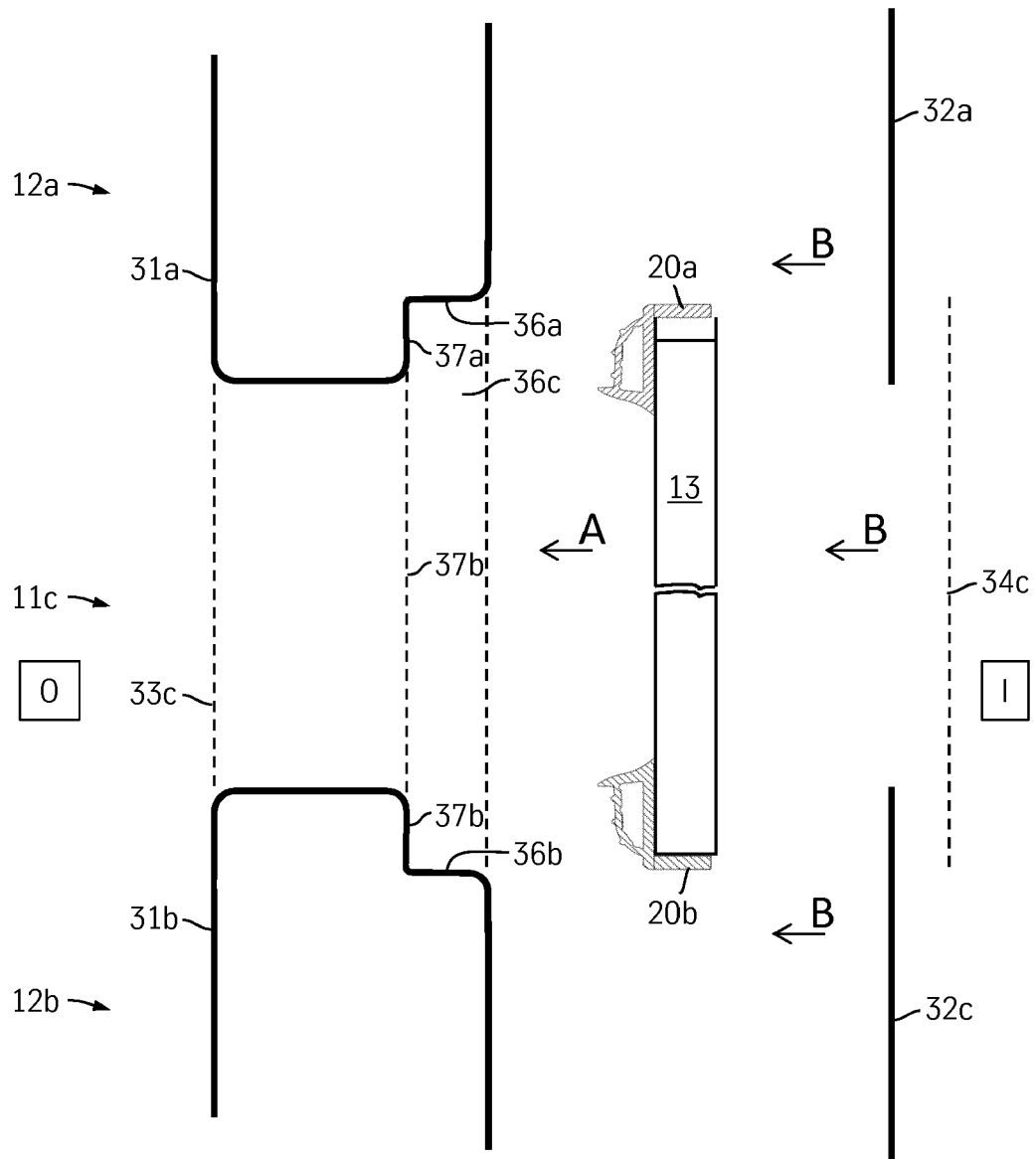


Fig. 6



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Application Number
EP 17 18 1224

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 February 2018	Examiner Nelis, Yves
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