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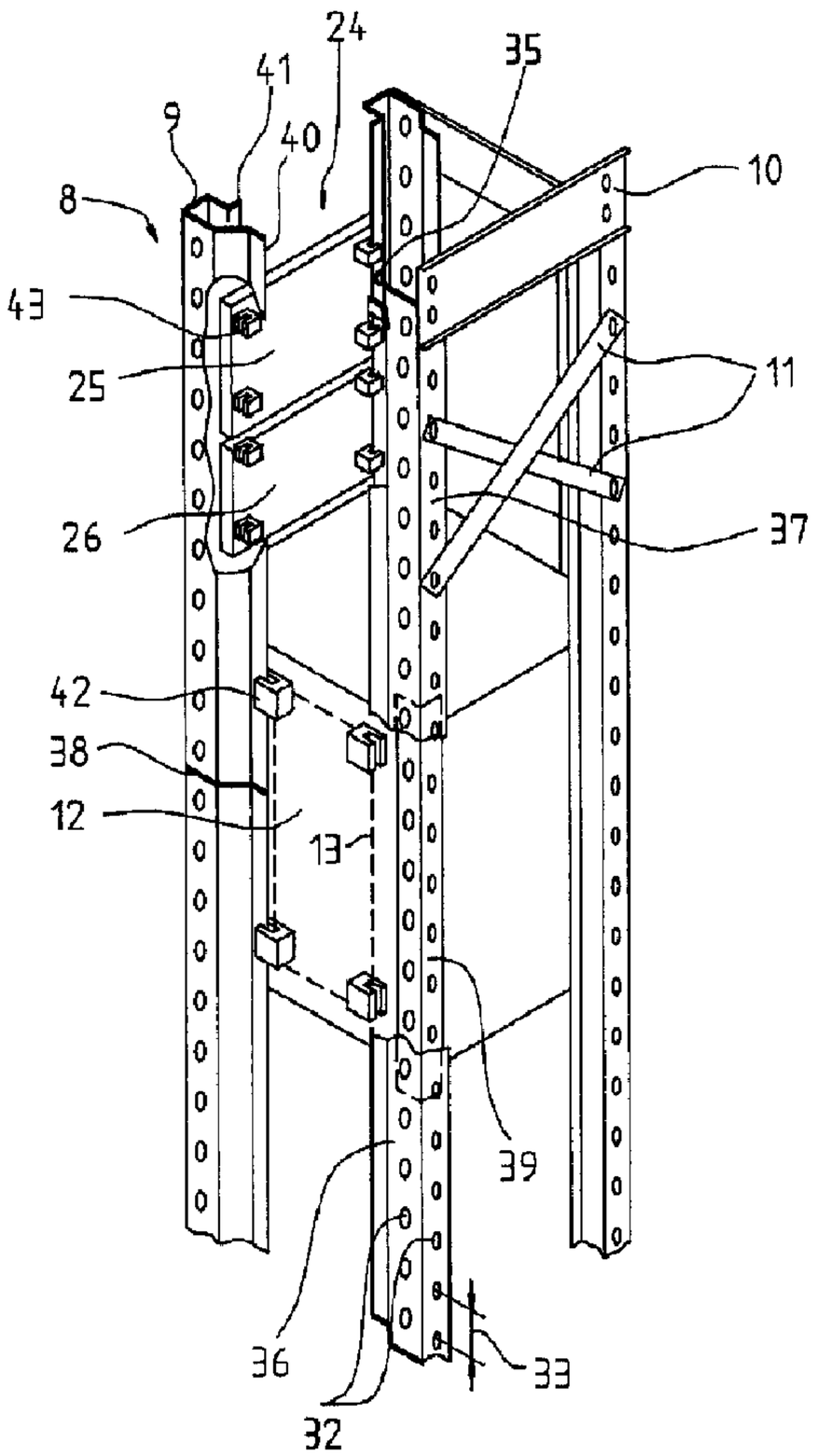
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(54) **APPAREIL DE LEVAGE**
(54) **LIFT INSTALLATION**



(57) In a lift for small goods with a self-supporting guide construction (8), which comprises at least two corner profile members (9) and several stopping places with vertically sliding doors (25, 26) and along which a cage (12) is movable in vertical direction, it is proposed for manufacture and assembly favourable in cost to form the cage guide rails (40) by vertical edges of the corner profile members (9) so that separate guide rails for the cage (12) are superfluous. In one embodiment of the invention, four corner profile members (9) are connected together by means of horizontally and diagonally arranged struts (10, 11). A lateral displacement of the cage guide plane (13) by bent-over edge portions of the corner profile members (9) enables a saving in the support area of the lift. A continuous two-row perforation (32)

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of the corner profile members (9) serves for the fastening of the struts (10, 11) and diverse attachment parts (35). The modular build-up of an embodiment of the invention with standardised corner profile pieces (36, 37) acts to lower the overall costs and facilitates the assembly of the lift installation according to the invention.

Abstract

In a lift for small goods with a self-supporting guide construction (8), which comprises at least two corner profile members (9) and several stopping places with vertically sliding doors (25, 26) and along which a cage (12) is movable in vertical direction, it is proposed for manufacture and assembly favourable in cost to form the cage guide rails (40) by vertical edges of the corner profile members (9) so that separate guide rails for the cage (12) are superfluous. In one embodiment of the invention, four corner profile members (9) are connected together by means of horizontally and diagonally arranged struts (10, 11). A lateral displacement of the cage guide plane (13) by bent-over edge portions of the corner profile members (9) enables a saving in the support area of the lift. A continuous two-row perforation (32) of the corner profile members (9) serves for the fastening of the struts (10, 11) and diverse attachment parts (35). The modular build-up of an embodiment of the invention with standardised corner profile pieces (36, 37) acts to lower the overall costs and facilitates the assembly of the lift installation according to the invention.

(Figure 2)

Lift installation

The invention concerns a lift installation, in particular a lift for small goods, with a preferably self-supporting guide construction, according to the classifying clause of patent claim 1.

In order to reduce the transmission of sound carried by solid bodies from the guide equipment to the building during movement of a lift cage along its travel path and during opening and closing of the vertical sliding doors, it is known to install the guide equipment in a lift shaft, which is provided at the building, with the use of a self-supporting shaft frame construction which is substantially free-standing and without a force-introducing connection. Thus, for example in French patent specification FR 1570002, the guide equipment of cage and vertical sliding doors is firmly connected with a shaft frame construction which is composed of bent sheet metal parts and which with the exception of the shaft door cut-outs is formed as channel closed in vertical direction. It is furthermore known from that to connect corner profile members bent out of sheet metal together by means of connecting metal sheets for the absorption of thrust forces. Moreover, two of the corner profile members, which face the cage front, form vertical edges which are bent over towards the cage and serve as guide equipment for the vertical sliding doors.

Although this shaft frame construction leads to a satisfactory, low-noise integration of the lift for small loads into the building, it is, however, very expensively constructed and requires an additional support surface in the shaft and the assembly of the bent sheet metal parts is furthermore difficult and expensive in the shaft of restricted space.

It is the object of the invention to provide a lift with a guide construction of the kind stated in the introduction, which avoids the mentioned disadvantages, is especially simple to manufacture at favourable costs and permits an improved utilisation of the support surface.

This object is achieved according to the invention by a lift with the features indicated in patent claim 1, in particular by the cage guide rails being formed by vertical edges or limbs of the corner profile members.

According to the invention, corner profile members of the self-supporting shaft frame construction thus at the same time also form the guide rail for the cage. Thus, separate guide rails for the cage become superfluous, for which reason the manufacture and the assembly of the guide construction according to the invention is favourable in cost. The reduced number of subassemblies and/or parts of the lift installation has a cost-reducing effect on the material and parts economics and simplifies the entire logistics up to the assembly. The arrangement of the cage guide rail laterally of the cage as part of the corner profile member moreover permits the spacing between the guide construction and the cage to be reduced and an improved utilisation of the support surface of the lift to be achieved.

In one embodiment of the guide construction, four corner profiles according to the invention are fixed mutually by suitable transverse stays for the reception of the supporting and guiding forces and the cage is moved along two guide rails according to the rucksack principle. This ensures a particularly stable linear cage movement along the travel path.

An exact orientation of the cage front relative to the vertical sliding doors is made certain by the cage and the vertical sliding doors each being guided at the same corner profile member in the case of at least the two corner profile members facing the cage front. Due to the physical unity according to the invention in a component subassembly, the orientation or position of these two guides is constructionally fixed relative to each other and can be represented as constantly dimensionally accurate. The precise guidance attainable by the invention furthermore permits the spacing of the vertical sliding door assembly from the cage to be minimised. In particular in the case of lifts for small loads, such as for example a dumbwaiter, this offers the advantage that, by comparison with conventional lifts of this kind, no or at least fewer dishes then pass through the gap into the lift shaft, which counteracts development of an unhygienic and unpleasant noise situation.

A particularly exact alignment of the cage front relative to the vertical sliding doors is achievable, starting out from the afore-mentioned construction, by a guide construction in which all four corner profile members are assembled together into a stiff guide construction by means of horizontally and diagonally arranged struts. The mutually facing vertical longitudinal edges of two oppositely disposed corner profile members each form, which are laterally of the cage, two mutually parallel guide planes in which the cage is guided.

The cage, in particular its loading opening cross-section at the cage front and the stopping place openings bounded by the frame of the vertical sliding door, are thereby oriented in alignment with each other without projecting steps and ledges disturbing the appearance. Goods or loads to be transported can thus be brought unhindered into or out of the cage. These are advantages which have particular significance especially in the case of use as food transport lift.

With such an embodiment with two guide planes, a more compact mode of construction of guide construction and cage can be achieved in simple manner if the vertical longitudinal edges, the guide rails, of two mutually opposite corner profile members are arranged to face each other and the cage guidance can therefore be represented constructionally with a smaller overall width dimension.

A further improvement in this manner of construction saving the support area can be achieved if the corner profile limb forming the vertical longitudinal edge forms a bent-over edge directed towards the cage in the manner that the guide plane is displaced so far in the direction of the cage that the overall width dimension of the guide means provided at the cage side is compensated for at least partially. The advantage gained therefrom mainly consists in, apart from an additional stiffening of the corner profile member, a saving of the support area of the lift or a better utilisation of the shaft cross-section provided at the building.

A preferred development of the invention provides a modular build-up, designed on the kit principle, of the guide construction of standardised horizontal and diagonal struts and corner profile members. Independently of the lifting height of the cage or of the guide path length specific to the lift, the corner profile members are produced in standardised lengths, preferably in three standard lengths. The respectively chosen length or height of the guide construction is then, in the case of use of connecting equipment, represented by the assembly of a suitable combination of the different standard corner profile members. Due to the production of the corner profile members in standard lengths, the cutting waste and the overall costs are reduced.

It is furthermore advantageous in this context when the corner profile members are perforated continuously in two rows. Such an equidistant hole pattern serves on the one hand for the fastening of the struts, machine supports and mounts of the electrical

components and the like and, on the other hand, the fastenings of the vertical slides find their reception therein. In combination with corner profile members perforated in this manner, the struts produced in uniform length dimension can also be provided with standardised perforation, which particularly facilitates assembly.

Moreover, the modular build-up simplifies the assembly of the guide construction according to the invention itself, as well as the assembly of the attachment part groups and subassemblies. On assembly of the guide construction according to the invention in the lift shaft, exclusively slender components of reduced weight have to be handled in the case of the perforated corner profile members, which by contrast to conventional constructions significantly facilitate an assembly under restricted space conditions, for example by means of screw connecting.

A corner profile member, which is rolled or bent out of sheet metal, is particularly simple to manufacture at favourable costs, wherein the longitudinal edges of both limbs of the corner profile member are preferably lapped over and form the cage guide rail or the vertical slider guide rail.

Further dependent claims contain additional expedient and advantageous embodiments of the invention given by the features of the claim 1.

Preferred examples of embodiment of the invention are illustrated in the drawing and described in detail in the following. There:

Figure 1 shows a plan view of the small goods lift according to the invention,

Figure 2 shows, schematically, a perspective view of a height portion of the guide construction according to the invention with a first construction of the corner profile member and with the cage,

Figure 3 shows a plan view of a second example of embodiment of the corner profile member guide according to the invention,

Figure 4 shows a plan view of a third example of embodiment of the corner profile member guide and

Figure 5 shows, schematically, a plan view of a small goods lift with a guide construction according to the invention with only two corner profiles.

Figure 1 shows the installation conditions of a small goods lift 1 in a lift shaft 2. Shaft walls 3, 4 and 5 bound a substantially rectangular support surface 6 at three sides and a vertical shaft space, whilst the shaft 2 is bounded towards the fourth side by a shaft wall 7 provided at the building, with two stopping places. The small goods lift 1 with a self-supporting vertical guide construction 8 according to the invention is mounted to be free-standing on the support surface 6 in the lift shaft 2 and without force-introducing connection to the shaft walls 3, 4 and 5. The guide construction 8 consists in this example of embodiment of four corner profile members 9, which are fixed in their position relative to each other by means of horizontal struts 10 and diagonal struts 11.

A cage 12 of the small goods lift 1 is guided to be vertically movable along the guide construction 8 in cage guide planes 13 and 14 at both sides of the cage side wall 15. The cage guide planes 13 and 14 are according to the invention defined by cage guides 16 in each corner of the self-supporting guide construction 8, which is described more exactly in the following.

For the raising and lowering of the parallelepipedonal cage 12, a drum drive 17 with cable drum 18 and electric geared motor 19 is mounted on a machine support 20 laterally at the upper end and externally at the guide construction 8. The cable 21 runs as a symmetrical cable loop over a deflecting roller mounted to protrude laterally at the cage base and is, according to the selected cage calls, reeled either onto or off from the cable drum 18, the cage 12 is correspondingly moved upwardly or downwardly thereby. In the region of each stopping place, a vertical sliding door assembly 24 is built onto the guide construction 8 at a spacing 22 and parallelly to the cage front 23. The known per se vertical sliding door assembly 24 comprises inter alia an upper slide 25 and a lower slide 26, which for example as illustrated here can be moved synchronously in opposite directions along a slide guide 29 by means of two cables 28 or chains guided over a deflecting rollers 27.

The guide construction 8 of the embodiment shown in Figure 1 and Figure 2 is composed substantially of four supporting multi-part corner profile members 9, which each form the corner edge of a rectangular base surface, which is marked out by their arrangement, of

the guide construction 8 and are connected together by means of horizontal struts 10 and diagonal struts 11 into a stiff, self-supporting guide structure 8 in the manner of a latticework and extending over the height of the shaft. Horizontal struts 10 at the upper end of the guide construction 8 each connect two adjacent corner profile members 9 and fix the mutual spacing of guide rails 40 and 41. As encircling stiffening, they assist the introduction or absorption of the driving forces of the drum drive 17 by way of the machine support 20 into the guide construction 8 during the movement of the cage 12.

Each of the four corner profile members 9 forms side limbs 30, which stand substantially at right angles one to the other, and width limbs 31, which are perforated continuously in two rows over the entire length of the corner profile member 9. This perforation 32 with uniform hole spacing 33 and hole diameter serves on the one hand for the fastening of the struts 10 and 11, of the machine support 20 and of the mounts of the electrical components, such as, for example, the shaft pit switch, and on the other hand for the reception and fastening of one or more slider fasteners 35 (Figure 2).

The corner profile members 9 consist in the embodiment illustrated in the Figures 1 and 2 not of a single continuous profile member, but each time of two corner profile members 36 and 37 of standard length and abutting one the other in alignment in longitudinal direction. The junction 38 is bridged over by a junction strap 39, which is laid inwardly against the facing ends, which are respectively to be connected together, of the corner profile members 36 and 37 and screw-connected together with these. The junction strap 39 lies, apart from the regions of the guide rails 40 and 41, complementarily against the inward surface of the corner profile members 36 and 37 and ensures an aligned transition, which is oriented exactly in longitudinal direction, from one corner profile member 36 to the other corner profile member 37. Alternatively to the embodiment illustrated here, the junction strap can be laid complementarily against the outward wall surface of the corner profile members 36 and 37 and be screw-connected with these. However, the corner profile member 9 and the entire guide structure 8 with junction strap 39 lying at the inside is smaller for the same bending resistance moment.

Thereagainst, it is important that the junction strap 39 causes a two-dimensional orientation, perpendicularly to the longitudinal direction of the corner profile member 9, of the corner profile members 36 and 37 to be connected together. The multi-dimensional

orientation represents an almost constant course during the movement of the cage 12 over the junction 38.

The length of the corner profile members 36 and 37 is, in fact, illustrated to be identical here; however, corner profile members according to the invention are provided in three different lengths. This facilitates the assembly of the guide construction 8 by piece weights which are short and as light as possible and keeps the corner profile waste small during the cutting to length of the guide construction 8 to the respectively desired dimension.

The vertical edges of the side limbs 30 and width limbs 31 of each of the four corner profile members 9 are lapped over and serve as guide rails 40 for the cage 12 and as guide rail 41 for the vertical slides 25 and 26 (Figure 3).

Figure 3 shows a plan view of a corner region of the guide construction according to the invention from Figures 1 and 2, in which the cage guide 16 and the vertical slide guide 29 are formed at one and the same corner profile member 9. Thereby, deviations of the vertical sliding door guide plane 53 relative to the cage front 23 can be reduced to a minimum. The cage guide 16 consists substantially of a cage guide shoe 42, which is mounted at the cage side wall 15, with a U-shaped recess which stands in engagement with a cage guide rail 40 to be freely displaceable thereon in longitudinal direction. In the embodiment shown in Figure 2, two cage guide shoes 42, which are spaced from each other in the direction of movement of the cage 12, for each cage guide rail 40 are fastened at the cage side wall 15. The four cage guide shoes 42 together form the cage guide plane 13 of the cage 12 guided according to the rucksack principle here. The vertical slide guide 29 comprises a slide guide shoe 43, which is connected in fixed location with one of the slides 25 and 26 and which slides in longitudinal direction on a vertical slide guide rail 41 by means of a U-shaped recess.

In the case of the embodiment of the corner profile member 44 according to the invention, which is shown in Figure 3, this consists of a guide profile member 45 and a supporting profile member 46 complementary thereto. The guide profile member 45 and the support profile member 46 are thus producible separately each from the other again in standardised lengths and are then connected together displaced in longitudinal direction. The carrier profile member 46 takes over the function of the junction strap 39 and serves at the same time for the stiffening of the guide profile member 45.

Furthermore of advantage with respect to the profile member manufacture is a multi-part corner profile member 47 according to an embodiment which is shown in Figure 4 and consists of a cage profile part 48 and a slide profile part 49, of which one is prefabricated separately with the cage guide rail 40 and the other with the vertical slide guide rail 41. Apart from the regions of the guide rails 40 and 41, the two profile parts 48 and 49 are laid against each other in complementary manner over wide regions and together result in the corner profile member 47 according to the invention with two guide rails 40 and 41. The complementarily formed profile regions each ensure an exact orientation of the profile parts 48 and 49 relative to each other and replace separate junction straps in the case of an arrangement of the two profile parts 48 and 49 displaced relative to each other in longitudinal direction. Both profile parts 48 and 49 are again provided with an equidistant perforation 32 and screwed together.

It is shown in Figures 1 to 4 that the side limb 30, 30' forming the vertical cage guide rail 40 each time forms a bent-over portion 61 directed towards the cage 12. The bent-over portion 61 displaces the cage guide 40 or the cage guide plane 13 and 14 so far in the direction of the cage 12 that the width dimension of the guide shoe 42 provided at the cage side is compensated for. This has the effect of a reduced support area 6 of the lift 1 or a better utilisation of the shaft cross-section placed provided at the building. At the same time, it additionally stiffens the corner profile members 9, 44 and 47.

Figure 4 shows an embodiment of the guide construction 50 according to the invention with only two corner profile members 51 and 52. The corner profile members 51 and 52 here have a U-shaped cross-section and are arranged with free profile limbs 53 and 54 as well as 56 and 57 facing each other and again stiffened into a self-supporting guide construction 50 by means of horizontal and/or diagonal struts. In this embodiment, too, the corner profile members 51 and 52 are prefabricated in standardised lengths with continuous perforation. The longitudinal edges of the free profile limbs 53 and 54 of the corner profile member 51 and the free longitudinal edges of the free profile limbs 56 and 57 of the corner profile member 52 form a vertical slide guide plane 59 and a cage guide rail 60, which extend parallel to each other and the spacing of which can be chosen to be a minimum according to the invention by the choice of the width of the profile webs 55 and 58. As described by reference to the preceding example of embodiment, two cage guide shoes 42 slide each time on one of the profile limbs 54 and 57 and guide the cage 12,

suspended in the manner of a rucksack, in the cage guide plane 60 in vertical direction. Each two vertical slide shoes 43 for each profile limb 53 and 56 guide a vertical slide of the vertical slide assembly 24 in the vertical slide guide plane 59.

By contrast to the embodiment of the guide construction 8, the guide construction 50 shown in Figure 4 is not free-standing, but supported or secured relative to the shaft wall and/or the respective stopping place floors with the aid of fastening means in horizontal planes. It distinguishes itself by a construction which is particularly favourable in costs and simple to assemble.

List of Reference Symbols

1. Lift for small loads
2. Lift shaft
3. Shaft wall
4. Shaft wall
5. Shaft wall
6. Support surface
7. Shaft wall
8. Guide construction
9. Corner profile member
10. Horizontal strut
11. Diagonal strut
12. Cage
13. Cage guide plane
14. Cage guide plane
15. Cage side wall
16. Cage guide
17. Drum drive
18. Cable drum
19. Electric geared motor
20. Machine support
21. Cable
22. Spacing
23. Cage front
24. Vertical slide assembly
25. Upper slide
26. Lower slide
27. Deflecting roller
28. Cable (slide)
29. Slide guide
30. Side limbs
31. Width limbs
32. Perforation
33. Hole spacing

34. Door contact
35. Slide lock
36. Corner profile piece
37. Corner profile piece
38. Junction
39. Junction strap
40. Cage guide rail
41. Vertical slide guide rail
42. Cage guide shoe
43. Slide guide shoe
44. Corner profile member
45. Guide profile member
46. Support profile member
47. Corner profile member
48. Cage profile part
49. Slide profile part
50. Guide construction
51. Corner profile member
52. Corner profile member
53. Profile limb
54. Profile limb
55. Profile web
56. Profile limb
57. Profile limb
58. Profile web
59. Vertical slide guide plane
60. Cage guide plane
61. Bent-over portion

Patent Claims:

1. Lift installation, in particular lift for small goods and with a preferably self-supporting guide construction consisting of at least two self-supporting corner profile members, along which a cage is movable in vertical direction between several stopping places with vertically sliding doors, characterised in that at least two corner profile members each time form a cage guide rail.

2. Lift installation according to claim 1, characterised in that the cage guide rails are formed as vertical edges of the corner profile members.

3. Lift installation according to claim 1 or 2, characterised in that the corner profile members are detachably connected together by means of horizontally arranged struts and/or diagonally arranged struts.

4. Lift installation according to claim 1, 2 or 3, characterised in that the corner profile members form at least one cage guide plane extending vertically and perpendicularly to the cage front.

5. Lift installation according to claim 4, characterised in that four corner profile members are combined into a cage construction and the mutually facing vertical longitudinal edges of two oppositely disposed corner profile members form mutually parallel guide planes, which are each laterally of the cage and in which the cage is guided.

6. Lift installation according to one of claims 1 to 5, characterised in that the corner profile limb, which forms the cage guide rail, forms a bent-over edge portion which is directed towards the cage and of such a kind that the guide plane is displaced so far in the direction of the cage that the width dimension of the guide means provided at the cage side is compensated for at least partially.

7. Lift installation according to one of claims 1 to 6, characterised in that the corner profile members form a guide plane, parallel to the cage front, for the vertical sliding door.

8. Lift installation according to one of claims 1 to 7, characterised in that the corner profile members have a continuous regular perforation.

9. Lift installation according to claim 4, characterised in that a machine support and fastening elements of lift components are connectible with the guide construction.

10. Lift installation according to claim 1, characterised in that the guide construction is built up in modular manner from corner profile rail members, horizontal struts and diagonal struts each of standardised dimensioning.

Fig. 1

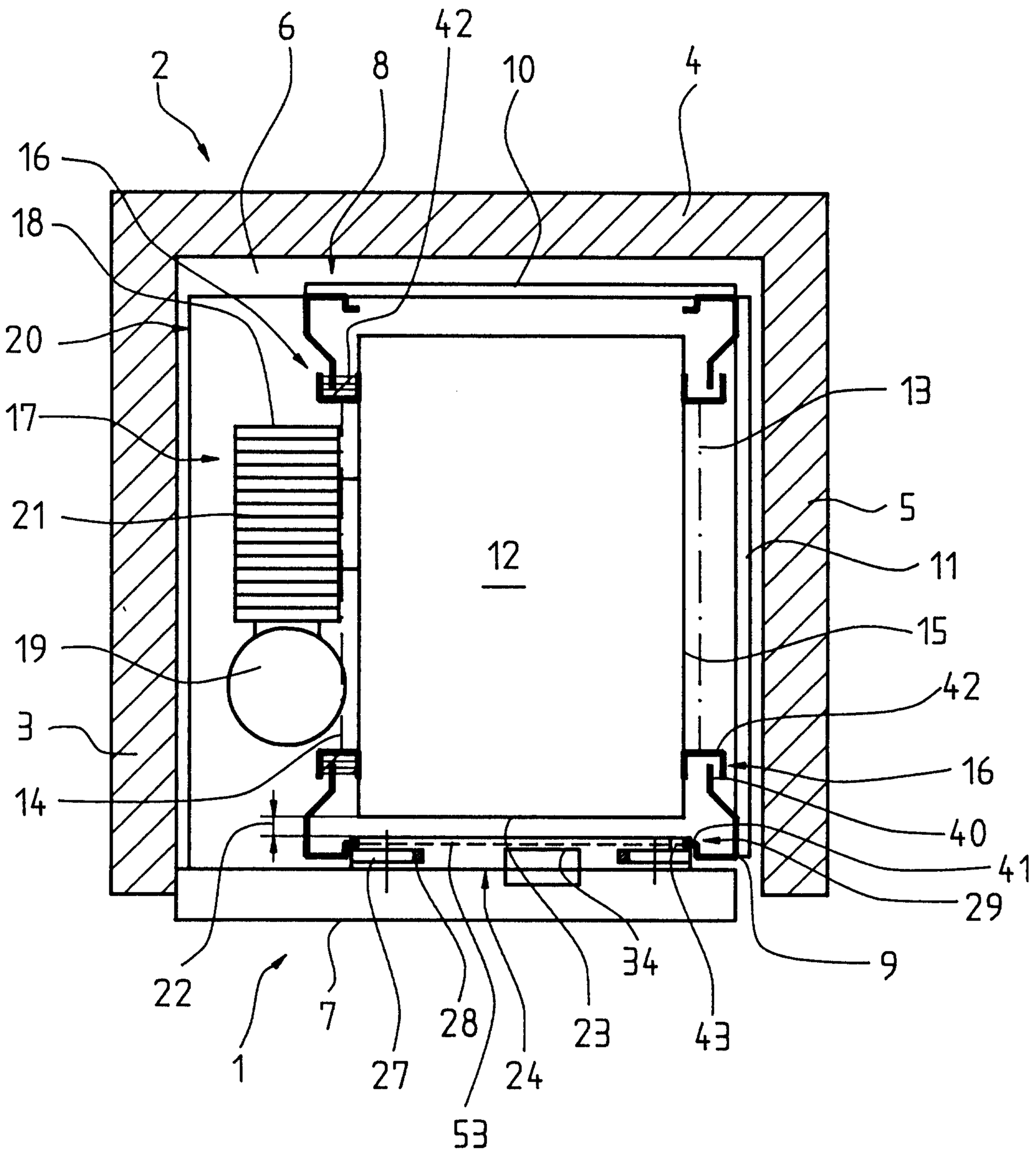

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Fig. 2

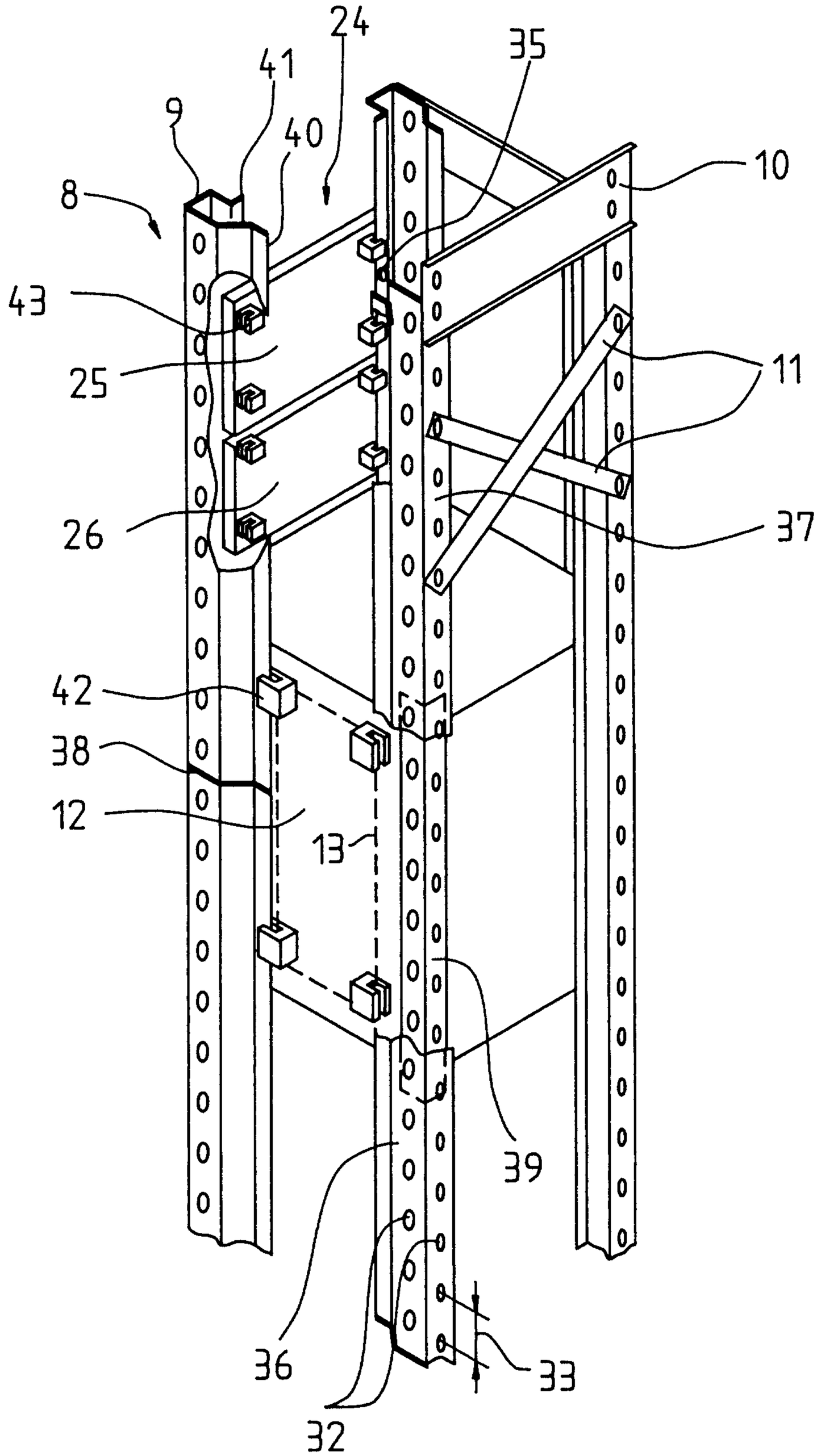


Fig. 3

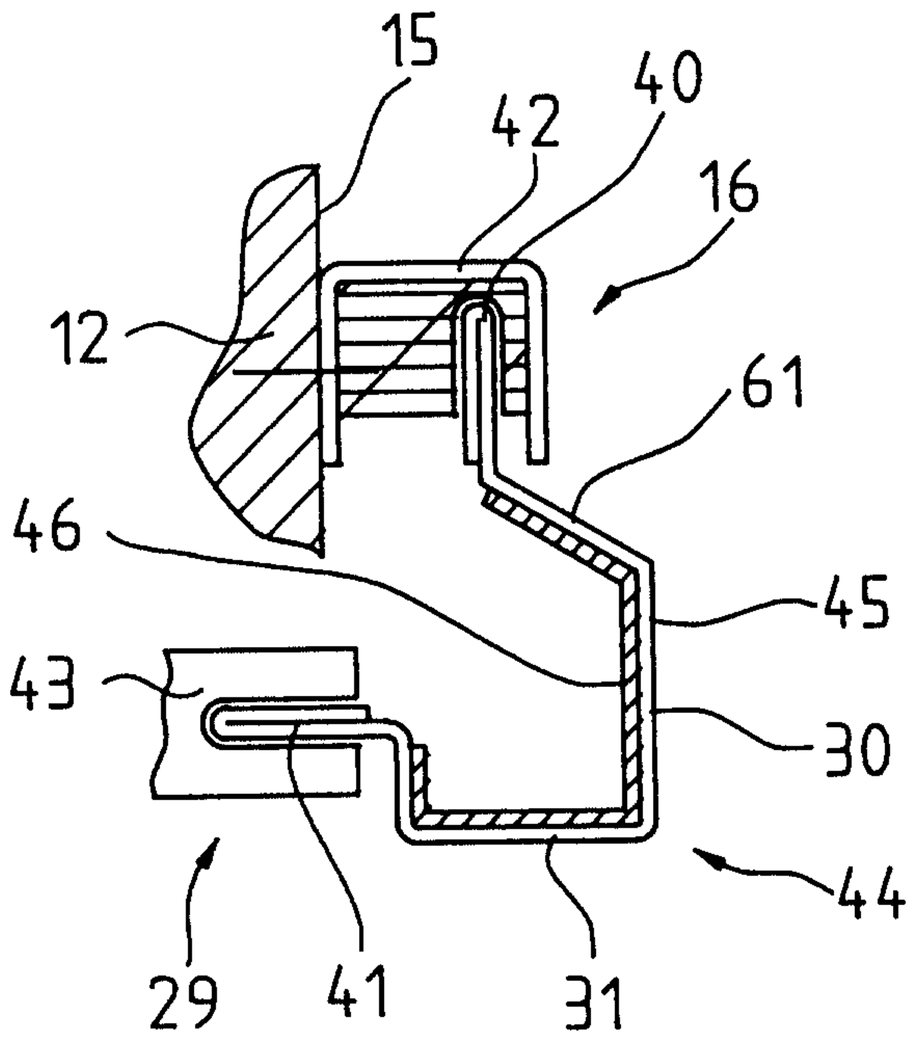

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Fig. 4

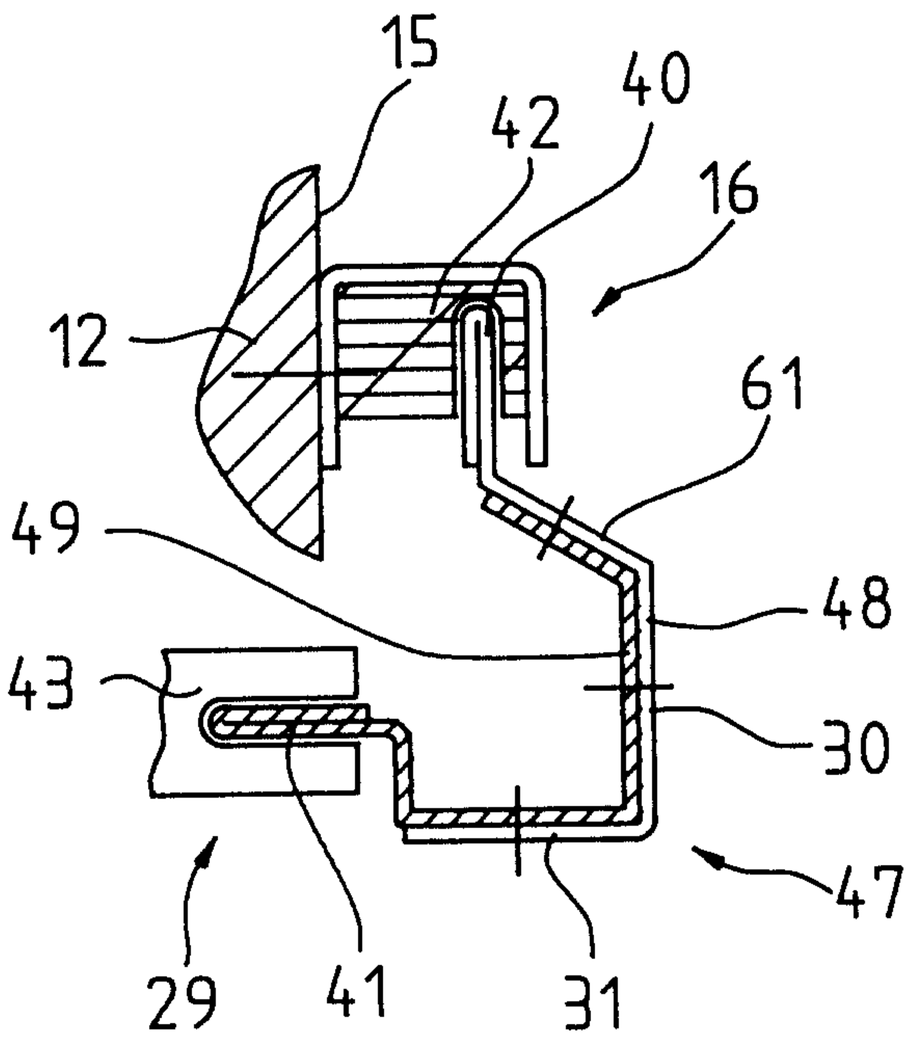
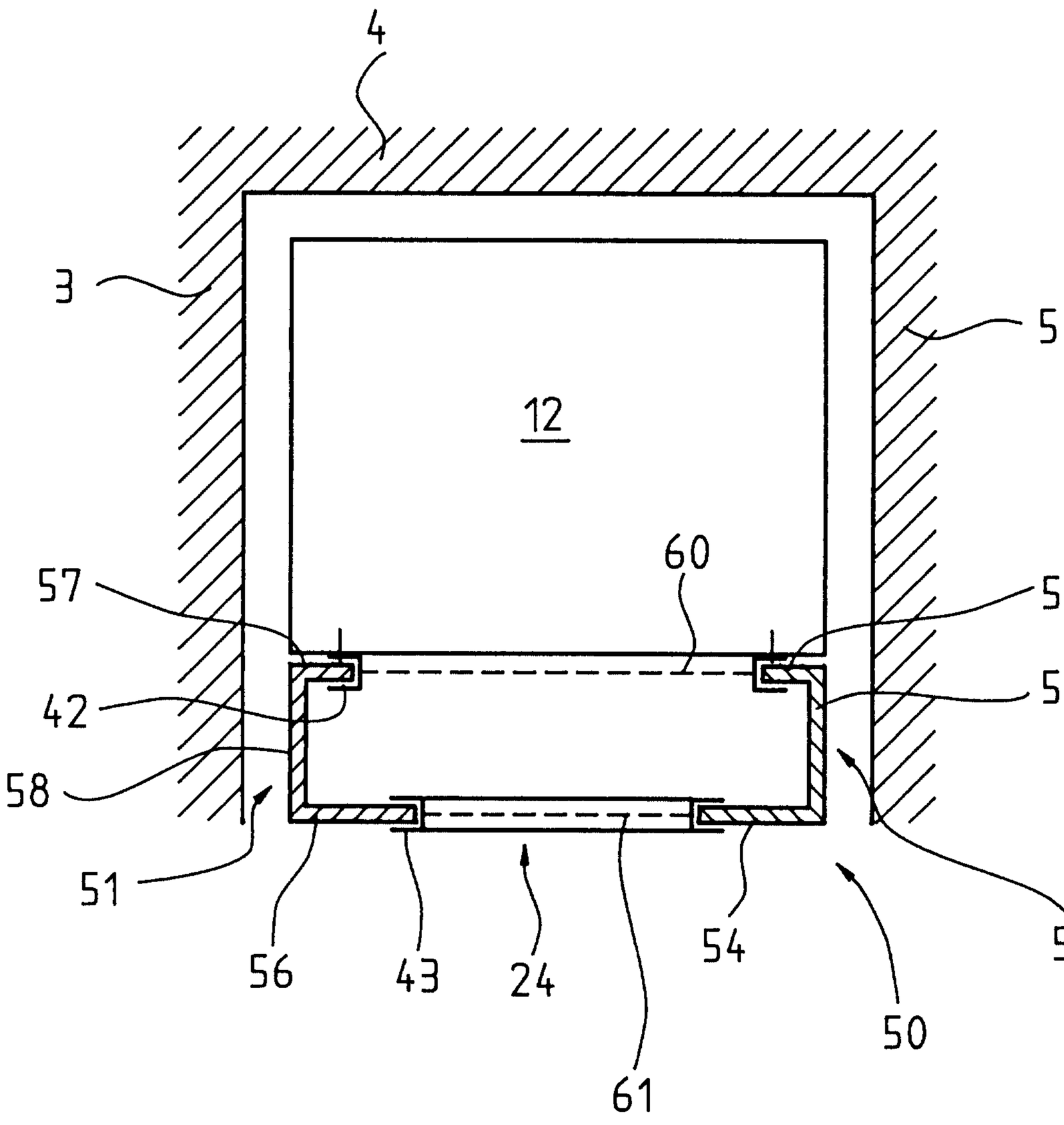
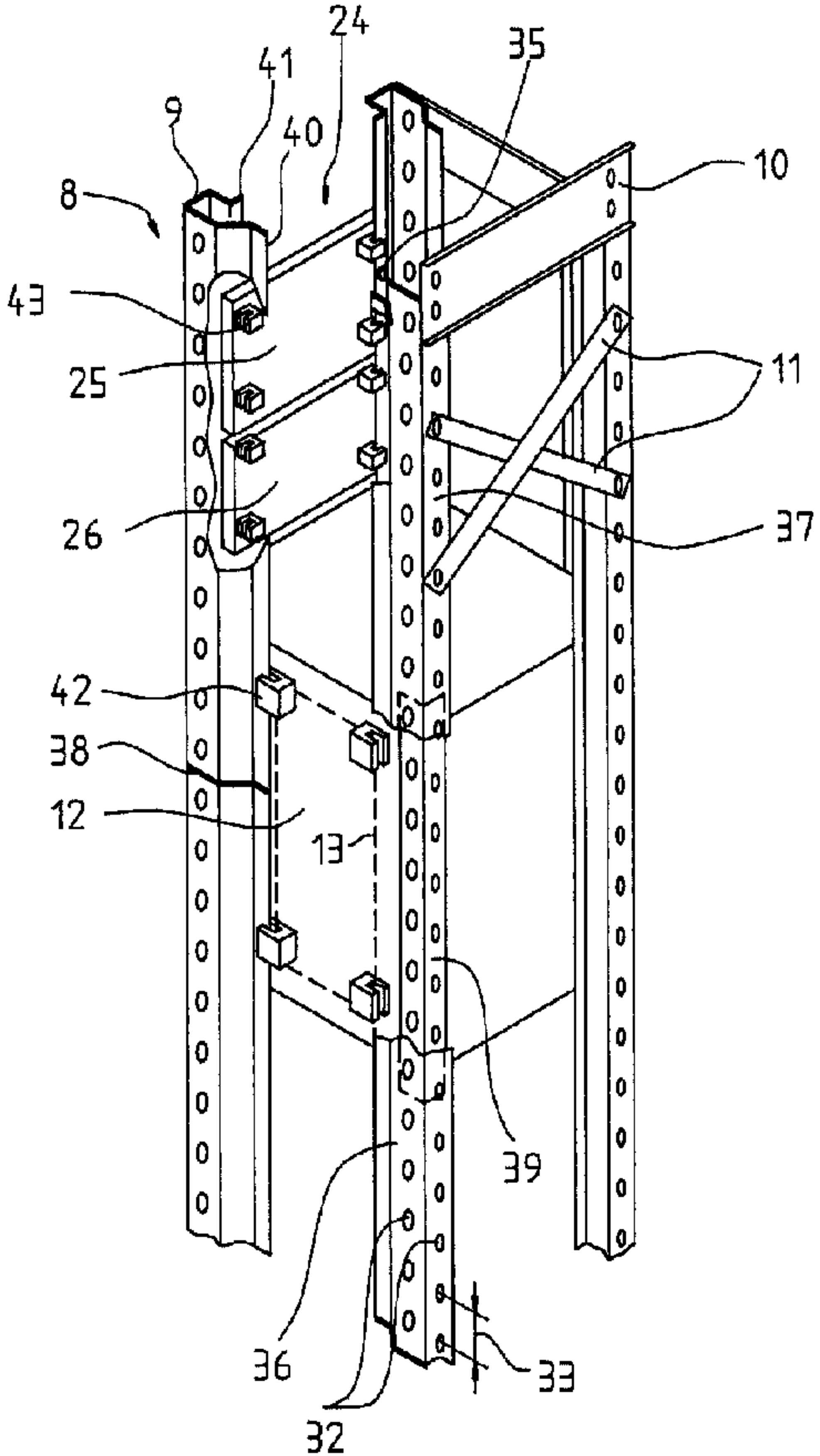

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Fig. 5




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