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<p>(21) International Application Number: PCT/FI98/00806</p> <p>(22) International Filing Date: 15 October 1998 (15.10.98)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>974158</td> <td>6 November 1997 (06.11.97)</td> <td>FI</td> </tr> <tr> <td>981992</td> <td>15 September 1998 (15.09.98)</td> <td>FI</td> </tr> </table> <p>(71) Applicant (for all designated States except US): KONE CORPORATION [FI/FI]; Kartanontie 1, FIN-00330 Helsinki (FI).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): KETONEN, Ari [FI/FI]; Perttulankatu 32, FIN-05900 Hyvinkää (FI). HÄGG, Jori [FI/FI]; Ilmattarentie 10, FIN-11910 Riihimäki (FI). ANTTILA, Harri [FI/FI]; Keskitie 10, FIN-05400 Jokela (FI).</p> <p>(74) Agent: KONE CORPORATION; Patent Dept., P.O. Box 677, FIN-05801 Hyvinkää (FI).</p>	974158	6 November 1997 (06.11.97)	FI	981992	15 September 1998 (15.09.98)	FI	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>
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<p>(54) Title: PROCEDURE FOR INSTALLING A LANDING DOOR, AND A CORRESPONDING INSTALLATION SYSTEM</p>							
<p>(57) Abstract</p>							
<p>Procedure for the installation of a landing door, in which a threshold module (2) is mounted on the lower edge of a door opening (1) of the elevator shaft, whereupon side posts (3, 4) are mounted at the edges of the opening and a lintel (5) connecting the side posts as well as an overhead supporter (6) for the suspension of the door panels are mounted in the upper part of the opening, the equally long side posts (3, 4) being mounted on top of the threshold module (2) while the side posts are connected to each other by the lintel (5) mounted on top of them, the overhead supporter (6) is lifted up onto the lintel and fixed to the wall by its ends.</p>							

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PROCEDURE FOR INSTALLING A LANDING DOOR, AND A
CORRESPONDING INSTALLATION SYSTEM

5 The present invention relates to a procedure for install-
ing a landing door as defined in the preamble of claim 1
and to an installation system as defined in the preamble
of claim 4.

10 Traditionally, to install a landing door for an elevator,
a threshold module is mounted on the lower edge of the
door opening, in a horizontal position and at the correct
distance from the elevator car. Next, the side posts are
mounted at the side edges of the door opening to form
15 door jambs, in a position as accurately vertical as pos-
sible and in alignment with the threshold module. The
side posts can be connected by their upper ends together
by a lintel, which can also be fastened by its ends to
the edges of the door opening. After this, the overhead
20 supporter is fixed to the upper part of the door opening
by lifting it up to its position and fastening it with
bolts to the edges of the door opening in a position as
accurately horizontal as possible, i.e. parallel to the
threshold module.

25 The prior-art procedure involves several drawbacks. In-
stallation must be carried out by resorting to welding
and observing relatively accurate measurements, so it im-
poses strict requirements regarding the dimensioning of
the door opening. Installation is difficult and slow be-
30 cause practically every part of the door must be measured
separately and mounted in the correct position relative
to the door opening. The relatively heavy overhead sup-
porter must be supported manually during the mounting and
measurement. In addition, especially in high-rise eleva-
35 tor shafts, tolerance problems are encountered because
the door openings must be relatively accurately posi-

tioned and sufficiently small to allow the door parts to be accurately installed in position.

The object of the present invention is to eliminate the drawbacks described above. A specific object of the invention is to present a new type of procedure and a corresponding system that makes it possible to assemble the landing door in as simple a manner as possible and without welding and laborious or difficult operations. A further object of the invention is to reduce the tolerance requirements regarding the construction of elevator shafts.

As for the features characteristic of the invention, reference is made to the claims.

In the procedure of the invention for the installation of a landing door, a threshold module is mounted on the lower edge of the door opening, in a position as accurately horizontal as possible and in a suitable position relative to the depth dimension of the door opening. After this, according to the invention, side posts of a length as precisely equal to each other as possible are mounted on top of the threshold module and attached to the threshold module by their lower ends, while the top ends of the side posts are connected to each other by a lintel mounted on top of them. Next, the overhead supporter is lifted up and allowed to rest on the lintel. The overhead supporter remains in position as it is supported by the lintel and thus it can be easily fixed to the wall by its ends.

It is possible to leave the overhead supporter resting on the lintel by its own weight, held in position only by suitable fitting parts and brackets, but preferably the overhead supporter, after being placed in position on the

lintel, is attached to the lintel e.g. using suitable bolts.

In an embodiment of the invention, the cross-measure of
5 the door opening formed by the side posts and the lintel
is taken and the door opening is straightened and at-
tached to the wall before the overhead supporter is
lifted into position. Another possibility is to lift the
overhead supporter into position on the lintel and cross-
10 measure the door opening only when the overhead supporter
is being attached to the wall.

The essential point in the procedure of the invention is
that, after the threshold module has been mounted in po-
15 sition, no accurate measurements to determine the verti-
cal or horizontal alignment of different parts are re-
quired, but the parts can be simply put together and
bolted to the wall of the elevator shaft after only tak-
ing the cross-measure. The heavy overhead supporter need
20 not be measured and fitted into position, but simply
lifting it onto the lintel will suffice to make sure that
the overhead supporter is in the correct position.

The system of the invention for the installation of a
25 landing door comprises a threshold module to be mounted
on the lower edge of the door opening, side posts, a lin-
tel and an overhead supporter, from which the door panels
are suspended. According to the invention, the lintel
mounted on top of the side posts comprises fitting parts
30 and the overhead supporter comprises corresponding brack-
ets so that the overhead supporter can be lifted into po-
sition on the lintel, the overhead supporter remaining in
its final mounting position on the lintel. After this,
the overhead supporter can be locked or fixed to the lin-
35 tel and also to the wall without having to be otherwise
supported during the mounting operation.

The fitting parts of the lintel preferably comprise slots, openings, sleeves, supporting pins or equivalent elements or areas for the brackets of the overhead supporter. Likewise, the brackets preferably consist of
5 tongues, pins, lugs or equivalent projections adapted to the fitting parts. Moreover, the brackets can advantageously be shaped in different ways and different supporting structures can be added to the lintel. Of course it is obvious in the framework of the inventive idea that
10 the fitting parts and brackets may be arranged the other way round on the lintel and overhead supporter, in other words, the essential point is that the lintel and the overhead supporter are provided with mutually corresponding elements that enable the overhead supporter to rest
15 on the lintel by its own weight.

The ends of the overhead supporter are preferably provided with fixing points by which the overhead supporter, resting on the lintel in precisely the correct position
20 relative to the door opening, can be fixed to the wall.

The lintel is preferably likewise provided with mounting brackets by which the lintel, resting on the side posts, can be attached to the wall after the cross-measurement
25 of the door opening formed by the side posts and the lintel. The mounting brackets or their attachments to the wall are preferably of a flexible or sliding type to permit the assembly formed by the lintel and side posts to be moved to a suitable distance from the wall, i.e. to a
30 precisely vertical position over the threshold module.

The system of the invention for the installation of a landing door allows the door frame to be assembled from parts that need no welding. Thus, it will be possible to
35 use pre-coated sheet material, resulting in obvious cost savings. The invention can be implemented using a lintel of a light structure that is easy to mount and adjust in

position on the side posts while at the same time serving as a mounting jig and support for the overhead supporter. Therefore, the overhead supporter can be allowed to rest on the lintel and it can then be permanently fixed to the wall by its ends. Moreover, the invention simplifies the process of constructing the elevator shaft as a whole because the entire door structure is measured and installed based on the lower edge of the door opening. Thus, the side and top edges of the door opening are not subject to any strict requirements regarding dimensional accuracy.

In the following, the invention will be described in detail by referring to the attached drawings, wherein Fig. 1 represents the first stage of the installation procedure of the invention, Fig. 2 represents the second stage of the installation procedure, Fig. 3 represents the third stage of the installation procedure, Fig. 4 represents the fourth stage of the installation procedure, and Fig. 5 presents a detail of the installation procedure.

As illustrated by Fig. 1, a threshold module 2 is fixed to the lower edge of a door opening 1 of an elevator shaft, in a horizontal position and correctly positioned in the depth direction of the door opening 1. On its top, the threshold module 2 has mounting areas 11 to which the lower ends of the side posts 3 and 4 are attached as illustrated by Fig. 2.

After this, as illustrated by Fig. 3, a lintel 5 of a relatively light structure is mounted horizontally on top of the side posts 3 and 4. Each end of the lintel is provided with a mounting bracket 10 extending over the edge of the door opening onto the wall. The cross-measure of the opening formed by the side posts 3 and 4 and the lin-

tel 5 is checked to ensure that the opening is straight, whereupon the lintel is preliminarily fastened to the wall from the holes at the ends of the mounting brackets 10. After this, the vertical alignment of the side posts 3 and 4 on the threshold module 2 is checked and adjusted, whereupon the mounting brackets 10 are tightened in position on the wall.

Next, as illustrated by Fig. 4, the overhead supporter 6 can be lifted onto the lintel so that its brackets 8 engage the pins 7 of the lintel. Thus, after being lifted onto the lintel, the overhead supporter 6 will remain in place without any additional support while at the same time being accurately positioned in its final installation position. The overhead supporter is therefore easy to fix permanently to the wall by the fixing points 9 at the ends by using suitable bolts. In addition, either before or after being attached to the wall, the overhead supporter 6 and the lintel 5 can be attached to each other by the fitting parts 7 and the brackets 8.

Fig. 5 presents a detail of a preferred installation system, in which the bracket 8 is so shaped that lugs 11 comprised in the bracket 8 intermesh with a supporting structure 12 comprised in the lintel 5. The supporting structure 12 may be e.g. a shaped portion of the lintel 5, a separate part attached to the lintel 5 or some other supporting element. With this arrangement, the overhead supporter 6 will remain in place supported by the bracket 8 and the lintel 5 so that it is not necessary to immediately tighten the fitting parts 7 to fix the overhead supporter 6 to the lintel 5. This procedure allows safer and faster installation as the overhead supporter 6 is held in place on the lintel 5 without being supported manually, and it makes it easier to fasten the fitting parts 7.

In the foregoing, the invention has been described by way of example by the aid of the drawings while different embodiments of the invention are possible within the scope of the inventive idea defined by the claims.

CLAIMS

1. Procedure for the installation of a landing door, wherein a threshold module (2) is mounted on the lower edge of a door opening (1) of an elevator shaft, where-
5 upon side posts (3, 4) are mounted at the edges of the opening and a lintel (5) connecting the side posts as well as an overhead supporter (6) for the suspension of door panels are mounted in the upper part of the opening,
10 **characterised** in that
- the equally long side posts (3, 4) are mounted on top of the threshold module (2),
 - the side posts are connected to each other by the lintel (5), which is mounted on top of
15 them,
 - the overhead supporter (6) is placed onto the lintel so that it rests on the lintel, and
 - the overhead supporter is fixed to the wall by its ends.
- 20
2. Installation procedure as defined in claim 1, **characterised** in that the overhead supporter (6) resting on the lintel (5) is attached to the lintel.
- 25
3. Installation procedure as defined in claim 1, **characterised** in that the lintel (5) and the side posts (3, 4) attached to the threshold module (2) are cross-measured and fixed to the wall before the overhead supporter (6) is brought to rest on the lintel.
- 30
4. System for the installation of a landing door, comprising a threshold module (2) to be attached to the lower edge of a door opening (1) of an elevator shaft, side posts (3, 4), a lintel (5) and an overhead supporter
35 (6), **characterised** in that the lintel (5), mounted on top of the side posts (3, 4), and the overhead supporter (6) are provided with fitting parts (7) and brackets (8) cor-

responding to each other to allow the overhead supporter to be supported by the lintel before being fixed to the edge of the door opening.

- 5 5. Installation system as defined in claim 4, **characterised** in that the fitting parts of the lintel (5) comprise slots, holes, sleeves, supporting pins or equivalent elements designed to engage the brackets (8).
- 10 6. Installation system as defined in claim 4, **characterised** in that the brackets (8) consist of tongues, pins, lugs or equivalent projections fitting onto the fitting parts (7).
- 15 7. Installation system as defined in claim 5, **characterised** in that lugs (11) or equivalent comprised in the bracket (8) engage supporting elements (12) comprised in the lintel (5).
- 20 8. Installation system as defined in claim 4, **characterised** in that the ends of the overhead supporter (6) are provided with fixing points (9) to allow the overhead supporter, resting in position on the lintel, to be fixed to the wall.
- 25 9. Installation system as defined in claim 4, **characterised** in that the lintel is provided with mounting brackets (10) by which the lintel, resting on the side posts, can be attached to the wall after cross-measurement of
- 30 the side posts and lintel.
10. Installation system as defined in claim 8, **characterised** in that the mounting brackets comprise a flexible element to permit the lintel and side posts to be moved
- 35 perpendicularly to the wall to a suitable distance from the wall.

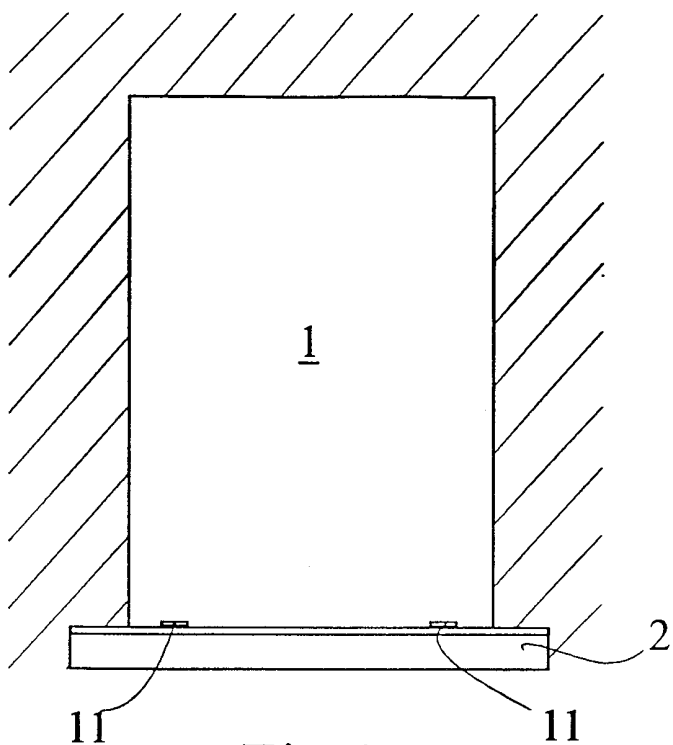


Fig 1

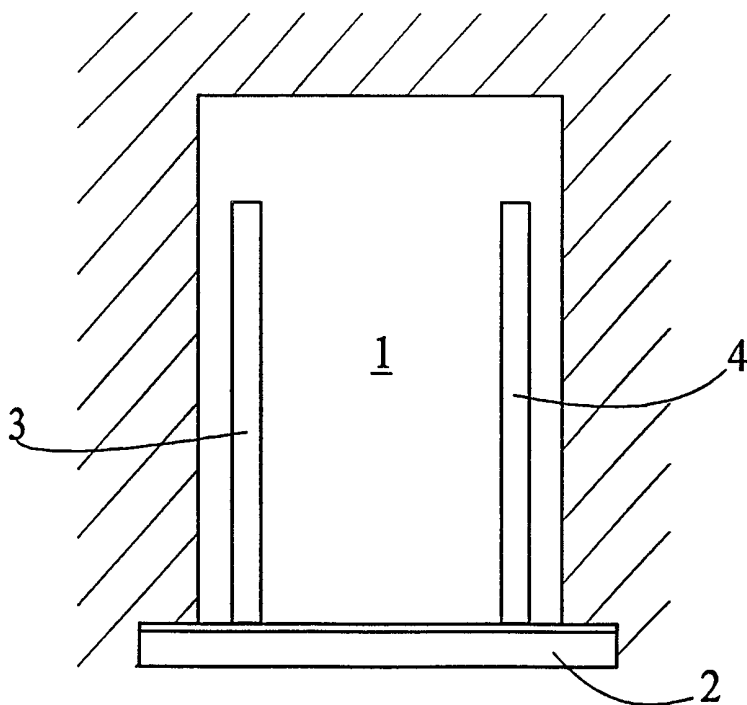


Fig 2

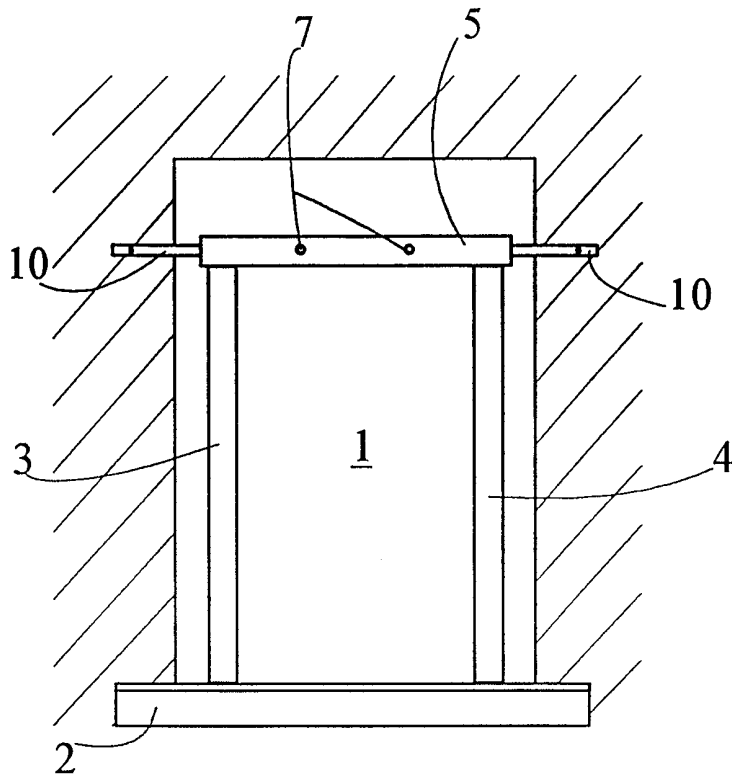


Fig 3

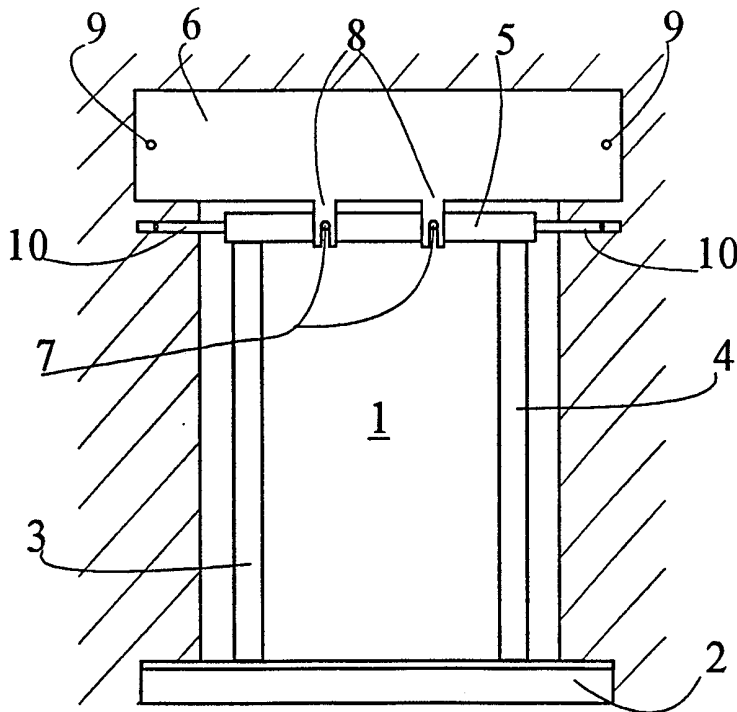


Fig 4

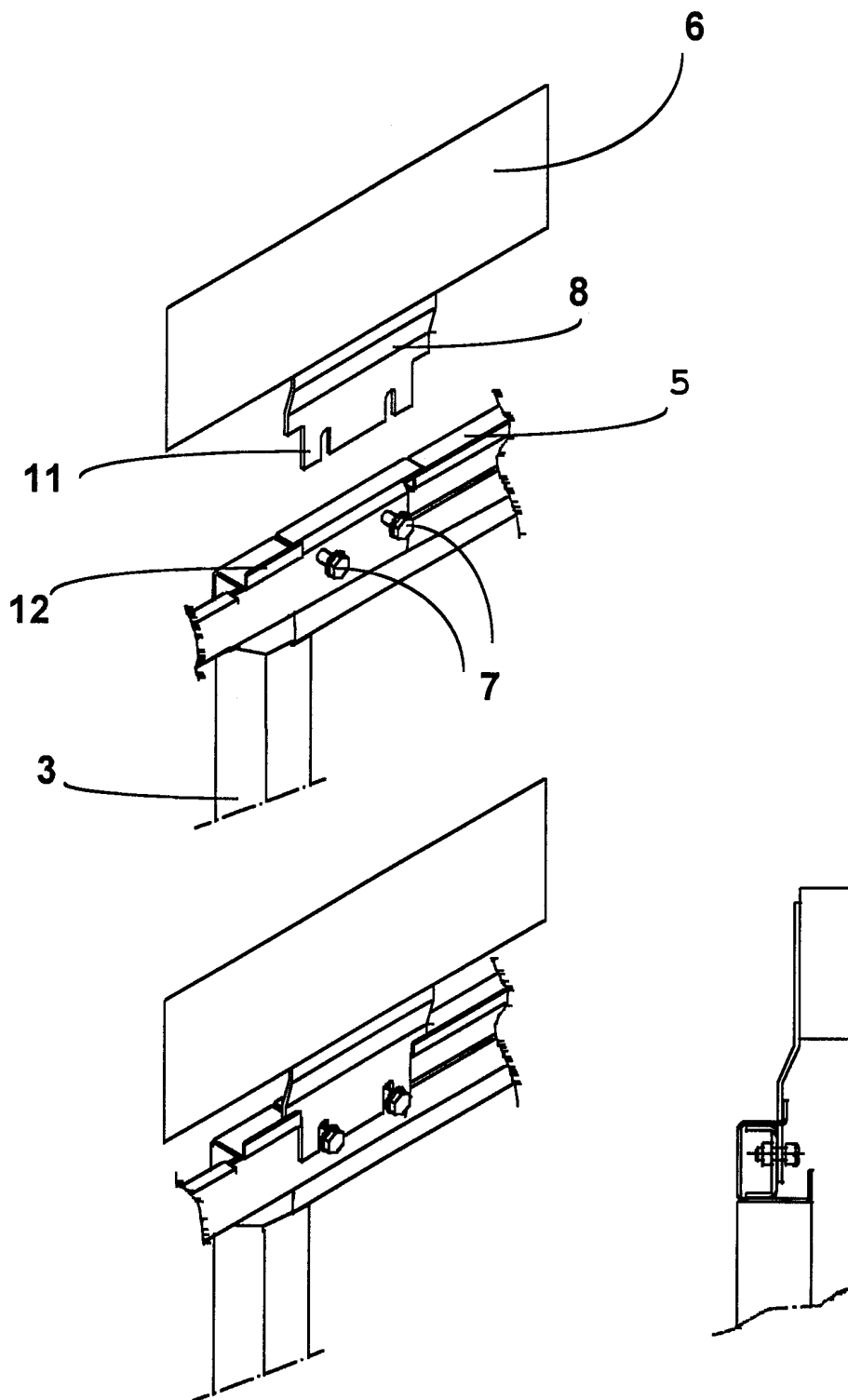


Fig 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 98/00806

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B66B 13/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B66B, E06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Patent Abstracts of Japan, abstract of JP 10-1275 A (MITSUBISHI ELECTRIC CORP), 6 January 1998 (06.01.98), abstract, details 28,48, 33 in figures 1,2,5,6	1-7,9
Y	--	10
X	Patent Abstracts of Japan, abstract of JP 4-133990 A (MITSUBISHI ELECTRIC CORP), 7 May 1992 (07.05.92), abstract, figures	1-8
Y	--	10

 Further documents are listed in the continuation of Box C. See patent family annex.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 98/00806

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

02/02/99

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