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HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,
KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD,
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(54) Title: ARRANGEMENT IN THE SILL OF AN ELEVATOR CAR, AND SKIRTING

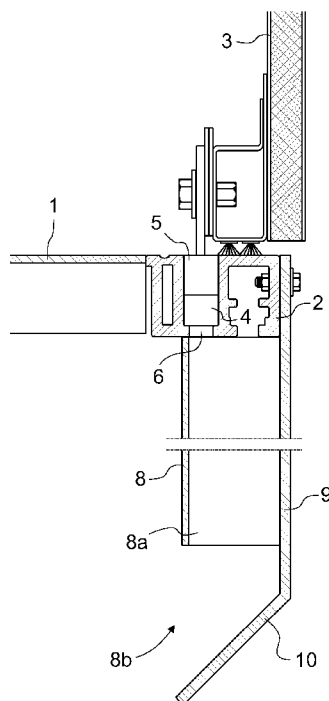


Fig. 3

(57) Abstract: The object of the invention is an arrangement in the sill of an elevator car, in which arrangement the sill of the elevator car comprises at least a sill profile (2) disposed on the front edge of the floor (1) of the elevator car, which sill profile comprises a guide groove (4) in the direction of movement of the door (3) of the elevator car, along which guide groove the guide shoe (5) of the door (3) is configured to travel, and in which bottom of the guide groove (4) are apertures (6) for dropping assorted debris and small stones out of the guide groove (4). An air duct (8) forming an air space (8a) is fitted below each aperture (6), the bottom end of which air duct is disposed below the raised air pressure zone produced by movement of the elevator car in such a way that the velocity of the air flowing into the air space (8a) from the bottom end of the air ducts (8) is essentially lower than the velocity of the air flowing at the level of the bottom edge of the sill profile (2).



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ARRANGEMENT IN THE SILL OF AN ELEVATOR CAR, AND SKIRTING

The object of the invention is an arrangement in the sill of an elevator as defined in the preamble of claim 1 and skirting as
5 defined in the preamble of claim 14.

In the bottom of the guide groove in the sill of an elevator car there must be apertures for removing debris, such as small stones or other corresponding debris, from the guide groove, so
10 that the door of the elevator car does not in the middle of its movement catch on and be obstructed by the debris. Debris from the apertures of the guide groove generally falls to the bottom of the elevator hoistway. One such solution according to prior art is presented in Fig. 1. A problem in this type of solution
15 is, however, that when the elevator car is traveling downwards at high velocity the air in the elevator hoistway below the elevator car tries to compact, producing air pressure, in which case the velocity of the pressurized air flow rises at the point of the sill of the elevator car. In this case, owing to
20 the pressure, the air flowing at high velocity through the apertures of the guide groove is in direct contact with the interior of the elevator car, in which the air flowing rapidly from the small apertures, especially in high-speed elevators, produces e.g. a disturbing noise.

25

The aim of the present invention is to eliminate the aforementioned drawbacks and to achieve an inexpensive and operationally reliable arrangement, which can be rapidly
30 through the sill of an elevator car by slowing down the passage of the air current through the sill of the elevator car or by completely preventing the passage of the air current through the sill of the elevator car. The arrangement according to the

invention is characterized by what is disclosed in the characterization part of claim 1. The skirting according to the invention is characterized by what is disclosed in the characterization part of claim 14. Other embodiments of the
5 invention are characterized by what is disclosed in the other claims.

The invention is applied in the sill of an elevator car, which sill comprises at least a sill profile disposed on the front
10 edge of the floor of the elevator car, in which sill profile is a guide groove for the guide shoe belonging to the door of the elevator car, and in the bottom of the guide groove apertures for dropping debris and small stones, and other dirt getting into the guide groove, out of the guide groove.
15 The concept of the invention is to fit ducts below the apertures of the bottom of the guide groove, which ducts start from below the guide groove and continue to a distance below the floor structure of the elevator car. Preferably the ducts continue to the bottom part of, or to below, the zone
20 below the elevator car of raised pressure resulting from the movement of the elevator moving downwards. In this case the velocity of the air flowing into the ducts, which can also be called air ducts, from the bottom end of them is essentially lower than the velocity of the air flowing at the level of
25 the bottom edge of the sill profile. At their simplest the air ducts are straight, or almost straight, tube or box sections.

Preferably the ducts are formed to be a part of the skirting
30 of the elevator car or are fixed to the skirting of the elevator car, in which case they in turn stiffen the structure of the skirting.

The arrangement according to the invention is also suited for use in the sill of an elevator car e.g. to damp the disturbing noise caused by movement of the elevator car, which noise is produced from the high-velocity air flow through the debris
5 apertures of the sill of the elevator car that is a consequence of the air pressure caused in the hoistway by the movement of the elevator car. For further reducing disturbing noise, the air ducts can be provided with a sound-damping cavity and/or a sound-damping material can be in the structure of the air
10 ducts.

Some inventive embodiments are also discussed in the descriptive section of the present application. The inventive content of the application can also be defined differently than
15 in the claims presented below. The inventive content may also consist of several separate inventions, especially if the invention is considered in the light of expressions or implicit sub-tasks or from the point of view of advantages or categories of advantages achieved. In this case, some of the attributes
20 contained in the claims below may be superfluous from the point of view of separate inventive concepts. Likewise the different details presented in connection with each embodiment can also be applied in other embodiments. In addition it can be stated that at least some of the subordinate claims can in at least
25 some situations be deemed to be inventive in their own right.

One advantage, among others, of the invention is that by means of it the detrimental and disturbing noises caused when the elevator car is moving by the rapidly flowing air current can
30 be reliably and effectively prevented. Another advantage is that the invention is inexpensive to implement and can be quickly and easily installed. Another advantage is that the damping of the air current can be integrated into the skirting,

which damping can at the same time reinforce the structures intended for sound damping of the air flow, in which case the skirting does not need extra reinforcement. Yet another advantage is that debris and small stones that have fallen from the aperture of the sill of the elevator car can be collected and emptied into a collection space from time to time, into suitable receptacles or bags, in which case debris and small stones are not be able to fall to the base of the elevator hoistway where they could hamper e.g. movements of the landing door of the lowermost floor.

In the following, the invention will be described in more detail by the aid of some examples of its embodiment with reference to the simplified and diagrammatic drawings attached, wherein

- Fig. 1 presents a simplified and partially sectioned side view of one sill of an elevator car according to prior art,
- 20 Fig. 2 presents a simplified and partially sectioned side view of one sill arrangement of an elevator car according to the invention,
- Fig. 3 presents a simplified and partially sectioned side view of one second sill arrangement of an elevator car according to the invention,
- 25 Fig. 4 presents a simplified and partially sectioned side view of one third sill arrangement of an elevator car according to the invention,
- Fig. 5 presents a top view of the skirting to be used in the sill arrangement of an elevator car according to Fig. 3.
- 30

Fig. 1 presents a simplified and partially sectioned side view of one sill arrangement of an elevator car according to prior art. The sill comprises a sill profile 200 disposed on the front edge of the floor 100 of the elevator car, which sill profile comprises a guide groove 400 in the direction of movement of the door 300 of the elevator car, along which guide groove a sliding guide shoe 500 of the door 300 is configured to travel. In Fig. 1 only the outermost part of the door 300 is presented. In the bottom of the guide groove 400 are apertures 600 for dropping assorted debris and small stones out of the guide groove 400. One problem is that when the elevator car is moving e.g. downwards in the elevator hoistway, the pressure of the air that is compressed because of the movement of the elevator car rises, and the air discharging due to the pressure flows between the sliding guide shoes 400 according to the arrow A at high velocity from the aperture 600 directly into the elevator car, producing *inter alia* a disturbing noise.

Fig. 2 presents a simplified and partially sectioned side view of one sill arrangement of an elevator car according to the invention. In this solution also the sill comprises a sill profile 2 disposed on the front edge of the floor 1 of the elevator car, which sill profile comprises a guide groove 4 in the direction of movement of the door 3 of the elevator car, along which guide groove the sliding guide shoe 5 of the door 3 is configured to travel. In Fig. 2 also only the outermost part of the door 3 is presented. Brush seals 7 are between the door 3 and the sill profile 2. In the bottom of the guide groove 4 are apertures 6 for dropping assorted debris and small stones out of the guide groove 4. An air duct 8 forming an air space 8a is fitted below each aperture 6, the bottom end of which air duct is disposed below the raised air pressure zone produced by movement of the elevator car in such a way that the velocity of

the air flowing into the air space 8a from the bottom end of the air ducts 8 is essentially lower than the velocity of the air flowing at the level of the bottom edge of the sill profile, in which bottom edge of the sill profile the high pressure raises the velocity of the air flow. In this way air under lower pressure flows essentially more slowly through the apertures 6 to inside the elevator car via the air space 8a of the air ducts 8 than if it were to flow directly from the level of the apertures 6 to inside the elevator car. A consequence of the slower flow is that the air flow no longer produces a disturbing noise or other nuisance.

Fig. 3 presents a simplified and partially sectioned side view of one second sill arrangement of an elevator car according to the invention. In this solution the air ducts 8 forming the air space 8a are integrated into the skirting 9, which is fixed at its top end to the sill profile 2. Air ducts 8, which are e.g. essentially rectangular in their cross-sectional shape, integrated into the skirting 9 function at the same time as reinforcements of the skirting 9, so that other ordinary stiffeners do not necessarily need to be fixed to the skirting 9. The skirting 9 below the air ducts 8 is preferably bent under the air ducts 8 in such a way that air is not able to flow directly into the air space 8a of the air ducts 8, in which case the velocity of the air flow slows down owing to the bend 10 before the air flow is admitted into the air space 8a. The bend 10 is made e.g. at an inclined attitude with respect to the vertical and so much lower than the bottom ends of the air ducts 8 that debris and small stones fall from the air space 8a from the gaps 8b between the bend 10 and the bottom ends of the air ducts 8 without the bend 10 preventing it, because the gaps 8b are larger than the debris and small stones falling through the air duct 8.

Fig. 4 presents a simplified and partially sectioned side view of one third sill arrangement of an elevator car according to the invention. In this solution the bottom end of the air ducts 5 8 is closed with a shut-off lid 11 so that debris and small stones are not able to drop directly into the elevator hoistway and at the same time so that air is in that case not able to flow at all into the elevator car via the air space 8a. The shut-off lid 11 is e.g. a sliding lid, which is configured for 10 moving in a groove 12 in essentially the horizontal direction, i.e. in the direction of the arrow B, to close and to open the bottom end of the air duct 8 as necessary. The shut-off lid 12 can also be hinged or otherwise configured to close and open the bottom end of the air duct 8.

15

Fig. 5 presents a top view of the skirting 9 to be used in the sill arrangement of an elevator car according to Fig. 3. On the side edges of the skirting 9 are various vertical stiffeners 13 of the skirting, but the air ducts 8 function as reinforcements 20 in the center of the skirting 9, of which air ducts there are a suitable number, e.g. 2, 3, 4, 5, 6 or more depending on the width of the skirting, at essentially regular intervals on the whole width of the skirting 9. The air ducts 8 are fixed to the skirting 9 e.g. with bolts and nuts, by welding or with some 25 other suitable fastening method.

It is obvious to the person skilled in the art that the invention is not limited solely to the examples described above, but that it may be varied within the scope of the claims 30 presented below. Thus, for example, the air ducts can be different to what is presented above. The bottom end of the air ducts can e.g. be bent in such a way that the air flow does not enter directly into the air ducts. What is essential is that

swiftly flowing air, which would produce extra noise or other disturbance, does not gain admission into the elevator car via the air ducts.

5 It is also obvious to the person skilled in the art that the air ducts do not necessarily need to be vertical, but instead they can also be in an inclined attitude with respect to the direction of movement of the elevator car. In this case the admission of air into the air duct becomes more difficult, in
10 which case an air flow that is significantly slowed down flows in the air duct.

It is also obvious to the person skilled in the art that there does not need to be an own air duct for each aperture of the
15 guide groove, and likewise it is obvious to the person skilled in the art that the air space formed by an individual air duct can extend to below more than one aperture of the guide groove.

It is also obvious to the person skilled in the art that in the
20 bottom end of the air duct can be a bend, such as a curved bend or sloping bend, for restricting the access of an air current into the air space.

CLAIMS

1. Arrangement in the sill of an elevator car, in which arrangement the sill of the elevator car comprises at least a
5 sill profile (2) disposed on the front edge of the floor (1) of the elevator car, which sill profile comprises a guide groove (4) in the direction of movement of the door (3) of the elevator car, along which guide groove the guide shoe (5) of the door (3) is configured to travel, and in the bottom of
10 which guide groove (4) are apertures (6) for dropping assorted debris and small stones out of the guide groove (4), **characterized** in that an air duct (8) forming an air space (8a) is fitted below each aperture (6), which air duct extends to below the elevator car.

15

2. Arrangement according to claim 1, **characterized** in that the bottom end of the air duct is disposed in the bottom part of, or below, the raised air pressure zone produced by movement of the elevator car.

20

3. Arrangement according to claim 1 or 2, **characterized** in that the velocity of the air flowing into the air space (8a) from the bottom end of the air ducts (8) is configured to be essentially lower than the velocity of the air flowing at the
25 level of the bottom edge of the sill profile (2).

4. Arrangement according to claim 1, **characterized** in that an air duct (8) forming an air space (8a) is fitted below each aperture (6), the bottom end of which air duct is disposed
30 below the raised air pressure zone produced by movement of the elevator car in such a way that the velocity of the air flowing into the air space (8a) from the bottom end of the air ducts (8) is essentially lower than the velocity of the

air flowing at the level of the bottom edge of the sill profile (2).

5. Arrangement according to claim 4, **characterized** in that the top end of the air duct (8) is essentially level with the bottom surface of the sill profile (2) and the bottom end of the air duct (8) is essentially below the raised air pressure zone produced by movement of the elevator car.

10 6. Arrangement according to any of the preceding claims, **characterized** in that the air ducts (8) are composed of different tubes or corresponding, which are fixed at their top end to the sill profile (2) at the point of the apertures (6), below the apertures (6).

15

7. Arrangement according to any of claims 1-5, **characterized** in that the air duct (8) is integrated into the skirting (9) and arranged at the same time to reinforce the skirting (9).

20 8. Arrangement according to claim 7, **characterized** in that on the bottom edge of the skirting (9) extending in the vertical direction to below the air space (8a) of the air duct (8) is a bend (10) covering the air space, which bend is arranged to prevent entry of the air flow directly into an air duct (8).

25

9. Arrangement according to claim 8, **characterized** in that between the bend (10) on the bottom edge of the skirting (9) and the bottom edge of the air duct (8) is a gap (8b), which is larger than the debris and small stones falling through the air
30 duct (8).

10. Arrangement according to any of the preceding claims, **characterized** in that the air duct (8) is disposed in an inclined attitude with respect to the vertical plane.

5 11. Arrangement according to any of the preceding claims, **characterized** in that in the bottom end of the air duct (8) is a bend, such as a curved bend or sloping bend, for restricting the access of an air current into the air space (8a).

10

12. Arrangement according to any of the preceding claims, **characterized** in that in the bottom end of the air duct (8) is a shut-off lid (11), for preventing the access of an air current into the air space (8a) as well as for preventing
15 debris and small stones from falling into the elevator hoistway.

13. Arrangement according to claim 9, **characterized** in that the shut-off lid (11) is a sliding lid, a lid provided with a hinge
20 or a shut-off lid fitted detachably, or in a manner allowing opening in some other way, to the bottom end of the air duct (8).

14. Skirting (9) of an elevator car, in which elevator car a
25 sill profile (2) is disposed on the front edge of the floor (1) of the elevator car, in the bottom of the guide groove (4) in which sill profile are apertures (6) for dropping assorted debris and small stones out of the guide groove (4), **characterized** in that on the skirting (9) an air duct (8)
30 forming an air space (8a) is fitted below at least one aperture (6) of the sill profile, which air duct extends from the proximity of the aperture (6) to the bottom end, or to the proximity of the bottom end, of the skirting (9).

15. Skirting according to claim 14, **characterized** in that there are a number of air ducts (8) in the skirting.

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Prior Art

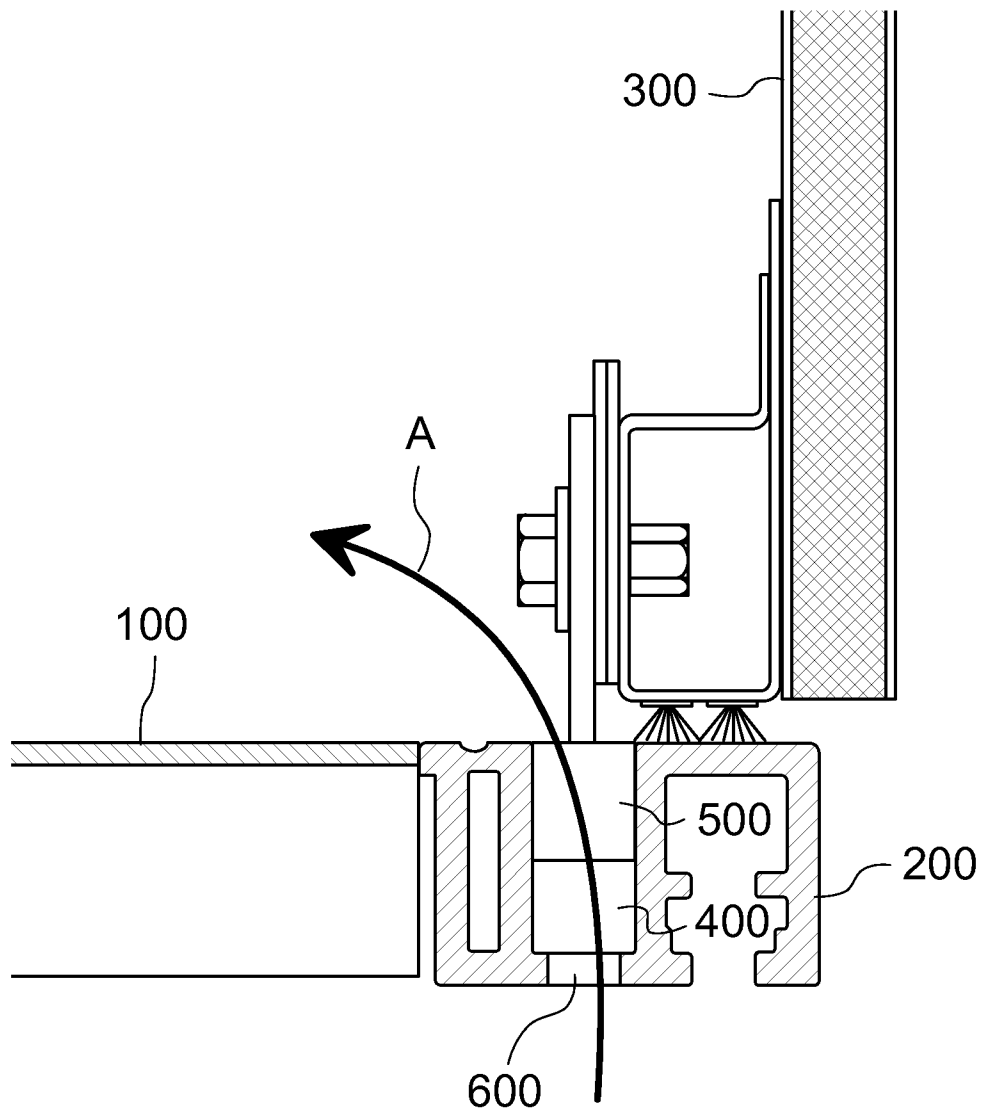


Fig. 1

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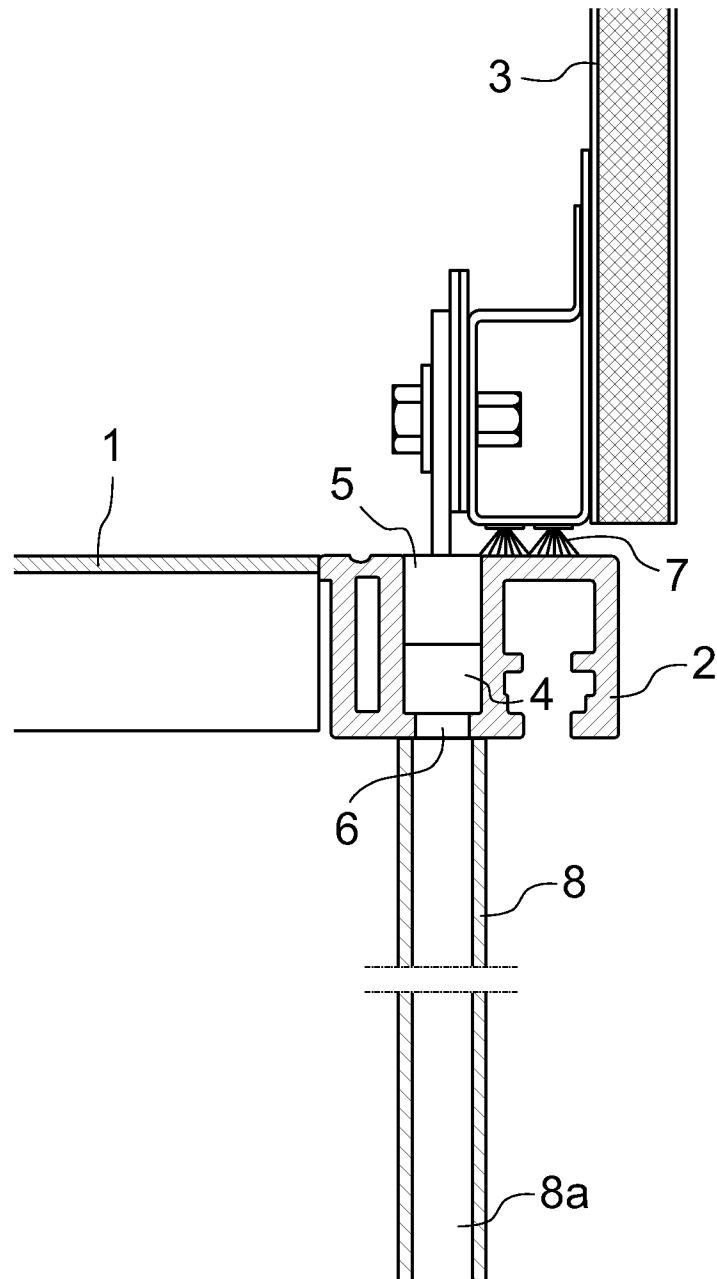


Fig. 2

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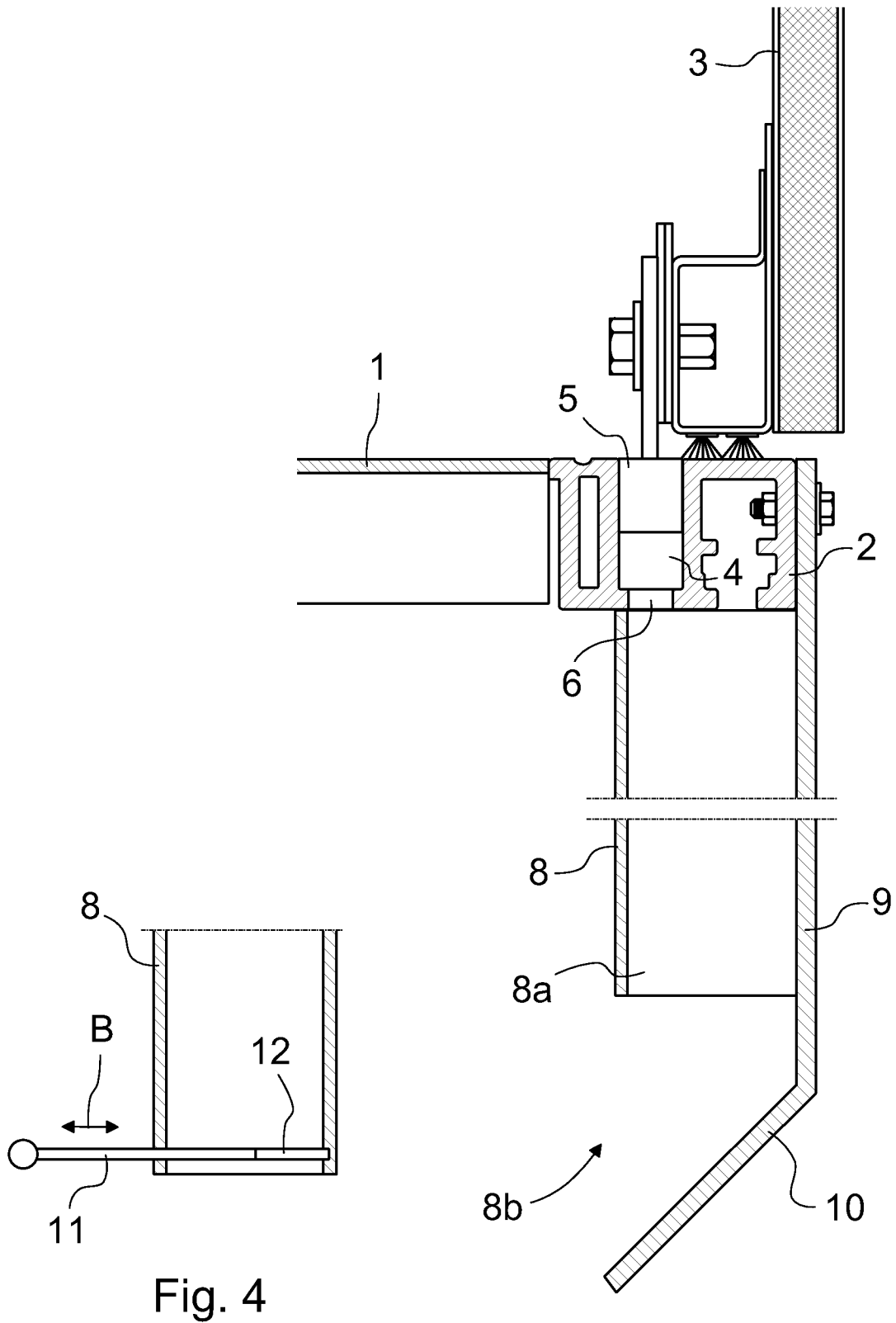


Fig. 4

Fig. 3

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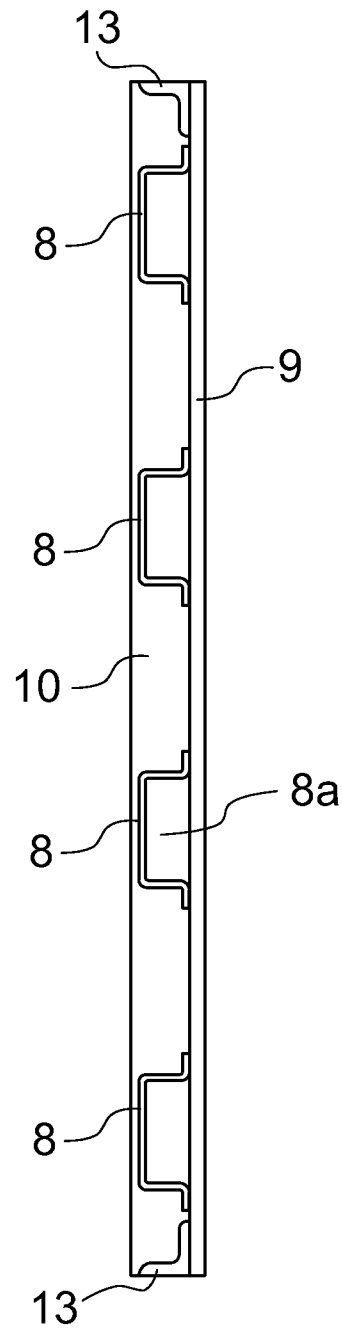


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2013/050221

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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)

IPC: B66B

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

FI, SE, NO, DK

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

EPO-Internal, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP H0578071 A (TOSHIBA CORP) 30 March 1993 (30.03.1993) figure 1 & abstract [online] EPOQUENET EPODOC	1-5, 12-13
A	EP 0603681 A1 (KONE OY [FI]) 29 June 1994 (29.06.1994) whole document, in particular column 1, line 43 – column 2, line 18; figure 1	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/FI2013/050221

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