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(54) **SLIDING DOOR DRIVE APPARATUS AND KIT FOR EQUIPPING A FACADE THEREWITH**

(57) Operating apparatus (10) for a sliding door comprising:

- a frame (11) fixable to a vertical support (12),
- support means (13) connected to said frame (11) and suitable to support at least one leaf (14) of the sliding door to said frame (11) and to slide said shutter (14) along said frame (11) according to a opening/closing direction (A);

- a casing (15) fixable to said frame (11) and adapted to cover said support means (13);

- lighting means (16) fixed to said frame (11) and configured such that in a condition of use, in which said frame (11) is fixed to a vertical wall, said lighting means (16) are activated to project at least one light radiation that is projected on said vertical wall in a direction which is substantially parallel to the latter.

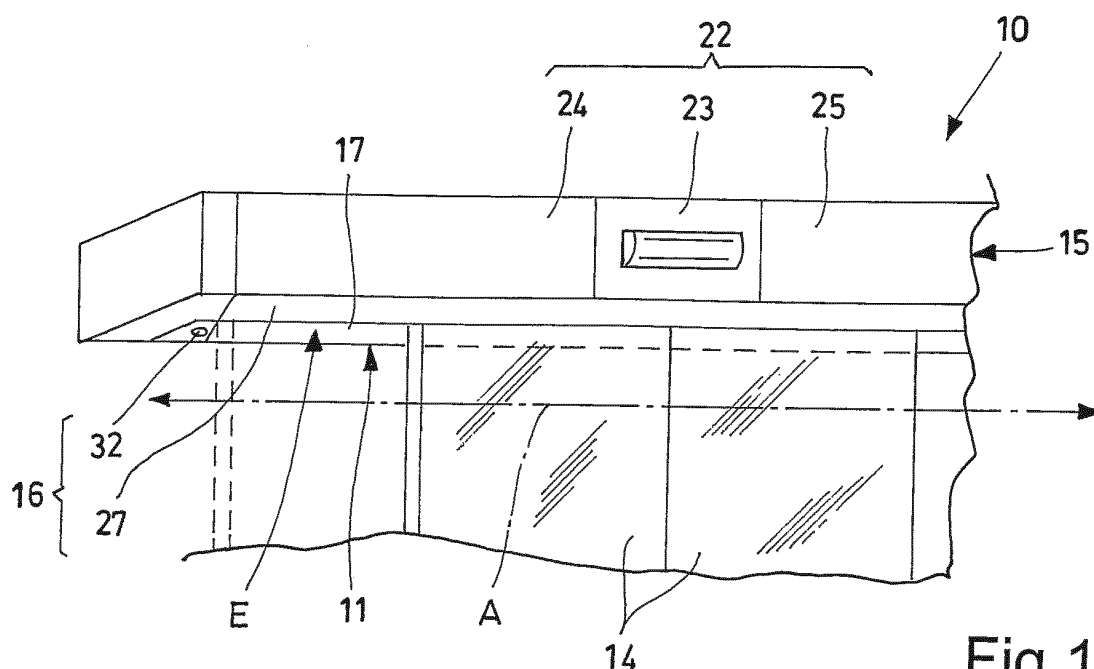


Fig.1

Description

[0001] The present invention relates to an apparatus for operating a sliding door and a kit for equipping a facade which comprises such an apparatus.

[0002] In particular, the present invention relates to an apparatus for operating a sliding door intended to be installed on walls not already adapted to carry a sliding door, and a kit to equip the facade of that wall.

[0003] Therefore the present invention is in the field of auxiliary structures for buildings.

[0004] Nowadays, in the field of drives for sliding doors are known apparatuses comprising a casing that can be fixed to the wall and which accommodates a device adapted to support and/or to operate a sliding door.

[0005] Once installed, this traditional system presents the casing that protrude from the wall facade wherein one leaf or two leaves of the door hang below the casing. It is clear that such operating device must extend for the entire movement path of the leaf and then, with respect to the area which the door is intended to close, extends the entire length of the leaf, on one side of the compartment, if the door is a single-leaf door or, if the door is a two-leaf door extends on both sides of the compartment of a length at least equal to that of each leaf.

[0006] The resulting aesthetic effect of the casing is that of a bulky item and disproportionate to the opening. Generally, the aesthetic effect of these traditional devices is not liked at all.

[0007] The problem underlying the present invention is to propose an apparatus for actuating a sliding door which present a visual impact less bulky than the traditional devices.

[0008] An aim of the present invention is to provide an apparatus for actuating a sliding door and a kit for equipping facades which solves this problem by overcoming the drawbacks of the traditional operating apparatuses described above.

[0009] Within this aim, it is an object of the present invention to propose an apparatus for operating a sliding door that, compared to traditional equipment, allows for greater integration of accessories to the walls as lighting systems or indication light systems or ventilation systems or awning or shading.

[0010] Another aim of the present invention is to provide an apparatus for operating a sliding door that, compared to the traditional ones, allows for greater integration with windows or accessories systems for windows and/or shop windows.

[0011] Another object of the invention is to propose an apparatus for operating a sliding door which allows to integrate more effectively with ancillary structures of glasses and display walls.

[0012] A further object of the present invention is to provide a kit for equipping a facade that allows to integrate easily and effectively a sliding door in a facade not suitable to have a compartment for sliding door.

[0013] This task, these aims and others which will be-

come apparent hereinafter are achieved by an apparatus for actuating a sliding door according to appended claim 1. Detail features of the apparatus for operating a sliding door according to the invention are disclosed in the dependent claims.

[0014] Further characteristics and advantages of the invention result from the description of a preferred embodiment, of the apparatus for operating a sliding door and a kit for equipping a facade according to the invention, illustrated only by way of non-limitative example in the accompanying of drawings, in which:

- Figure 1 shows schematically a perspective view of an apparatus of the operating apparatus according to the invention;
- Figure 2 shows a cross section of an operating apparatus according to the present invention;
- Figures 3a and 3b show, respectively in front view and plan view, a first combination of modules of a kit for equipping a facade according to the present invention;
- Figure 4 illustrates in schematic form the parts of a kit for equipping a facade according to the present invention;
- Figures 5a and 5b show, in front view and plan view respectively, a second combination of modules of a kit for equipping a facade according to the present invention;
- Figures 6 to 10 illustrate combinations of modules of a kit for equipping a facade according to the present invention.

[0015] With particular reference to the mentioned figures, it is globally indicated with 10 an apparatus for operating a sliding door comprising:

- a frame 11 that can be fixed to a vertical support 12,
- support means 13 connected to the frame 11 and adapted to hang at least one leaf 14 of the sliding door to the frame 11 and to slide the leaf 14 along the frame 11 in a opening/closing direction A;
- a casing 15 which can be fixed to the frame 11 and adapted to cover the support means 13 for concealing them.

[0016] According to the present invention, the operating apparatus 10 has a particular characteristic in that it comprises lighting means 16 fixed to the frame 11 and configured such that, in a use condition in which the frame 11 is fixed to a vertical wall, the lighting means 16 are activated to project at least one light radiation that hits in a substantially oblique way the vertical wall.

[0017] The illumination effect on a zone of the wall or facade adjacent to where the operating apparatus 10, thereby created, is that it is dramatically reduced the perception of the operating apparatus itself so as to greatly reduce the visual impact thereof compared to the conventional operating apparatuses.

[0018] Preferably, the operating apparatus 10 is configured in such a way that the lighting means 16 in use project at least one light radiation towards the sliding door and/or towards the facade on which the operating apparatus 10 is supported.

[0019] In general, preferably the lighting means 16 are adapted to generate:

- a light radiation substantially uniform and diffused on the area below the operating apparatus 10 when it is in use;
- and/or one or more focused light beams, which are projected below the operating apparatus 10 when it is in use.

[0020] Structurally, the operating apparatus 10 preferably develops mainly along the opening/closing direction A and includes:

- a rear wall 17 shaped to be fixed on a substantially flat support, that forms part of the frame 11 and is adapted to be secured to vertical support 12;
- a upper wall 18, directly fixed to or integral with the rear wall 17;
- a front wall 19, opposite said rear wall 17 and directly fixed to or integral with the upper wall 18. These walls 17, 18, 19 delimit a compartment B internal to the apparatus 10 in which are housed the support means 13.

[0021] The lighting means 16 are advantageously configured so as to generate a light radiation directed from the inside towards the outside of the compartment B, in a direction at least predominantly parallel to the rear wall 17.

[0022] In this way, the lighting means 16 in use illuminate in a substantially oblique way the facade on which the apparatus is installed and/or the opening of the door so as to make more relevant the visual impact of the illuminated area, and then draw on this the attention of a bystander and consequently further reduce the visual impact of the operating apparatus.

[0023] The frame 11 includes advantageously the rear wall 17 and the upper wall 18, each provided with a face C and D respectively, that are external to the compartment B. These two external faces C and D preferably extend along mutually perpendicular planes, so that, when the operating apparatus is fixed to a vertical wall, by its rear wall 17, then the outer face D of the upper wall is horizontal.

[0024] The support means 13 advantageously comprise at least one rail 20 fixed to the rear wall 17 or integral with the latter.

[0025] The front wall 19 preferably includes a support 21 fixed to the upper wall 18, or integral with the latter and a hiding element 22 that can be fixed in a removable manner to the support 21 and adapted to conceal the contents of the compartment B.

[0026] The hiding element 22 advantageously comprises:

- at least one central element 23;
- at least a left lateral element 24;
- and at least one right lateral element 25.

[0027] For sake of simplicity only, in the description that follows, and in Figure 1, is disclosed a hiding element 22 that have only two lateral elements, one on the right side and one on left side 25, 24, however, the present description is applicable mutatis mutandis to the case of a plurality of lateral elements 24 and 25. Advantageously, locking means adapted to lock the hiding element 22 to the support 21 are provided.

[0028] These locking means 26 are configured so that the lateral elements 24, 25 are locked or unlocked to the support 21 by means of a sliding movement along a direction parallel to the opening/closing direction A. In general, the locking means 26 are also configured in such a way that the central element 23 is lockable and unlockable to the support 21 along a direction perpendicular to the opening/closing direction A and that if the elements 23, 24, 25 are locked to the support 21, then the central element 23 prevents lateral elements 25, 26 an unlocking sliding along the opening/closing direction A, to keep them locked to the support 21 as long as the central element 23 is locked thereto.

[0029] Preferably, the locking means 26 comprise a bayonet type device of the type equipped with a mushroom-shaped anchoring member adapted to engage a lane by means of a movement that is first perpendicular to the opening/closing direction A, for coupling with the lane, and then parallel to the opening/closing direction A to engage the lane with the head of the anchoring device.

[0030] The lighting means 16 advantageously comprise a device for light diffusion 27 shaped to form a light band, extending parallel to the opening/closing direction A. The light diffusion device 27 advantageously comprises:

- a parabolic reflector 28;
- light emitters 29, preferably LEDs, mounted to the parabolic reflector 28 and arranged so as to illuminate it during use;
- a translucent screen 30 secured to the parabolic reflector 28 so as to be illuminated, in use, by the light emitted by the light emitters 29 after being reflected from the parabolic reflector 28.

[0031] Preferably, the light diffusion device 27 is fixed to or integral with the front wall 19, and delimits, in cooperation with the rear wall 17 and a bottom opening E of the compartment B through which a leaf 14 of the sliding door can protrude from the operating apparatus 10.

[0032] Preferably, the light diffusion device 27 protrudes from the front wall 19 towards the rear wall 17 and by its own free edge defines a side of the lower opening,

the other side of the latter being defined by the rear wall 17.

[0033] Advantageously, the free edge of the light diffusion device 27 carries a yielding element, for example a brush, adapted to close a portion of the lower opening E which is free from the leaf 14 when this is hanged to the support means 13.

[0034] The lighting means 16 preferably comprise spotlights adapted to emit focused light beams.

[0035] It makes part of the present invention also a kit 100 to equip a facade with a sliding door, which comprises an operating apparatus 10.

[0036] Preferably, the kit 100 comprises support elements 101, which can be fixed to the operating apparatus 10 so as to extend transversely and/or parallel to the opening/closing direction A and suitable for being affixed to a floor and/or ceiling and/or vertical walls of a building and configured to support the operating apparatus 10.

[0037] Advantageously, the support elements 101 include bearing beams preferably equipped with a cover.

[0038] With particular reference to Figure 10, the support elements 101 are preferably configured to form an H-shaped structure comprising a central beam 101a that extends horizontally between two walls, and two uprights 101b and 101c which extend from a floor to a ceiling.

[0039] In this way, through the support elements 101 it is possible to obtain a self-supporting structure which includes the operating device 10 which may comprise in central part of the support means 13 to operate the leaves 14 of a door and, in the side parts 10a such as spotlights and/or tends to respectively illuminate or cover an exhibition zone as a shop window 102.

[0040] The kit 100 is advantageously modular and comprises a plurality of modular elements having a flat face that can be fixed to a vertical support and having all the same cross section, relative to a plane perpendicular to said planar face.

[0041] Said plurality of modules 110, 111, 112, 113 preferably comprises:

- a main module 110 which consists of the operating apparatus 10;
- extension modules 111 that can be fixed or put side by side to the main module 110 to extend the latter, or to be aligned to it, along the opening/closing direction A;
- angular modules 112, suitable to be attached to the main module 110 and/or extension modules 111 and having a first part 112a extending in a first direction, that can be aligned to the opening/closing direction A, and a second part 112b extending in a second direction forming a predetermined angle with the first direction;
- modular end elements 113 equipped with a face shaped so as to connect to a front face of the modules 110, 111, 112 to the surface to which they are attached in use.

[0042] At least one of the modules 110, 111, 112, 113 is equipped with an accessory to choose from:

- an extensible curtain comprising a protecting or shading element and a drive device configured to extend or rewind said protecting or shading element from/into said module;
- an air knife generating device configured to generate an air knife extending from the module;
- lighting elements capable of casting light on the outside of the module.

[0043] With particular reference to Figures 7 to 13, the kit 100 further includes structural elements accessories, globally indicated with reference numeral 114, adapted to be combined with the operating apparatus 10 and/or with the support elements 11 to form a box shaped access structure with sliding doors, possibly equipped with display niches 115.

[0044] The structural elements accessories 114 preferably include structural supports 114a, 114b, suitable to support the operating apparatus 10 spaced apart from the wall which has the opening to be closed by the door supported by the operating mechanism 10.

[0045] The support elements 114a and 114b may comprise glass panels 114a, possibly self-supporting, and/or beams 114b.

[0046] With particular reference to Figures 11-13, the structural supports advantageously define a forepart 300 that can support the structure 200 resulting from the installation of the kit 100, spaced from the wall that presents the compartment to be equipped with the leaf/leaves of the sliding door.

[0047] In this way it is possible to prevent the structure 200 to be superimposed to the facade to which it is connected, so as to integrate them by defining an architectural element in its own right in combination with the projecting part, such as illustrated in Figures 11-13.

[0048] The invention as it is conceived is susceptible to numerous modifications and variants, all falling within the scope of the appended claims.

[0049] Furthermore all the details can be replaced by technically equivalent elements.

[0050] In practice, the materials used, as well as the contingent shapes and dimensions, can be varied according to the contingent requirements and the state of the art.

[0051] Where the construction characteristics and techniques mentioned in the appended claims are followed by signs or reference numbers, such signs or reference numbers have been used for the sole aim of increasing the intelligibility of the claims themselves and, therefore, they do not in any way constitute a limitation to the interpretation of each element which is identified, purely by way of example, by such signs or reference numbers.

Claims

1. Operating apparatus (10) for a sliding door comprising:

- a frame (11) fixable to a vertical support (12),
 - support means (13) connected to said frame (11) and suitable to support at least one leaf (14) of the sliding door to said frame (11) and to slide said shutter (14) along said frame (11) according to a opening/closing direction (A);
 - a casing (15) fixable to said frame (11) and adapted to cover said support means (13);
characterized in that it comprises lighting means (16) fixed to said frame (11) and configured such that in a condition of use, in which said frame (11) is fixed to a vertical wall, said lighting means (16) are activated to project at least one light radiation that is projected on said vertical wall in a direction which is substantially parallel to the latter.

2. Operating apparatus (10) according to claim 1 **characterized in that** said operating apparatus (10) which extends mainly along said opening/closing direction (A) and comprises:

- a rear wall (17) forming part of said frame (11) and adapted to be secured to said vertical support (12);
 - an upper wall (18), directly attached to said rear wall (17) or integral with the latter;
 - a front wall (19), opposite said rear wall (17) and directly fixed to said upper wall (18) or integral with the latter;
 said walls (17, 18, 19) delimiting a compartment (B) which is internal to said operating apparatus (10) in which are housed said support means (13); said lighting means (16) being configured so as to emit said at least one light radiation from the inside to the outside of said compartment (B), in a direction at least predominantly parallel to said rear wall (17).

3. Operating apparatus (10) according to claim 2 **characterized in that** said frame (11) comprises said rear wall (17) and said upper wall (18), having two outer faces which are external to said compartment (B) which develop according to mutually perpendicular planes; said support means (13) comprising at least one rail (20) fixed to said rear wall (17) or integral with the latter.

4. Operating apparatus (10) according to one of claims 2 and 3 **characterized in that** said front wall (19) comprises a support (21) secured to said upper wall (18), or integral with the latter, and a hiding element (22) fixable in a removable manner to said support

(21).

5. Operating apparatus (10) according to claim 4 **characterized in that** said hiding element (22) comprises:

- at least one central element (23);
 - at least a left lateral element (24);
 - and at least one right lateral element (25);
 locking means (26) being provided for locking said hiding element (22) to said support (21) and configured so that said lateral elements (24, 25) are locked to/unlocked from said support (21) by a sliding movement along a direction parallel to said opening/closing direction (A); said locking means (26) being further configured such that said central element (23) is lockable/unlockable from said support (21) along a direction perpendicular to said opening/closing direction (A) and that if said elements are locked to said support (21), said central element (23) prevents said side (24, 25) sliding along said opening/closing direction (A), to keep them locked to said support (21).

6. Operating apparatus (10) according to one of the preceding claims **characterized by** the fact that said lighting means (16) comprise a device for light diffusion (27) shaped to form a light band elongated, extending parallel to said opening/closing direction (A).

7. Operating apparatus (10) according to claim 6, **characterized in that** said device for light diffusion (27) comprises:

- a parabolic reflector (28);
 - light emitters (29) fixed to said parabolic reflector (28) and arranged so as to illuminate it during use;
 - a translucent screen (30) fixed to said parabolic reflector (28) so as to be illuminated, in use, by the light emitted by said light emitters (29) after being reflected from said parabolic reflector (28).

8. Operating apparatus (10) according to claim 2 and one of claims 6 and 7 **characterized by** the fact that said device for light diffusion (27) is fixed to or integral with said front wall (19), and delimits, in cooperation with said rear wall (17) a bottom opening (E) of said compartment (B) through which a leaf (14) of the sliding door can protrude from said operating apparatus (10).

9. Operating apparatus (10) according to one of the preceding claims **characterized by** the fact that said lighting means (16) comprise spotlights adapted to emit focused light beams.

10. Kit for equipping a facade with a sliding door, comprising an operating apparatus (10) made according to one of the preceding claims.
11. A kit for equipping a facade according to claim 10 **characterized in that** it comprises support elements (101), attachable to said operating apparatus (10) so as to extend transversely and/or parallel to said opening/closing direction (A) and adapted to be fixed to a floor and/or ceiling and/or the vertical walls of a building and configured to support said operating apparatus (10). 5 10
12. A kit for equipping a facade according to one of claims 10 and 11 **characterized in that** it comprises a plurality of modular elements having a flat face that can be fixed to a vertical support (12) and having all the same section, with respect to a plane perpendicular to said flat face. 15 20
13. A kit for equipping a facade according to claim 12 **characterized in that** said plurality of modules 110, 111, 112, 113 includes:
- a main module (110) said apparatus consisting of said operating apparatus(10); 25
 - extension modules (111) which can be fixed or placed side by side to said main module (110) to extend the latter, or to be aligned to it, along said opening/closing direction (A); 30
 - angular modules (112), adapted to be secured to said main module (110) and/or said extension modules (111) and having a first part (112a) extending in a first direction, and suitable to be aligned along said opening/closing direction (A), and a second part (112b) extending in a second direction forming a predetermined angle with said first direction; 35
 - modular end elements (113) equipped with a front shaped so as to joint a front face of said modules (110, 111, 112) to the surface to which they are attached in use. 40
14. Kit for equipping a facade according to claim 13 **characterized in that** at least one of said modules (110, 111, 112, 113) is equipped with at least one accessory chosen from: 45
- an extensible curtain comprising a shielding or shading element and an operating device configured to extend or fold out/rewind said shielding or shading element from/into said module; 50
 - an air knife configured to generate an air curtain extending from said module;
 - lighting elements capable of casting light towards the outside of that module. 55

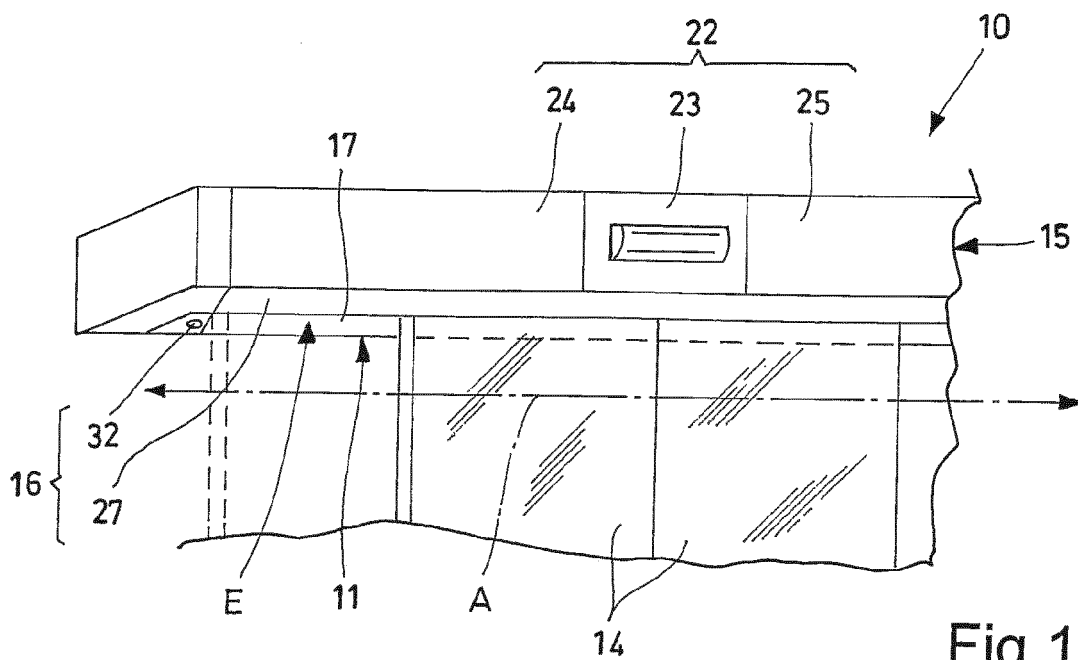


Fig. 1

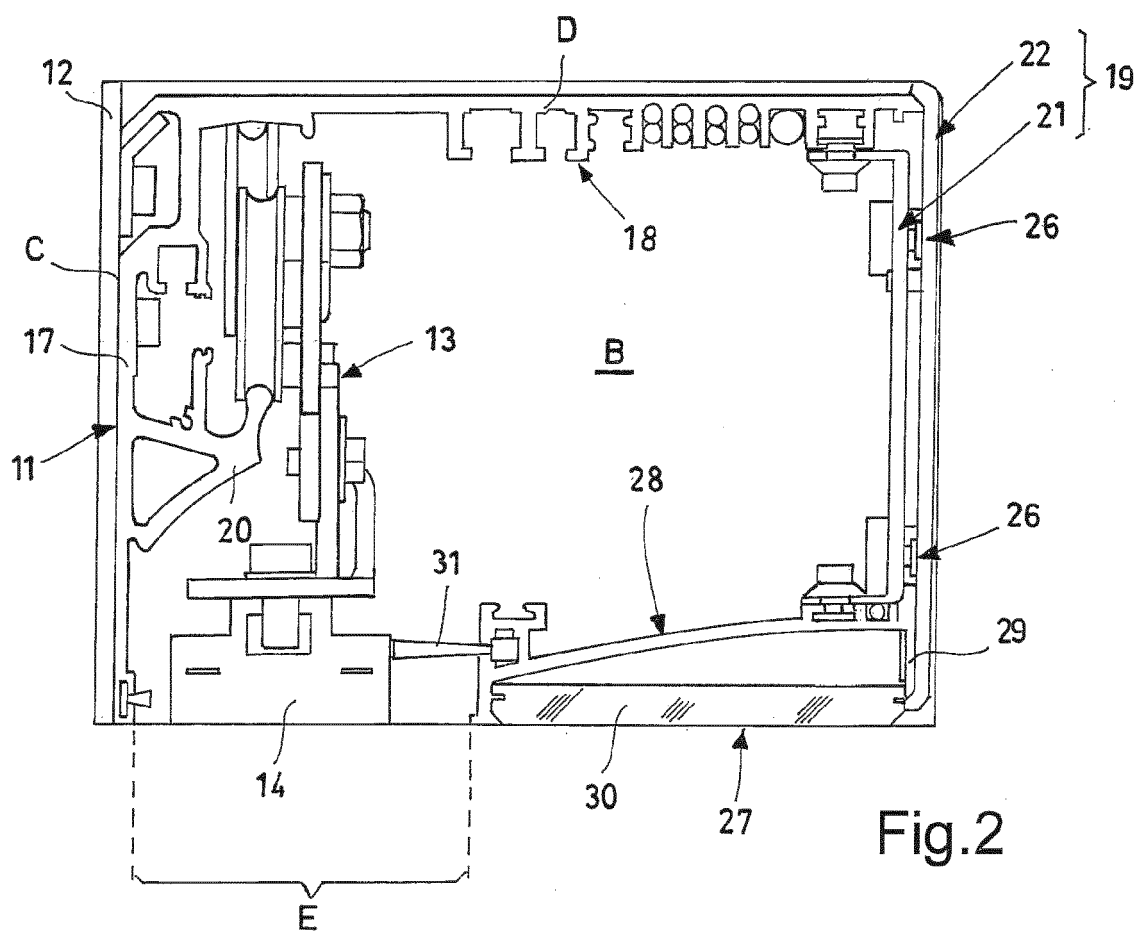


Fig.2

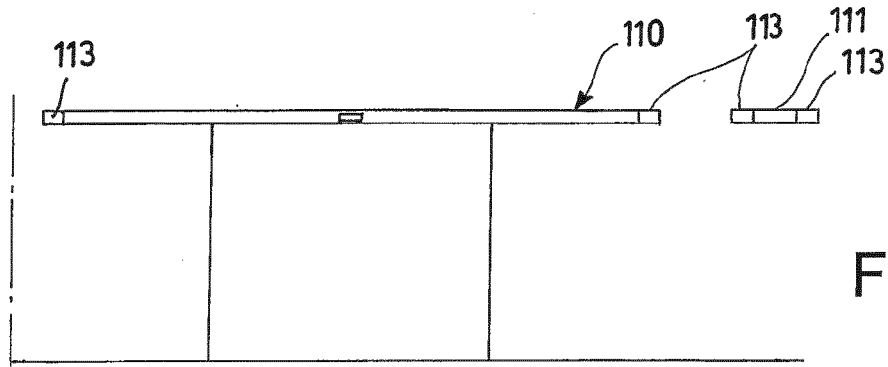


Fig.3a

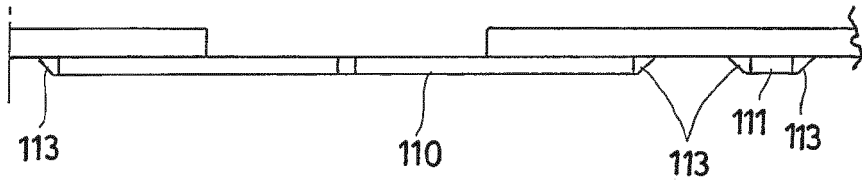


Fig.3b

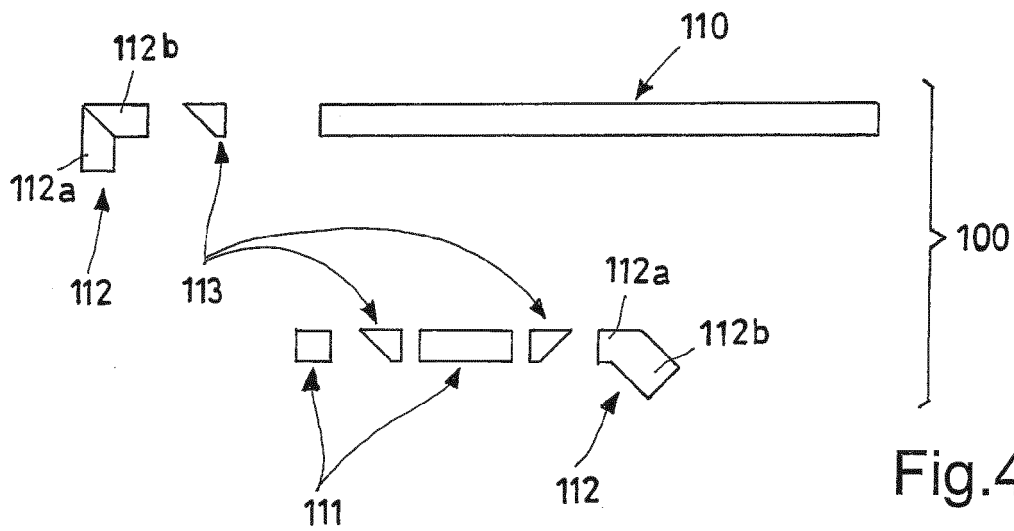


Fig.4

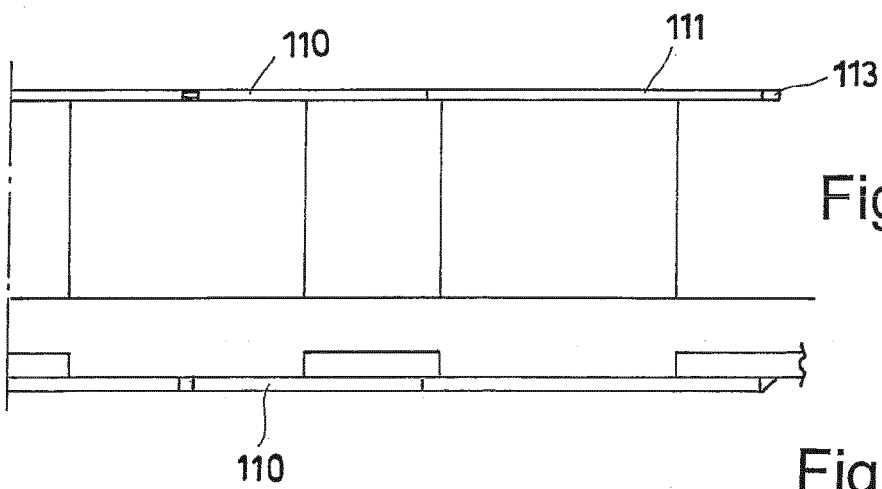


Fig.5a

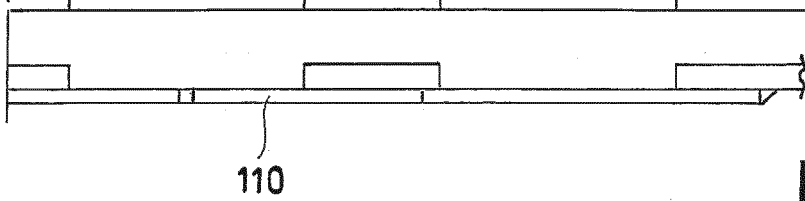


Fig.5b

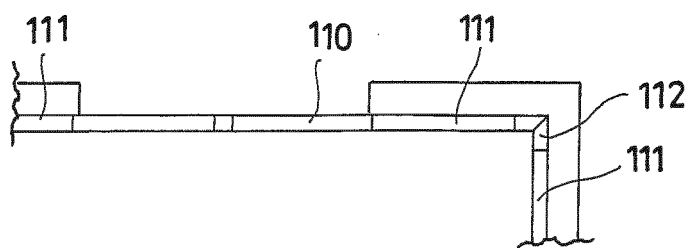


Fig. 6

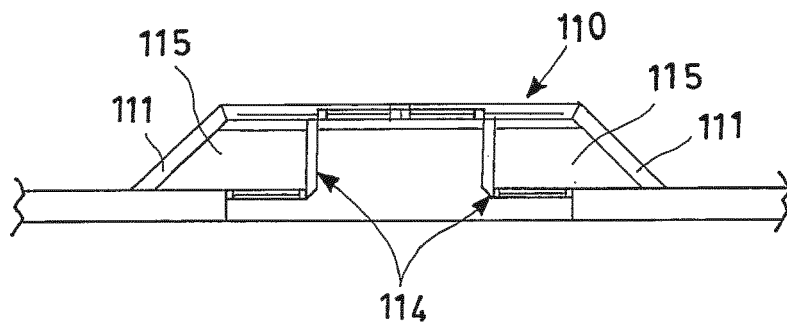


Fig. 7

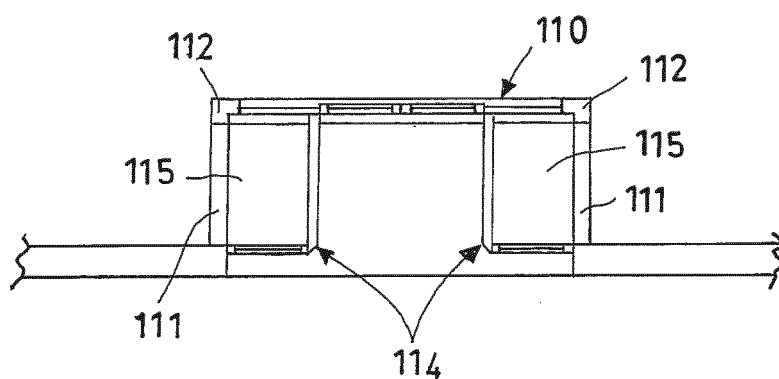


Fig. 8

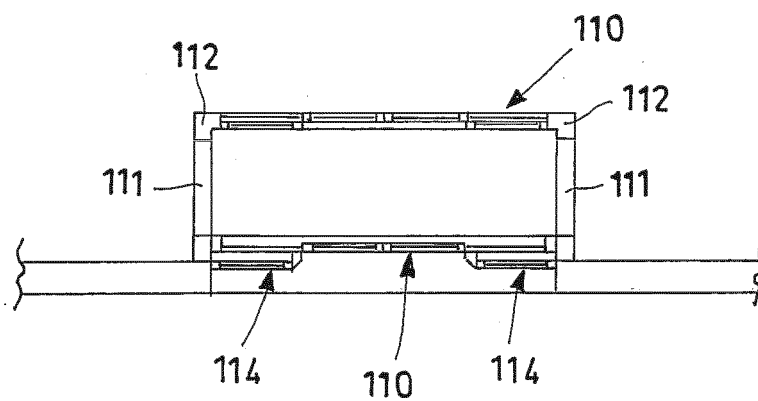


Fig. 9

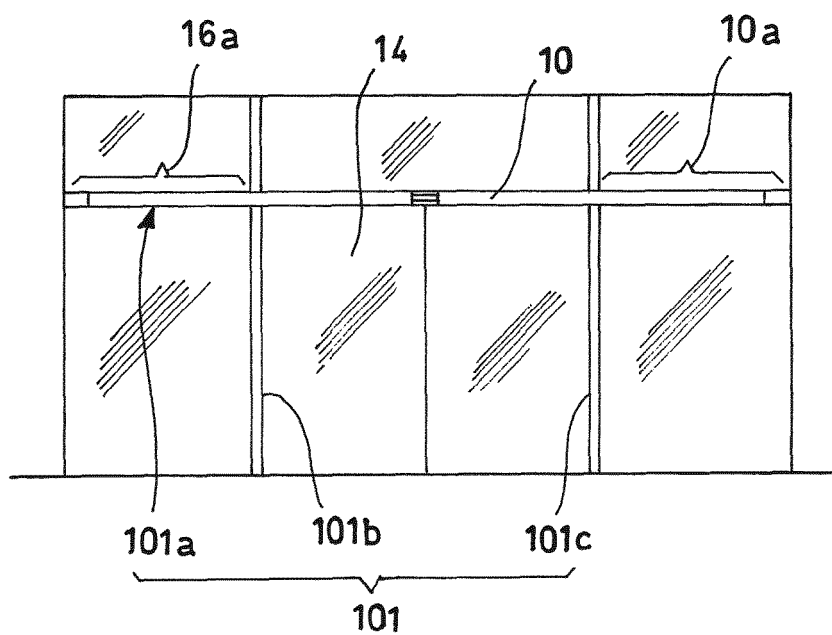


Fig.10

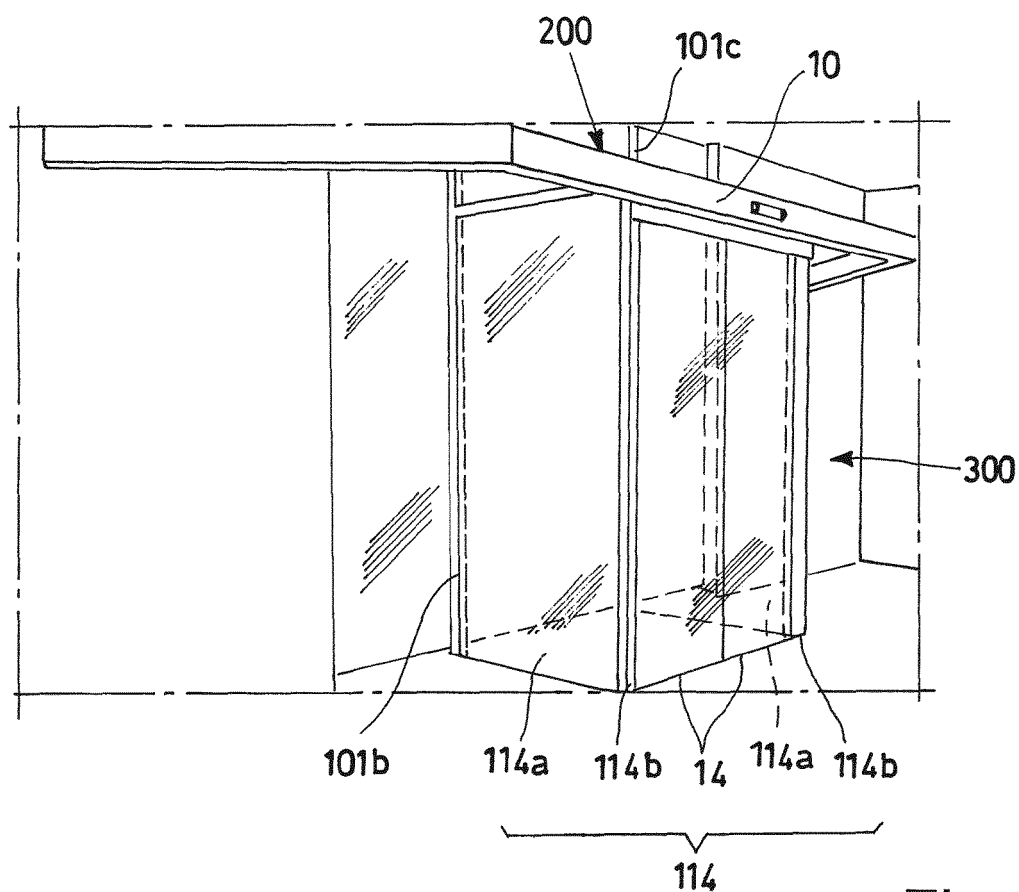
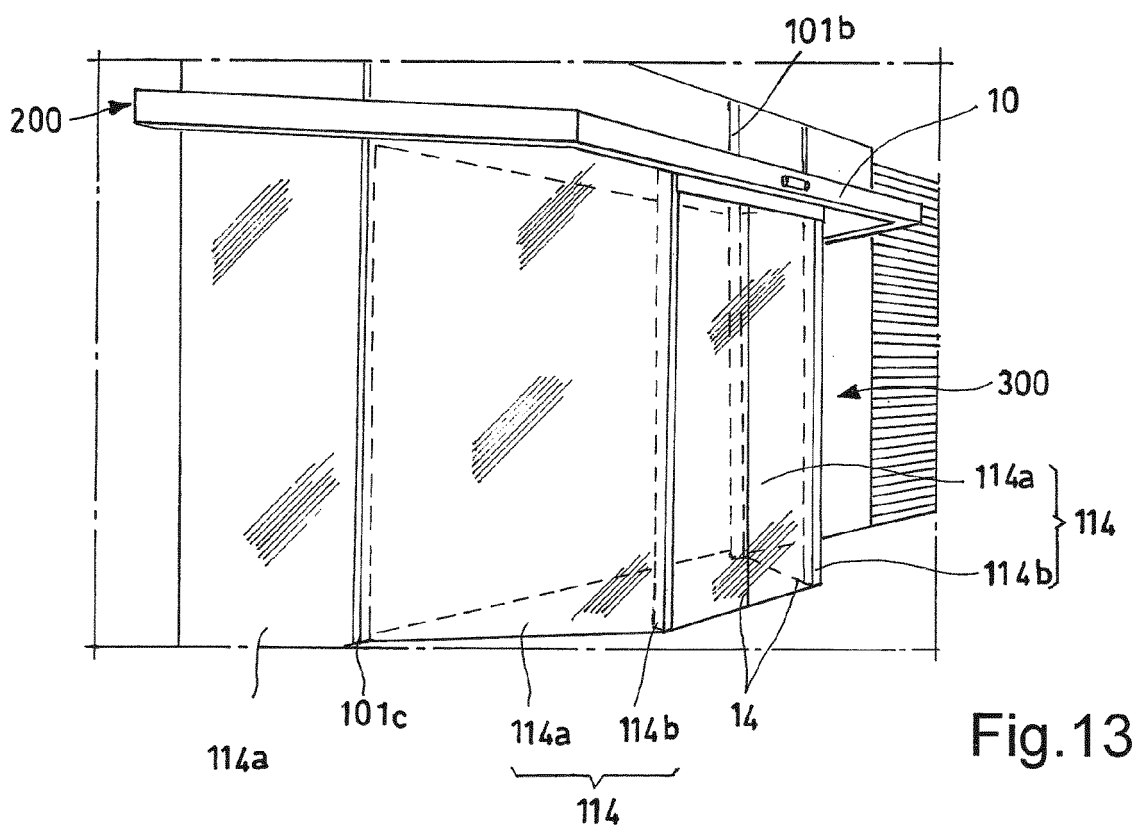
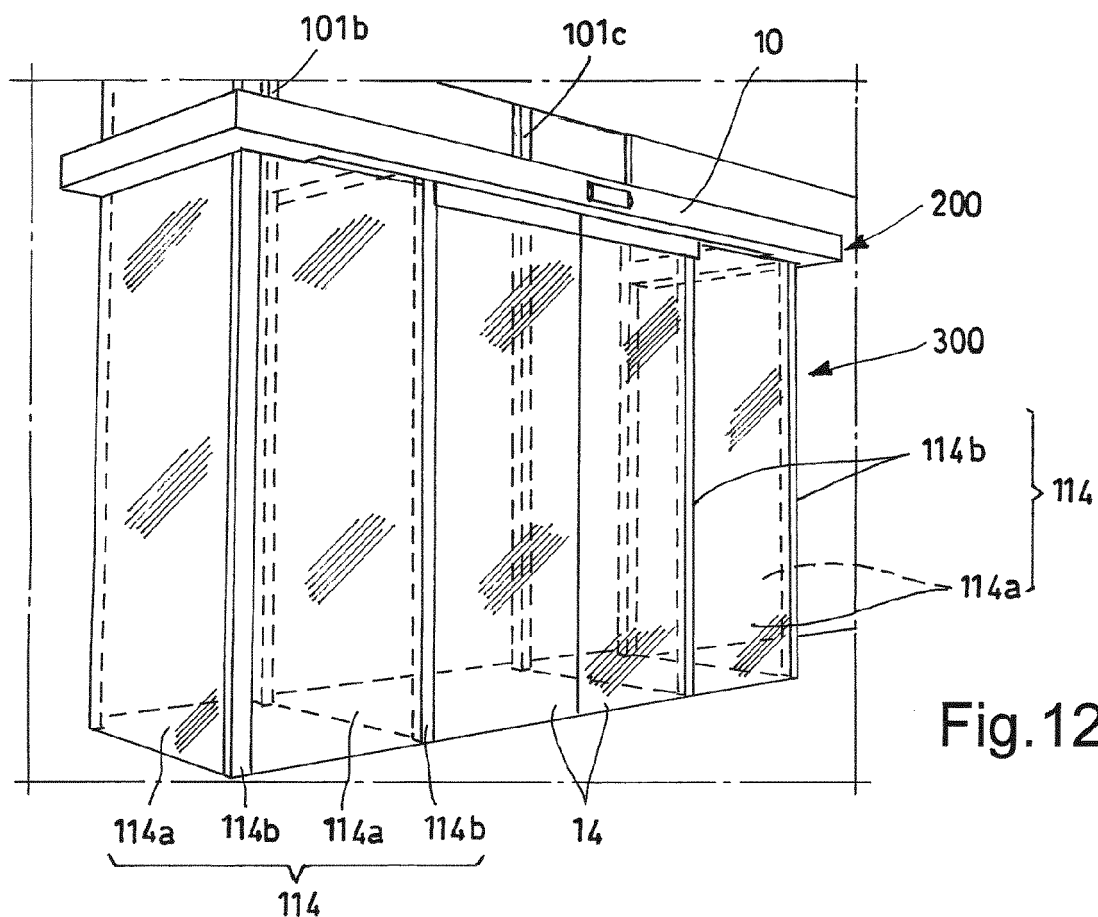


Fig.11





EUROPEAN SEARCH REPORT

 Application Number
 EP 15 19 0070

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 102 60 109 A1 (GEZE GMBH [DE]) 1 July 2004 (2004-07-01)	1-3, 10-14	INV. E05F15/632
A	* paragraphs [0011], [0012], [0018], [0020], [0022], [0024], [0028], [0029], [0030]; figures 1-3 *	4-9	E05D15/06
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Y	* page 4, line 1 - page 5, line 22; figure 1 *	9	
Y	EP 2 375 150 A2 (HIERZER ANDREAS [AT]) 12 October 2011 (2011-10-12) * paragraph [0038]; figures 1,6 *	9	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05D E05F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 March 2016	Examiner Klemke, Beate
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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