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(54) **Protection and display case**

Schutz- und Ausstellungsvitrine

Vitrine de protection et d'exposition

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Description

[0001] The present invention refers to a display case, in particular a protection and display case, that is provided for housing and displaying objects (typically objects of artistic or cultural value) in climate-protected environment.

In these cases, maximum care must be devoted to the overall protection of the displayed objects, which normally are both delicate and of great value. The term "protection" must therefore be intended here and below in a very broad sense; it comprises for example the maintenance of pre-established climatic conditions (temperature, humidity) and the elimination of dangerous substances from the space around the object (dust, pollutants). Moreover, the quality of the display to the public must be clearly guaranteed. Such display cases are known from US 5 524 977 A or DE 198 26 930 A.

[0002] When the objects to be displayed are very particular, the abovementioned needs normally result in rather complex cases, often designed and built for the single specific use; these cases are therefore costly and hard to reuse for objects other than those for which they had been designed.

There is therefore the need in the field to have cases which are capable of satisfying the highest protection needs and ensuring a suitable quality of the display towards the public, while at the same time not having overly high costs. Consequently, the present invention regards a case according to claim 1. Preferred characteristics are reported in the dependent claims.

More in particular, a case according to the invention comprises a sealed display space and is characterised in that it comprises a load-bearing base platform, which includes a lower portion and an upper portion separated by a sealed horizontal separator, the base platform being sealingly coupled to the sealed display space in a manner such that the upper portion of the base platform is inside the sealed display space while the lower portion is outside the sealed display space.

The base platform can be appropriately equipped according to the needs of every specific use, using its upper portion for systems and devices that must be inside the display space (such as for example a hygroscopic material for the humidity control or a lighting body) and its lower portion for systems and devices which are better situated outside the display space, due to their capacity to alter the conditions of the display space (such as for example a thermal machine or an illuminator).

[0003] The case production therefore becomes rationalised and facilitated, and is thus cheaper, since it becomes possible to build cases in a somewhat modular manner: the same base platform can be used not only to support display spaces of different heights, but also and above all for housing different systems or devices which are specific for every single embodiment.

[0004] Typically, the case comprises fixed walls, at least one openable door, and a top, and preferably:

- the fixed walls are anchored and sealed to the upper portion of the base platform and to the top,
- the openable door is mounted on the upper portion of the base platform and on the top, seal means being provided for sealing the openable door with respect to the fixed walls, to the top and to the upper portion of the base platform, in a manner such that the sealed display space is delimited by the horizontal separator, by the fixed walls, by the openable door and by the top.

[0005] The top can be a simple sheet, also made of glass if deemed necessary for the display, or of a more complex structure, it too capable - like the base platform - of housing systems and devices.

[0006] The case preferably comprises a lower door support group anchored between the openable door and the upper portion of the base platform, in which the seal means are provided outside with respect to the lower door support group; analogously, the case preferably comprises an upper door support group anchored between the openable door and the top, in which the seal means are situated outside with respect to the upper door support group. The door support groups can be hinges (simple or complex), sliding systems or more complex systems.

[0007] The case preferably comprises a lighting system of the display space, including at least one illuminator housed outside the display space, at least one lighting body in the display space and at least one light guide between the at least one illuminator and the at least one lighting body.

[0008] In the present text, by "illuminator" it is intended an apparatus capable of generating light, starting from energy of different types: an apparatus capable of distributing light generated from an illuminator is called a "lighting body" in the present context. In current applications and also in display cases, a lighting body can be directly associated with an illuminator; in such case, though, the energy dispersed by the illuminator in the form of heat energy during the generation of the light is released in the same space where the lighting body and displayed object are situated. The object is thus not only illuminated but also heated. This situation is avoided, however, by separating the illuminator from the lighting body and connecting the two with a suitable light guide, typically one or more optical fibres.

[0009] When its presence is required, therefore, the at least one illuminator is housed in the lower portion of the base platform and/or in an external space made in the top, isolated with respect to the sealed display space.

[0010] When a continuous and complete air treatment (or treatment of a possible gas different from air) of the display space is required, the case preferably comprises a conditioning system of the air in the display space, including at least one air treatment machine housed outside the display space and an intake duct of treated air from the at least one treatment machine situated inside

the display space; the at least one air treatment machine is a cooling machine and/or humidity control machine and/or purification machine. Preferably, the at least one treatment machine is housed in the lower portion of the base platform and/or in an external space made in the top, sealed with respect to the display space; in this manner, the heat dispersion directly into the display space is avoided along with the possible dispersion of polluting substances produced during the operation of the air treatment machine, due for example to lubricant substances.

[0011] The case preferably comprises an air circulation system in the lower portion of the base platform and/or in the external space of the top, so to more easily remove heat and undesired substances produced by the systems housed therein.

[0012] Preferably, the conditioning system includes a reception box of hygroscopic material, housed in the upper portion of the base platform, open onto the display space. The hygroscopic material, typically silica gel, can be provided for the climate control in place of the thermal machine, or in combination therewith.

[0013] Preferably, the case comprises stiffening beams arranged in the upper and/or lower portion of the base platform, and/or in the top. Thanks to these beams, the upper and lower base platform portions can better support the entire case structure, in particular the openable door when this is of large size and thus relatively heavy.

[0014] Preferably, the upper and lower portions of the base platform are fixedly connected with each other. The base platform thus results functionally differentiated, with the possibility of housing therein both systems inside the display space (in the upper portion), and systems outside thereof (in the lower portion), while it is mechanically monolithic and hence extremely strong.

[0015] Further characteristics of the present invention will be clearer from the following detailed description of a preferred embodiment thereof and a variant thereof, made with reference to the enclosed drawings. In such drawings,

- Figure 1 is a perspective section view of a case according to the present invention;
- Figure 2 is a front section view of the case of figure 1;
- Figure 3 is an enlarged-scale, front perspective section view of the lower part of the case of figure 1;
- Figures 4, 5 and 6 are enlarged-scale, cross-section perspective views of the lower part of the case of figure 1, with parts partially removed, taken along different vertical section planes;
- Figure 7 is an enlarged-scale, front section view of the upper part of the case of figure 1;
- Figure 8 is an enlarged-scale perspective view of only the top of the case of figure 1, with parts partially removed;
- Figure 9 is an enlarged-scale perspective view of only the top of figure 1;
- Figure 10 is an enlarged-scale, cross-section per-

spective view of the top as shown in figure 9;

- Figure 11 is a section view analogous to figure 3 of a case variant according to the present invention.

[0016] In the figures, a protection and display case is indicated with 1 in its entirety. The case 1 comprises a load-bearing base platform 2, surmounted by a display space 3, delimited by two fixed, vertical glass walls 4 and 5, and a third fixed, vertical blind wall 6 (also called back), a blind top 7 and an openable glass door 8.

[0017] The base platform 2 comprises a lower portion 11 and an upper portion 12, fixedly connected with each other and delimited by a horizontal separator 13. The lower portion 11 is formed with a metal lattice structure 14, provided with feet 15 for supporting and/or fixing to the ground and diagonal reinforcement beams 16. The upper portion 12 is formed with a metal frame structure 17, sealingly closed on its lower part by the horizontal separator 13 and provided with diagonal reinforcement beams 18. A non-sealed support surface 19 closes the upper part of the upper portion 12.

[0018] The top 7 is formed with a metal lattice structure 21 and comprises an upper space 22. Except for the space 22, the top 7 is sealingly closed on its upper, part by a cover 23 due to the presence of two concentric seals 24; the space 22 therefore remains open towards the outside of the display space, possibly protected by a grate (not illustrated).

[0019] The fixed walls 4-6 are anchored and sealed together, both to the frame structure 17 of the upper portion 12 of the base platform 2, and to the lattice structure 21 of the top 22. The openable door 8 is supported by an upper door support group mounted on the top 7 and a lower door support group mounted on the upper portion 12 of the base platform 2; the two door support groups are of *per se* known type, for example they of hinge type. A seal 33 is mounted between the openable door 8 and the fixed adjacent structures, or rather the frame structure 17 of the base platform 2, the lattice structure of the top 7 and the edges of the fixed panels 4 and 5. In this manner, the display space 3 is sealed when the openable door 8 is closed. The position of the seal 33 is peripheral with respect to the openable door 8, such that the hinges 31 and 32 are included in the display space 3. The back 6 is provided with reinforcement beams 34.

[0020] The case 1 then comprises a first illuminator 41, housed in the lower portion 11 of the base platform 2, as well as two second illuminators 42, housed in the space 22 of the top 7. The illuminators 41 and 42 are of ventilated type, in order to more easily remove, to the outside, the heat produced during light generation; alternatively (or in addition), specific ventilation systems can be provided around the illuminators 41 and 42. The illuminator 41 is optically connected to a first lighting body 43, housed in the upper portion 12 of the base platform 2, by means of a bundle of optical fibres 44 which cross through the separator 13 in a suitable sealed connector 45. Analogously, the illuminators 42 are optically con-

nected to two second lighting bodies 46, housed in the top 7, by means of bundles of optical fibres 47.

[0021] The case 1 then comprises an air conditioning system of the display space 3. In the case 1, such conditioning system comprises two reception boxes 51 of hygroscopic material, supported by the lower portion 11 of the base platform 2 so to be sealingly facing through the separator 13 onto the upper portion 12, the hygroscopic material resulting inside the display space 3; functionally, therefore, the boxes 51 are housed in the upper portion 12.

[0022] In the variant of figure 11 (in which parts corresponding to parts of the case 1 are distinguished by the same reference numbers, marked with apostrophes), a case 1' is shown in which the conditioning system comprises a single box 51', housed in the upper portion 12' of the base platform 2' in an identical manner to the boxes 51 in case 1, and an air treatment machine 52' housed in the lower portion 11' of the base platform 2'. The air treated by the machine 52' is introduced into the display space 3' by means of an intake duct 53', sealingly facing an opening 54' formed in the separator 13'.

[0023] In other variants, not shown, the conditioning system can be entirely absent, or it can comprise only the air treatment machine and not the box with the hygroscopic material; moreover, these components can also be housed in the top, facing the display space or in the upper open space, depending on whether they must be inside (boxes) or outside (treatment machines).

Claims

1. Protection and display case (1, 1'), comprising

- a load-bearing base platform (2, 2'), which includes a lower portion (11, 11') and an upper portion (12, 12') separated by a sealed horizontal separator (13, 13'),
- a sealed display space (3, 3'), defined by the upper portion (12) of the base platform (2), fixed walls (4-6), at least one openable door (8), and a top (7),

wherein:

- the upper portion (12, 12') of the base platform (2, 2') is inside the sealed display space (3, 3')
- the lower portion (11, 11') is outside the sealed display space (3, 3')
- the fixed walls (4-6) are anchored and sealed to the upper portion (12) of the base platform (2) and to the top (7),
- seal means (33) are provided for sealing the openable door (8) with respect to the fixed walls (4-6), to the top (7) and to the upper portion (12) of the base platform (2).

wherein the openable door (8) is mounted on the upper portion (12) of the base platform (2) and on the top (7).

2. Case according to claim 1, comprising an upper door support group anchored between the openable door (8) and the top (7), wherein the seal means are situated outside with respect to the upper door support group.
3. Case according to claim 1, comprising a lighting system of the display space (3), including at least one illuminator (41, 42) housed outside the display space (3), at least one lighting body (43, 46) in the display space (3) and at least one light guide (44, 47) between the at least one illuminator (41, 42) and the at least one lighting body (43, 46).
4. Case according to claim 3, wherein the at least one illuminator (41, 42) is housed in the lower portion (11) of the base platform (2) and/or in an external space (22) made in the top (7), isolated with respect to the sealed display space (3).
5. Case according to claim 1, comprising an air conditioning system in the display space, including at least one air treatment machine (52') housed outside the display space (3') and an intake duct (53') of treated air from the at least one treatment machine inside the display space (3').
6. Case according to claim 5, wherein the at least one air treatment machine (52') is a cooling machine and/or a humidity control machine and/or a purification machine.
7. Case according to claim 5 or 6, wherein the at least one treatment machine (52') is housed in the lower portion (11') of the base platform (2') and/or in an external space made in the top, sealed with respect to the display space (3').
8. Case according to claim 4 or 7, comprising an air circulation system in the lower portion (11, 11') of the base platform (2, 2') and/or in the external space (22) of the top (7).
9. Case according to claim 5, wherein the conditioning system includes a reception box (51, 51') of hygroscopic material, housed in the upper portion (12, 12') of the base platform (2, 2'), open onto the display space (3, 3').
10. Case according to claim 1, comprising stiffening beams (16, 18) arranged in the upper portion (12) and/or in the lower portion (11) of the base platform (2), and/or in the top (7).

11. Case according to claim 1, wherein the upper (12) and lower (11) portions of the base platform (2) are fixedly connected with each other.

Patentansprüche

1. Schutz- und Ausstellungsvitrine (1, 1'), umfassend

- eine lastaufnehmende Basisplattform (2, 2'), die einen unteren Teil (11, 11') und einen oberen Teil (12, 12') aufweist, die durch ein abgedichtetes, horizontales Trennelement (13, 13') getrennt sind,
- einen abgedichteten Ausstellungsraum (3, 3'), der durch den oberen Teil (12) der Basisplattform (2), durch Festwände (4-6), wenigstens eineöffnungsfähige Tür (8) und eine Oberseite (7) definiert ist,

wobei

- der obere Teil (12, 12') der Basisplattform (2, 2') sich innerhalb des abgedichteten Ausstellungsraums (3, 3') befindet
- der untere Teil (11, 11') sich außerhalb des abgedichteten Ausstellungsraums (3,3') befindet
- die Festwände (4-6) am oberen Teil (12) der Basisplattform (2) und an der Oberseite (7) befestigt und abgedichtet sind,
- Dichtungsmittel (33) zum Abdichten deröffnungsfähigen Tür (8) in Bezug auf die Festwände (4-6), die Oberseite (7) und den oberen Teil (12) der Basisplattform (2) vorgesehen sind,

wobei die öffnungsfähige Tür (8) am oberen Teil (12) der Basisplattform (2) und an der Oberseite (7) angeschlagen ist.

2. Vitrine nach Anspruch 1, umfassend eine obere Türauftragruppe, die zwischen der öffnungsfähigen Tür (8) und der Oberseite (7) befestigt ist, wobei die Dichtungsmittel außerhalb in Bezug auf die obere Türauftragruppe angeordnet sind.

3. Vitrine nach Anspruch 1, umfassend ein System zur Beleuchtung des Ausstellungsraums (3), welches wenigstens eine außerhalb des Ausstellungsraums (3) untergebrachte Beleuchtungseinrichtung (41, 42), wenigstens einen Leuchtkörper (43, 46) im Ausstellungsraum (3) und wenigstens einen Lichtleiter (44, 47) zwischen der wenigstens einen Beleuchtungseinrichtung (41, 42) und dem wenigstens einen Leuchtkörper (43, 46) aufweist.

4. Vitrine nach Anspruch 3, wobei die wenigstens eine Beleuchtungseinrichtung (41, 42) im unteren Teil

(11) der Basisplattform (2) und/oder in einem äußeren Raum (22) untergebracht ist, der in der Oberseite (7) ausgebildet und in Bezug auf den abgedichteten Ausstellungsraum (3) isoliert ist.

5. Vitrine nach Anspruch 1, umfassend ein Klimatisierungssystem im Ausstellungsraum, umfassend wenigstens ein außerhalb des Ausstellungsraums (3') untergebrachtes Luftaufbereitungsgerät (52') und einen Kanal (53') zum Ansaugen der aufbereiteten Luft von dem wenigstens einen Luftaufbereitungsgerät im Inneren des Ausstellungsraums (3').

6. Vitrine nach Anspruch 5, wobei das wenigstens eine Luftaufbereitungsgerät (52') eine Kältemaschine und/oder eine Feuchtigkeitsregleinrichtung und/oder eine Reinigungsmaschine ist.

7. Vitrine nach Anspruch 5 oder 6, wobei das wenigstens eine Aufbereitungsgerät (52') im unteren Teil (11') der Basisplattform (2') und/oder in einem äußeren, in der Oberseite ausgebildeten und in Bezug auf den Ausstellungsraum (3') abgedichteten Raum untergebracht ist.

8. Vitrine nach Anspruch 4 oder 7, umfassend ein Luftumwälzsystem im unteren Teil (11,11') der Basisplattform (2, 2') und/oder im äußeren Raum (22) der Oberseite (7).

9. Vitrine nach Anspruch 5, wobei das Klimatisierungssystem einen Behälter (51, 51') zum Aufnehmen von feuchtigkeitsbindendem Material im oberen Teil (12, 12') der Basisplattform (2, 2') aufweist, der zum Ausstellungsraum (3, 3') hin offen ist.

10. Vitrine nach Anspruch 1, umfassend Versteifungsträger (16, 18), die im oberen Teil (12) und/oder im unteren Teil (11) der Basisplattform (2) und/oder in der Oberseite (7) angeordnet sind.

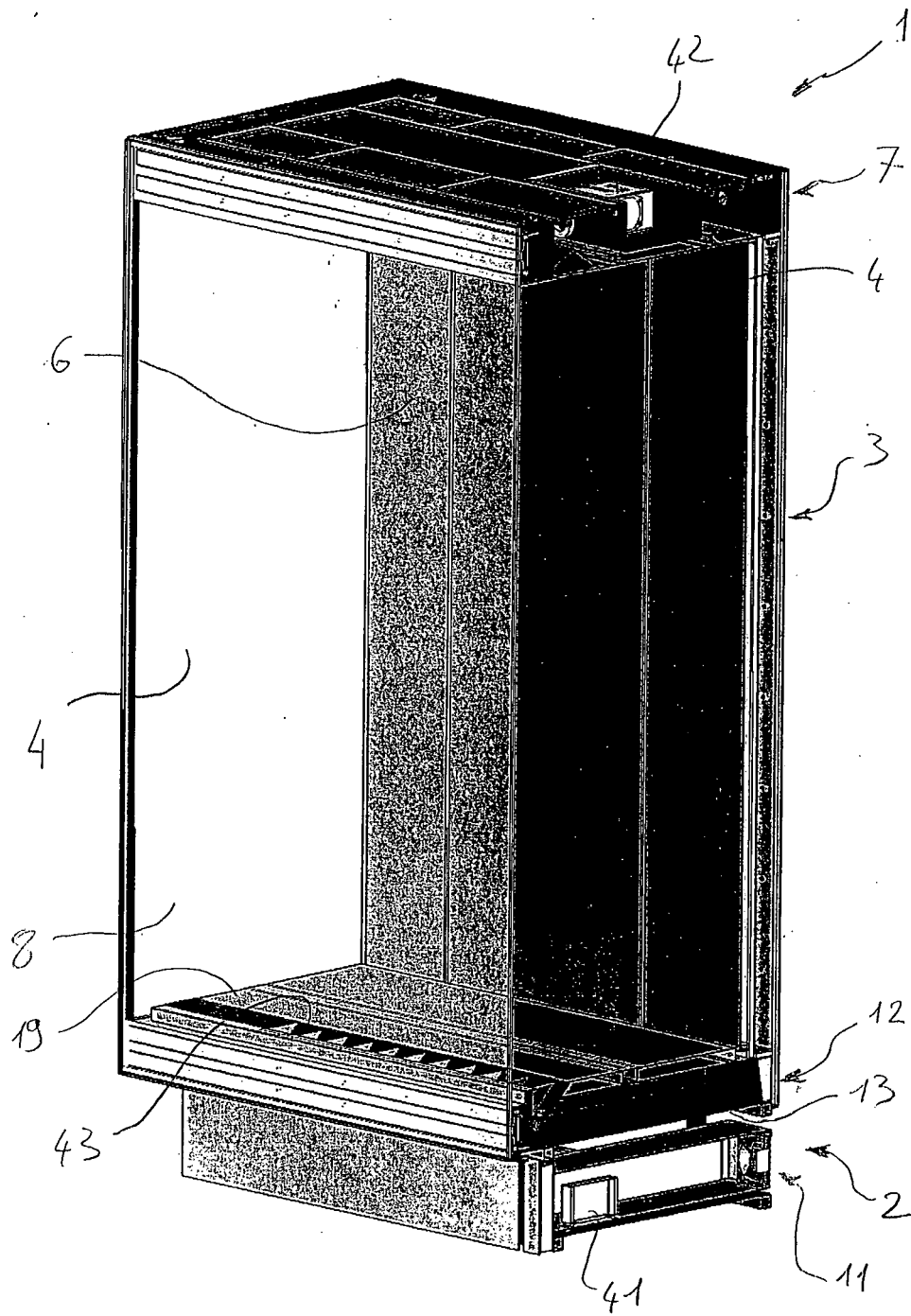
11. Vitrine nach Anspruch 1, wobei der obere (12) und der untere (11) Teil der Basisplattform (2) fest miteinander verbunden sind.

Revendications

1. Vitrine d'exposition et de protection (1, 1'), comprenant

- une plate-forme de base portante (2, 2'), qui comprend une partie inférieure (11, 11') et une partie supérieure (12, 12') séparée par un séparateur horizontal scellé (13, 13'),
- un espace d'exposition scellé (3, 3'), défini par la partie supérieure (12) de la plate-forme de base (2), des parois fixes (4-6), au moins une

- porte ouvrable (8) et un élément supérieur (7), dans laquelle
- la partie supérieure (12, 12') de la plate-forme de base (2, 2') est à l'intérieur de l'espace d'exposition scellé (3, 3')
 - la partie inférieure (11, 11') est à l'extérieur de l'espace d'exposition scellé (3, 3')
 - les parois fixes (4-6) sont ancrées et scellées à la partie supérieure (12) de la plate-forme de base (2) et à l'élément supérieur (7),
 - des moyens formant joint (33) sont disposés pour sceller la porte ouvrable (8) par rapport aux parois fixes (4-6), à l'élément supérieur (7) et à la partie supérieure (12) de la plate-forme de base (2).
- dans laquelle la porte ouvrable (8) est montée sur la partie supérieure (12) de la plate-forme de base (2) et sur l'élément supérieur (7).
2. Vitrine selon la revendication 1, comprenant un groupe de support de porte supérieur ancré entre la porte ouvrable (8) et l'élément supérieur (7), dans laquelle les moyens formant joint sont situés à l'extérieur par rapport au groupe de support de porte supérieur.
 3. Vitrine selon la revendication 1, comprenant un système d'éclairage de l'espace d'exposition (3), comprenant au moins un dispositif d'illumination (41, 42) logé à l'extérieur de l'espace d'exposition (3), au moins un corps d'éclairage (43, 46) dans l'espace d'exposition (3) et au moins un guide de lumière (44, 47) entre l'au moins un dispositif d'illumination (41, 42) et l'au moins un corps d'éclairage (43, 46).
 4. Vitrine selon la revendication 3, dans laquelle l'au moins un dispositif d'illumination (41, 42) est logé dans la partie inférieure (11) de la plate-forme de base (2) et/ou dans un espace externe (22) réalisé dans l'élément supérieur (7), isolé par rapport à l'espace d'exposition scellé (3).
 5. Vitrine selon la revendication 1, comprenant un système de conditionnement d'air dans l'espace d'exposition, comprenant au moins une machine de traitement de l'air (52') logée à l'extérieur de l'espace d'exposition (3') et un conduit d'admission (53') d'air traité provenant de l'au moins une machine de traitement à l'intérieur de l'espace d'exposition (3').
 6. Vitrine selon la revendication 5, dans laquelle l'au moins une machine de traitement de l'air (52') est une machine de refroidissement et/ou une machine de régulation d'humidité et/ou une machine de purification.
 7. Vitrine selon la revendication 5 ou 6, dans laquelle l'au moins une machine de traitement (52') est logée
- dans la partie inférieure (11') de la plate-forme de base (2') et/ou dans un espace externe réalisé dans l'élément supérieur, scellé par rapport à l'espace d'exposition (3').
8. Vitrine selon la revendication 4 ou 7, comprenant un système de circulation d'air dans la partie inférieure (11, 11') de la plate-forme de base (2, 2') et/ou dans l'espace externe (22) de l'élément supérieur (7).
 9. Vitrine selon la revendication 5, dans laquelle le système de conditionnement comprend une boîte de réception (51, 51') de matériau hygroscopique, logée dans la partie supérieure (12, 12') de la plate-forme de base (2, 2'), ouverte sur l'espace d'exposition (3, 3').
 10. Vitrine selon la revendication 1, comprenant des poutres de raidissement (16, 18) agencées dans la partie supérieure (12) et/ou dans la partie inférieure (11) de la plate-forme de base (2), et/ou dans l'élément supérieur (7).
 11. Vitrine selon la revendication 1, dans laquelle les parties supérieur (12) et inférieure (11) de la plate-forme de base (2) sont connectées de manière fixe l'une avec l'autre.



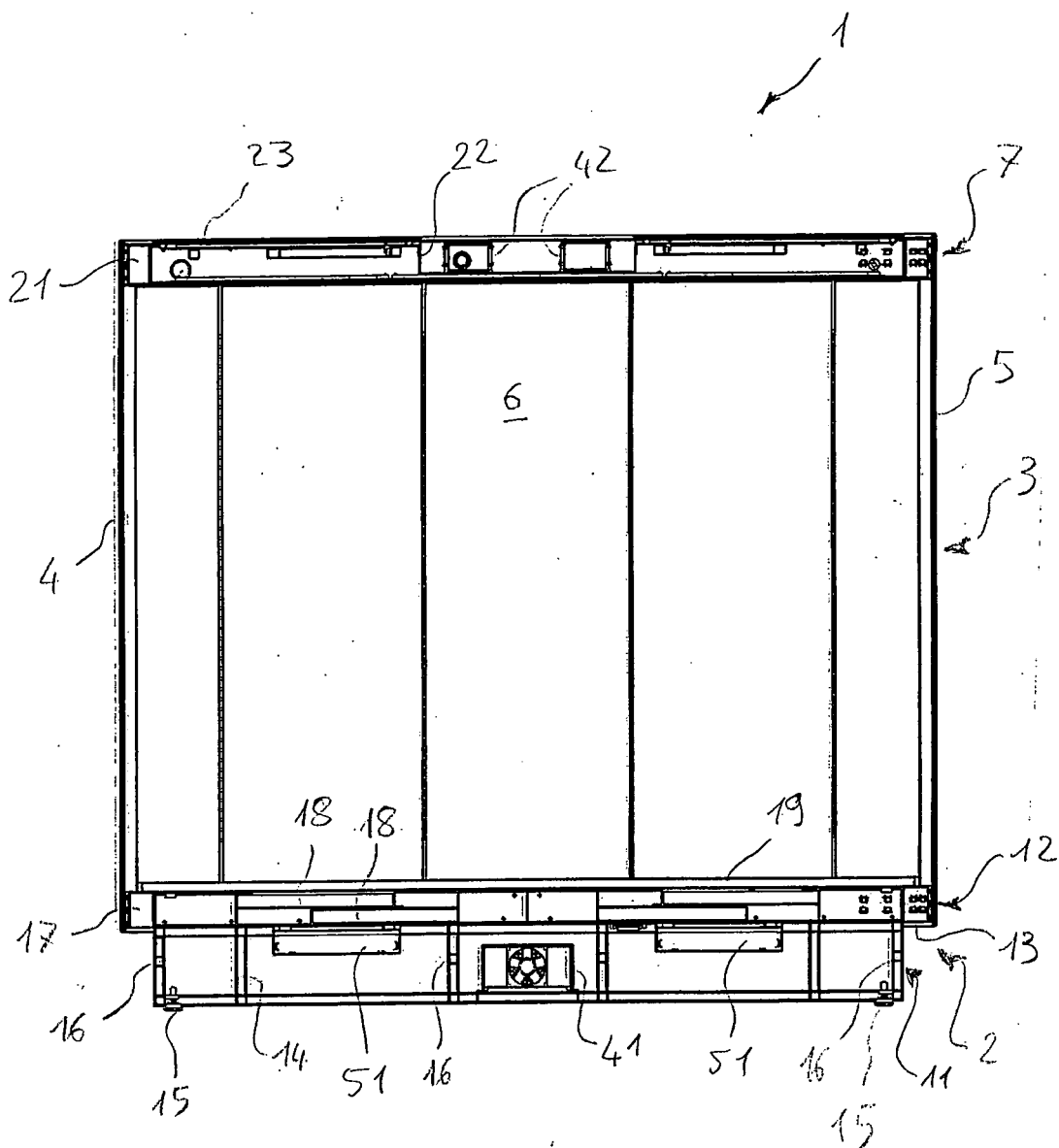
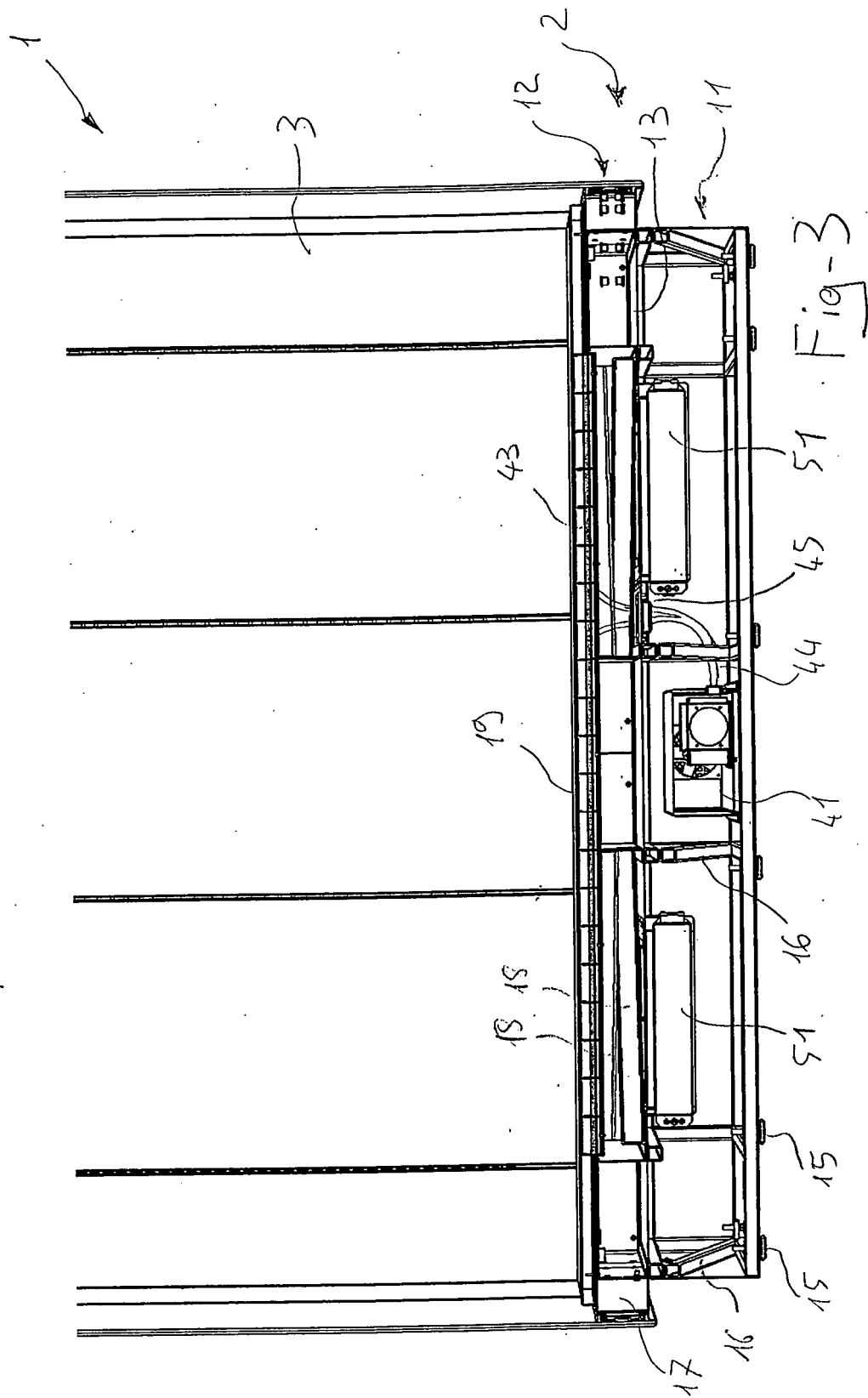


Fig - 2



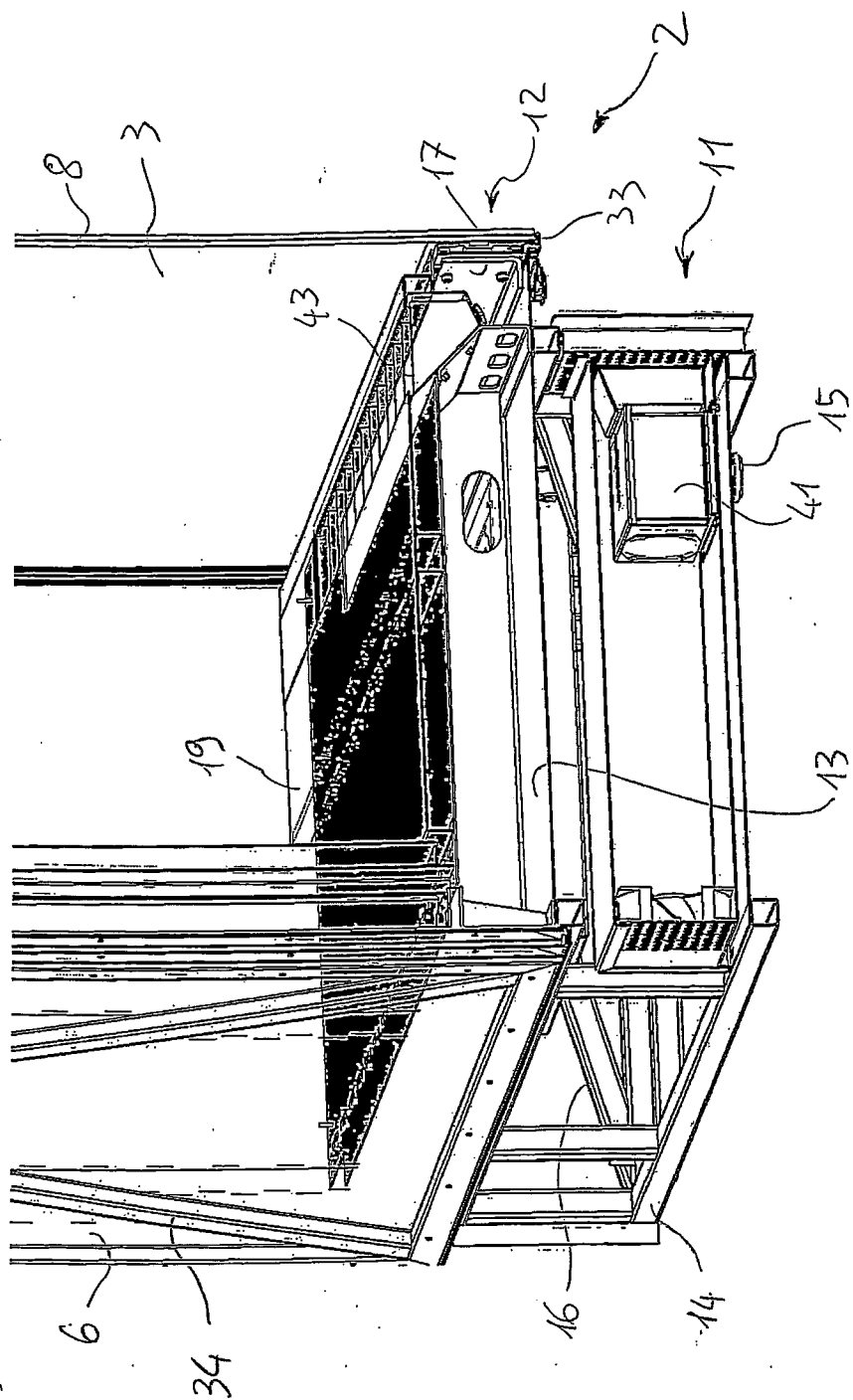
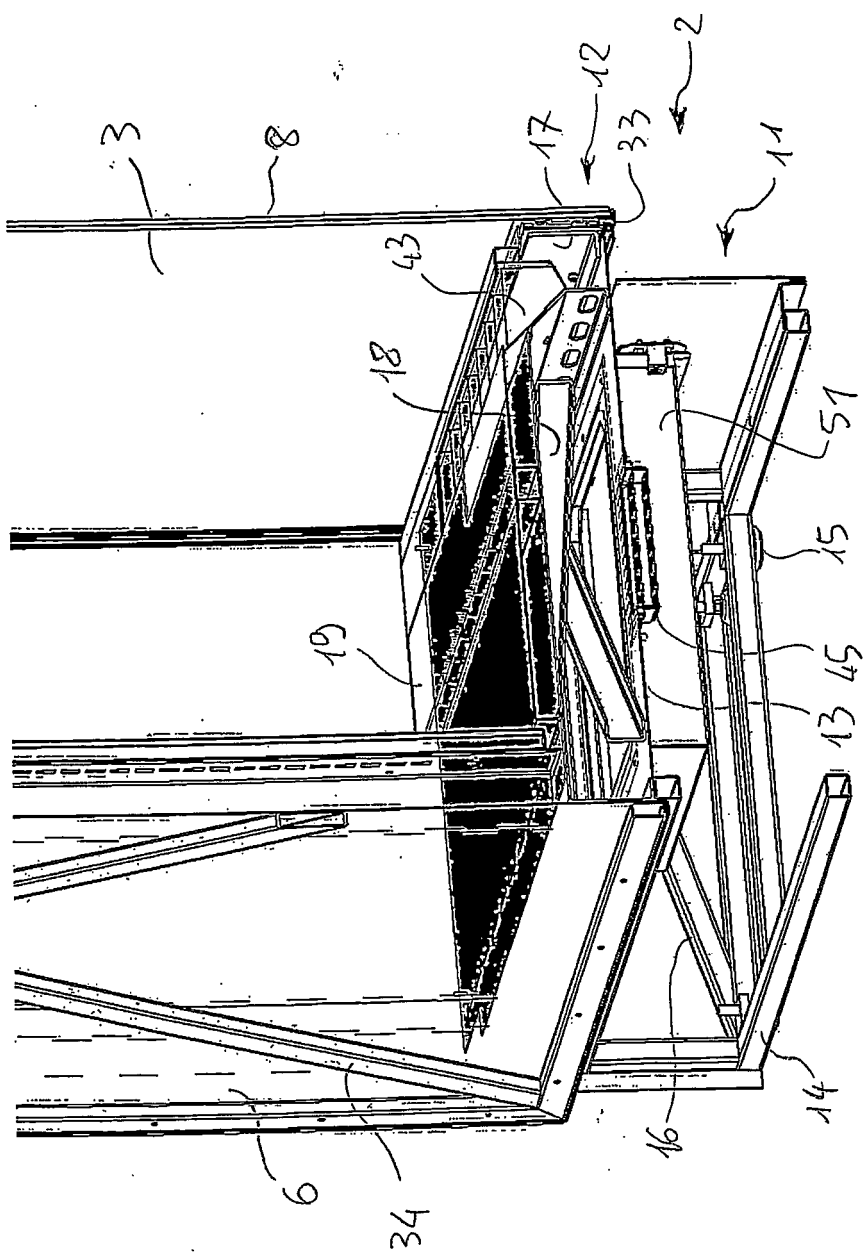
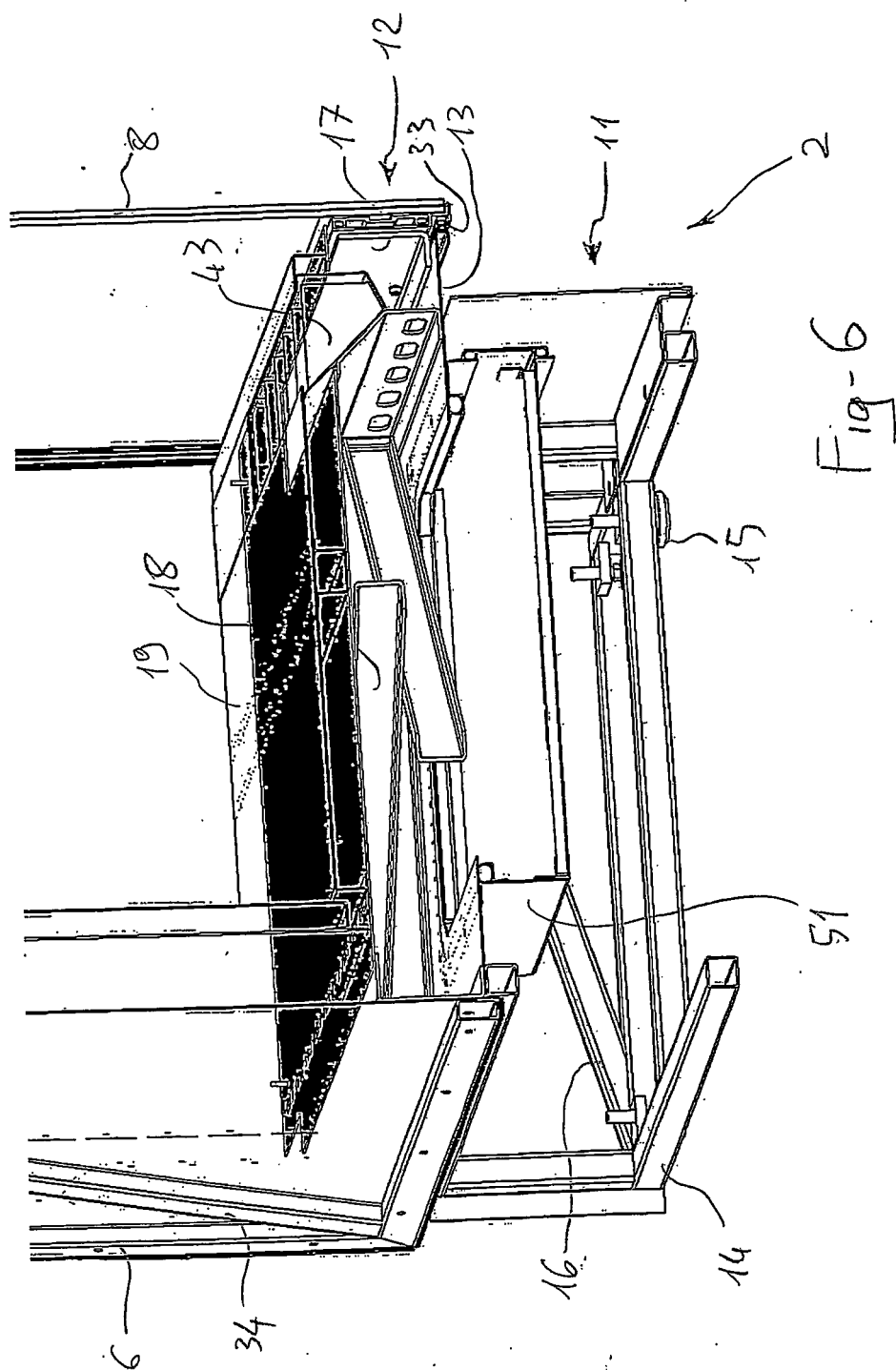
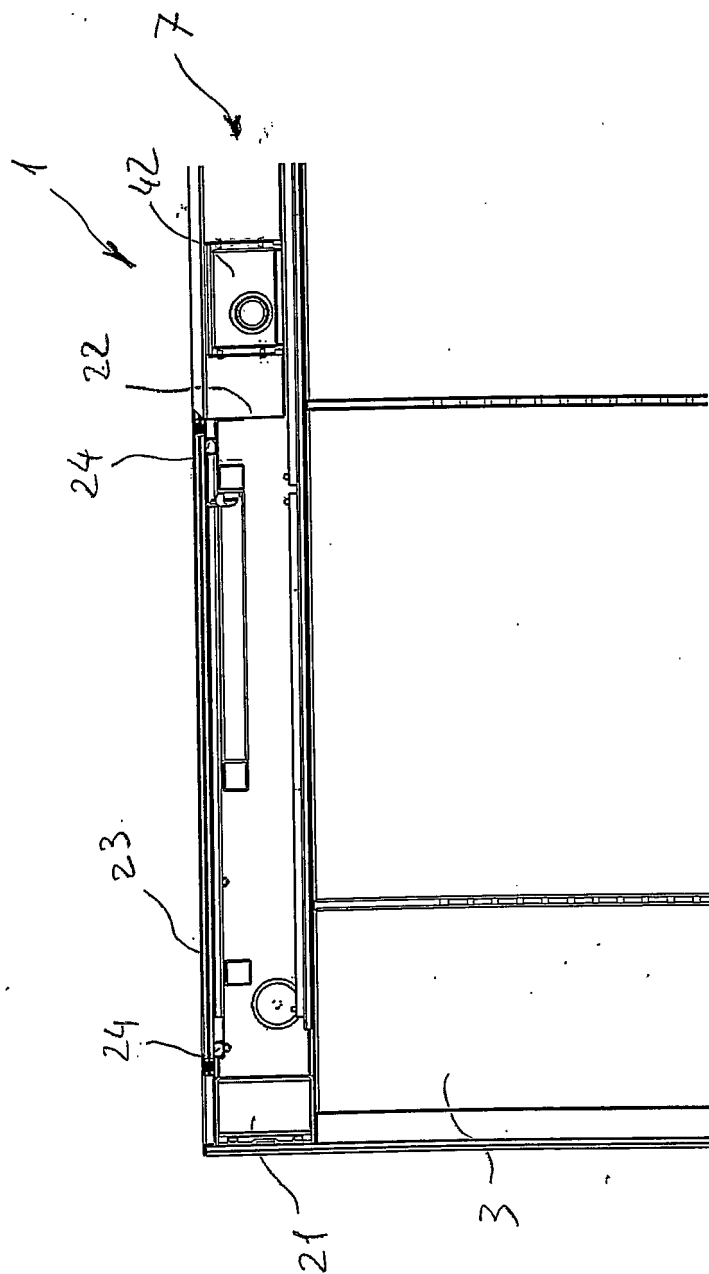


Fig-4



5
1
5
7





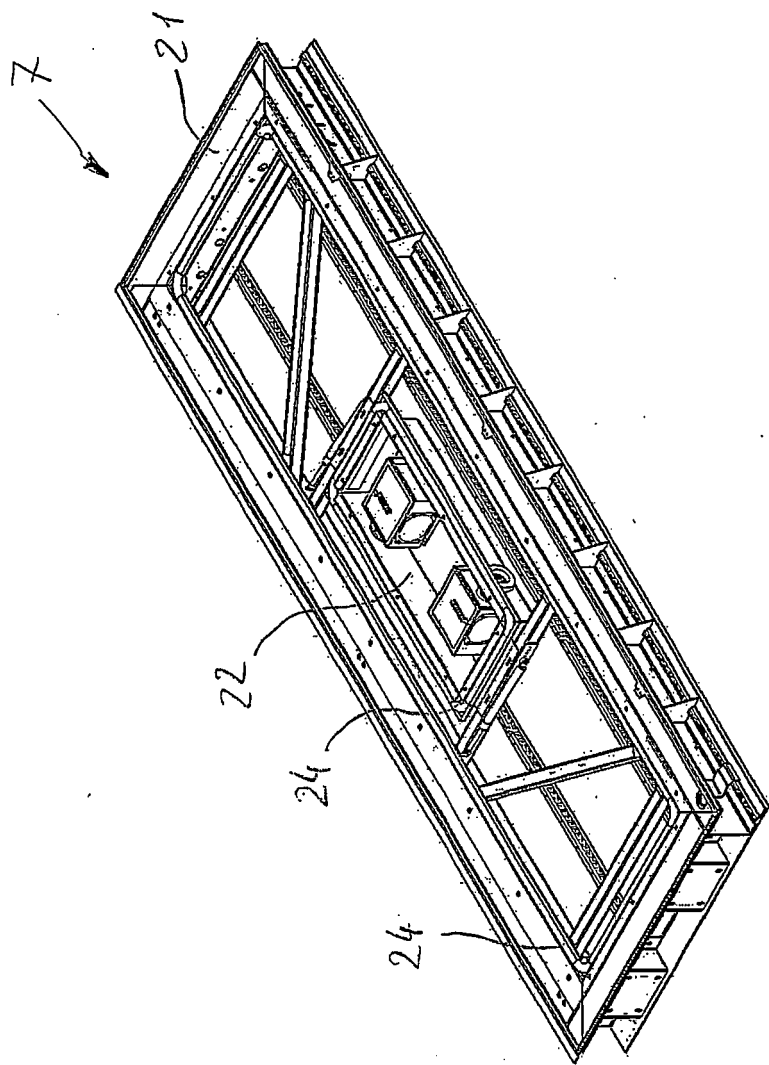


Fig-8

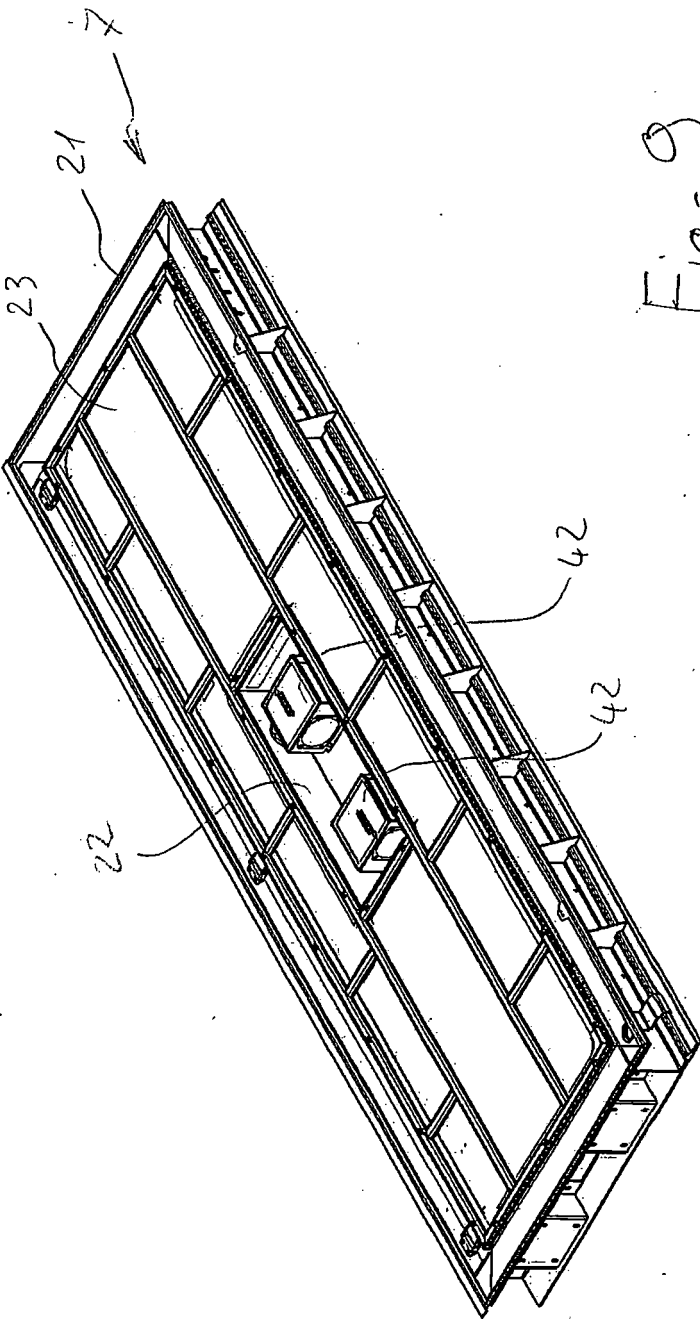
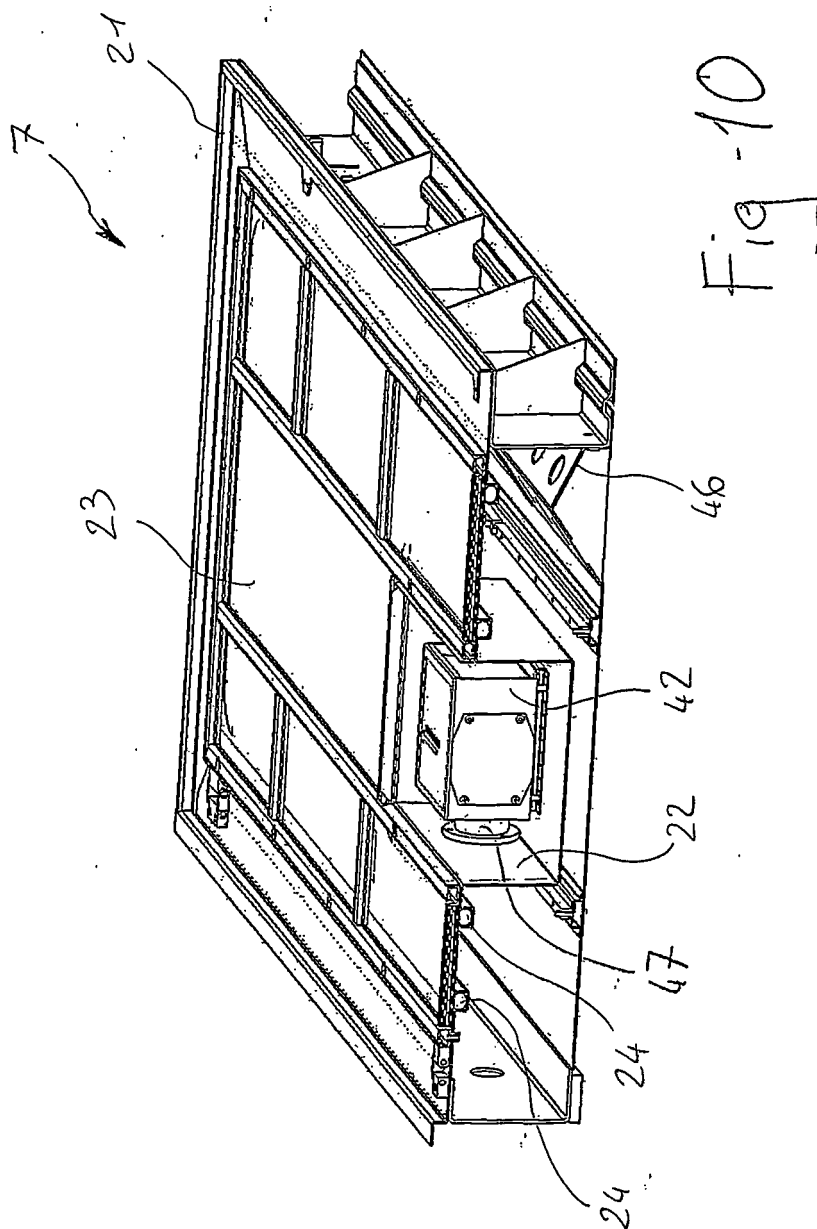
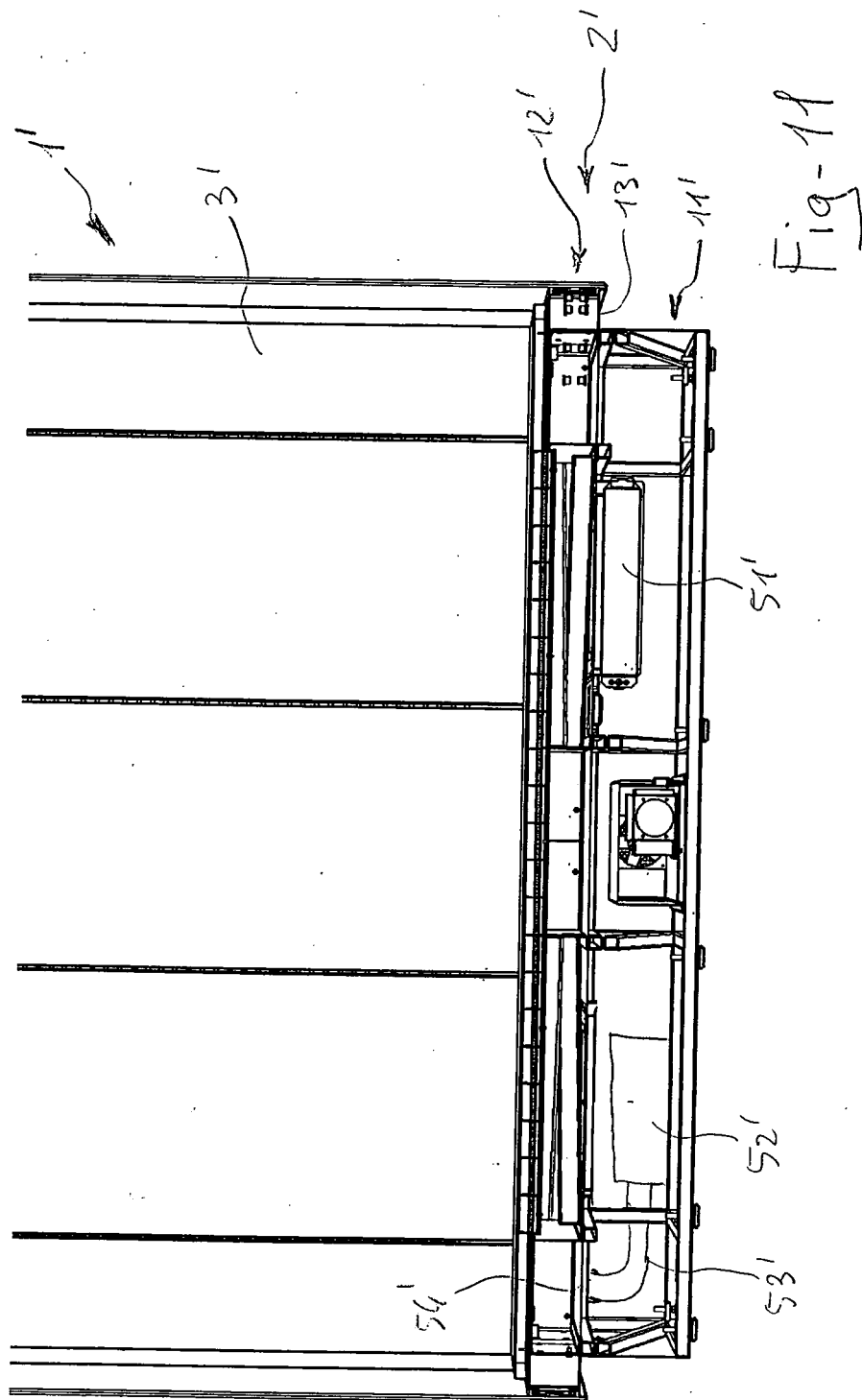


Fig-9





REFERENCES CITED IN THE DESCRIPTION

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