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(54) TANK FOR CONTAINING FLUIDS AND CABINET COUPLED WITH SAID TANK

(57) Tank 1, for containing fluids exiting accidentally from a cabinet 100, of the type comprising a box body 2, defining a containment volume (V), provided with a base 3 from which a pair of lateral walls 4 extend that are parallel to one another, a front wall 5, joining on one side the pair of lateral walls 4 and a rear wall 6, joining on the opposite side the pair of lateral walls 4. Said front wall 5 ends with a fold 7 angled with respect to the front wall 5 and extending along an oblique direction from the front wall 5 to the base 3 so as to define a conveying slide for conveying fluids exiting from the cabinet 100 to inside the tank 1.

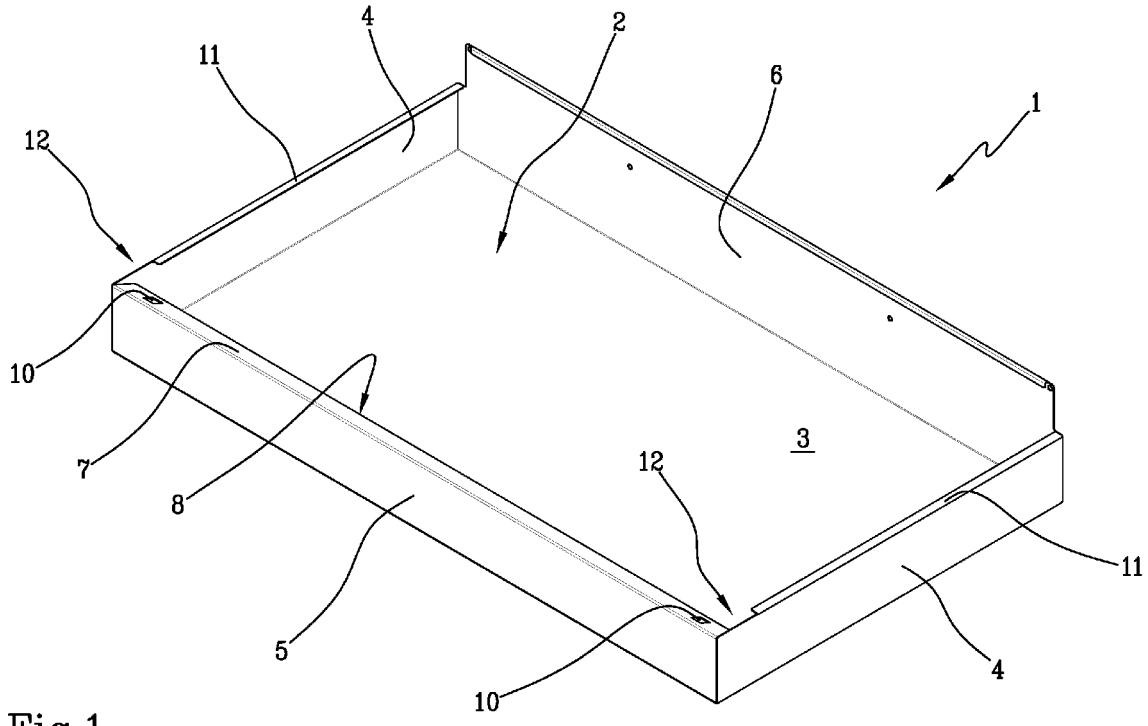


Fig.1

EP 4 088 877 A1

Description

[0001] The object of the present invention is a tank for containing fluids, known here also as liquids, and a cabinet coupled with said tank.

[0002] Different cabinets for technical and hobby use currently exist on the market.

[0003] Generally, each cabinet has a parallelepiped shape of variable height, width and depth, and has an opening on one side to permit an access area for picking up or unloading the objects or the materials contained therein.

[0004] The open side is generally provided with a closing element that in some cases can be defined by a gate wall, or a pair of sliding wings or also a pair of hinged wings.

[0005] The closing element is provided for protecting the content stowed inside the cabinet from dust, sunlight, humidity or preventing the access of unauthorized persons.

[0006] Owing to the great flexibility of these cabinets, over the life cycle of the cabinets, the intended use of these cabinets may change from the original use, just as the type of material stowed inside the cabinets may change. Both in professional and in hobby use, a cabinet may be originally purchased to contain work tools and over time may be intended to contain bags of paint or another fluid material that is always used in daily work or hobbies.

[0007] Considering these frequent changes in use of the cabinets and the possibility that the cabinets are intended to contain liquids, laws have been passed to protect the environment and health at work and in particular aimed at containing spills of liquids in the environment surrounding the area in which the cabinets are located (e.g. legislative decree No. 152/2006).

[0008] In order to prevent liquids exiting from the cabinets being able to contaminate the support area surrounding the cabinet, it is necessary for the cabinet manufacturer to provide systems for containing the leaks.

[0009] In this context, the manufacturer can thus intervene on the newly manufactured cabinets designed for this purpose, but he cannot intervene on those already sold that are not provided internally with containing tanks or shelves.

[0010] For all the cabinets already present in the market, the owners are often ignorant of the standards because in some cases they impose changing the criteria for storing objects inside the cabinet, which are often in conflict with their own operating needs or because in other cases they impose the replacement of the preceding containers with new ones complying with the regulations.

[0011] To cite one example, a user who has purchased, even recently, a cabinet provided with suitable openings to enable an electric supply wire to be connected inside the cabinet in order to take electric energy to tools stowed inside the cabinet cannot, unless he decides to ignore the aforesaid standards, change the intended use of the cabinet and store therein paint containers (after duly removing the wired tools). In fact, in the case of accidental spillage of the paints outside the cabinet, for example because of accidental damage to a container, the paints, not remaining inside the cabinet, would tend to exit therefrom with heavy consequences of pollution for the environment surrounding the cabinet or hazard to the safety of the persons operating near the affected area.

[0012] In the cited embodiment, the user has two possibilities: either storing the paints in another place that protects the environment from possible risks of contamination or changing the preceding cabinet for a new one that can avoid or limit this hazard.

[0013] It must also be added that cabinets for general use on the market are structural steel cabinets or cabinets originating from plastic moulding processes that by the nature of the manufacturing process and the use thereof do not require manufacturing tolerances that are able to define a liquid-tight chamber inside the cabinet.

[0014] Accordingly, even if the user had purchased a cabinet recommended for receiving liquids inside the containers, as the cabinet does not guarantee a liquid tightness it is not able to ensure in the event of damage to a container for liquids that the escaping liquids are not spilt into the surrounding environment.

[0015] The technical task of the present invention is thus to make available a tank for containing liquids and a cabinet provided with said tank that are able to overcome the prior-art drawbacks which have emerged.

[0016] One object of the present invention is thus to provide a tank and relative cabinet that in the event of an accidental exit of liquids can prevent the spread of the liquids by containing the liquids inside the volume subtended by the tank.

[0017] Moreover, a further object of the present invention is to provide a tank that can be adaptable to pre-existing cabinets and permits coupling with pre-existing cabinets, avoiding the need to have to replace the cabinet.

[0018] Another object of the present invention is to provide a tank and corresponding cabinet that, in the event of containing liquids that have accidentally leaked from the cabinet, is easy to empty and/or to maintain. The specified technical task and specified objects are substantially achieved by a liquids tank and cabinet coupled with said tank comprising the technical features disclosed in one or more of the appended claims. Further characteristics and advantages of the present invention will become more apparent from the indicative and thus non-limiting description of an embodiment of a tank for containing liquids and of a cabinet coupled with said tank.

[0019] Such a description will be set out below with reference to the appended drawings, which are provided solely for illustrative and therefore non-limiting purposes, in which:

- Figure 1 is a perspective view of a tank for containing

liquids according to the present invention;

- Figure 2 is a plan view of the tank of figure 1;
- Figure 3 is a cross section of the tank of figure 2 made according to a longitudinal plane III-III illustrated in figure 2;
- Figure 4 is a cross section of the tank of figure 2 made according to a cross section IV-IV illustrated in figure 2;
- Figure 5 is a perspective view of a second embodiment of a tank for containing liquids according to the present invention;
- Figure 6 is a cross section of the tank for containing liquids of figure 5.
- Figure 7 is a perspective view of a cabinet according to the present invention associated with the aforesaid tank in a closed configuration.
- Figure 8 is a perspective view of the cabinet of figure 7 in an open configuration;
- Figure 9 is a rear view of the cabinet of figure 7 with some parts removed in order to better illustrate others.

[0020] With reference to the appended figures, 1 indicates overall a tank for containing liquids and 100 indicates a cabinet that is couplable with said tank 1.

[0021] The cabinet 100 is preferably made of metal or alternatively of plastics.

[0022] The cabinet 100 is defined by a pair of flanks 101, each preferably sheet-like and of rectangular shape, which are parallel to one another and define the width of the cabinet 100. Behind the pair of flanks 101 it is connected to a back 102, which is also preferably sheet-like and of rectangular shape, defining the capacity depth of the cabinet 100. The pair of flanks 101 is then connected above to a top 103 and to a bottom 104, which together with the back 102 and with the flanks 101 define a box structure 105 of the cabinet 100, in the form of a parallelepiped open on one side 106.

[0023] The open side 106 is inspectable, to access the inside of the cabinet 100, through a pair of wings 107 that promote opening and closing of the open side 106. The pair of wings 107 is coupled with the pair of flanks 101, preferably by hinge coupling, thus making what is defined in the industry as a hinged door.

[0024] It remains understood that without departing the field of protection of the present invention, the open side 106 of the cabinet 100 can be opened and closed with any alternative means to the hinged door like, for example, a gate wall or a pair of sliding wings.

[0025] Before illustrating the type of coupling of the cabinet 100 with the tank 1, the tank is disclosed below.

[0026] The tank 1 is defined by a box body 2. Said box body defines a containment volume V for containing possible liquids that could accidentally escape from the cabinet 100.

[0027] The box body 2 is in turn defined by a base 3 from which a plurality of peripheral walls defining a closed boundary extend.

[0028] More precisely, a pair of lateral walls 4 that are parallel to one another extend away from the base 3. The pair of lateral walls 4 is joined on a front side to a front wall 5 and on a rear side to a rear wall 6. The front wall 5, rear wall 6 and the pair of lateral walls 4 define in plan a rectangular contour, most cabinets having a preferably rectangular shape in plan.

[0029] It remains understood that without departing the field of protection of the present invention, the tank 1 can have in plan any geometric shape provided that the condition is respected according to which the vertical walls define a closed boundary.

[0030] The front wall 5 ends with a fold 7. The fold 7 defines an acute angle α preferably comprised between 10 and 80 degrees with respect to the front wall 5 from which it extends. In substance, the fold 7 is angled relative to the front wall 5.

[0031] The fold 7 faces the rear wall 6 and when the tank 1 is coupled with the cabinet 100 it faces the pair of wings 107.

[0032] The direction of extension of the fold 7 is substantially oblique and extends from the front wall 5 to the base 3.

[0033] The fold 7 acts as a conveying slide for conveying liquids that exit from the cabinet 100 so that in the event of an accidental escape (for example below the pair of wings 107), the liquids are conveyed inside the tank 1. Again with reference to the spatial location of the fold 7, the latter subtends a plane K-K that is substantially oblique to a plane X-X, which is substantially horizontal, and subtended by the base 3. The extension of the aforesaid oblique plane K-K is incident on the plane X-X.

[0034] In the illustrated preferred embodiment, the fold 7 has a planar shape without interruptions of the continuity. It is understood that, without departing from the scope of protection of the present invention, the fold 7 can have a comb conformation or be defined by shelf portions that are tilted and interrupted with empty portions.

[0035] The fold 7 ends with an end edge 8 that in association with the pair of wings 107 and with the structure of the cabinet 100, when the tank 1 is associated with cabinet 100, defines a slit 9 for the passage of liquids exiting from the cabinet 100.

[0036] At the fold 7, there is at least one hole 10, preferably two, for accessing the inside of the tank.

[0037] Said at least one hole 10 has a triple function: it can act as an "overflow" alert if the cabinet was left unattended for a long time; it can enable the inside of the tank 1 to be inspected and if it is suitably coupled with suitable vacuum means it enables the liquids accumulated in the tank 1 to be emptied from the containment volume V.

[0038] Each lateral wall 4 has an edge of the fold 11 that is folded inside the containment volume V. In other words, a first edge of the fold 11 is folded inside the tank 1 and faces reciprocally. The pair of edges subtends an inner distance defining a spacing for centring the cabinet

100 inside the tank 1.

[0039] In other words, when the cabinet 100 is coupled with the tank 1, each fold 11 can abut against a respective flank 101 that the fold 11 faces.

[0040] Each fold 11, in the extension thereof along the lateral wall 4 that goes from the rear wall 6 to the front wall 5, has an interruption of the continuity that defines a window 12 that also has the function of facilitating the construction of the tank 1.

[0041] Said interruption of the continuity generating the window 12 is located near the end edge 8.

[0042] At a wall 4,5,6 of the tank 1, a hole can be present, which is not illustrated in the attached figures, which is closable by a discharge cap for facilitating the operations of emptying the tank 1.

[0043] The tank 1 further comprises a spacing body 13 placed on the base 3. Said spacing body 13 can be solidly constrained to and integrated with the base 3 or removable from the latter.

[0044] Said spacing body 13 is preferably defined by a parallelepiped located with an orientation that is parallel to one of the lateral walls 4.

[0045] Still more preferably, the tank 1 can contain two spacing bodies 13, each located near a respective lateral wall 4.

[0046] Said spacing body 13, when the cabinet 100 is coupled with the tank 1, enables the cabinet 100, and more precisely, the bottom wall 104, to be maintained raised from the base 3 of the tank 1 so that the cabinet 100 does not occupy a good part of the containment volume V inside the tank 1.

[0047] In this manner, locating the cabinet 100 inside the tank 1 does not completely penalize the capacity to contain the liquids that could be collected inside the tank 1.

[0048] Returning to the cabinet 100, the cabinet 100 has a passage hole 110 at the back 102.

[0049] The passage hole 110 can be used to place inside the cabinet 100 an electric wire connected outside to an electric network to supply if necessary electronic devices stowed, at rest inside the cabinet.

[0050] The box structure 105, defined by the coupling of the walls of the cabinet 100, is not liquid-tight. In particular, the pair of wings 107 defines below a lower slit 108 located above the bottom wall 104 and at the lower region of the pair of wings 107.

[0051] In the same manner, due to the nature of the type of cabinet 100 and in particular of the hinge wings, the pair of wings 107 defines a lateral slit 109 with the respective flank 101 with which the wing 107 is coupled. In other words, the pair of wings 107 defines at opposite ends a pair of lateral slits 109 that are each contiguous with a respective flank 101.

[0052] If liquids are spilt outside the cabinet 100, the aforesaid slits perform the (undesired) function of exit routes for the liquids from the cabinet. Regarding the lower slit 108, the liquids exiting from the aforesaid slit can overflow frontally from the cabinet 100 and knocking the fold 7, be conveyed, passing through the slit 9 inside the tank 1.

[0053] For this reason, the fold 7 faces the pair of wings 107 when the cabinet 100 is coupled with the tank 1. The pair of wings 107 defines one side of the slit 9 and the end edge 8 of the fold 7 defines the other side of the slit 9.

[0054] Regarding the lateral slits 109, the liquids exiting from the aforesaid slits can overflow laterally from the cabinet 100 and be conveyed inside the tank 1, through the pair of windows 12 obtained from the respective interruptions to the fold edges 11 and between the cabinet and the edge of the fold 11.

[0055] Lastly, the rear wall 6 is a protection against a possible accidental escape of liquid from the passage hole 110.

[0056] In order for this to occur, the rear wall 6 has a height extension, that is away from the base 3 of the tank 1, so as to cover the passage hole 110 entirely.

[0057] In this manner, if liquid accumulates inside the cabinet 100 and the aforesaid accumulation reaches the passage hole 110, the rear wall 6 hinders a potential escape of the liquid, forcing the liquid to exit to the slits 108, 109 in which the suitable conveying means, the fold 7 and the pair of windows 12 of the liquid inside the tank 1 are present.

[0058] Even if the liquid flowed directly to the back 102, the wall 6 would convey the liquid by channelling the liquid between the wall 6 and back 102, inside the tank 1.

[0059] Advantageously, the present invention is able to overcome the drawbacks which have emerged from the prior art.

[0060] Advantageously, the tank 1 enables the liquids to be collected that may accidentally exit from the cabinet 100 and the environment to be thus safeguarded from possible environmental contaminations and the workplace to be kept safe (for example by preventing slips on oil spilt on the floor).

[0061] In addition, the conformation of the tank 1 enables the tank 1 to be applied to existing cabinets 100, once the correct distance between the fold edges 11 is defined or once the tank 1 and the spacing body 13 have been suitably sized, that is able to receive internally the spacing subtended between the pair of flanks, without the need to change the cabinet itself.

Claims

1. A tank (1) for containing fluids exiting accidentally from a cabinet (100) provided with a pair of flanks (101) that are connected behind to a back (102) and connected above and below respectively to a top (103) and to a bottom (104) to define a parallelepiped-shaped box structure (105) open on one side (106); said side (106) being closable by a pair of wings (107) each hinged on a respective flank (101); the tank (1) comprises:

- a box body (2), defining a containment volume (V) and comprising a base (3) from which a pair of lateral walls (4) that are parallel to one another, a front wall (5), joining on one side the pair of lateral walls (4), and a rear wall (6), joining on the opposite side the pair of lateral walls (4) extend; **characterized in that** said front wall (5) ends with a fold (7), angled with respect to the front wall (5) and facing the pair of wings (107), extending along an oblique direction from the front wall (5) to the base (3) so as to define a conveying slide for conveying the liquids exiting from the cabinet (100) to inside the tank (1).

2. The tank (1) according to claim 1 wherein said base (3) subtends a substantially horizontal plane (X-X), and wherein said fold (7) subtends an oblique plane (K-K) the extension of which inside the tank (1) is incident on the plane (X-X).

3. The tank (1) according to claim 1 wherein said front wall (5), said rear wall (6) and said pair of lateral walls (4) define together a closed contour and together with the base (3) a containment volume (V) that is open only on the top of the tank (1).

4. The tank (1) according to claim 1 wherein said fold (7) has an end edge (8) facing and spaced apart from the pair of wings (107) and bounding a slit (9) for the passage of liquids exiting from the cabinet (100).

5. The tank (1) according to claim 1 wherein said fold (7) has at least one hole (10), defining an inspection point inside the tank (1), which is connectable to a vacuum source to promote emptying of the containment volume (V).

6. The tank according to claim 1, wherein each lateral wall (4) ends above with an edge of a fold (11) towards the inside of the containment volume (V) preferably abutting in contact with the respective flank (101) with which the fold (11) is contiguous; said pair of edges of the fold (11) subtending between one another an inner distance defining a spacing for centring the cabinet (100) with respect to the tank (1).

7. The tank (1) according to claims 4 and 6 wherein each edge of a fold (11) has an interruption of continuity near the end edge (8), each generating a window (12) for receiving liquids exiting from the pair of lateral slits (109) or from the flanks (101) of the cabinet (100).

8. The tank (1) according to claim 1 further comprising at least one spacing body (13) placed on the base (3) of the tank (1) to generate, when the cabinet (100) is coupled inside the tank (1), a spacing thickness to maintain the cabinet raised with respect to the base (3) of the tank (1).

9. A cabinet (100) for containing solid and/or liquid products, the latter being preferably contained inside containers of the type comprising:

- a pair of flanks (101) that are parallel to one another and define externally the overall width of the cabinet (100);
- a back (102) connected behind to the pair of flanks (101) and defining the load depth and having a passage hole (110) below
- a top (103) connected above to the pair of flanks (101) and to the back (102) and a bottom (104) connected below to the pair of flanks (101) and to the back (102); said pair of flanks (101), back (102), top (103) and bottom (104), defining a parallelepiped-shaped box structure (105) that is open on one side (106);
- a pair of wings (107), each coupled with a respective flank (101), preferably by a hinge coupling, to enable the side (106) of the cabinet (100) to be opened and closed; said pair of wings (107) generating in the cabinet (100), a lower slit (108), located between the lower portion of each wing (107) and the top of the bottom (104) and a pair of lateral slits (109), each located between the coupling region between the wing (107) and respective flank (101);

characterized in that said cabinet (100) is placed inside a tank (1) defined according to one or more of the preceding claims.

10. The cabinet (100) according to claim 9 **characterized in that** it is positioned inside the tank (1) so as to place the lower slit (108) in a position facing the fold (7) to promote, in the event of an accidental leak of liquids from the cabinet (100), conveying the liquids inside the slit (9) defined between the end edge (8) and pair of wings (107) or the front side of the cabinet (100).

11. The cabinet (100) according to claim 9 **characterized in that** it is positioned inside the tank (1) so that each lateral slit (109) faces a respective window (12), defined by the interruption of the continuity of the fold (11) of each lateral wall (4), and/or faces the respective fold (11).

12. The cabinet (100) according to claim 9 **characterized in that** said spacing body (13) promotes a detachment between the bottom (104) of the cabinet (100) and base (3) of the tank (1) so as to increase the volumetric capacity of the tank (1) to receive liquids.

13. The cabinet (100) according to claim 9 **character-**

ized in that said rear wall (6) has, in height, a sufficient extension to cover the passage hole (110) obtained on the back (102) so as to avoid a possible accidental leak of liquid from the rear part of the cabinet (100) promoting conveying to inside the tank (1).

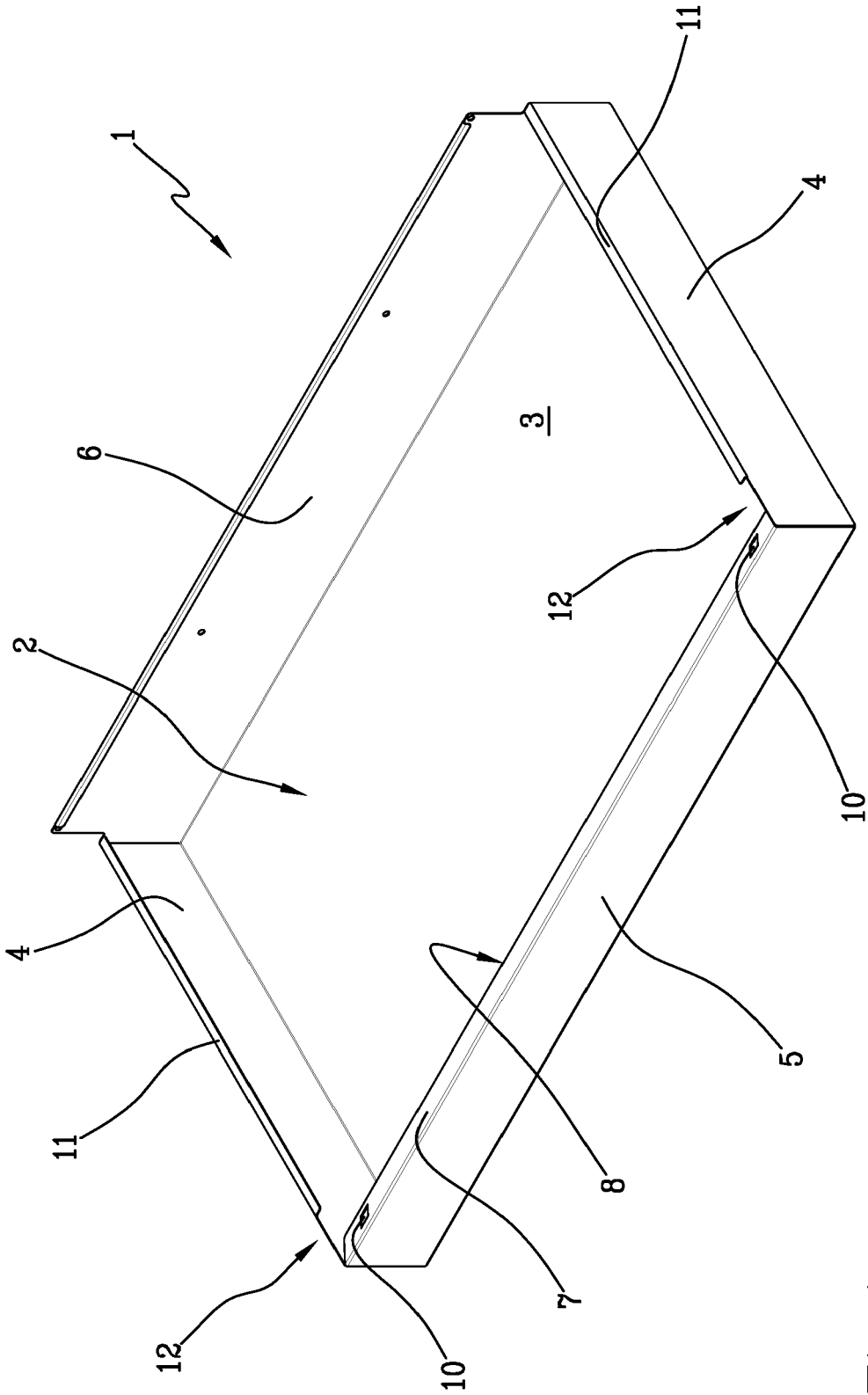


Fig.1

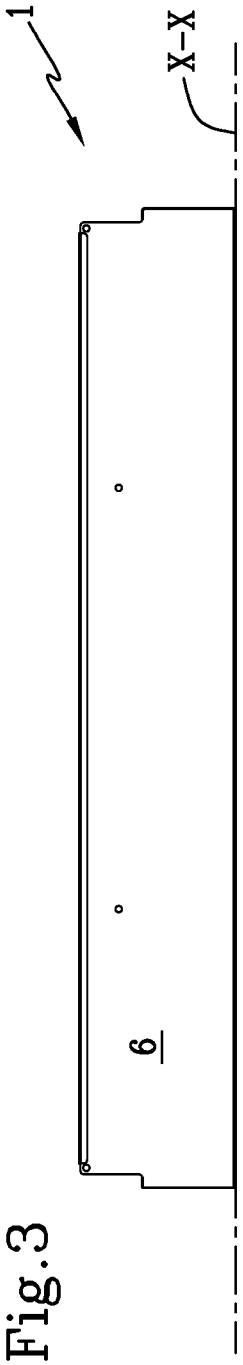


Fig.3

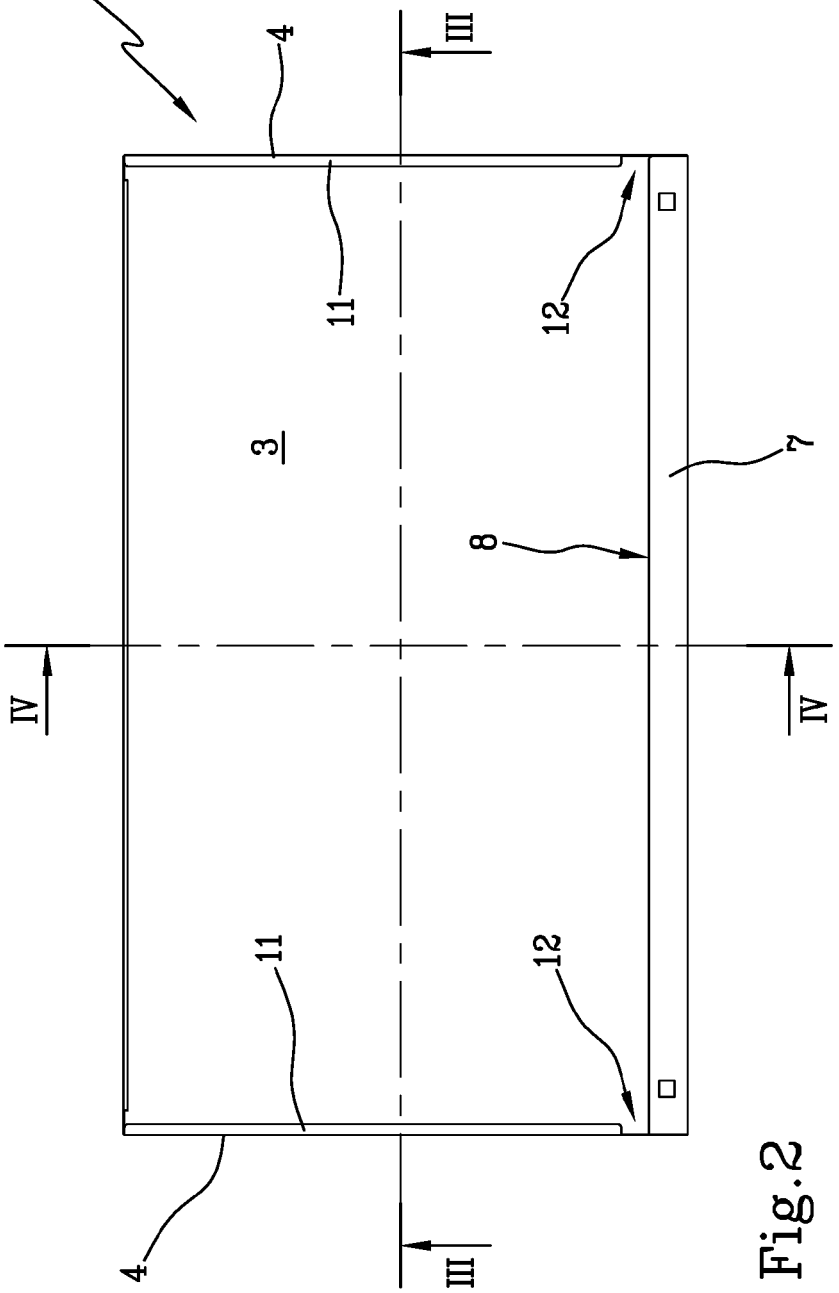


Fig.2

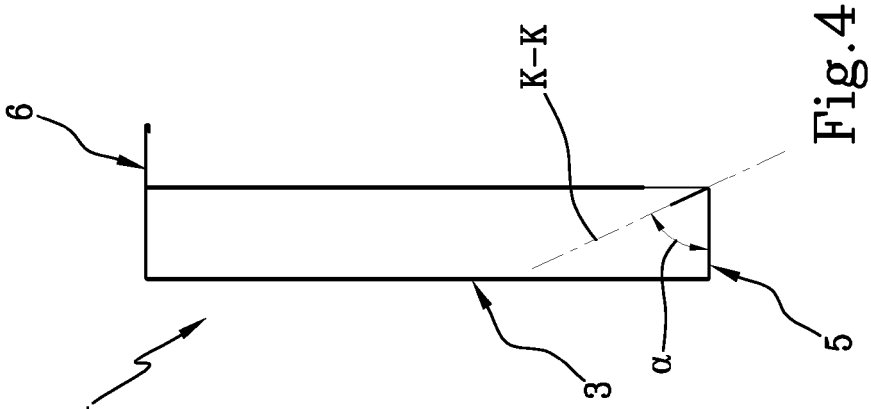


Fig.4

Fig.5

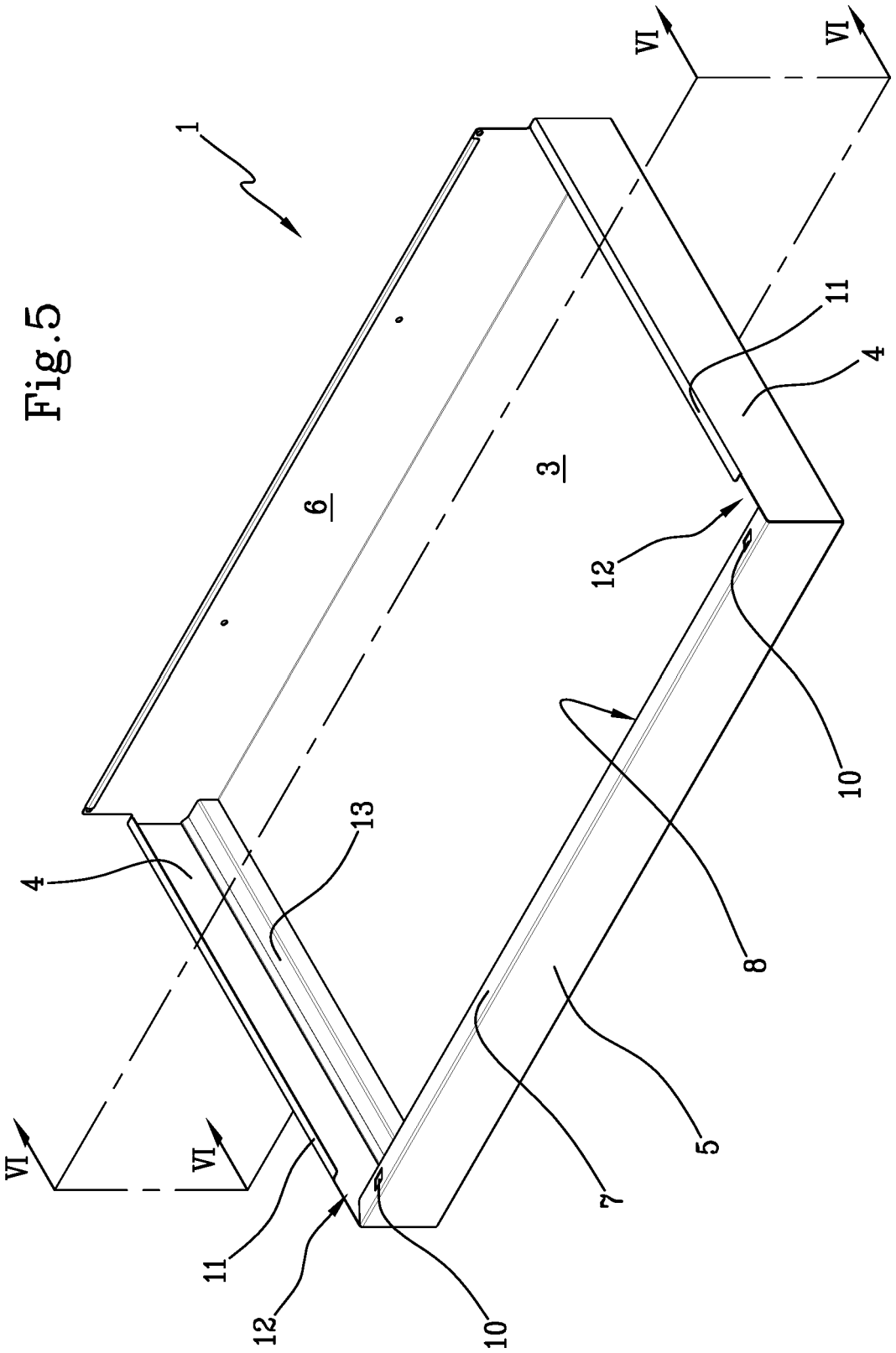


Fig.6

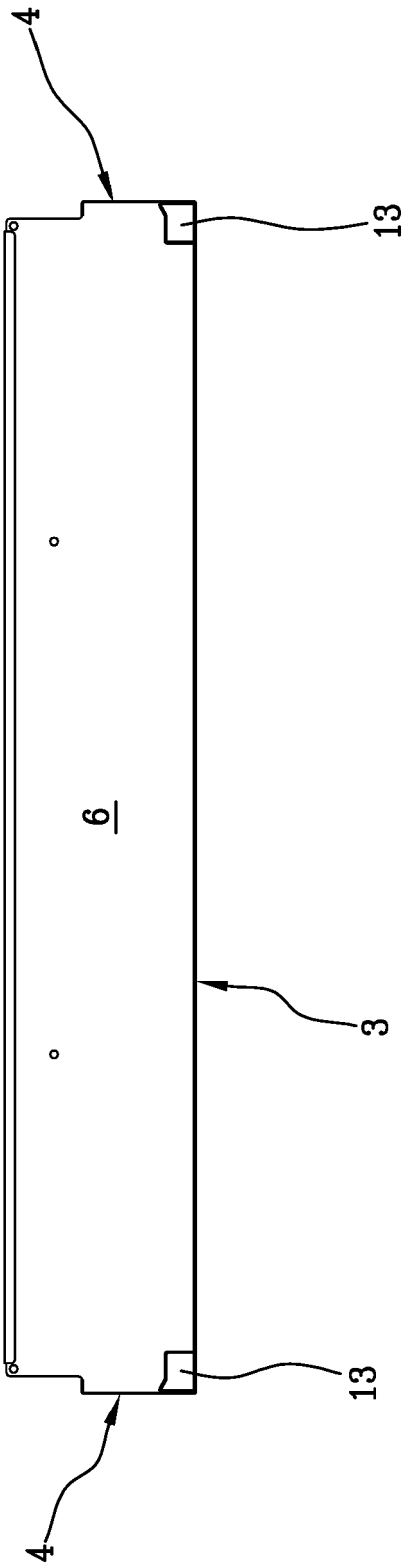
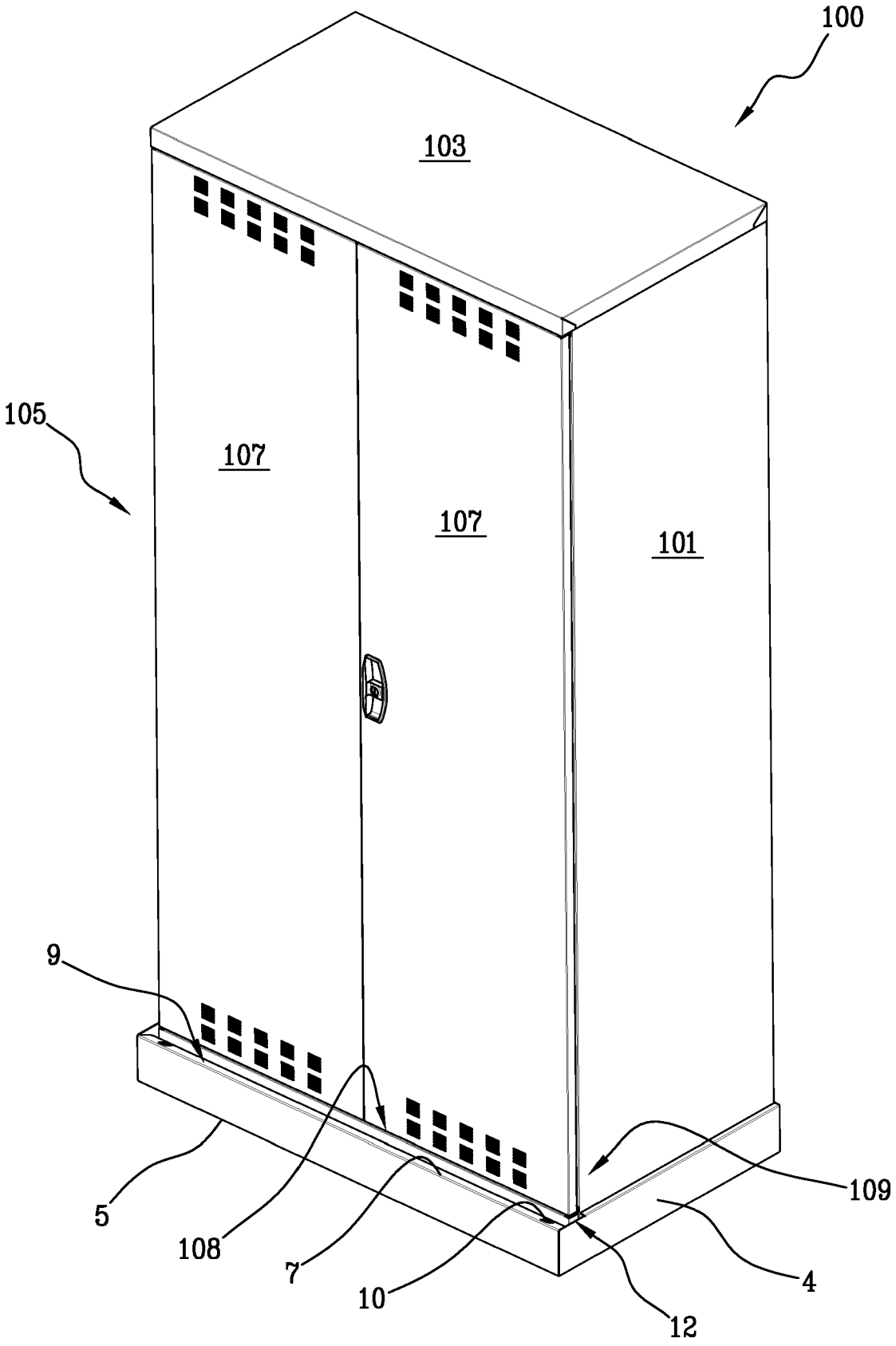


Fig.7



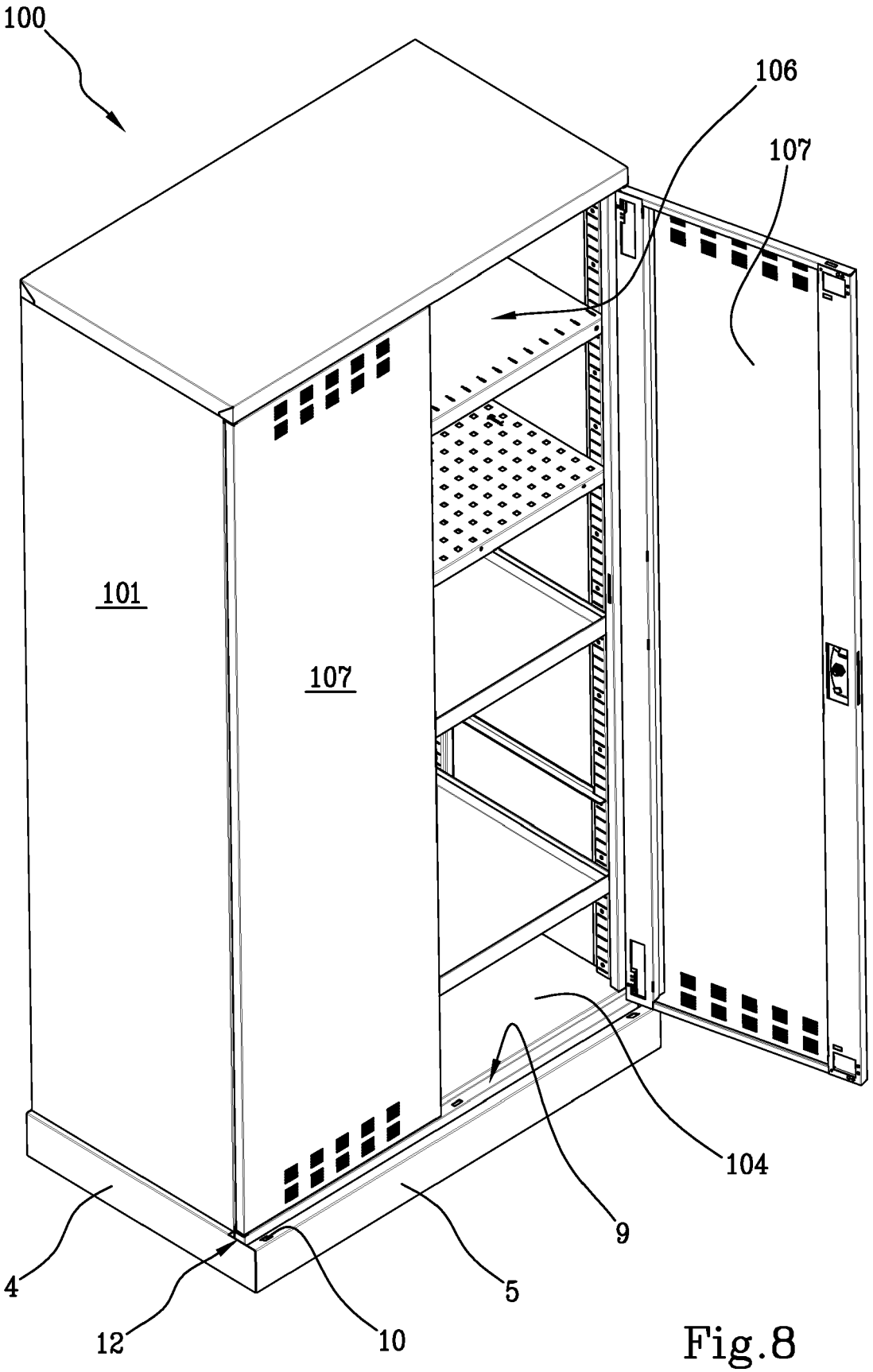


Fig.8

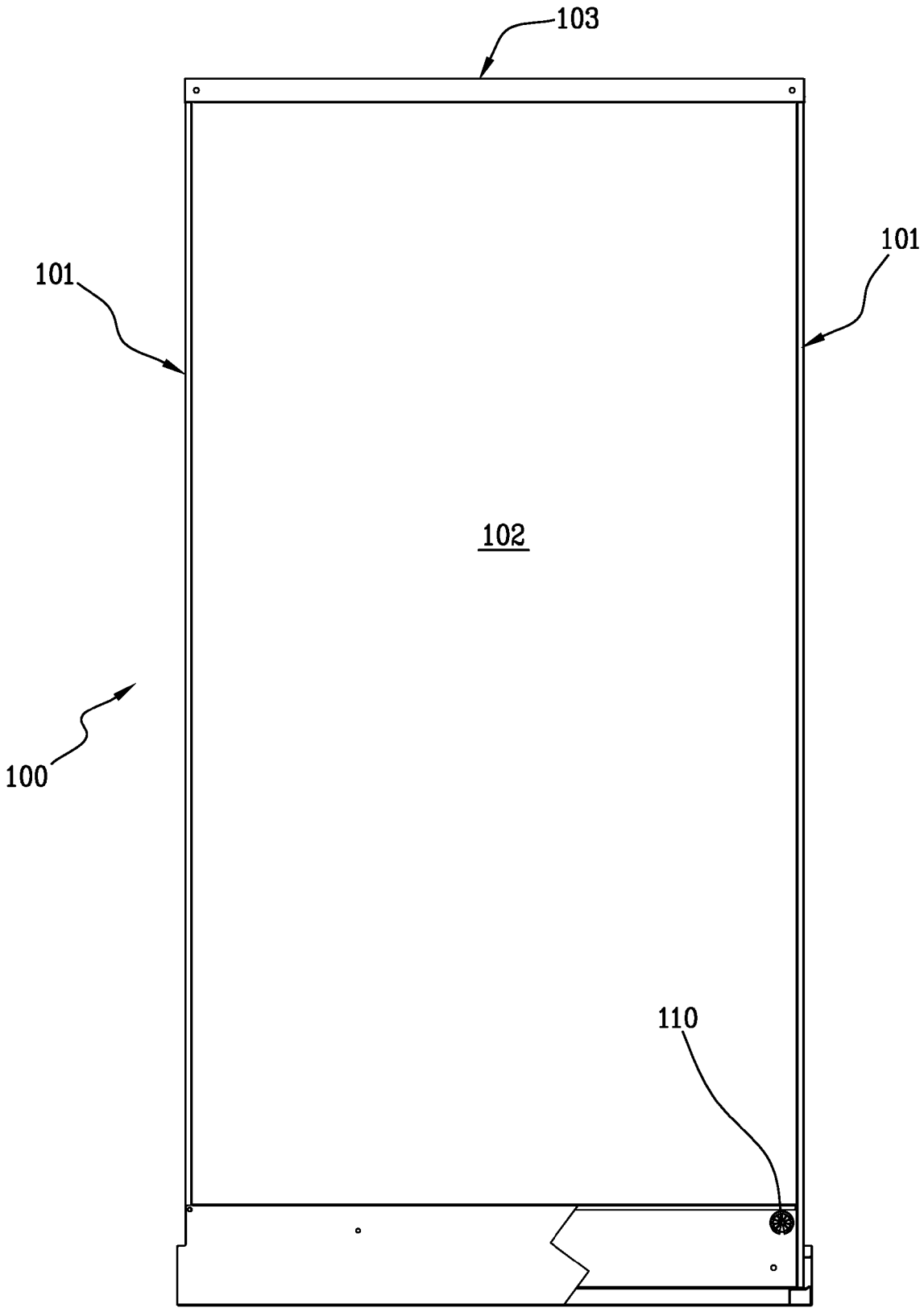


Fig.9

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EUROPEAN SEARCH REPORT

Application Number
EP 22 16 2854

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 August 2022	David, Radu

CATEGORY OF CITED DOCUMENTS

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