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(54) **PROTECTION OF VALUABLES**

(57) The invention relates to a protection device for the protection of valuables inside a container. The protection device has a support supporting a marking fluid container that contains a marking fluid and is provided

with apertures allowing the marking fluid to spill onto the valuables upon rupture of the marking fluid container in case of an explosion.

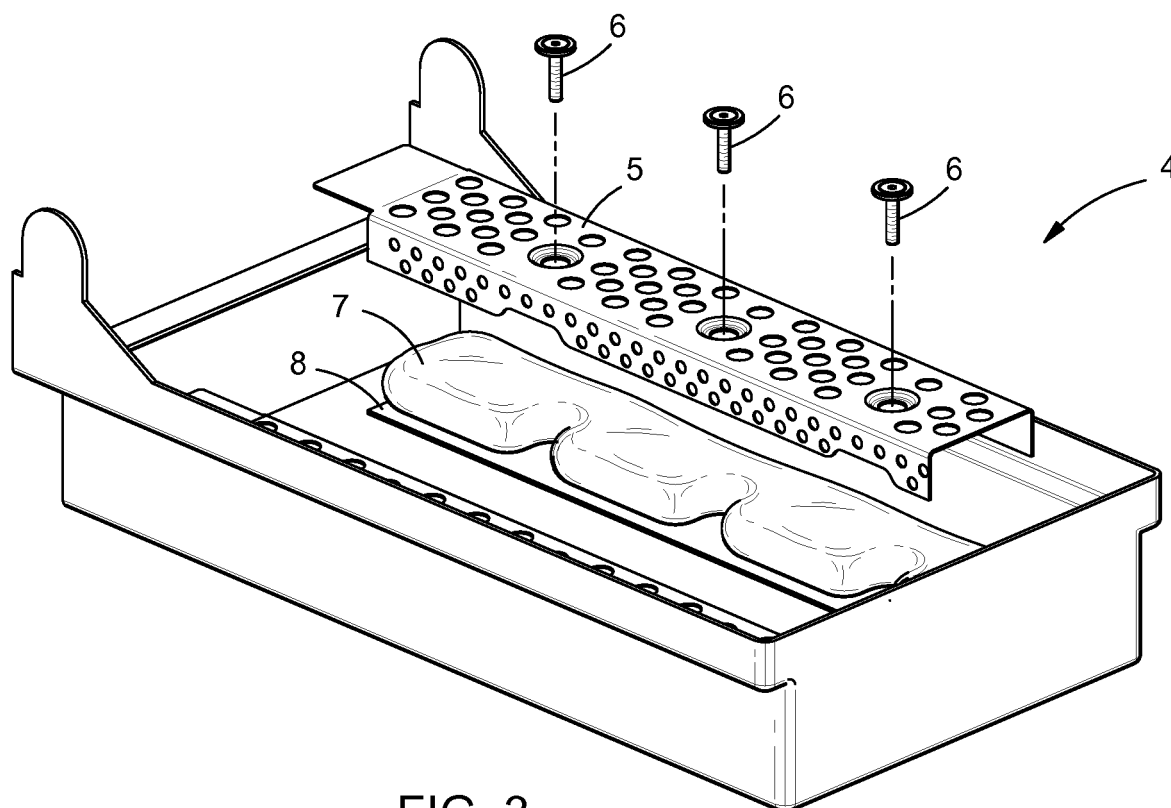


FIG. 3

Description

FIELD OF THE INVENTION

[0001] This invention relates to the protection of valuables and more particularly, but not exclusively, to the protection of banknotes inside a container such as a cassette of an automatic teller machine (ATM) by marking the banknotes to render them unusable.

BACKGROUND TO THE INVENTION

[0002] Methods and apparatus for the protection of banknotes inside a cassette of an ATM or inside a so-called cross-pavement container is well-known and widely used.

[0003] ATMs are used to dispense banknotes to the public. Containers (cassettes) filled with banknotes are loaded into the ATMs so that the banknotes can be dispensed to the public using bank cards or inputs on a keyboard. Unfortunately, although ATMs are fortified and protected, they are vulnerable to explosive attack. Explosives such as dynamite or other solid explosives or solids used in mining for rock breaking and the like, are employed to great effect. In addition, gaseous compositions are increasingly being used. For example, acetylene gas from a gas bottle may be introduced into an ATM. The gas mixes with oxygen in the atmosphere and, at a critical gas concentration, the mixture can be ignited to release a substantial explosive force. These explosives are used, literally, to blast an ATM apart and, when this occurs, banknotes in the containers or cassette can be accessed or the banknotes are released when the container or cassette are destroyed by the explosion.

[0004] It is not feasible to prevent an explosive attack for the initiative to use an explosive applied by the perpetrator. An attempt has been made to negate the success of this type of attack by including, between the banknotes, at regular intervals, sachets formed from a soft plastics material. Each sachet is sealed and contains a marking ink. An objective in this respect is that at least one sachet will be broken in case of an explosive shock wave and the ink therein will be released at least on to some of the banknotes which are adjacent the sachet. The banknotes thus marked with the ink is then rendered unusable.

[0005] Another method to counter-attack includes the use of a fully automated electronic system which monitors the ATM and an associated bank note cassette. Ink is released upon sensing an unwarranted intrusion of the ATM or bank note cassette. Although the system is effective in countering physical attacks or break-ins of the ATM machine, the efficacy is reduced in an explosive attack and often the system is destroyed before dye or ink can be released onto the banknotes or warning signals can be sent to the device that releases or causes the release of the ink. Such a system is also relatively expensive to install and maintain.

[0006] It has also been proposed to attach ink filled plastic material bottles on the inside of the lids of these banknote carrying cassettes. The design of these bottles is critical as they need to rupture in case of an explosion but must remain intact under normal use, especially when the cassettes are handled during normal operation such as the removal and replacement thereof. This approach, however, is only effective in case of solid explosives exceeding a critical level of explosion power, not in case of attacks wherein gaseous compositions are used.

OBJECT OF THE INVENTION

[0007] It is an object of this invention to provide a protection means and a protection method of the type described above.

SUMMARY OF THE INVENTION

[0008] In accordance with this invention there is provided a protection means or protection device comprising a marking fluid container containing a marking fluid and a fragmentation object that breaks into fragments in case of an explosion.

[0009] There is provided for the fragments of the fragmentation object to pierce the marking fluid container in case of an explosion.

[0010] The protection device is for the protection of valuables inside a container such as banknotes in a cassette of an automatic teller machine.

[0011] A further feature of the invention provides for the fragmentation object to be an elongate sheet; alternatively, to be shaped complementary to an outer surface of the fluid container. As a further alternative, the fragmentation object is formed by a support supporting the marking fluid container. As yet a further alternative, the protection device does not include a fragmentation object, however, still including a support supporting the marking fluid container and being provided with apertures allowing the marking fluid to spill onto the valuables upon rupture of the marking fluid container in case of an explosion.

[0012] There is provided for the marking fluid to be an ink, a gas or the like.

[0013] A still further feature of the invention provides for the fragmentation object to be a glass sheet.

[0014] There is also provided for the marking fluid container to be a rigid plastics material container or bottle; alternatively, for the marking fluid container to be a flexible plastics material container.

[0015] More specifically there is provided for the marking fluid container to be a plastics material bag such as a sachet.

[0016] There is still further provided for the marking fluid container to be supported in a support means having apertures there through.

[0017] The protection device may include a single or a multiple number of marking fluid containers.

[0018] The support means also acts as a guide means to guide banknotes in a container in which the protection means is installed.

[0019] A yet further feature of the invention provides for the protection means to be attached inside a lid of a cartridge in which banknotes are stored.

[0020] The fragmentation object may be attached to at least part of the fluid container; alternatively, the fragmentation object is attached to an inside of the lid with a shock absorbent attachment means.

[0021] Optionally, the support is integrally formed with a lid of the container in which the protection device is installed. Here, an outer surface of the container lid may be provided with an entrance opening for inserting a marking fluid container.

[0022] There is provided for the shock absorbent attachment means to be attached on the inside of the lid of a bank note cartridge, for the fragmentation means to be attached thereto, for the support means to be attached over the shock absorbent attachment means and the fragmentation means and for the marking fluid container to be carried and supported inside the support means without being attached to either the support means or the fragmentation device.

[0023] The protection device may consist of passive elements only.

[0024] According to a further aspect, an automatic teller machine (ATM) is provided, comprising a cassette fillable with banknotes and a protection device being installed in the cassette.

[0025] This invention extends to protection method comprising the steps of:

- providing a fragmentation object in close proximity to a marking fluid container filled with a marking fluid; and
- allowing the fragmentation object to fragment and for a fragmentation of the fragmentation device to pierce the marking fluid container in case of an explosion.

[0026] A further step of the protection method includes mounting the fragmentation object on a shock absorbent attachment means.

[0027] A still further step of the protection method includes supporting the marking fluid container inside a support means which support means is attached to the inside of a lid of a container so that the marking fluid container rests, in use, on an inner surface of the support means operatively underneath and in close proximity to the fragmentation object.

[0028] The invention also relates to a method for the protection of valuables inside a container, the method comprising the steps of:

- providing a marking fluid container containing a marking fluid to spill onto the valuables upon rupture of the marking fluid container in case of an explosion,

and

- providing a support supporting the marking fluid container. Further, the method may include the step of:
- causing fragmentation objects to pierce the marking fluid container in case of an explosion.

[0029] These and other features of invention are described in more detail below.

10 BRIEF DESCRIPTION OF THE DRAWINGS

[0030] Embodiments of the invention is described below, by way of example only, and with reference to the drawings in which:

Figure 1 shows a perspective view of a container for carrying banknotes, with protection means according to a first embodiment of the invention in a lid thereof;

Figure 2 shows a perspective view of a lid of the container of figure 1 with the protection means attached therein;

Figure 3 shows the same view as that of figure 2 but with part of the protection means in exploded view;

Figure 4 shows an operatively underside perspective view of the protection means of figures 1 to 3;

Figure 5 shows an exploded view of the protection means of figures 1 to 4;

Figure 6 shows an operatively upper perspective view of the protection means of figures 1 to 5;

Figure 7 shows a perspective exploded view of a second embodiment of protection means according to the invention in which supports thereof have clips for engaging with formations on the inside of a lid of a cassette;

Figure 8 shows a perspective view of the protection means of figure 7 in which the supports are engaged with formations on the lid, and

Figure 9 shows a schematic top view of a third embodiment of protection means according to the invention, in a flat state prior to bending.

DETAILED DESCRIPTION OF THE DRAWINGS

[0031] With reference to the drawings, a container for banknotes is generally indicated by reference numeral 1.

[0032] The protection means includes, in the embodiment shown in Fig. 1-8, two marking fluid containers 7 and two fragmentation objects 8.

[0033] The protection means are attached on the inner

operatively underside surface of a lid 4 of a container 1 having a main container section or cartridge 2 for storing banknotes 3, as is known in the art.

[0034] The marking fluid containers are elongate flexible plastics material bags or sachets with recesses to accommodate mounting screws as explained in further detail below. The sachets can be made from flexible plastics material such as polyethylene, e.g. Low Density Polyethylene, LDPE. The flexible wall made from the plastics material may have a thickness allowing the sachets to rupture upon the occurrence of an explosion, e.g. ranging between circa several tens to circa hundreds of micrometers, e.g. circa 100 micrometers.

[0035] Preferably, the sachet has a design such that, e.g. depending on size and/or geometry of the sachet, type and/or thickness of wall material and/or type and amount of marking fluid, the plastics material ruptures in a more or less uniform way in case of an explosion, allowing the marking fluid to leave the sachet with minimal flowing resistance, in a relatively short time window and/or in multiple directions. The sachet may rupture between opposing ends and along a major portion of a sachet portion between said ends. As an example, the sachet may tear from one end to the opposing, other end. Further, the sachet may partially or completely crumble or disintegrate, releasing the marking fluid.

[0036] A sachet may contain an amount of marking fluid, e.g. a volume ranging from circa 450 ml to circa 600 ml. However, a sachet may contain an amount of marking fluid more than 600 ml, e.g. 800 ml or less than 450 ml, e.g. 300 ml.

[0037] The protection means may include a single or a multiple number of marking fluid containers. Preferably, the shape and/or size of the marking fluid containers are designed to match a geometry of the container, especially to a lid of the container in which the protection means are installed.

[0038] The marking fluid containers fit into support grids 5 which are elongate and U-shaped in cross section so that when the supports are attached to an operatively inner surface of the lid 4, the marking fluid containers are held in the U-shaped supports without being attached thereto.

[0039] The supports 5 are perforated and include holes for receiving fastening means in the form of screws or bolts 6 there through. The screws pass through the holes of the supports 5, through the recesses of the marking fluid containers and terminate in complementary receiving means into which they are screwed.

[0040] Soft material thick adhesive strips 9 are attached to the inner surface of the lid, operatively above the marking fluid containers. These strips 9 are thick and soft enough to absorb shock through normal use of the container and lid.

[0041] Fragmentation objects in the form of glass sheets are attached to the adhesive strips so that the glass sheets located operatively above the marking fluid containers, preferably without touching them.

[0042] With the lid closed over the cartridge 2, an underside surface of the supports 5 ensures that the banknotes are securely and snugly pushed down into the cartridge 2, as is known in the art.

[0043] With reference to figures 7 and 8, the supports 5 have clip formations 10 at their ends for engaging with engagement formation is 11 inside of a lid. The clips 10 terminating resiliently movable ends 12 for engaging with the engagement formation is 11 as is shown in figure 8. In other words, the ends 12 are forced operatively inwards and then released once the support position so that the ends 12 engage behind a side of the engagement formation is 11.

[0044] In use, the protection means is installed in a lid as described above with the marking fluid containers resting freely within the U-shaped support grids 5. In case of an explosion, the glass sheets will fragment and fragmentation is thereof will travel towards the marking fluid containers and peers the marking fluid containers. The marking fluid containers may, by themselves, without the assistance of the fragmentation objects rupture thus causing the ink thereinto spill onto the banknotes 3 there below. However, the fragmentation objects are included to ensure a more complete destruction and rupturing of the marking fluid containers. This, in turn, ensures a more effective spillage of the ink inside the marking fluid containers onto the banknotes there below thus rendering most, if not all, of the banknotes unusable.

[0045] In a specific embodiment, the support 5 is integrally formed with the lid 4 of the container 1 in which the protection means are installed. Then, the support 5 and the lid 4 form one piece, and can be manufactured and mounted to the container 1 as a single piece. In an embodiment, the support 5 and the lid 4 surround a chamber wherein the marking fluid container or marking fluid containers 7 can be placed, preferably by inserting the marking fluid containers 7 through a single or multiple number of entrance openings in the outer surface of the container lid 4. During use of the protection means and the container with valuables, the entrance openings can be closed, e.g. by moving a movable cover such as a lid element in front of the individual entrance openings.

[0046] The support 5 itself can be formed as a single unit for supporting a single or a multiple number of marking fluid containers. Alternatively, the support 5 may include a multiple number of separate support units each of the separate support units supporting a single or a multiple number of marking fluid containers 7. The Support units can be mounted to each other or to another unit such as the lid 4 of the container 1. In the embodiments shown in Fig. 1-8 the support 5 includes two separate support units 5 each supporting a single marking fluid container 7. As a further example, the support 5 can be formed as a single support unit having two or more cages, e.g. parallel to each other, each cage supporting one or more marking fluid containers 7. It is noted, however, that the cages can be placed in another position and/or orientation with respect to each other, e.g. along

sides of a polygon.

[0047] Figure 9 shows a schematic top view of a third embodiment of protection means according to the invention, in a flat state, prior to bending. Here, the protection means include a support 5 formed as a single support unit forming, after bending, two elongate cages 15, 16 placed in a mainly parallel position, next to each other. Further, the support unit 5 includes an intermediate support element 17 defining an offset distance between the cages 15, 16 and provided with holes 18 for fixation to a lid 4 of a container for carrying valuables such as banknotes.

[0048] In the shown embodiment, the cages 15, 16, formed after bending, are mainly box shaped each having a bottom surface 19, 20 facing, during use, away from the lid 4, said bottom surface 19, 20 each being provided with apertures 21, 22 allowing the marking fluid to spill onto valuables in the container. The cages 15, 16 further each have two short side surfaces 23a,b, 24a,b and two long side surface 25a,b, 26a,b bounding the interior space or chamber in the cage 15, 16 in directions D1, D2 lateral to a plane P wherein the lid 4 mainly extends. At least one of the short or long side surfaces 23-26 can be provided with additional apertures 28a,b allowing the marking fluid to flow outwardly from the cage 15, 16 in case of an explosion. Generally, each of the side surfaces 23-26 can be provided with or without apertures.

[0049] The intermediate support element 17 can be mounted to the lid 4 prior to or after inserting one or more marking fluid containers in the cages 15, 16. As an example, fixation can be carried out using screws penetrating through the holes 18 in the intermediate support element 17 and into the lid 4. It is noted that the fixation of the intermediate support element can be performed using additional or alternative connection means such as a glue. The fixation can be permanently or temporarily, in the latter case the content of the cage 15, 16 can be replaced. Further, openings in the lid 4 can be provided, in front of the cages 15, 16, for removing and/or inserting marking fluid containers.

[0050] The support 5 of the protection means is shown, in Fig. 9, in a flat state, prior to a bending process resulting in the box-shaped structure. Prior to bending, the support 5 is provided with folding lines for facilitating a bending process. Along a first folding line B1, B1' the corresponding cage 15, 16 is bent downwardly with respect to the intermediate support element 17. Further, the bottom surface 19, 20 is bent upwardly with respect to the corresponding long side surface 25b, 26b next to the intermediate support element 17, along a second folding line B2, B2', and the corresponding further long side surface 25a, 26a, as well as the corresponding short side surfaces 23a,b, 24a,b can be bent upwardly with respect to the corresponding bottom surface 19, 20, along a third, fourth and fifth folding line B3, B3', B4, B4', B5, B5', thereby forming the box shaped structure of the support 5. In Fig. 9, the support 5 is shown without corresponding marking fluid containers.

[0051] In this respect it is noted that, in an embodiment, the support 5 may form fragmentation objects in case of an explosion, e.g. by splintering. Then, fragmentation objects of the support 5 pierce the marking fluid container 7 or marking fluid containers 7 thereby allowing the marking fluid to flow through apertures in the support grids 5 to spill onto the valuables in the container 1 in which the protection means or protection device is installed.

[0052] In a specific embodiment, the protection device does not include a glass sheet or another separate fragmentation object. Then, the marking fluid containers may rupture by themselves and/or by fragmentation objects from a splintering support 5 in case of an explosion.

[0053] It is envisaged that the protection means described herein will be convenient to use in that it provides a simple solution in cases where an ink container may not rupture to a required extent. The design of the marking fluid container or ink container becomes less critical and may make the protection means more reliable than existing systems and methods. The protection device may consist of passive elements only, i.e. without electronic equipment, providing a robust and reliable protection.

[0054] It will be appreciated by those skilled in the art that the invention is not limited to the precise details as described herein without departing from the scope of the invention.

Claims

1. Protection device for the protection of valuables inside a container, the protection device comprising a marking fluid container containing a marking fluid, the protection device further comprising a support supporting the marking fluid container, the support being provided with apertures allowing the marking fluid to spill onto the valuables upon rupture of the marking fluid container in case of an explosion.
2. Protection device according to claim 1, wherein the marking fluid container is a flexible plastics material bag or sachet.
3. Protection device according to claim 2, wherein the flexible plastics material is Low Density Polyethylene, LDPE.
4. Protection device according to claim 2 or 3, wherein the flexible wall of the marking fluid container has a thickness ranging between circa several tens to circa several hundreds of micrometers so as to allow the bag or sachet to rupture by itself upon the occurrence of an explosion.
5. Protection device according to any of the preceding claims, wherein the support are U-shaped in cross section holding the marking fluid container, the mark-

ing fluid container preferably being held in the support without being attached thereto.

6. Protection device according to any of the preceding claims, further arranged for causing fragmentation objects to pierce the marking fluid container in case of an explosion. 5
7. Protection device according to claim 6, wherein the support forms fragmentation objects in case of an explosion. 10
8. Protection device according to claim 6, further comprising a separate fragmentation object arranged to pierce the marking fluid container in case of an explosion. 15
9. Protection device according to claim 8, wherein the separate fragmentation object is an elongate sheet such as a glass sheet and/or is shaped complementary to an outer surface of the marking fluid container. 20
10. Protection device according to any of the preceding claims, further comprising a multiple number of marking fluid containers. 25
11. Protection device according to any of the preceding claims, wherein the support is arranged for attachment to an inside of a lid of the container in which the protection device is installed. 30
12. Protection device according to any of the preceding claims, wherein the support is integrally formed with a lid of the container in which the protection device is installed, wherein an outer surface of the container lid is preferably provided with an entrance opening for inserting a marking fluid container. 35
13. Protection device according to any of the preceding claims, further comprising shock absorbent attachment means attaching the fragmentation object to the lid. 40
14. Automatic teller machine, comprising a cassette fillable with banknotes and a protection device according to any of the preceding claims, the protection device being installed in the cassette. 45
15. A method for the protection of valuables inside a container, the method comprising the steps of 50
 - providing a marking fluid container containing a marking fluid to spill onto the valuables upon rupture of the marking fluid container in case of an explosion, 55
 - providing a support supporting the marking fluid container.

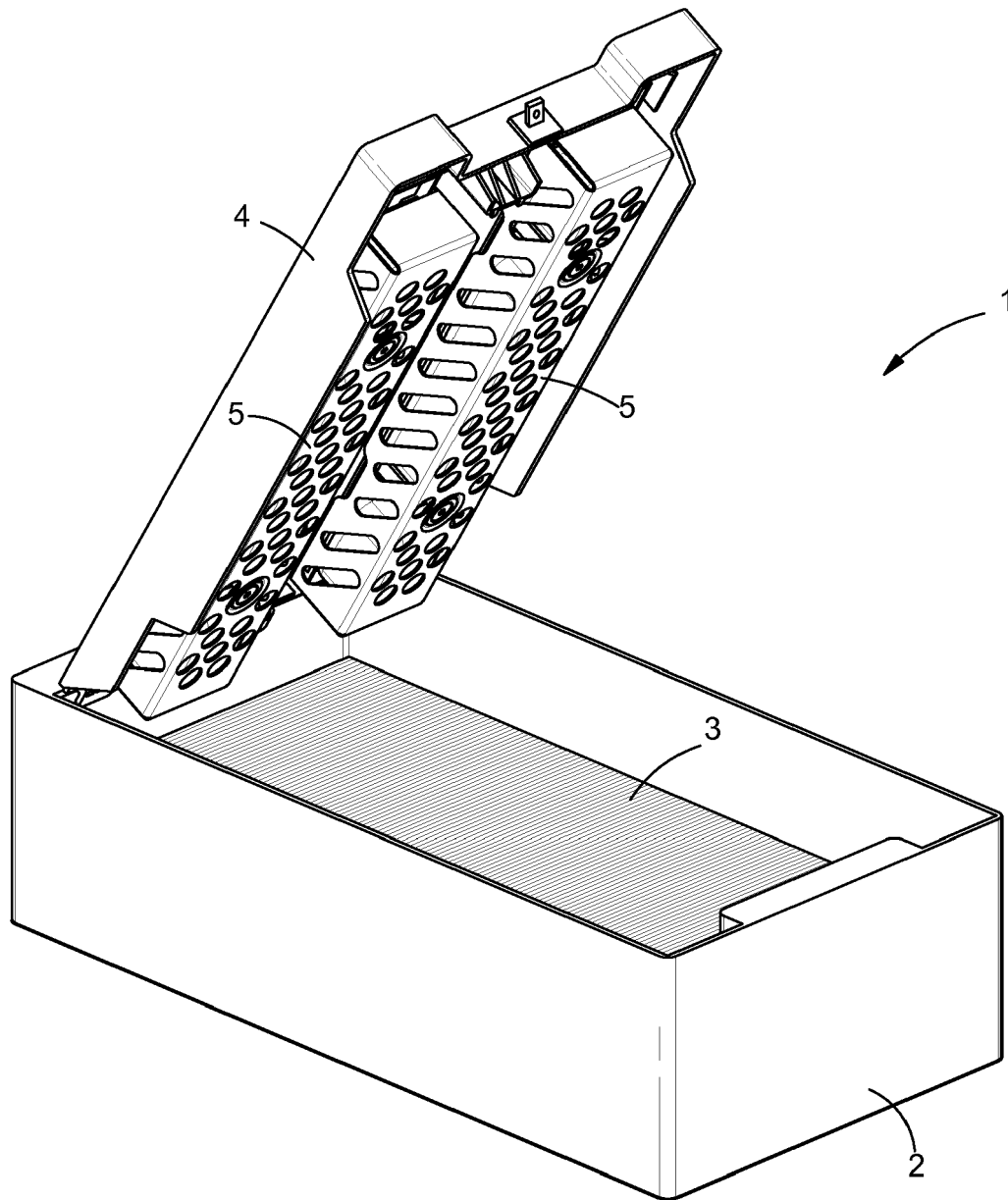


FIG. 1

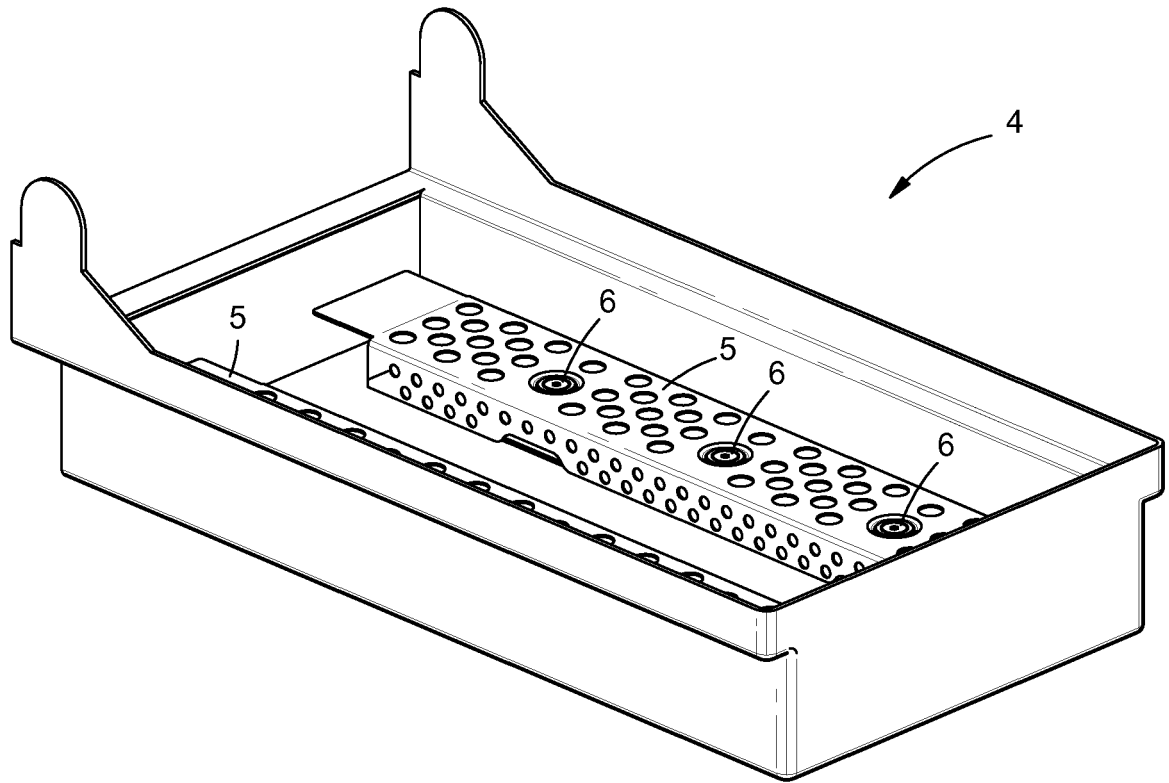


FIG. 2

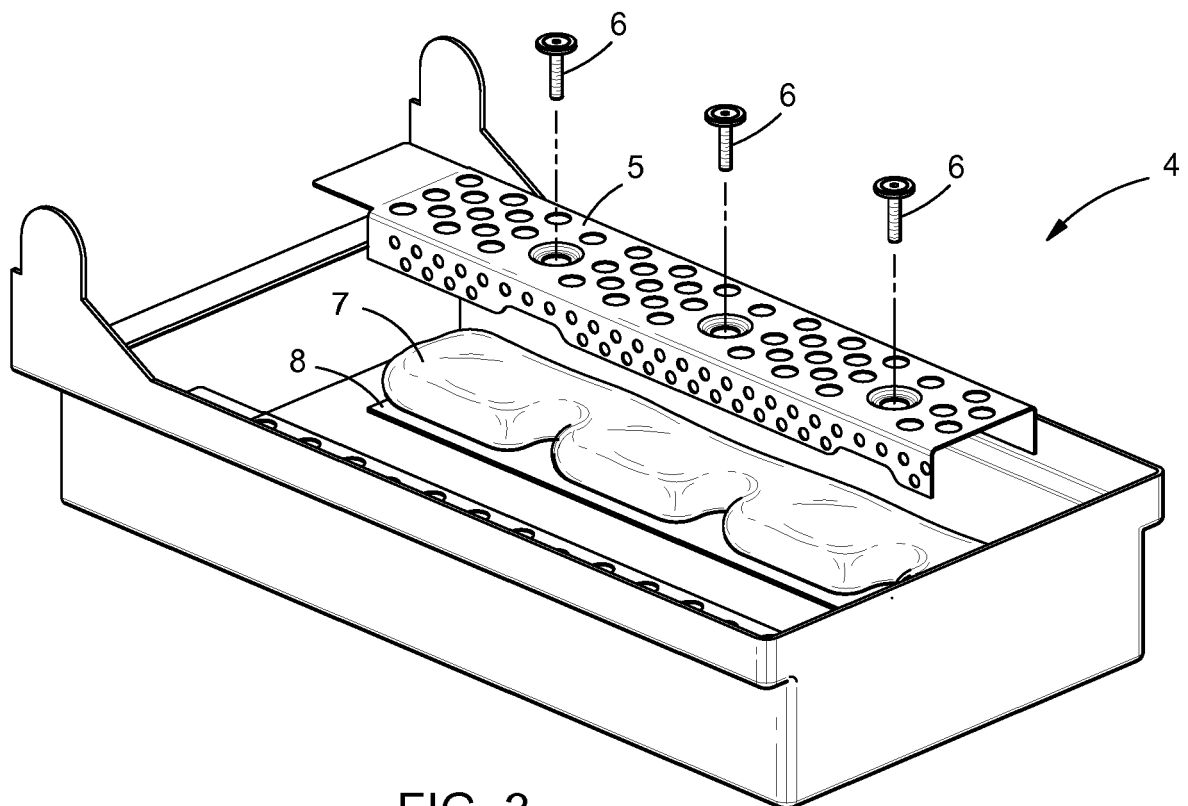


FIG. 3

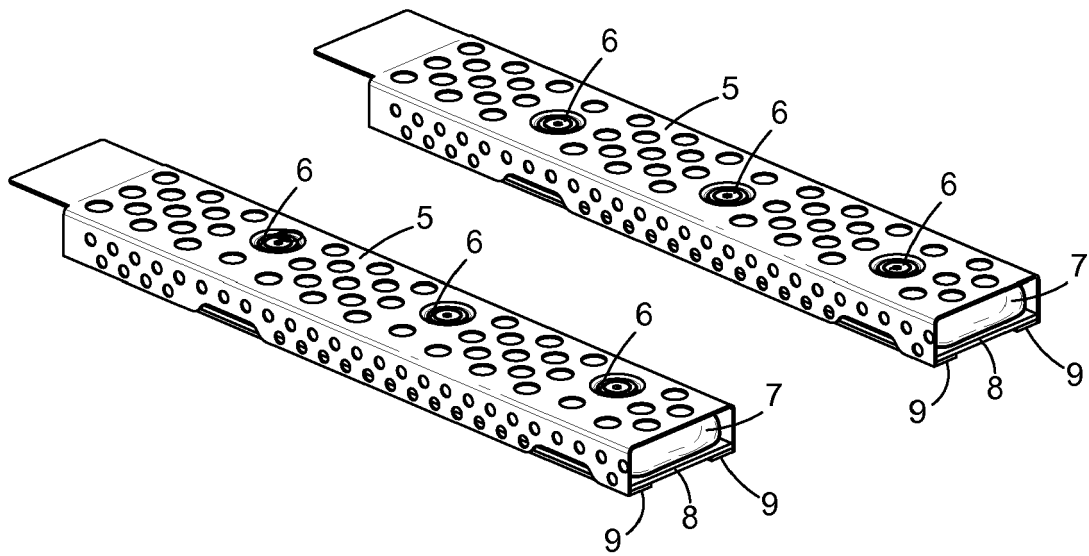


FIG. 4

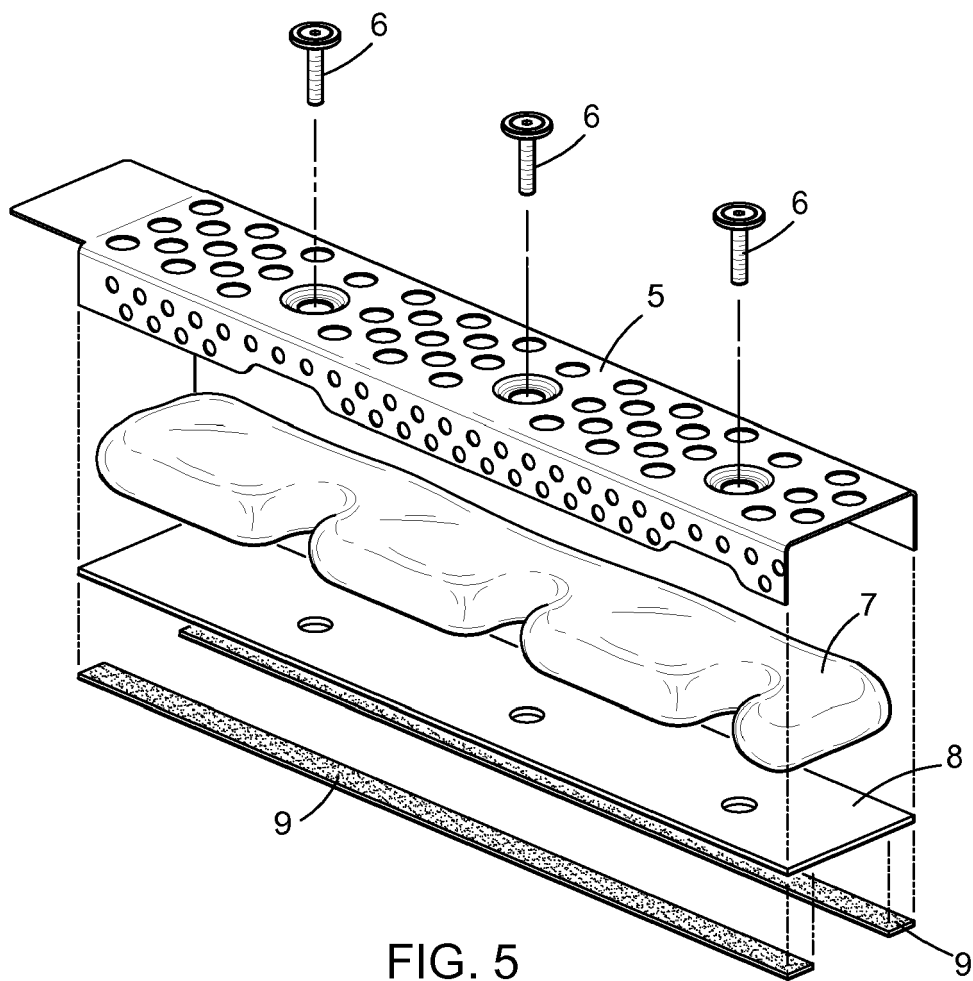


FIG. 5

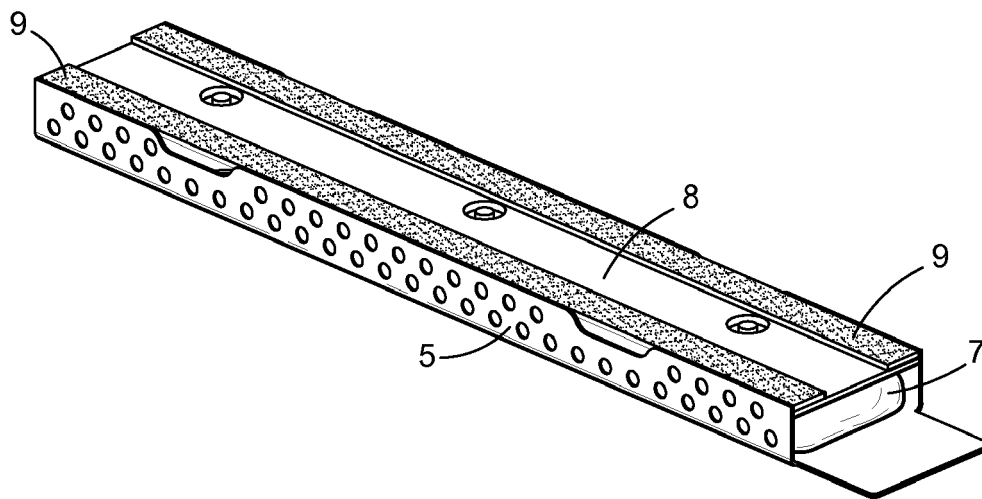


FIG. 6

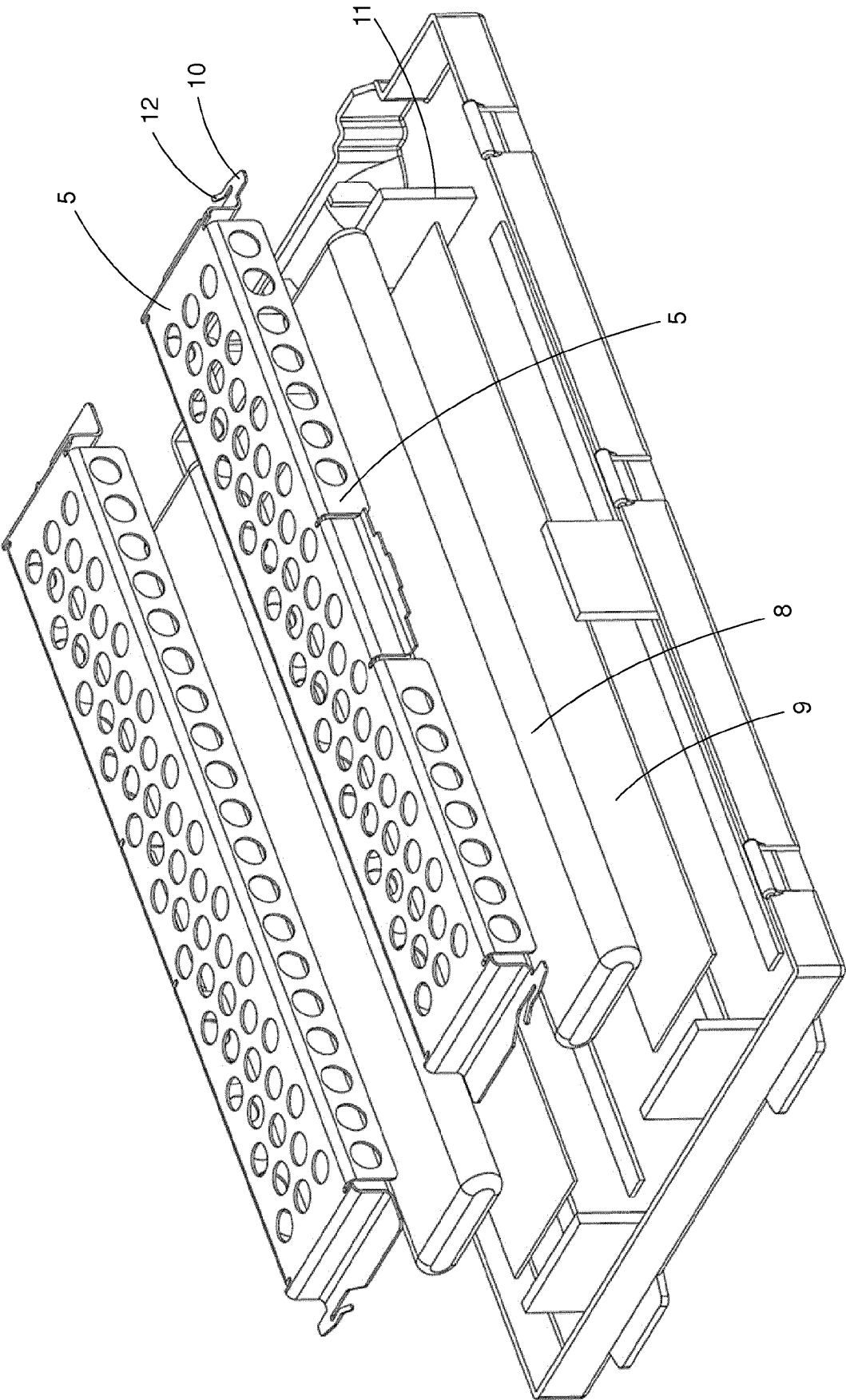


FIG. 7

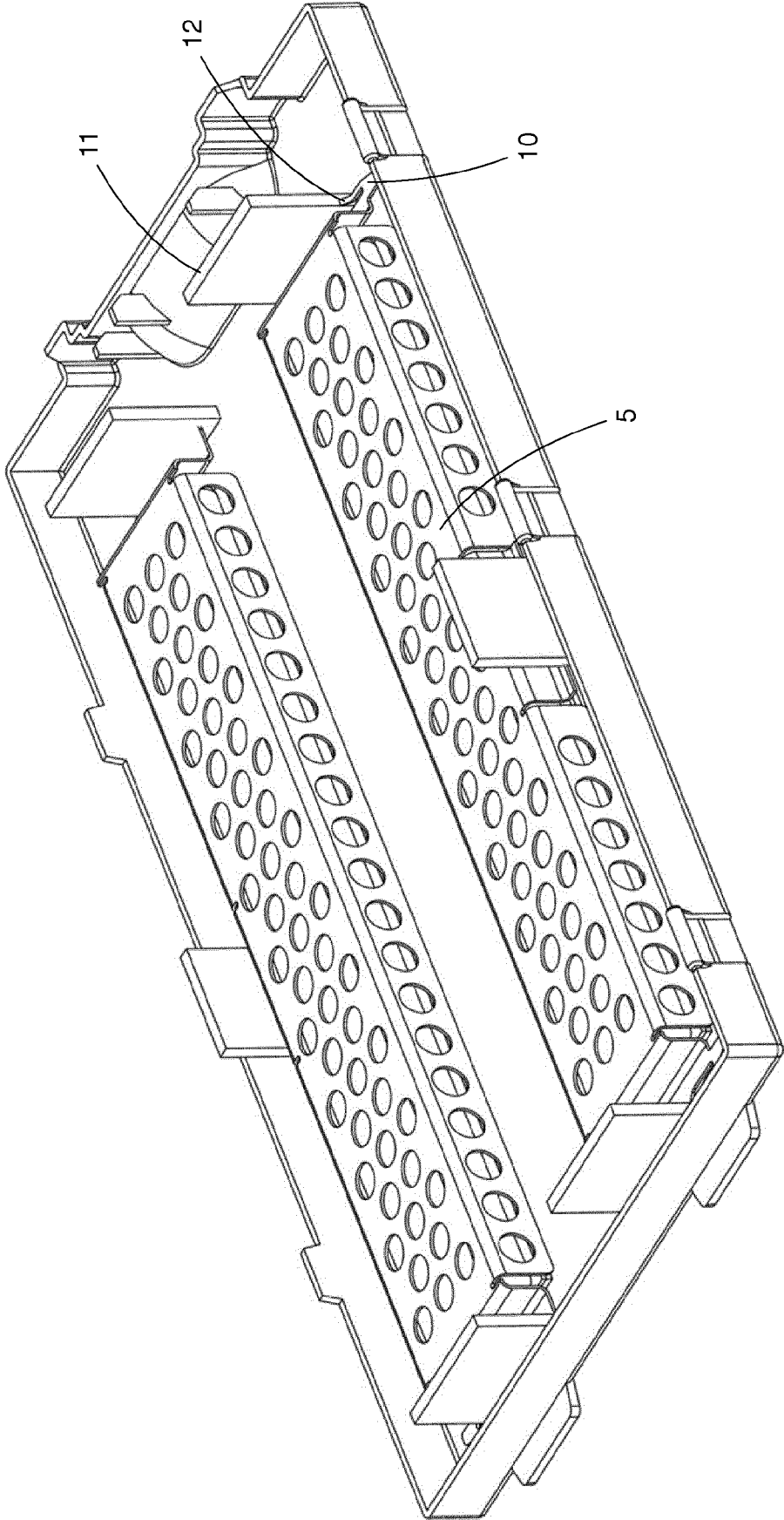


FIG. 8

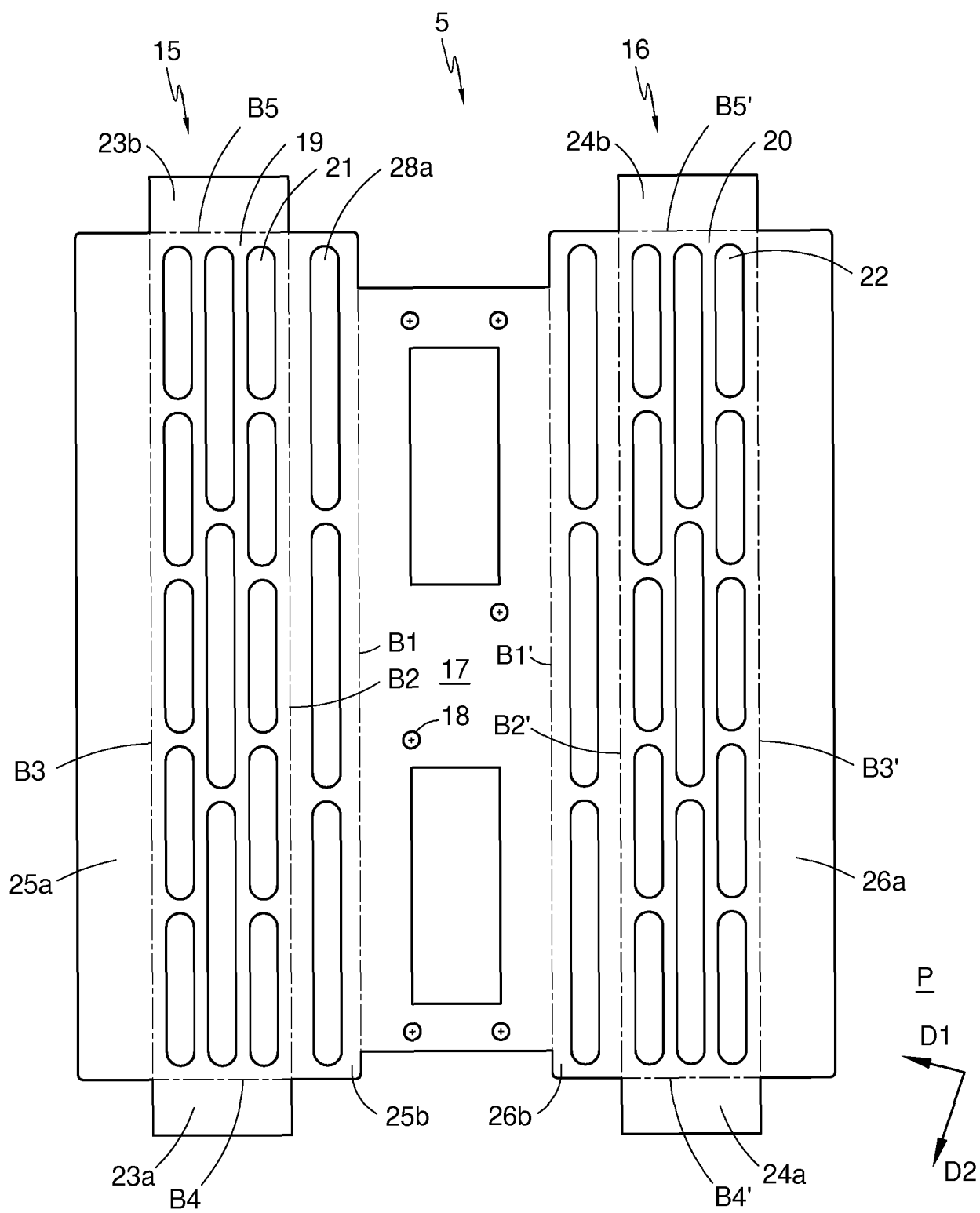


FIG. 9



EUROPEAN SEARCH REPORT

Application Number
EP 19 16 4171

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC) G07D E05G G07F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 August 2019	Examiner Holzmann, Wolf
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 16 4171

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07-08-2019

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