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(54) **TRAY**

(57) A solution of transporting items to the place of commerce with minimal staff involvement in setting the goods up for display is herein proposed. A novel tray (100) is provided including a tray body (10) with a top surface (11) for receiving the items and a bottom surface (12). The normal of the top surface (11) forms a first direction and the normal of the bottom surface (12) forms a second direction. The tray (100) also includes peripheral stands (21, 22), which extend from and orthogonally to the top surface (11) of the tray body (10) in the first direction. The tray (100) further includes deployable stands (30), which are attached to the tray body (10) in an articulated manner such to be pivotable between a flanked con-figuration and a deployed configuration. In the deployed configuration the stands (30) extend from and orthogonally to the tray body (10) in the second direction for creating an underside clearance for items stored on a similar cell tray in a stack of cell trays.

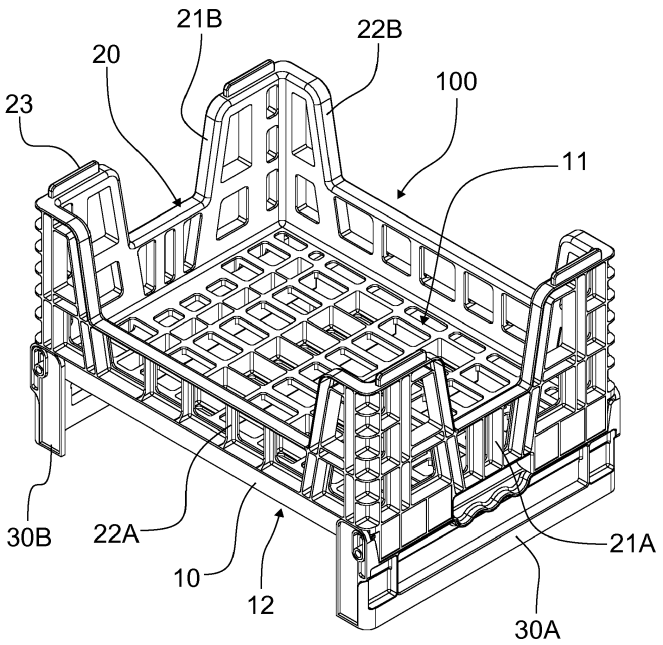

FIG. 3

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to handheld logistics equipment. More specifically, the invention relates to a tray according to the preamble portion of claim 1.

BACKGROUND ART

[0002] The tools used in modem logistics of consumer products include trays, prismatic crates of different sorts, dollies, pallets, and such. Trays are mostly suited for transporting products, which can withstand external vertical loads to the extent that loaded trays can be stacked on top of each other. Trays are a very advantageous way of transporting sturdy containers, since they take up very little space and enable handling by automated or power-assisted devices. Another key benefit of trays is that the products may be displayed in the tray, which eliminates the need to shelf the products in the place of commerce.

[0003] Certain consumer product packages, however, are not designed to withstand external vertical loads but rather to act as a protective shell to the contents. There is indeed a trend in the packaging industry to minimize packaging material not only for economic reasons but environmental impacts as well. This development affects the load carriers used in transporting such non-self-supporting goods as trays, for example, cannot be used. Instead, such products are packed and transported in various kinds of crates that can be used in forming stacks. The crates are typically collapsible or they have a rigid frame. The rigid frame crates usually have a bottom piece, to which is fixed four opposing side walls that have handles of some sort. More popular are crates with four foldable walls, wherein the four walls are foldable for collapsing the crate so that the crate takes up minimal space during return logistics.

[0004] However, known foldable crates for non-self-supporting packages feature considerable disadvantages. Known collapsible crates have been found rather labor intensive and lacking display value as the goods have to be unloaded from the stack of crates and shelved. Traditional crates are therefore less user-friendly because the goods need to be removed from the crate before they can be set up for sale into exhibiting trays, for example.

[0005] It is therefore an aim of the present invention to provide a way of transporting items, particularly non-self-supporting goods, to the place of commerce with minimal staff involvement in setting the goods up for display. It is a particular aim to establish a tray which could be directly used for displaying the goods to the customer.

SUMMARY

[0006] The aim of the present invention is achieved with aid of a novel tray for transporting items. The novel tray includes a tray body with a top surface for receiving the items and a bottom surface on the opposite side of the tray body in respect to the top surface. The normal of the top surface forms a first direction of the cell tray and the normal of the bottom surface forms a second direction. The tray also includes peripheral supports, which extend from and orthogonally to the top surface of the tray body in the first direction. The tray further includes deployable stands, which are attached to the tray body in an articulated manner such to be pivotable between a flanked configuration and a deployed configuration. In which deployed configuration the stands extend from and orthogonally to the tray body in the second direction for creating an underside clearance for items stored on a similar cell tray in a stack of cell trays.

[0007] More specifically, the tray according to the present invention is characterized by the characterizing portion of claim 1.

BENEFITS

[0008] Considerable benefits are gained with aid of the present invention. Because the stands of the tray may be deployed, the tray may be used for transporting low non-self-supporting items with the stands folded and taller non-self-supporting items with the stands deployed. Because the deployable stands create clearance, the products need not be shelved, whereby they can be readily displayed in a stack of trays.

[0009] According to one embodiment, the supports take the form of end walls, which have a centrally recessed profile, when viewed from the side. The middle vertical recesses are designed to grant access to the contents of the tray from the side, when several trays are stacked on top of each other, whereby items are accessible from all trays in a stack formation.

BRIEF DESCRIPTION OF DRAWINGS

[0010] In the following, exemplary embodiments of the invention are described in greater detail with reference to the accompanying drawings in which:

Fig. 1 presents an upper isometric view of a cell tray according to one embodiment in a folded state,

Fig. 2 presents a lower isometric view of the cell tray of Fig. 1 in a folded state,

Fig. 3 presents an upper isometric view of the cell tray of Fig. 1 in a deployed state,

Fig. 4 presents a lower isometric view of the cell tray of Fig. 1 in a deployed state,

Fig. 5 presents an isometric view of a stack of cell trays of Fig. 3,

Fig. 6 presents an upper isometric view of a cell tray according to another embodiment in a folded state,

Fig. 7 presents an upper isometric view of the cell tray of Fig. 6 in a deployed state,

Fig. 8 presents an up-side-down isometric view of the cell tray of Fig. 7,

Fig. 9 presents a detail view of the connection between the tray body and the foot of the cell tray of Fig. 7,

Fig. 10 presents an exploded view of Fig. 9,

Fig. 11 presents a detail view of the connection between the tray body and the foot of the cell tray of Fig. 8,

Fig. 12 presents an exploded view of Fig. 9, and

Fig. 13 presents a side elevation view of a stack of cell trays of Fig. 6.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0011] A tray 100 according to one embodiment includes an integral tray body 10 and peripheral supports as well as two pivotable stands 30A, 30B. That is to say the tray body 10 and the supports are produced as one solitary piece by means of molding, for example. The tray body 10 has a quadrilateral shape, when viewed from above. As is the case with conventional trays, the top surface 11 of the tray 10 is for receiving the items. The normal of the top surface forms a first direction, i.e. upward direction, of the cell tray 100. In this context, the *normal* of the surface refers to the orthogonal direction extending from the approximated plane of the surface in question. Conversely, the normal of the bottom surface 12, which is on the opposite side of the tray body 10 in respect to the top surface 11, forms a second direction. The first and second directions are therefore opposing directions in the same dimension, i.e. vertical dimension in the typical using environment of the tray. The tray body 10 is has a relieved structure with a plurality of recesses, openings etc.

[0012] In the illustrated example the supports take the form of end walls 21, 22 that extend along the peripheral edge of the tray body 10. In particular, the top surface 11 is surrounded by peripheral end walls 21, 22 that extend from and orthogonally to the top surface 11 into the first direction. The short sides of the tray 100 include opposing end walls 21A, 21B and the long sides include opposing end walls 22A, 22B (see Fig. 1). The end walls 21A, 21B, 22A, 22B have a recessed side profile in that the middle section of the end wall extends lower than side end sections of the end walls, when viewed from the side. The middle vertical recesses are designed to grant access to the contents of the tray 100, when several trays are stacked on top of each other (see Figs. 5 and 13). The end walls 21A, 21B, 22A, 22B are recessed to such an extent that the tray 100 is not considered to be a crate because end walls 21A, 21B, 22A, 22B are not intended to provide full lateral support for the items transported on the tray.

[0013] The terminal, i.e. top, ends of the end walls 21A, 21B include locking protrusions 23, which extend in the first direction from the end walls 21A, 21B so as to be inserted into receptive locking slots 35 in the stands 30 of a superposed cell tray 100 (see Figs. 3 and 12). A reversed construction is also possible but less preferred.

[0014] According to another embodiment (not shown), the peripheral supports are corner posts, which are arranged to the corners of the tray body. In such an embodiment, the corner posts do not extend along the peripheral edge of the tray body so as to unite with another corner post. Instead it is possible to provide a similar support function with simple corner extensions that are preferably made integral to the tray body for added rigidity.

[0015] In the Figs., two embodiments are shown featuring stands of different length for providing two different amounts of clearance underneath the tray for stacking purposes. The first embodiment shown in Figs. 1 to 5 features a tray with shorter stands, whereas the second embodiment shown in Figs. 6 to 13 features a tray with longer stands. The major difference in the embodiments resides in the length of the longitudinal members of the stands 30. The length of the stands is preferably limited to half of the lateral length of the tray body 10 so that the stands would not have to be folded on top of each other. Indeed, the pivoting and locking mechanisms of the stands are similar in both illustrated embodiments. Also it is to be noted that the cell tray includes several similar features herein described. Different expressions of the same feature are therefore denoted with a specified reference numeral, e.g. end wall 21 on the right in Fig. 1 bears the reference numeral 21A, whereas the end wall on the left bears the reference numeral 21B and so forth.

[0016] Next, the features of the stands 30 and the interface between the stands 30 and the tray body 10 are described more closely.

[0017] The tray 100 has two foldable stands 30A, 30B at opposing ends of the tray body 10, namely at the narrower ends that include the walls 21A, 21B, respectively. The stands 30A, 30B are attached to the tray body 10 in an articulated manner such to be pivotable between a flanked configuration shown in Figs. 1, 2 and 6 and a deployed configuration shown in Figs. 3 to 5 and 7 to 13. In the flanked configuration the stands 30 extend parallel to the bottom surface 12 of the tray body 10, i.e. orthogonal to the second direction. In the deployed configuration the stands 30 extend from and orthogonally to the tray body 10 into the second direction for creating an underside clearance for items stored on a similar cell tray

in a stack of cell trays. Alternatively, the stands 30 could be constructed to pivot about the longer edge of the tray 100 featuring the longer end walls 22A, 22B. According to another embodiment (not shown), the stands flank the end walls 21A, 21B, whereby they extend parallel to the first and second direction. This would, however, require a different pivoting mechanism than herein described.

[0018] The pivoting action of the stand 30 is three-fold. Firstly, the stand 30 is articulated in respect to the tray body 10 to undergo rotation about an axis orthogonal to the first and second directions. More particularly, the axis extends along the side of the tray 100, which side in the illustrated embodiments is the side with the shorter end walls 21A, 21B. Naturally, it would be equally possible to arrange the pivoting axis on the longer side of the tray (not shown). Secondly, the stand 30 is articulated in respect to the tray body 10 to undergo deviation in the second direction, i.e. to be lowered in respect to the tray body 10, and orthogonal to the second direction, i.e. to slide along the under the bottom surface 12 of the tray body 10.

[0019] The pivoting mechanism 13, 36 for providing movement of the stand 30 in respect to the tray body 10 in three degrees of freedom, namely rotation and two mutually orthogonal translations, is best shown in Figs. 9 to 12. On the stand 30, the end of the longitudinal member 31A is provided with a pivot groove 36A, which is a through hole having a hole elongated along the longitudinal member 31A. The other longitudinal member 31B has of course another pivot groove (not shown) on the same level. The counterpart to the pivot groove 36 is a pin 13 provided to the tray body 10, particularly to the side surface of the tray body 10. These cooperating and mutually engaging components 13, 36 enable the pivoting motion of the stand 30 in the three degrees of freedom: rotation is enabled by the rotation of the longitudinal member 31 about the pin 13 slidably inserted through the pivot groove 36, whereas the translations are enabled by the elongated shape of the pivot groove 36.

[0020] The rotation of the stand 30 is guided by a guiding mechanism 14, 15, 38. On the tray body 10 there is a guide groove 14 dictating the path of the rotational movement, whereas on the stand 30 there is a respective cooperating stub 38, which travels in the guide groove 14 during the pivoting motion of the stand 30. As best seen from Figs. 11 and 12, the guide groove 14 is a curvaceous through hole in the lateral side surface of the tray body 10, through which the stub 38 of the stand 30 extends. Accordingly, the stub 38 on the stand 30 is dimensioned such to only just extend to the inside of the lateral side wall of the tray body 10 so as to not make unintentional contact with the webs in the honeycombed structure of the tray body 10. One end of the guide groove 14 is closed for acting as end point for the path of movement. The other end of the guide groove 14 is partially closed by a claw 15. The guide groove 14 is shaped to guide the stub 38 along an arcuate path at the end of a vertical section. As best shown in Figs. 9 and 10, the guide groove 14 contains a vertical section for allowing only vertical movement of the stub 38 for dropping the stand 30 away from the tray body 10 and for lifting the stand towards the tray body 10. During the vertical travel of the stub 38, the pivot groove 36 travels across the hinge pin 13. At the lower end of the vertical section the guide groove 14 extends as an arc dimensioned to force the stub 38 inserted therein to undergo a similar arcuate movement. During the arcuate travel of the stub 38, the pivot groove 36 rotates around the hinge pin 13 until the stand 30 has assumed an orientation parallel to the bottom surface 12 of the tray body 10.

[0021] Naturally, the pivoting mechanism 13, 36 and the guiding mechanism 14, 15, 38 could be provided as reversed such that the tray body would include the guide pivot groove and the stand would include the corresponding pin (not shown) or such that the tray body would include the stub, whereas the stand would include the guide groove (not shown).

[0022] A locking mechanism 16, 37, best shown in Figs. 10 to 12, has also been provided for locking the stand 30 into the deployed configuration. On the stand 30 there is a locking tab 37, which extends from the transversal member 34 connecting the longitudinal members 31, 32 proximal to the tray body 10. The locking tab 37 extends parallel to the longitudinal members 31, 32. On the tray body 10, namely on the second surface 12, there is a cooperating locking slot 16 extending parallel to the second direction. The locking slot 16 is designed to receiving the locking tab 37 of the stand 30 in the direction parallel to the second direction for locking the stand 30 into the deployed configuration. It is therefore preferable to design a sufficient reach in the locking tab 37 and slot 16 for ensuring a sturdy fit between the stand 30 and tray body 10.

[0023] The transversal member 34 connecting the longitudinal members 31, 32 of the stand 30 has preferably been contoured such to facilitate a good hand grip by the user. Fig. 7 shows one example in detail. In the example, the top transversal member of the stand 30 includes three longitudinal handle recesses 33A for accommodating fingers of the user.

[0024] In use, the tray 100 may be used in flanked configuration (Figs. 1, 2 and 6) to transport and store non-self-supporting items. When laid on a surface, the stands 30A, 30B are protected against wear by the appropriately recessed bottom surface 12, which has depressions for receiving the stands 30A, 30B in the flanked configuration. In other words, the bottom surface 12 may include protruding blocks 17A to 17D, which extend further in the second direction than the thickness of the folded stands 30A, 30B (see Fig. 2, 4, 11 and 12). The tray 100 is easy to carry because it can be grabbed from the sides due to centrally recessed end walls 21, 22.

[0025] The tray 100 may be manipulated from the folded configuration into the deployed configuration (Figs. 3 to 5 and 7 to 13) as follows. The user places his hands onto the recessed portions of the end walls 21A, 21B and

pushes the flanked stands 30 towards each other from the handle recesses 33. The stands 30 then undergo linear movement along the bottom surface 12 of the tray body 10, i.e. orthogonal to the second direction, i.e. in the first degree of freedom, while maintaining a horizontal attitude. As soon as the stand 30 is released from the flanked configuration, i.e. the stub 38 is released from the stopper 15, the stand 30 is free to undergo rotation about a horizontal axis, i.e. to move in the second degree of freedom. During the rotation of the stand 30, the guide groove 14 guides the sub 38 along an arcuate path. After completion of the 90 degree rotation, the stand 30 extends orthogonally to the tray body 10, namely to the bottom surface 12. The pin 13 is located at the topmost point of the pivot groove 36, which may now facilitate the lifting of the stand 30 to be locked into the deployed state. The stand 30 is moved in a direction parallel to the second direction upward, wherein the now vertical slot 36 slides in respect to the pin 13, until the locking tab 37 of the stand 30 has been inserted into the receptive locking slot 16 of the tray body 10.

[0026] With the stands 30 locked into the deployed state, several trays 100A to 100D may then be stacked on top of each other (see Figs. 5 and 13). The deployed stands 30 together with the recessed end walls 21, 22 create a convenient opening to the side of the tray 100 for enabling the removal of items directly from the stack of trays 100A to 100D without the need to discharge the stack.

TABLE 1: LIST OF REFERENCE NUMBERS.

Number	Part
10	tray body
11	top surface for receiving items
12	bottom surface
13	hinge pin
14	guide groove
15	claw
16	locking slot
20	rim
21	end wall
22	end wall
23	locking protrusion
30	stand
31	longitudinal member
32	longitudinal member
33	handle recess
34	transversal member
35	locking slot
36	pivot groove
37	locking tab
38	"stub"
100	tray

Claims

1. A tray (100) for transporting items, which tray (100) comprises:

   - a tray body (10) having:

     o a top surface (11) for receiving the items, wherein the normal of the top surface (11) forms a first direction of the cell tray (100) and
     o a bottom surface (12) on the opposite side of the tray body (10) in respect to the top surface (11), wherein the normal of the bottom surface (12) forms a second direction, and

   - peripheral supports (21, 22) extending from and orthogonally to the top surface (11) of the tray body (10) into the first direction,

   characterized by deployable stands (30) attached to the tray body (10) in an articulated manner such to be pivotable between a:

   - flanked configuration and a
   - deployed configuration, in which deployed configuration the stands (30) extend from and orthogonally to the tray body (10) in the second direction for creating an underside clearance for items stored on a similar tray in a stack of trays.

2. The tray (100) according to claim 1, wherein the tray body (10) and the peripheral supports (21, 22) form an integral part of the tray (100), to which integral part the stands (30) are attached.

3. The tray (100) according to claim 1 or 2, wherein

   - the tray body (10) is quadrilateral and wherein
   - the tray (100) comprises two stands (30A, 30B) at opposing ends of the tray body (10).

4. The tray (100) according to any of the preceding claims, wherein the stands (30) extend in the flanked configuration parallel to the bottom surface (12) of the tray body (10).

5. The tray (100) according to any of the preceding claims, wherein the terminal ends of the peripheral supports (21, 22) and stands (30) comprise cooperating and mutually locking members (23, 35) for securing the stands of one tray to the end walls of another tray below in a stack of trays.

6. The tray (100) according to any of the preceding claims, wherein the stand (30) comprises longitudinal members (31, 32) pivotably attached to side surfaces of the tray body (10).

7. The tray (100) according to claim 6, wherein the longitudinal members (31, 32) of the stand (30) and the side surface of the tray body (10) comprise cooperating and mutually engaging components, which are configured to enable the pivoting motion of the stand (30).

8. The tray (100) according to any of the preceding claims, wherein the side surface if the tray body (10) comprises a hinge pin (13) and the stand (30) comprises an elongated pivot groove (36), or vice versa, for enabling rotation about an axis orthogonal to the second direction and translation in the second direction between the tray body (10) and the stand (30).

9. The tray (100) according to any of the preceding claims, wherein the tray body (10) comprises a guide groove (14) and the stand (30) comprises a respective cooperating stub (38), which is configured to travel in the guide groove (14) during the pivoting motion of the stand (30).

10. The tray (100) according to any of the preceding claims, wherein:

    - the stand (30) comprises a locking tab (37) extending from an end of the stand (30) proximal to the tray body (10) and parallel to the longitudinal members (31,32) and wherein
    - the tray body (10) comprises a respective locking slot (16) for vertically receiving the locking tab (37) of the stand (30) for locking the stand (30) into the deployed configuration.

11. The tray (100) according to any of the preceding claims, wherein the peripheral supports are end walls (21, 22), which extend along the peripheral edges of the tray body (10).

12. The tray (100) according to claim 11, wherein the peripheral end walls (21, 22) comprise a recess in the first direction at the center region of the end wall (21, 22) so as to provide access to the items from the side.

13. The tray (100) according to any of the preceding claims 1 to 10, wherein the peripheral supports are corner posts arranged to and extending into the first direction from the corners of the tray body (10).

14. The tray (100) according to any of the preceding claims, wherein the tray (100) is a hand-held tray.

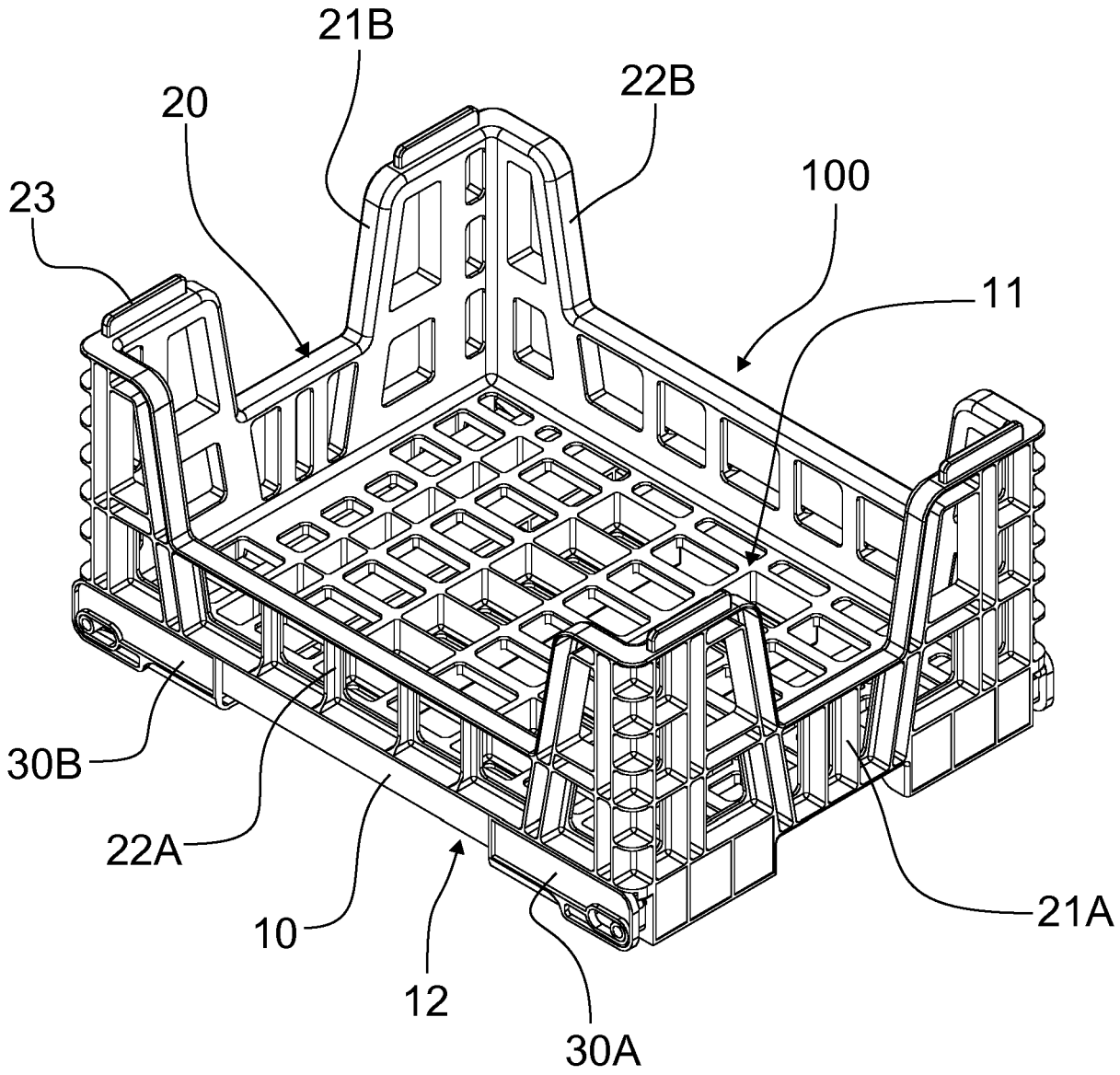

FIG. 1

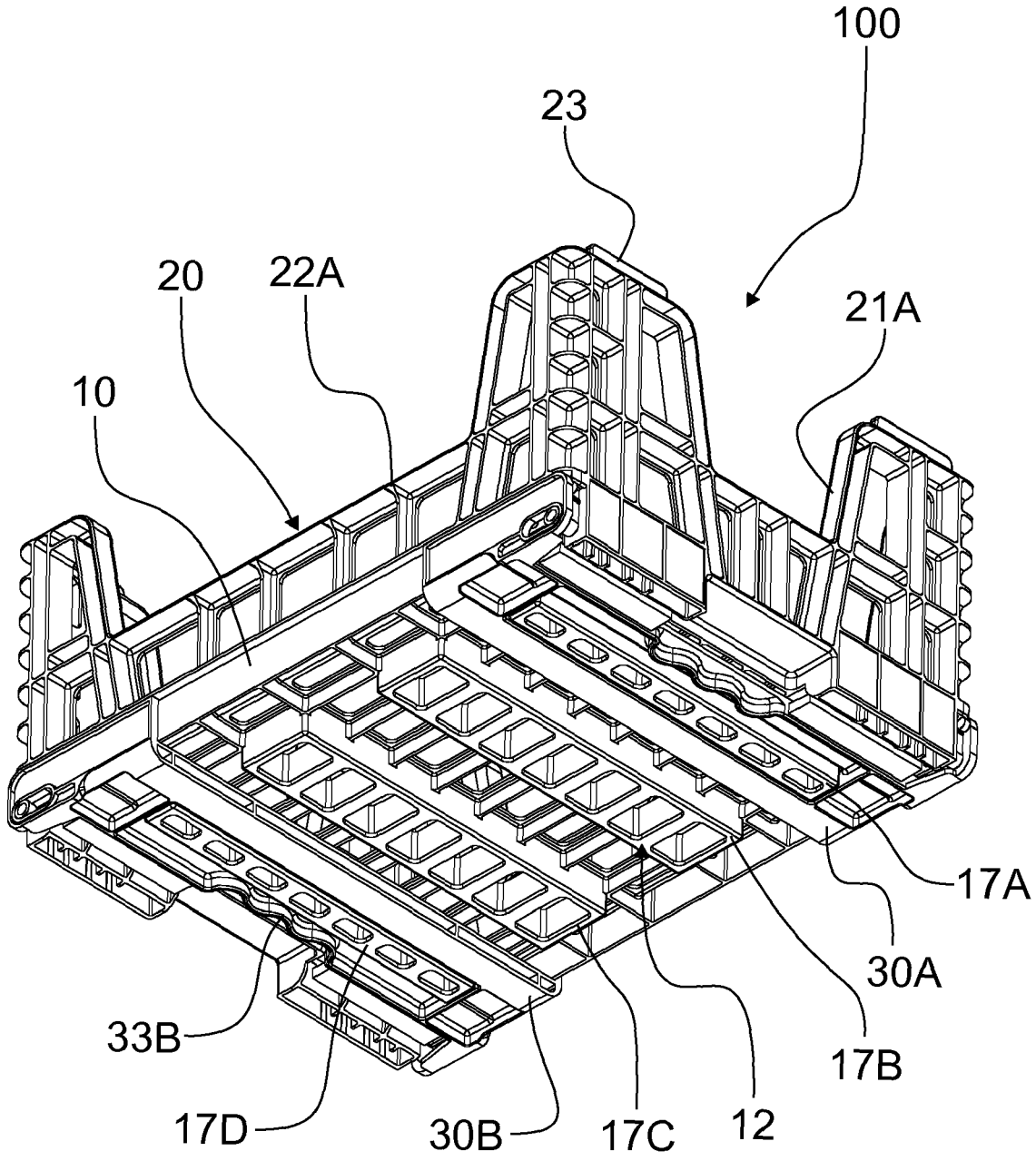

FIG. 2

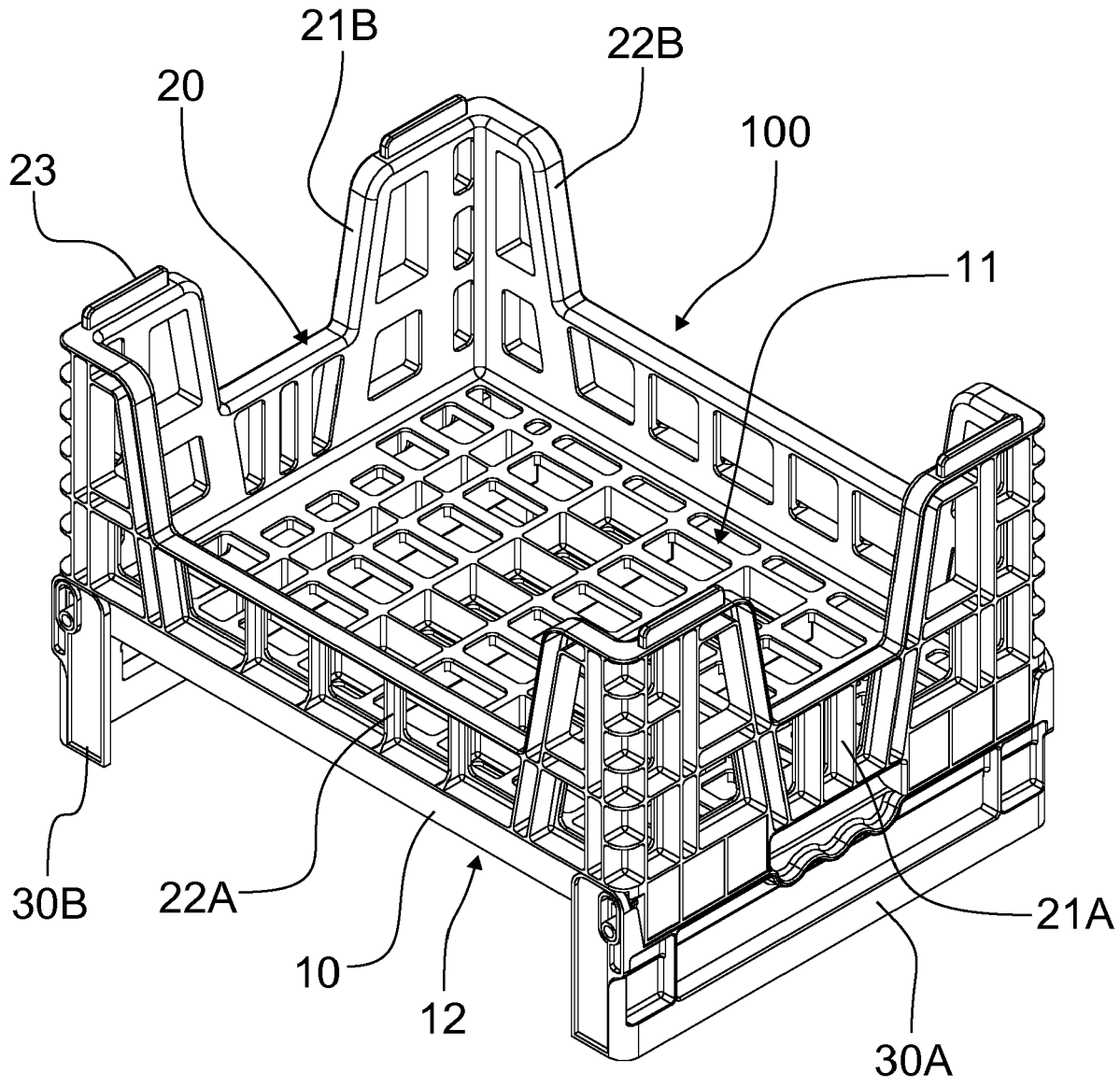

FIG. 3

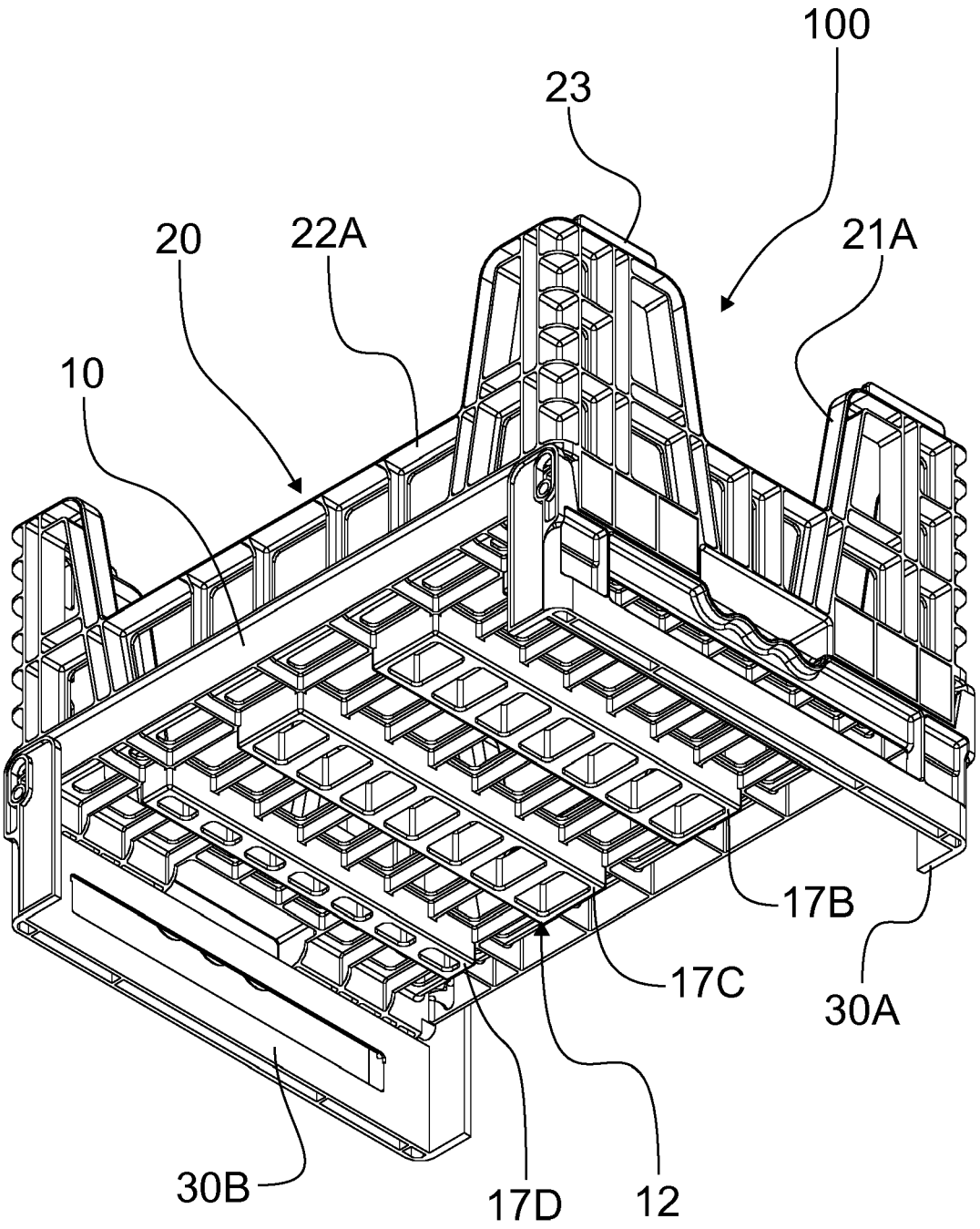

FIG. 4

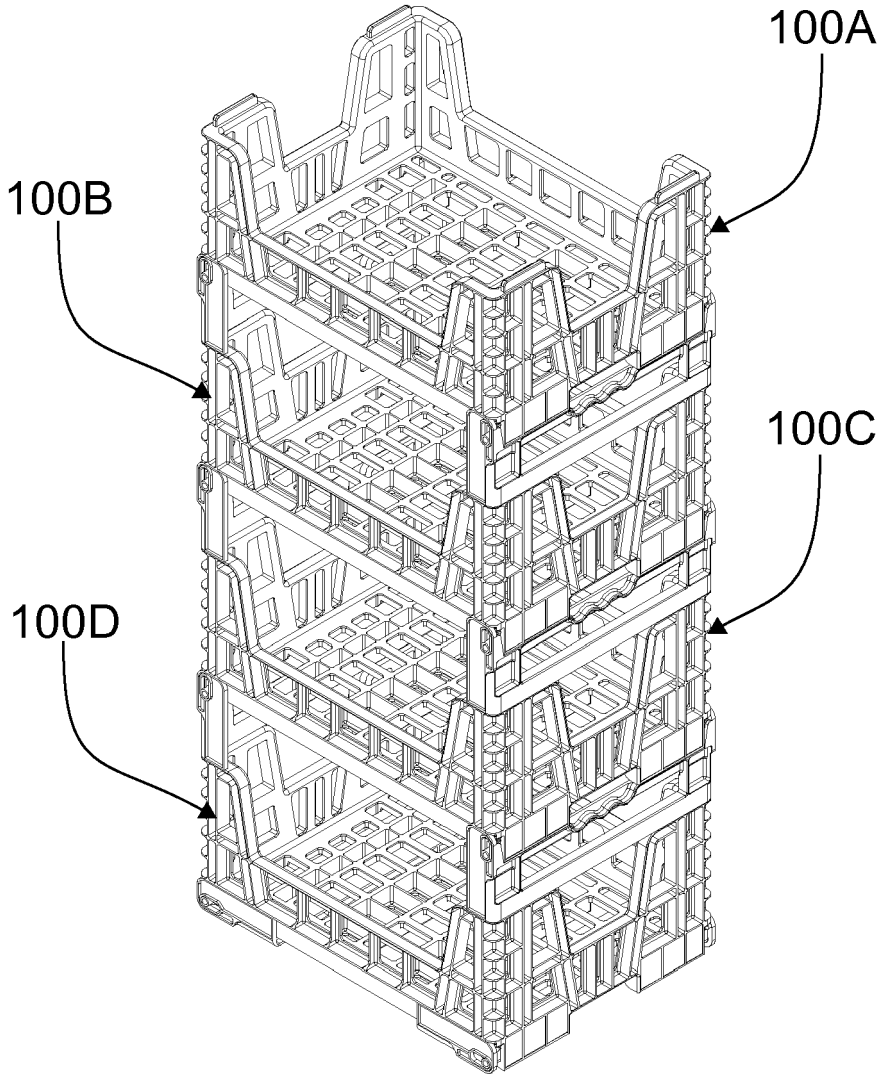

FIG. 5

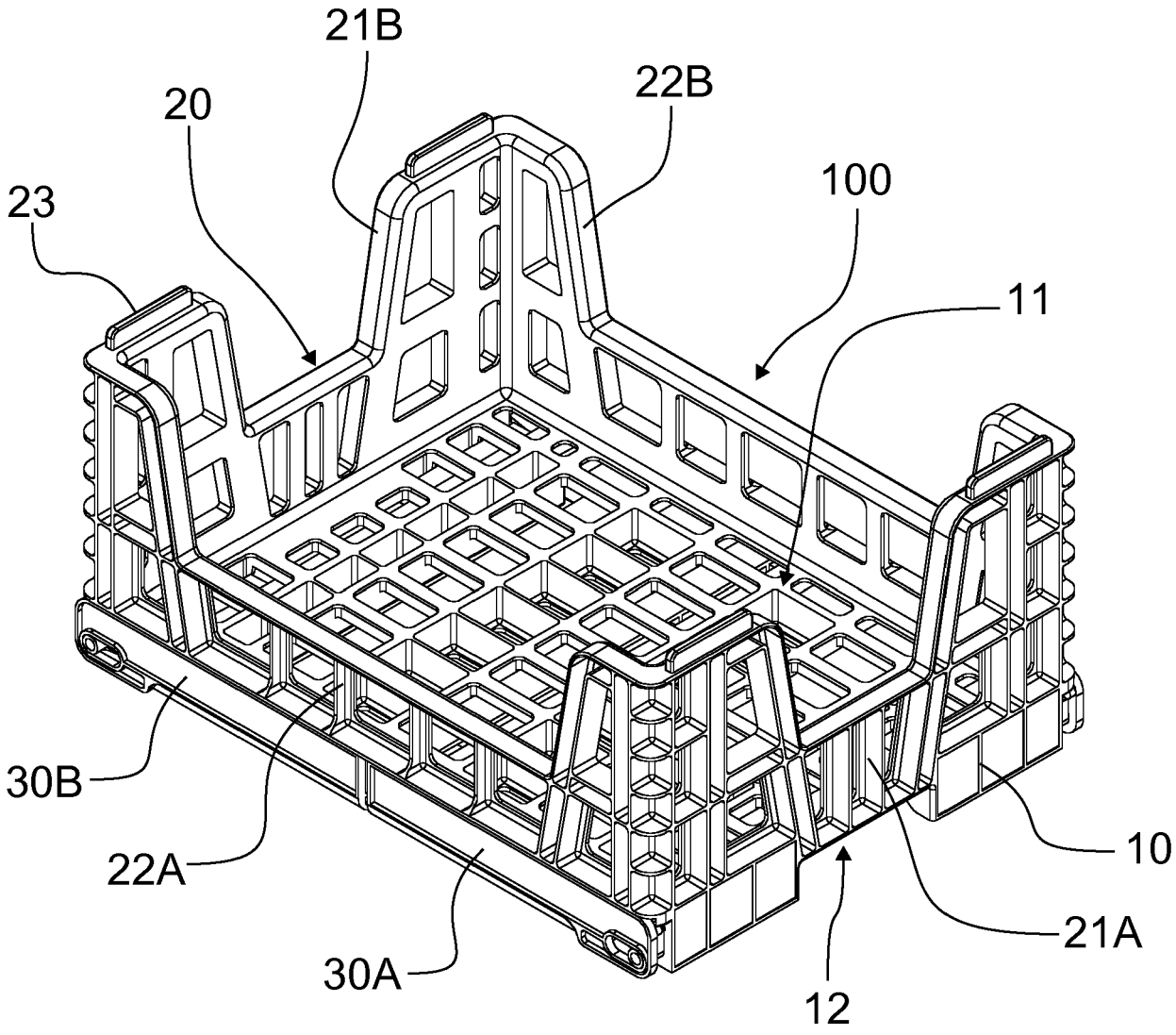

FIG. 6

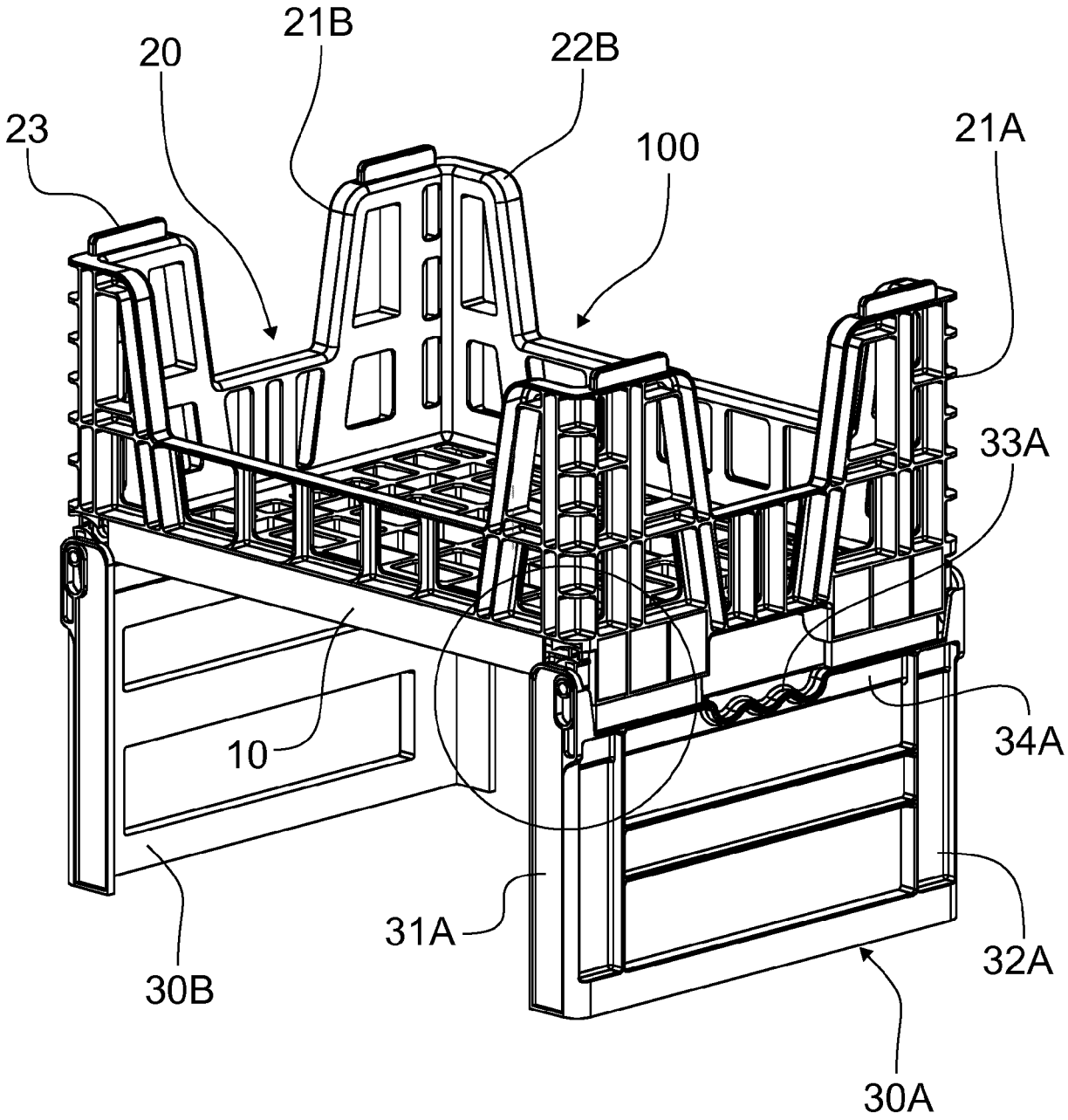

FIG. 7

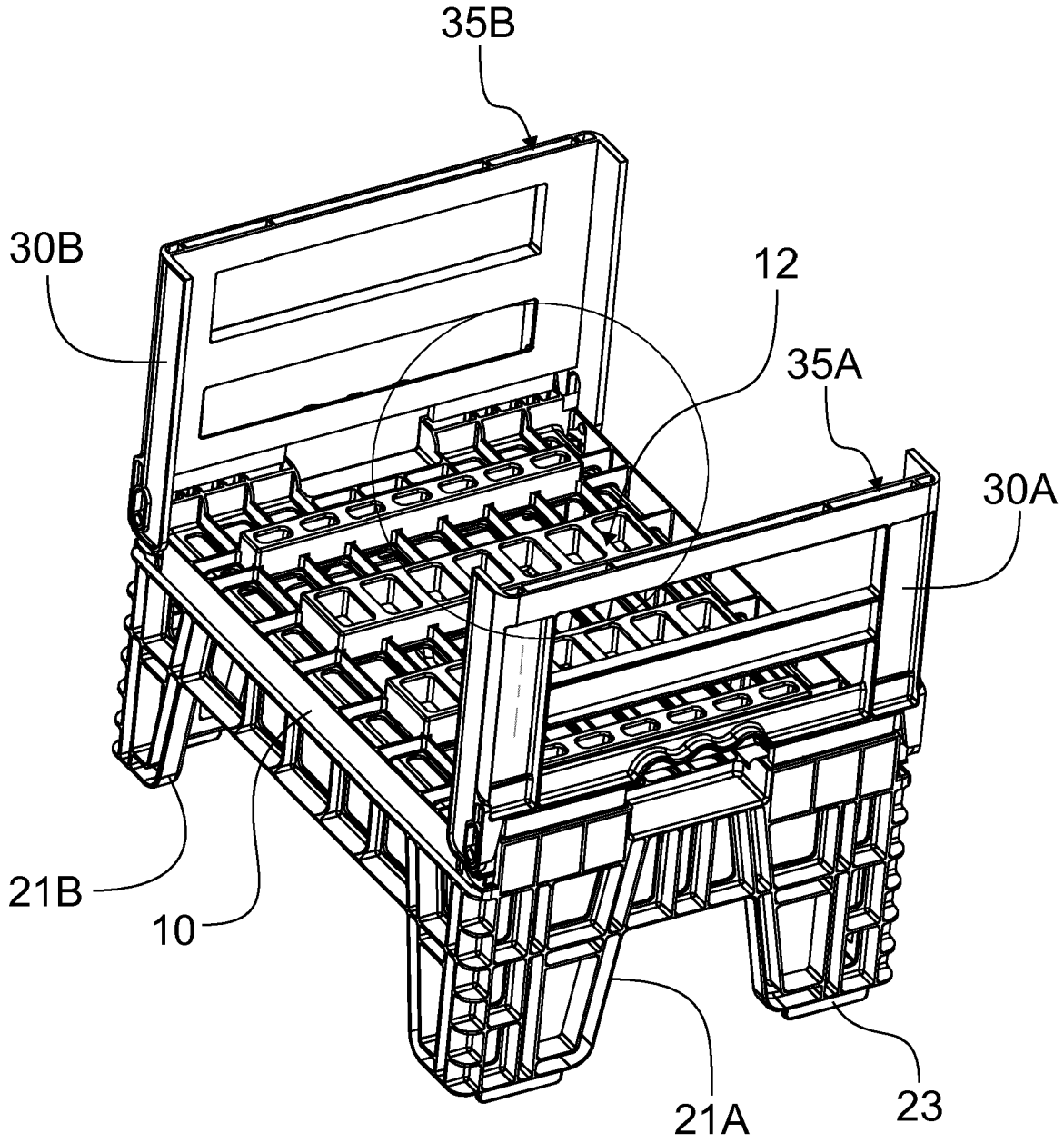

FIG. 8

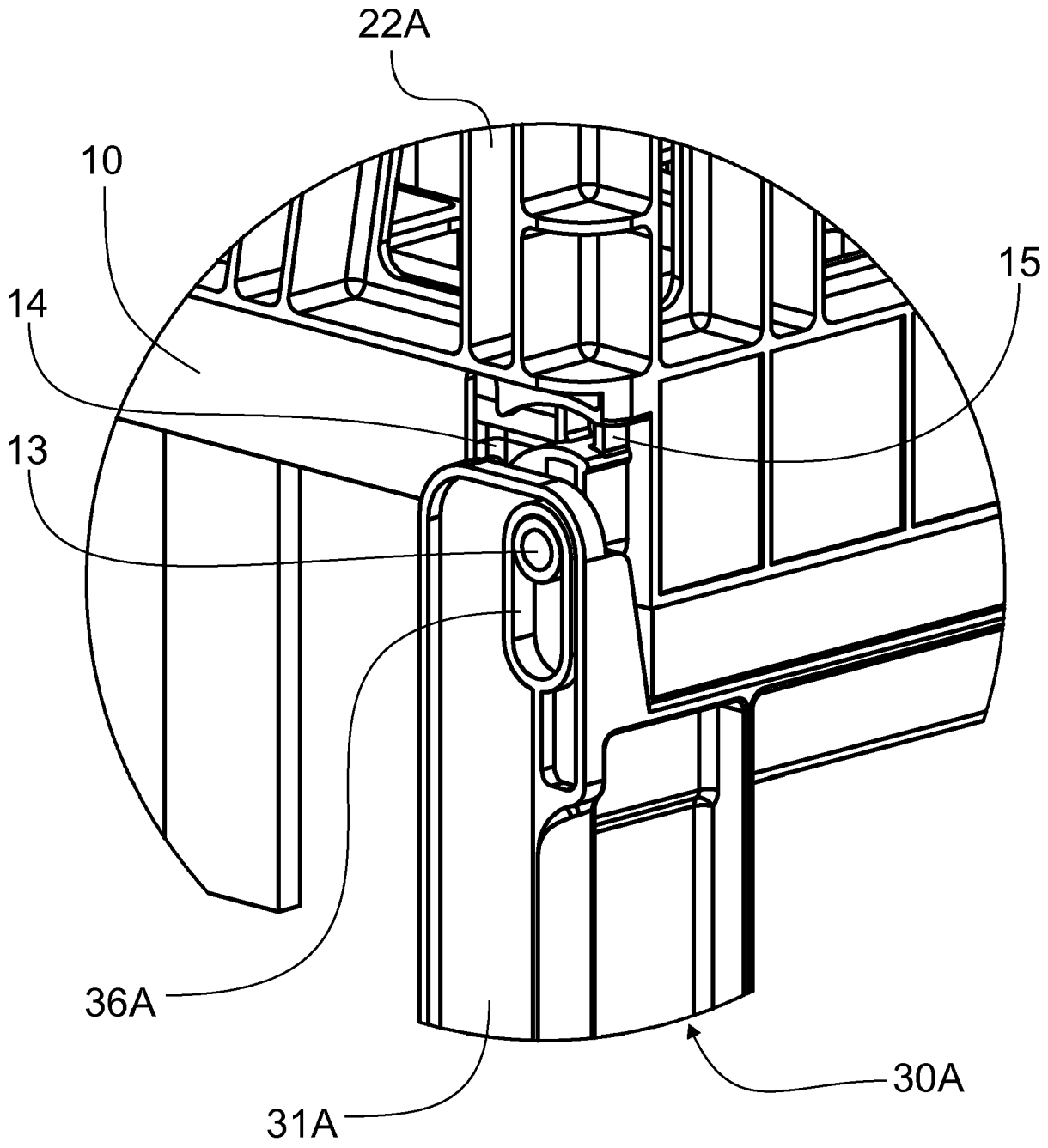

FIG. 9

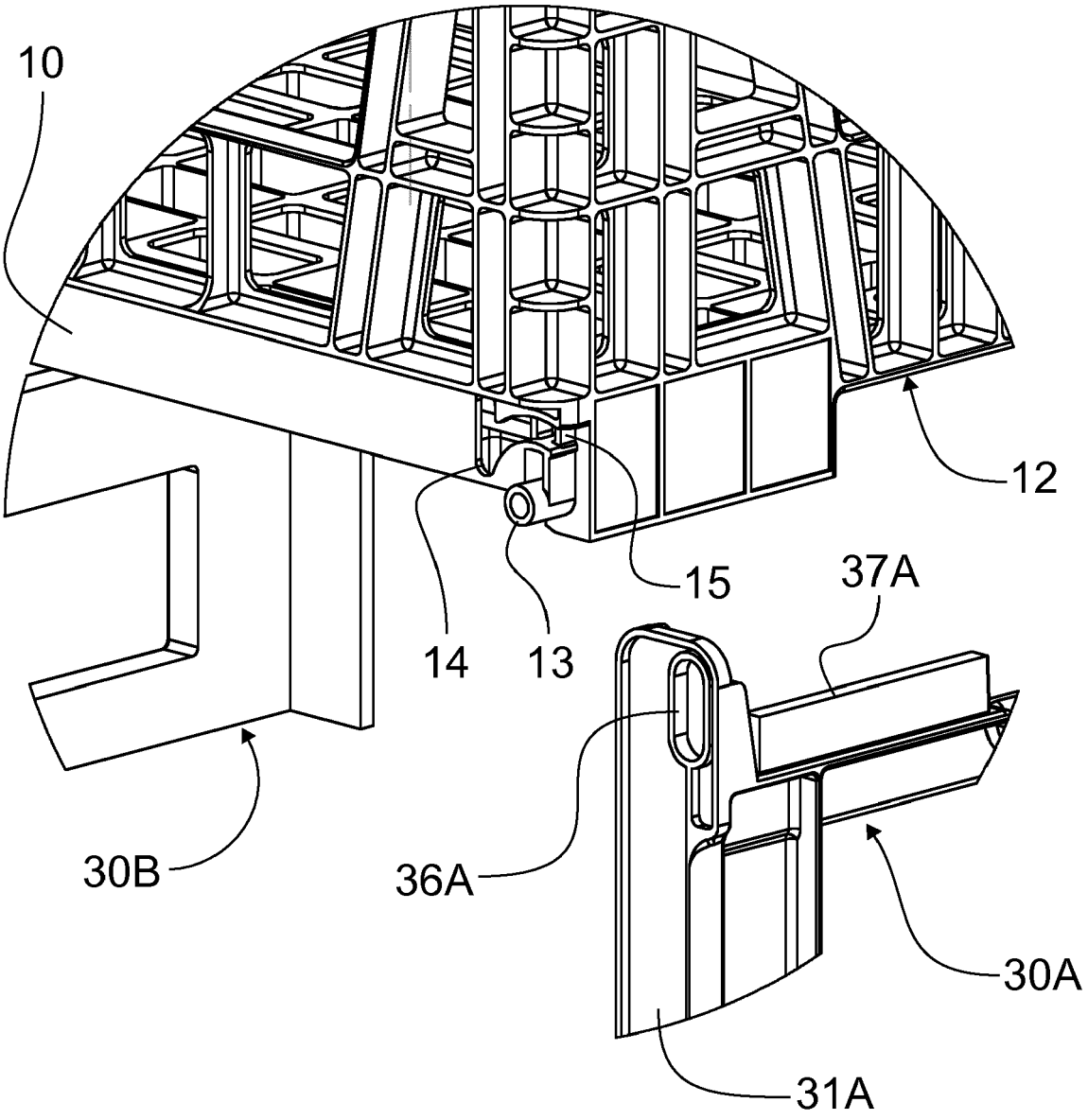

FIG. 10

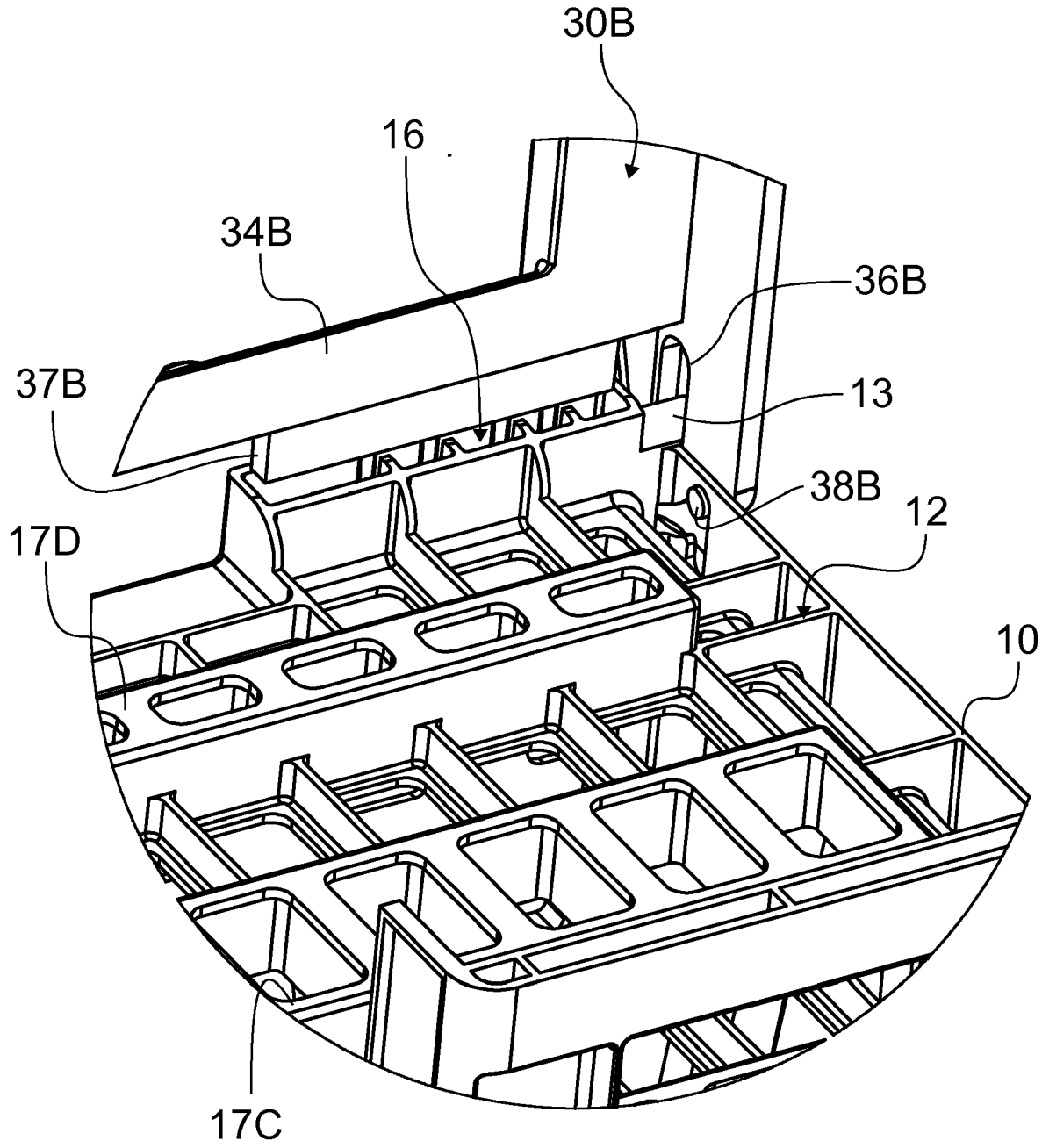

FIG. 11

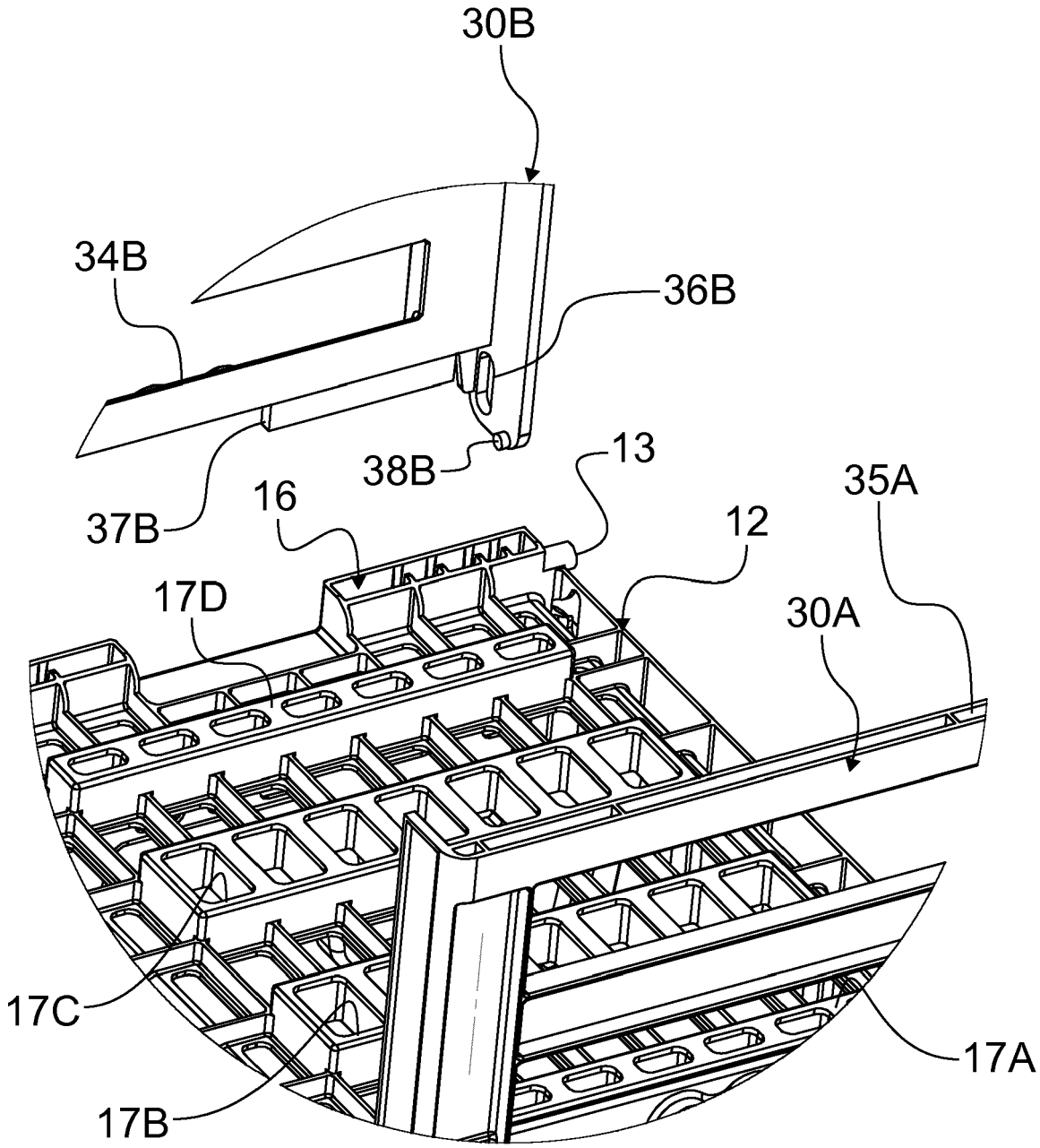

FIG. 12

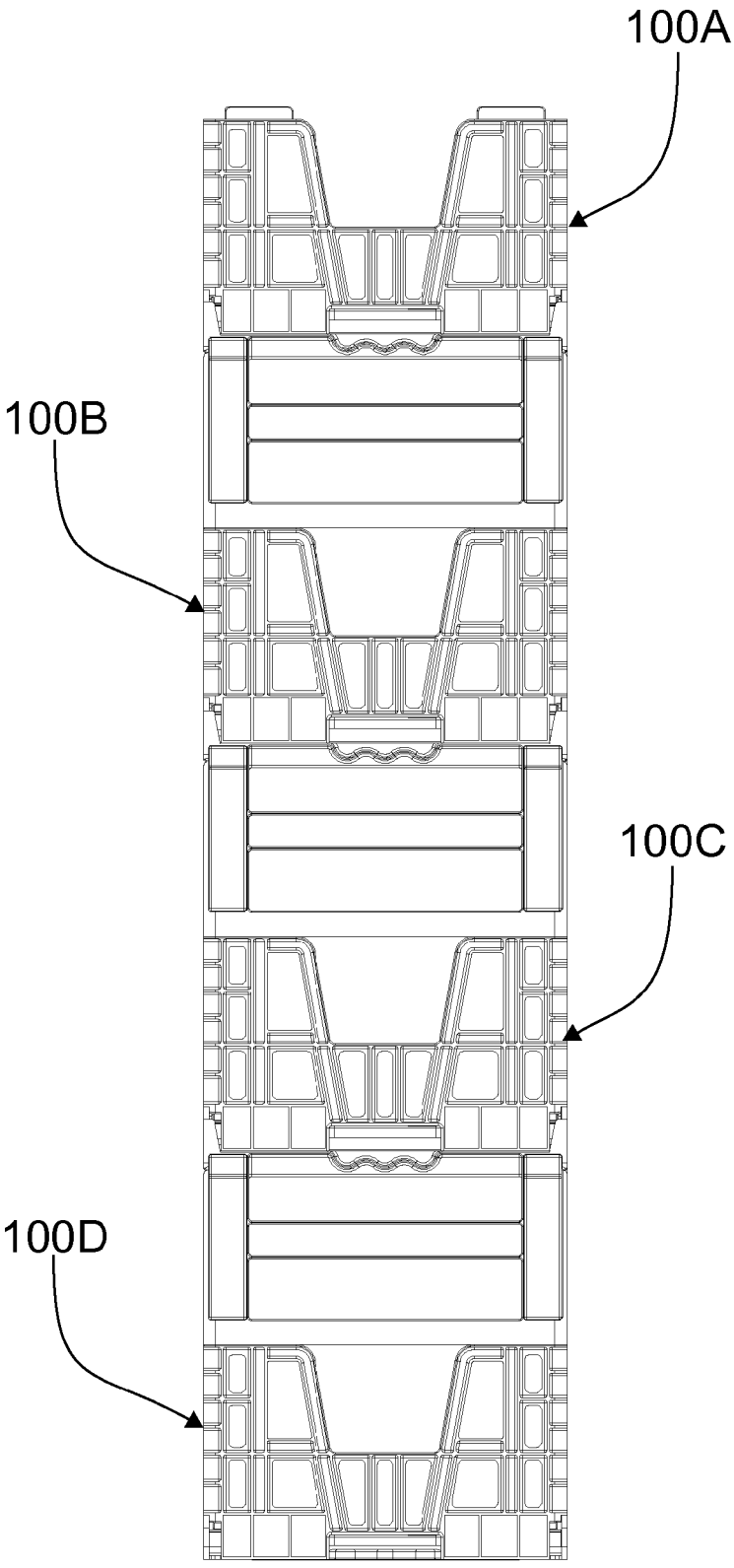

FIG. 13

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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 4374

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	AU 2012 100 016 A4 (HARTWALL K OY AB) 16 February 2012 (2012-02-16) * figures 1-9 *	1-14	INV. B65D21/02
A	EP 2 210 481 A1 (MENEGAZZO CORRADO [IT]) 28 July 2010 (2010-07-28) * figures 1-19 *	1-14	
A	EP 2 223 861 A1 (DUNIA CAMPOALMERIA SL [ES]) 1 September 2010 (2010-09-01) * figures 1-4 *	1-14	

TECHNICAL FIELDS SEARCHED (IPC)
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 April 2016	Serbescu, Anca

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 15 4374

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29-04-2016

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