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(54) Foldable crate

(57) Crate (1) comprising a rectangular base (2), a pair of short walls (3,4) and a pair of long walls (5,6) each connected hingedly to said base and moveable between a collapsed position wherein said walls are folded and a upright position wherein said walls extend in a mainly perpendicular plane from said base to define an interior of said container, wherein said walls are provided with a locking system (13,14,15,20,21,22) for providing a locking engagement between the short wall and the long wall in said upright position, whereby at least one wall is moveable in the upright position in said plane.

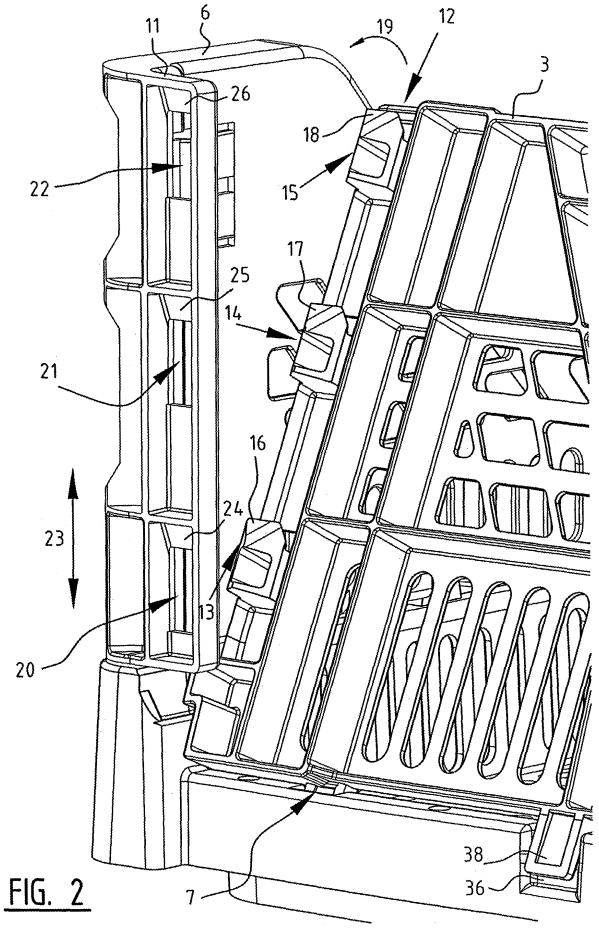

FIG. 2

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Description

[0001] The invention relates to a crate, comprising a rectangular base, a pair of short walls and a pair of long walls each connected hingedly to said base and moveable between a collapsed position wherein said walls are folded and a upright position wherein said walls extend in a mainly perpendicular plane from said base to define an interior of said container, wherein said walls are provided with a locking system for providing a locking engagement between the short wall and the long wall in said upright position.

[0002] Such crates are known from EP 0 655 392 or US Patent Application 2003/40950. The known crates have a locking or engagement system. It is known to use taps in one wall and sockets in the other wall for locking. It is also known to use a slidable locking means. Both known locking systems have disadvantages. They are hard to unlock or an extra element is needed during production. The known locking system for the crates therefor provides difficulties in handling.

[0003] The invention has for an object to provide an improved crate with a locking system.

[0004] This object is achieved according to the invention with a crate wherein at least one wall is moveable in the upright position in said plane. Hereby this movement can be used for a desired action e.g. unlocking said wall from the locking engagement. It is counter intuitive to the person skilled in the art to make said wall movable in the upright position, since one wishes to lock said walls in said uprights positions. However by providing said movability the user of said crate is provided with an instrument for controlling e.g. said locking system. Preferably the locking system comprises two parts, one provided on the moveable wall, the other on an adjacent wall.

[0005] Preferably said short wall is provided with a handle for lifting said crate and said long wall is moveable in said plane. Hereby lifting the crate by said handle will not initiate said movability of said long wall e.g. unlocking the engagement.

[0006] Further said crate according to the invention has a locking system that is actuated by said movement in said plane. Using the movement, the walls are locked in the upright position. Preferably, said locking system is actuated by a movement of said wall directed in the direction towards said base. If the crate is in the upright position, said walls will stand vertical upwards from the base. Gravity will hold said wall in position exerting a force directed towards the base.

[0007] Preferably, rotation means are provided connecting said walls to the base and the rotation means of the at least one moveable wall comprises wall movement means for allowing said movement in said perpendicular plane. In the production of the rotating means, a hinge for example, the wall movement means can be provided simultaneously, and in assembling the rotation means the wall movement means are assembled together.

[0008] Preferably, said wall movement means comprises a guide for guiding the wall is said plane. Said guide could be a groove or slot. The wall movement means can be provided on the base or on said movable wall.

[0009] Preferably said wall movement means comprises a limiting means, limiting movement of the wall to a certain extent, preferably less than 8 mm. Preferably 3-5 mm is employed. Hereby the crate wall does not become unstable if moved.

[0010] The locking system according to the invention preferably comprises at least a rib on a first wall and at least a engaging part on a second wall, engageable in the upright position. Such a locking system is well known in the art. Preferably the engaging part has a opening in said second wall for guiding said rib. Hereby, even though one wall is movable in the upright position, the locking system, can engage because the rib is guided through the opening for engagement. After being guided the locking system is actuated by the movement in the perpendicular plane. By moving the wall in the direction of the base, the rib engages on the second wall.

[0011] Preferably said rib is provided with a hook. Preferably said hook extends at an angle of less than 45° from said rib. Hereby a certain force directed inwardly on said first wall for directing said first wall to the folded position, can be absorbed until a certain limit. Beyond said limit the hook will release from the locking system. If the hook was provide with an angle of e.g. 90°, there will be a chance of breaking the lock. Contrarily to the knowledge of the person skilled in the art, the locking system is provided with means to unlock the system if a force beyond the certain limit is exerted on one of the walls.

[0012] The advantages and features of the present invention will be further elucidated hereinbelow with reference to the annexed figures, in which:

Figure 1 shows a perspective view of a crate according to a first embodiment,
Figure 2 shows a detail of the crate according to the first embodiment in between the upright and folded position,
Figure 3a and 3b show a detail of the crate according to the first embodiment,
Figure 4a and 4b show a detail of the locking system according to the first embodiment,
Figure 5 shows a detail of the crate according to the first embodiment,
Figure 6 shows a detail of the hinge according to an embodiment of the invention.

[0013] Crate 1 is shown in figure 1 in the upright position. Crate 1 has a base 2 and four side wall 3-6. Short side walls 3,4 are hingedly connected to the base with a rotation means or hinge 7. Each short side wall has two hinges 7. The short side walls are provided with a handle 8.

[0014] The five main parts of the crate 1 can be manufactured by injection molding. The parts are assembled

to form the crate 1.

[0015] Long side walls 5,6 are also hingedly connected to the base 2. Short side wall 3 can hinge according to arrow 9, long side wall 6 according to arrow 10. The walls are locked in the upright position. If unlocked, first short walls 3,4 are moved according to arrow 9, in order to be positioned substantially parallel to the base 2. Hinge 7 has a hinge axis positioned close above the base 2. Thereafter long walls 5,6 are moved according to arrow 10, placed above the already folded short walls 3,4. The respective hinges for the long walls are positioned at a distance more removed from base 2.

[0016] Both side ends of both long side walls 5,6 are provided according to this embodiment with a corner piece 11. It prevents the short walls from being hinged past the upright position.

[0017] Figure 2 shows the short wall 3 and long wall 6. Long wall 6 is in the upright position, extending in a plane perpendicular to the base 2. The corner piece 11 extends in the plane of the upright position of short wall 3.

[0018] Along side 12 of the short side wall 3, three taps 13,14,15 are provided. In this embodiment such taps can be provided on each end side of a short wall 3,4.

[0019] The taps are provided with a hook 16-18 as also visible in figure 3b. These hooks or guide ribs 16-18 are provided with a surface extending in general at an angle between 30°-70°, shown here at 60°. Both sides of the hook are provided with an angled surface.

[0020] The front side of the hook is a guiding rib 16-18. If the short side wall 3 is moved further to the upright position according to arrow 19, guide rib 13 will come into contact with the corner piece 11 of long side wall 6.

[0021] The corner piece 11 is provided with three holes 20-22 at the basically the same height as the guide ribs. Above the holes 20-22 the corner piece is provided with wall elements 24-26.

[0022] As indicated more clearly in figures 4a and 4b, side wall 6 can move according to arrow 23 in the vertical plane, the plane of the upright position, generally perpendicular to the base.

[0023] When the short side wall is moved further according to arrow 19 guiding rib 16 will contact the interior side of wall element 24. The guiding rib will exert a force partially directed upward according to arrow 23, thereby lifting said long side wall according to arrow 23. The same repeats itself with guide rib 17 and wall element 25, and guide rib 18 and wall element 26.

[0024] If moved further long side wall 6 can be moved back to the initial position as shown in figure 3a, wherein hooks 16-18 are locked in the opening 20-22. The upright position will be maintained. The moveable side wall actuated the locking system.

[0025] If the crate is lifted, e.g. by grabbing the handles 8, the locking system comprising the taps 13-15 and openings 20-22, will remain locked. The crates can e.g. be piled.

[0026] The locking system further comprises resilient taps 27 near the corners provided on the interior side of the long walls 5,6. These taps elastically lock the short side walls. It can be unlocked by a user by pushing said tap.

[0027] In the locked upright position as shown in figure 3a and 4a, the long side wall can be moved upward, thereby unlocking the locking system. This is shown in figure 4a and figure 4b.

[0028] The angled surface on the interior side of the hook 16-18, as shown in figure 3b, prevents dislocating the hinge 7 of the short side wall 3. If a great force is applied directed inwardly, the locking system will unlock itself. The hooks 16-18 will move the long side wall upward according to arrow 23. If moved upward, the hooks no longer lock, and the short side wall 3 can hinge toward the base 2.

[0029] Figure 6 shows a further detail of a hinge 29 used in a crate 1 according to the invention. This embodiment for a hinge is used for the side wall or the pair of side walls that can be moved in the upright position in said perpendicular plane.

[0030] The hinge 29 comprises a first part 30 provided for in the base 2 and a second part 31 provided for on the side wall. The first part 30 comprises a socket 32 for notch 33 of the second part. The notch forms the pivot axis 34 of the hinge 29 if assembled. The notches 33 can be guided through the grooves 35 extending in the vertical direction. These grooves can guide the side wall in the upright position moving in the plane perpendicular to the base 2.

[0031] Visible in figure 2 is a limiting wall 36 arranged on the base 2. This wall together with part 38 on the hinging side wall limits the hinging movement of that side wall. Each side wall 3-6 can have such a limiting wall. The side walls 3-6 can not be moved beyond the upright position.

[0032] In figure 6 wall 37 is visible, part of base 2. It is an upright wall part preventing further movement of the side wall past the upright position.

[0033] The invention is shown in a preferred embodiment. The man skilled in the art will be able to make other combination using the above description and applying the invention. The short side wall can be moveable in the perpendicular plane. Hooks can be provided on the moveable wall. The moveable wall can be the lower wall if the crate is in the folded position.

Claims

1. Crate comprising a rectangular base, a pair of short walls and a pair of long walls each connected hingedly to said base and moveable between a collapsed position wherein said walls are folded and a upright position wherein said walls extend in a mainly perpendicular plane from said base to define an interior of said container, wherein said walls are provided with a locking system for providing a locking engagement between the short wall and the long wall in said

upright position, **characterized in that**, at least one wall is moveable in the upright position in said plane.

2. Crate according to claim 1, **characterized in that** said short wall is provided with a handle for lifting said crate and that the long wall is moveable in said plane.

3. Crate according to claim 1 or 2, **characterized in that** the locking system is actuated by said movement in said plane.

4. Crate according to any of the previous claims, **characterized in that** a rotation means connecting said walls to the base comprises wall-movement means for allowing said movement in said plane.

5. Crate according to claim 4, **characterized in that** said wall movement means comprises a guide for guiding the wall is said plane.

6. Crate according to claim 4 or 5, **characterized in that** said wall movement means comprises a limiting means, limiting the movement to preferably less than 8 mm.

7. Crate according to any of the previous claims, **characterized in that** the locking system comprises at least a rib on a first wall and at least a engaging part on a second wall, engageable in the upright position.

8. Crate according to claim 7, **characterized in that** the rib is provided with a hook.

9. Crate according to claim 8, **characterized in that** said hook extends at an angle of less than 45° from said rib.

10. Crate according to any of claims 7-9, **characterized in that** the engaging part comprises an opening in said wall for guiding said rib.

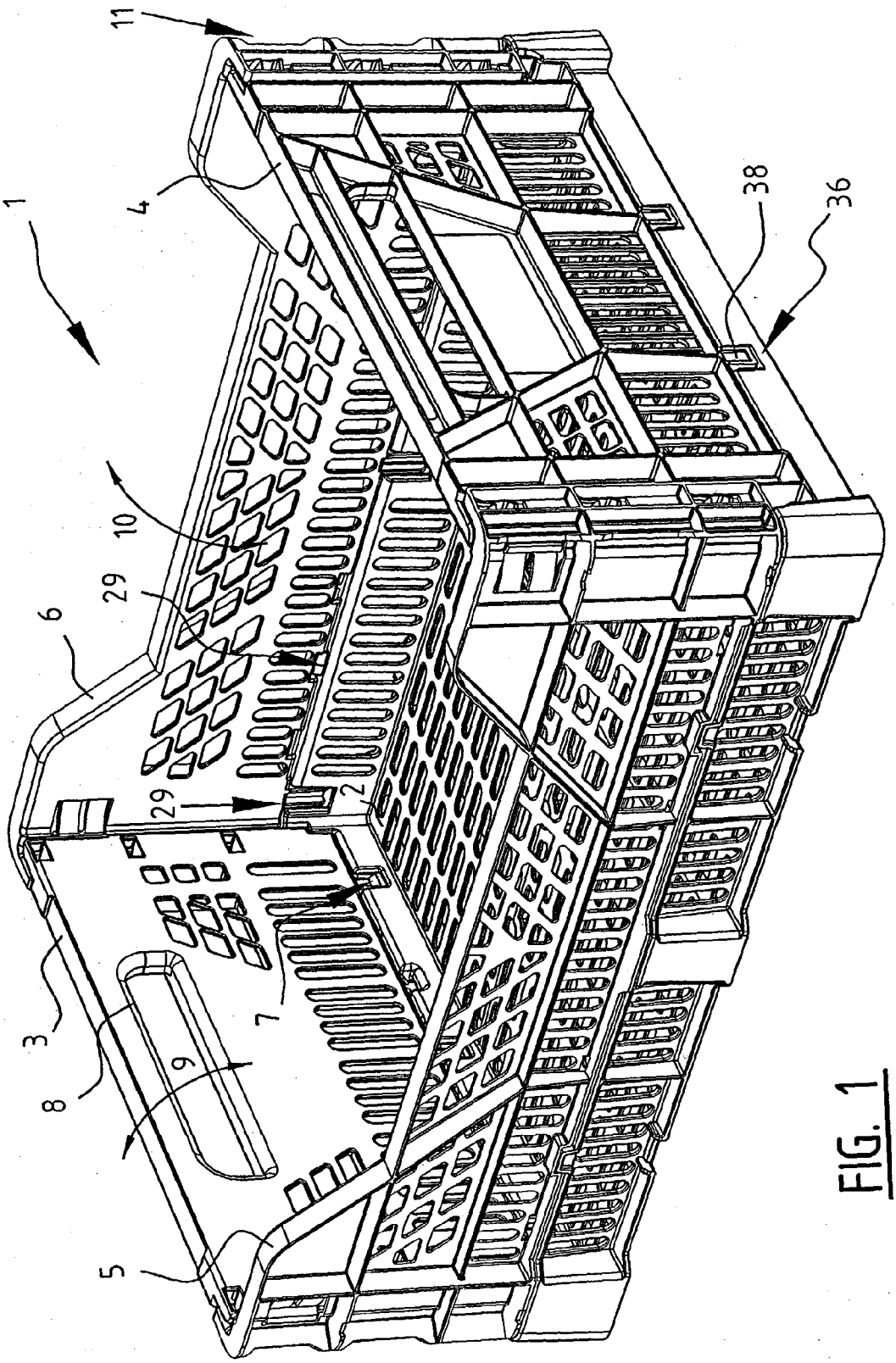


FIG. 1

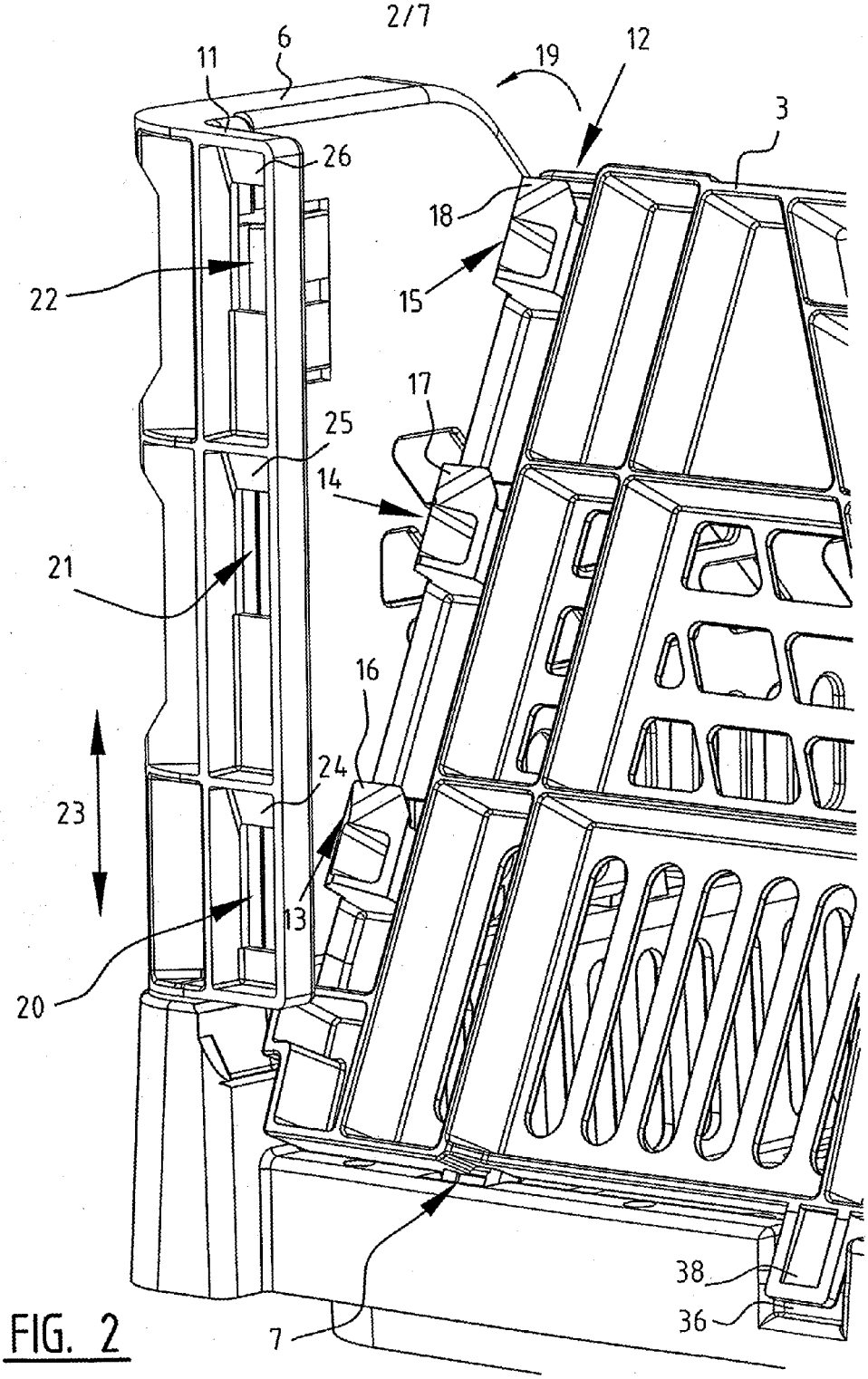


FIG. 2

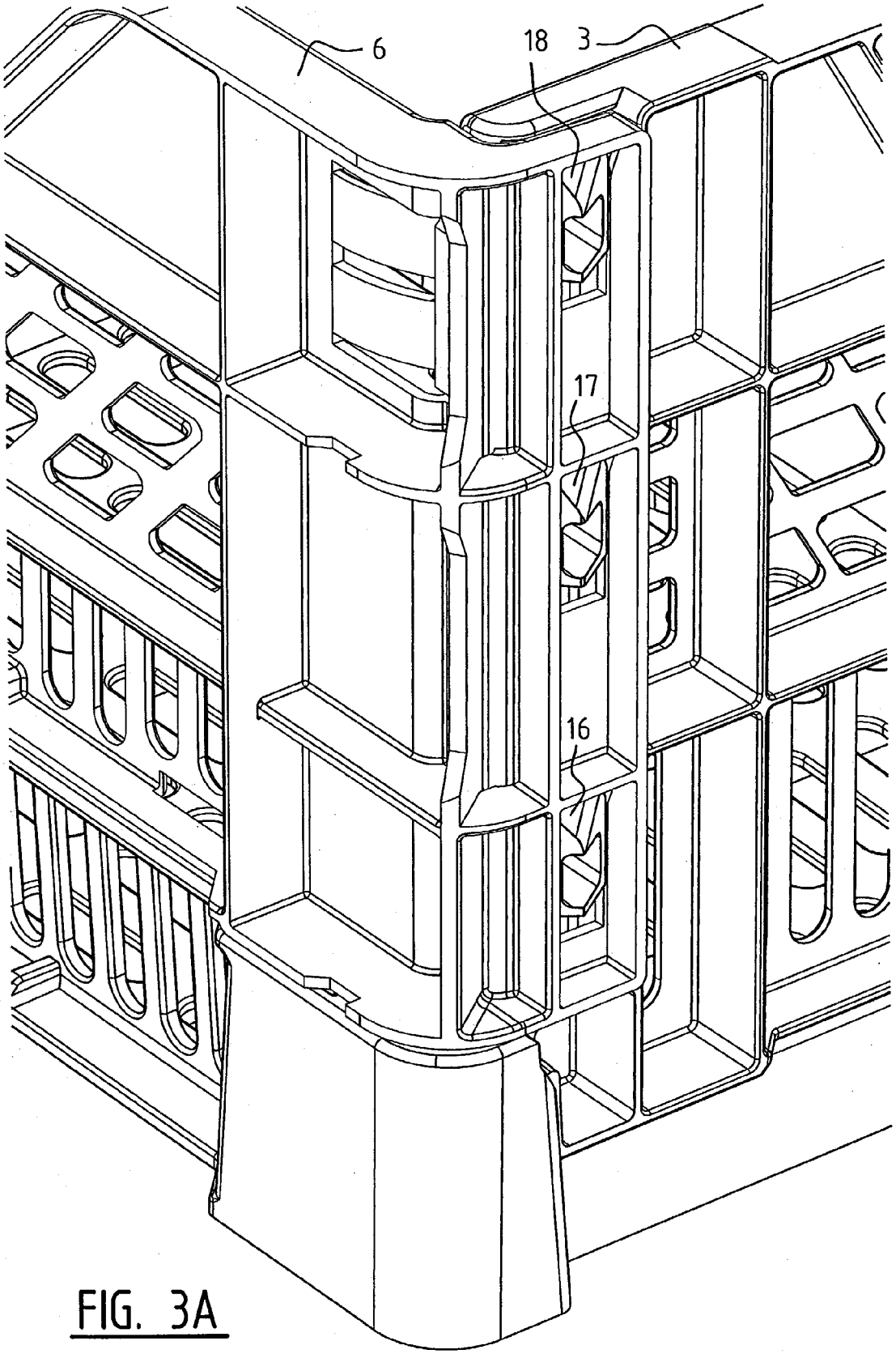


FIG. 3A

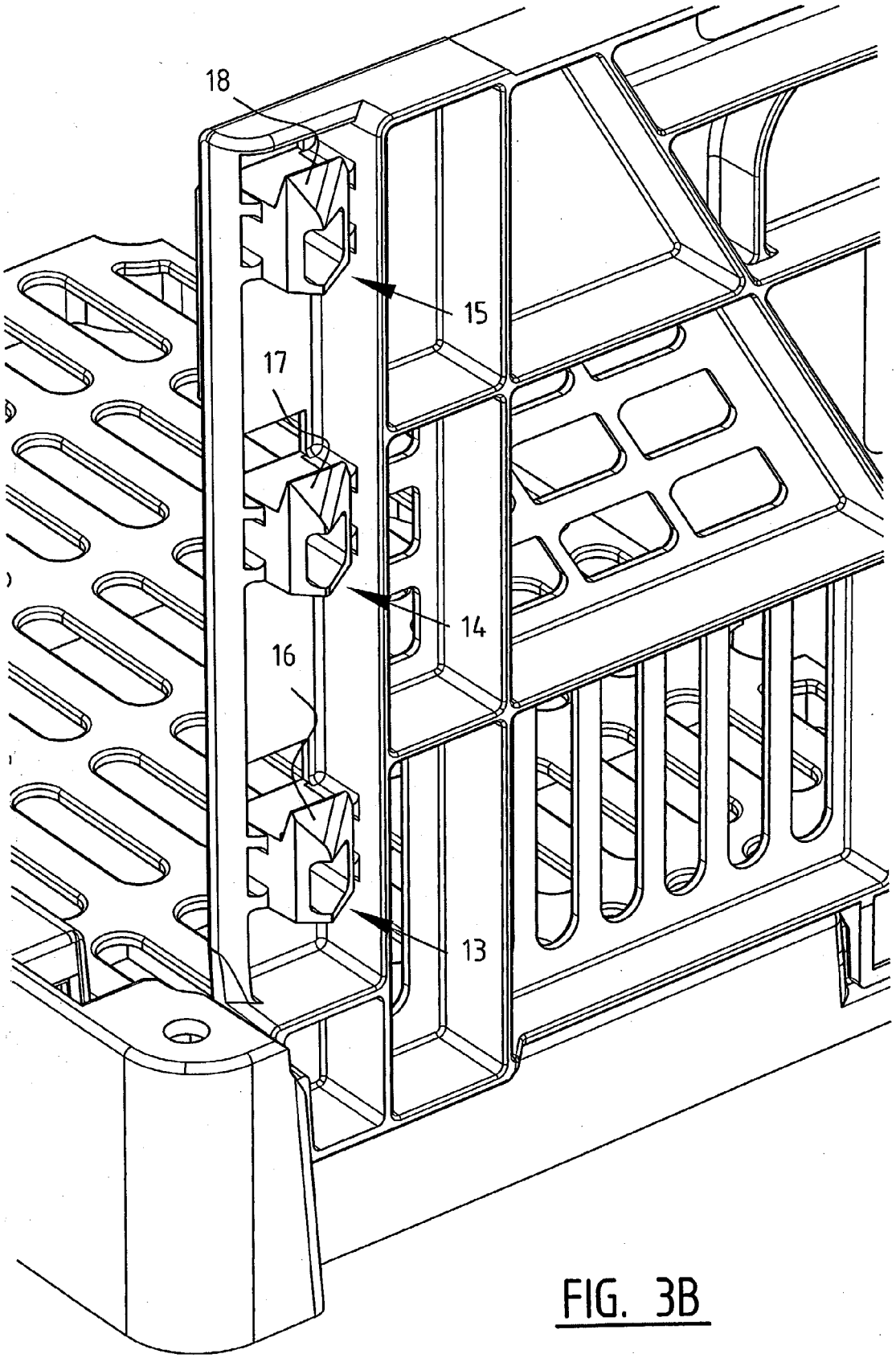


FIG. 3B

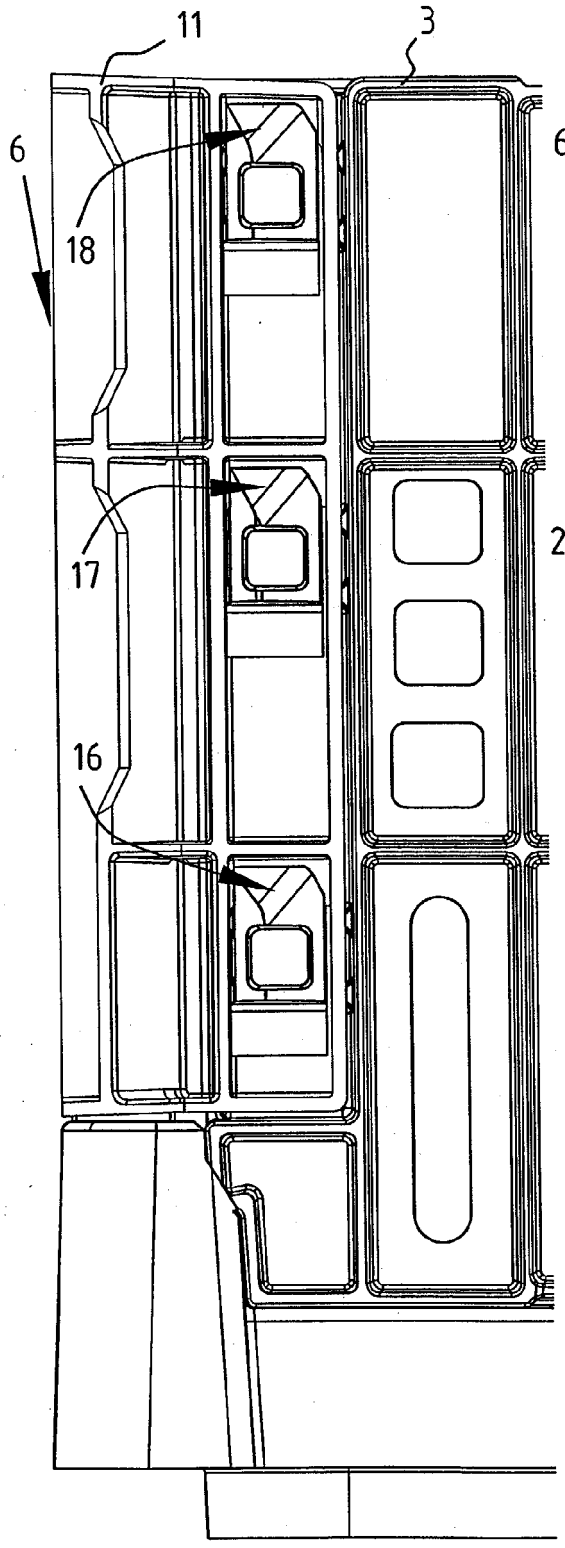


FIG. 4A

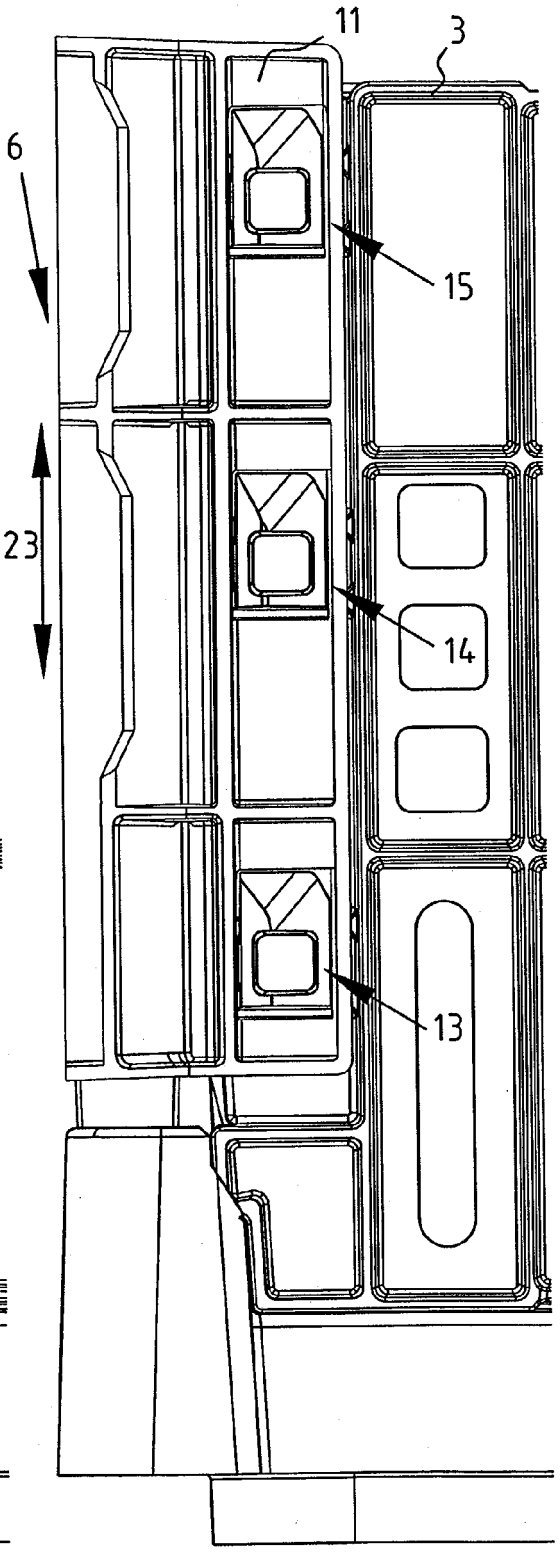
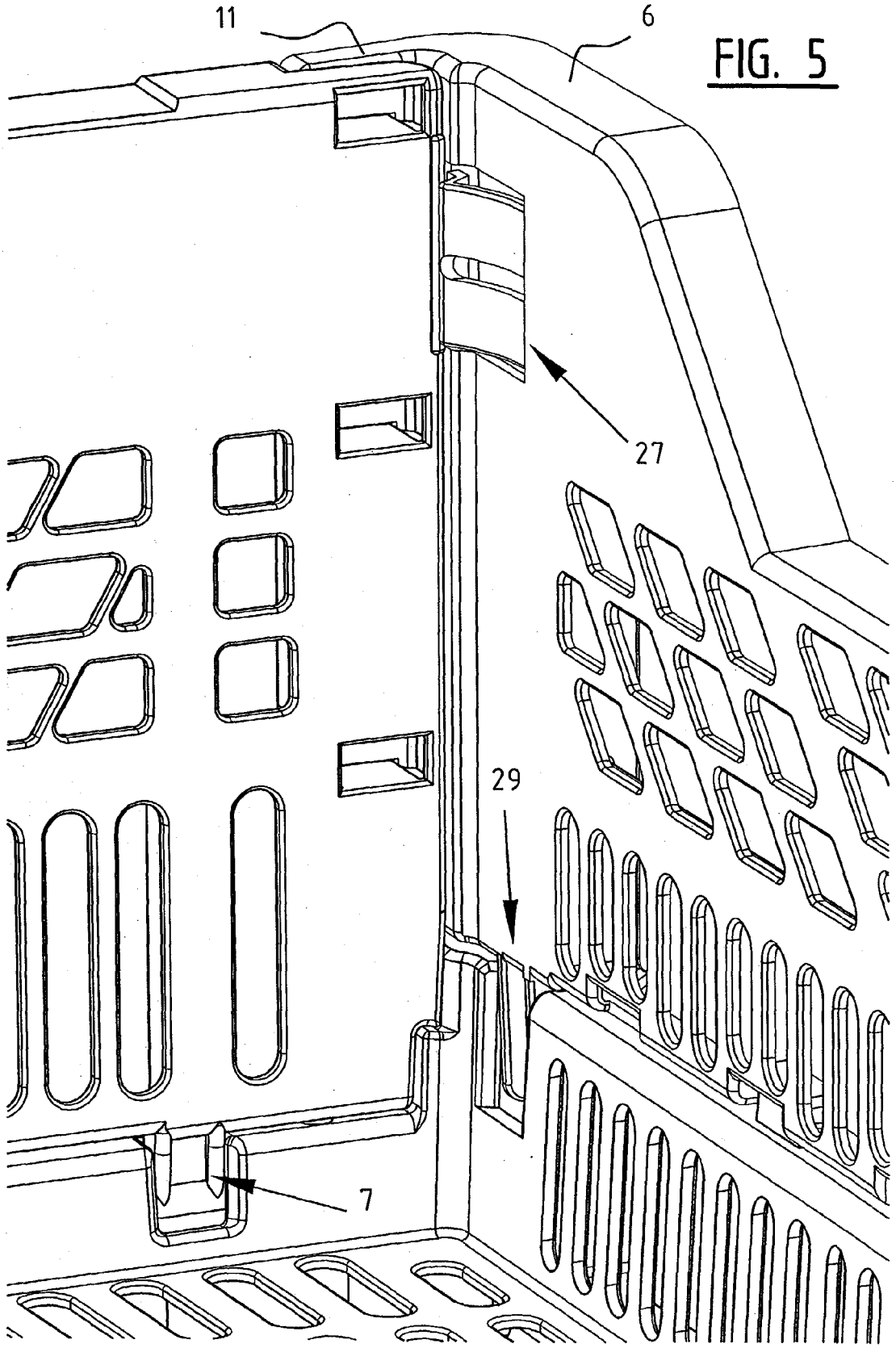


FIG. 4B

FIG. 5



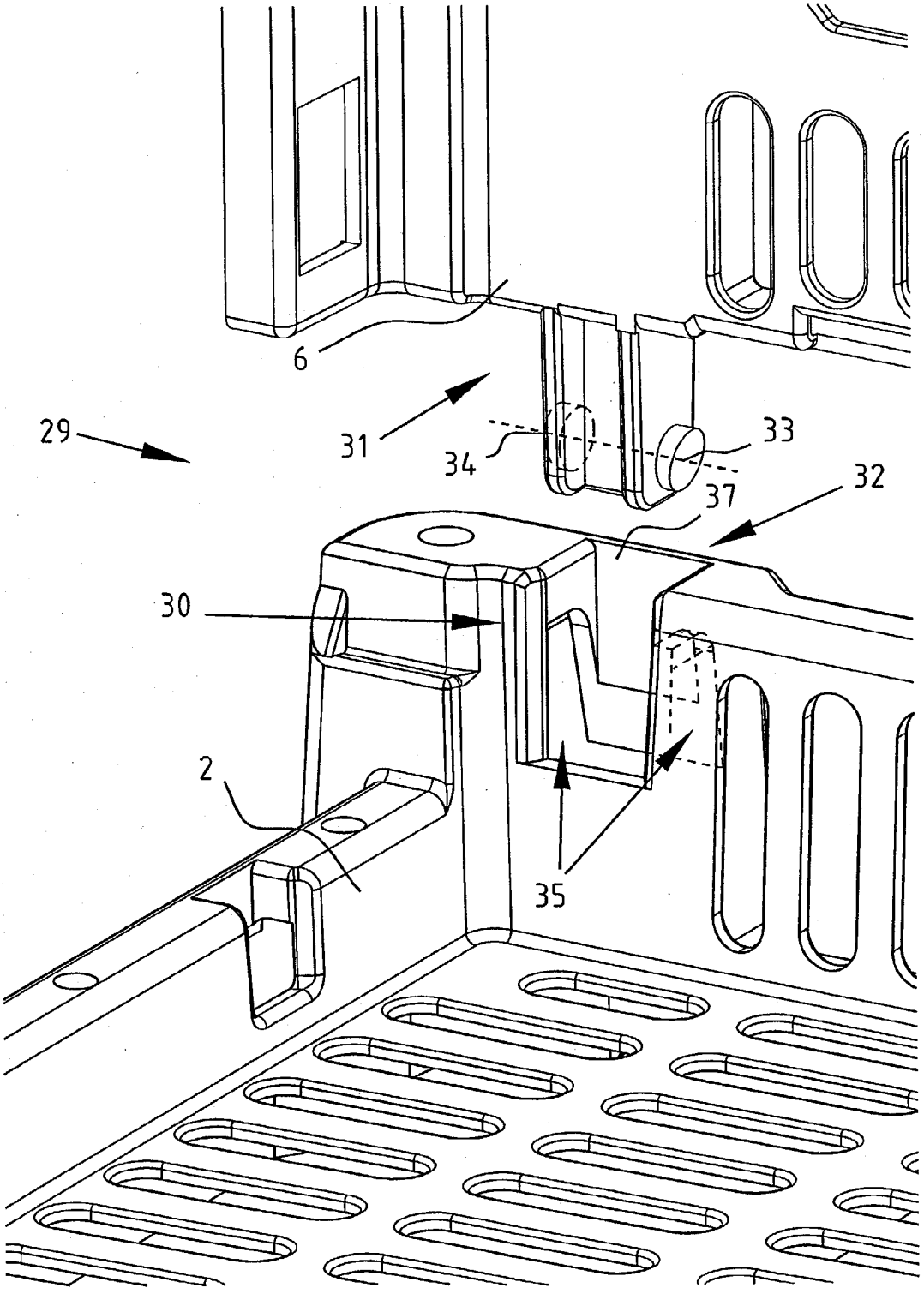


FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 04 07 7825

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 85 36 127 U1 (SGOURAKIS, CONSTANTIN, 5600 WUPPERTAL, DE) 13 February 1986 (1986-02-13)	1-8,10	B65D6/18
Y	* page 5, line 19 - page 7, line 22; figures 3,6,7 *	9	

Y	FR 2 408 979 A (RAOULT GUSTAVE) 8 June 1979 (1979-06-08) * figure 3 *	9	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 March 2005	Bridault, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 07 7825

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08-03-2005

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DE 8536127 U1	13-02-1986	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82