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(71) Applicant: **Odesa Gelistirilmis Polimer Yatirimlari Ve Dis Tic**  
**34662 Istanbul (TR)**

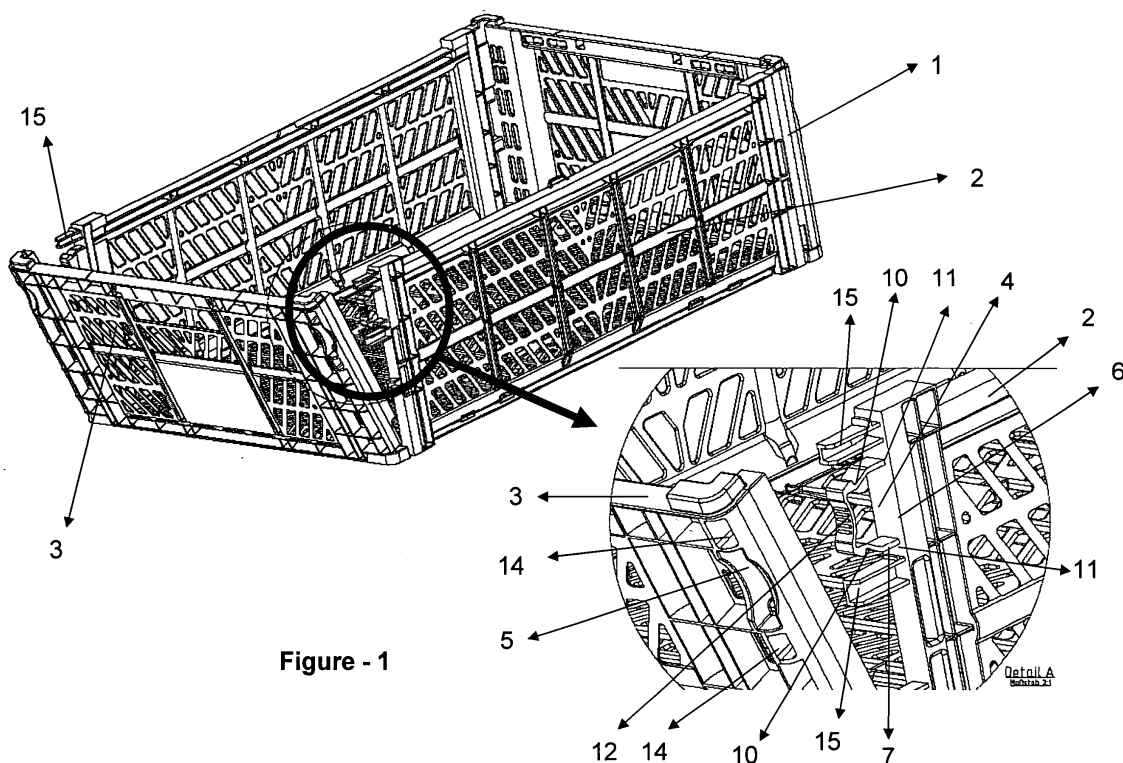
(72) Inventor: **Sabancı, Demir**  
**Saral Merkezi 5/2 K2 Gayrettepe**  
**Istanbul (TR)**

(74) Representative: **Dosterschill, Peter**  
**Petra & Kollegen**  
**Patentanwälte**  
**Herzog-Ludwig-Strasse 18**  
**85570 Markt Schwaben (DE)**

(54) **Locking system for a foldable crate**

(57) This invention is related with the locking system which provides foldable crates' edges are locked to each other and characterized with having main elements as;  
• male part (4) composing base (6), edge (7), space (indent) (10), edge and base connection (11), and pressing part (12) to unlock, located on one of the edges (2 or 3)

of the crate (1),  
• female part (5) composing edge (8) and ledge (9) located on the other edge (2 or 3) of the crate (1),  
• centralization ledges (15) located under or above or both sides of male part (4),  
• Centralization indents (14) located under or above or both sides of female part (14).



**Figure - 1**

## Description

### RELATED FIELD OF INVENTION

[0001] This invention is related with the locking system which provides foldable crates' edges are locked to each other.

### PRIOR ART

[0002] This subject matter of invention, locks manufactured in respect of the prior art in order to fix edges on foldable crates, provides locking usually with solid penetration method, opens with a hard hit on the edge. During carrying or placing, in case of a hit of crate to somewhere, lock may open and material in the crate is spilled. In these kinds of locking systems, solid penetration providing parts cannot perform locking function due to wearing off in the course of time. Consequently, crate cannot be used for desired purpose.

[0003] Related to the locking system for foldable crates developed with this invention, a search has been performed in UK patent Office with the service number SAS/P201391 and additionally another search has been performed in Austrian Patent Office for patentability and the following documents have been determined.

- US 6,722,516 B1,
- US 2003/0116564 A1,
- US 6,073,790,
- US 6,435,349 A1,
- DE 2546636 A1, and
- DE 19511655 A1

[0004] In the document US 6,722,516 B1 a foldable crate of which at least two sides are folded has been disclosed. In the crate disclosed in this document the folded sides of the crate are locked to the other sides. In this document an L shaped locking element is disclosed. In this system there is no centralization feature.

[0005] In the document US 2003/0116564 A1 a foldable crate has been disclosed. In the crate disclosed in this document the folded sides of the crate are locked to the other sides. In this system there is no centralization feature.

[0006] In the document US 6,073,790 a foldable crate of which the sides are folded inside has been disclosed. The sides folded inside are locked by the locking elements which are passing inside part of the other sides. The locking system disclosed in this document doesn't contain centralization elements.

[0007] In the document US 6,435,349 A1 a foldable and reusable box made of cardboard has been disclosed.

Male and female locking elements are disclosed for the box disclosed in this document. The locking system disclosed in this document doesn't contain centralization elements.

[0008] In the document DE 2546636 A1 a hinge system which can be locked has been disclosed. The locking system disclosed in this document doesn't contain centralization elements.

[0009] In the document DE 19511655 A1 an electric connection element which can be locked by a metallic piece has been disclosed. The locking system disclosed in this document doesn't contain centralization elements.

### PURPOSES OF DEVELOPING THE INVENTION

[0010] In developing locking system for foldable crates developed with this invention,

- providing easy locking,
  - providing not to be opened after locked, under weight or during carrying,
  - providing to open easily by hand when needed
- are aimed.

### DESCRIPTION OF THE FIGURES

[0011] In order to describe locking system for foldable crates developed with this invention better, drawn up figures are attached. Description of the figures are below.

- Figure 1- Perspective view of foldable crate and locking system
- Figure 2- Perspective view of foldable crate (locked appearance)
- Figure 3- Cross section view of locking system
- Figure 4- Inner perspective view of locking system (unlocked appearance)
- Figure 5- Outer perspective view of locking system (unlocked appearance)
- Figure 6- Inner perspective view of locking system (locked appearance)
- Figure 7- Side view of locking system (motion appearance of short edge)
- Figure 8- Cross section view of locking system (motion appearance of short edge)
- Figure 9- Outer picture view of locking system (unlocked appearance)
- Figure 10- Inner picture view of locking system (unlocked appearance)

### DESCRIPTION OF ITEMS — PARTS — COMPONENTS

[0012] In order to describe locking system for foldable crates developed with this invention better, parts (items)

forming components are numbered separately. Definitions of the numbers shown in attached figures are as follows:

- 1- Foldable crate
- 2- Long edge
- 3- Short edge
- 4- Male part of locking system
- 5- Female part of locking system
- 6- Male part base
- 7- Male part edge
- 8- Female part edge
- 9- Female part ledge
- 10- Male part space (indent)
- 11- Male part edge and base connection
- 12- Male part pressing part
- 13- Finger
- 14- Centralization indent (hole - space)
- 15- Centralization ledge
- 16- Male part ledge
- 17- Female part indent

## DESCRIPTION OF INVENTION

**[0013]** Main components (elements) of locking system for foldable crates developed with this invention compose;

- male parts, preferably near two sides (2 or 3) of one of the foldable edges (4),
- female parts on the other edge (5), counter to male parts (4),
- centralization ledges (15) located on one of the foldable edges (2 or 3), preferably both sides of male parts,
- centralization indents (14) located on the other edge opposing to centralization ledges (15).

**[0014]** Centralization indents (14) can either be in a square or rectangular prism or cylindric or half sphere form. Centralization indents (14) can locate either on the short edge (3) or the long edge (2).

**[0015]** Centralization ledges (15) can either be in a square or rectangular prism or cylindric or half sphere form in order to fit in the centralization indents. Centralization ledges (15) can locate either on the long edge (3) or the short edge (2).

**[0016]** Centralization ledges (15) can locate either on both sides of male parts (4) or female parts (5). One of the centralization ledges (15) can locate on one side of male part (4), the other one can locate on the other side of female part (5). Centralization indents (14) are located opposite to centralization ledges (15).

**[0017]** Main function of centralization indents (14) and ledges (15) is to provide male (4) and female (5) part of

the lock encounter during locking and unlocking. Thus, locking and unlocking process will be easy.

**[0018]** Another function of centralization indents (14) and ledges (15) is to meet the load and prevent the lock from forcing, when edges are loaded after locking, during carrying or warehousing.

**[0019]** Male part (4) of the locking system for foldable crates developed with this invention compose;

- base (6),
- edge (7),
- space (indent) (10),
- edge and side connection (11), and
- pressing part to unlock (12).

**[0020]** Base (6) and edge (7) of the male part (4) combine at the edge and side connection (11). Combination at connection (11) can either be vertical edged, or convex or concave form in order to provide strengthening.

**[0021]** There is space (indent) (10) on both edges (7) of the male part (4). Space (10) provides locking after fitting in the ledge (9) of female part (5).

**[0022]** In front of male part (4) (facing the female part), there is a pressing part (12) to unlock. When pressed with a finger to pressing part (12), side edges (7) of male part (4) stretches and moves space (indent) (10) inside. Thus, ledge (9) of female part (5) rescue from space (10) and consequently lock is opened.

**[0023]** Female parts (5) of locking system for foldable crates developed with this invention compose,

- female part edge (8) and
- female part ledge (9).

**[0024]** Female part (5) edge (8) ledge (9), provides locking by fitting in the space (10) on the male part (4) edge (7).

**[0025]** Centralization ledges (15) and indents (14) which helps locking, provides locking to be easy, prevent crate edges from stretching against loads during transportation and warehousing, and meets the load on the lock and thus prevents the lock from undesirable openings. These indents (14) and ledges (15) prevent the lock from attrition and extend lifespan at the same time.

## PREFERED APPLICATION OF THE INVENTION

**[0026]** Male parts (4) of locking system for foldable crates developed with this invention are located on two sides of the long edge (2) of the crate (1), preferably somewhere close to the upper part. Female parts (5) are on the short side (3) of the crate (1) located exact opposite of the male parts.

[0027] Centralization ledges (15) are located above and under the male parts (4). Centralization indents (14) are located on the short side (3) of the crate (1), exact opposite of the ledges (15).

#### DIFFERENT APPLICATION FORMS OF THE INVENTION

[0028] Locking system for foldable crates developed with this invention can be applied in foldable crates (1) with different combination forms; where,

- male parts (4) are located on both sides of the short edge (3) of the crate (1); female parts (5) on the other one which is the long edge (2);
- centralization ledges (15) are under and above the female parts (5),
- one of the centralization ledges (15) is under the male part (4), the other one is above the female part (5);
- one of the centralization ledges (15) is above the male part (4), the other one is under the female part (5).

[0029] Crates, on which locking system for foldable crates developed with this invention is applied, preferably are manufactured from polymer or polymer mixed plastic-based material and can be in any size.

[0030] During an application of locking system for foldable crates developed with this invention, locking can be provided by fitting male part ledge (16) into the female part indent (17). This application is in the scope of the invention.

Summing up, the locking system for a foldable crate 1 having side elements 2, 3 according to the invention comprises the following features:

- a male part (4) composing a male part base (6), at least one male part edge (7), at least one male part indent (10), at least one male part edge and base connection (11), and a male part pressing part (12) to unlock, located on a first side element (2, 3) of the crate (1),
- a female part (5) composing a female part edge (8) and a female part ledge (9) located on a second side element (3, 2) of the crate (1),
- centralization ledges (15) located at least one side of the male part (4),
- centralization indents (14) located at least one side of the female part (5), and

the male part pressing part (12) is constructed in that way

that when pressed the at least one male part edge (7) stretches and moves the at least one male part indent (10) inside, thus, the female part ledge (9) rescues from the male part indent (10) and consequently the locking system is opened.

[0031] The centralization indents (14) can be square or rectangular prism formed. Also, the centralization indents (14) can be cylinderic or half sphere formed. The centralization indents (14) can be located on first side elements (3) and/or on second side elements (2), whereby the first side elements (3) and the second side elements (2) have the same or a different length.

[0032] Centralization ledges (15) fit into the centralization indents (14). The centralization ledges (15) can be located on first side elements (3) and/or on second side elements (2), whereby the first side elements (3) and the second side elements (2) have the same or a different length. The centralization ledges (15) can also be located on each side of the male parts (4) and/or of the female parts (5).

[0033] One of the centralization ledges (15) can be located on one side of the male part (4), while another centralization ledge (15) is located on the other side of the female part (5).

[0034] The male part edge and base connection (11) is either vertical edged or has a convex or concave form.

[0035] The male indents (10) can be located on each male part edge (7).

[0036] The female part (5) ledge (9) fits in the male part indents (1) on both edges (7) of the male part (4).

[0037] The pressing part (12) can be located in front of the male part (4).

[0038] At least a part of the crate (1) can be manufactured from polymer or polymer mixed plastic-based material thereof.

[0039] Male part (4) ledges (16) on two male part edges (7) fit into female part (5) indents (17) and thereby lock.

[0040] Any one of the sides of the male part (4) or of the female part (5) can be flat.

#### Claims

1. Locking system for a foldable crate (1) having side elements (2, 3) **characterized by**

- a male part (4) composing a male part base (6), at least one male part edge (7), at least one male part indent (10), at least one male part edge and base connection (11), and a male part pressing part (12) to unlock, located on a first side element (2, 3) of the crate (1),
- a female part (5) composing a female part edge (8) and a female part ledge (9) located on a second side element (3, 2) of the crate (1),
- centralization ledges (15) located at least one side of the male part (4),
- centralization indents (14) located at least one

side of the female part (5), and

the male part pressing part (12) is constructed in that way that when pressed the at least one male part edge (7) stretches and moves the at least one male part indent (10) inside, thus, the female part ledge (9) rescues from the male part indent (10) and consequently the locking system is opened.

2. Locking system for a foldable crate (1) as claimed in claim 1, and **characterized in that** the centralization indents (14) are square or rectangular prism formed.
3. Locking system for a foldable crate (1) as claimed in claim 1, and **characterized in that** the centralization indents (14) are cylinderic or half sphere formed.
4. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** the centralization indents (14) are located on first side elements (3) and/or on second side elements (2), and **in that** the first side elements (3) and the second side elements (2) have the same or a different length.
5. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** centralization ledges (15) fit into the centralization indents (14).
6. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** centralization ledges (15) are located on first side elements (3) and/or on second side elements (2), and characterized that the first side elements (3) and the second side elements (2) have the same or a different length.
7. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** the centralization ledges (15) are located on each side of the male parts (4) and/or of the female parts (5).
8. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** one of the centralization ledges (15) is located on one side of the male part (4), while the other centralization ledge (15) is located on the other side of the female part (5).
9. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** the male part edge and base connection (11) is either vertical edged or has a convex or concave form.
10. Locking system for a foldable crate (1) as claimed in

any one of the above claims and **characterized in that** the male indents (10) are located on each male part edge (7).

- 5 11. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** the female part (5) ledge (9) fits in the male part indents (1) on both edges (7) of the male part (4).
- 10 12. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** the pressing part (12) is located in front of the male part (4).
- 15 13. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** at least a part of the crate (1) is manufactured from polymer or polymer mixed plastic-based material thereof.
- 20 14. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** male part (4) ledges (16) on two male part edges (7) fit into female part (5) indents (17) and thereby lock.
- 25 15. Locking system for a foldable crate (1) as claimed in any one of the above claims and **characterized in that** any one of the sides of the male part (4) or of the female part (5) is flat.
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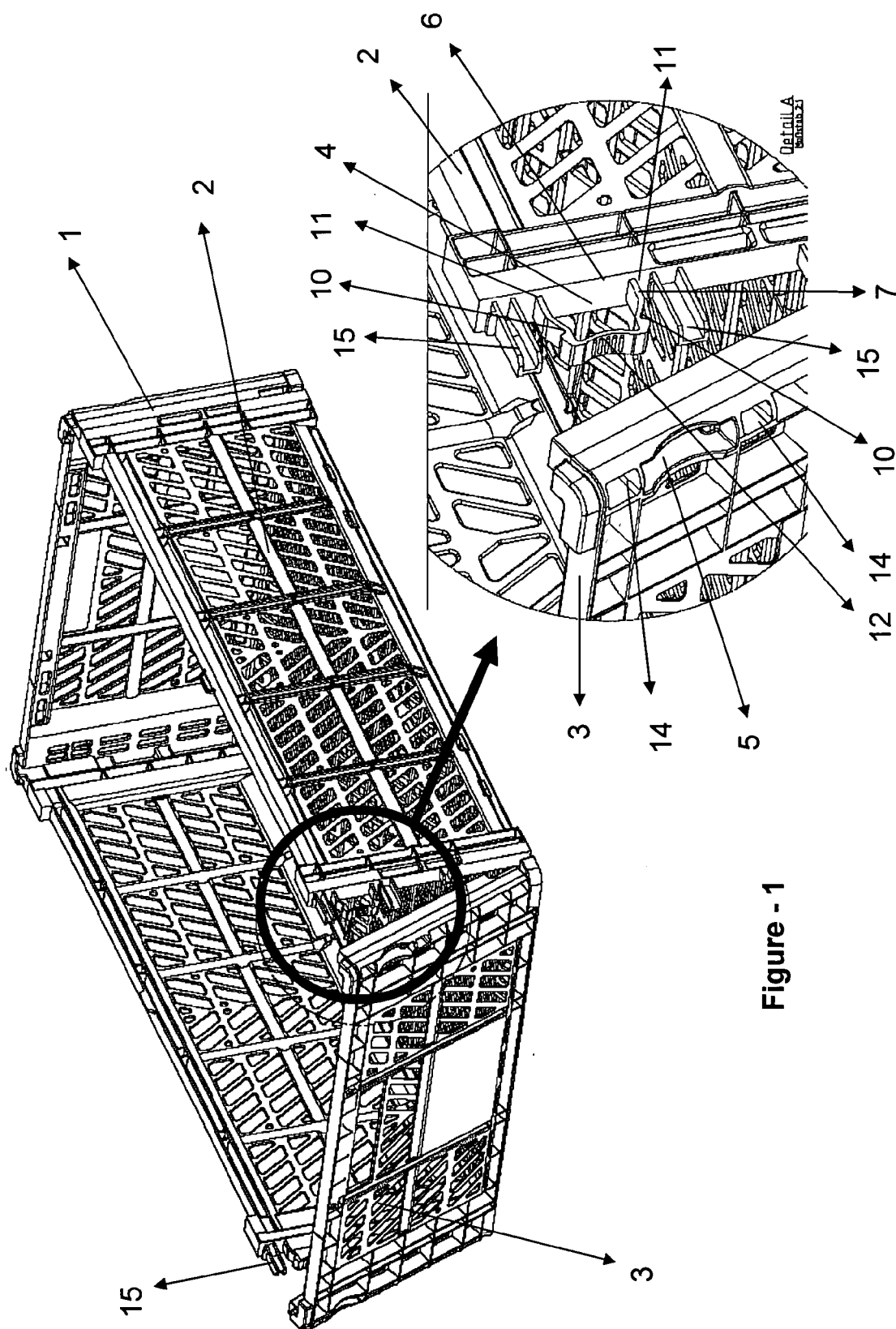
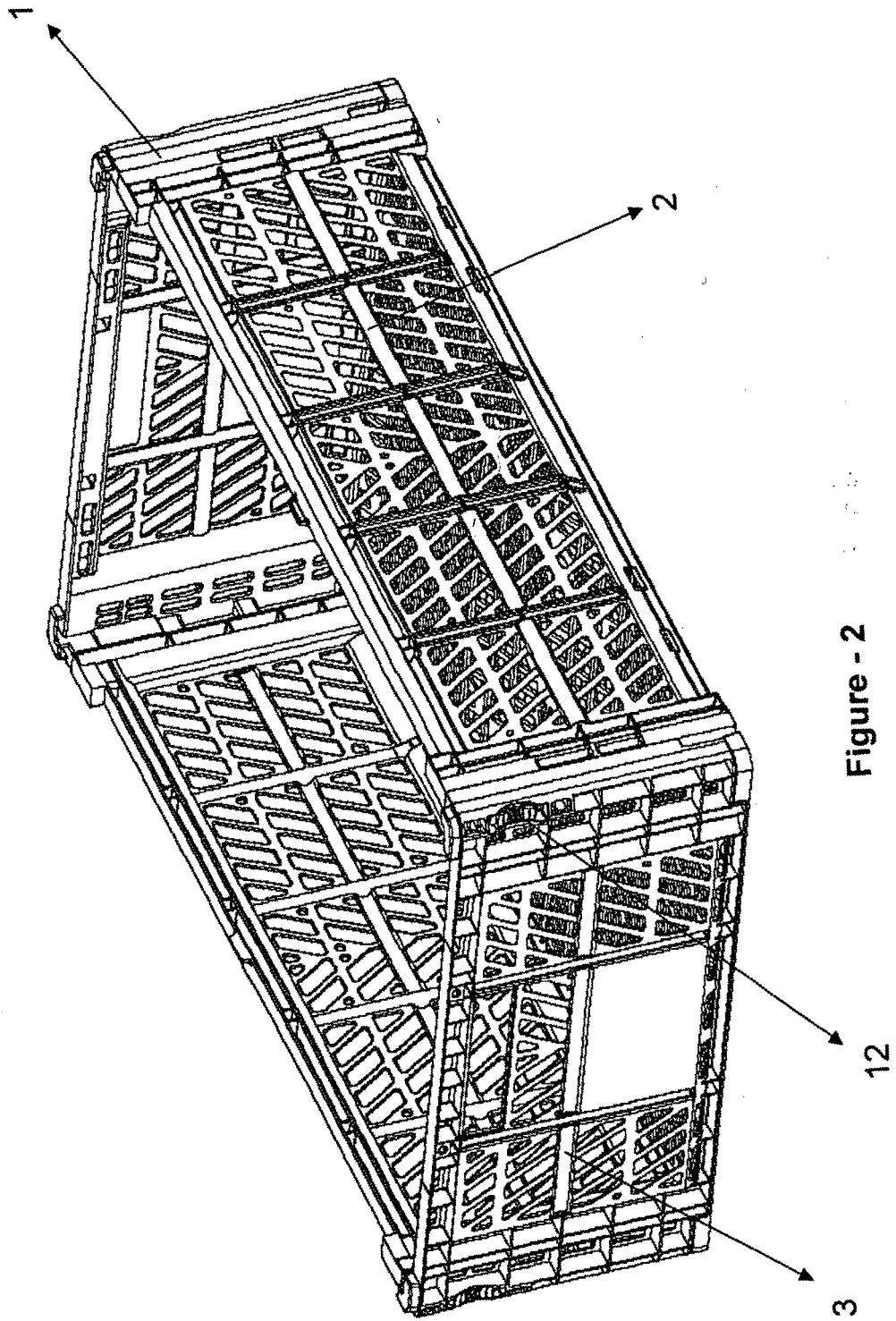


Figure - 1



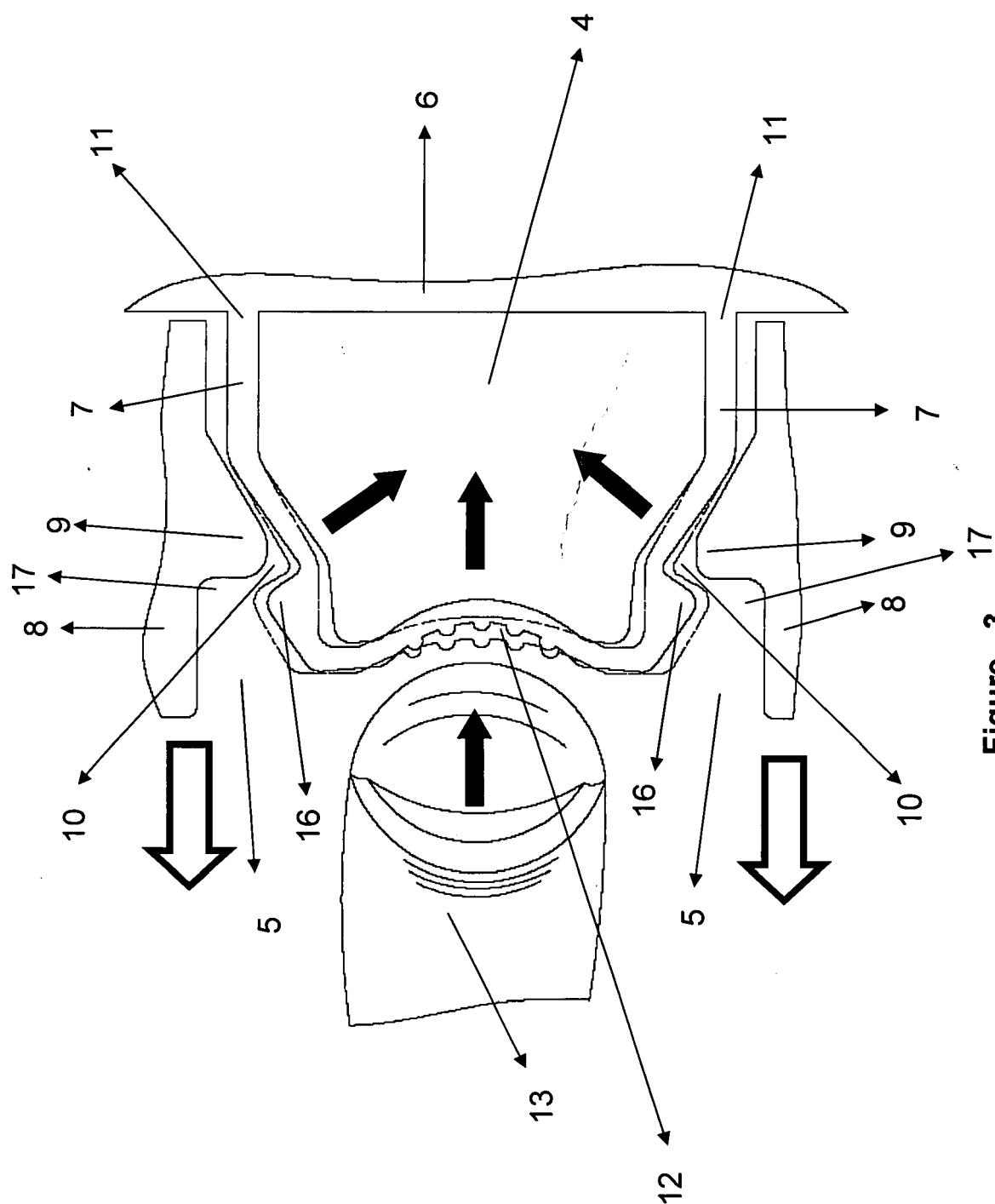


Figure - 3



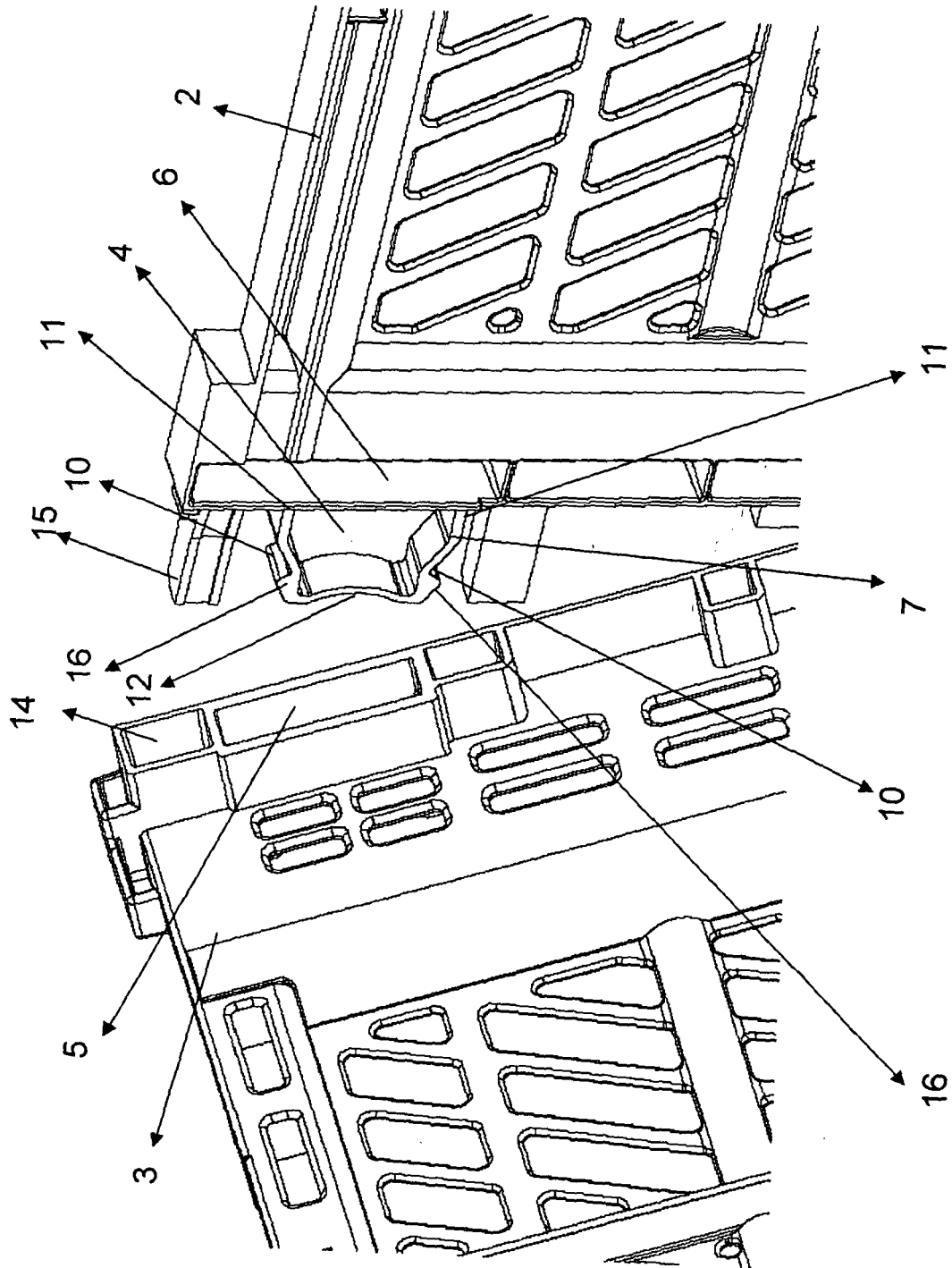


Figure - 4

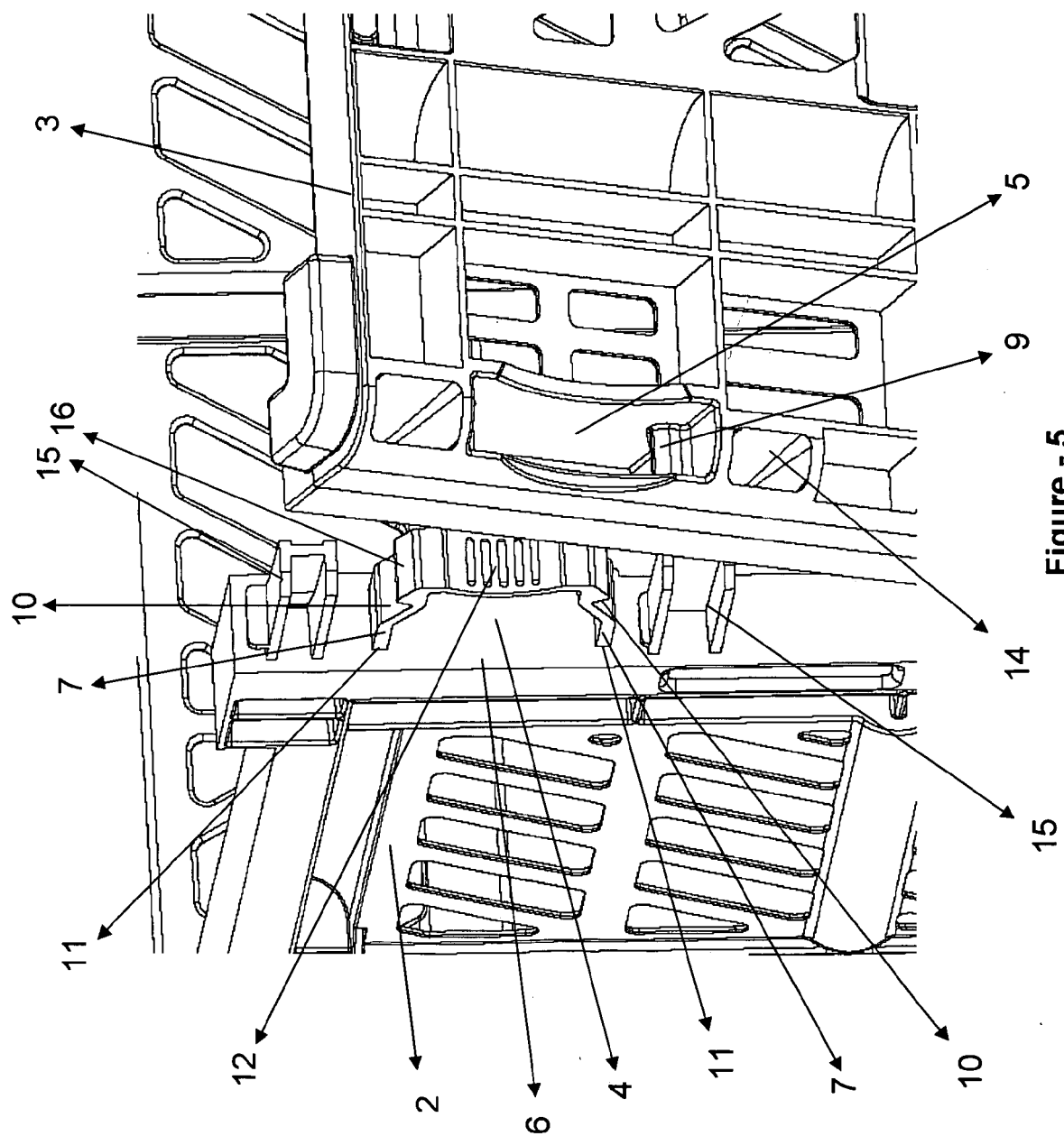


Figure - 5

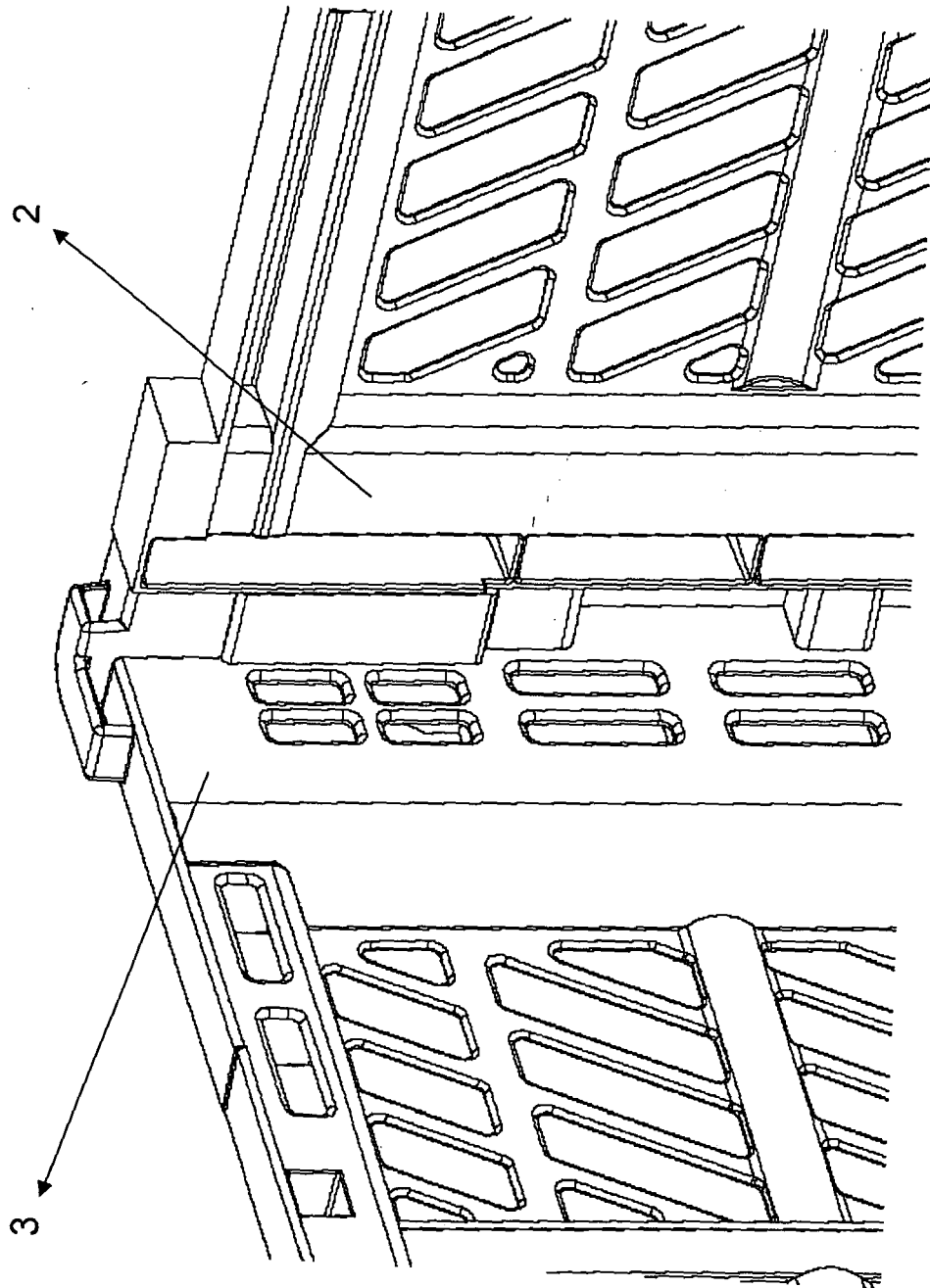


Figure - 6

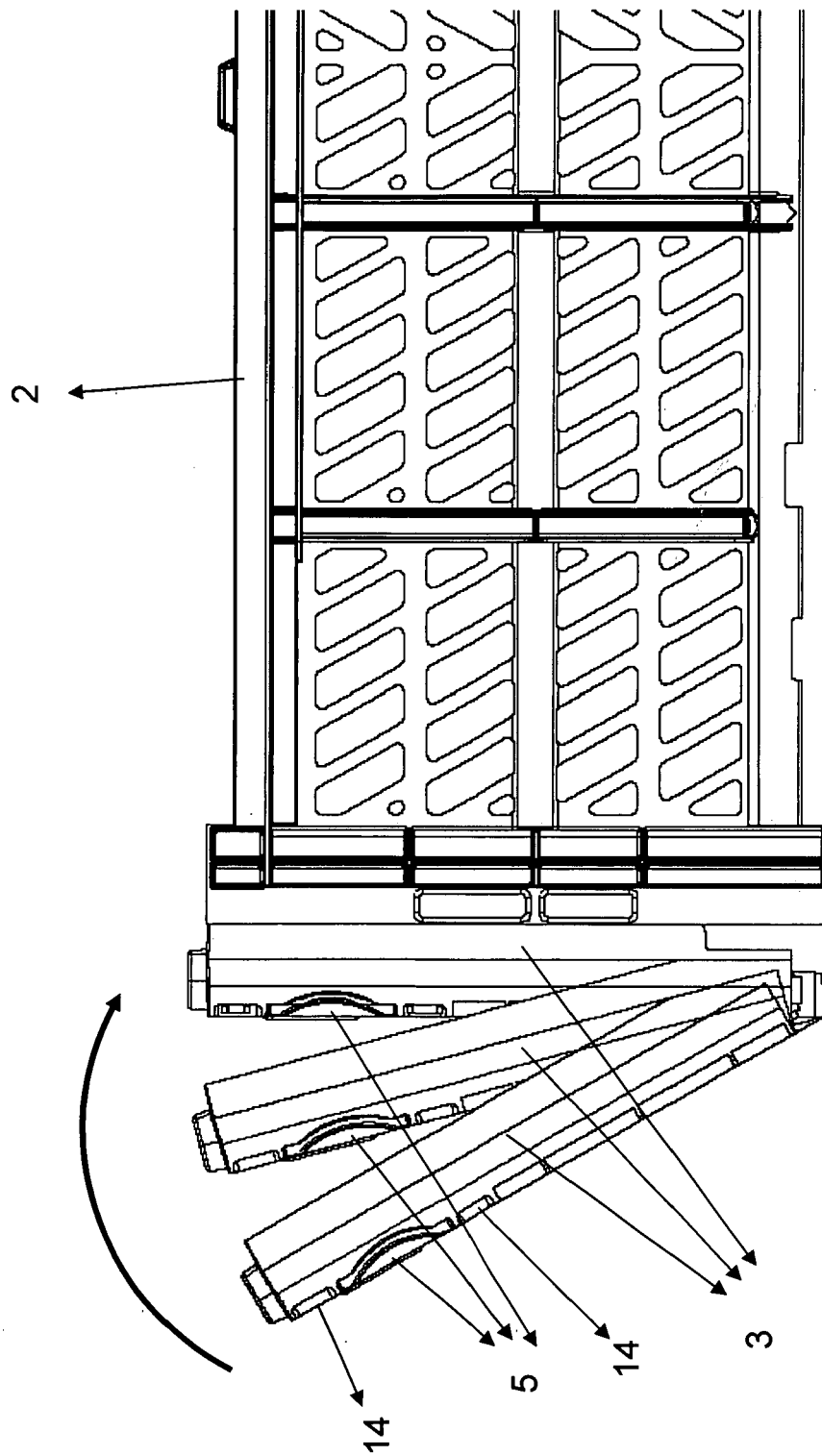


Figure - 7

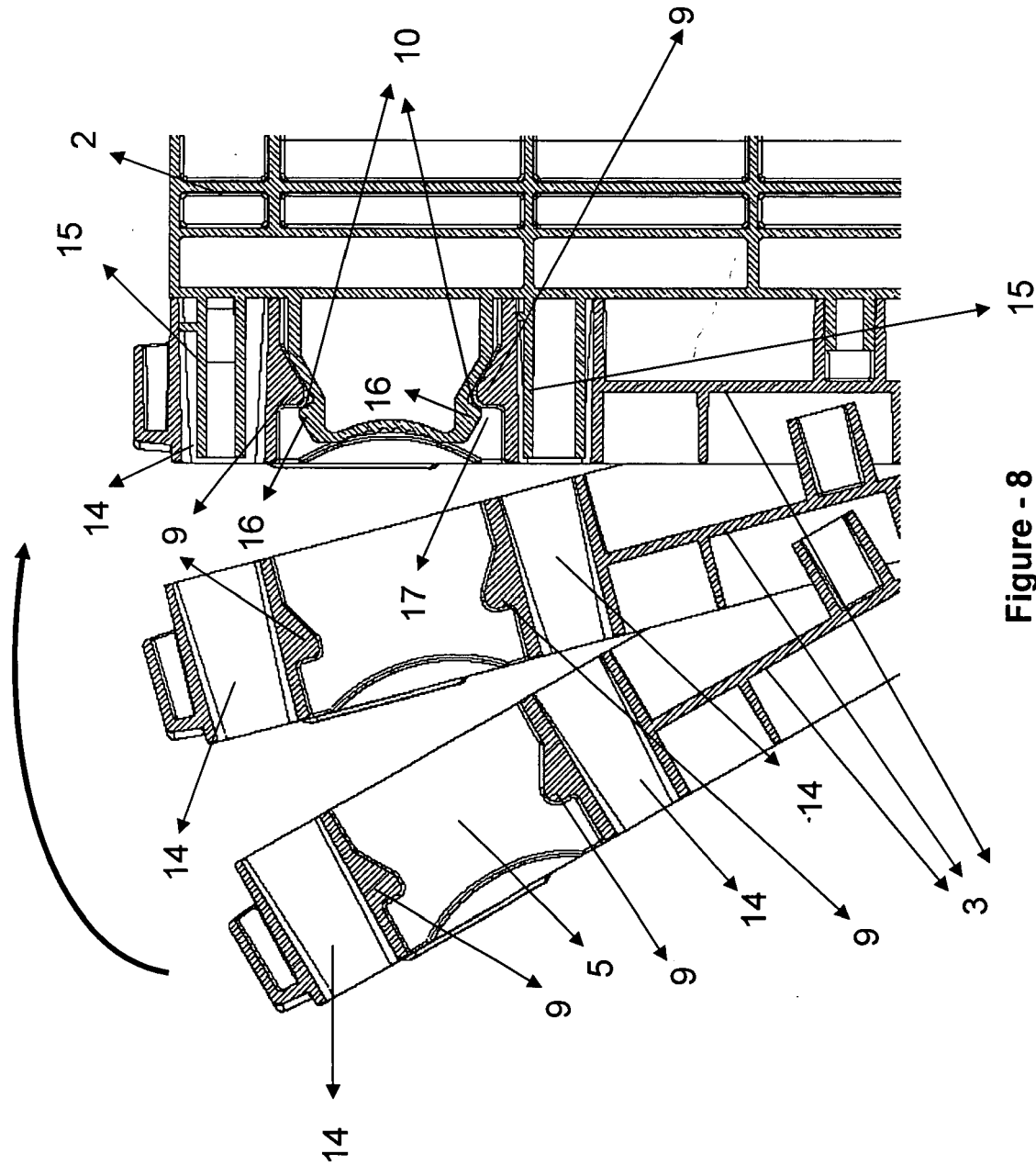
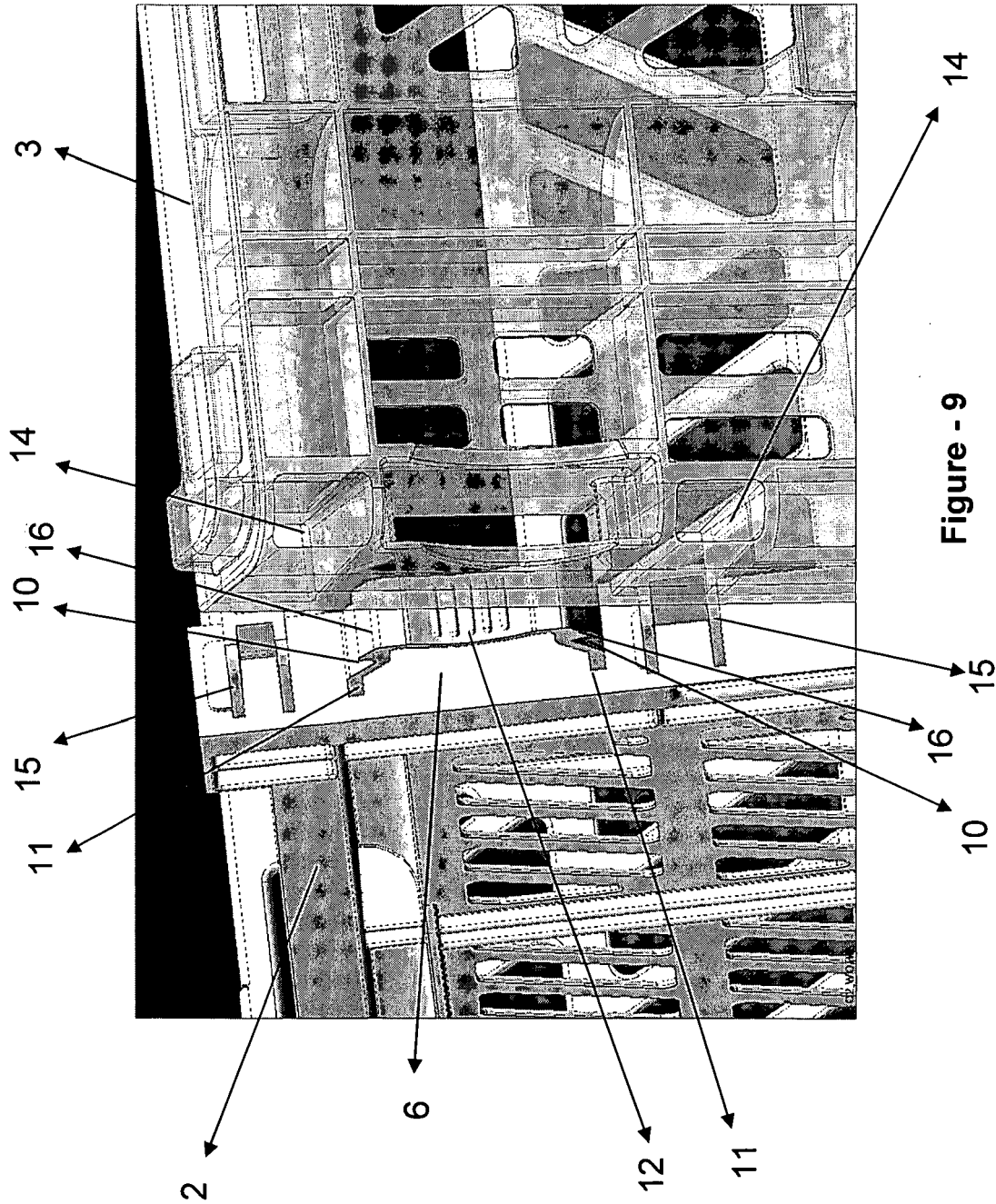


Figure - 8



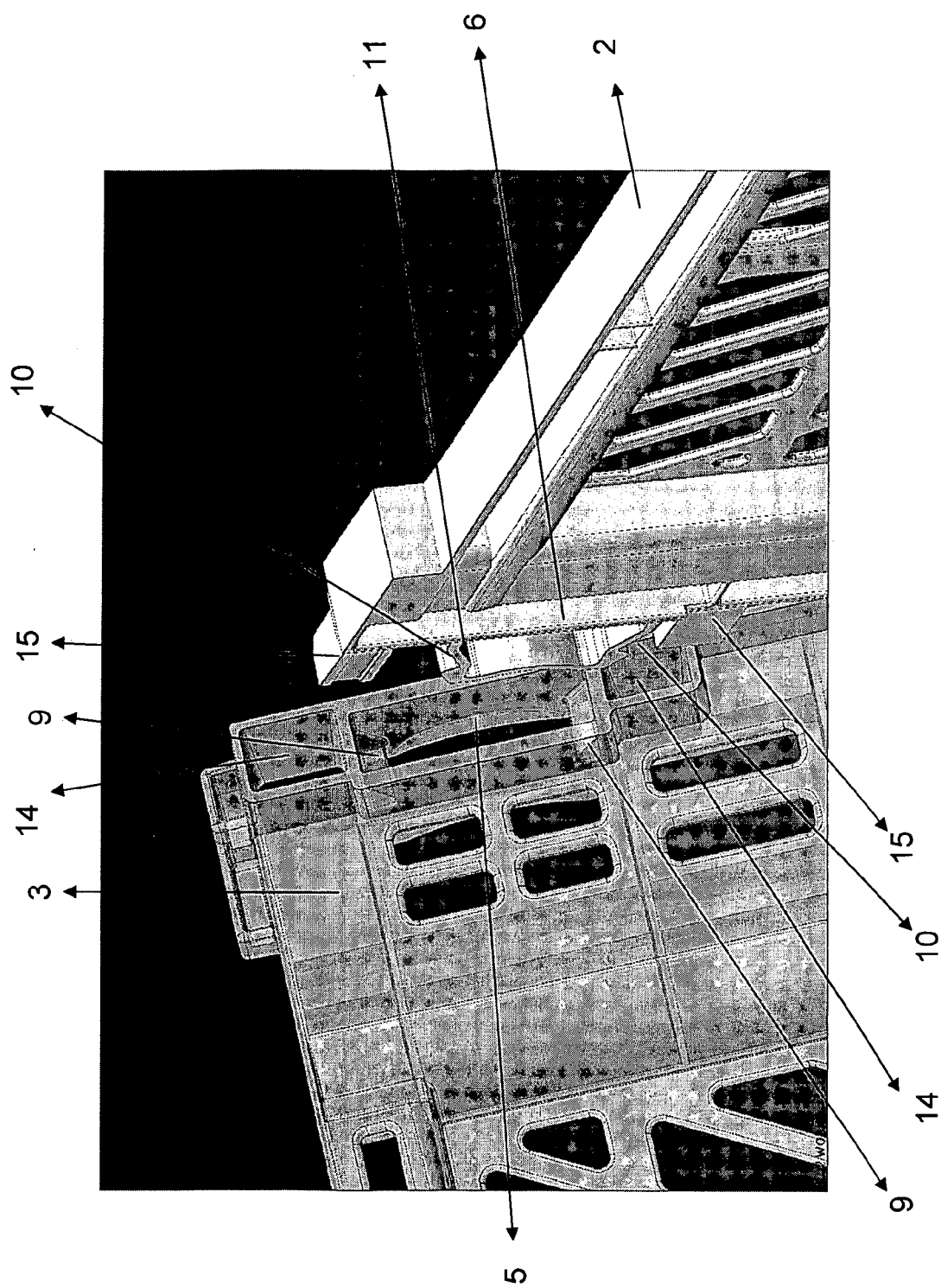


Figure - 10



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 06 00 8417

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                           |                                  |                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Citation of document with indication, where appropriate, of relevant passages                                                                             | Relevant to claim                | CLASSIFICATION OF THE APPLICATION (IPC) |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | US 2003/136781 A1 (RUMPEL DONALD)<br>24 July 2003 (2003-07-24)<br>* paragraphs [0028], [0040], [0042];<br>figures 2,4-6 *                                 | 1-15                             | INV.<br>B65D8/14                        |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | US 2004/178197 A1 (HSU ROGER S ET AL)<br>16 September 2004 (2004-09-16)<br>* paragraph [0030] - paragraph [0036] *<br>* paragraph [0042]; figures 1,3,6 * | 1-15                             |                                         |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | WO 03/039978 A (ARCA SYSTEMS AB; BRAUNER, MANFRED) 15 May 2003 (2003-05-15)<br>* page 4, line 21 - line 26; figure 1 *                                    | 1-15                             |                                         |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                           |                                  | TECHNICAL FIELDS SEARCHED (IPC)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                           |                                  | B65D                                    |
| Place of search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                           | Date of completion of the search | Examiner                                |
| Munich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                           | 6 October 2006                   | Vesterholm, Mika                        |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/> Y : particularly relevant if combined with another document of the same category<br/> A : technological background<br/> O : non-written disclosure<br/> P : intermediate document</p> <p>T : theory or principle underlying the invention<br/> E : earlier patent document, but published on, or after the filing date<br/> D : document cited in the application<br/> L : document cited for other reasons<br/> &amp; : member of the same patent family, corresponding document</p> |                                                                                                                                                           |                                  |                                         |

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EPO FORM 1503 03.02 (P04C01)



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

EP 06 00 8417

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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06-10-2006

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**REFERENCES CITED IN THE DESCRIPTION**

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