(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 078 298 A1

# (12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
**12.10.2016 Bulletin 2016/41**

(51) Int Cl.:
***A47B 47/00*** *(2006.01)*

(21) Application number: **15163066.2**

(22) Date of filing: **09.04.2015**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
**BA ME**
Designated Validation States:
**MA**

(71) Applicant: **Wire Master Industry Co., Ltd.**
**Changhua Hsien (TW)**

(72) Inventor: **Cheng, Hsi-Ming**
**Changhua Hsien (TW)**

(74) Representative: **Lang, Christian**
**LangPatent Anwaltskanzlei**
**IP Law Firm**
**Rosenheimer Straße 139**
**81671 München (DE)**

## (54) IMPROVED FRAME OF PARTITION PLATE OF STORAGE RACK

(57) The present invention provide an improved frame of a partition plate of a storage rack, the top and the bottom edge of a frame of a partition plate is respectively folded for forming a horizontal folding sheet having a predetermined width, four corners thereof are respectively formed with a concave slot allowing a sleeve tube to be sleeved therein, and the sleeve tubes are formed in a conical status having a narrower top and a wider bottom, so the dimension of the concave slot of the top folding sheet is slightly smaller than the dimension of the concave slot of the bottom folding sheet, when the sleeve tubes are sleeved at the four corners of the frame, an ultrasonic welding operation can be processed for welding the frame and the sleeve tubes, thereby solving disadvantages such as unattractive welding marks being formed when a conventional welding means being adopted.

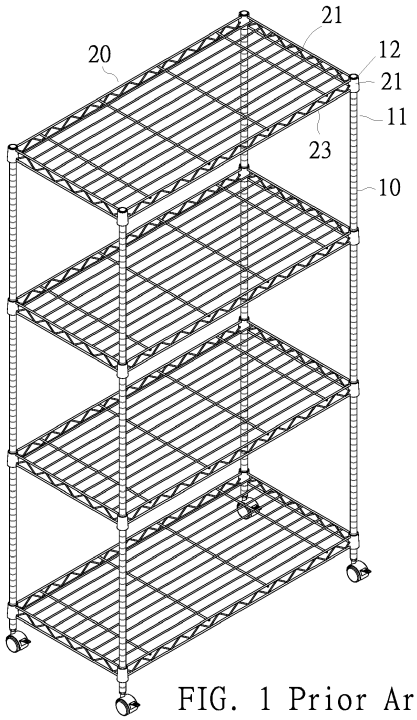



FIG. 1 Prior Art

EP 3 078 298 A1

## Description

### BACKGROUND OF THE INVENTION

Field of the Invention:

**[0001]** The present invention relates to an improved frame of a partition plate of a storage rack for solving disadvantages generated when the frame of a conventional partition plate is welded with a sleeve tube; the present invention utilizes concave slots formed at corners defined at a top and a bottom folding sheets of a frame for accommodating a sleeve tube, thereby enabling the frame to be combined with the sleeve tube with an ultrasonic welding means.

2. Description of Related Art:

**[0002]** The structural design for a conventional metal storage rack as such as a wave-shaped rack is shown in FIG. 1 and FIG. 2, at least four vertical posts (10) are installed, and the peripheral circumference of each of the posts (10) is formed with a plurality of annular concave slots (11) spaced with an equal interval, plastic sleeve members (12), (13) are provided for being selectively sleeved for the purpose of combination, ribs (14) formed at inner edges of the plastic sleeve members (12), (13) are served to be mounted and latched in the annular concave slots (11) of the post (10) for obtaining an initial positioning relation, and with the conical design for the plastic sleeve members (12), (13) and the inner conical design for sleeve tubes (21) at four corners of a partition plate (20), the partition plate (20) and the posts (10) are enabled to be stably positioned and combined through the plastic sleeve members (12), (13) being positioned, and the above-mentioned partition plate (20) is mostly formed through welding a plurality of metal strips so as to form a grid-like carrying surface (22), meanwhile a frame (23) of the partition plate (20) is also formed through welding one or a plurality of metal strips and decorative strips for providing a better structural strength, so an effect of allowing objects to be places is achieved; moreover, the skilled people in the art have also developed a metal lath sheet for replacing the grid-like surface, thereby preventing small objects from falling through gaps formed between grids.

**[0003]** However, no matter a grid-like design or a metal lath sheet is adopted as the carrying surface of the partition plate, the assembly of the partition plate and the sleeve tube of the vertical post is achieved by a welding means, in other words four corners of the frame of the partition plate are respectively formed with a notch or a concave slot for allowing the additionally-made sleeve tube to be installed, then a welding agent is provided for the purpose of welding and positioning so as to finish the assembly of the partition plate and the sleeve tube, and with the conical design for the inner diameter of the sleeve tube, the sleeve tube is able to form a positioning relation with the plastic sleeve member after the sleeve tube is sleeved on the vertical post, and the distance defined between two adjacent partition plates can be adjusted according to the actual needs.

**[0004]** However, because the frame of the partition plate and the sleeve tubes at four corners are combined with a welding means, unattractive welding marks may be formed and the appearance may be affected, and the whole quality may depend on the technical level and experience of an operator who is in charge of the welding operation; in addition, the whole operation procedure is complicated, thus the disadvantages existed in prior art shall be improved.

### SUMMARY OF THE INVENTION

**[0005]** In view of the conventional storage rack having the frame and the sleeve tubes at four corners being welded for assembly which may cause the disadvantages such as the process is time consuming, the quality is uneasy to be controlled and the appearance may be affected by welding marks, the applicant of the present invention has devoted himself for inventing a novel design for improving the above-mentioned disadvantages, thus an improved frame of a partition plate is provided

**[0006]** The present invention is aimed to solve the disadvantages generated when the frame of a conventional partition plate is welded with a sleeve tube; accordingly, the present invention provide a design that the top and the bottom edge of a frame of a partition plate is respectively folded for forming a horizontal folding sheet having a predetermined width, and four corners thereof are respectively formed with a concave slot respectively allowing an additionally-made sleeve tube to be sleeved therein, and the dimensions of the concave slots formed on the top and the bottom folding sheets are matched with the conical status of the sleeve tube, so after the sleeve tubes are respectively sleeved at the four corners of the frame, an ultrasonic welding operation is able to processed for welding the frame and the sleeve tubes, thereby achieving an effect of stably combining without forming any welding mark.

**[0007]** The present invention is aimed to improve the assembly of a frame of a partition plate of a storage rack and sleeve tubes at four corners thereof, in which an ultrasonic welding means is adopted for replacing the conventional welding means, so the operation can be simplified, the structural stability can be greatly enhanced, and no unattractive welding mark is formed, thereby allowing the whole appearance and quality to be improved; accordingly, the present invention is novel and more practical in use comparing to prior art.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]**

FIG. 1 is schematic view showing the structure of a

conventional storage rack;

FIG. 2 is a partially exploded view showing the conventional storage rack;

FIG. 3 is a schematic view showing the partition plate of the storage rack according to the present invention;

FIG. 4 is an exploded view showing the frame of the partition plate and the sleeve tube according to the present invention;

FIG. 5 is a partially exploded view showing the frame of the partition plate and the sleeve tube according to one preferred embodiment of the present invention;

FIG. 6 is a partially exploded view showing the frame of the partition plate and the sleeve tube according to another preferred embodiment of the present invention;

FIG. 7 is a partially exploded view showing the frame of the partition plate and the sleeve tube according to one another preferred embodiment of the present invention;

FIG. 8 is a partial view showing the assembly of the frame of the partition plate and the sleeve tube according to the present invention;

FIG. 9 is a partial view showing the assembly of the frame of the partition plate and the sleeve tube taken from another angle according to the present invention;

FIG. 10 is a partial view showing the structure relation of the frame of the partition plate and the sleeve tube according to the present invention;

FIG. 11 is a partial view showing the structure relation of the frame of the partition plate and the sleeve tube taken from another angle according to the present invention; and

FIG. 12 is a schematic view showing the whole structure of the storage rack according to one preferred embodiment of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0009]** Preferred embodiments of the present invention will be described with reference to the drawings

**[0010]** Referring from FIG. 3 to FIG. 12, according to the present invention, the structural design for assembling a frame of a partition plate of a storage rack and a sleeve tube is that: a metal lath sheet (41) or a sheet-like member and a plate-like frame (42) are assembled for forming as a partition plate (40) of a storage rack (30), four corners of the frame (42) of the partition plate (40) are respectively installed with a sleeve tube (50), and an additionally-made plastic sleeve member (32) is respectively provided for being sleeved on a vertical post (31) fastened with the storage rack (30), thereby allowing the assembly of the storage rack (30) to be finished, wherein:

**[0011]** In the structural design for the partition plate (40) and the sleeve tube (50), the top edge and the bottom edge of the frame (42) of the partition plate (40) are respectively folded for forming a horizontal folding sheet (43), (44) having a predetermined width, so the top folding sheet (43) allows the metal lath sheet (41) to be assembled, and the bottom folding sheet (44) is able to provide a safety and decorating effect, and four corners defined on the top and the bottom folding sheets (43), (44) of the frame (42) are respectively formed with a concave slot (45), (46) allowing the sleeve tube (50) to be sleeved therein, and the sleeve tube (50) is formed in a conical status having a narrower top and a wider bottom, thus the dimension of the concave slot (45) of the top folding sheet (43) is slightly smaller than the dimension of the concave slot (46) of the bottom folding sheet (44), meanwhile slot walls of the concave slots (45), (46) are respectively formed with a plurality of convex pieces (47), (48) (as shown in FIG. 5), or the outer periphery of the sleeve tube (50) is formed with a plurality of ribs (51) (as shown in FIG. 6), or the slot walls of the concave slots (45), (46) of the top and the bottom folding sheets (43), (44) and the outer periphery of the sleeve tube (50) are respectively formed with a plurality of convex pieces (47), (48) and a plurality of ribs (51) which are staggeringly arranged (as shown in FIG. 7); as such, the sleeve tubes (50) are enabled to be sleeved in the concave slots (45), (46) formed at the four corners of the frame (42), and a multiple point contact status is established between the outer periphery of the sleeve tube (50) and the slot walls of the concave slots (45), (46), so when the frame (42) and the sleeve tube (50) are welded with an ultrasonic means, the convex pieces (47), (48) or the ribs (51) are able to be melted and combined for allowing a stably combining status to be achieved between the frame (42) and the sleeve tube (50).

**[0012]** According to the above-mentioned structure, the sleeve tubes (50) are sleeved in the concave slots (45), (46) formed at the four corners of the frame (42) of the partition plate (40) so as to be enclosed by the frame (42), so the outer appearance thereof is formed with no welding mark while being processed with the ultrasonic welding operation, thereby providing an excellent combining stability, and no welding agent is required during the assembly process, the adopted ultrasonic welding operation enables the whole operation to be simplified and the technical level and experience of an operator has no affection regarding to the assembly quality, thus the combining quality can be stably maintained and enhanced, therefore the present invention is able to solve the disadvantages such as the unattractive welding marks being formed when the conventional welding means being adopted and the whole operation being inconvenient. Accordingly, the present invention is novel and more practical in use comparing to prior art.

**[0013]** Based on what has been disclosed above, the structural design for assembling the frame of the partition plate of the storage rack and the sleeve tube utilizes the concave slots formed at the four corners of the top and the bottom folding sheets of the frame to be served to

allow the sleeve tube to be sleeved therein, and the plural convex pieces formed at the inner edges of the concave slots or the ribs formed at the outer periphery of the sleeve tube are welded with the ultrasonic welding means, thereby allowing the operation to be simplified and providing a stably combining effect to the sleeve tube and the frame, so disadvantages such as the welding marks are formed when the conventional welding means is adopted and other relevant issues can be solved. Accordingly, the present invention is novel and more practical in use comparing to prior art.

**[0014]** Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the inventions are not to be limited to the specific examples of the embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

## Claims

1. An improved frame of a partition plate of a storage rack, the storage rack being composed of at least four vertical posts and a plurality of plastic sleeve members being assembled with a plurality of partition plates, each of the plural partition plates being composed of a carrying surface and a plate-like frame, four corners of the frame of the partition plate being respectively installed with a sleeve tube for being sleeved on each of the vertical posts through each of the plastic sleeve members, and **characterized in that**:

   the top edge and the bottom edge of the frame of the partition plate being respectively folded for forming a horizontal folding sheet having a predetermined width, four corners defined on the top and the bottom folding sheets of the frame being respectively formed with a concave slot allowing each of the sleeve tubes to be sleeved therein, and the concave slots formed at the four corners of the top and the bottom folding sheets of the frame being matched with the conical status of the sleeve tube which having a narrower top and a wider bottom, thus the dimension of the concave slot of the top folding sheet being slightly smaller than the dimension of the concave slot of the bottom folding sheet, so each of the sleeve tubes being able to be sleeved in the concave slots formed at the four corners of the frame, and an ultrasonic welding operation being processed for combing each of the sleeve tubes and the frame.

2. The improved frame of the partition plate of the storage rack as claimed in claim 1, wherein slot edges of the concave slots formed at the four corners defined on the top and the bottom folding sheets of the frame of the partition plate are formed with a plurality of convex pieces for being in contact and welded with the outer circumference of the sleeve tube.

3. The improved frame of the partition plate of the storage rack as claimed in claim 1, wherein the outer circumference of the sleeve tube is formed with a plurality of ribs, so when each of the sleeve tubes is sleeved in the concave slots formed at the four corners defined on the top and the bottom folding sheets of the frame of the partition plate, slot walls of the concave slots and the ribs are able to be mutually welded.

4. The improved frame of the partition plate of the storage rack as claimed in claim 1, wherein slot edges of the concave slots formed at the four corners defined on the top and the bottom folding sheets of the frame of the partition plate are formed with a plurality of convex pieces, the outer circumference of the sleeve tube is formed with a plurality of ribs, the convex pieces of the concave slots and the ribs of the sleeve tube are staggeringly arranged, so when each of the sleeve tubes is sleeved in the concave slots formed at the four corners defined on the top and the bottom folding sheets of the frame of the partition plate, the convex pieces and the ribs allow each of the sleeve tubes and the slot walls of the concave slots to be mutually welded and combined.

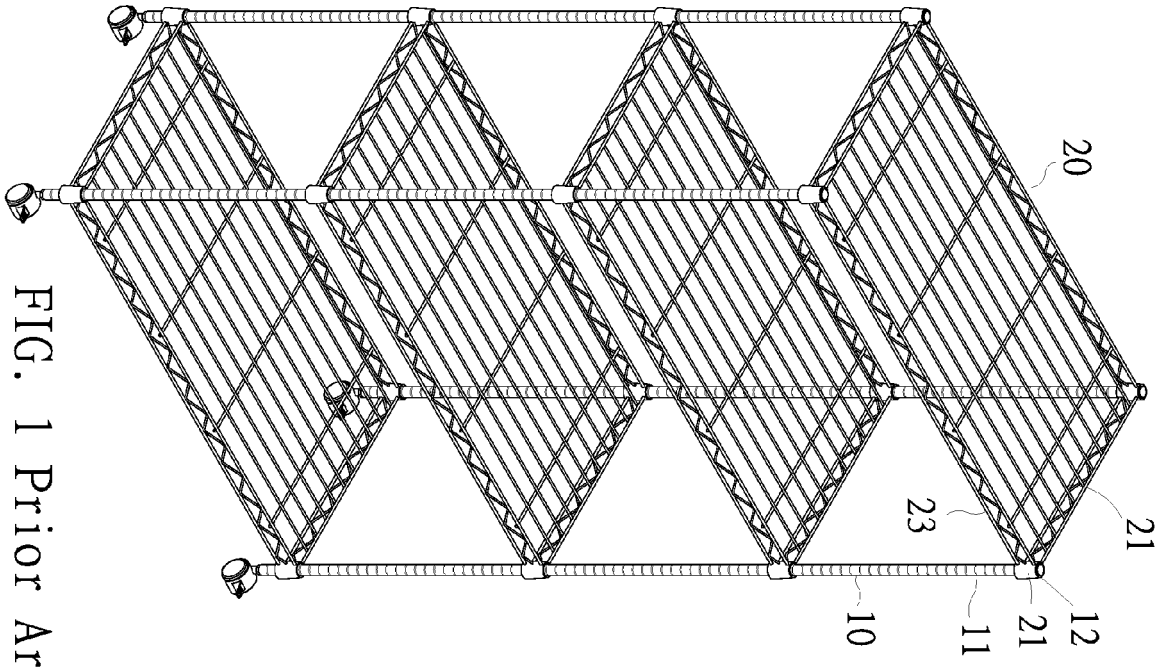



FIG. 1 Prior Art

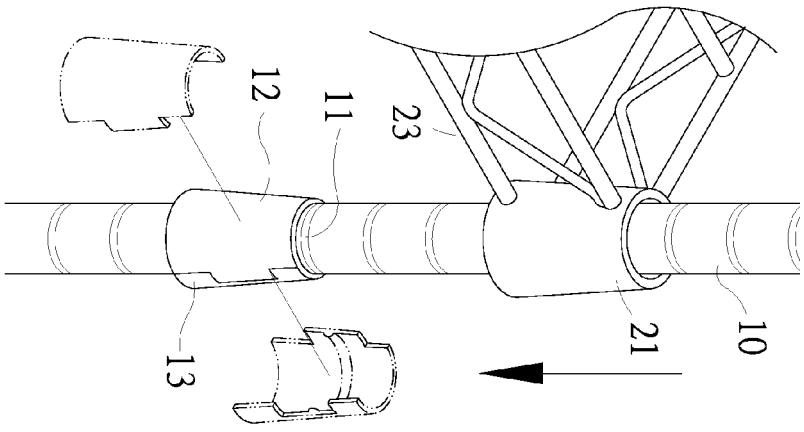
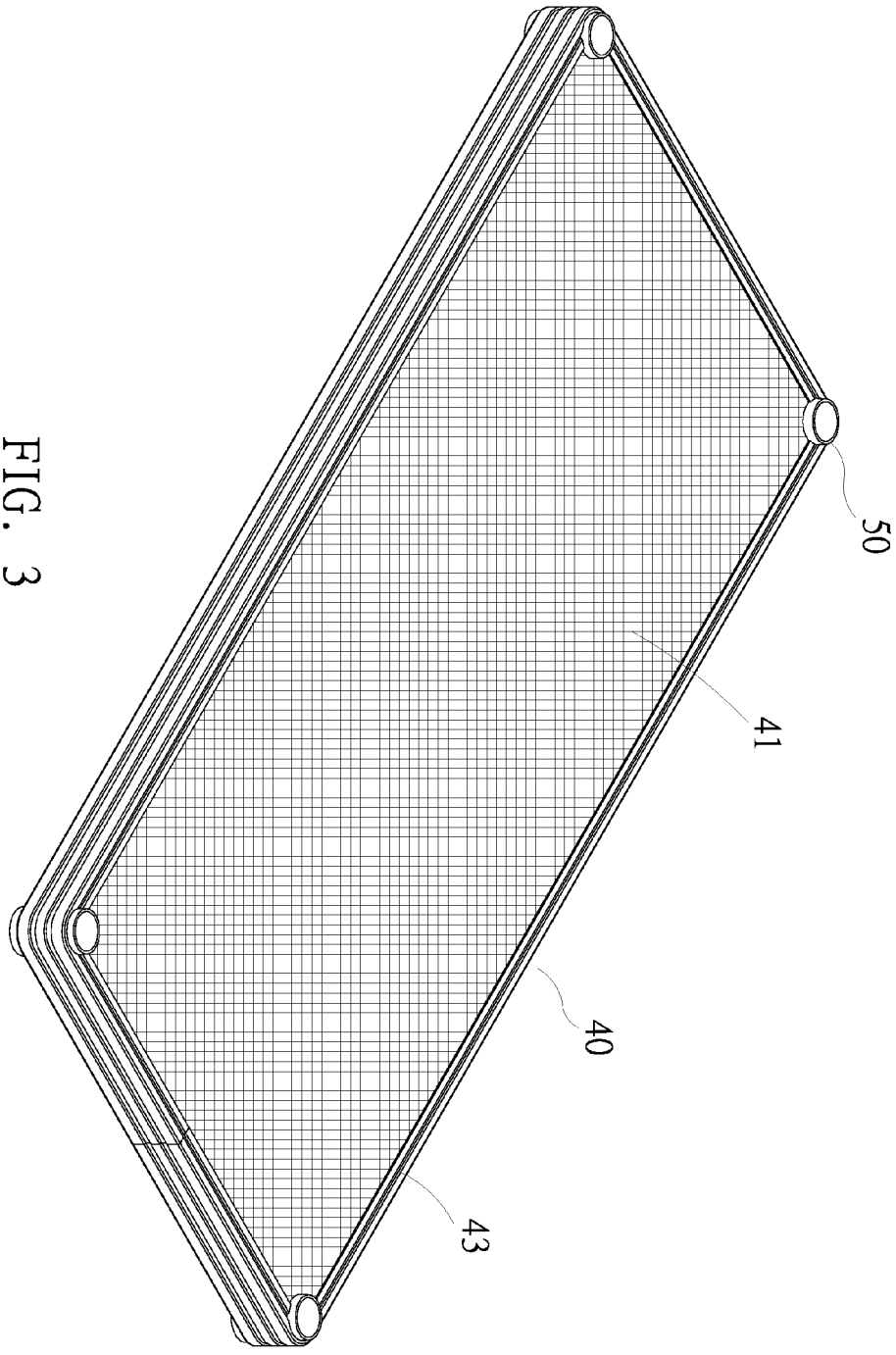



FIG. 2 Prior Art

FIG. 3



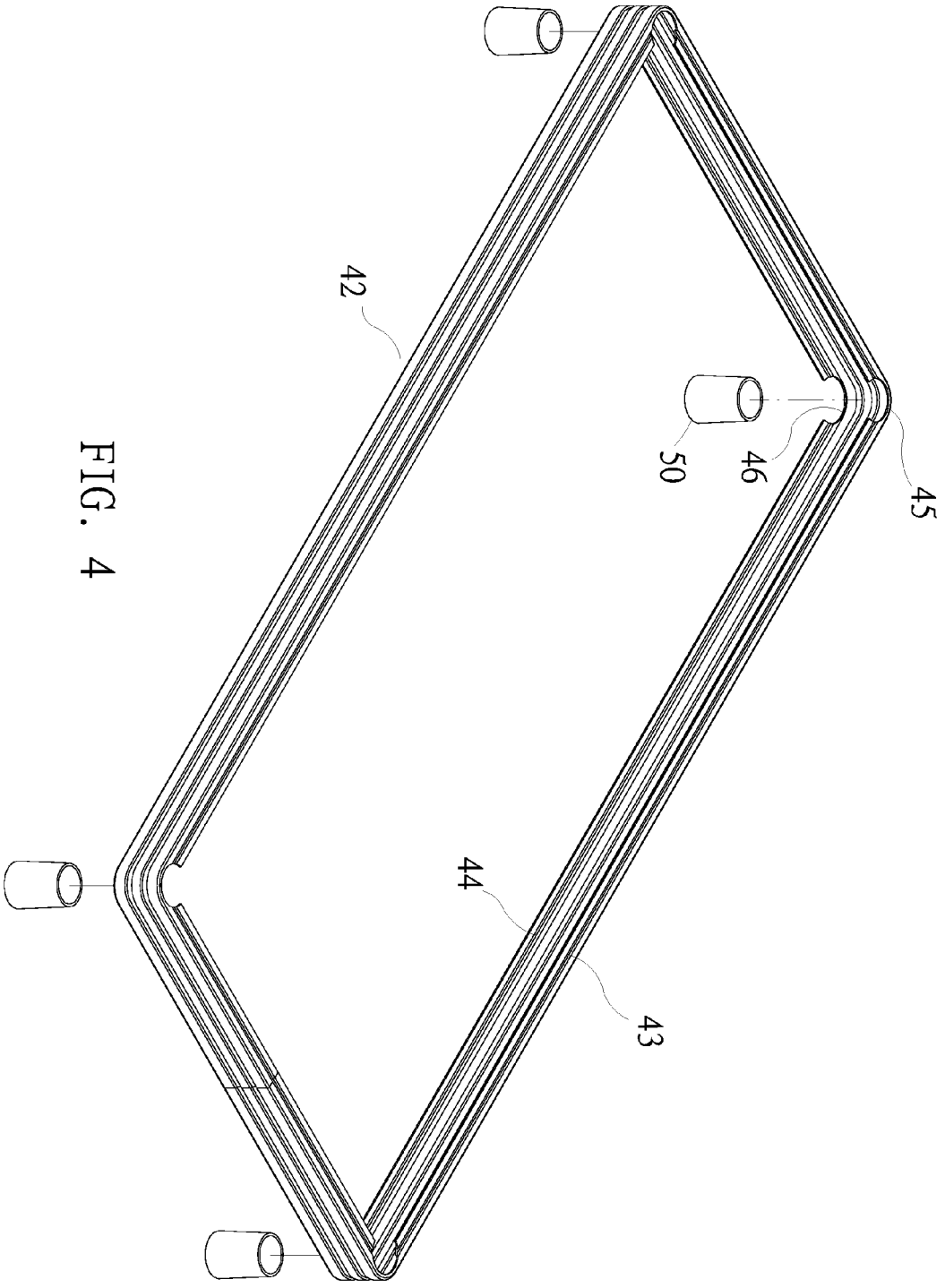



FIG. 4

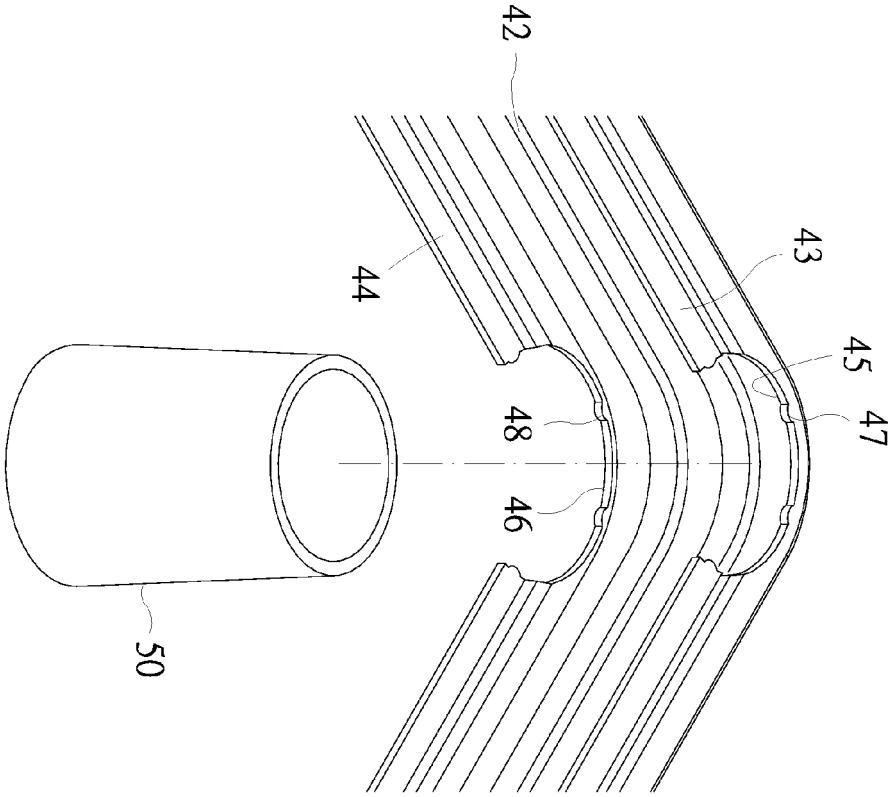



FIG. 5

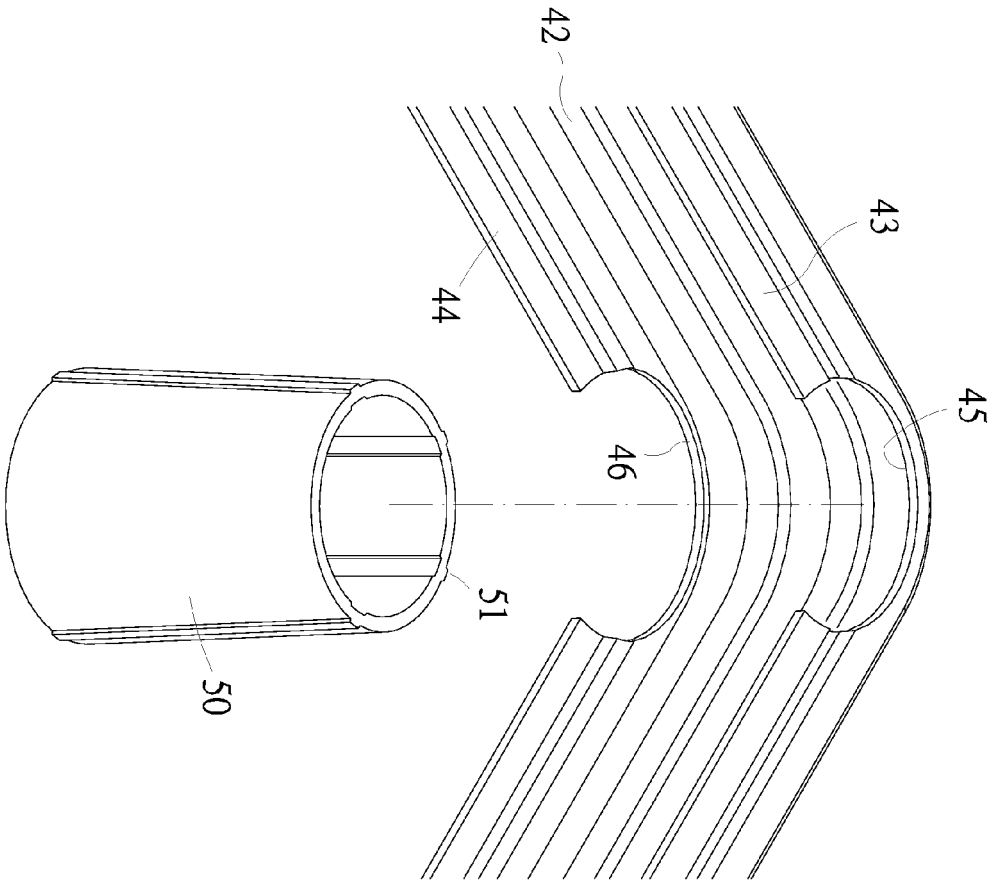



FIG. 6

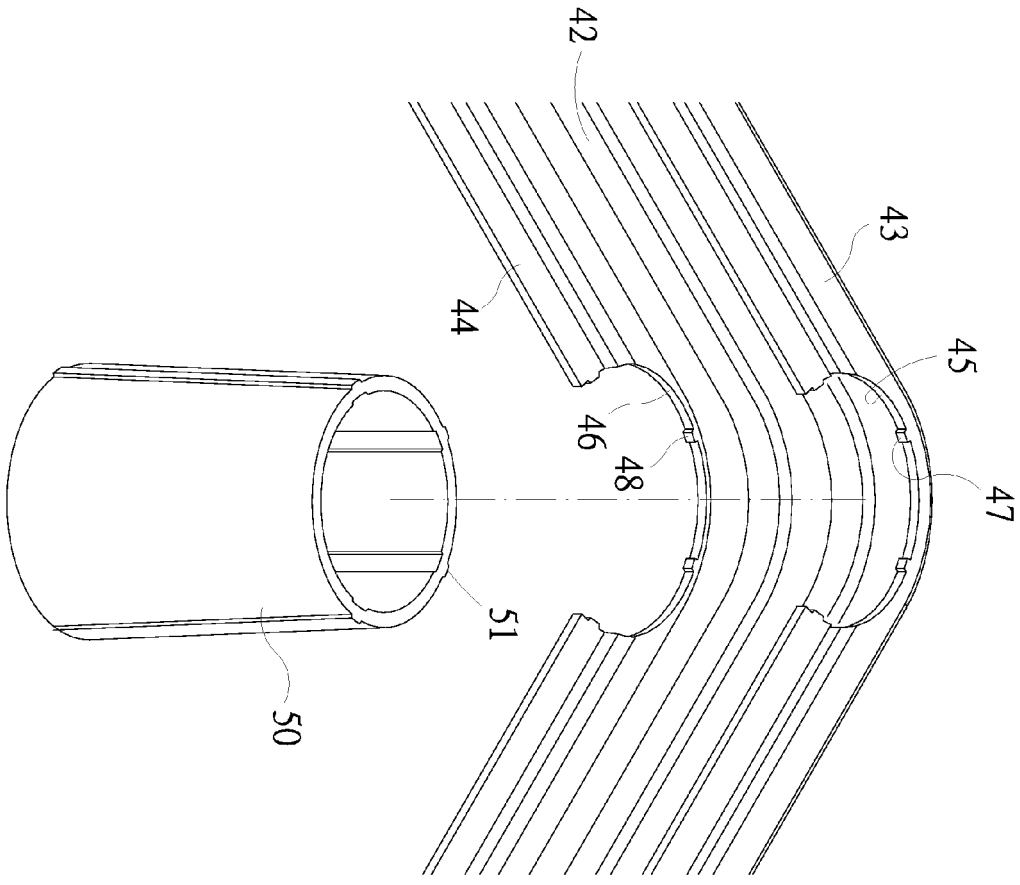



FIG. 7

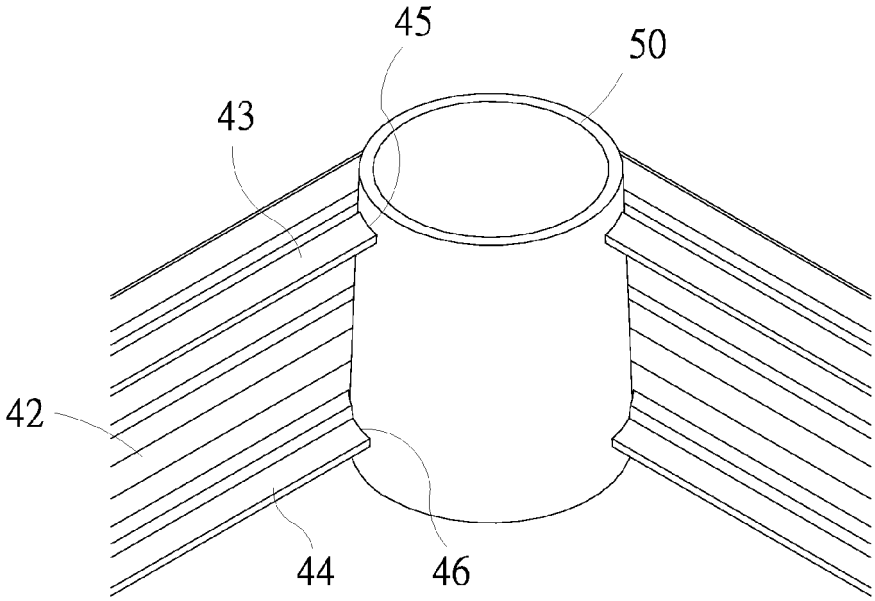



FIG. 8

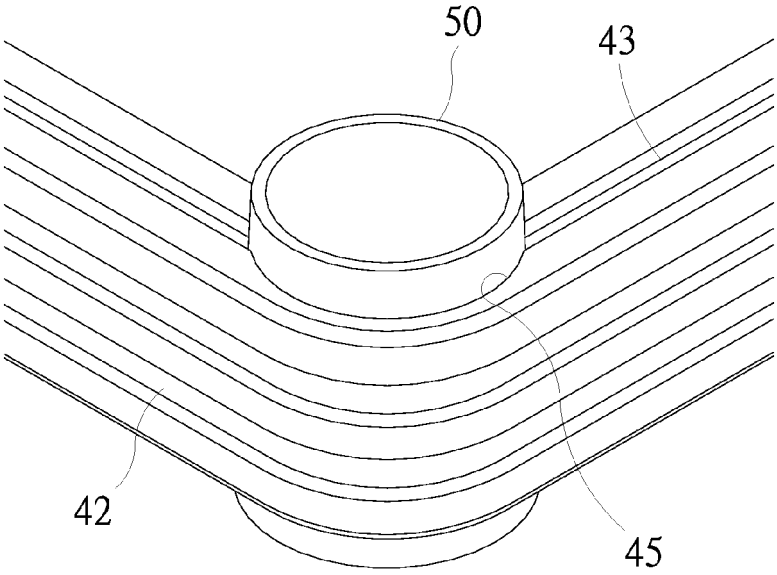



FIG. 9

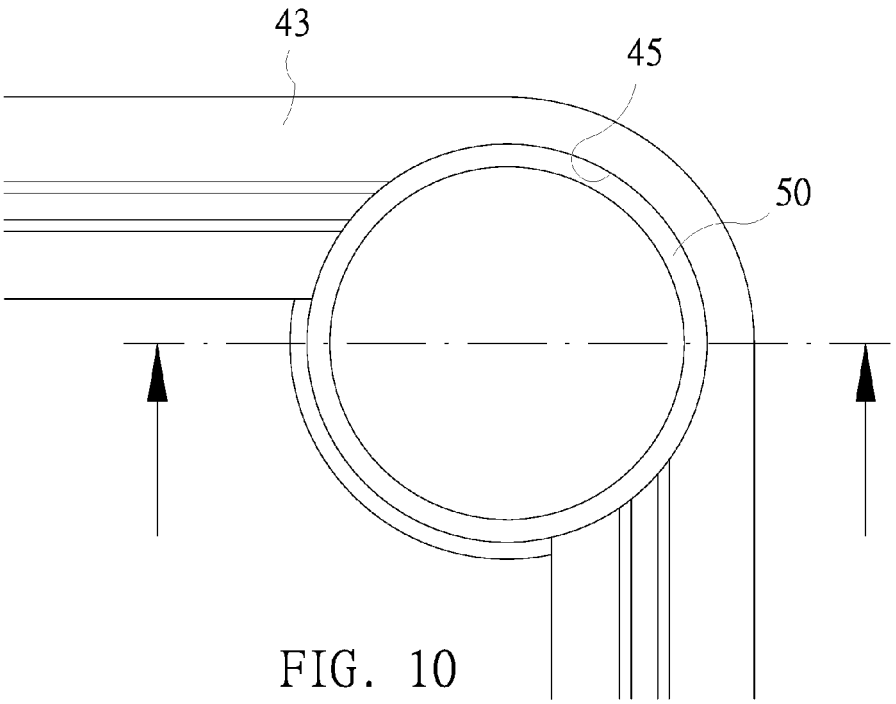



FIG. 10

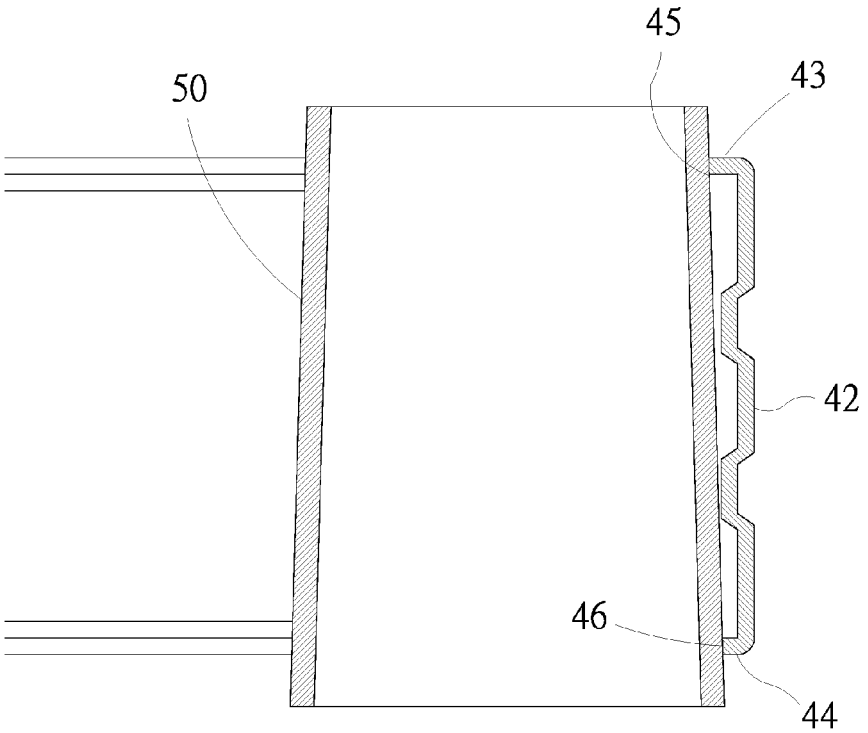



FIG. 11

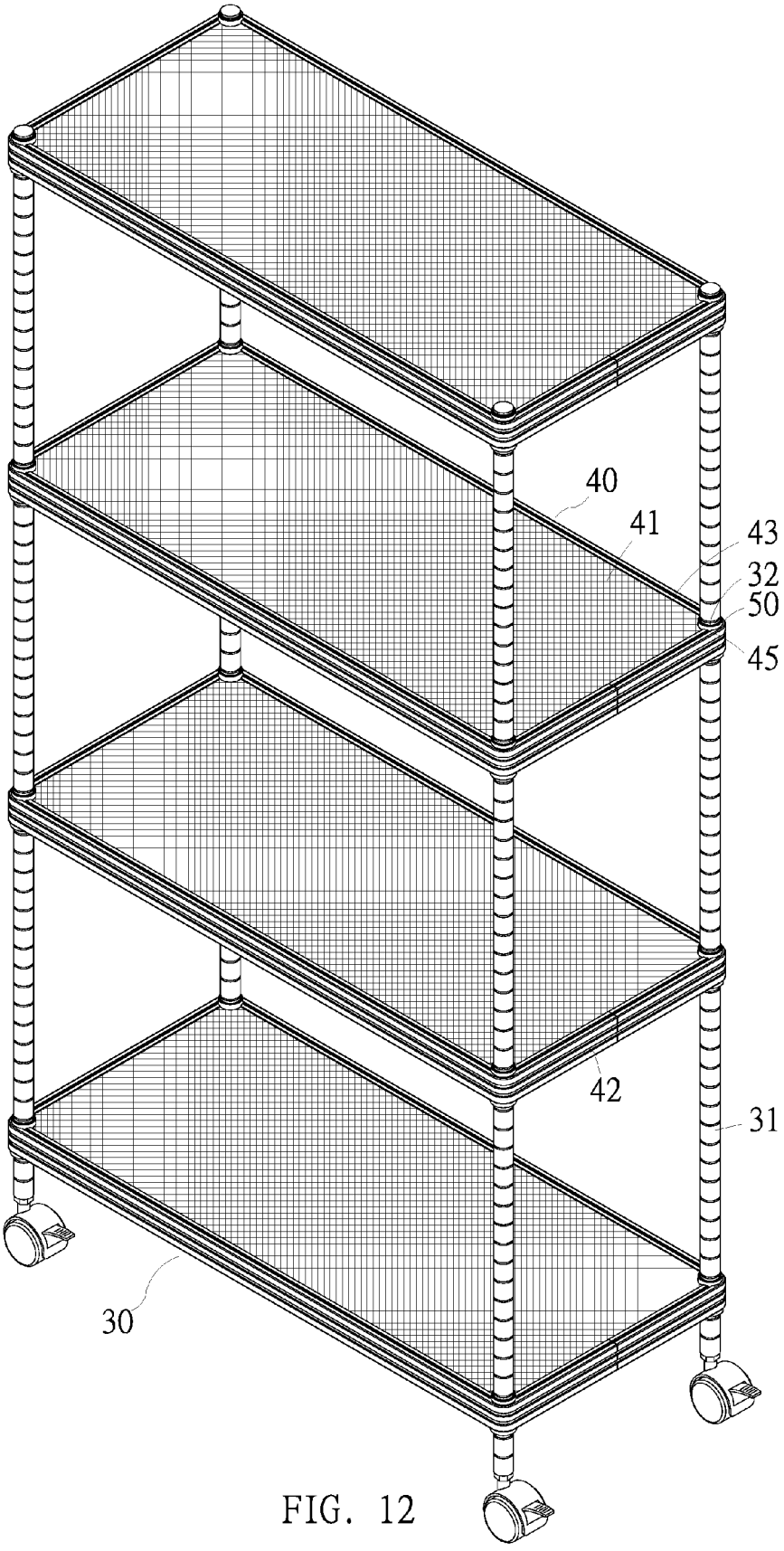



FIG. 12

Europäisches Patentamt
European Patent Office
Office européen des brevets

# EUROPEAN SEARCH REPORT

Application Number
EP 15 16 3066

## 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 6 848 659 B1 (LIU GEORGE C M [TW])<br>1 February 2005 (2005-02-01) | 1 | INV.<br>A47B47/00 |
| A | * column 1, line 51 - column 2, line 49; figures 1-3 * | 2-4 | |
| A | US 4 138 953 A (TASHMAN PHILIP)<br>13 February 1979 (1979-02-13)<br>* column 1, line 1 - column 4, line 22; figures 1-8 * | 1-4 | |

TECHNICAL FIELDS SEARCHED (IPC)

A47B

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 24 September 2015 | Kohler, Pierre |

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

EPO FORM 1503 03.82 (P04C01)

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 16 3066

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

24-09-2015

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 6848659 B1 | 01-02-2005 | TW M240135 U | 11-08-2004 |
| | | US 6848659 B1 | 01-02-2005 |
| US 4138953 A | 13-02-1979 | NONE | |

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82