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(54) **BOX WITH LATERAL COLLAPSIBLE WALLS**

KASTEN MIT LATERAL ZUSAMMENLEGBAREN WÄNDEN

BOÎTE À PAROIS LATÉRALES PLIABLES

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(73) Proprietor: **Tontarelli, Sergio**
60022 Castelfidardo (AN) (IT)

(72) Inventor: **Tontarelli, Sergio**
60022 Castelfidardo (AN) (IT)

(74) Representative: **Baldi, Claudio**
Ing. Claudio Baldi s.r.l.
Viale Cavallotti 13
P.O. Box 187
60035 Jesi (AN) (IT)

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Description

[0001] The present patent application relates to a plastic moulded box, according to the preamble of claim 1, with parallelepiped structure and rectangular base provided with lateral collapsible walls, in which the two longitudinal walls are higher than half of the width of the transversal walls.

[0002] For space reasons plastic moulded box with parallelepiped structure provided with collapsible walls are largely used, in which the collapsible walls are hinged to the perimeter borders of the bottom wall and designed to be alternatively brought from vertical operative position to horizontal idle position (forming a compact pile) against the bottom wall of the box.

[0003] Normally, the walls of this type are collapsed according to a sequence of operations in which the transversal walls are collapsed first, until they touch the upper side of the bottom wall of the box, and then the longitudinal walls are collapsed until they touch the external side of the transversal walls.

[0004] For a long time the said boxes have been provided with longitudinal walls slightly shorter than the width of the transversal walls.

[0005] Because of this, once they are brought in idle position, the two longitudinal walls lay on the same horizontal plane, thus giving the box a perfectly regular shape that is especially useful during packaging and stacking with similar boxes.

[0006] More recently, a different solution has been devised to provide this type of boxes with four walls higher than the width of the transversal walls.

[0007] To that end, the two longitudinal walls of the box had to be perfectly aligned on the same horizontal plane, once they are collapsed in idle position.

[0008] This was done in spite of the mutual interference of the top of the longitudinal walls caused by the fact that the longitudinal walls are higher than half of the width of the transversal walls.

[0009] In view of the above, boxes with collapsible walls have been provided with longitudinal walls having crenellated longitudinal top profiles designed to match exactly by mutual penetration when the box is collapsed in compact position.

[0010] It is worthless saying that the height of the crenellated profile of each longitudinal wall is the difference between the total height of the longitudinal wall and half of the width of the transversal walls of the box.

[0011] Nevertheless, the said solution has not proved to be fully satisfactory, not only because of the fact that the presence of the two crenellated top profiles is rather anti-aesthetic and reduces the lateral loading capacity of the box, but also because of the lower rigidity of the two longitudinal walls in the crenellated longitudinal areas.

[0012] EP 0 785 140 discloses a folding container, corresponding to the features of the preamble of claim 1, with four vertical side walls that are hinged to a base plate, each side wall being able to pivot inwardly into a horizontal position.

[0013] The specific purpose of the present invention is to devise a box with collapsible walls, in which the longitudinal walls (same as the transversal ones) are higher than half of the width of the transversal walls, without affecting the structural continuity of the longitudinal walls and without reducing the general rigidity of the walls. Said purpose is achieved as disclosed in the characterizing portion of claim 1.

[0014] The inventive idea that has permitted to achieve the aforementioned purposes consists in providing the top of the two longitudinal walls of the box of the invention with a longitudinal shaped band with basically sinusoidal section.

[0015] Preferably, the height of the shaped bands is the dimensional difference between the total height of each longitudinal wall and half of the transversal walls of the box.

[0016] It must be noted that, although having a profile with similar shape, the two shaped bands of the longitudinal walls do not have the same dimensions.

[0017] This fact is of crucial importance to permit perfect alignment of the two longitudinal walls (on the same horizontal plane) when they are both collapsed in horizontal position against the bottom wall of the box.

[0018] In this phase, the longitudinal wall with the smaller shaped band is collapsed first in horizontal position, in such a way that the external side of the band is positioned upwards.

[0019] Then, the second longitudinal wall is collapsed, ensuring that the internal side of the shaped band is exactly overlapped (completely embracing it) on the corresponding external side of the shaped band of the first wall.

[0020] In other words, the two longitudinal walls are maintained on the same horizontal plane by means of the male-female coupling of the shaped bands.

[0021] For purposes of clarity, the description of the invention continues with reference to the enclosed drawings, which are intended for purposes of illustration only and not in a limiting sense, whereby:

- figure 1 is a partial axonometric view of the box with the two longitudinal walls in vertical position and the two transversal walls in collapsed position;
- figure 2 is identical to fig. 1, except for the fact that only one longitudinal wall is in vertical position;
- figure 3 is a view of the box of the invention in idle position after all lateral walls have been collapsed.

[0022] With reference to the aforementioned figures, the invention consists in a plastic moulded box with parallelepiped structure (1) of the type provided with lateral walls designed to be collapsed on the bottom wall (2), being hinged to corresponding perimeter borders of the bottom wall (2).

[0023] In the box (1) of the invention, the two longitudinal walls (3, 4) and the two transversal walls (5) are higher than half of the width of the transversal walls (5).

[0024] Both longitudinal walls (3, 4) are provided on top with corresponding longitudinal shaped bands (31, 41) with basically sinusoidal profile, each of them being bordered by a lower groove (31 a, 41 a).

[0025] The box-shaped band (31) obtained on top of the first longitudinal wall (3) - that is to say the wall designed to be collapsed first - has a slightly lower height and length than the box-shaped band (41) of the second longitudinal wall (4).

[0026] Because of this, the external side of the box-shaped band (31) of the first longitudinal wall (3) is exactly engaged (by means of male-female coupling) into the internal side of the corresponding shaped band (41) of the second longitudinal wall (4), when the second longitudinal wall (4) is collapsed in horizontal position on the first longitudinal wall (3).

[0027] Additional solutions have been necessary in order to guarantee that the two longitudinal walls (3, 4) are perfectly aligned on the same horizontal plane when they are collapsed in idle position.

[0028] The first longitudinal wall (3) is laterally bordered by two stiffening edges (32) obtained on the vertical borders, but not for the entire height; in fact, the upper end of each edge (32) is positioned at about half of the height of the longitudinal rib (31 a) provided in lower position on the top box-shaped band (31).

[0029] The lateral ends of the box-shaped band (31) are closed for their entire height by corresponding partitions (33) provided with cylindrical pins (33a) on top and towards the inside of the box.

[0030] It must be noted that, although having the same vertical direction, each partition (33) occupies a more internal position than the adjacent stiffening edge (32); it being also provided that a transversal notch (34) is obtained in intermediate position between them, ending into a circular hole (35) on the surface of the longitudinal wall (3).

[0031] As shown in the enclosed figures, the two lateral notches (34) of the first longitudinal wall (3) are perfectly aligned with the rib (31 a) that borders in lower position the box-shaped band (31).

[0032] The function of the cylindrical pins (33a) provided on top and at the two ends of the box-shaped band (31) is to be exactly engaged - when the entire first longitudinal wall (3) is collapsed in horizontal position on the previously collapsed transversal walls (5) - into corresponding holes with vertical axis (50) suitably provided above the two short raised sections (51) where the transversal walls (5) are pivoted.

[0033] The second transversal wall (4) is provided with stiffening edges (42) on the vertical borders.

[0034] The edges (42) extend for the entire height of the vertical borders, so that they are joined on top with very short edges (43) with identical height obtained at the two ends of the upper horizontal border of the shaped band (41) of the second longitudinal wall (40).

[0035] The short edges (43) are joined on the opposite side, with the interposition of corresponding cylindrical pins (43a), with the ends of a longitudinal rib (44) that protrudes from the upper horizontal border of the shaped band (41) of the second longitudinal wall (4).

[0036] A vertical niche (45) with concavity towards the inside of the box (1) is provided in intermediate position between each longitudinal end of the shaped band (41) and the opposite section of the stiffening edge (42).

[0037] The internal cavity of each niche (45) is exactly compatible with the shape and dimensions of each partition (33) provided at the ends of the box-shaped band (31) of the first longitudinal wall (3).

[0038] When the second longitudinal wall (4) is collapsed in horizontal position on the first longitudinal wall (3), other consequences are simultaneously produced, in addition to the aforementioned coupling between the shaped bands (31, 41).

[0039] In particular, the longitudinal rib (44) provided on top of the box-shaped band (41) of the second longitudinal wall (4) is exactly engaged into the corresponding groove (31 a) provided at the base of the shaped band (31) of the first longitudinal wall (3).

[0040] Simultaneously, the short edges (43) provided at the ends of the upper horizontal border of the second longitudinal wall (4) are exactly engaged into corresponding notches (34) obtained on the two vertical borders of the first longitudinal wall (3), thus favouring the engagement of the cylindrical pins (43a) of the second longitudinal wall (4) into corresponding holes (35) on the first longitudinal wall (3).

[0041] The niches (45) provided at the sides of the box-shaped band (41) of the second longitudinal wall (4) are exactly lowered onto the partitions (33) provided at the sides of the shaped band (31) of the first longitudinal wall (3).

[0042] Following the said matching, the stiffening edge (42) provided on each side of the second longitudinal wall (4) is brought in perfect alignment with the corresponding stiffening edge (32) of the first longitudinal wall (3).

Claims

1. Plastic moulded box with collapsible lateral walls, of the type in which the longitudinal walls (3, 4) are higher than half of the width of the transversal walls (5), **wherein** the two longitudinal walls (3, 4) are provided on top with shaped longitudinal bands (31, 41) with identical section and different dimensions, so that the internal side of the box-shaped band (41) of the second longitudinal wall (4) is exactly overlapped, receiving it completely, on the external side of the shaped band (31) of the first longitudinal wall (3) when both walls (3, 4) are collapsed in a sequence in horizontal idle position parallel to the bottom wall (2) of the box (1),
said band (41) of the second longitudinal wall having a longitudinal rib (44) protruding from the upper hor-

izontal border, able to engage into a longitudinal groove (31a) provided at the base of the shaped band (31) of the first wall (3), **characterised in that** said first longitudinal wall (3) being laterally bordered by two stiffening edges (32) obtained on the vertical borders, but not for the entire height thereof,
the lateral ends of the box-shaped band (31) of the first lateral wall being closed by corresponding partitions (33), occupying a more internal position than the adjacent stiffening edge (32),
a transversal notch (34) being obtained in intermediate position between the stiffening edge (32) and the partition (33), said transversal notch (34) ending into a circular hole (35) on the surface of the first longitudinal wall (3),
the second longitudinal wall (4) being provided with stiffening edges (42) on the vertical borders extending for the entire height of the vertical borders, said stiffening edges (42) being joined on top with very short edges (43) with identical height obtained at the two ends of the upper horizontal border of the shaped band (41) of the second longitudinal wall (40),
the short edges (43) being joined on the opposite side, with the interposition of corresponding cylindrical pins (43a), with the ends of said longitudinal rib (44) that protrudes from the upper horizontal border of the shaped band (41) of the second longitudinal wall (4),
so that, when the second longitudinal wall (4) is collapsed on the first longitudinal wall (3):

- the rib (44) is exactly engaged into the corresponding longitudinal groove (31a) provided at the base of the shaped band (31) of the first wall (3).
- the lateral short edges (43) are exactly engaged into the corresponding transversal notches (34) provided on the vertical borders of the first wall (3),
- the cylindrical pins (43a) are exactly engaged into the corresponding holes (35) obtained on the first longitudinal wall (3) in internal position in each notch (34), and
- the stiffening edge (42) of the second longitudinal wall (4) is brought in perfect alignment with the corresponding stiffening edge (32) of the first longitudinal wall (3).

2. Plastic moulded box as claimed in claim 1, **characterised in that** the longitudinal shaped bands (31, 41) of the two longitudinal walls (3, 4) have a basically sinusoidal section.

3. Plastic moulded box as claimed in one or more of the above claims, **characterised in that** the second longitudinal wall (4) is provided at the two sides of the box-shaped band (41) with corresponding niches (45) with vertical direction and concavity towards the inside of the box (1) bordered on the external side by **said** stiffening edges (42) provided on both the vertical borders of the second longitudinal wall (4); it being provided that, when the internal side of the second longitudinal wall (4) touches the external side of the first longitudinal wall (3), the niches (45) are exactly overlapped, embracing them completely, on **said** corresponding partitions (33) provided at the two ends of the shaped band (31) of the first longitudinal wall (3).

4. Plastic moulded box as claimed in one or more of the above claims, **characterised in that** the top border of the box-shaped band (31) of the first longitudinal wall (3) is provided at the two ends with cylindrical pins (33a) facing the inside of the box (1), designed to be exactly engaged, when the entire first longitudinal wall (3) is collapsed in horizontal position on the previously collapsed transversal walls (5), into corresponding holes with vertical axis (50) suitably obtained above the two short raised edges (51) where the transversal walls (5) are pivoted.

Patentansprüche

1. Aus Kunststoff geformte Schublade mit klappbaren Seitenwänden des Typs, bei dem die Höhe der Längswände (3,4) größer ist als die die Hälfte der Breite der Querwände (5),
wobei beide Längswände (3,4) an der Oberseite jeweils kastenförmige Längsbänder (31,41) aufweisen, die ein Querschnittprofil gleicher Form, aber unterschiedlicher Größe besitzen, so dass die Innenseite des kastenförmigen Längsbandes (41) der zweiten Längswand (4) in der Lage ist, sich exakt über die Außenseite des kastenförmigen Bandes (31) der ersten Längswand (3) zu legen und diese vollkommen in ihrem Innern aufzunehmen, wenn beide Wände (3,4) hintereinander in ihre nicht betriebsbereite, waagrechte Lage parallel zur Bodenwand (2) der Schublade (1) gebracht werden.
wobei das Band (41) der zweiten Längswand eine Längsrippe (44) besitzt, die am oberen, waagrechten Rand übersteht und dazu dient, in eine Längsrille (31 a) einzugreifen, die auf der Basis des kastenförmigen Bandes (31) der ersten Wand (3) vorgesehen ist,
dadurch gekennzeichnet, dass
die erste Seitenwand (3) seitlich durch zwei Verstärkungsborde (32) begrenzt wird, die auf den senkrechten Rändern - allerdings nicht über die gesamte Länge derselben - herausgearbeitet sind,
wobei die seitlichen Enden des kastenförmigen Bandes (31) der ersten Seitenwand mit entsprechenden Trennwänden (33) abgedichtet sind, die - bezogen auf die anliegenden Verstärkungsborde (32) - weiter innen angeordnet sind,

wobei eine Querkerbe (34) in einer Position zwischen dem Verstärkungsbord (32) und der Trennwand (33) herausgearbeitet ist und in einem Rundloch (35) auf der Oberfläche der ersten Längswand (3) endet,
wobei die zweite Längswand (4) mit Verstärkungsborden (42) auf den senkrechten Rändern versehen ist, die sich über die gesamte Länge der senkrechten Ränder erstrecken, wobei die Verstärkungsborde (42) an der Oberseite mit kurzen Borden (43) gleicher Höhe verbunden sind, die an den beiden Enden des oberen, waagrechten Randes des kastenförmigen Bandes (41) der zweiten Längswand (40) herausgearbeitet sind,
wobei die kurzen Borde (43) auf der gegenüberliegenden Seite durch Einlegen entsprechender zylindrischer Stifte (43a) mit den Enden der Längsrippen (44) verbunden sind, die am oberen waagrechten Rand des kastenförmigen Bandes (41) der zweiten Längswand (4) überstehen.
so dass beim Herablassen der zweiten Längswand (4) auf die erste Längswand (3):

- die Längsrippe (44) exakt in die entsprechende Längsrille (31 a) eingreift, die auf der Basis des kastenförmigen Bandes (31) der ersten Wand (3) vorgesehen ist,
- die kurzen Seitenborde (43) exakt in die entsprechenden Querkerben (34) eingreifen, die auf den vertikalen Rändern der ersten Wand (3) vorgesehen sind,
- die zylindrischen Stifte (43a) exakt in die entsprechenden Löcher (35) eingreifen, die auf der ersten Längswand (3) im Inneren einer jeden Kerbe (34) herausgearbeitet sind und
- die Verstärkungsrippe (42) der zweiten Längswand (4) perfekt auf das entsprechende Verstärkungsbord (32) der ersten Längswand (3) ausgerichtet ist.

2. Aus Kunststoff geformte Schublade gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die geformten Längsbänder (31,41) der beiden Längswände (3,4) ein im Wesentlichen S-förmiges Querschnittprofil besitzen.

3. Aus Kunststoff geformte Schublade gemäß einem oder mehreren der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die zweite Längswand (4) an den beiden Seiten der entsprechenden kastenförmigen Bänder (41) mit ebenso vielen, vertikal angeordneten und der konkaven Seite zum Innern der Schublade ausgerichteten Nischen (45) ausgestattet ist, die auf der Außenseite von den Verstärkungsborden (42) begrenzt werden, die an beiden senkrechten Rändern der zweiten Längswand (4) vorgesehen sind, wobei vorgesehen ist, dass die Nischen (45) beim Anschlagen der Innenseite der zweiten Längswand (4) gegen die Außenseite der ersten Längswand (3) exakt übereinander zu liegen kommen und dabei die entsprechenden Zwischenwände (33), die an den beiden Enden des kastenförmigen Bandes (31) derselben ersten Längswand (3) vorgesehen sind, in ihrem Innern versenkbar aufnehmen.

4. Aus Kunststoff geformte Schublade gemäß einem oder mehreren der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der obere Rand des kastenförmigen Bandes (31) der ersten Längswand (3) an den beiden Enden jeweils zylindrische Schubdübel (33a) aufweist, die ins Innere der Schublade (1) gerichtet und in der Lage sind, in dem Moment, in dem die gesamte erste Längswand (3) in eine waagrechte Lage oberhalb der zuvor herunter geklappten Querwände (5) gebracht wird, in entsprechende Löcher mit vertikaler Achse (50) einzurasten, die oberhalb der beiden kurzen, erhöhten Ränder (51) herausgearbeitet wurden, an denen die Querwände (5) schwenkbar gelagert sind.

Revendications

1. Cageot moulé en plastique avec parois latérales rabattables, du type où les parois longitudinales (3, 4) présentent une hauteur majeure de la moitié de la largeur des parois transversales (5),
où les deux parois longitudinales (3, 4) ont à leur sommet des respectives bandes longitudinales façonnées (31, 41), dotées de section identique mais de dimensions différentes, de manière que la bande interne de la bande façonnée (41) de la seconde paroi longitudinale (4) est en mesure de se superposer exactement, en l'accueillant entièrement à son interne, à la bande externe de la bande façonnée (31) de la première paroi longitudinale (3), lorsque les deux dites parois (3, 4) sont menées en succession sur leur position horizontale non opérationnelle, parallèlement à la paroi du fond (2) du cageot (1),
dite bande (41) de la seconde paroi longitudinale ayant une nervure longitudinale (44) débordante du bord horizontal supérieur, apte à s'engager dans une rainure longitudinale (31 a) prévue à la base de la bande façonnée (31) de la première paroi (3),
caractérisé en ce que
la dite première paroi latérale (3) est délimitée latéralement par deux rebords de raidissement (32) réalisés sur les bords verticaux, mais non sur leur entière longueur,
les extrémités latérales de la bande façonnée (31) de la première paroi latérale étant fermées par des cloisons correspondantes (33), qui occupent une position plus interne par rapport aux rebords de raidissement adjacents (32),
une entaille transversale (34) étant réalisée en po-

sition intermède entre le rebord de raidissement (32) et la cloison (33), dite entaille transversale (34) se terminant par un trou circulaire (35) sur la surface de la première paroi longitudinale (3),
la seconde paroi longitudinale (4) étant dotée de rebords de raidissement (42) sur les bords verticaux qui se déploient sur toute la longueur des bords verticaux, dits rebords de raidissement (42) étant reliés au sommet par des petits rebords (43) dont la hauteur est identique, réalisés aux deux extrémités du bord horizontal supérieur de la bande façonnée (41) de la seconde paroi longitudinale (40),
les petits rebords (43) étant reliés sur le côté opposé par l'interposition de pivots cylindriques correspondants (43a), avec les extrémités des dites nervures longitudinales (44) qui débordent du bord horizontal supérieur de la bande façonnée (41) de la seconde paroi longitudinale (4),
de manière que, lorsqu'on fait tomber la seconde paroi longitudinale (4) sur la première paroi longitudinale (3) :

- la nervure (44) s'engage exactement dans la correspondante rainure longitudinale (31 a) prévue à la base de la bande façonnée (31) de la première paroi (3),
- les petits rebords latéraux (43) s'engagent exactement dans les entailles transversales correspondantes (34) prévues sur les bords verticaux de la première paroi (3),
- les pivots cylindriques (43a) s'engagent exactement dans les trous correspondants (35) réalisés sur la première paroi longitudinale (3) en position interne de chaque entaille (34), et
- le rebord de raidissement (42) de la seconde paroi longitudinale (4) se dispose en alignement parfait avec le correspondant rebord de raidissement (32) de la première paroi longitudinale (3).

2. Cageot en plastique selon la revendication 1, **caractérisé en ce que** les dites bandes longitudinales façonnées (31, 41) des deux parois longitudinales (3, 4) présentent un profil dont la section est substantiellement sinusoïdale.

3. Cageot en plastique selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** la seconde paroi longitudinale (4) résulte dotée, sur les deux côtés de la respective bande façonnée (41), d'autant de niches (45) développées en verticale, dont la concavité est tournée vers l'intérieur du cageot (1), qui résultent délimitées sur le côté externe par les dits rebords de raidissement (42) prévus en correspondance des deux bords verticaux de cette seconde paroi longitudinale (4) ; étant prévu que lorsque la bande interne de la seconde paroi longitudinale (4) est disposée en battement contre la face externe de la première paroi longitudinale (3), les dites niches (45) sont en mesure de se superposer exactement, en les accueillant de manière escamotable à leur interne, aux respectives cloisons (33) prévues aux deux extrémités de la bande façonnée (31) de la dite première paroi longitudinale (3).

4. Cageot en plastique selon l'une ou plusieurs des revendications précédentes, **caractérisé en ce que** le bord de sommet de la bande façonnée (31) de la première paroi longitudinale (3) présente aux deux extrémités des pieux cylindriques respectifs (33a) tournés vers l'intérieur du cageot (1), en mesure de se loger exactement, lorsque l'entière première paroi longitudinale (3) est disposée en position horizontale au-dessus des parois transversales (5) précédemment rabattues, dans des trous correspondants ayant axe vertical (50), opportunément réalisés au-dessus des deux petits rebords rehaussés (51) sur lesquels sont pivotées ces dites parois transversales (5).

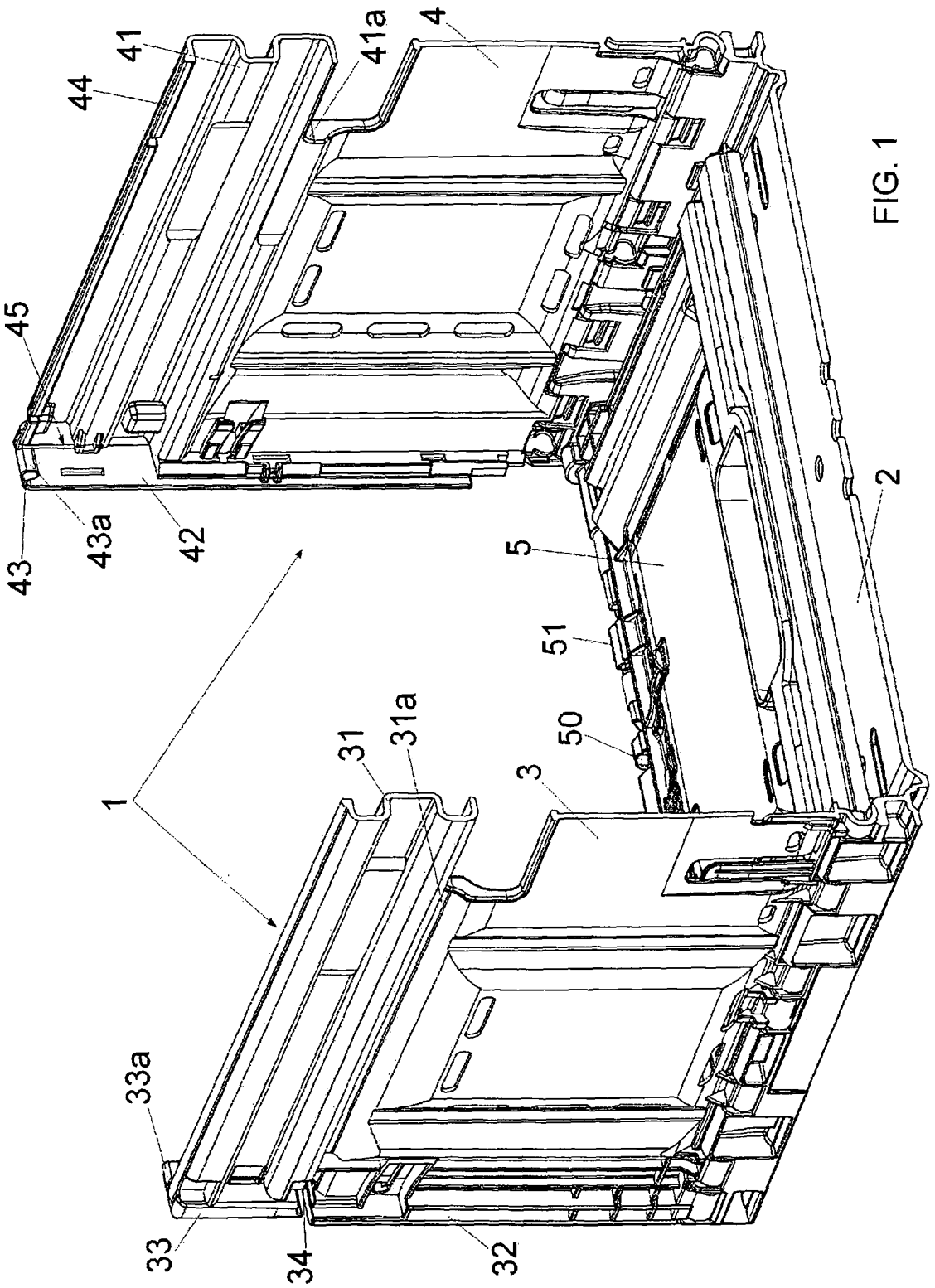

FIG. 1

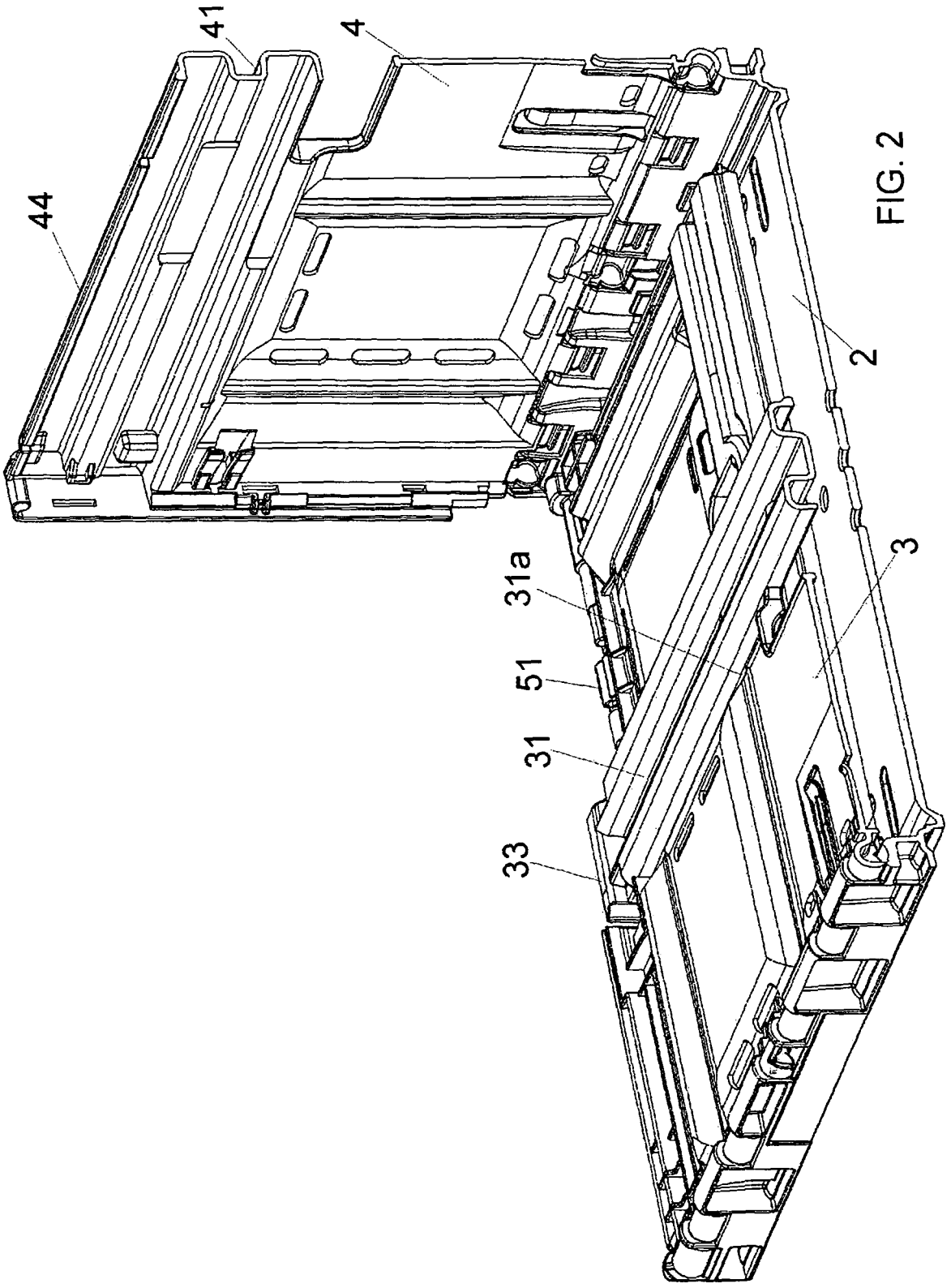

FIG. 2

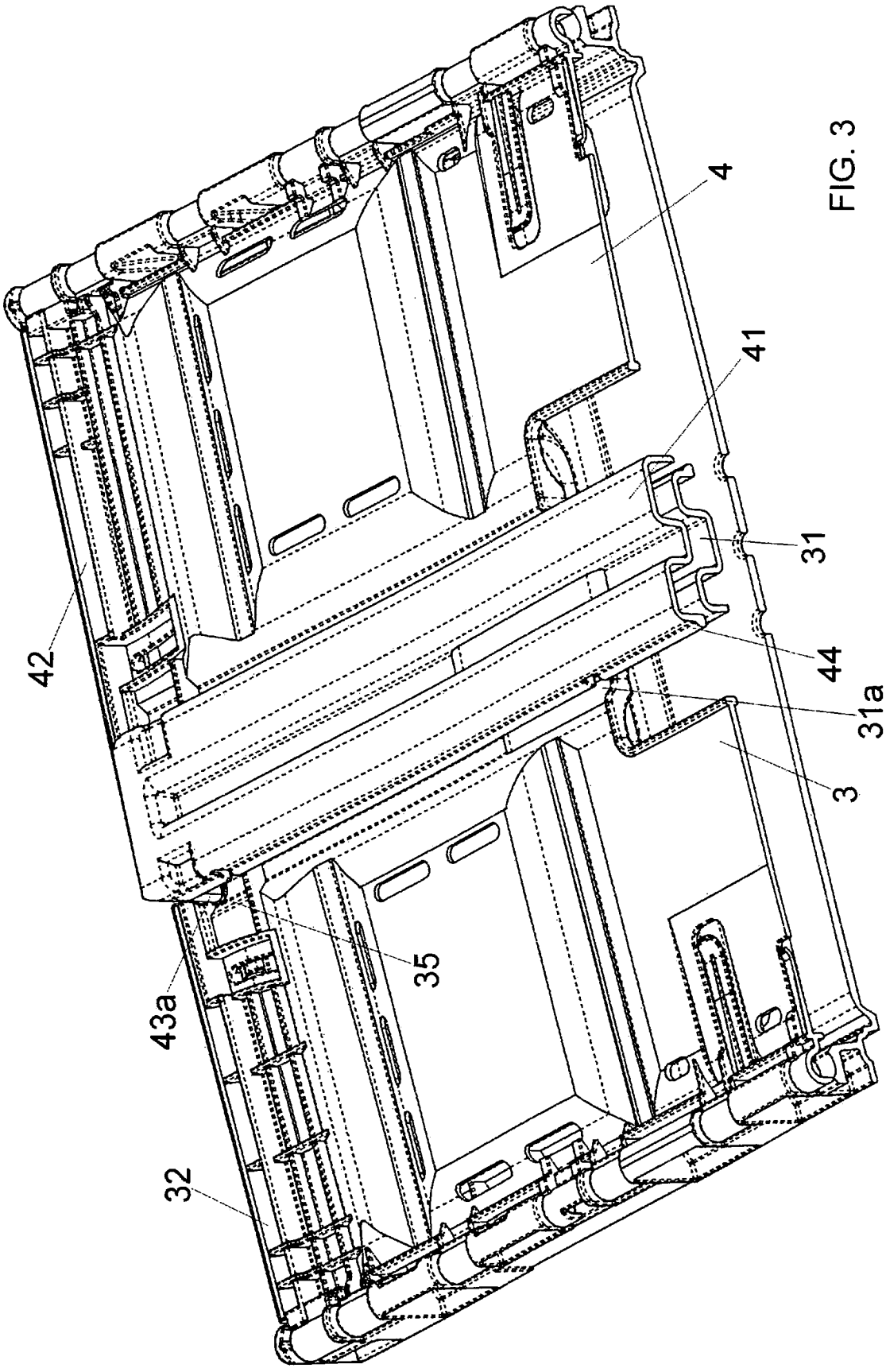

FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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