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(54) **COLLAPSIBLE BOX MOULD**

(57) The invention refers to a box (1) comprising a frame, wherein a number of side panels are provided, which cover the frame on the inner sides and in a position of use enclose an interior space for the receival of goods. The box comprises a bottom frame (10) and a top part formed by four walls (21, 22, 23, 24), which is fastened on the bottom frame. The side panels are provided on the walls. The walls are fastened rotatably on the bottom frame and are moveable between the position of use, wherein the walls extend from the bottom frame and a transport position, wherein the walls are stacked on each other.

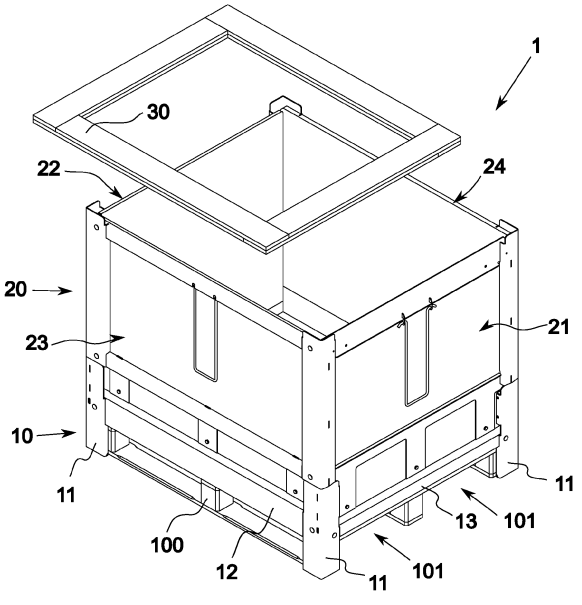

FIG. 1

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(52) Cooperative Patent Classification (CPC): (Cont.)
B65D 2519/00791; B65D 2519/009

Description

[0001] The invention refers to a box comprising a frame, wherein a number of side panels are provided, which cover the frame in the inner sides and in a position of use enclose an interior space for the receival of goods.

[0002] Such a box is known as a box mould, wherein the side panels can form soft goods, such as cheeses. In practice these box moulds are known for the curing of young cheese which is wrapped in foil. It is common to stack the foil cheeses for example 8 layers high with 8 pieces per layer on a pallet. The total mass of the cheese is then 1024 kilos. Because of the foil cheese being very soft and only slightly being kept in shape by the vacuum sealed foil a support is needed, which is referred to as box mould.

[0003] A box mould is for example known from the European patent EP2177442 of the same applicant.

[0004] The known box mould has an innovative construction of a frame and detachable side panels, which completely shield off the interior space. The known box mould can be demounted to a transport position after the unloading of the goods, wherein it takes up less space than in the position of use.

[0005] The present invention aims to provide a box of the kind mentioned in the preamble, which can be put into the transport position in a quicker and easier manner.

[0006] The box according to the invention further comprises a bottom frame and a top part with four walls, which is mounted on the bottom frame, wherein the side panels are attached to the walls, wherein the walls are mounted pivotably on the bottom frame and are moveable between the position of use, wherein the walls extend from the bottom frame, and a transport position, wherein the walls are stacked on each other. The side panels do not have to be demounted now, because the walls can be rotated to the transport position, which can take place quicker and is easier to carry out. Moreover, the walls in the transport position fall within the dimensions of the bottom frame. The boxes take up minimal space in the transport position and can moreover be stacked by stacking the bottom frames on each other without hitting the walls.

[0007] A box according to the preamble of claim 1 is known from the British patent application GB 2105683. The known box is not suitable as box mould.

[0008] The present invention aims to provide a box of the kind mentioned in the preamble of claim 1, which is suitable for use as box mould.

[0009] The box according to the invention thereto has the characteristic, that the walls are provided with cooperating locking means. Concerning the known box, the walls are each individually locked to the bottom frame. When the known box is filled with soft goods, the walls will start to give way. Concerning the box according to the invention on the other hand, the mutual locking of the walls makes sure that the walls connect properly without seams and that in the position of use the walls give enough back pressure to form the soft goods.

[0010] In another preferred embodiment of the box according to the invention, the box is further provided with a cover, which is arranged for placement on the bottom frame in the transport position and for placement on the top part in the position of use. The cover facilitates the stacking of the boxes in the transport position and in the position of use and protects the walls in the transport position.

[0011] According to a strengthened preferred embodiment of the box according to the present invention, the walls comprise lower transverse profiles on which the side panels are fastened and the bottom frame comprises first angle profiles for cooperation with the lower transverse profiles. In a practical elaboration the lower transverse profiles are provided with pens that extend sidewards and the first angle profiles are provide with openings for receival of the pens.

[0012] In a compact preferred embodiment of the box according to the present invention, the walls comprise a first pair of walls, which are positioned opposite of each other, and a second pair of walls, which are positioned opposite of each other, wherein the rotation axes of the second pair of walls are arranged in the bottom frame to be shiftable in height. When walls of the second pair are collapsed last, these will rest in the transport position as flat as possible on the walls in the first pair. In a practical elaboration of this, a number of the openings in the first angle profiles are arranged as slotted holes for the receival of the pens of the second pair of walls.

[0013] In an elegant elaboration of the cooperating locking means, the walls in the first pair are provided with second angle profiles for cooperation with the walls in the first pair. In a practical elaboration, the second angle profiles are provided with bent edges and the walls in the first pair are arranged for cooperation with the bent edges. After being set upright, the walls in the first pair are being locked with these in the position of use in the walls of the first pair.

[0014] In a very effective, robust preferred embodiment, the cooperating locking means are provided near the top of the second angle profiles. Due to the locking of walls near the top, the occurrence of unwanted seams between the walls is prevented as much as possible. In a practical preferred embodiment, the walls in the first pair are provided with one or more bolts and the second angle profiles are arranged for receival of an outer end of one of the bolts. The bolts provide a powerful enclosure of the walls. Furthermore, bolts that run transversely over the walls give the walls extra firmness.

[0015] According to an optimal preferred embodiment, the second angle profiles in the position of use contact the first angle profiles in a contact area, wherein each second angle profile and each first angle profile in the contact area are formed complementary. In the contact area each first angle profile guides the complementary second angle profile during the movement between position of use and the transport position. The complementary shape is preferably an S-shape. The S-shape forces

the second angle profile upwards during the rotation from the position of use to the transport position, causing unwanted damage of the bottom of the side panels to be prevented.

[0016] In a further preferred embodiment of the box according to the present invention, the side panels are closed and smooth on the inner sides and therefore the interior space is suitable for forming goods, such as packed cheeses.

[0017] Preferably the bottom frame is arranged for placement over a pallet, such that the top of the pallet forms the bottom of the interior space. In an alternative preferred embodiment the bottom frame is arranged for cooperation with a forklift and is provided with a bottom panel that forms the bottom of the interior space.

[0018] For optimal ease of use, the walls are provided with operating elements on the outer sides, for example handles, for the movement of the walls between the position of use and the transport position. In a very user-friendly variant, the operating elements are coupled to the locking means for the operation of the locking means. In a smooth movement a user can unlock the wall using the operating elements and move the wall from the position of use to the transport position or move the wall from the transport position to the position of use and lock it in.

[0019] The invention will now be further explained using a number of figures, wherein

Figure 1 shows a schematic view of a preferred embodiment of the box according to the invention in the position of use;
Figure 2 shows a schematic view of the preferred embodiment of figure 1 in transport position;
Figures 3A up to 3C show schematic views of the preferred embodiment of the box according to the invention with a first pair of walls in various intermediate positions;
Figures 4A up to 4D show schematic views of the preferred embodiment of the box according to the invention with a second pair of walls in various intermediate positions;
Figure 5A and 5B show schematic views of a part of an alternative, second preferred embodiment of the box according to the invention from different points of view;
Figure 6A shows a schematic view of a third preferred embodiment of the box according to the invention in the position of use;
Figure 6B schematically shows part B of figure 6A in more detail;
Figure 6C shows a schematic view of the box of figure 6A wherein some parts are broken away; and
Figure 6D schematically shows part D of figure 6C in more detail.

[0020] Figure 1 shows a schematic view of a preferred embodiment of the box according to the invention in the position of use.

[0021] The box 1 comprises a bottom frame 10 and a top part 20, which is fastened on the bottom frame. In the position of use, the top part 20 provides an interior space for receival of goods. Optionally the box 1 is further provided with a cover, for example a covering edge 30. According to the inventive thought, the box 1 is moveable between the position of use and a transport position. The top part 20 is thereto arranged collapsible in the bottom frame 10. Figure 2 shows a schematic view of the box 1 in the transport position.

[0022] In the preferred embodiment, the top part 20 comprises four walls 21, 22, 23, 24, which are fastened rotatably to the bottom frame 10 and extend upwards from the bottom frame 10 in the position of use. The bottom frame 10 preferably comprises first angle profiles 11, wherein the walls 21, 22, 23, 24 are fastened rotatably. Each wall is individually collapsible and thereto provided with an operating element, in this example a handle 50. Figure 2 shows a schematic view of the box 1 in a transport position, wherein all walls 21, 22, 23, 24 are collapsed and are stacked on each other.

[0023] In the shown preferred embodiment, the bottom frame 10 is arranged for placement over a pallet 100, such that the upper side of the pallet forms the bottom of the interior space. The angle profiles 11 in the bottom frame 10 are interconnected by means of support profiles 12, 13. The angle profiles 11 can contribute to a fitting placement of the box 1 over the pallet 100.

[0024] In the shown preferred embodiment, the walls comprise a first and second wall 21, 22, which are positioned opposite of each other, and a third and fourth wall 23, 24, which are positioned opposite of each other.

[0025] Figures 3A up to 3C illustrate the collapse of the first and second wall 21, 22.

[0026] Figures 4A up to 4D illustrate the collapse of the third and fourth wall 23, 24.

[0027] In the shown preferred embodiment, the walls 21, 22, 23, 24 are each provided with a side panel 21P, 22P, 23P, 24P. The side panels 21P, 22P, 23P, 24P are in the position of use placed adjacently and define the interior space of the box 1. Preferably, the side panels 21P, 22P, 23P, 24P are smooth on the inner sides and the interior space is therefore suitable for the forming/curing of packed cheeses. The side panels 21P, 22P, respectively 23P, 24P, are fixed on the transverse profiles 26, respectively 27, that cooperate with the first angle profiles 11.

[0028] Figure 3A shows a schematic view of the box 1 with a collapsible wall 21. Figure 3B shows a schematic view of the box 1 with a collapsing second wall 22 that lays opposite of it. For the purpose of clarity, the third wall 23 is excluded from figure 3B. Figure 3C shows a sectional view of the box 1 at the location of plane A in figure 3B, but with collapsed walls 21, 22. It is clearly visible that the first wall 21 rests on the pallet 100 and that the second wall 21, 22 rests on the first wall 21.

[0029] Figure 4A shows a schematic view of the box 1

with a collapsing third wall 23. Figure 4B shows a part B of figure 4A in more detail. Figure 4C shows a schematic view of the box 1 with a collapsing fourth wall 24 that lays opposite of it.

[0030] The first wall 21 and the second wall 22 are fixed hingably in the bottom frame 10.

[0031] In the shown preferred embodiment the first wall 21 and the second wall 22 are provided with pens 26A that extend sidewards and the first angle profiles 11 are provided with holes 16 for the receival of the pens 26A. The rotation axes of the first and second wall 21, 22 run in the longitudinal direction of the pens 26A. Preferably the walls 21, 22 are provided with a lower transverse profile 26 on which the pens 26A are fixed.

[0032] The rotation axes of the third and fourth wall 23, 24 are arranged in the angle profiles 11 to be shiftable in height. In the shown preferred embodiment, the third and fourth wall 23, 24 are thereto provided with pens 27A that extend sidewards and the first angle profiles 11 are provided with slotted holes 17 for the receival of the pens 27A. The rotation axes of the walls 23, 24 run in the longitudinal direction of the pens 27A. The longitudinal direction of the slotted holes 17 runs substantially transversely thereto and in the longitudinal direction of the first angle profiles 11. Preferably the walls 23, 24 are provided with a lower transverse profile 27 on which the pens 27A are fixed.

[0033] Figure 4D shows a sectional view of the box 1 in the transport position in the plane C of figure 2. In the transport position the bottom frame 10 receives the collapsed top part 20. After all, in the shown preferred embodiment, the collapsed walls 21, 22, 23, 24 fall within the dimensions of the bottom frame 10. In height the dimensions of the bottom frame 10 are determined by the length of the angle profiles 11. In length and width the dimensions of the bottom frame 10 are determined by the distance between the angle profiles 11.

[0034] During the movement of the transport position to the position of use, the walls are raised in reverse order.

[0035] The box 1 is preferably arranged for the locking of the first and second walls 21, 22 on the third and fourth walls 23, 24.

[0036] In the shown preferred embodiment of the box 1, the third and fourth walls 23, 24 are provided with second angle profiles 28. The second angle profiles 28 are in line with the first angle profiles 11 in the position of use of the box 1. The second angle profiles 28 are provided with bent edges 28A and the first and second walls 21, 22 are arranged for cooperation with the bent edges 28A.

[0037] The side panels 21, 22P, respectively 23P, 24P, are fixed on upper transverse profiles 29, respectively 25. The upper transverse profiles 29 cooperate with the second angle profiles 28.

[0038] In the shown preferred embodiment, the upper transverse profiles 29 are for example provided with grooves 29A for receival of the bent edges 28A of the second angle profiles.

[0039] The upper transverse profiles 29 and the second angle profiles 28 are optionally provided with first locking means 41, 42. Various locking means are available to the expert in the field.

[0040] An example of an alternative, second preferred embodiment regarding the locking is illustrated in figures 5A and 5B, wherein schematic views of the first wall 21 and the fourth wall 24 are shown from different points of view. The fourth wall 24 is situated in the position of use. The first wall 21 is situated between the position of use and the transport position. The upper transverse profiles 29 and the second angle profiles 28 are optionally provided with second locking means 43, 45 and 44. In this example, the second locking means comprise an edge 43, which is fixed partly over the upper transverse profile 29 and is provided with an opening 45. The second angle profile 28 is provided with a lip 44 for receival in the opening 45. The lip 44 runs parallel to the bent edge 28A.

[0041] Figures 6A up to 6D show schematic views of a third preferred embodiment of the box according to the invention with again other alternative locking means. Figure 6A shows a schematic view of a third preferred embodiment of the box according to the invention in the position of use. Figure 6B schematically shows part B of figure 6A in more detail. In the third preferred embodiment, the first wall 21 and the second wall 2 and the second angle profiles 28 are optionally provided with third locking means 46, 47 and 48. As an example, third locking means are only shown on the first wall 21. The second wall 22 is provided with the same third locking means.

[0042] The third locking means comprise a bolt 46, which is fixed on the first wall 21. The length of the bolt 46 is smaller than or equal to the width of the first wall 21. The bolt 46 is preferably fixed near the top of the first wall 21. The first wall 21 is provided with two support elements 47 for the bolt 46. In the third preferred embodiment, the support elements are arranged as longitudinal profiles 47 with through openings . Each of the second angle profiles 28 is provided with a hook-shaped recess 48 for receival of one of the outer ends of the bolt 46. The hook-shaped recess 48 is situated in the bent edge 28A.

[0043] In the third preferred embodiment, the handle 150 serves as an operating element for the bolt 46. The handle 150 and the bolt 46 are preferably coupled by means of a connecting rod 49, with which the rotation of the handle 150 is converted into a linear movement (up and down) of the bolt 46. Instead of the bolt 46, the third locking means can also comprise two bolts.

[0044] Figure 6C shows a box according to the invention schematically in side view with parts that are broken away. The bottom frame with first angle profiles 11 is visible, just as the second pair of walls 23, 24. The third wall 23 takes on an intermediate position. The fourth wall 24 is standing in the position of use. Figure 6D schematically shows part D of figure 6C in more detail. The second angle profiles 28 in the position of use contact the first angle profiles in a contact area. In the contact area each second angle profile and each first angle profile are

formed complementary. The first angle profiles 11 have a top, for example upper edge 11S, that is formed complementary with a bottom laying opposite of it, for example a bottom edge 28S of the second angle profile 28. The complementary shape is preferably an S-shape. The S-shaped upper edge of one of the sides of the first angle profile 11 is also shown in figure 2, 3B, 4A, 4C and 4D, but is herein not provided with a number. The S-shaped bottom edge of the opposite laying side of the second angle profile 28 is also visible in figures 4A, 4B and 4D, but is herein not provided with a number. In the contact area 11S, 28S the first angle profile guides the second angle profile in such a way that the side panel stays free and therefore undamaged during rotation.

[0045] The covering edge 30 is both arranged for placement on the first angle profiles 11 in the transport position, as for placement on the second angle profiles 28 in the position of use.

[0046] The box according to the invention is, provided that it comprises closed side panels with a smooth inner side, especially suitable for application as a box mould for cheese but is thereto explicitly not limited. The box according to the invention is suited for each other application wherein products need to be stored for some time.

[0047] Suitable material for the side panels is wood, preferably concrete plywood. This is a compressed wood with a layer of film. Suitable material for the angle profiles and support profiles is steel. Possibly other materials are usable, among which plastic or aluminium.

[0048] In the shown preferred embodiment, the bottom frame is suitable for cooperation with a pallet. Preferably the bottom frame is arranged for placement over a pallet, whereby the angle profiles are placed around the corners of the pallet and together with the support profiles enclose the pallet. The top of the pallet forms the bottom of the interior space. As an alternative, the bottom frame can be arranged in itself for handling by a forklift and can for example be provided with openings for the forks.

[0049] In the shown preferred embodiment, the box has four walls and four angle profiles. Though this is the most common embodiment, this number can vary. A suitable number of walls is an even number. The number of angle profiles is preferably equal to the number of walls.

[0050] The invention is finally explicitly not limited to the described and shown embodiments, but generally extends to any embodiment that falls within the scope of the attached claims, viewed in light of the preceding description and drawings.

Claims

1. Box comprising a frame, wherein a number of side panels are arranged, which cover the frame on the inner sides and in a position of use enclose an interior space for the receival of goods, wherein the box comprises a bottom frame and a top part formed by four walls, which is mounted on the bottom frame, wherein the side panels are attached to the walls, wherein the walls are mounted pivotably on the bottom frame and are movably between the position of use, wherein the walls extend from the bottom frame and a transport position, wherein the walls are stacked on each other, **characterized in, that** the walls are provided with cooperating locking means.

2. Box according to claim 1, wherein the walls on the outside are provided with operating elements, for example handles, for the movement of the walls between the position of use and the transport position.

3. Box according to claim 2, wherein the operating means are coupled to the locking means for operating the locking means.

4. Box according to one of de preceding claims, wherein the walls comprise a first pair of walls, which are positioned opposite of each other, and comprise a second pair of walls, which are positioned opposite of each other, wherein the rotation axes of the second pair of walls are arranged in the bottom frame to be shiftable in height.

5. Box according to claim 4, wherein the walls in the second pair are provided with second angle profiles for cooperation with the walls in the first pair.

6. Box according to claim 5, wherein the second angle profiles are provided with bent edges and wherein the walls in the first pair are arranged for cooperation with the bent edges.

7. Box according to claim 5 or 6, wherein the cooperating locking means are attached near the top of the second angle profiles.

8. Box according to one of the preceding claims 5-7, wherein the walls in the first pair are provided with one or more bolts and wherein the second angle profiles are arranged for the receival of an outer end of one of the bolts.

9. Box according to one of the preceding claims, wherein the walls comprise lower transverse profiles on which the side panels are mounted and wherein the bottom frame comprises first angle profiles for cooperation with the lower transverse profiles.

10. Box according to claim 9 referring to one of the claims 5-8, wherein the second angle profiles in a position of use contact the first angle profiles in a contact area, wherein each second angle profile and each first angle profile in the contact area are formed complementary.

11. Box according to claim 10, wherein in the comple-

mentary shape is an S-shape.

12. Box according to claim 9, 10, or 11, wherein the lower transverse profiles are provided with pens that extend sidewards and wherein the first angle profiles are provided with openings for receival of the pens.

13. Box according to claim 12, wherein a number of the openings in the first angle profiles are arranged as slotted holes for receival of the pens of the second pair of walls.

14. Box according to one of the preceding claims, wherein the side panels are closed and provided with smooth inner sides.

15. Box according to one of the preceding claims, wherein the box is further provided with a cover, which is arranged for placing on the bottom frame in the transport position and on the top part in the position of use.

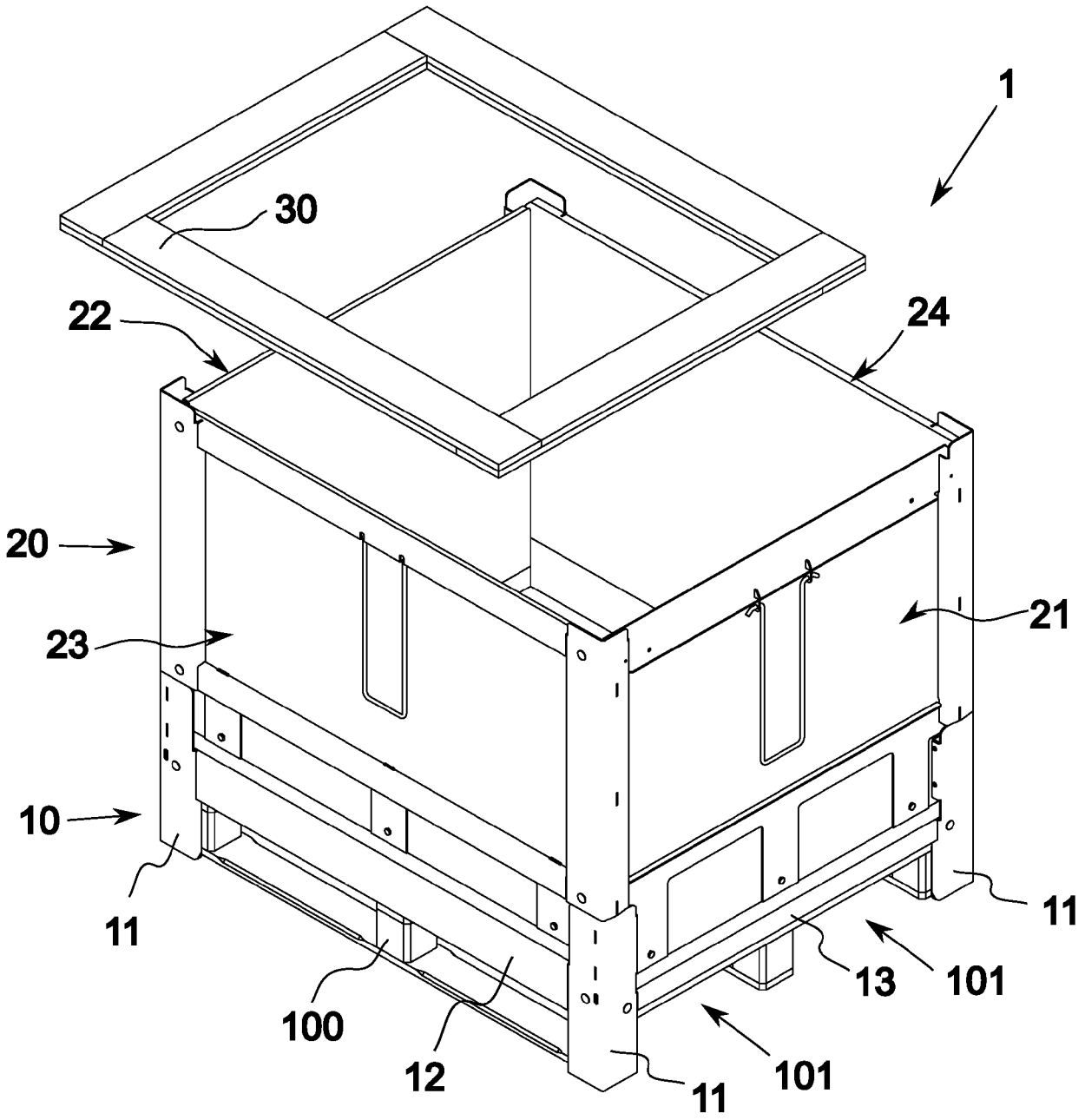

FIG. 1

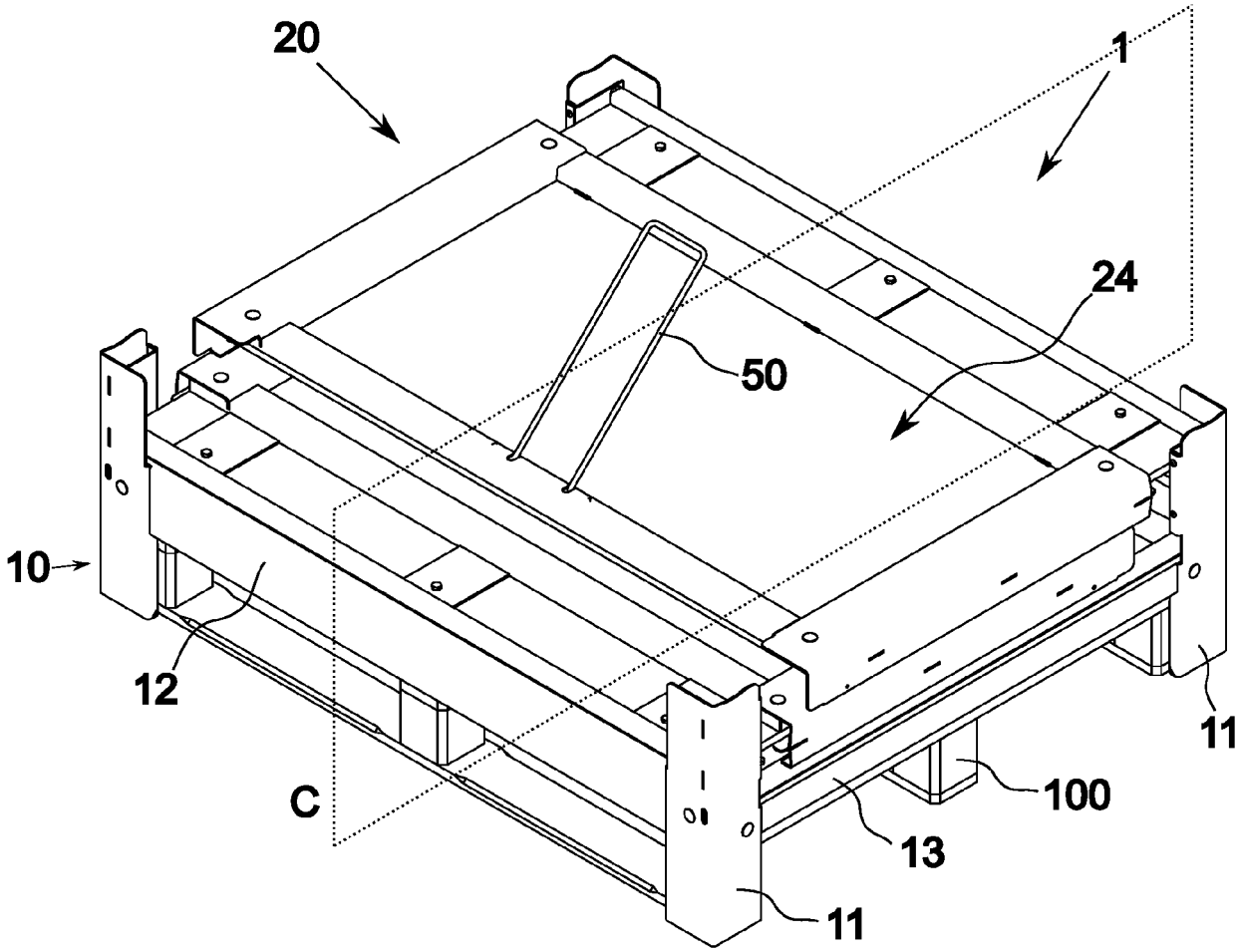

FIG. 2

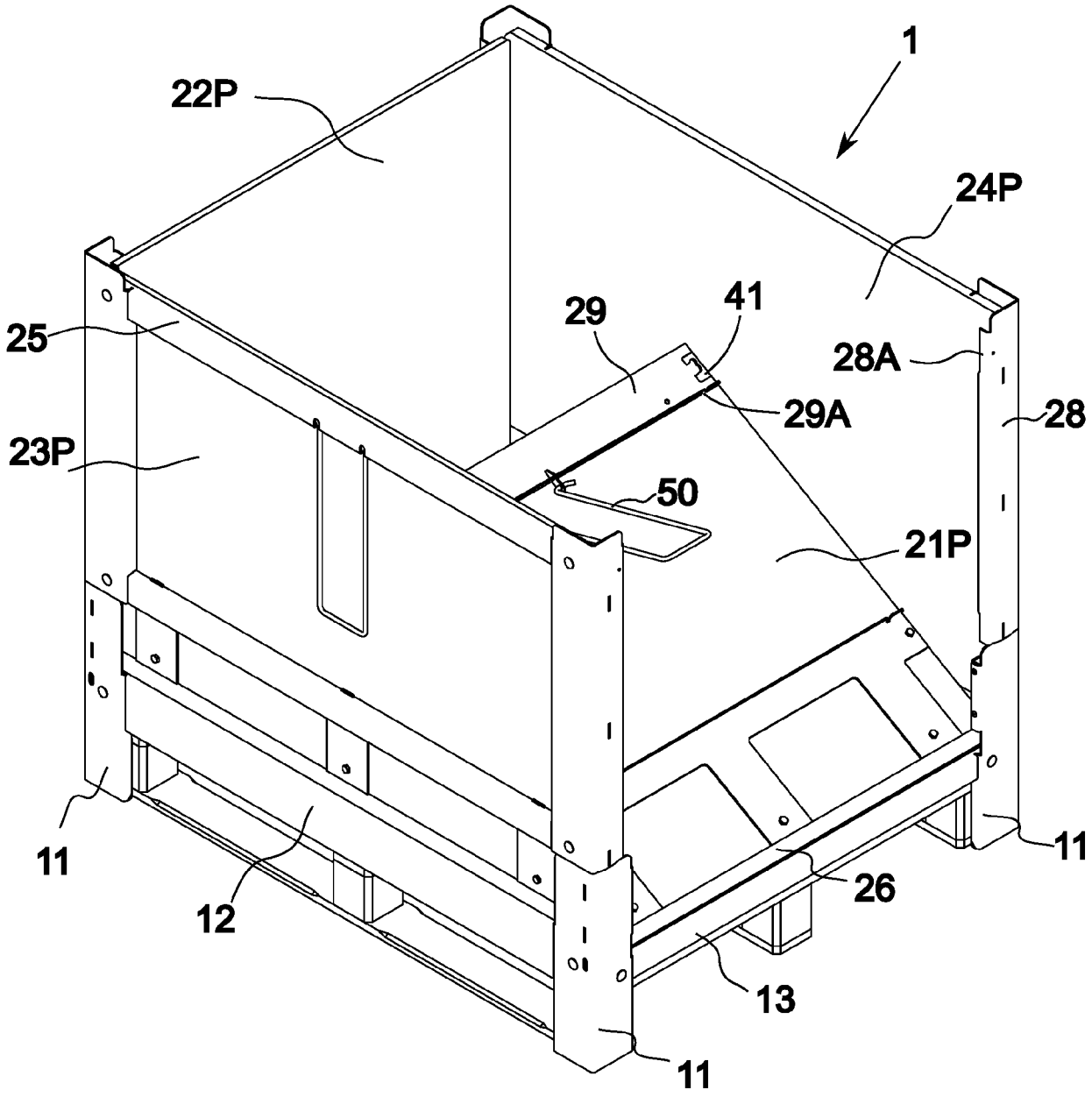

FIG. 3A

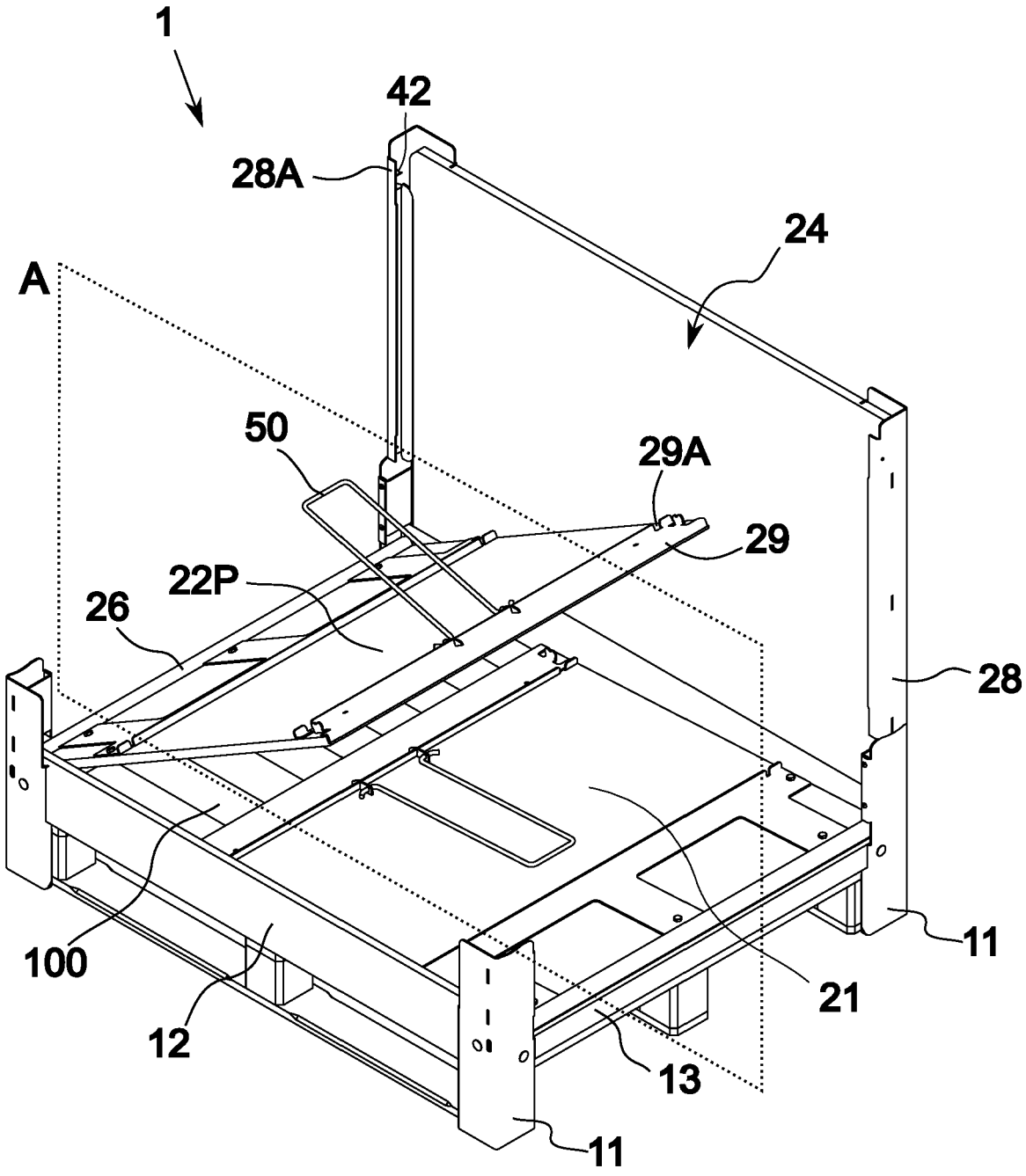

FIG. 3B

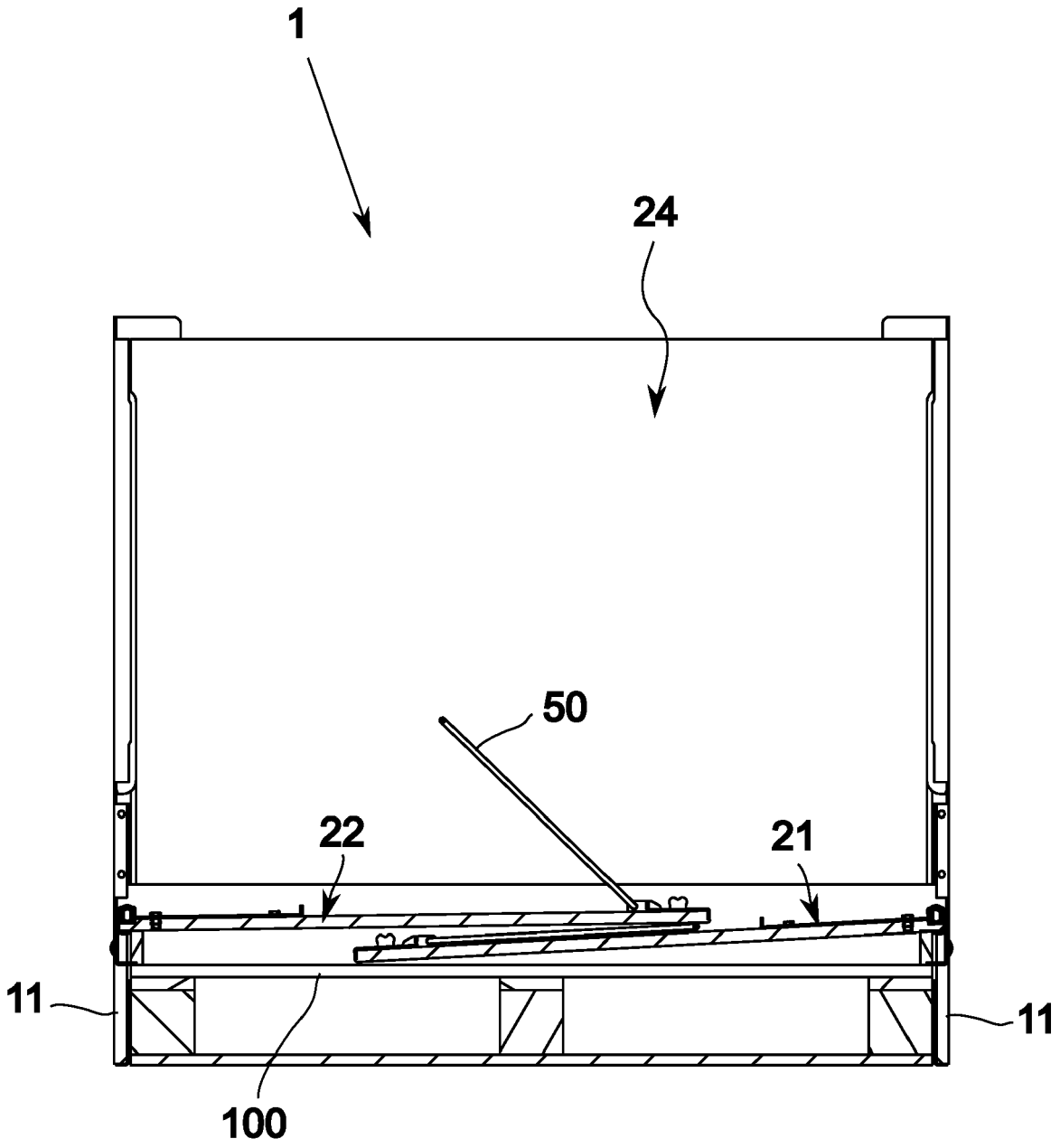

FIG. 3C

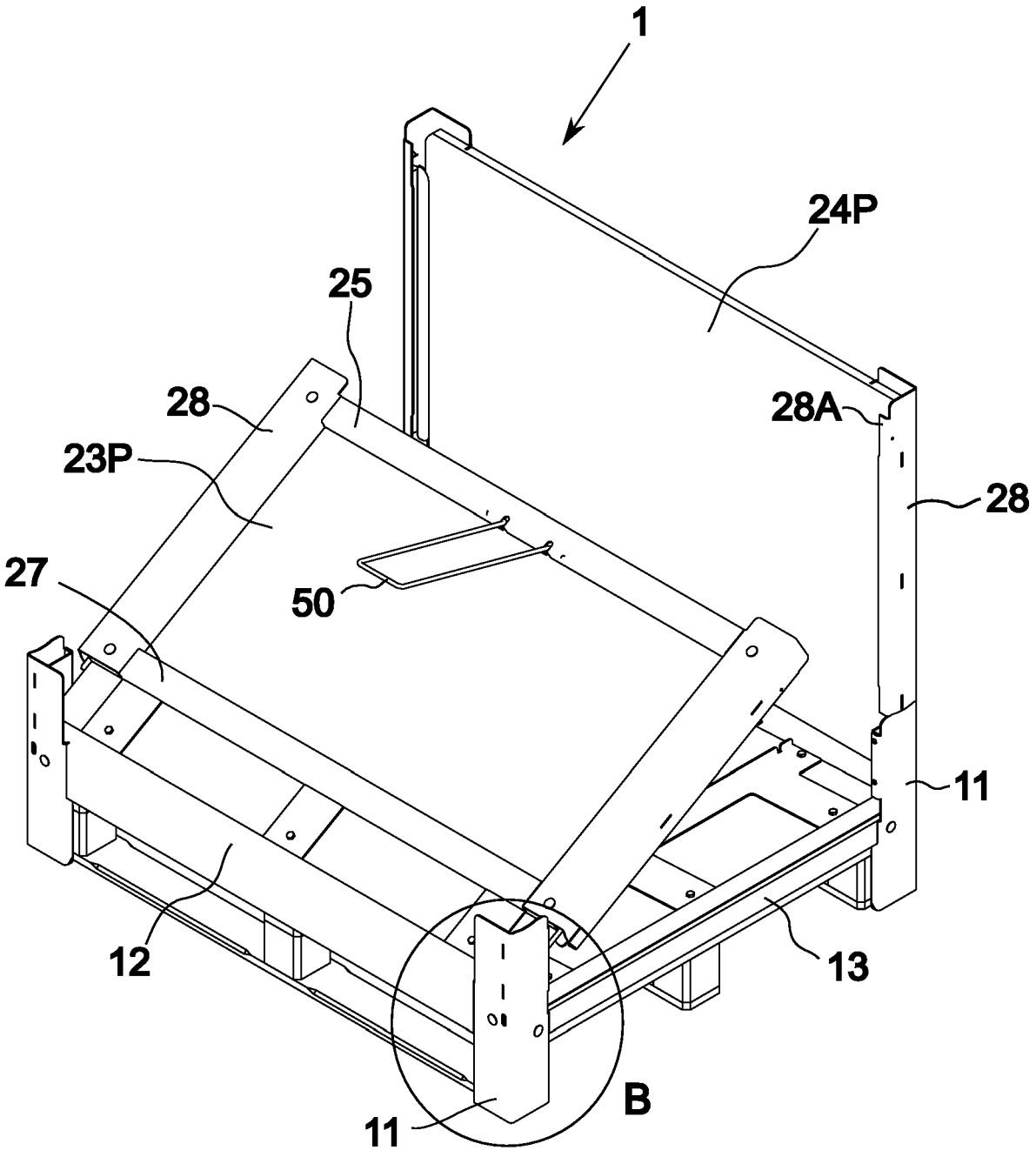

FIG. 4A

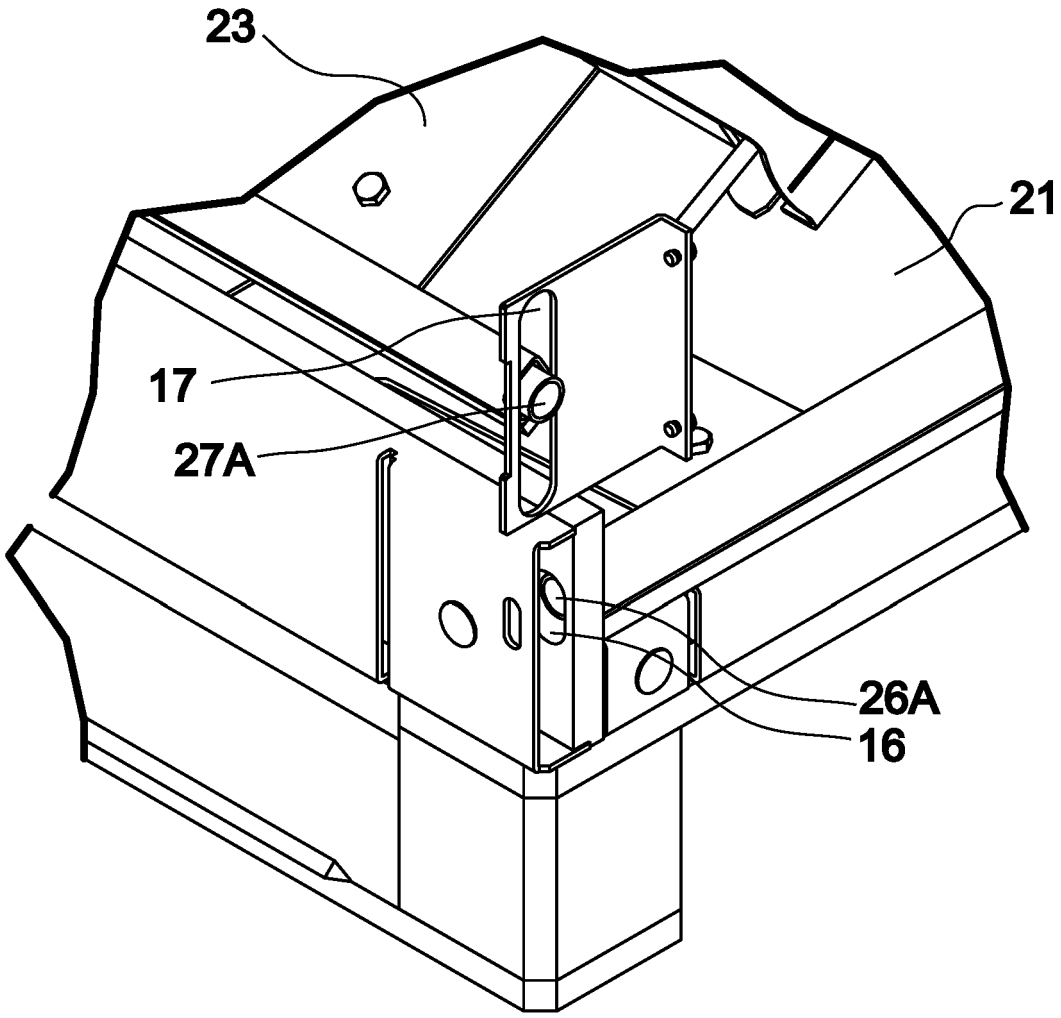

FIG. 4B

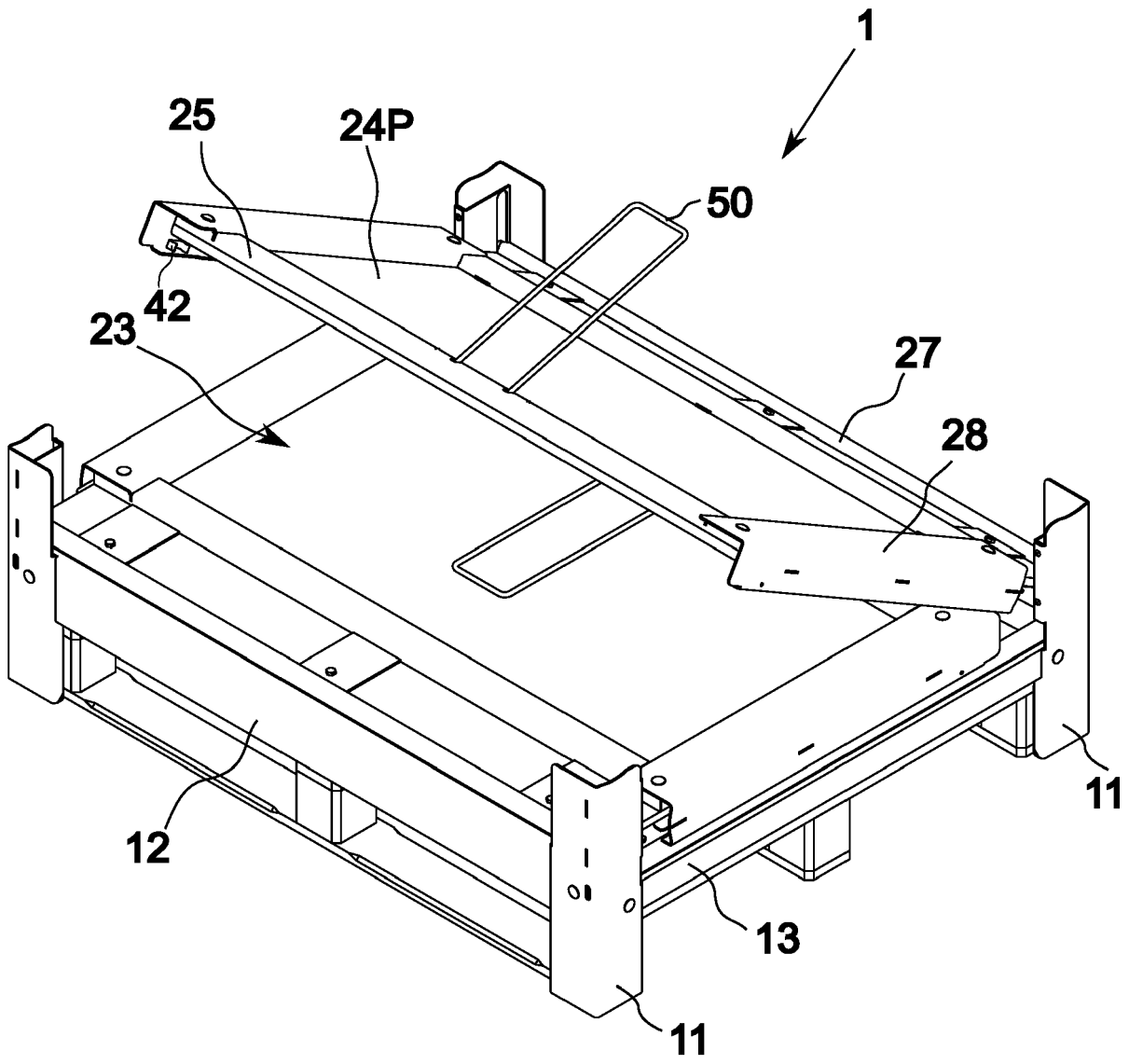

FIG. 4C

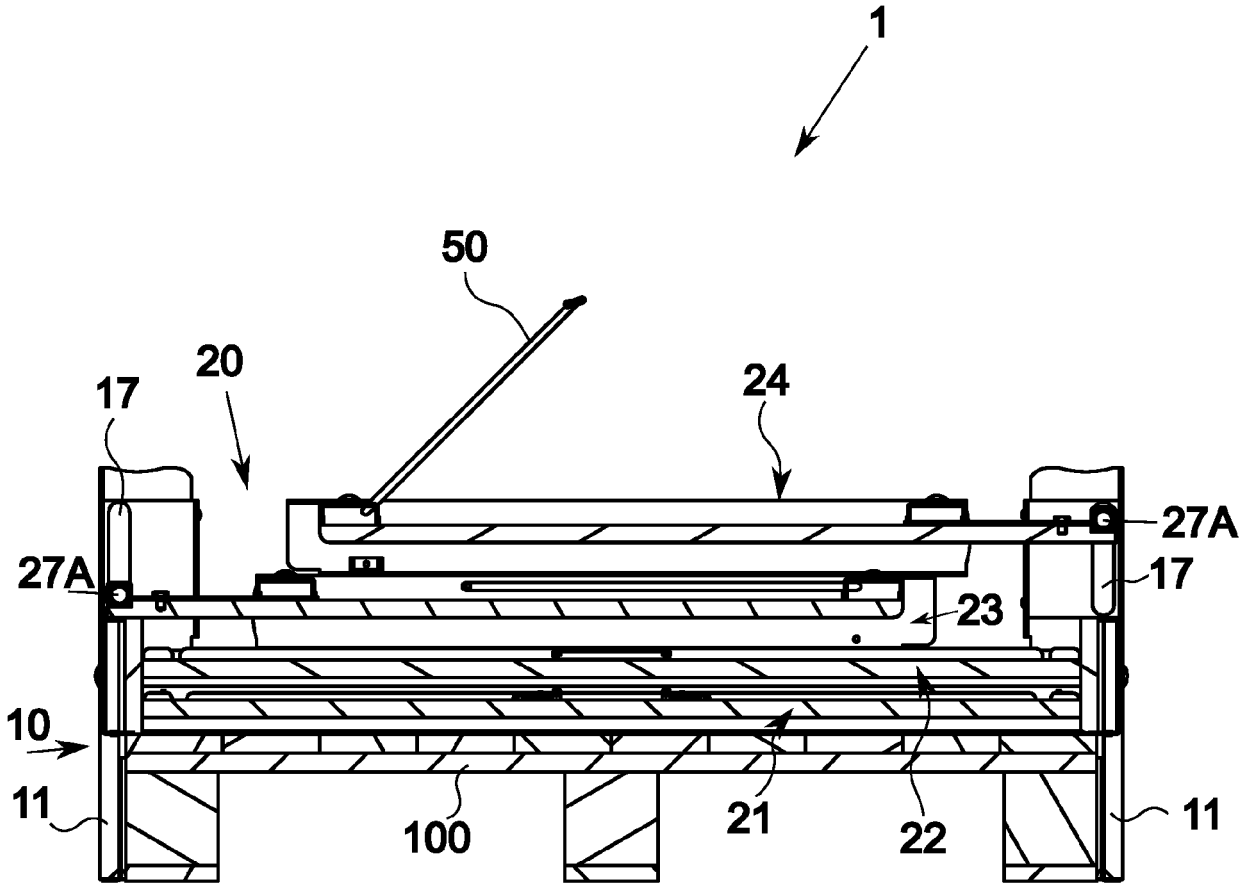

FIG. 4D

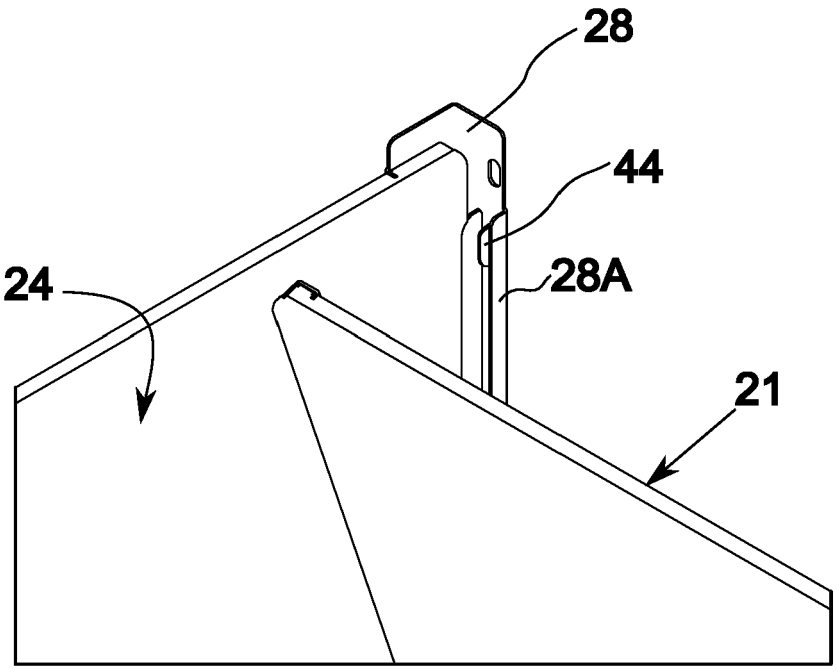

FIG. 5A

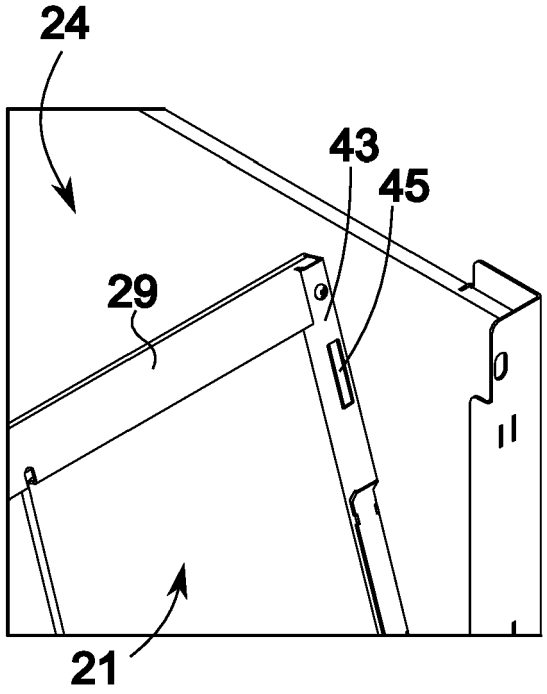

FIG. 5B

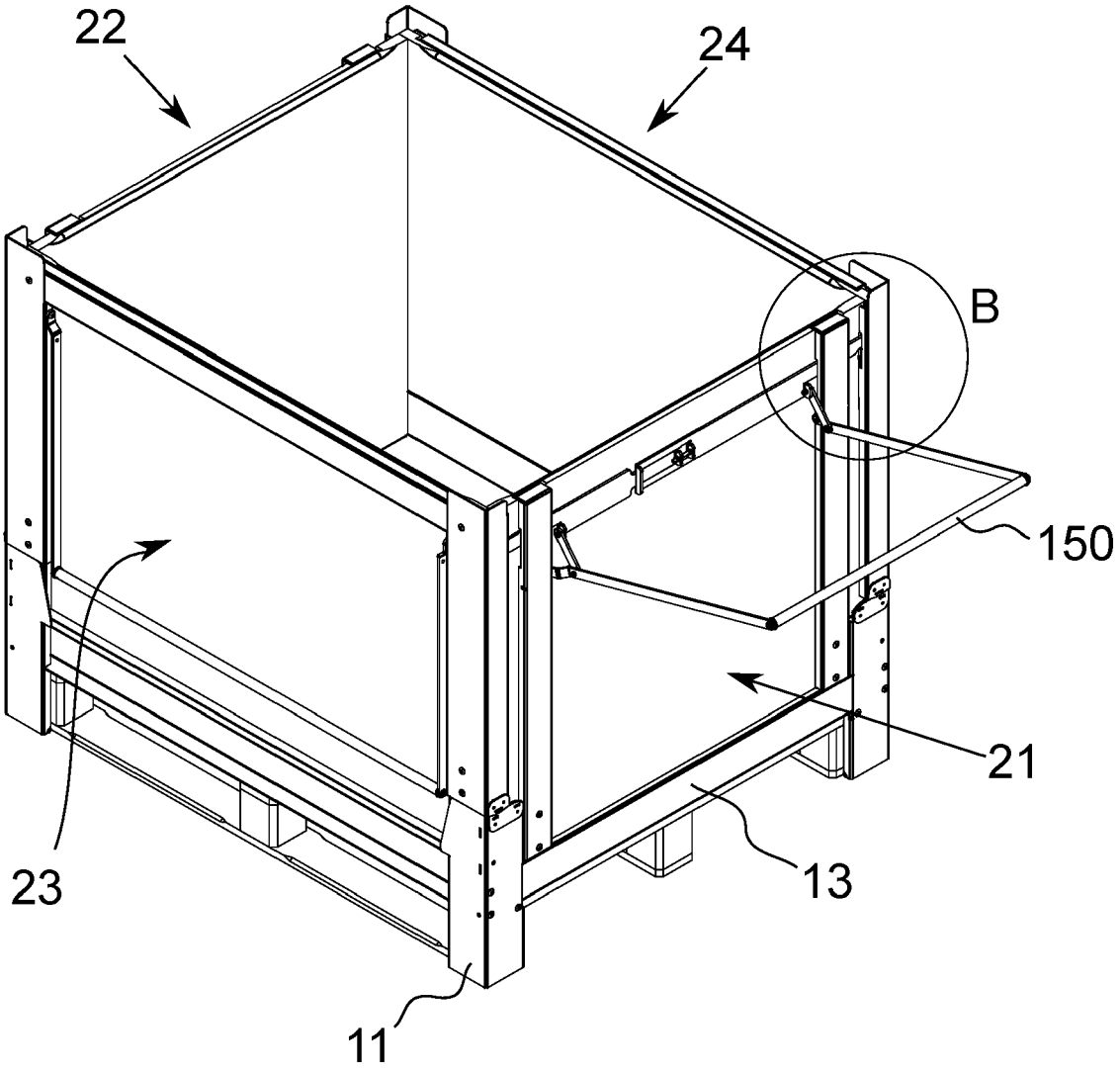

FIG. 6A

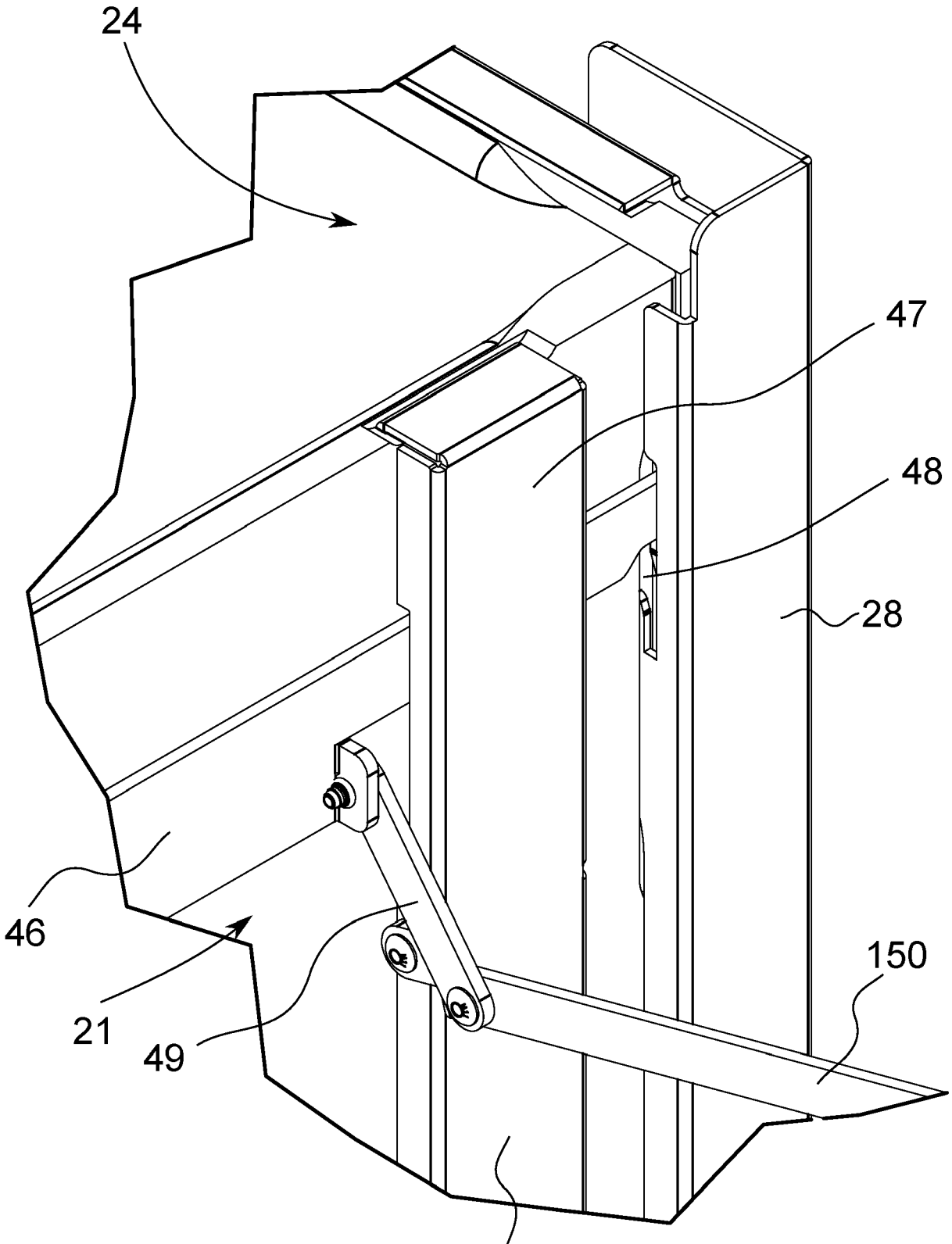

FIG. 6B

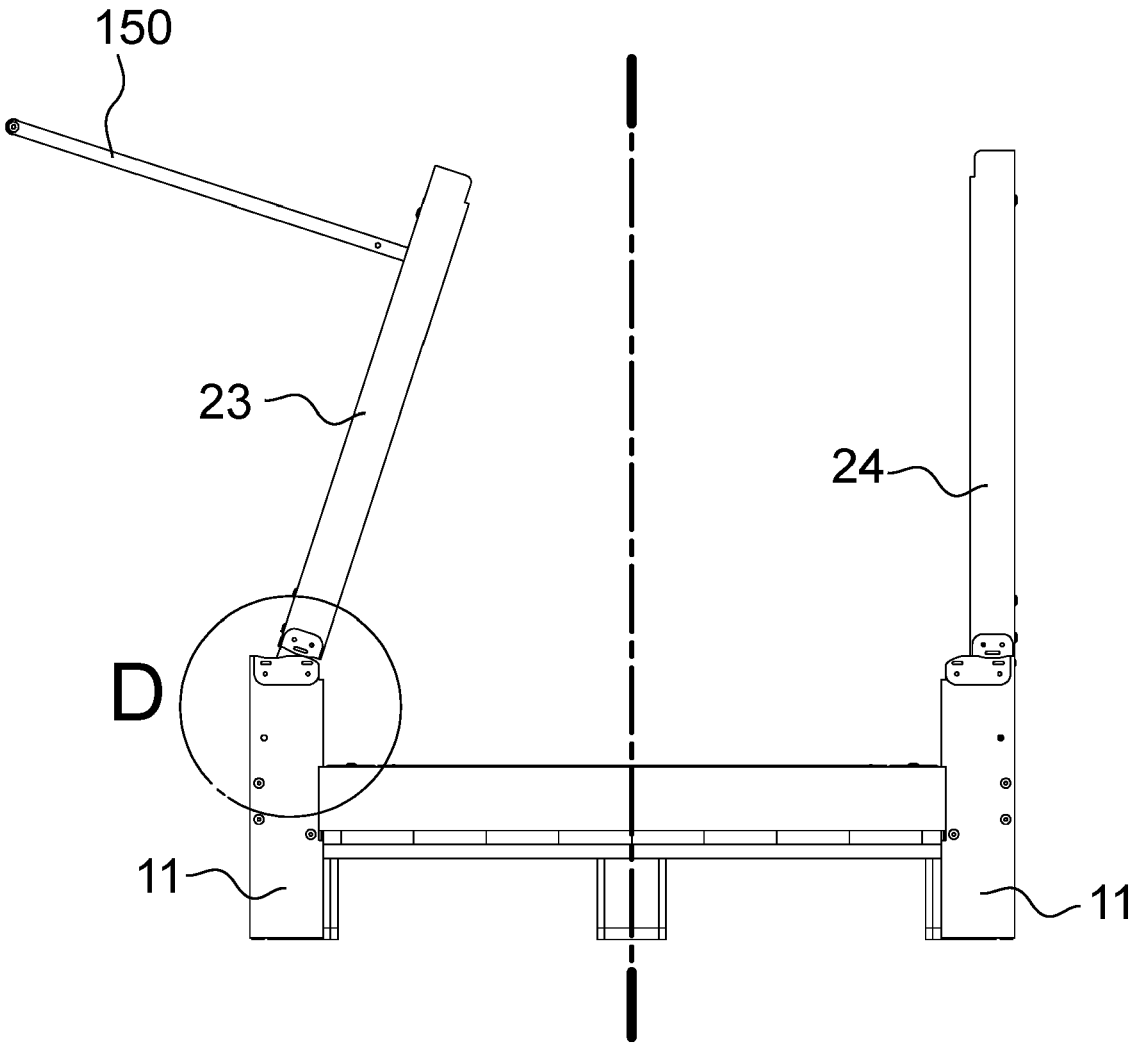

FIG. 6C

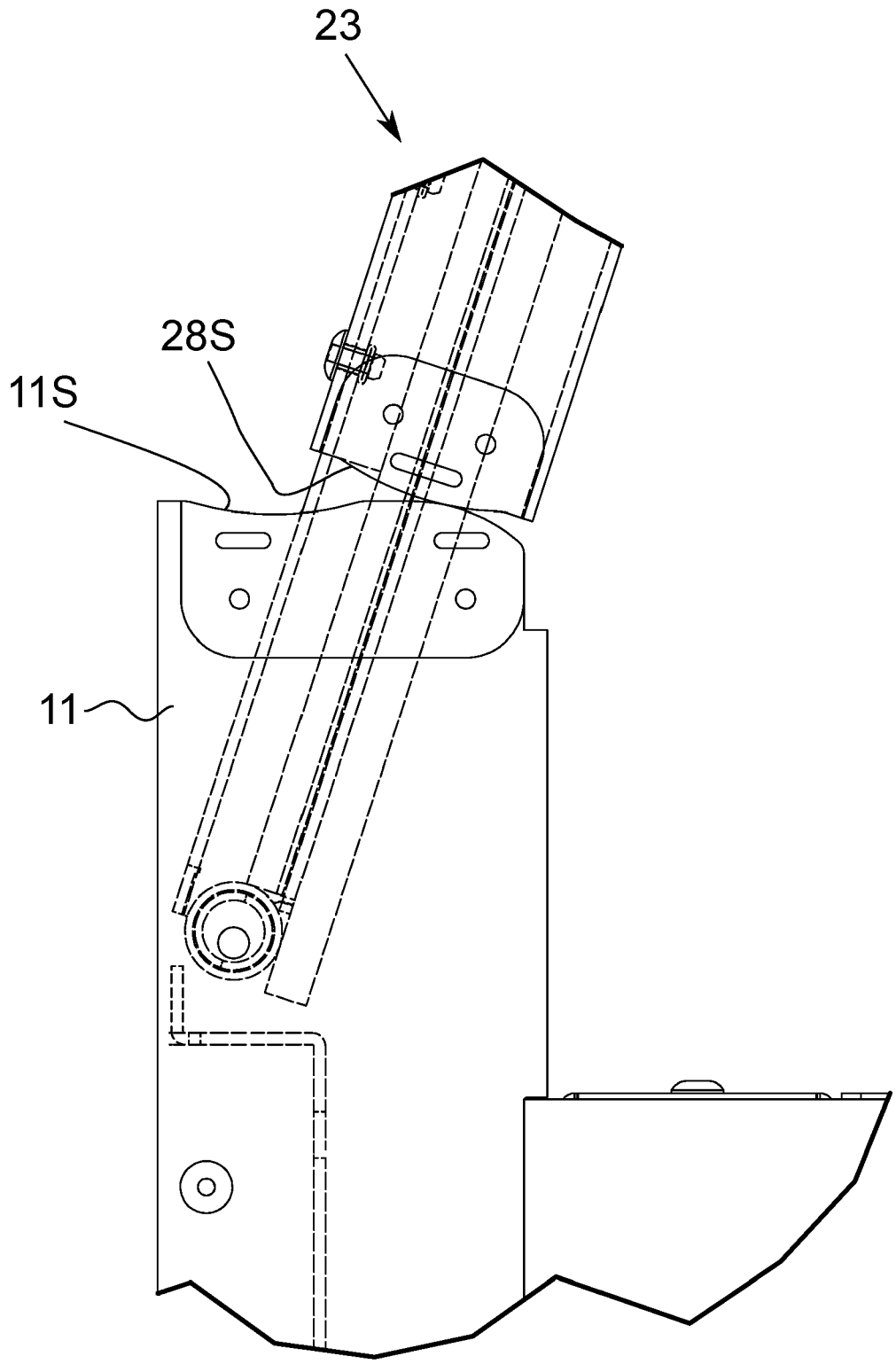

FIG. 6D

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EUROPEAN SEARCH REPORT

Application Number
EP 22 15 5796

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 Y	KR 200 465 521 Y1 (GONG GAN CHANNEL CO LTD) 25 February 2013 (2013-02-25) * figures 1-6 *	1-4,9, 10,12-14 4-8	INV. B65D19/06 ADD.
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Place of search	Date of completion of the search	Examiner
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