

12 **EUROPEAN PATENT APPLICATION**

21 Application number: 85201659.1

51 Int. Cl.⁴: B 65 D 5/36

22 Date of filing: 11.10.85

30 Priority: 16.10.84 SE 8405157

43 Date of publication of application:
23.04.86 Bulletin 86/17

84 Designated Contracting States:
AT BE CH DE FR GB IT LI NL

71 Applicant: Noren, Tony
S:t Pauligatan 23 B
S-416 60 Gothenburg(SE)

72 Inventor: Noren, Tony
S:t Pauligatan 23 B
S-416 60 Gothenburg(SE)

74 Representative: Nydell, Peder
Nydells Patentbyrå Storgatan 57
S-392 31 Kalmar(SE)

64 A collapsible high-sided tray.

57 A collapsible tray produced from a rigid blank. Two walls (6, 8) of the tray are each provided with a respective first fold line (18, 18) which extends parallel with the lower edge of the wall, and a respective second and a third fold line (20, 21 and 22, 23) which extends from a respective one of the two lower corners of the wall to a respective free edge (14, 16) of the wall while intersecting the first fold line to form an oblique angle (ν_1) therewith, the second and the third fold lines forming an angle of about 45° with a respective side edge extending from the same corner. The tray can be either folded (Figure 2) along the first fold line to form rim sections (26-29) which when folded outwards lock the walls in a position in which folding along the second and the third fold lines is prevented, or can be folded (Figure 3) along the second and the third fold line, so as to collapse the tray.

It is suggested that Figure 1 is published together with the abstract.

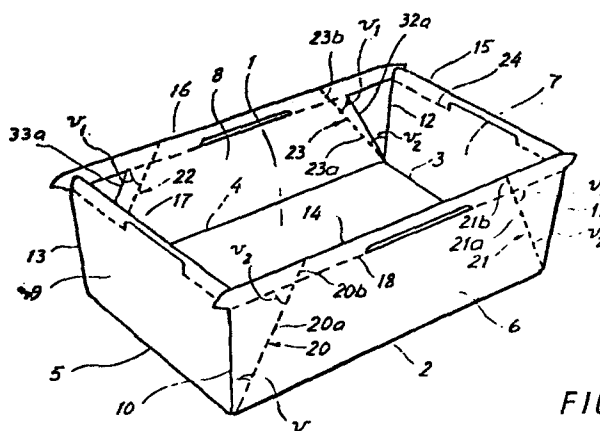


FIG. 1

A collapsible high-sided tray

TECHNICAL FIELD

The present invention relates to a collapsible high-sided tray manufactured from a planar rigid blank having a rectangular base, defined by four base edges, and four walls, each of which presents firstly a lower edge which coincides with a respective one of said base edges and secondly two side edges, each of which coincides along a given length with a respective side edge on an adjacent wall, and thirdly an upper free edge.

BACKGROUND PRIOR ART

Such collapsible high-sided trays are known to the art, for example from U.S. Patent Specification No. 1 760 325. The collapsible trays known hitherto, however, are not sufficiently stable or rigid when erected, since the additional fold lines or score lines necessary to impart foldability result in an indefinite and flimsy tray construction.

Neither can the known collapsible high-sided trays be used for heat-retention purposes, for example to keep food warm, since these trays lack the possibility of being closed with a lid which affords a sufficiently effective seal against the tray walls.

In addition, the known trays are not constructed in a manner which enables them to be stored in a storage holder in a collapsed state, and quickly removed from the holder and erected.

DISCLOSURE OF THE INVENTION

Accordingly the invention is to provide a collapsible high-sided tray which exhibits none of the aforesaid drawbacks.

This object is achieved by means of a high-sided tray having the characterizing features set forth in Claim 1.

Further developments of the invention are disclosed in the dependant claims.

- 5 The high-sided tray according to the invention, hereinafter referred to simply as the tray, obtains a high degree of flexibility due to the fact that it is foldable along the second and third fold or score lines and can be stabilized in its erected state through the agency
10 of the first fold lines. Because the first fold lines cross the second and the third fold lines at oblique angles thereto, when the tray is folded along the first fold lines, the second and the third fold lines are divided into two differently directed fold parts which can
15 not both be folded at the same time.

- Trays which are constructed in accordance with the present invention can also be stacked when collapsed, in a container therefor, from which they can be removed singly while being erected at the same time upon passage
20 through a slot-like opening in the container.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail with reference to a preferred embodiment thereof illustrated in the accompanying drawings.

- 25 Figure 1 illustrates an erected tray constructed in accordance with the invention.
Figure 2 illustrates the erected tray of Figure 1 with outwardly folded side edges or rim sections.
Figure 3 illustrates the tray of Figure 1 when collapsed.
30 Figure 4 is a blank from which the tray is erected.
Figure 5 illustrates a facility which enables a lid to be secured to an erected tray.

Figure 6 illustrates a rack or holder for storing collapsed trays.

DESCRIPTION OF A PREFERRED EMBODIMENT

The tray embodiment illustrated in Figure 1 comprises a
5 four cornered, preferably rectangular base 1 defined by
four bottom edges 2-5 and presenting four walls 6-9,
each of which has a lower edge which coincides with a
respective bottom edge 2-5, and two side edges 10 and 11,
11 and 12, 12 and 13, and 13 and 10 respectively, each
10 of which coincides with a respective side edge of an
adjacent wall over a pre-determined distance, this distance
equalling about 70-90% of the length of a side
edge, calculated from the lower corner of the wall.

Those parts of the side edges 10-13 which do not mutually
15 ly coincide from the side edges of outwardly foldable rim
sections described in more detail hereinafter.

The walls 6-9 also present free upper edges 14-17.
Each of the walls 6-9 has the shape of a parallel truncated
triangle, the bases of respective triangles forming
20 the free edges 14,15,16 and 17. The tray walls thus lean
slightly outwards, enabling a plurality of erected trays
to be stacked one within the other.

The two mutually opposing walls 6 and 8 are provided with
a respective first fold line 18 and 19 which extends
25 between the two side edges 10,11 and 12,13 of respective
walls and parallel with respective lower wall edges 2
and 4. Each of second and third fold lines 20,21 and 22,
23 extends from its respective one of the two lower corners
of the walls 6 and 8 adjacent the free edges 14,16
30 of said walls while intersecting the first fold line 18
and 19 respectively at an oblique angle v_1 which if the
walls do not lean is about 45° and which in the illustrated
embodiment of Figure 1 having inclined or leaning

walls exceeds 45° , in proportion to the extent to which the sides lean. Thus, each of the fold lines 20-23 is divided by the fold lines 18 and 19 into a first, lower part 20a, 21a, 22a and 23a located beneath a respective fold line 18 and 19, and a second, upper part 20b, 21b, 22b and 23b located above a respective fold line 18 and 19.

Each of the fold lines 20-23 forms an angle v_2 of about 45° with a respective side edge 10,11,12 and 13 extending from the same corners as said lines, such that folding can be effected along the lines 20-23 under certain conditions when erecting the tray, as made more apparent hereinafter.

Each of the remaining two sides 9 and 7 is provided with a respective fold line 25 and 24 which extends between respective wall side-edges 10,13 and 11,12 parallel with respective lower edges 5 and 3 of said walls and at the same height from the base 1 of the erected tray as the fold lines 18 and 19 on the first mentioned walls 6 and 8.

The tray illustrated in Figure 1 can be folded to the configuration shown in Figure 3, by folding the tray walls 7 and 9 in towards or against the centre of the tray, wherewith the walls 6 and 8 automatically fold along the fold lines 20-23, as shown in Figure 3.

On the other hand, when the walls of the tray illustrated in Figure 1 are instead folded outwardly along the fold lines 18,19,24 and 25 to form outwardly projecting side pieces in the form of rim sections 26-29, as illustrated in Figure 2, the above mentioned upper parts 20b, 21b, 22b and 23b of respective fold lines 20-23 form an angle with corresponding lower parts 20a, 21a, 22a and 23a of said lines, so as to prevent

folding along the fold lines 20-23 and therewith providing a well defined and rigidly stable tray when erected.

Figure 4 illustrates a pre-cut planar blank which is made of cardboard or like material treated with a synthetic resin substance and which can be folded to and secured in the tray configuration illustrated in Figures 1-3. Extending from each of the four corners of the panel forming the tray base are two further fold lines 30a-b, 31a-b, 32a-b and 33a-b respectively. The manner in which the corner sections of the tray are joined together is the same for all four corners, and hence in the following reference in this respect will be made solely to the lower right-hand corner section in Figure 4.

In this regard the blank is first folded along the lines 11, 31a and 31b, whereafter the blank portions located between the lines 11, 31a and 31a and 31b are caused to overlap one another and also part of the blank portion located between the lines 31b and 21a. In the position shown in Figure 4 the line 31a is located centrally between the lines 11 and 31b, so that they therewith coincide with one another and together form the side edge 11 illustrated in Figures 1-3. The corner part is then fixed in its raised position as by gluing, riveting or welding of the plastics-treated outer surface of the tray blank.

Alternatively, the triangular part of the blank located between the lines 31a and 31b may be removed, so that only the part located between the lines 11 and 31a need be fixed to the wall 6.

As shown more clearly in Figure 4, the fold lines 24 and 25 are interrupted between two points 34,35 and 36, 37 respectively, which constitute the respective terminal points of a U-shaped slot 38 and 39 which extends

into corresponding rim sections 28 and 29. When folding out the rim sections 28 and 29, each of the slots 38 and 39 forms a respective locking tongue, as illustrated in Figures 2 and 5.

- 5 Two elongated, narrow locking apertures in the form of slots 40 and 41 are provided in the remaining two rim sections 14 and 16, the one longitudinally extending edge of respective slots preferably falling on its associated fold line 18 or 19.
- 10 The described locking tongues and locking slots are intended for securing a lid 42 which is more clearly shown in Figure 5, this Figure illustrating a tray of identical form to that illustrated in Figure 2. Accordingly, the lid 42, which comprises a planar cardboard blank or
- 15 the like treated with a synthetic resin composition, presents two locking flaps 43 and 44, formed for example by punching out material from the edges of the lid, and two apertures 45 and 46, formed for example by through-
- 20 punching, said flaps and apertures being intended for locking co-action with the locking slots 40 and 41 and the locking tongues 38 and 39 of the tray. Each of the apertures 45 and 46 suitably comprises an elongated slot 45a and 46a respectively intended to receive a respective locking tongue on the tray, and two shorter slots
- 25 45b,c and 46b,c extending transversally to an associated elongated slot 45a and 46a, thereby to form two locking flaps between the slots 45b and c and between the slots 46b and c respectively. The lid 42 can thus be secured to the tray, by simply placing the lid against the rim
- 30 section and exerting a slight pressure on the lid, so that it snaps firmly into position against said rim sections.

According to an alternative embodiment the lid can be fastened to the tray by means of welds or the like. In

this case the locking slots and tongues on the rim sections and the locking slots and flaps on the lid can be omitted.

5 Figure 6 illustrates a holder 47 which is adapted to accommodate a plurality of collapsed trays placed in a stack therein. The trays can be removed singly from the holder 47 and caused to unfold to their erected state at the same time as they are removed.

10 The holder 47 has a bottom wall 48 and four vertical walls 49-52. The wall 49 presents along its vertical centre line a slot like opening 53 having a uniform width substantially equal to the distance between the fold lines 18 and 19 of the two walls 6 and 8. The collapsed trays are placed one upon the other in the holder
15 47 to form a stack 54 with each of the lower edges 3 and 7 of the walls 7 and 9 lying parallel with the width axis of the slot 53.

Resting freely on top of the stack 54 is a holding-down weight in the form of a rectangular plate 55 made, for
20 example, of metal or a plastics material. The plate 55 is provided on each of two mutually sides with a rectangular recess 56 and 57, such as to obtain an H-shape, with the web 58 mutually separating the recesses 56 and 57. The plate 55 is positioned so that its one recess,
25 e.g. the recess 56, faces the slot opening 53. As illustrated in Figure 6, the wall 7 of the uppermost collapsed tray can be gripped, either by the hand or a suitable gripping tool, and horizontal withdrawal of the tray through the slot opening 53 initiated. Since the width
30 of a collapsed tray is too great for the tray to pass through the slot 53, the edges defining the slot will engage the tray walls 6 and 7 and guide the same to a raised position, so that the tray can pass through the slot.

It will be understood that the plate 55 may have a shape different to that illustrated. One condition, however, is that the plate has a width which is at least equal to the distance between the free edges 14 and 16 in the collapsed state of the tray, so that the plate is lifted by said edges as the tray opens out. Neither need the hooking element 57 have the form of a recess, but may alternatively have the form of at least one outwardly projecting tongue or the like (not shown) capable of hooking onto the rear wall 9 when the tray is drawn through the slot opening 53. The choice of hooking element on the plate 55 is governed by the extent of the space available between the free edges 15 and 17 of the tray in its collapsed state. The hooking element may also conceivably have the form of one or more tongues or the like arranged in the recess 57 and extending from the rearward edge of the web 58. The hooking element may also comprise one or more tongues or the like projecting from underneath plate 55. In this case no recess 57 is needed in the plate.

C l a i m s:

1. A collapsible high-walled tray produced from a planar, rigid blank having a four-cornered base (1) defined by four bottom edges (2-5), and four walls (6-9) each of which presents a lower edge which coincides with a respective one of said bottom edges, two side edges (10-11, 11-12, 12-13 and 13-10) each of which coincides along a given length with a respective side edge of an adjacent wall, and an upper free edge (14-17), c h a r a c t e r i z e d in that each of two mutually opposing first walls (6,8) of said walls presents a respective first fold line (18 and 19) which extends between the two side edges of the wall parallel with the respective lower edge (2,4) thereof, and a respective second (20,22) and third (21,23) fold line which each extend from a respective lower corner of the wall to a respective free edge (14,16) thereof while intersecting the associated first fold line (18,19) to form an oblique angle (v_1) therewith, the second and the third fold lines forming an angle of about 45° with the side edge extending from the same corner, whereby each of said first walls (6,8) can either be folded (Figure 2) along a respective first fold line (18,19) to form a rim section (26-29) which in an outwardly folded position locks the wall in a position in which folding along any of the second and the third fold lines is prevented, or along the second and the third fold lines (Figure 3), so that both of said walls (6,8) are folded outwardly along their lower edges (2,4) until said walls lie flat on the base (1) of the tray, and so that the two remaining walls (7,9) can be simultaneously folded along their lower edges (3,5) in towards said base (1).

2. A tray according to Claim 1, c h a r a c t e r i z e d in that each of the two remaining walls (7,9) presents a fold line (24,26) which extends between the two side edges (10-12,13-10) of the wall in parallelity

with the lower edge (3,5) of said wall and at the same height from the base (1) of the tray as the first fold lines (18,19) of respective said first walls (6,8).

5 3. A tray according to Claim 2, c h a r a c t e r i-
z e d in that the fold lines (24,25) of the remaining
walls are interrupted between two points (34,35 and 36,
37) which constitute the terminal points of a U-shaped
slot (38 and 39) which extends into a respective rim
section (28,29) of an associated wall such as to form
10 a locking tongue, wherewith a lid (42) which is intended
to be placed on the rim (26-29) of the tray is provided
with two apertures (45,46) for locking engagement with
a respective one of said tongues.

15 4. A tray according to Claim 3, c h a r a c t e r i-
z e d in that each of the rim sections (26,27) of the
first two walls presents a slot (40,41) for locking
engagement with a respective locking flap (43,44) pro-
vided on the lid (42).

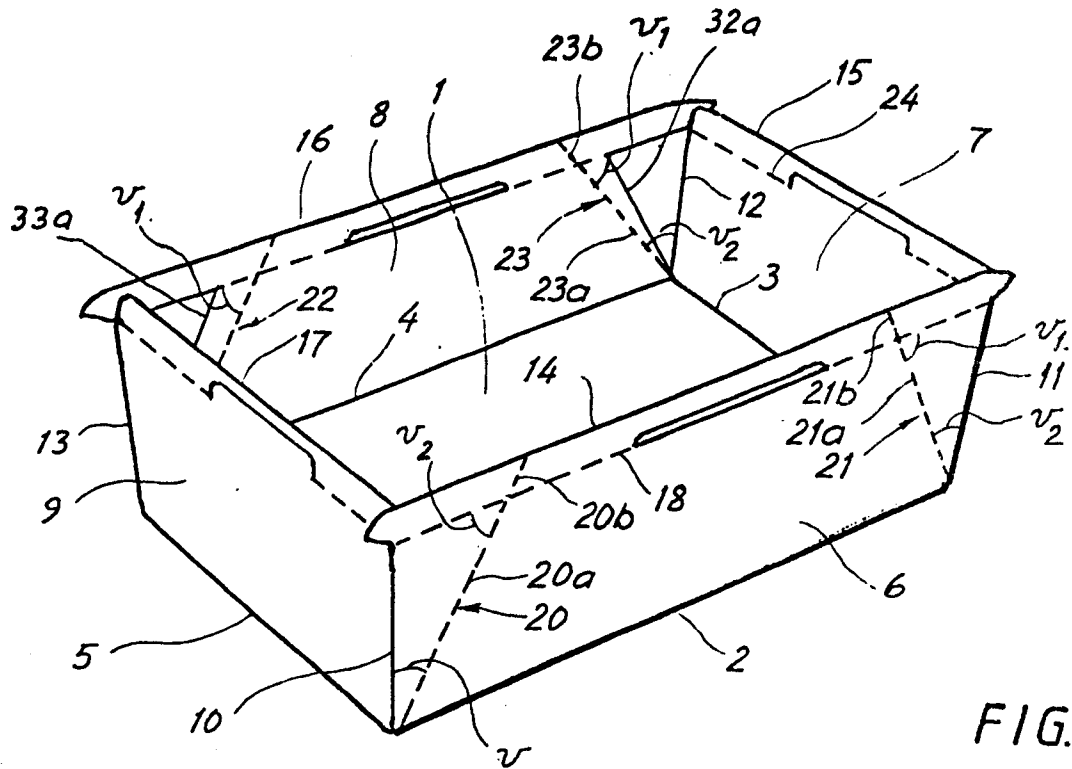


FIG. 1

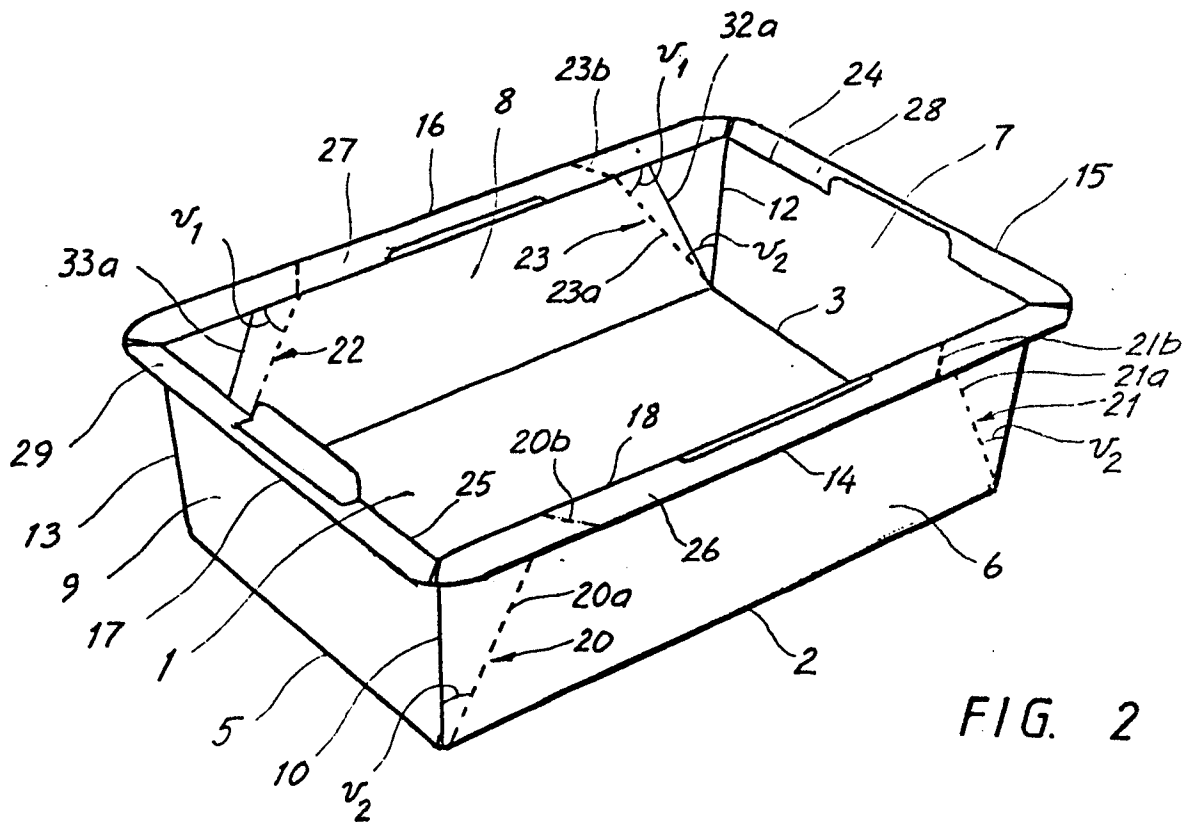


FIG. 2

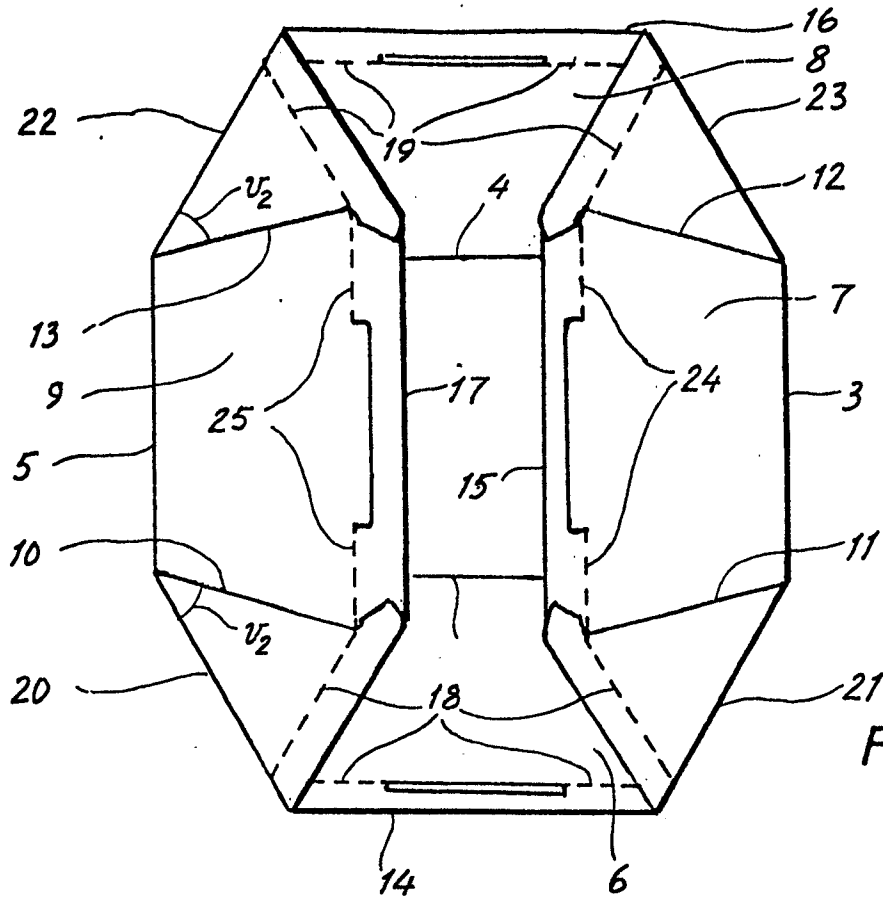


FIG. 3

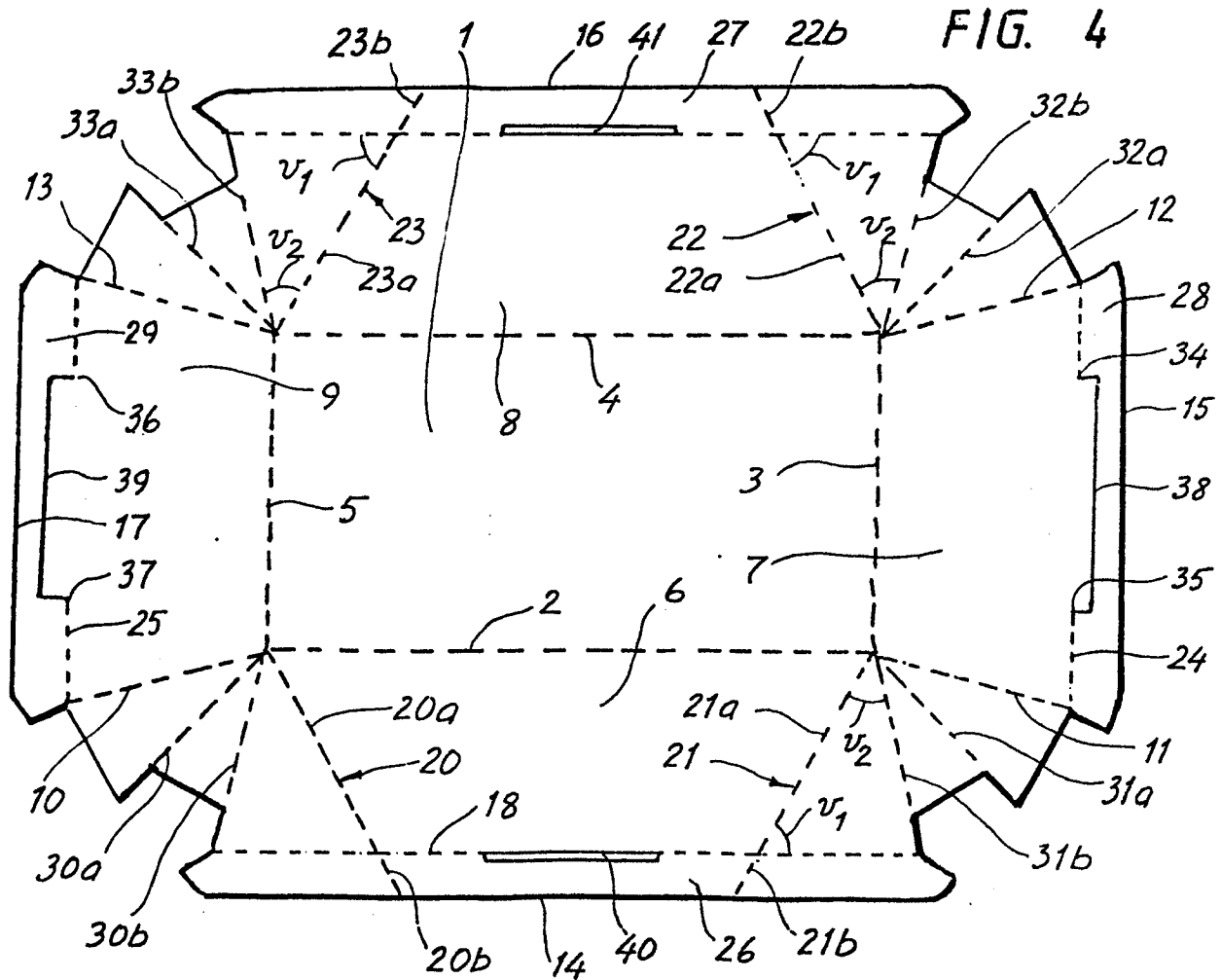
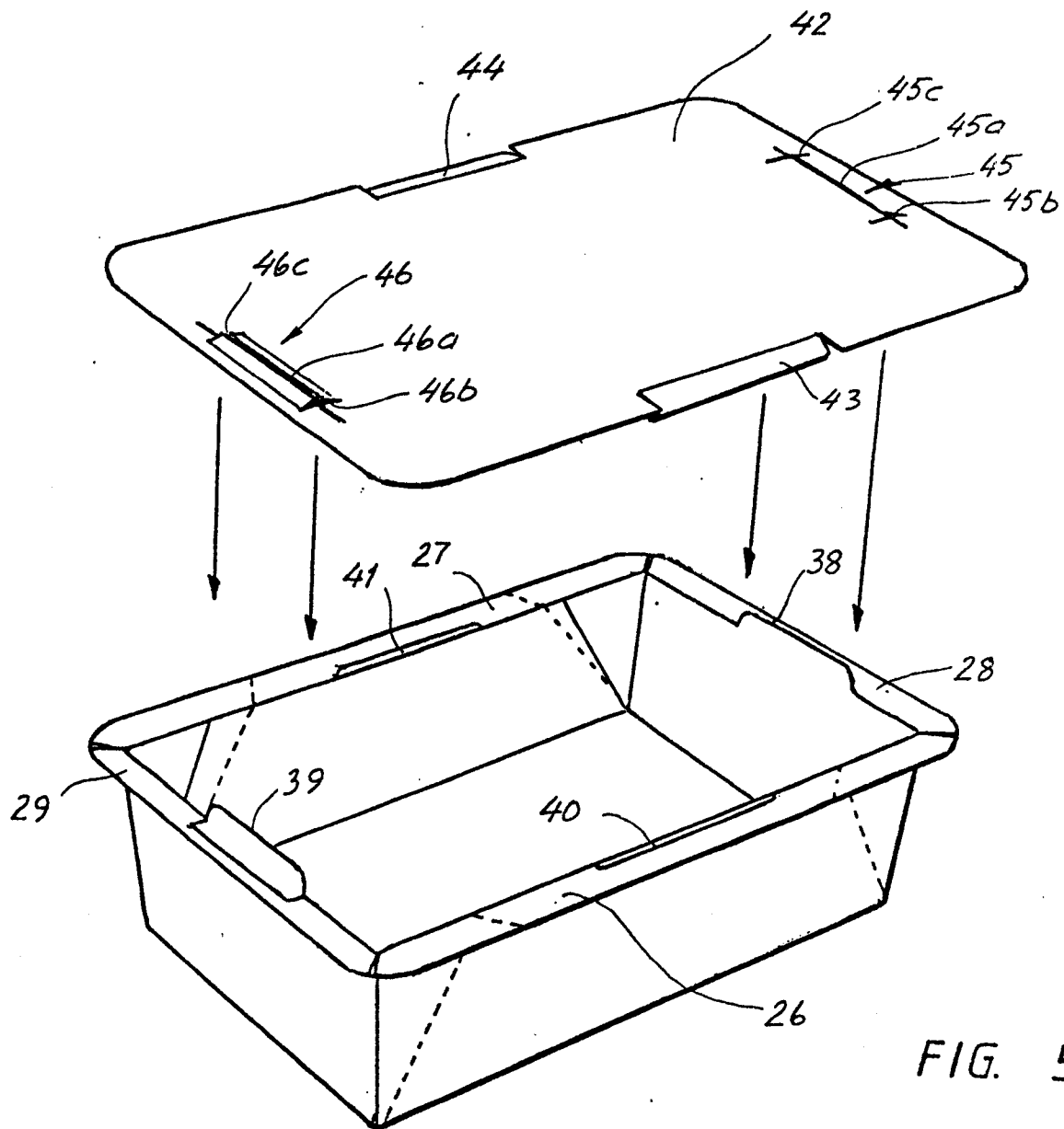


FIG. 4



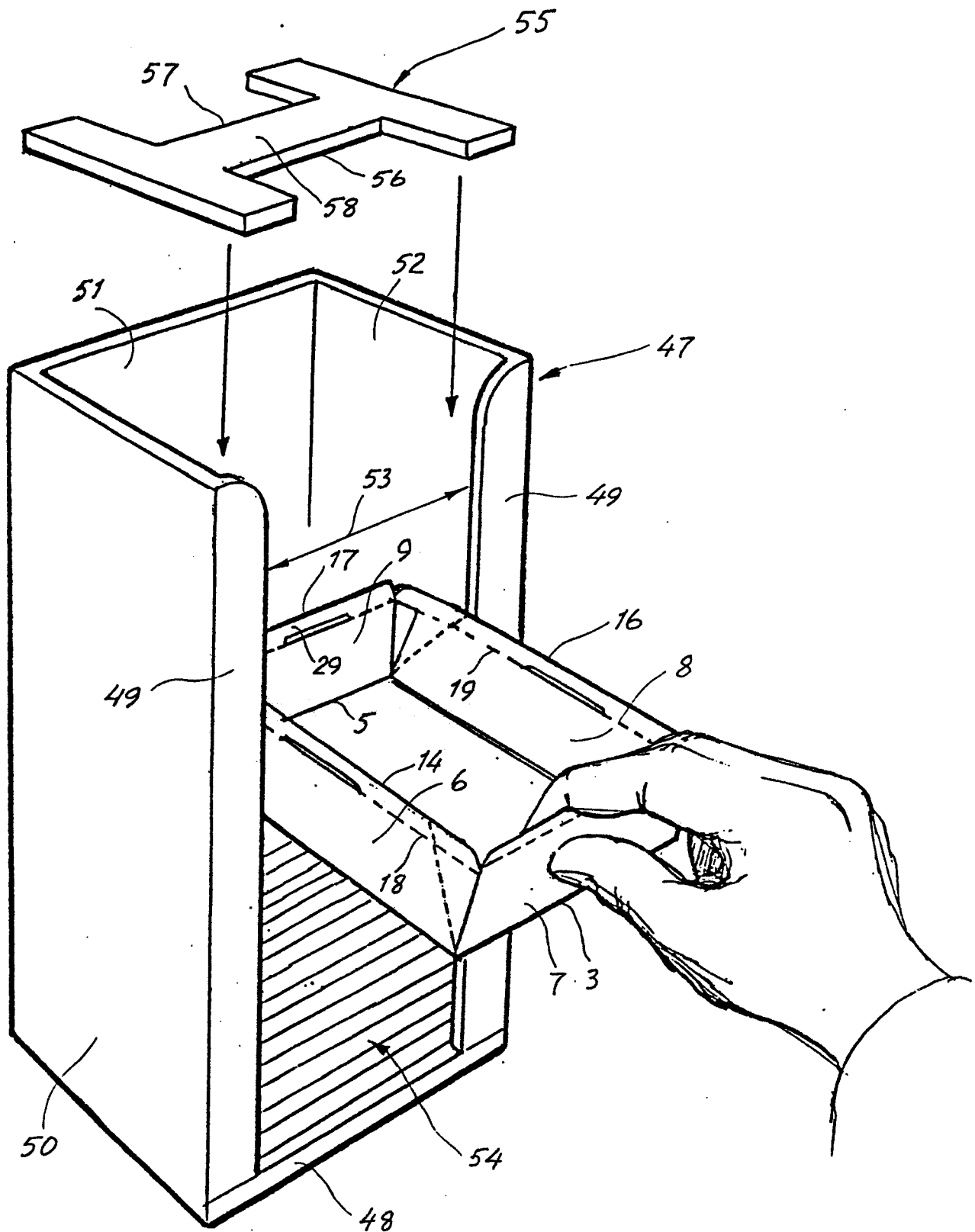


FIG. 6