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**GB-A- 2 160 506**  
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# DESCRIPTION

**[0001]** The present invention relates to a blank of corrugated cardboard, and the box obtained from folding such a blank.

**[0002]** As it is known, corrugated cardboard is composed of a fluted paper core sandwiched between and bonded to inner and outer paper face liners.

**[0003]** According to the prior art, any kind of box is produced from one or more specific blanks of corrugated cardboard in dependence on the intended use and distribution channel. Hence, the present trends towards multiple formats, smaller volumes and customization dramatically increase the burden on production lines for adapting to such different requirements. One object of the present invention is thus reducing the burden imposed by such articulated and various requirements on the production lines. A blank and a box obtained from said blank are known from GB 2 160 506 A.

**[0004]** According to the present invention, this object is achieved by means of a blank comprising:

- a chassis of corrugated cardboard having a series of four first parallel crease lines, and a second and a third crease line intersecting said four first parallel crease lines, wherein said first, second and third crease lines individuate a series of a quadrangular closure flap, a quadrangular cover panel, a first quadrangular lateral panel, a quadrangular bottom panel and a second quadrangular lateral panel, wherein said second crease line individuates a respective left quadrangular flap of each panel and wherein said third crease line individuates a respective right quadrangular flap of each panel, each flap being separated from the adjacent flaps by cuts which extend along a prolongation of the respective first crease line,
- two compression members of corrugated cardboard glued to an internal face of the chassis in correspondence of areas at least bordering on both sides at least a part of a respective length of the second crease line joining the first and second quadrangular lateral panel to the respective left flap, and
- two compression members of corrugated cardboard glued to the internal face of the chassis in correspondence of areas at least bordering on both sides at least a part of a respective length of the third crease line joining the first and second quadrangular lateral panel to the respective right flap.

**[0005]** A further subject-matter of the present invention is constituted by a box obtainable from the above-disclosed blank by:

- folding the first and second lateral panels at 90° about the respective first crease line contiguous to the bottom panel, so as a first couple of opposite box side faces is formed,

- folding the flaps of the first and second lateral panels at 90° about the respective lengths of the second and third crease lines, so that a second couple of opposite box side faces is formed,
- folding the flaps of the bottom panel at 90° about the respective lengths of the second and third crease lines, so that the flaps of the bottom panel are arranged parallel and externally to said flaps of the first and second lateral panels,
- folding the cover panel at 90° about the first crease line contiguous to the adjacent lateral panel,
- folding the flaps of the cover panel at 90° about the respective lengths of the second and third crease lines, so that the flaps of the cover panel are arranged parallel and externally to said flaps of the first and second lateral panels, and
- folding the closure flap at 90° about the respective first crease line contiguous to the cover panel, so that said closure flap is arranged parallel and externally to said second lateral panel, wherein each corner of the box is internally reinforced by a compression member.

**[0006]** According to the invention, by changing size and marginal features of the standardized blank, whose basic structure remains unchanged, it is possible to produce different boxes satisfying quite different requirements.

**[0007]** According to the present invention, the performance of the used cardboard is optimized by using strengthening members where they are most needed and thus lightening the general structure of the box, which is thus fundamentally different from the conventional one due to the significant increase in performance.

**[0008]** The strength-conferring material is allocated only where it is absolutely needed: in particular, the chassis weight is decreased, because an high amount of fiber is not needed in the flaps, and the purpose of the chassis is essentially just to wrap around the articles within the box, so that the quantity of fiber is dramatically lower in comparison with conventional chassis. Such a reduction is rendered possible by the use of the compression members which confer the required strength.

**[0009]** According to the prior art, the final box is produced from a blank or chassis, in the entirety of which the quantity of fiber and the board grade are adapted to the performances required for the intended application.

**[0010]** On the contrary, according to the present invention, the manufacturing of chassis of different board grades is avoided and the chassis can be produced with the lightest weight, whereas the satisfaction of different requirements is allowed by selection of the proper size of the compression members.

**[0011]** For example, a box according to the invention has a total grammage of 99 g of fiber

and is suitable for containing a load of 149 kg, with a reduction in fiber weight of 29% in respect of a conventional box realizing the same performance.

**[0012]** The gist of the present invention thus resides in the presence of the compression members, whose size can vary and provide the flexibility necessary for adapting to the different requirements with the lowest possible weight obtainable today on a corrugator.

**[0013]** Further advantages and features of the present invention will be apparent from the following detailed description, given by way of non-limiting example with reference to the appended drawings, in which:

figure 1 is an exploded perspective view of a blank according to the invention,

figure 2 is a plan view of the blank of figure 1,

figure 3 is a plan view of a second embodiment of a blank according to the invention,

figure 4 is a plan view of a third embodiment of a blank according to the invention,

figure 5 is a perspective view in open configuration of a box obtained from the blank of figure 1,

figure 6 is a perspective view in open configuration of a further embodiment of box according to the invention, and

figure 7 is a perspective view in open configuration of a box obtained from the blank of figure 4.

**[0014]** A blank (see figures 1 and 2) comprises a chassis 10 of corrugated cardboard and four reinforcing members 30 of corrugated cardboard which can be of the same or different kind as the cardboard of the chassis 10. The flutes of the cardboard of the compression members 30 may be substantially orthogonal or parallel to the flutes of the cardboard of the chassis 10.

**[0015]** The chassis 10 has a series of four first parallel crease lines 12a-d, and a second and a third crease line 14a, 14b intersecting the four first parallel crease lines 12a-d.

**[0016]** The first, second and third crease lines 12a-d, 14a, 14b individuate a series of a quadrangular closure flap 16, a quadrangular cover panel 18, a first quadrangular lateral panel 20, a quadrangular bottom panel 22 and a second quadrangular lateral panel 24. The closure flap 16 has a median portion formed by a strip 32 separated by the adjacent end portions by respective pre-perforated detachment lines 34.

**[0017]** Furthermore, the second crease line 14a individuates a respective left quadrangular flap 26a of each panel 18, 20, 22, 24 and the third crease line 14b individuates a respective right quadrangular flap 26b of each panel 18, 20, 22, 24. Each flap 26a, 26b is separated from the adjacent flaps 26a, 26b by cuts 28 which extend along a prolongation of the respective first crease line 12b-d. The width of the flaps 26a, 26b is preferably about half of the length of the

second and third crease lines 14a, 14b defining the bottom panel 22.

**[0018]** As shown by figure 2, the second and third crease lines 14a, 14b are orthogonal to the four first parallel crease lines 12a-d and parallel to each other, so that the panels 18, 20, 22, 24 are substantially rectangular, including the particular case of "square".

**[0019]** Figure 3 shows a different embodiment of the chassis 10, wherein the second and third crease lines 14a, 14b are slightly inclined and intersect the four first parallel crease lines 12a-d at an angle slightly lower than 90°, e.g. until 85°. The other features of the chassis of figure 3 are the same as the ones of the chassis of figure 2 and indicated by the same reference numbers.

**[0020]** Two compression members 30 (see figures 1 and 2) are glued to an internal face of the chassis 10 in correspondence of areas at least bordering on both sides at least a part of a respective length of the second crease line 14a joining the first and second quadrangular lateral panel 20, 24 to the respective left flap 26a. Likewise, two compression members 30 are glued to the internal face of the chassis 10 in correspondence of areas at least bordering on both sides at least a part of a respective length of the third crease line 14b joining the first and second quadrangular lateral panel 20, 24 to the respective right flap 26b.

**[0021]** A box (see figure 5), in particular a retail shipper, is obtained from the previously disclosed blank by substantially conventional automatized methods of folding, possibly providing also for using, if necessary, glue and/or adhesive tape.

**[0022]** In particular, one of such methods provides for:

- folding the first and second lateral panels 20, 24 at 90° about the respective first crease line 12c, 12d contiguous to the bottom panel 22, so as a first couple of opposite box side faces is formed,
- folding the flaps 26a, 26b of the first and second lateral panels 20, 24 at 90° about the respective lengths of the second and third crease lines 14a, 14b, so that a second couple of opposite box side faces is formed,
- folding the flaps 26a, 26b of the bottom panel 22 at 90° about the respective lengths of the second and third crease lines 14a, 14b, so that the flaps 26a, 26b of the bottom panel 22 are arranged parallel and externally to the flaps 26a, 26b of the first and second lateral panels 20, 24,
- folding the cover panel 18 at 90° about the first crease line 12b contiguous to the adjacent lateral panel 20,
- folding the flaps 26a, 26b of the cover panel 18 at 90° about the respective lengths of the second and third crease lines 14a, 14b, so that the flaps 26a, 26b of the cover panel 18 are arranged parallel and externally to the flaps 26a, 26b of the first and second lateral panels 20, 24, and
- folding the closure flap 16 at 90° about the respective first crease line 12a contiguous to the cover panel 18, so that the closure flap 16 is arranged parallel and externally to

second lateral panel 24.

**[0023]** As it is apparent from figure 5, each corner of the box 36 is internally reinforced by a compression member 30.

**[0024]** Figure 6 shows a different embodiment of box 36, which is an e-com shipper. In this latter embodiment, the compression members 30 have a greater size, so that they reinforce the second couple of opposite box side faces for the entire extension thereof. Furthermore, the flutes of the chassis 10 may be so oriented that they lie horizontally in the erected configuration of the panels 24, 20, whereas they may lie vertically in the erected configuration of the box of figure 5. The other features of the boxes of figures 5 and 6 are substantially the same.

**[0025]** Figures 4 and 7 illustrate a further embodiment of blank and box, respectively, wherein features equal or equivalent to the ones disclosed with reference to the embodiments of the previous figures have the same reference number.

**[0026]** In this embodiment, the chassis has pre-perforated detachment lines 38 and the box 36 is a shelf ready container having a removable portion 42 delimited by these pre-perforated detachment lines on the cover panel, the lateral panels and a front part of the box 36.

**[0027]** As it is apparent from figure 7, the compression members 30 reinforcing the front corners of the box are glued solely to the removable portion 40, so that they are removed together with this latter and do not hinder the access of the public to the articles within the box 36. It has to be emphasized that the portion 40 is quick and easy to remove and also to knock-flat after removal

**[0028]** Accordingly, such latter embodiment constitutes further evidence of the versatility offered by the box structure of the present invention.

## **REFERENCES CITED IN THE DESCRIPTION**

Cited references

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**Patent documents cited in the description**

- GB2160506A [0003]

**Patentkrav****1. Emne bestående af:**

- en ramme (10) af bølgepap med en række af fire første parallelle foldelinjer (12a-d), og en anden og en tredje foldelinje (14a, 14b), der skærer de fire første parallelle foldelinjer (12a-d), hvor nævnte første, anden og tredje foldelinje (12a-d, 14a, 14b) individuelt udgør en række af en firkantet lukkeflap (16), et firkantet dækpanel (18), et første firkantet sidepanel (20), et firkantet bundpanel (22) og et andet firkantet sidepanel (24), hvori nævnte anden foldelinje (14a) individuelt udgør en respektiv venstre firkantet flap (26a) af hvert panel (18, 20, 22, 24), og hvor nævnte tredje foldelinje (14b) individuelt udgør en respektiv højre firkantet flap (26b) af hvert panel (18, 20, 22, 24), idet hver flap (26a, 26b) er adskilt fra de tilstødende flapper (26a, 26b) ved snit (28), som strækker sig langs en forlængelse af den respektive første foldelinje (12b-d),

**15 kendetegnet ved, at**

- to kompressionselementer (30) af bølgepap er limet til en indvendig flade af rammen (10) i overensstemmelse med områder, der i det mindste på begge sider grænser op til mindst en del af en respektiv længde af den anden foldelinje (14a), der forbinder det første og andet firkantede sidepanel (20, 24) til den respektive venstre flap (26a), og

- to kompressionselementer (30) af bølgepap er limet til den indvendige flade af rammen (10) i overensstemmelse med områder, der i det mindste på begge sider grænser op til mindst en del af en respektiv længde af den tredje foldelinje (14b), der forbinder det første og andet firkantede sidepanel (20, 24) til den respektive højre flap (26b).

**2.** Emne ifølge krav 1, hvor nævnte anden og tredje foldelinje (14a, 14b) skærer nævnte fire første parallelle foldelinjer (12a-d) i en vinkel i området 90° til 85°, og især er vinkelrette på fire første parallelle foldelinjer (12a-d).

**3.** Emne ifølge et hvilket som helst af de foregående krav, hvor rillerne af nævnte kompressionselementer (30) er i alt væsentligt parallelle med rillerne af nævnte ramme (10).

**4.** Emne ifølge et hvilket som helst af de foregående krav 1 eller 2, hvor rillerne af nævnte kompressionselementer (30) (10) er i alt væsentligt vinkelrette på rillerne af nævnte ramme (10).

5 **5.** Emne ifølge et hvilket som helst af de foregående krav, hvor bredden af nævnte flapper (26a, 26b) er ca. halvdelen af længden af den anden og tredje foldelinje (14a, 14b), der definerer nævnte bundpanel (22).

**6.** Emne ifølge et hvilket som helst af de foregående krav, hvor bølgepappet af 10 rammen (10) og kompressionselementerne (30) er af samme slags.

**7.** Emne ifølge et hvilket som helst af de foregående krav, hvor nævnte lukkeflap (16) har en midterdel dannet af en strimmel (32), der er adskilt af de tilstødende endedele af respektive præperforerede adskillelseslinjer (34).

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**8.** Kasse (36) opnåelig fra et emne ifølge et hvilket som helst af de foregående krav ved:

- 20 - foldning af det første og det andet sidepanel (20, 24) ved 90° omkring den respektive første foldelinje (12c, 12d), der støder op til bundpanelet (22), således at der dannes et første par modstående kassesideflader,
- foldning af flapperne (26a, 26b) af det første og andet sidepanel (20, 24) ved 90° omkring de respektive længder af den anden og tredje foldelinje (14a, 14b), således at der dannes et andet par modstående kassesideflader,
- 25 - foldning af flapperne (26a, 26b) ved bundpanelet (22) ved 90° omkring de respektive længder af den anden og tredje foldelinje (14a, 14b), således at flapperne (26a, 26b) på bundpanelet (22) er anbragt parallelt og udvendigt i forhold til nævnte flapper (26a, 26b) af det første og andet sidepanel (20, 24),
- 30 - foldning af dækpanelet (18) ved 90° omkring den første foldelinje (12b), der støder op til det tilstødende sidepanel (20),
- foldning af flapperne (26a, 26b) på dækpanelet (18) ved 90° omkring de respektive længder af den anden og tredje foldelinje (14a, 14b), således at flapperne (26a, 26b) på dækpanelet (18) er anbragt parallelt og udvendigt

i forhold til nævnte flapper (26a, 26b) af det første og andet sidepanel (20, 24), og

- 5 - foldning af lukkeflappen (16) ved 90° omkring den respektive første foldelinje (12a), der støder op til dækpanelet (18), således at nævnte lukkeflap (16) er anbragt parallelt og udvendigt i forhold til nævnte andet sidepanel (24), hvor hvert hjørne af kassen er indvendigt forstærket af et kompressionselement (30).

9. Kasse (36) ifølge krav 8, som er valgt i gruppen bestående af detailafsender, e-  
10 handelaftsender og hyldeklar beholder.

10. Kasse (36) ifølge krav 9, som er en hyldeklar beholder med en aftagelig del (40) afgrænset af respektive præperforerede adskillelseslinjer (38) på dækpanelet, sidepanelerne og en frontdel.

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11. Kasse (36) ifølge krav 10, hvor kompressionselementerne (30), der forstærker de forreste hjørner af kassen (36), er limet udelukkende til nævnte aftagelige del (40).

DRAWINGS

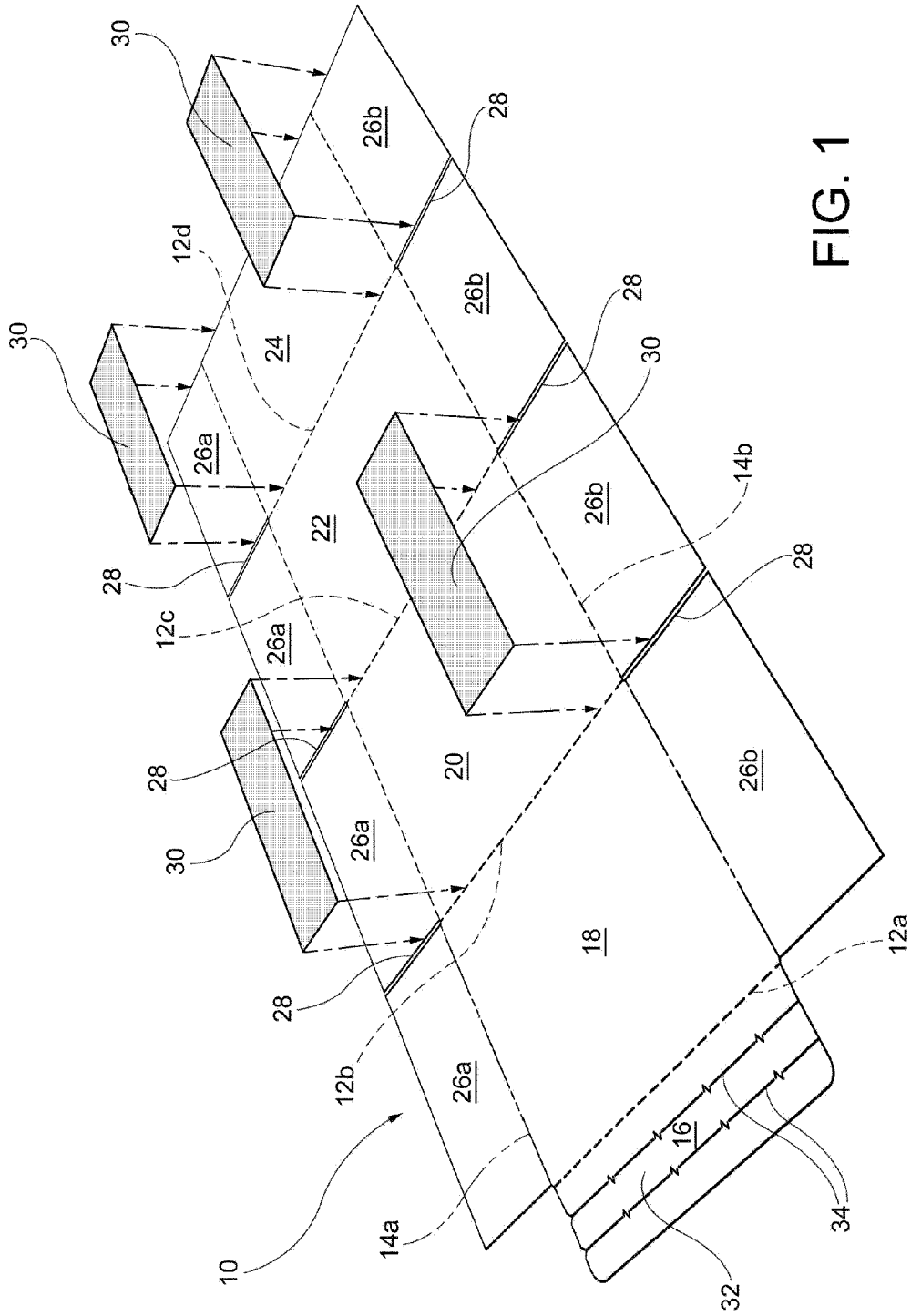


FIG. 1

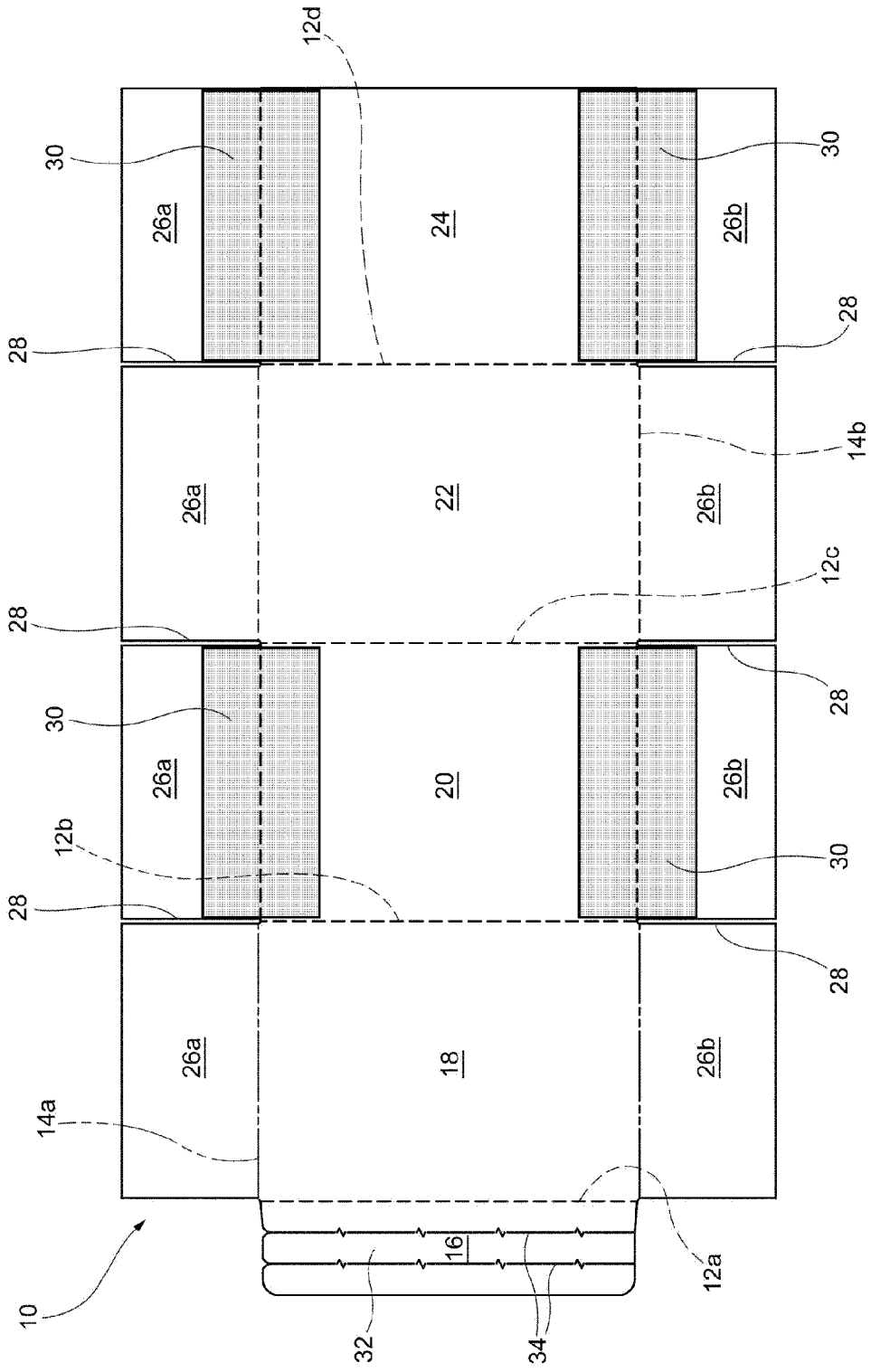


FIG. 2

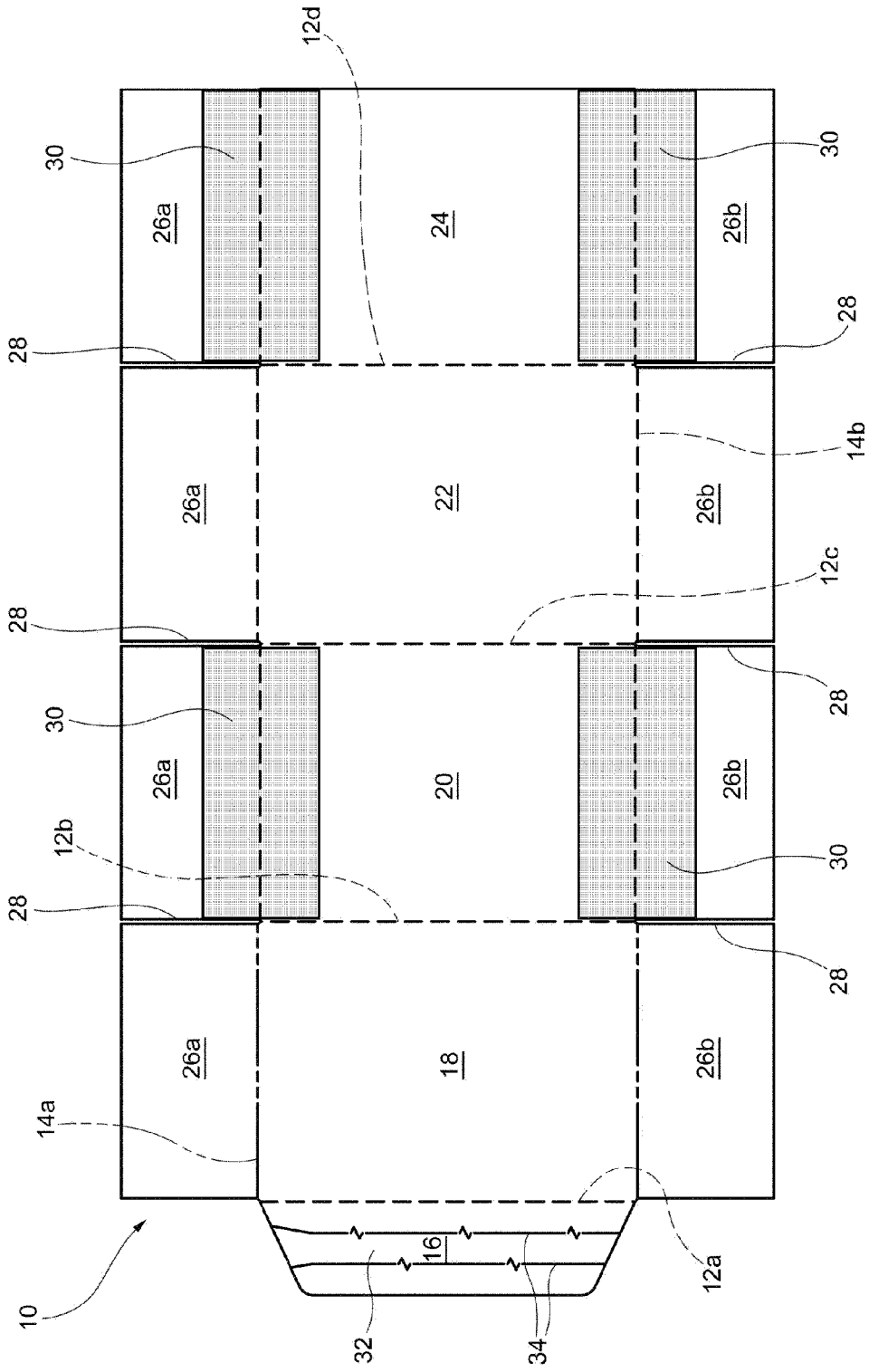


FIG. 3

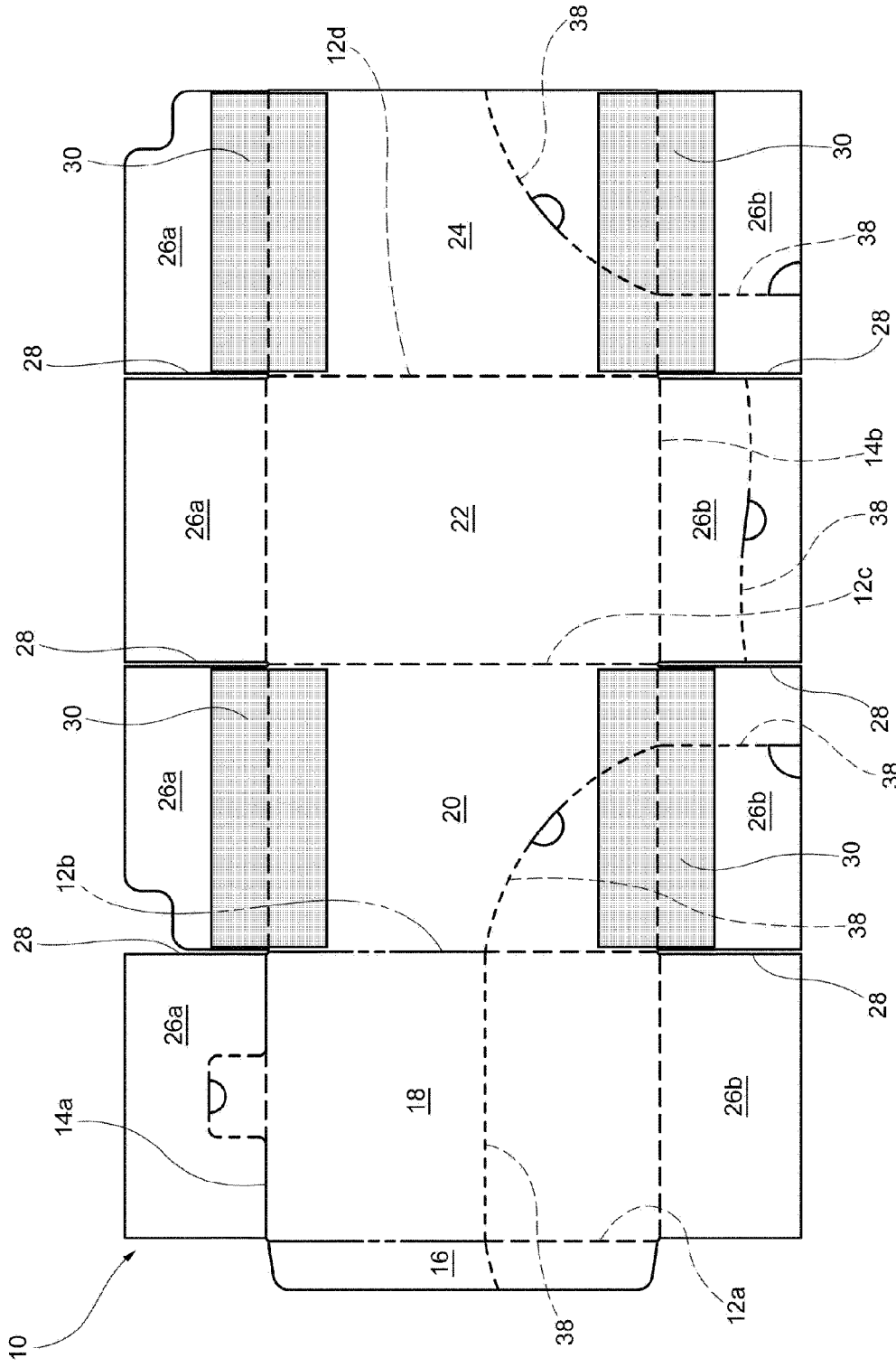
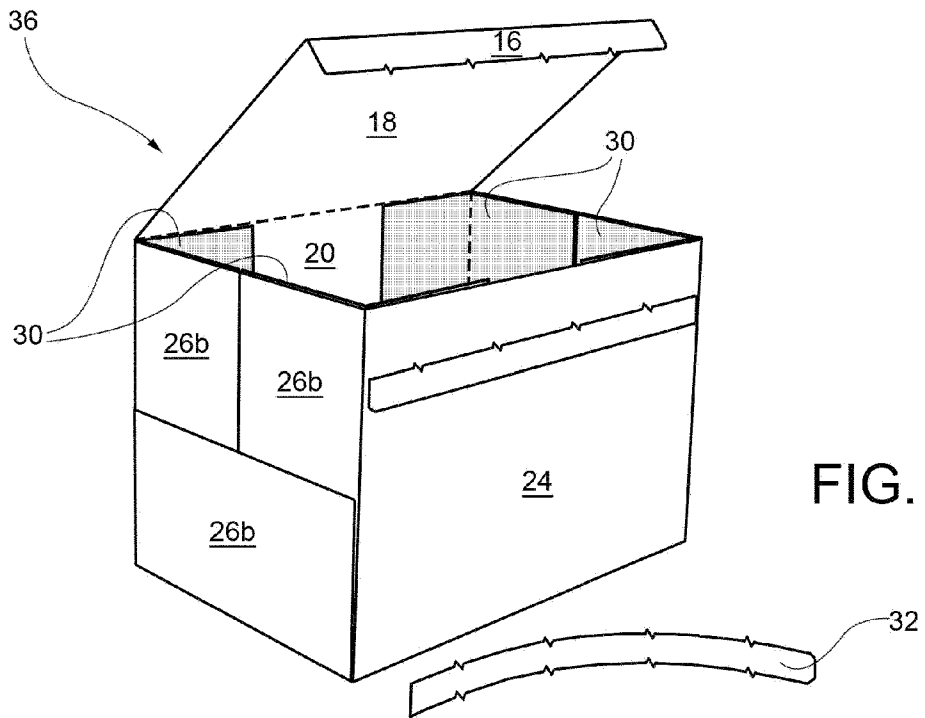
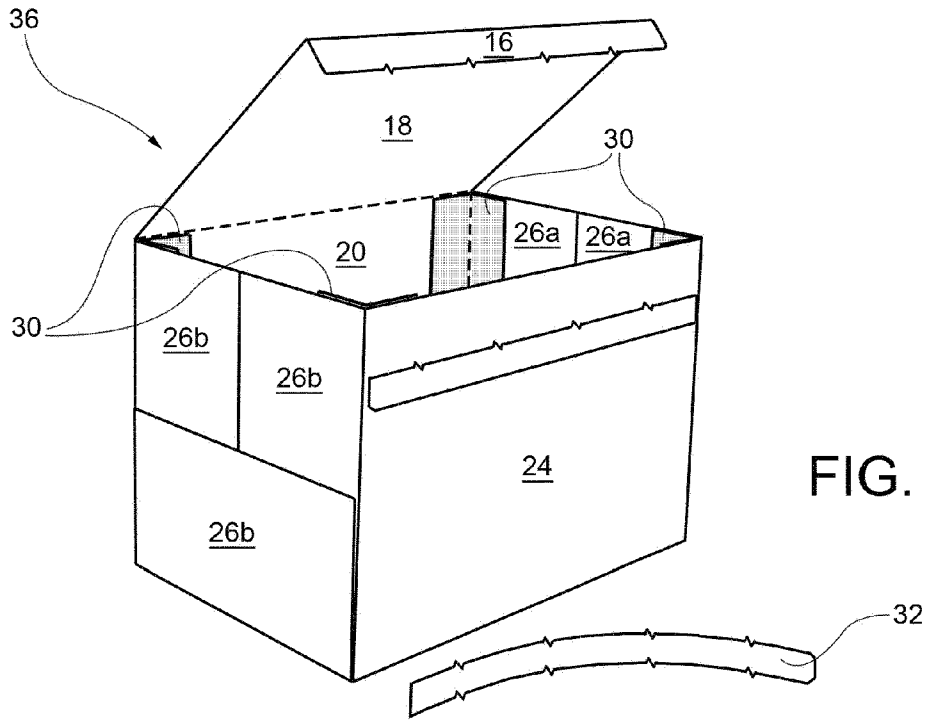


FIG. 4



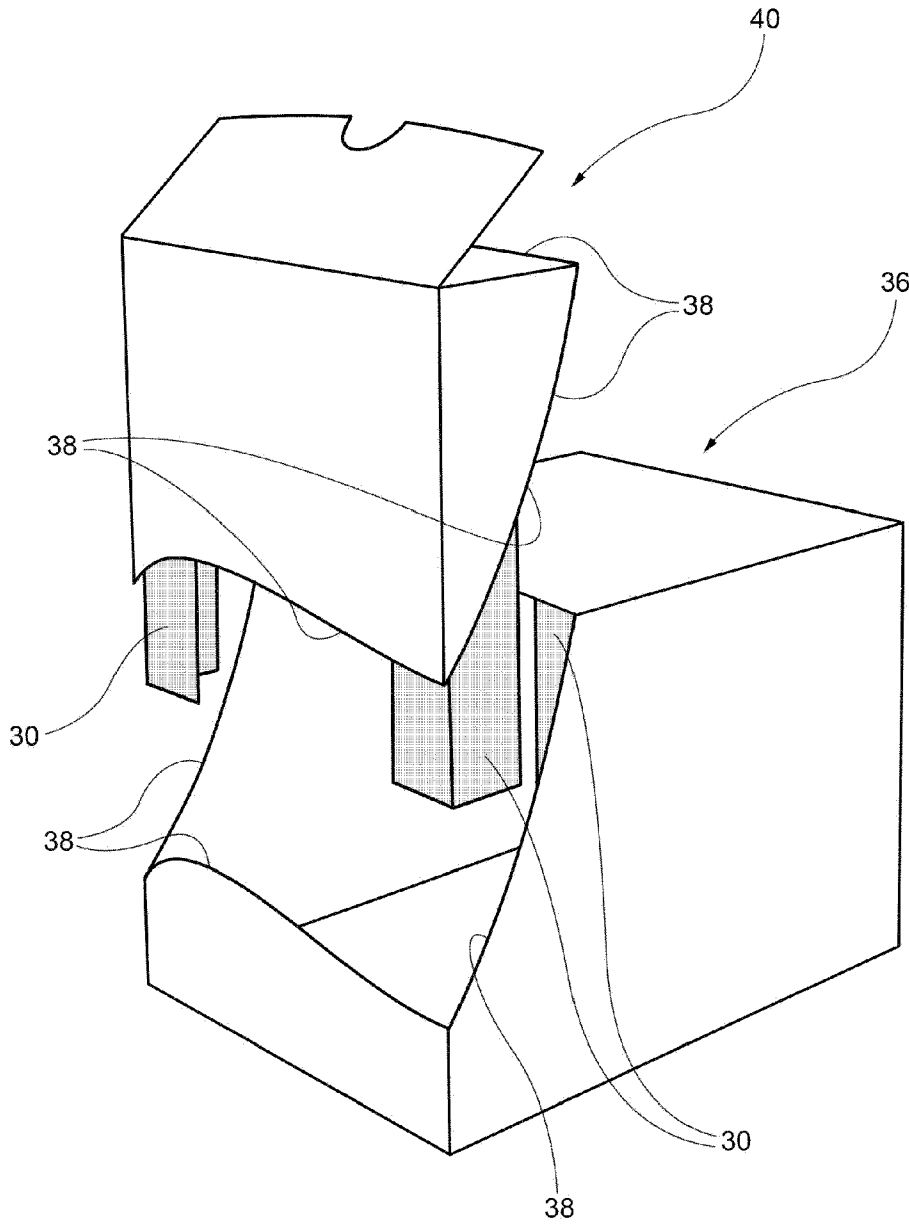


FIG. 7