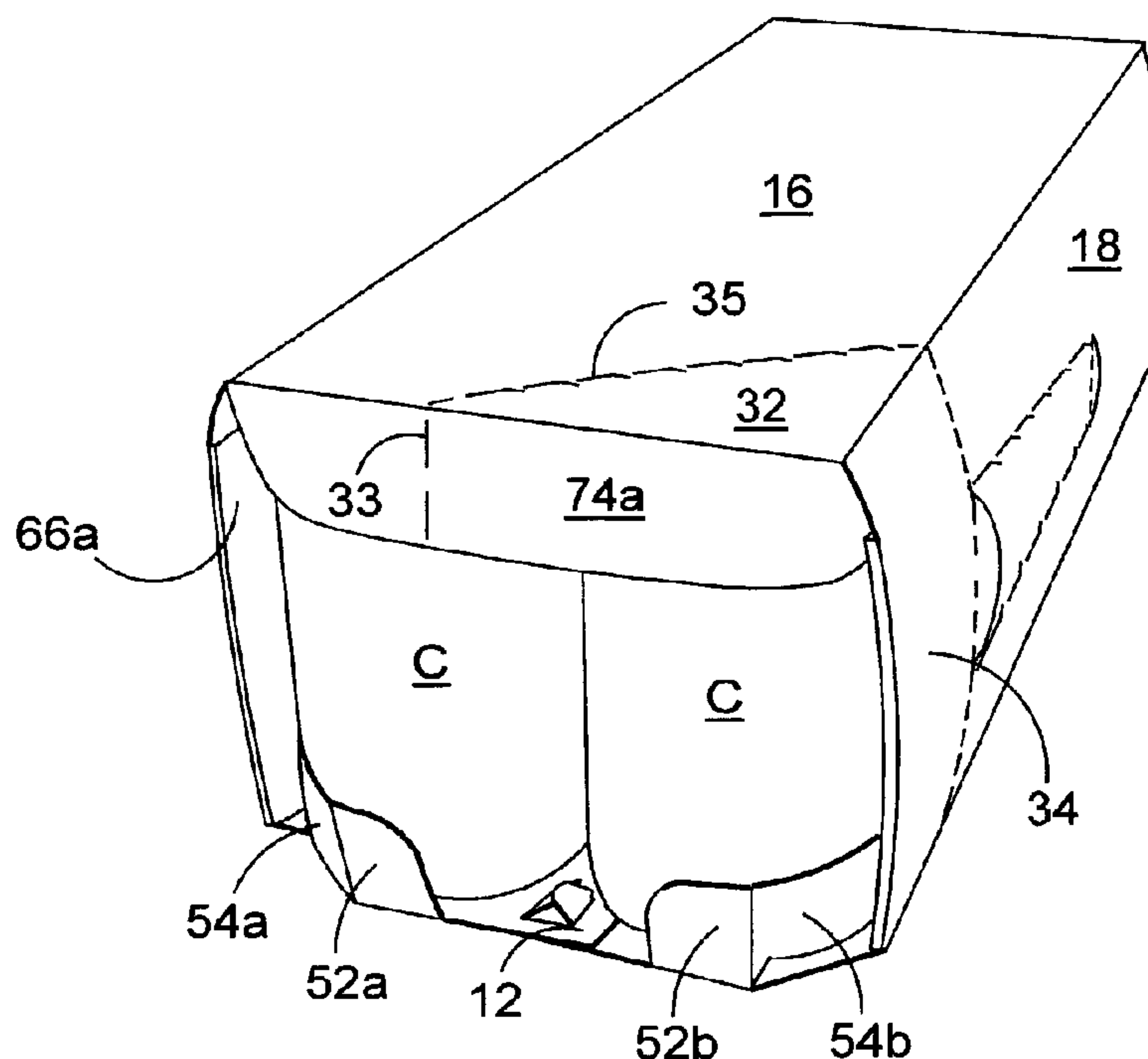




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(54) Titre : EMBALLAGE DE CARTON FACILITANT L'EXTRACTION DE CANETTES
(54) Title: CARTON WITH DISPENSING FEATURE FOR CANS



(57) Abrégé/Abstract:

A carton for cans in two rows is provided wherein a base wall of the carton is formed from a pair of overlapping panels (12, 20) of the carton secured together so that the carton walls are tensioned around articles contained in the carton wherein the carton is adapted to be utilized such that a lower most row of cans (C) is in rolling contact with one (14) of the carton side walls (14, 18) disposed to act as the base of the carton and wherein article retaining means (74a, 51a, 51b) are provided at least partially to close one end of the carton to discourage dislodgement of the articles from that end of the carton and access means (30) is provided at the one end of the carton, the removal of which releases the upper row of cartons from restraint by the article retaining means but maintains the article retaining means effective for the lower row of articles, and wherein removal of the access means further relieves tension of the carton walls about the articles to facilitate their removal from that end of the carton.

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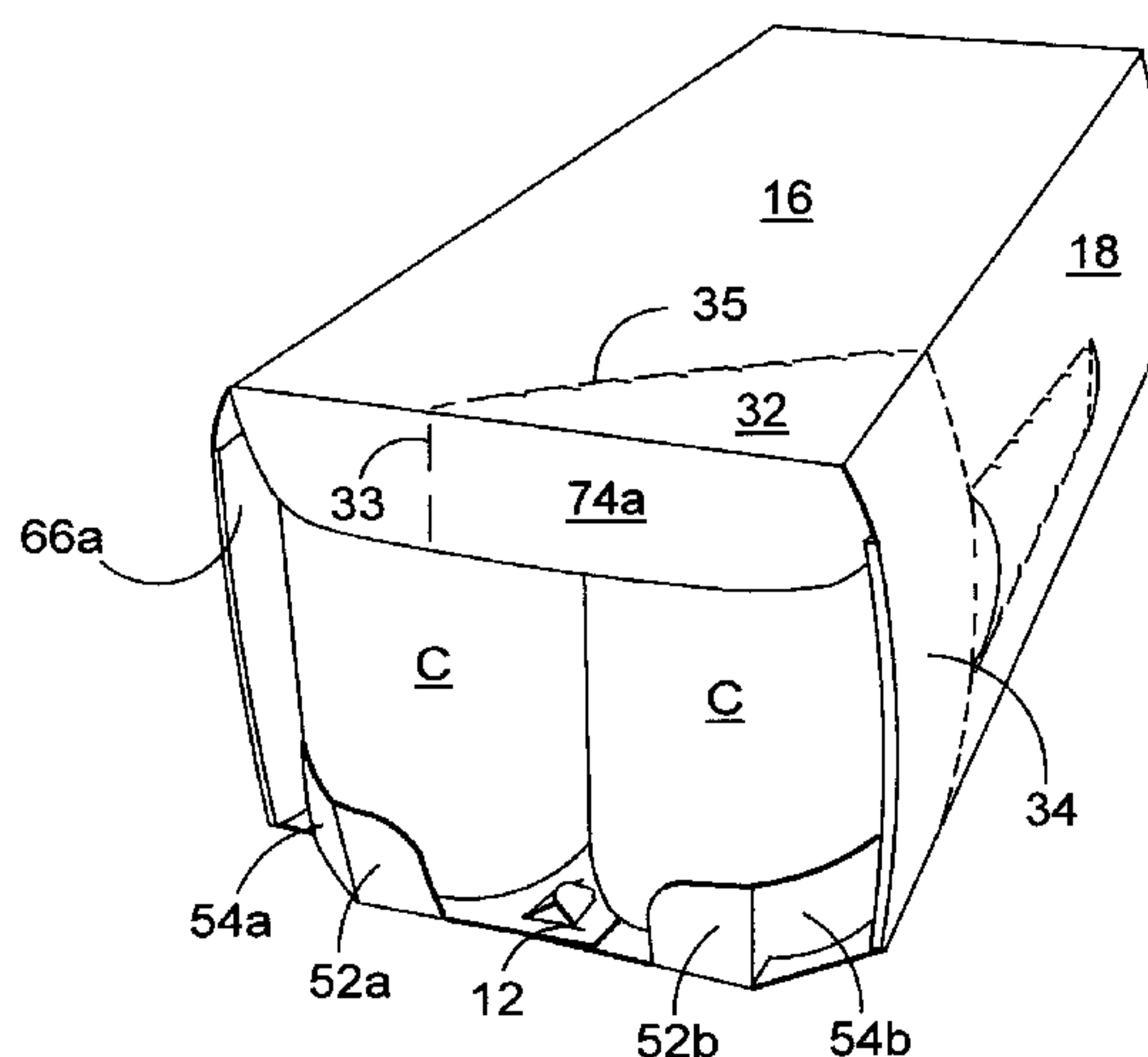
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(54) Title: CARTON WITH DISPENSING FEATURE FOR CANS



(57) Abstract: A carton for cans in two rows is provided wherein a base wall of the carton is formed from a pair of overlapping panels (12, 20) of the carton secured together so that the carton walls are tensioned around articles contained in the carton wherein the carton is adapted to be utilized such that a lower most row of cans (C) is in rolling contact with one (14) of the carton side walls (14, 18) disposed to act as the base of the carton and wherein article retaining means (74a, 51a, 51b) are provided at least partially to close one end of the carton to discourage dislodgement of the articles from that end of the carton and access means (30) is provided at the one end of the carton, the removal of which releases the upper row of cartons from restraint by the article retaining means but maintains the article retaining means effective for the lower row of articles, and wherein removal of the access means further relieves tension of the carton walls about the articles to facilitate their removal from that end of the carton.

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CARTON WITH DISPENSING FEATURE FOR CANS

Background of the Invention

This invention relates to a carton, preferably a wraparound carton, which is particularly, but not exclusively, a carton for cans and includes detachable means at one end of the carton the detachment of which removes article restraining means and facilitates access to the carton contents.

Cartons for encasing and dispensing multiple articles such as soft drink cans or bottles are useful for enabling users to transport, store, and access the articles for consumption. The user typically prefers the ability to easily retrieve one article from the carton at a time. To that end, it is desirable to have cartons with dispensers which allow one article to be removed at a time, while continuing to encase the remaining articles. The user tears out a detachable portion of the carton to form an access opening from which articles may be dispensed.

When the articles contained in the carton are cylindrical, and are disposed in the carton upon their sides, it is important that the articles be constrained such that the remaining articles do not unexpectedly and undesirably roll out of the dispenser when one is removed. Thus, it can be appreciated that it would be desirable to have a carton with a dispenser that constrains articles to prevent the articles from undesirably rolling from or otherwise exiting the carton when one article is removed.

As a carton may be stored in a restrictive space such as on a refrigerator shelf, it is advisable to provide an access opening that enables a user to access an end of an article to pull the article out of the carton end rather than having to lift the article out of the top of the carton. End removal of articles is especially advantageous where the carton is to be stored on an adjustable refrigerator shelf, because the user is able to optimize storage space by conforming the height of the shelf to the height of the carton, without obscuring the access opening.

It is known to provide a carton having an end accessible dispenser for articles, such as those shown in U. S. Patent Nos. 6,283, 293 and 6,578, 736. Advantageously, these cartons enable the

user to access either the end or side of a cylindrical article through an access opening, such that the article can be removed from the carton through the end and/or top wall portion of the access opening without undesired exit of the other articles in the carton. However, the known end accessible dispensers have been available primarily for end-loading cartons and particularly for fully enclosed, end-loading cartons. There have not been many wraparound- style cartons that were provided with end accessible dispensers that were designed such that the articles in the carton may be removed one at a time through an open end while the other articles are well retained within the carton or otherwise the integrity of the carton was well maintained.

Therefore, there is a need for an improved article dispenser or a carton with such an article dispenser that is convenient to use with open-ended cartons and facilitates access to and removal of articles.

Summary of the Invention

One aspect of the invention provides a carton for cans in two rows wherein a base wall of the carton is formed from a pair of overlapping panels of the carton secured together so that the carton walls are tensioned around articles contained in the carton wherein the carton is adapted to be utilized such that a lower most row of cans is in rolling contact with one of the carton side walls disposed to act as the base of the carton and wherein article retaining means are provided at least partially to close one end of the carton to discourage dislodgement of the articles from that end of the carton and access or dispenser means is provided at said one end of the carton, the removal of which releases the upper row of cartons from restraint by said article retaining means but maintains said article retaining means effective for said lower row of articles, and wherein removal of the access or dispenser means further relieves tension of the carton walls about said articles to facilitate their removal from that end of the carton.

According to a feature of this aspect of the invention the access or dispenser means may comprise removable portions of the side wall panel acting as a top wall of the carton and adjacent portions of each of the top and base walls acting as opposed side walls sufficient to

expose the endmost articles, remove the restraining means from the uppermost row of articles and relieve tension in the carton walls relative to the carton contents.

According to another feature of this aspect of the invention, the access means may further include a secondary removable portion which further opens said side wall panel (acting as a top wall) towards the opposite end of the carton thereby further facilitating removal of the upper row of articles.

Another aspect of the invention provides a blank for forming a carton as defined in any of the three immediately preceding paragraphs.

According to a one aspect of the invention, a carton wherein one side is formed from a composite wall comprising a pair of overlapping panels secured together so that the carton may be tensioned around articles contained in the carton, the carton further comprises end retention means at each end of the carton to at least partially close the respective end, wherein at least one of the end retention means comprises a top and bottom stopper to prevent dislodging of the articles from the respective end of the carton, which carton further comprises a tear line which defines an at least two part removable device characterised in that a first portion of the at least two part removable device, includes a part of both the top and bottom stopper at a first end of the carton and a second part of the at least two part removable device extends from the first portion towards a second end of the carton, the at least two-part removable device designed so that when the first portion is removed access to the articles contained at said first end of the carton can be gained whilst a remaining part of the stopper substantially retains the articles, the rearmost articles are retained by the carton until the second part of the at least two part removable device is removed releasing the tension in the carton allowing substantial release of the articles contained proximate the second end of the carton.

According to a second aspect of the invention, a carton having an end retention structure comprising two pairs of top and bottom end flaps, and a pair of side end flaps each connected to the respective top and bottom end flaps through a pair of gusset panels, wherein each side end flap is folded inwardly and lying flat with the inside surface of the respective side wall,

and wherein a tear line traverses one of the side walls and extends into the top and bottom to define a removable portion including one of the side end flaps and its associated pair of top and bottom end flaps.

According to a third aspect of the invention, a carton wherein only one of the side walls is formed with a tear line for removing the adjacent stopper from the carton when one side wall is torn along the tear line.

According to a fourth aspect of the invention, a carton wherein the tear line traverses the one sidewall extends into both the top and bottom of the carton.

According to a fifth aspect of the invention, a carton wherein the end edge of the top and bottom adjacent to the tear line has a free section that is free of connection to the other part of the carton and wherein the tear line extends to the free section of the adjacent end edge of the top and the bottom.

According to a sixth aspect of the invention, a carton wherein one side is formed from a composite wall comprising a pair of overlapping panels secured together so that the carton may be tensioned around articles contained in the carton, the carton further comprises end retention means at each end of the carton to at least partially close the respective end, wherein at least one of the end retention means comprises a top and bottom stopper to prevent dislodging of the articles from the respective end of the carton, which carton further comprises a tear line which defines an at least two part removable device characterised in that each stopper comprises an anchor flap hingedly connected to the respective end edge of the respective side wall and in a flat face contacting relationship with the inside surface of the respective side wall, a pair of top and bottom stopper flaps hingedly connected to the top and bottom respectively and extending toward each other, and a pair of gusset panels each hingedly interconnecting the anchor flap with respective one of top and bottom stopper flaps.

According to a seventh aspect of the invention, a carton wherein one side is formed from a composite wall comprising a pair of overlapping panels secured together so that the carton may

be tensioned around articles contained in the carton, the carton further comprises end retention means at each end of the carton to at least partially close the respective end, wherein at least one of the end retention means comprises a top and bottom stopper to prevent dislodging of the articles from the respective end of the carton, which carton further comprises a tear line which defines an at least two part removable device characterised in that each stopper comprises a stopper flap hingedly connected to the respective end edge of the respective side wall and extending away from the respective side wall, a pair of top and bottom anchor flaps hingedly connected to the top and bottom respectively and folded in flat face contacting relationship with the inside surfaces of the top and bottom respectively, and a pair of gusset panels each hingedly interconnecting the stopper flap with respective one of the top and bottom anchor flaps.

According to a eighth aspect of the invention, a carton wherein one side is formed from a composite wall comprising a pair of overlapping panels secured together so that the carton may be tensioned around articles contained in the carton, the carton further comprises end retention means at each end of the carton to at least partially close the respective end, wherein at least one of the end retention means comprises a top and bottom stopper to prevent dislodging of the articles from the respective end of the carton, which carton further comprises a tear line which defines an at least two part removable device characterised in that each stopper comprises a stopper flap hingedly connected to the respective end edge of the respective side wall and extending away from the respective side wall, a pair of top and bottom anchor flaps hingedly connected to the top and bottom respectively and folded in flat face contacting relationship with the inside surfaces of the top and bottom respectively, and a pair of gusset panels each hingedly interconnecting the stopper flap with respective one of the top and bottom anchor flaps.

According to a ninth aspect of the invention, a carton wherein one side is formed from a composite wall comprising a pair of overlapping panels secured together so that the carton may be tensioned around articles contained in the carton, the carton further comprises end retention means at each end of the carton to at least partially close the respective end, wherein at least one of the end retention means comprises a top and bottom stopper to prevent dislodging of the articles from the respective end of the carton, which carton further comprises a tear line which defines an at least two part removable device characterised in that the end retention structure

comprises two pairs of top and bottom end flaps, and a pair of side end flaps each connected to the respective pair of top and bottom end flaps through a pair of gusset panels, wherein each side end flap is folded inwardly and lying flat with the inside surface of the respective side wall and extends into the top and bottom to define a removable portion including one of the side end flaps and its associated pair of top and bottom end flaps.

According to a tenth aspect of the invention, a carton wherein the end edge of each top and bottom adjacent tear line has a free section that is free of connection to the other part of the carton, and wherein the tear line extends to the free section of the adjacent end edge of each of the top and bottom.

According to an eleventh aspect of the invention, a blank for forming a carton as claimed in any one of the preceding claims.

Brief Description of the Drawings Exemplary embodiments will now be described by way of example only, with reference to the accompanying drawings wherein;

FIG. 1. is a plan view of a carton blank according to a first embodiment of the invention;

FIG. 2A. is a section of the carton blank of FIG. 1. showing a part of an end retention means;

FIG. 2B. is a diagram showing a first step in construction of the end retention means of FIG. 2A;

FIG. 2C. is a diagram showing a second step in the construction of the end retention means of FIG. 2A;

FIG. 2D. is a diagram showing a third step in the construction of the end retention means of FIG. 2A;

FIG. 2E. is a perspective view from inside the carton of the erected end retention means of FIG. 2A;

FIG. 3. is a perspective front, side and top view of a carton erected from the blank of FIG. 1;

FIG. 4. is a perspective front, top and second side view of a carton erected from the blank of FIG. 1 ;

FIG. 5. is an exploded perspective view showing the carton of FIG. 4., after a first removable portion has been removed from the carton to access the contents (C) and showing the first removed portion;

FIG. 6. is a perspective front and top view showing the carton of FIG. 5. after a second removable portion has been removed;

FIG. 7. is a plan view of a carton blank according to a second embodiment of the invention;

FIG. 8. is a perspective front, top and side view of a carton erected from the blank of FIG. 7; and

FIG. 9. is an exploded perspective view of the carton of FIG. 8. with both a first and second removable portions removed and showing the removed portions.

Detailed Description of the Preferred Embodiment

FIGS. 1-6 illustrate a first embodiment of the present invention, in which FIG. 1 shows a blank (10) from which the wraparound carton of FIGS. 3 and 4 is erected. The blank (10) is vertically elongate as viewed in FIG. 1 and is formed, in this embodiment, of paperboard.

However the blank maybe formed of other foldable material such as corrugated board, plastic or the like. The blank (10) of this embodiment is designed for packaging ten articles of an identical configuration, such as beverage cans, arranged in two rows of five articles each.

The blank (10) includes a rectangular top panel (16) located at the centre of the blank (10). The side panel (18) is connected to the top panel (16) along a fold line (26) and a further rectangular side panel (14) is connected to the side panel (16) along a fold line (24). A pair of base panels

(12,20) can form a composite bottom wall. Base panel (12) is connected to the side panel (14) by a fold line (22) and base panel (20) is connected to the side panel (18) by a fold line (28).

Along each of the edges of the side panel (18), top panel (16) and side panel (14) are fold lines (68a) and (68b) which connect the main panels of the blank (10) to a series of end panels and retention panels. The side panel (18) is foldably connected to end panels (82a) and (82b), the top panel (16) is foldably connected to retention panels (74a) and (74b) and similarly the side panel (14) is foldably connected to end panels (66a) and (66b). The retention panels (74a, 74b) are connected to the adjacent end panels (82a, 66a, 82b, 66b) by fold lines (78a, 73a) respectively.

Each of the overlapping base panels (12) and (20) are connected at each end to stopper flaps (51a, 51b, 51c, 51d). Overlapping base panel (12) is connected at each end to stopper flaps (51a) and (51d) by fold lines (58a). Similarly overlapping base panel (20) is connected at each end to stopper flaps (51b) and (51c) by fold lines (58a). Each of the stopper flaps (51a, 51b, 51c, 51d) are also foldably connected to the adjacent end panels (66a, 82a, 82b, 66b).

FIGS. 2A-2E show the sequential erecting of a stopper flap (51d). FIG. 2A is a corner section of blank (10) showing the overlapping base panel (12) connected to the stopper flap (51d) which is connected to the adjacent end panel (66b). The end panel (66b) comprises two fold lines (72b, 64d) which are positioned diagonally with respect to the fold lines (68b, 58b) and (24,22) and define two gusset sections (70b, 56d). In erecting the carton, the end panel (66b) is folded in flat face contacting relationship with the inside surface of side panel (14) as the top panel (16) and overlapping base panel (12) fold inward to create the wraparound carton as illustrated in FIG. 2B. The gusset sections (70b, 56d) fold in the opposite direction to the top panel (16), that being outwardly as illustrated in FIG. 2C. The stopper flap (51d) and retention panel (74b) are then urged to fold at angles to the overlapping base panel (12) and top panel (16) as illustrated in FIG. 2D. The stopper flap (51d) and retention panel (74b) then serve to partially close the end of the tubular carton as illustrated in FIG. 2E and further illustrated in FIG. 3., which shows a carton erected from the blank (10) with stopper flaps (51a, 51b) and retention panel (74a) partially closing the end of the tubular carton.

The overlapping base panels (12) and (20) are provided with a panel interlocking arrangement for securing the base panels (12) and (20) together in an overlapping relationship. The arrangement includes a pair of male and female tabs (L) that are struck from, and hingedly connected to the overlapping base panels (12) and (20). These tabs are well known in the art as means for holding an elongate blank in a tubular form that is tightly wrapped around a group of articles (C). FIG. 4 shows a perspective view of a carton erected from the blank (10) illustrating the overlapping base panels (12) and (20) together in an overlapping relationship, held by the male and female tabs (L).

In use the carton stands on its side wall 14 so that side wall 18 is then viewed as the top wall and the base panels are exposed on one side of the carton. Thus, the lowermost row of cans abut the side wall panel 14.

The side panel (18) comprises access or dispenser means, which in the preferred embodiment of the invention is a two-part removable portion. The first portion comprises a section (34) of the side panel (18) which is defined by a severance line (49) which outlines a pull tab (48), which is hingedly connected to section (34) by a fold line (50). Section (34) is further defined by tear lines (37) which may extend into the top panel (16) and base panel (20) along tear lines (35) and (39) as in the preferred embodiment of the present invention. The extended tear lines (35) and (39) define sections (32) and (36) respectively which are foldably connected to section (34) along fold lines (38) and (40). Collectively sections (34), (48), (32) and (36) form the first removable portion of the two-part removable portion, which also incorporates the stopper (51b) and a part of the retention tab (74a) defined by a further tear line (33). Removal of the first removable portion allows access to the articles (C) contained within the wraparound carton. However, retention of the articles (C) which abut and can roll along the side wall 14 when the cans of the lower row are removed is maintained by the remaining part of retention panel (74a) and stopper flap (51a). FIG. 5 shows a perspective view of a tubular carton constructed from the elongate blank (10) and illustrates the access gained to the articles (C) by the removal of the first removable portion, whilst the remaining part of retention panel (74a) and stopper (51 a) continue to provide retention of the lowermost articles within the carton. Also illustrated in FIG. 5 is the removed, first removable portion.

The side panel (18) further comprises a second removable portion (42) struck from, and hingedly connected to the side panel (18) by fold line (46) which also hingedly connects pull tab (44) to the second removable portion (42). The second removable portion (42) is connected to the first removable portion by severance line (49) and together the two removable portions form the two-part removable portion.

Access panels are well known in the art for solely providing access to the articles contained within a carton. In the present invention the second removable portion (42) serves a dual purpose when removed; to provide access to the articles (C) and to relieve tension in the carton and thus release the rearmost articles held within the tubular carton. This is illustrated in FIG. 6 where upon removal of the second removable portion (42) it can be seen that the tension is relieved and the secured overlapping base panels (12,20) may slacken slightly giving a greater degree of access to the articles (C).

FIGS. 7-9 illustrate a second embodiment of the present invention. Like reference numerals have been used for the like parts of the first embodiment and therefore only the differences from the first embodiment are described in any greater detail. FIG. 7 shows a blank (110) from which the wraparound carton of FIGS. 8 and 9 is erected. The blank (110) of FIG. 7 different from the blank (10) of FIG. 1 in that the retention panels (74a, 74b) have been split to form, at the ends of top panel (116), pairs of stopper flaps (174a, 175a) and (174b, 175b), where each pair of stopper flaps (174a, 175a) and (174b, 175b) are separated by a free section at the ends of top panel (116). The free section between the pair of stopper flaps (174a, 175a), which are on the same side of the blank (110) as the first removable portion, which comprises sections (148), (134), (132) and (136), may not be defined by a straight edge. In the second embodiment of the invention the free section between the pair of stopper flaps (174a, 175a) is defined by a rounded 'V' shaped edge. The extended tear line (135) extends to the tip of the 'V' shaped edge of the free section which may assist the easy removal of the first removable portion.

In erecting the carton the stopper flaps (174a, 175a) and (174b, 175b) are folded along fold lines (168a) and (168b) respectively and urged to fold at an angle to the top panel (16) to partially

close the ends of the carton as shown in FIG. 8. A carton erected from the blank (110) of FIG. 7 is shown in FIG. 9 with the two-part removable portion removed.

Although the invention has been specifically described with reference to wraparound cartons, it will be appreciated that the invention is not limited to wraparound cartons.

We claim:

1. A carton comprising a top wall and bottom wall interconnected by a pair of
5 side walls to form a tubular structure for receiving articles, the carton further
comprising end retention means at each end of the tubular structure to at least
partially close the respective end of the tubular structure, wherein at least one of the
end retention means comprises: first top and first bottom stopper flaps for preventing
dislodgement of articles from at least one row of articles through the respective end
10 of the carton; and a first anchor flap hingedly connected to the respective end edge
of one of the side walls of the carton and disposed in flat face contacting relationship
with the inside surface of the one side wall to retain the first top and first bottom
stopper flaps in their operable positions, the first top and first bottom stopper flaps
being hingedly connected to the respective end edges of the top and bottom walls,
15 the first anchor flap being hingedly connected to the first top and first bottom stopper
flaps, characterized in that the carton further comprising a tear line which defines a
removable portion of the carton, the tear line being disposed entirely across the one
side wall and extending into the top and bottom walls such that the removable
portion includes the first anchor flap.
20
2. A carton as claimed in claim 1, wherein the first anchor flap is hingedly
connected to the first top and first bottom stopper flaps via respective gusset flaps.
3. A carton as claimed in claim 1 or claim 2 wherein the removal of the
25 removable portion relieves tension in the carton walls relative to the carton contents,
when present.
4. A carton as claimed in any one of claims 1 to 3, wherein the carton comprises
a second anchor flap, second top stopper flap and second bottom stopper flap, and

wherein the second anchor flap is hingedly connected to the respective end edge of the other of the side walls of the carton and disposed in flat face contacting relationship with the inside surface of that other side wall to retain the second top and second bottom stopper flaps in their operable positions to prevent dislodgement of at least one other row of articles through a respective end of the carton, and wherein removal of the removable portion does not affect the operation of the second top and bottom stopper flaps.

5. A carton according to claim 4 wherein the first top stopper flap and the second top stopper flap are connected to one another by a tear line that defines the removable portion, such that removal of the removable portion requires tearing that tear line and thus separation of the respective stopper flaps from the carton.

6. A carton according to claim 4 wherein the first bottom stopper flap and the second bottom stopper flap, are connected to one another by a tear line that defines the removable portion, such that removal of the removable portion requires tearing that tear line and thus separation of the respective stopper flaps from the carton.

7. A carton according to any one of claims 1 to 6, wherein a portion of the end edge of one or more of the top wall and the bottom wall, has a portion that is free of connection to any other part of the carton and wherein the tear line extends to and terminates at that free portion of the end edge.

8. A blank for forming a carton comprising panels for forming a top wall and bottom wall interconnected by panels for forming a pair of side walls for forming a tubular structure for receiving articles, the blank further comprising panels to form an end retention means at each end of the tubular structure to at least partially close the respective end of the tubular structure, wherein at least one of the end retention means comprises: first top and first bottom stopper flaps for preventing dislodgement of articles from at least one row of articles through the respective end of the erected carton; and a first anchor flap hingedly connected to the respective end edge of one

of the panels for forming a side wall of the erected carton and disposable in flat face contacting relationship with the inside surface of the one side wall to retain the first top and first bottom stopper flaps in their operable positions, the first top and first bottom stopper flaps hingedly connected to the respective end edges of the panels for forming the top and bottom walls, the first anchor flap being hingedly connected to the panels for forming the first top and first bottom stopper flaps, characterized in that the blank further comprising a tear line which defines a removable portion of the erected carton, the tear line being disposed entirely across said one of the panels for forming a side wall and extending into the panels for forming the top and bottom walls such that the removable portion includes the first anchor flap .

9. The blank according to claim 8, wherein the first anchor flap is hingedly connected to the first top and first bottom stopper flaps via respective gusset flaps.

10. A blank as claimed in claim 8 or 9, wherein the blank comprises a second anchor flap, second top stopper flap and second bottom stopper flap, and wherein the second anchor flap is hingedly connected to the respective end edge of the other of the panels for forming the side walls of the erected carton and disposed in flat face contacting relationship with the inside surface of that other panel to retain the second top and second bottom stopper flaps in their operable positions to prevent dislodgement of at least one other row of articles through a respective end of the erected carton, and wherein removal of the removable portion does not affect the operation of the second top and bottom stopper flaps.

11. A blank according to claim 10 wherein the first top stopper flap and the second top stopper flap are connected to one another by a tear line that defines the removable portion, such that removal of the removable portion requires tearing that tear line and thus separation of the respective stopper flaps from the carton.

12. A blank according to claim 10 wherein the first bottom stopper flap and the second bottom stopper flap, are connected to one another by a tear line that defines

the removable portion, such that removal of the removable portion requires tearing that tear line and thus separation of the respective stopper flaps from the carton

5 13. A blank according to any one of claims 8 to 12, wherein a portion of the end edge of one or more of the panels for forming the top and bottom walls, has a portion that is free of connection to any other part of the blank and wherein the tear line extends to and terminates at that free portion of the end edge.

10 14. A carton as claimed in claim 1, wherein the removable portion further includes at least part of the first top and first bottom stopper flaps.

15. A carton as claimed in claim 14, wherein the removable portion includes the entirety of the first top and first bottom stopper flaps.

15

16. A blank as claimed in claim 8, wherein that the removable portion includes at least part of the first top and first bottom stopper flaps.

20 17. A blank as claimed in claim 16, wherein the removable portion includes the entirety of the first top and first bottom stopper flaps.

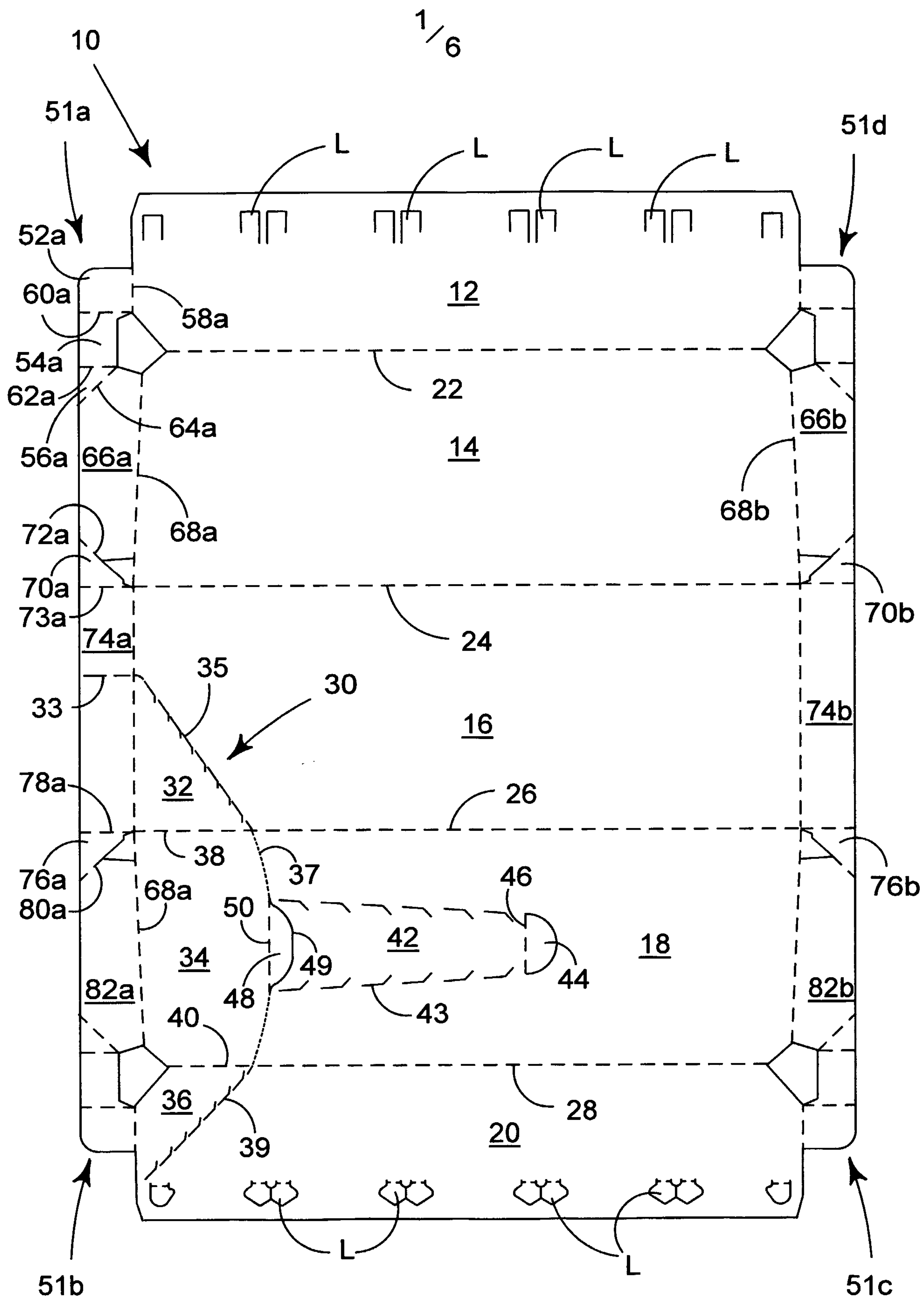


FIGURE 1

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FIGURE 2A

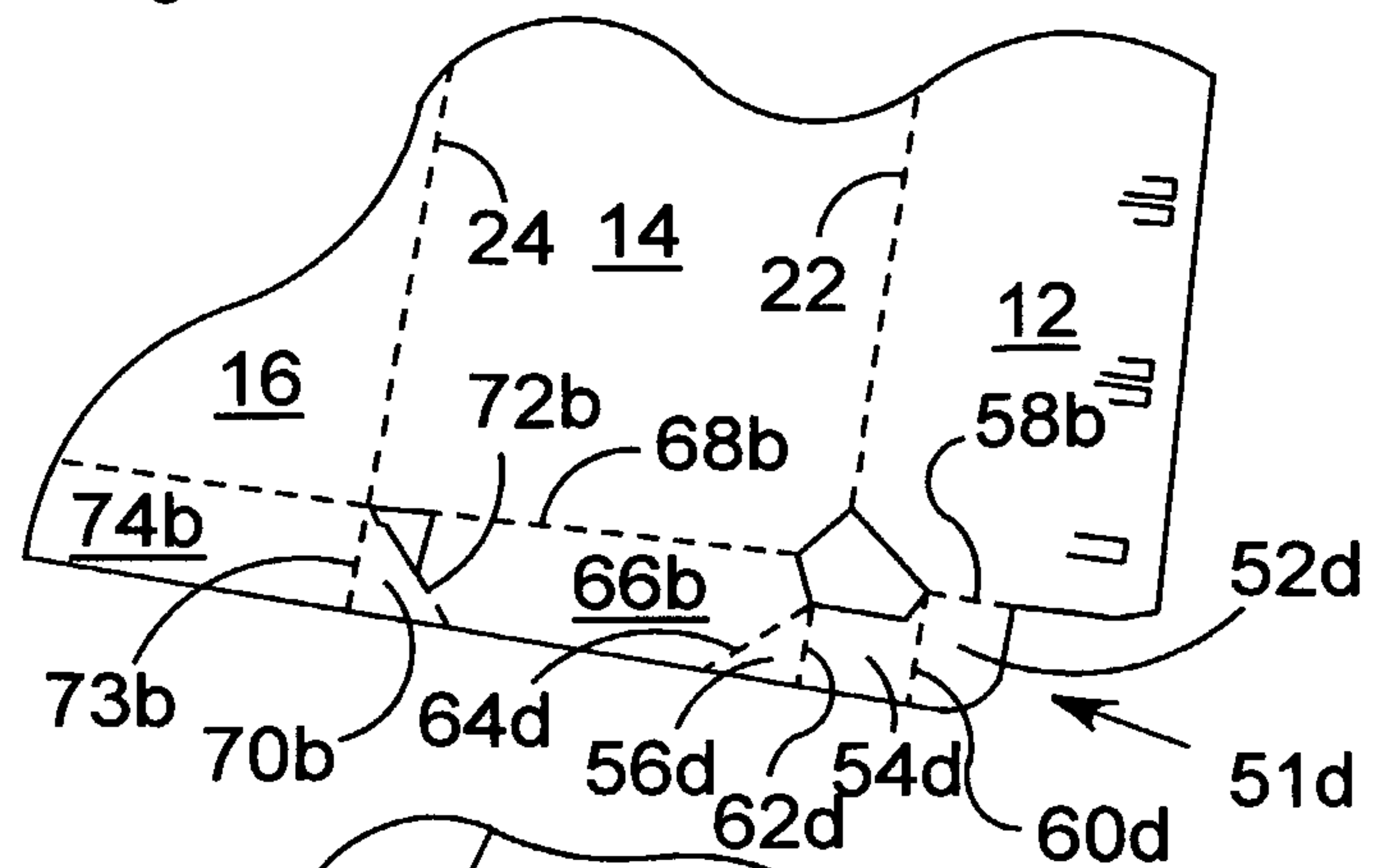


FIGURE 2B

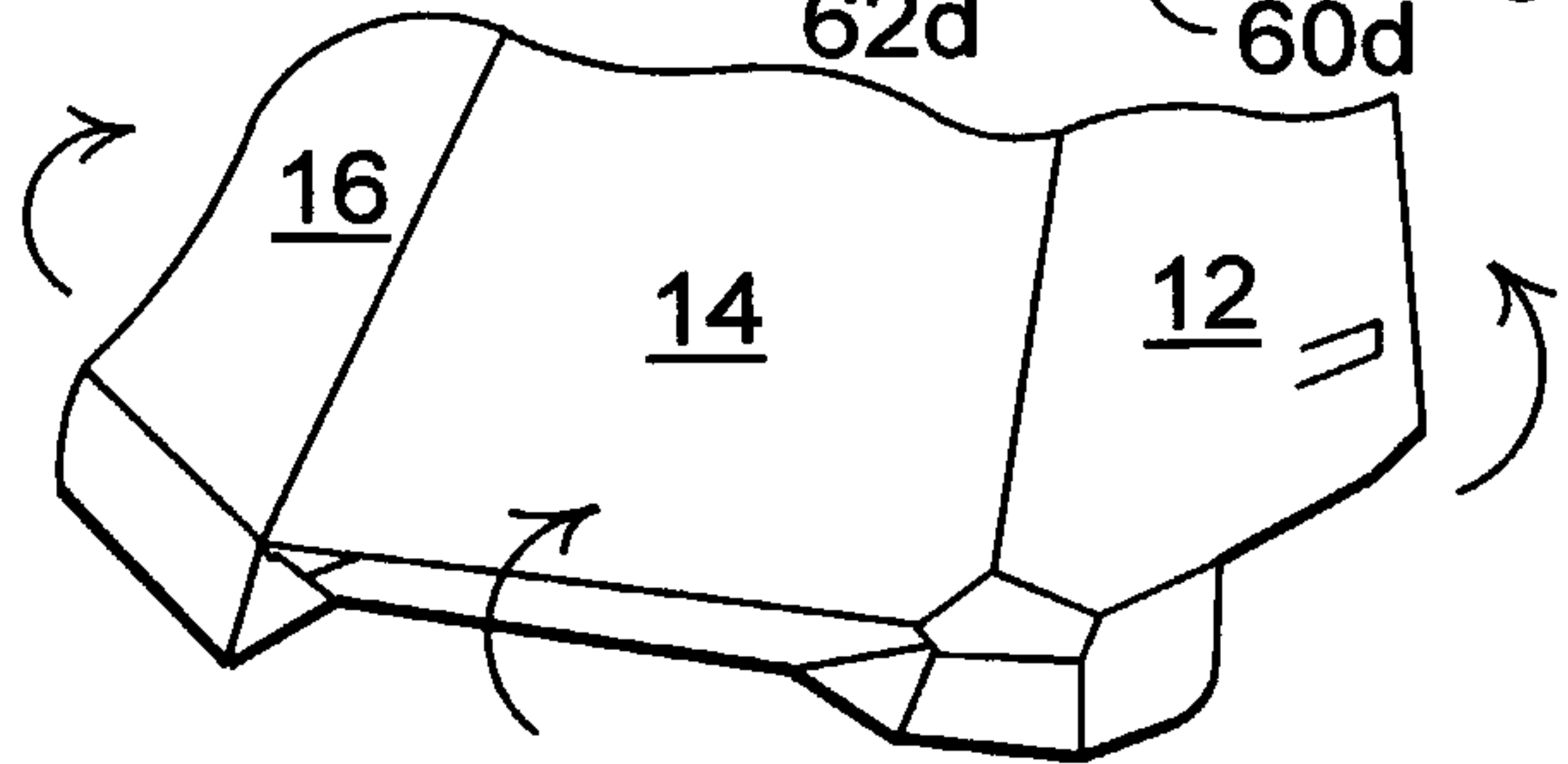


FIGURE 2C

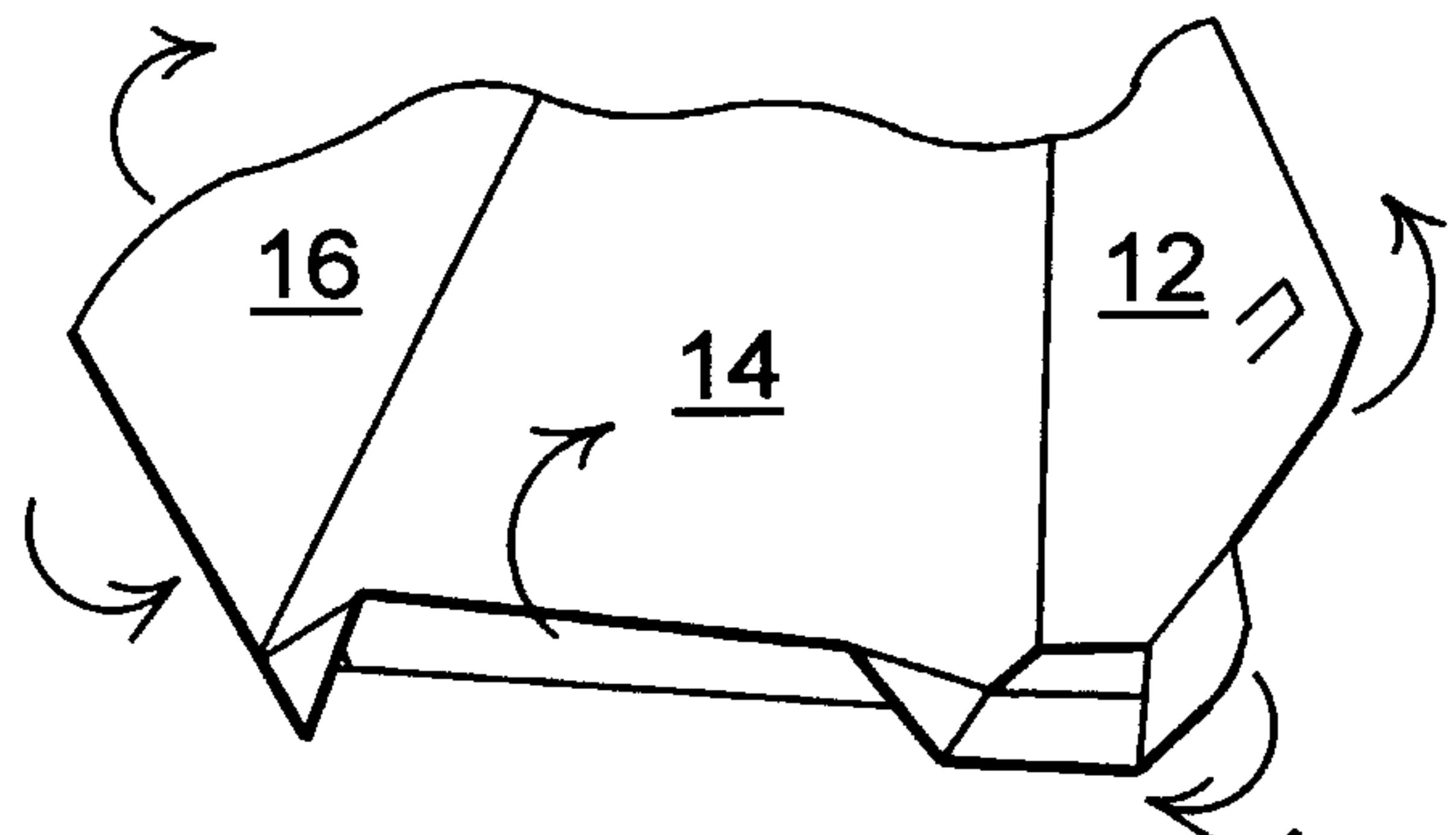


FIGURE 2D

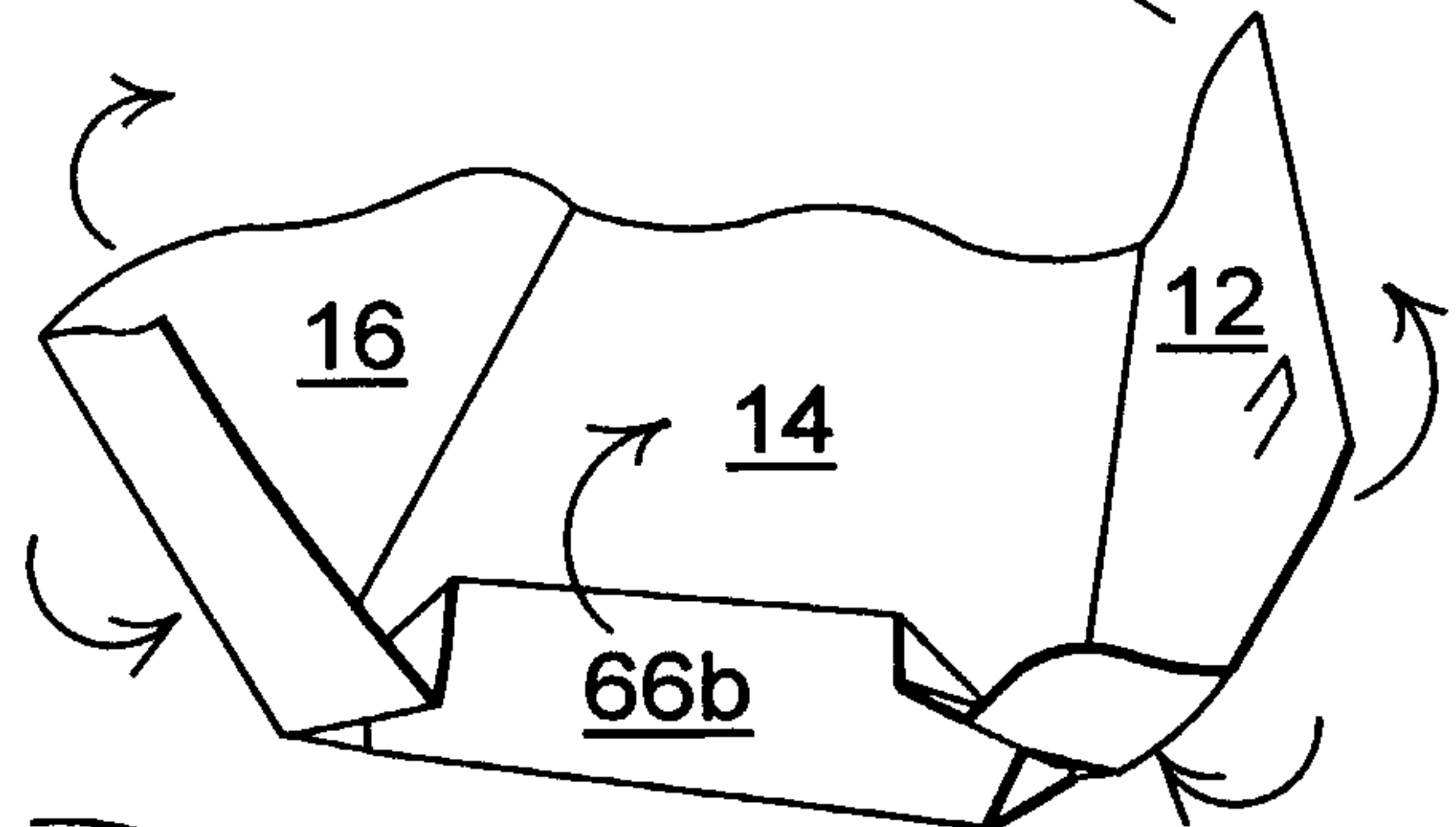
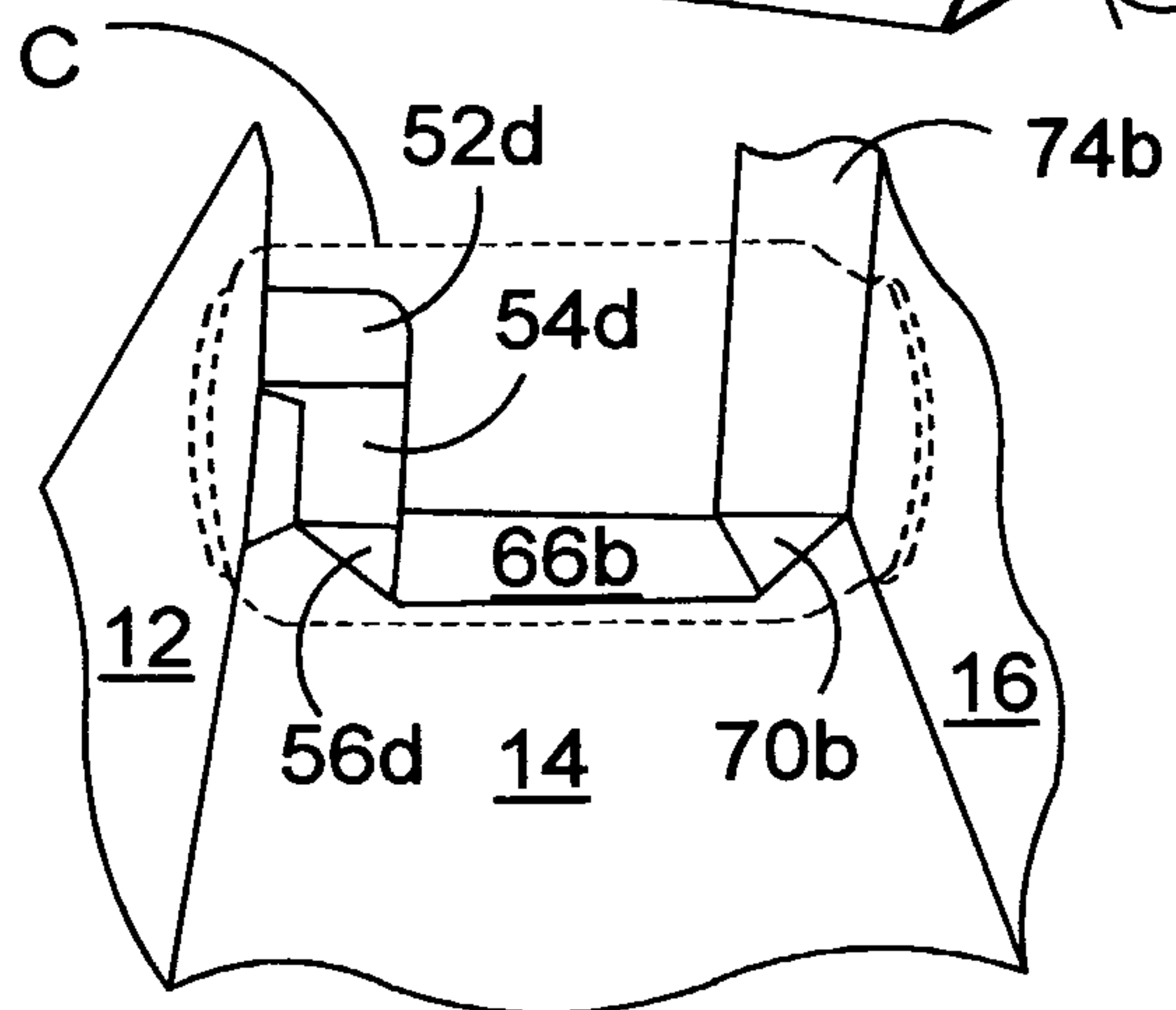
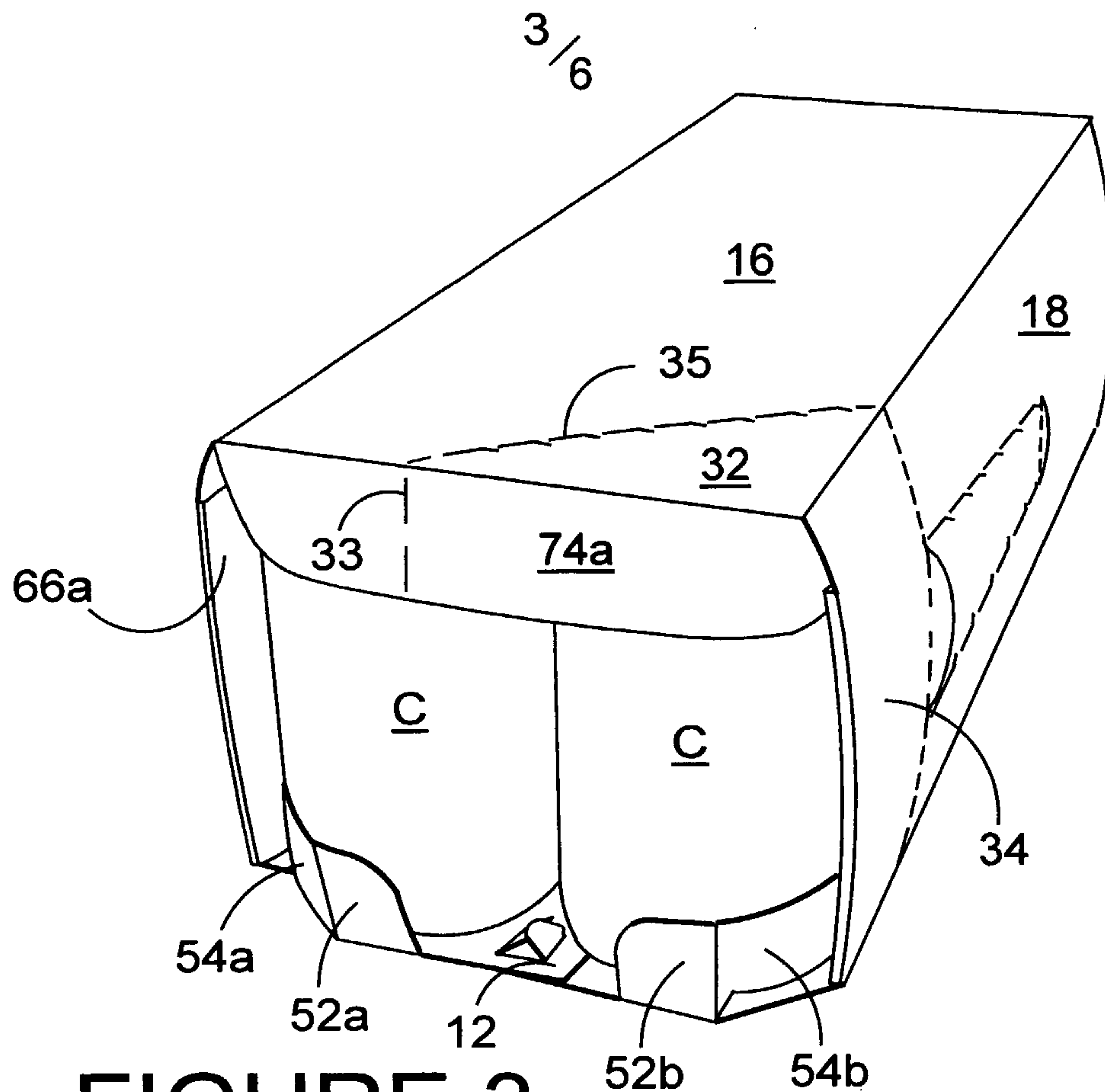
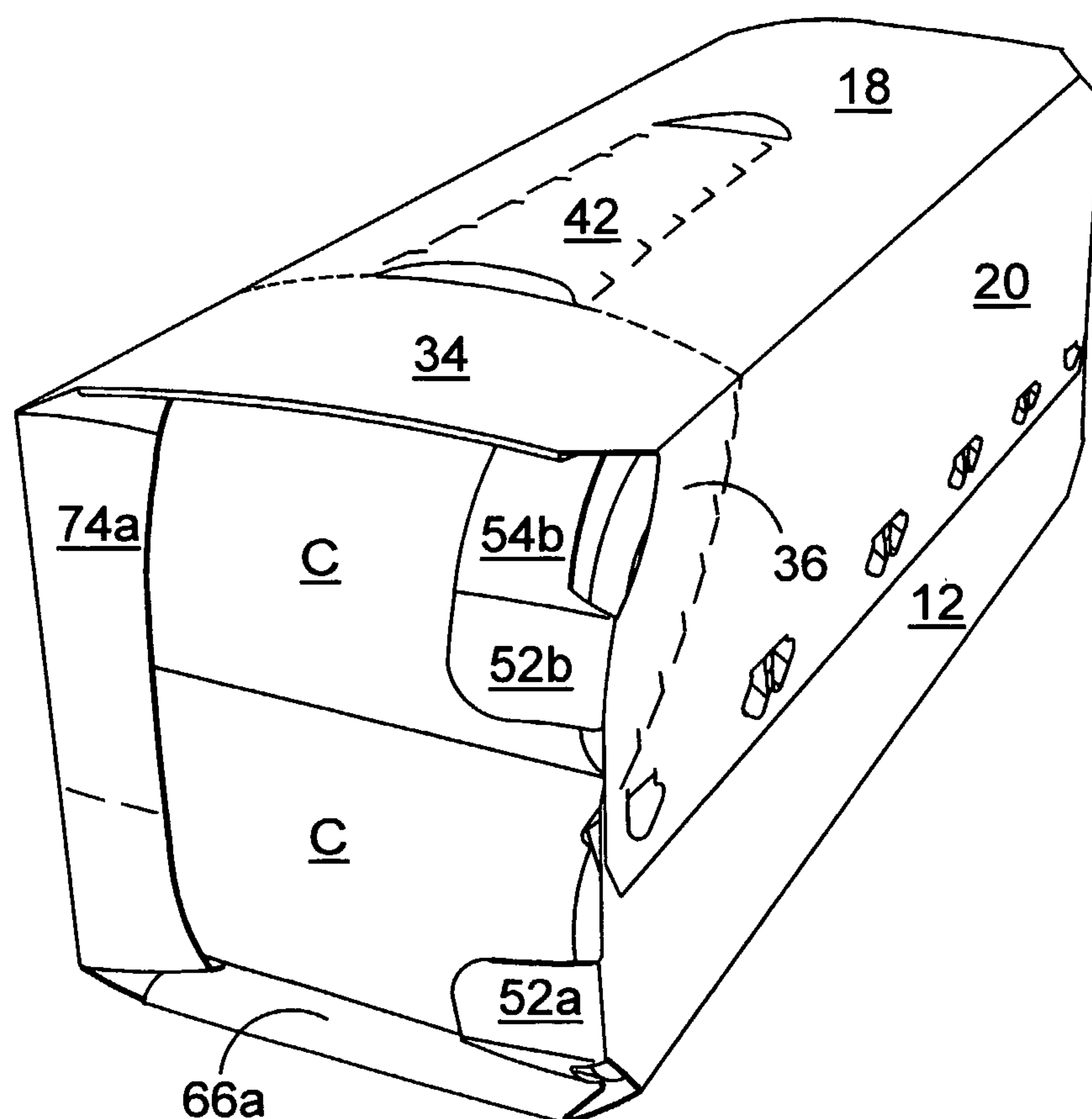
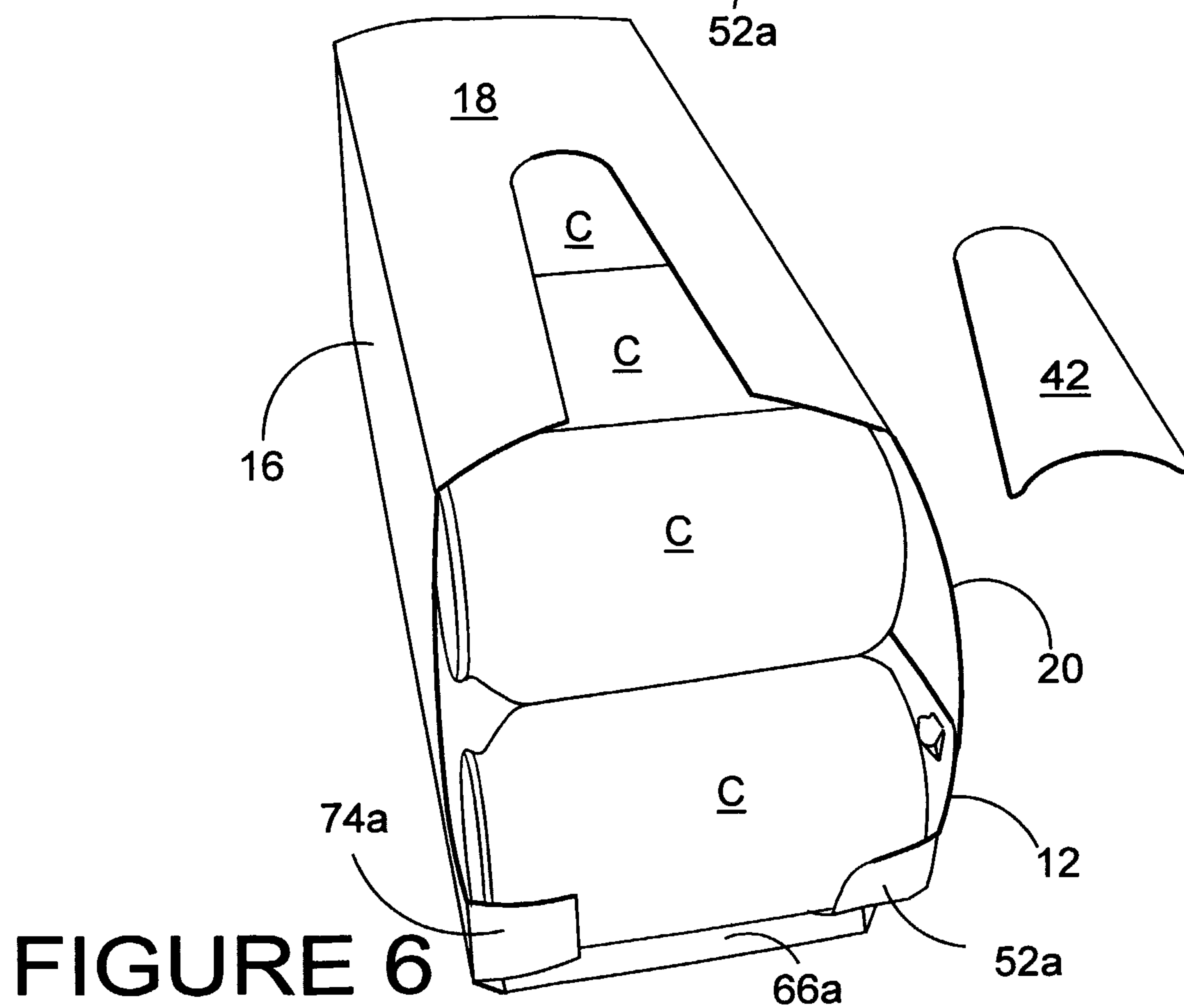
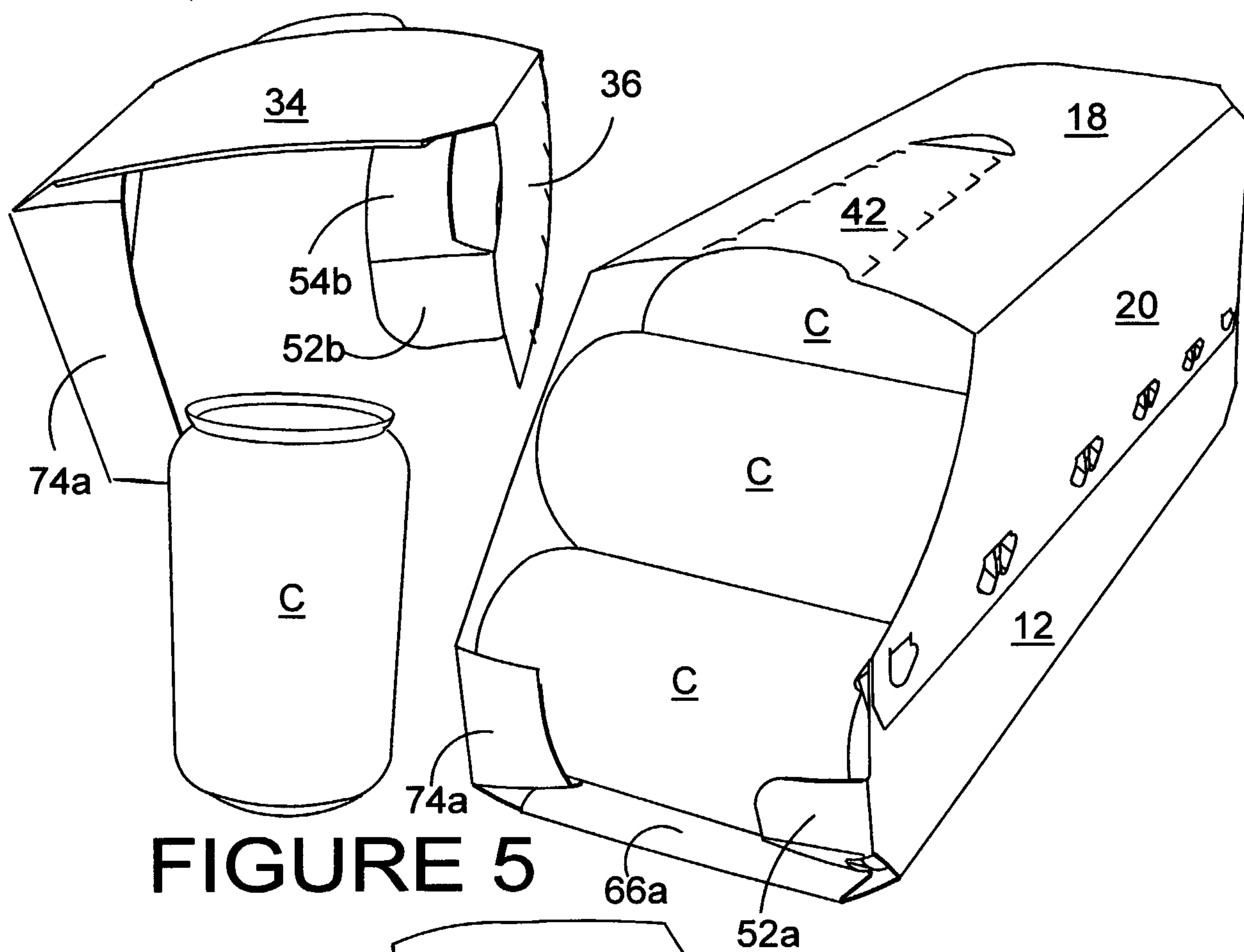


FIGURE 2E



**FIGURE 3****FIGURE 4**

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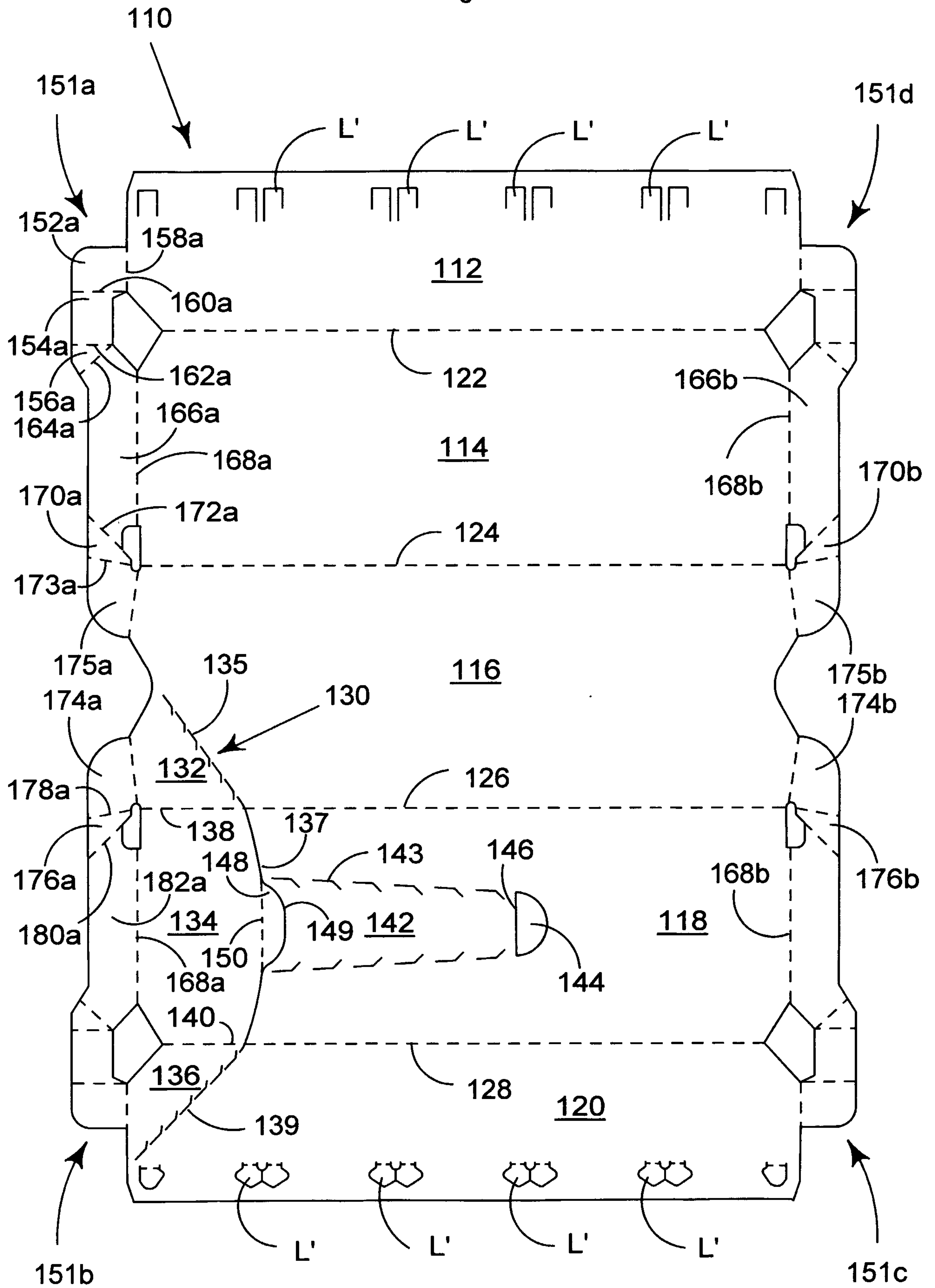


FIGURE 7

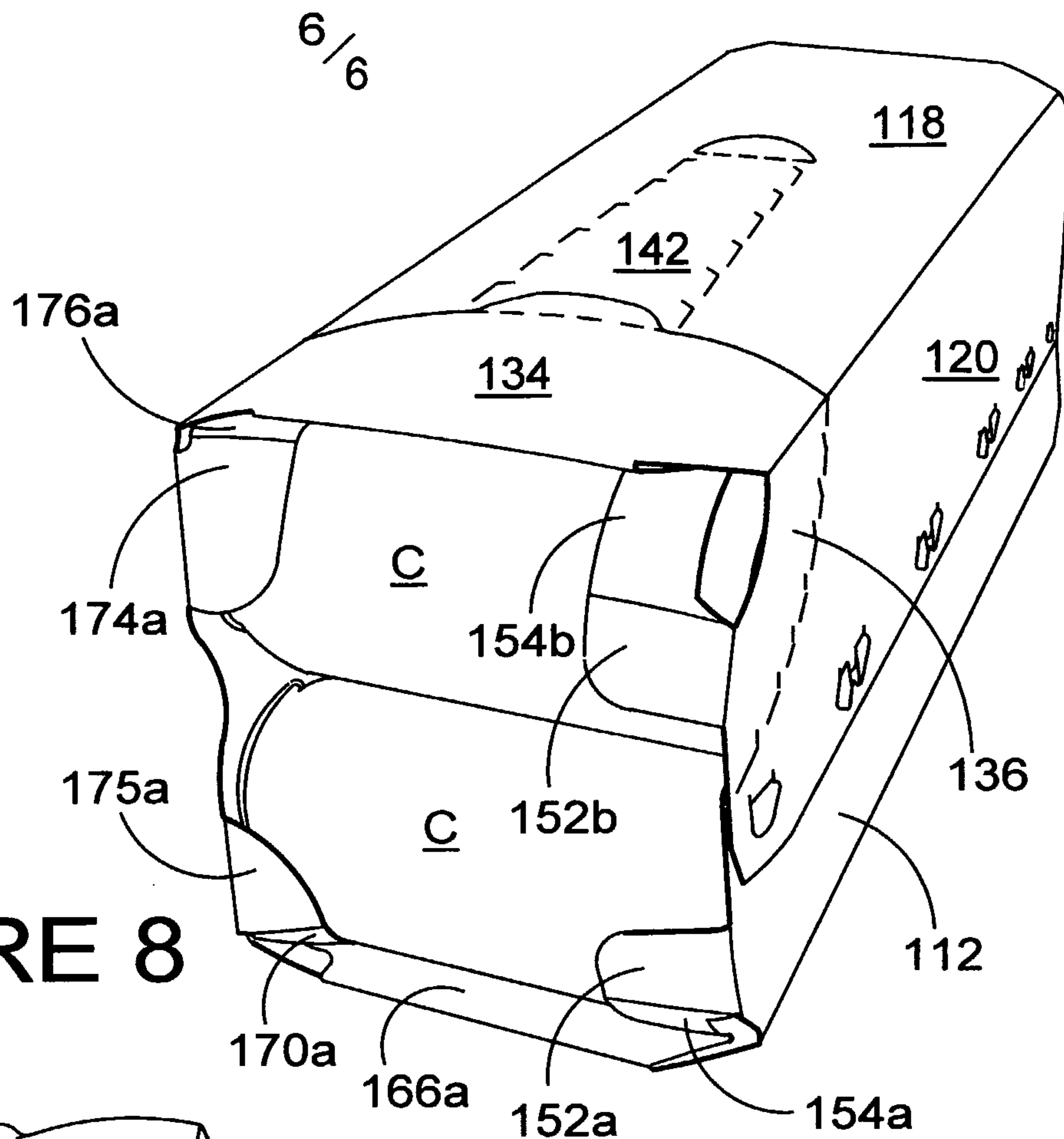
$$\frac{6}{6}$$


FIGURE 8

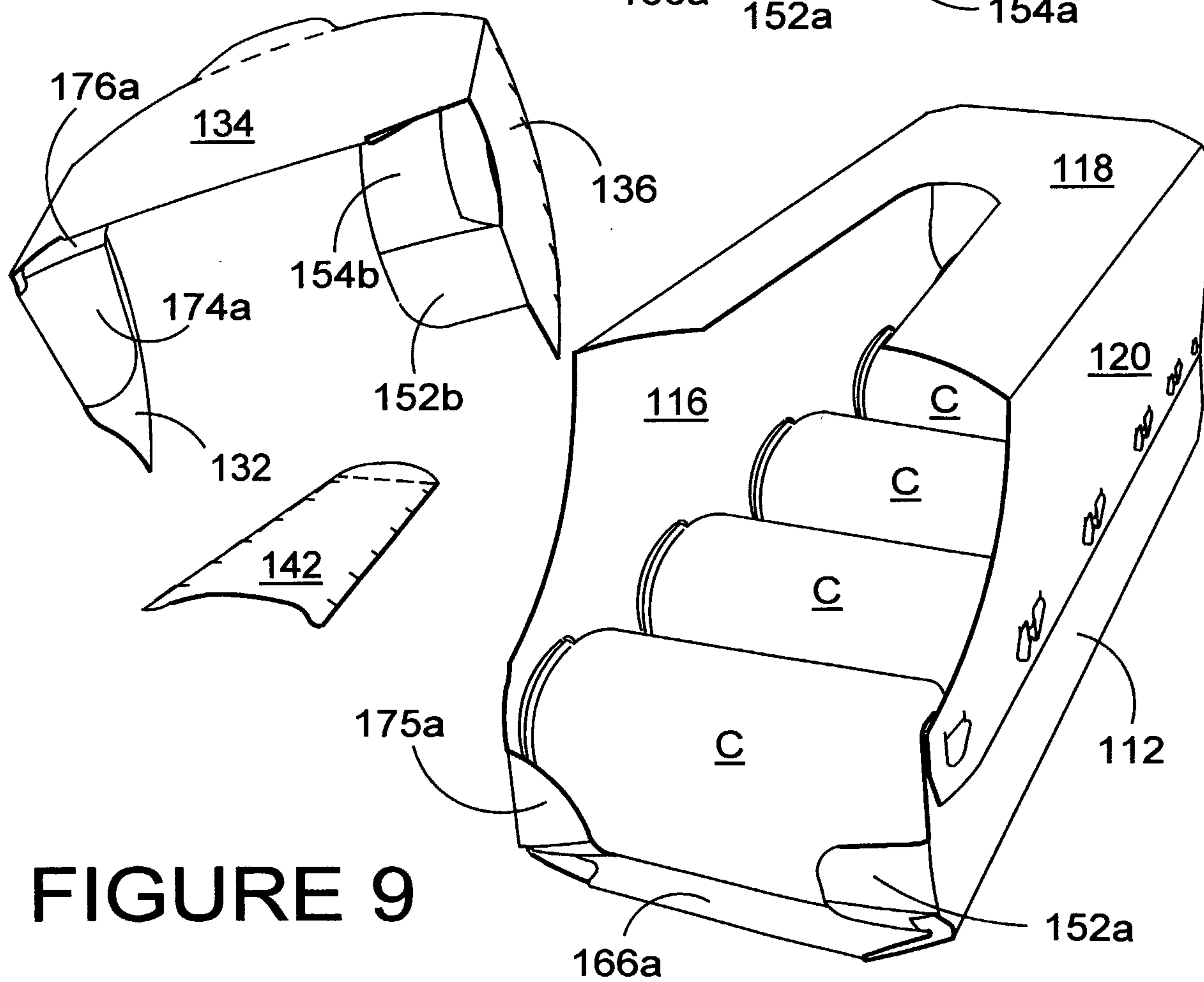


FIGURE 9

