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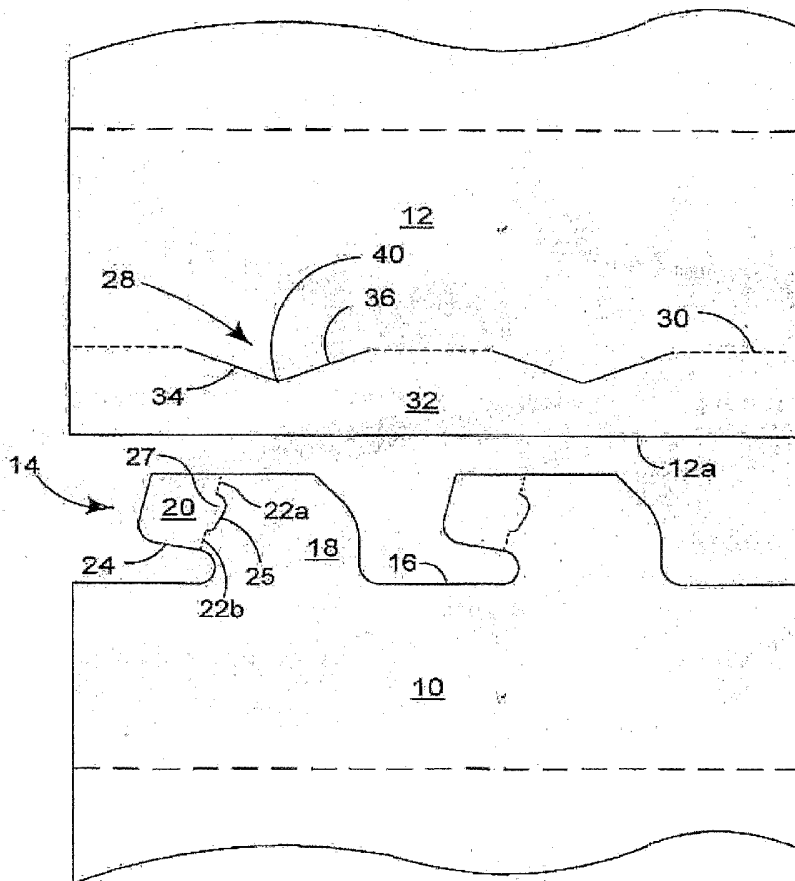
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[Continued on next page]

(54) Title: INTERLOCKING MEANS FOR CARTON PANELS



(57) Abstract: A panel interlocking arrangement comprising a locking tab (14) projecting from one (10) of two interlocked panels and a locking slit (28) provided adjacent an end edge (12a) of the other (12) panel. The locking tab (14) has a leading main portion (18) and an anchoring tab (20). The locking slit (28) is disposed along a fold line (30) spaced inwardly from the end edge (12a) of the other panel to define a foldable edge strip (32). The anchoring tab (20) is folded into overlapping relationship with the main portion (18) when the locking tab is inserted into the locking slit. The locking slit (28) is formed to accept the folded arrangement of the locking tab. A stopper tab (27) is provided to prevent the anchoring tab (20) from unfolding relative to the main portion.

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INTERLOCKING MEANS FOR CARTON PANELS

Background of the Invention

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This invention relates to panel interlocking means for securing together a pair of panels, for example, adjacent overlapping panels of a paper-board carton. In some situations, these panels are provided by the opposite ends of a wrapper blank which are brought together and interlocked.

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Locking tabs which are struck from one end of a carton wrapper and which are arranged to be driven through corresponding apertures, defined by retaining tabs, struck from an opposite end of the wrapper are well known e.g. from US Patent No 4,093,116. In the present invention however, the interlocking of panels is effected by causing a locking tab to be engaged by a relative sliding movement into a locking aperture.

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Known panel interlocking arrangements in which a locking tab is caused to be engaged by relative sliding movement into a locking aperture and in which the locking tab has a hinged "anchoring tab" include FR-A-2 447 863 and US-A-3 191 845. However, neither of these disclosures relates to a blank for forming a wrap-around article carrier as in the present invention. In FR-A-2 447 863 an "anchoring tab" (D) of a locking tab unfolds following engagement in a locking aperture so that a main portion (99) of the locking tab and its anchoring tab are co-planar and it is only when in this co-planar relationship that the anchoring tab is able to engage a panel adjacent the locking slit to prevent disengagement of the locking tab. In US-A-3 191 845 an "anchoring tab" also unfolds somewhat after engagement but does not engage with a foldable edge strip of the panel having the locking slit. Moreover, EP-A-0 150 117 discloses a panel interlocking means in which a series of locking tabs are located on one end panel of a carton blank and a complementary series of locking slits are provided in an opposite end panel of the blank. Both the opposed end panels form overlapping base panels in the completed package. The blank is applied to a group of articles to be packaged in a packaging machine as the articles and blank are conveyed together, through the machine by folding the blank around the article group. Each anchoring

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tab is folded into overlapping relationship with the main part of the locking tab to facilitate insertion into a locking slit during the folding operation of the blank. The locking slit is formed in a fold line of its associated panel the fold line being spaced inwardly from the end edges of that panel to define a foldable edge strip. The anchoring tab remains in its folded
5 overlapping relationship and has a trailing edge which lies substantially parallel to an abutment edge of the locking slit. The trailing edge and the abutment edge cooperate when the locking tab is engaged, to hold the locking tab engaged in the locking slit.

In EP 0464960, the arrangement is similar except that the foldable edge strip and anchoring
10 tab cooperate when in an upstanding position relative to their associated carton panels in order to hold the locking tab engaged in the locking slit. The problem with this locking arrangement is that once engaged in the slit, the upstanding anchoring tab is substantially perpendicular to the foldable edge strip, so that the complete edge of the anchoring tab is aligned in one vertical axis of the strip and the locking tab can pivot or rotate about the
15 vertical axis. This can be especially problematic when only one locking tab and slit is used to secure two panels together since the locking tab has some freedom to move within the slit which allows the panels to move relative to one another. This can be very undesirable in wraparound cartons where a tight fit of the carton around the contents is required to securely hold the contents. Furthermore, if the lock is placed under high tension then the anchoring tab
20 can become detached from the locking tab and the lock can completely fail.

The present invention seeks to avoid or at least mitigate these and other problems of the prior art by providing a locking arrangement wherein the anchoring tab is provided with an additional projection to limit its upward travel so that it does not stand substantially upright
25 and in fact still partially overlaps the adjacent panel.

Summary of Invention

According to a first aspect of the invention, in a blank for forming a wraparound carton, an
30 arrangement for securing together a pair of panels of the blank is provided, said arrangement comprising a locking tab projecting from an end edge of one of said panels and a locking slit provided adjacent an end edge of the other of said panels, said locking tab having a leading

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main portion and an anchoring tab provided with a trailing edge and hinged to one side of said main portion, said locking slit being disposed along a fold line spaced inwardly from, and extending substantially parallel to, the end edge of said other panel to define a foldable edge strip, wherein said anchoring tab is folded into overlapping relationship with said main
5 portion when said locking tab is being inserted into said locking slit and wherein said locking slit is formed to accept the folded arrangement of said locking tab when said locking slit is opened by folding said edge strip out of the plane of said other one of said panels, characterized by means to prevent said anchoring tab unfolding relative to said main portion such that when said trailing edge clears said locking slit, the trailing edge of the anchoring tab
10 is juxtaposed said folded edge strip, so that said panels are locked together.

Preferably wherein said locking slit is disposed essentially entirely along said fold line.

Preferably wherein the means to prevent said anchoring tab unfolding is provided by at least
15 one protruding tab extending from the hinged connection with said main portion and being defined by one or more cut lines.

Additionally wherein the protruding tab is substantially semi-circular.

20 Preferably wherein said locking slit is generally in the form of a shallow "V" which extends into said edge strip and interrupts said fold line.

Additionally wherein said locking slit is symmetrical so that the legs of said "V" are of
25 similar lengths.

Additionally wherein the trailing edge of said anchoring tab is substantially parallel to one of
said legs and wherein the complete trailing edge of the anchoring tab contacts the edge strip
adjacent the locking slit.

30 Additionally wherein said locking slit comprises a first part extending towards the end edge of said other panel at an acute angle with respect to said fold line, a return part extending

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back to meet said fold line at an acute angle with respect thereto and an end part extending substantially along said fold line.

Brief Description of the Drawings

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Three embodiments of the present invention will now be described by way of example with reference to the accompanying drawings in which:

10 Fig. 1 shows the blanks of two panels to be locked together, one panel having a locking slit and the other panel having locking tab;

Fig. 2 shows a pair of blanks, one panel having a locking tab according to a second embodiment of the invention;

15 Fig. 3 shows a pair of blanks, one panel having a locking tab according to a third embodiment of the invention;

Fig. 4 shows an enlarged view of the blanks of Fig.1;

20 Fig. 5 is a perspective view of the top of the panels of Figs. 1 and 4;

Fig. 6 is a perspective view illustrating the opening of the slit and folding of the locking in preparation of interlocking the two panels together;

25 Fig. 7 is a perspective view showing the initial engagement of the locking tab of one panel in the slit of the other panel;

Fig. 8 is a perspective view of the locking tab engaged in the slit;

30 Fig. 9 is a view from one panel of the two interlocked panels;

Fig. 10 is a further perspective view of the interlocked panels and

Fig. 11 is an end on view of the two interlocked panels.

Detailed Description of the Preferred Embodiments

5

Referring to Figs. 1 and 4, a pair of panels 10 and 12 respectively, are adapted to be interlocked and are formed from paperboard or similar foldable sheet material. The panels 10 and 12 may, for example, be disposed at the opposite ends of one and the same wraparound carton blank which is to be formed into a carton sleeve in which panels 10 and 12 then provide bottom panels of the carton. Panel 10 includes a locking tab 14 projecting outwardly in the plane of the panel from the end edge 16. The locking tab 14 comprises a main portion 18 and an integral anchoring tab 20 which is hinged to one side edge of the main portion 18 along an interrupted fold line 22a/22b. The fold line 22a/22b is interrupted by a shaped cut line 25 which defines a stopper tab 27. The interrupted fold line 22a/22b is angled relative to the end edge 16 of panel 10, such that the leading edge of the anchoring tab 20, when folded about the interrupted fold line 22a/22b, is substantially parallel to an edge 34 of a locking slit 28 of panel 12. The trailing edge 24, of the anchoring tab 20, is spaced from end edge 16 and is also substantially parallel with the edge 34 of the locking slit 28 such that in use the trailing edge 24 provides a locking edge for cooperation with the edge 34 of the locking slit 28.

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Panel 12 includes the locking slit 28 in the form of a shallow "V" which is struck from panel 12 along a fold line 30 extending parallel to the end edge 12a of panel 12. Thus, the foldable front edge strip 32 is provided. The slit is formed by a continuous cut line comprising a first part 34 extending along strip 32 towards the end edge of the panel at an acute angle with respect to fold line 30 and a similar return part 36 extending back to meet fold line 30 at an acute angle with respect thereto. When front edge strip 32 is folded out of the plane of the remainder of panel 12, the slit 28 is opened and the first and return parts 34 and 36 define a guide projection 40 extending outwardly from fold line 30.

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In order to lock together panels 10 and 12, first the anchoring tab 20 is folded 180 degrees about fold line 22a/22b into face contacting overlapping relationship with the underside of the main portion 18 such that the stopper tab 27 projects from the interrupted fold line

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22a/22b, as shown in Fig. 6. Also the foldable edge strip 32 is folded about fold line 30 out of the plane of the blank (Fig. 6) into an upright position relative to panel 12 to open the slit 28. Once the anchoring tab 20 has been folded thus, the maximum transverse dimension (corresponding to the maximum width of the main portion plus the stopper tab) from the outer edge of stopper tab 27 to the opposite edge of the main portion is sized so that the locking tab 14 can be slidably engaged in the locking slit 28 (Fig. 7). The locking tab 14 may be an interference fit in the locking slit 28. Hence, locking tab 14 can be inserted into the slit until the trailing edge 24 of the anchoring tab 20 has moved past, that is to say, cleared the locking slit 28. The natural resilience of the paperboard material would normally allow the folded anchoring tab 20 to spring back into a more upright position, however the stopper tab 27 is deliberately designed to limit the return of the anchoring tab 20 such that the anchoring tab 20 remains substantially in overlapping relationship with the main portion 18, whereby the trailing edge 24 is brought into a position in which it will abut the face of the edge strip 32 adjacent the cut 34 when tension is applied to the panels in opposition to the locking direction i.e. in a direction tending to move the panels apart (Figs. 8 -10). Furthermore the foldable edge strip 32 relaxes into a substantially coplanar relationship with panel 10 which causes the locking slit 28 to close slightly. Thus, the abutting engagement between trailing edge 24 and the edge strip 32, along with closure of the locking slit due to the edge strip 32 relaxing back into a less upright position relative to panel 12, maintains the two panels 10, 12 locked together. The projection 40 and the nose 26 of the anchoring tab 20 cooperate to aid in the alignment of the locking tab into the slit during locking. Furthermore the interrupted fold lines 22a/22b are angled such that the leading and trailing edges 24 of the folded anchoring tab 20 are aligned substantially parallel with the first part 34 of the locking slit 28. This arrangement enables the folded anchoring tab 20 to engage or abut the edge strip 32 along the line of part 34 of the locking slit 28. The two parts are similarly shaped so that the anchoring tab 20 fits or connects with the edge strip along the entire trailing edge 24 (Figs. 8 -11).

Second and third embodiments of the present invention are shown in Figs. 2 and 3 respectively. Like reference numbers are used to identify panels and features which are similar to those of the first embodiment, albeit the numbers are raised by a factor of 100 and 200 to distinguish between embodiments. Since the subsequent embodiments share similar features to the first embodiment only differences will be described in detail.

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The second embodiment the stopper tab 127, defined by the cut line 125 is arcuate in shape. It is envisaged that the stopper tab 127 can take a variety of shapes which will enable it to adequately function as a stopper means to prevent the folded anchor tab 120 from unfolding
5 relative to the main portion 118 and . The cut line 125 in this embodiment is therefore a curve which defines a semicircular stopper tab 127. In other embodiments the cut line 125 may define a different shaped stopper tab 127 without departing from the scope of the present invention.

10 The third embodiment is illustrated in Fig. 3. In this embodiment, two stopper tabs 227a, 227b are used to prevent the anchoring tab 220 from unfolding once the locking tab 214 is engaged in the locking slit 228. Each stopper tab 227a, 227b is defined by a cut line 225a, 225b. The cut lines 225a, 25b are separated by a fold line 222. The fold line 222 and cut lines 225a, 225b are angled with respect to the end edge 216 as in the first embodiment, so that
15 upon engagement into the locking slit 228, the trailing edge 224 is substantially parallel with the opening edge 234. The stopper tabs 227a, 227b may be shaped differently to that shown in Fig. 3 without departing from the scope of the invention and the size of the stopper tab 227a, 227b can be used to control the amount of unfolding of the anchoring tab 220 relative to the main portion 218. A short stopper tab 227a, 227b may allow a greater degree of
20 unfolding of the anchoring tab 220 compared to a longer stopper tab.

It can be appreciated that various changes may be made without departing from the scope of the present invention, for example, the size and shape of the locking tab and locking slit may be adjusted to accommodate panels of differing size or shape, providing that the lock and slit
25 are sized in complementary fashion to one another. It is also envisaged that panel 12 could be provided with a slit or aperture which could receive the stopper tab 27 so that the anchoring tab 20 of panel 10 is additionally locked to panel 12. Other variations may also be made within the scope of the invention. For example the size, shape, position and number of stopper tabs may be altered providing that the stopper tab can still prevent the anchoring tab
30 from unfolding. It will also be apparent that the locking mechanism of the present invention could be applied to a variety of cartons and its application is not limited to a wraparound

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carton. It is also clear that the locking slit and tab could be formed from opposite ends of a unitary blank, or indeed from two separate panels.

5 It will also be recognised that as used herein, any reference to hinged connection should not be construed as necessarily referring to a single fold line only; indeed it is envisaged that hinged connection can be formed from one or more of the following, a score line, a frangible line or a fold line without departing from the scope of the invention.

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CLAIMS

- 5 1. In a blank for forming a wraparound carton, an arrangement for securing together a pair of panels of the blank, said arrangement comprising a locking tab projecting from an end edge of one of said panels and a locking slit provided adjacent an end edge of the other of said panels, said locking tab having a leading main portion and an anchoring tab provided with a trailing edge and hinged to one side of said main portion, said locking slit being disposed along a fold line spaced inwardly from, and extending substantially parallel to, the end edge of said other panel to define a foldable edge strip, wherein said anchoring tab is folded into overlapping relationship with said main portion when said locking tab is being inserted into said locking slit and wherein said locking slit is formed to accept the folded arrangement of said locking tab when said locking slit is opened by folding said edge strip out of the plane of said other one of said panels, characterized by means to prevent said anchoring tab unfolding relative to said main portion such that when said trailing edge clears said locking slit, the anchoring tab remains in substantially overlapping relationship with said main portion, and the trailing edge of the anchoring tab is juxtaposed said folded edge strip, so that said panels are locked together.
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2. An arrangement according to Claim 1, wherein said locking slit is disposed essentially entirely along said fold line.
- 25
3. The arrangement according to any of the preceding claims wherein the means to prevent said anchoring tab unfolding is provided by at least one protruding tab extending from the hinged connection with said main portion and being defined by one or more cut lines.
- 30
4. An arrangement according to Claim 3 wherein the protruding tab is substantially semi-circular.

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5. The arrangement according to any of the preceding claims, wherein said locking slit is generally in the form of a shallow "V" which extends into said edge strip and interrupts said fold line.
- 5 6. The arrangement according to claim 5 wherein said locking slit is symmetrical so that the legs of said "V" are of similar lengths.
7. The arrangement according to claim 6, wherein the trailing edge of said anchoring tab is substantially parallel to one of said legs.
- 10 8. The arrangement according to any of the preceding claims wherein the complete trailing edge of the anchoring tab contacts the edge strip adjacent the locking slit.
9. An arrangement according to any of the preceding claims wherein a slit or aperture is
15 provided in the panel for receiving the means for preventing unfolding of the anchoring tab and thereby providing additional locking of the two panels.
10. The arrangement according to any of the preceding claims wherein said locking slit
20 comprises a first part extending towards the end edge of said other panel at an acute angle with respect to said fold line, a return part extending back to meet said fold line at an acute angle with respect thereto and an end part extending substantially along said fold line.

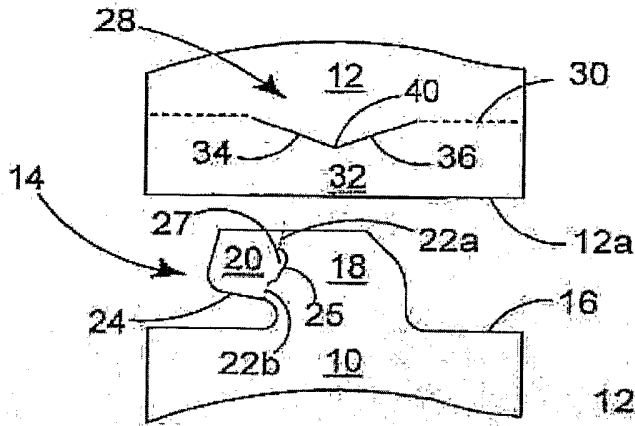


FIGURE 1

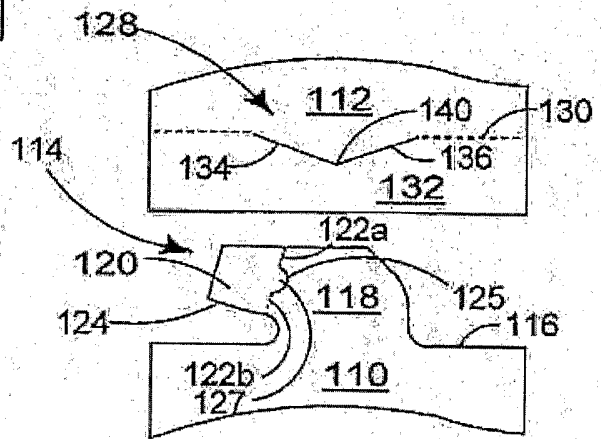


FIGURE 2

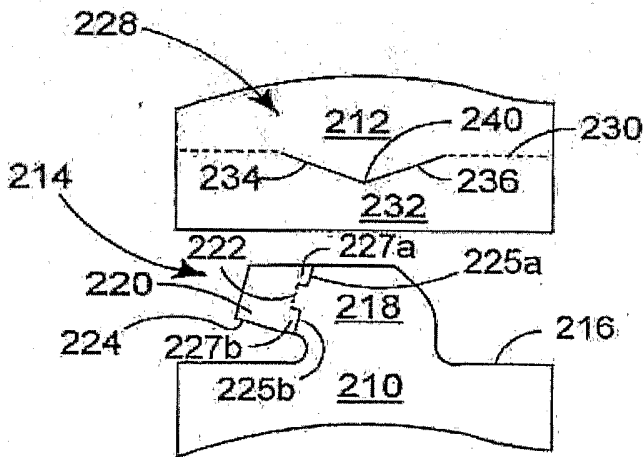


FIGURE 3

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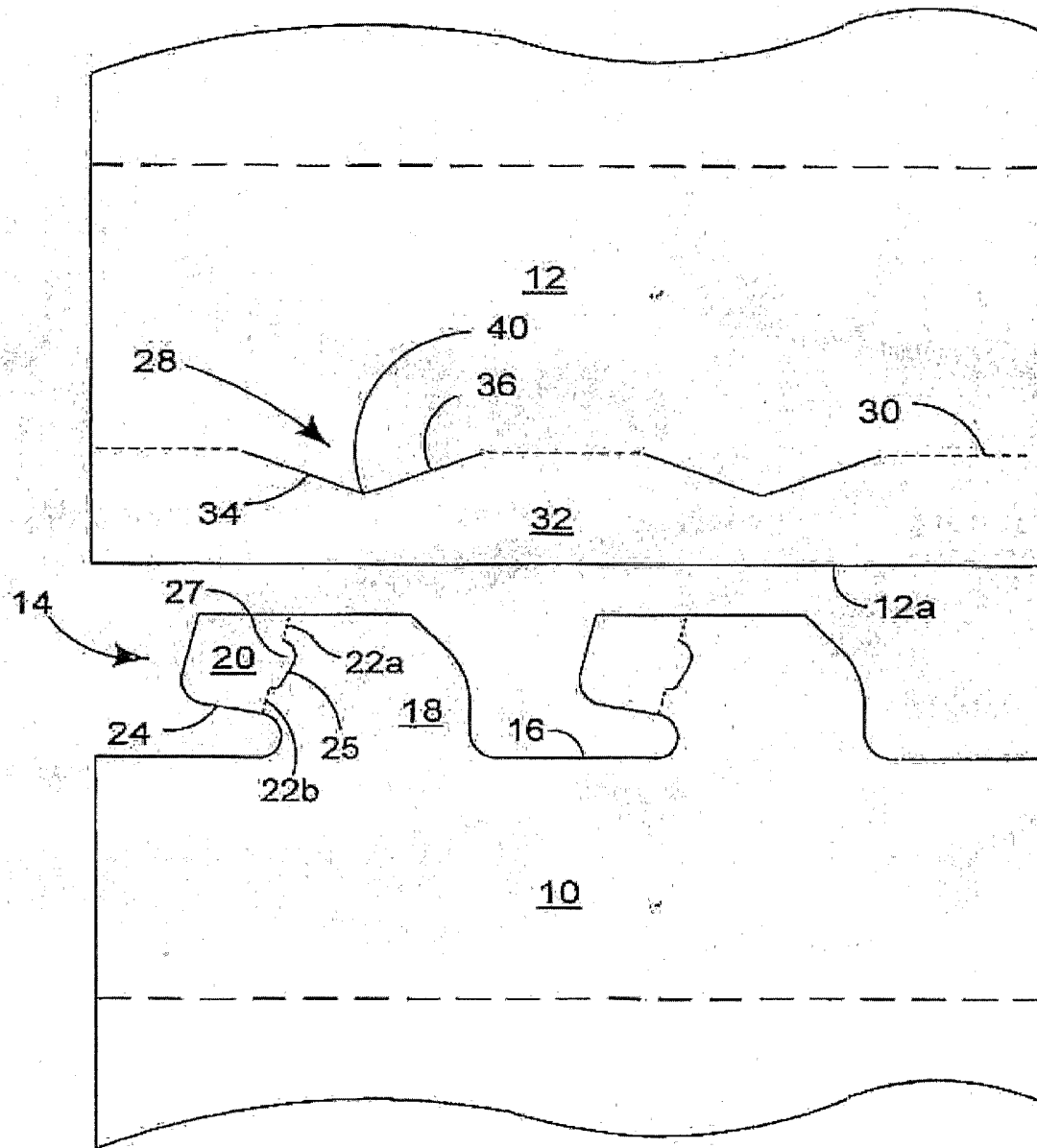


FIGURE 4

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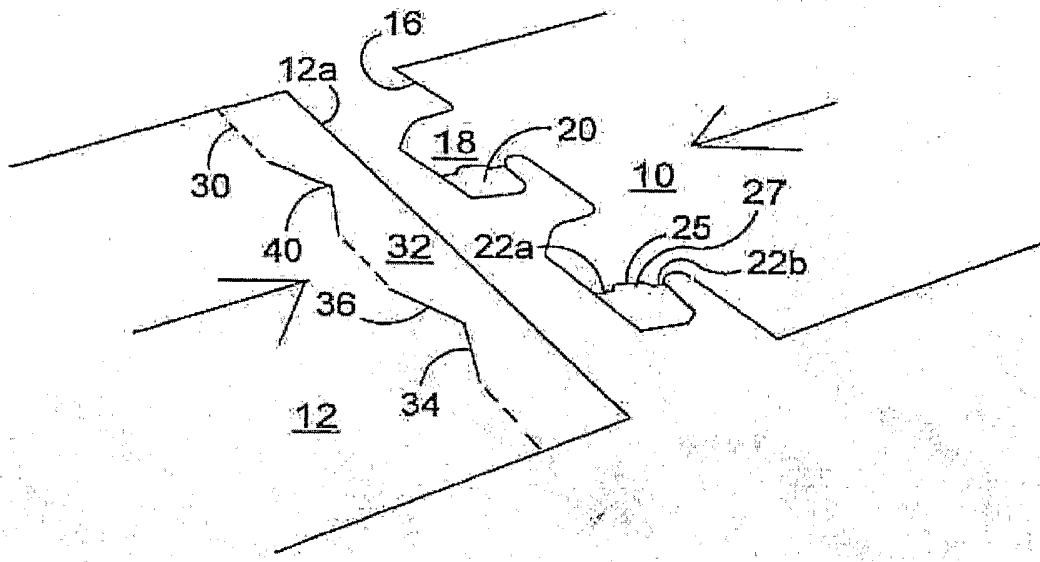


FIGURE 5

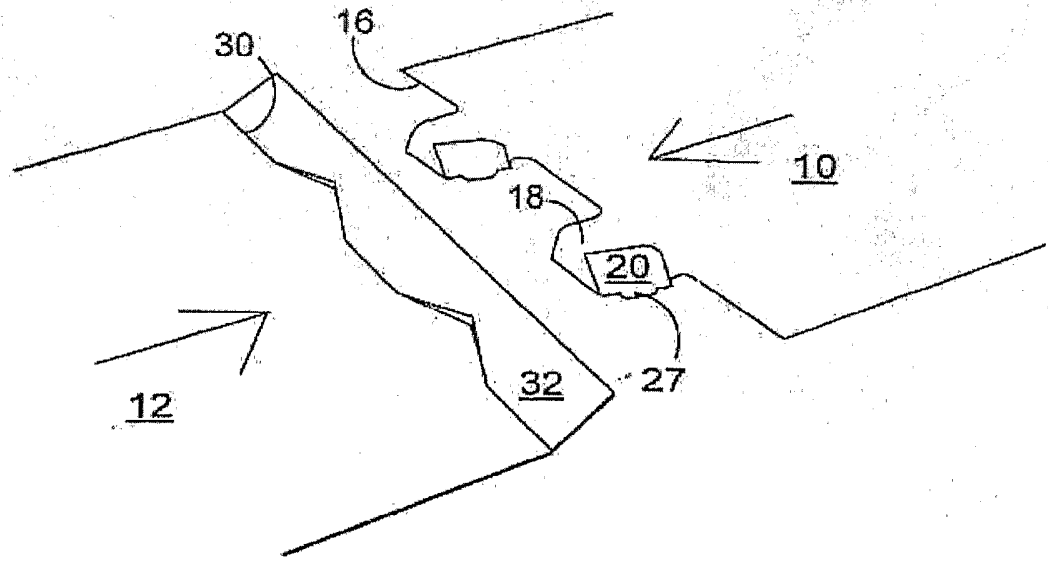


FIGURE 6

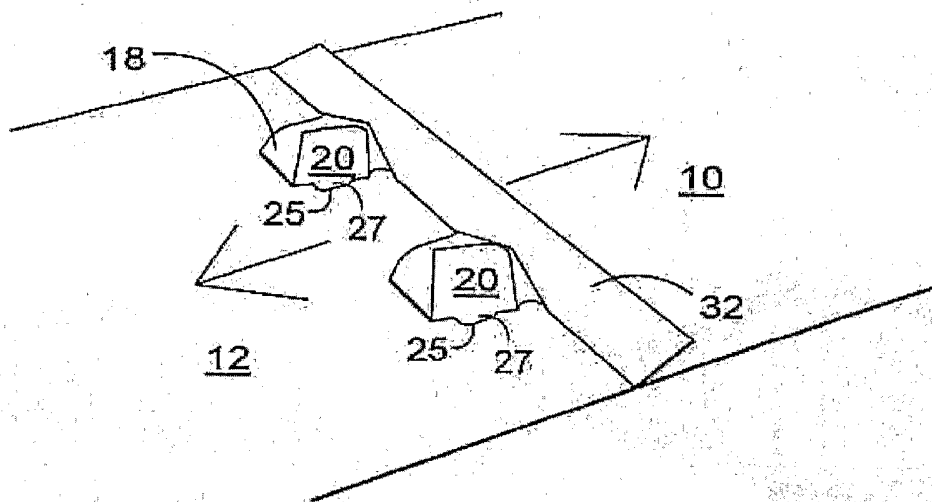


FIGURE 7

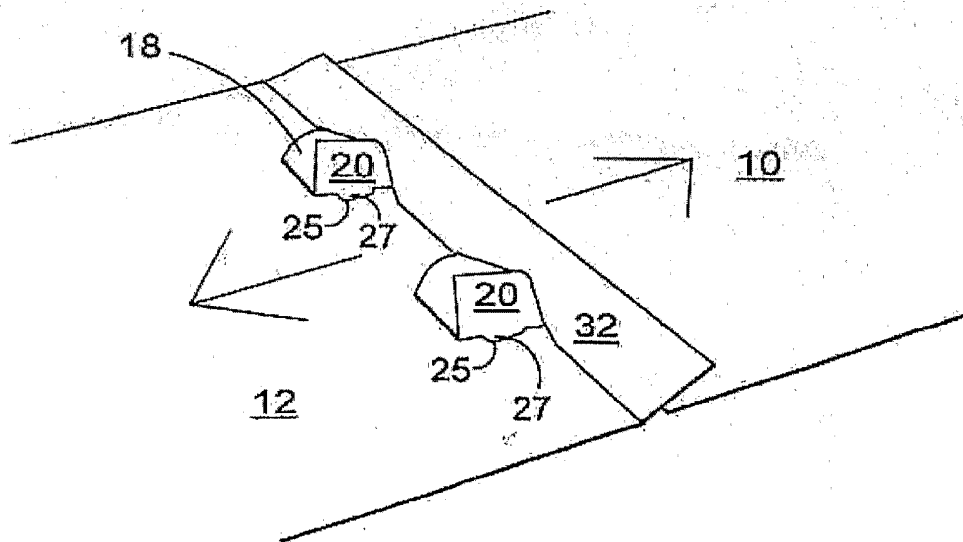


FIGURE 8

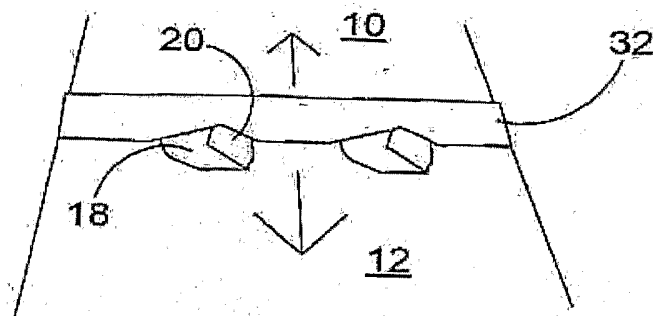


FIGURE 9

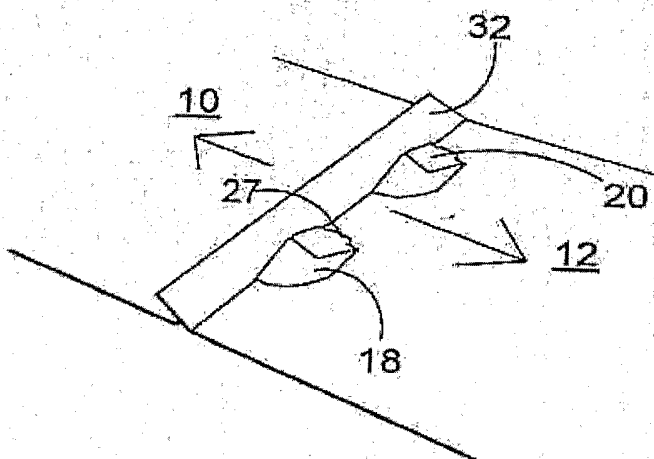


FIGURE 10

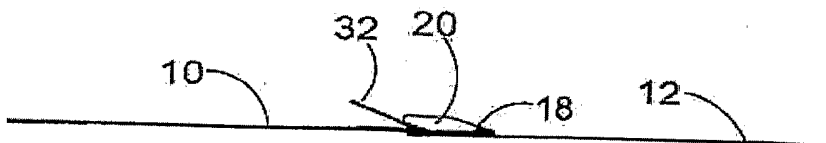


FIGURE 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/003509

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D71/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 150 117 A (THE MEAD CORPORATION) 31 July 1985 (1985-07-31) cited in the application abstract figures 1-13	1-10
A	EP 0 371 298 A (UNILEVER NV; UNILEVER PLC; 4P NICOLAUS KEMPTEN GMBH) 6 June 1990 (1990-06-06) figures 1-5	1-10

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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