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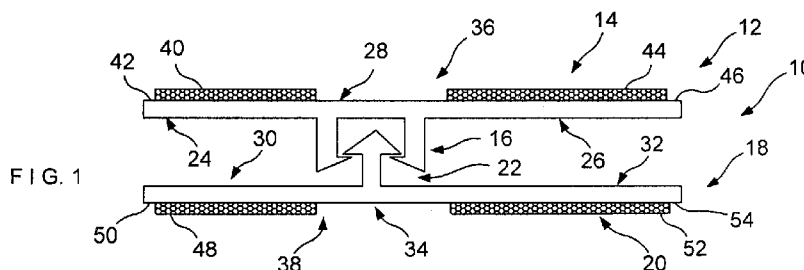
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(54) Title: ZIPPER PROFILES WITH FOAMED SEALANT



(57) Abstract: A reclosable zipper (10) is disclosed which includes a first profile (12) which has a first compressible foamed sealant layer (14), and a first interlocking element (16), which is unfoamed, extending from the first profile (12). The zipper (10) includes a second profile (18) which has a second compressible foamed sealant layer (20), and a second interlocking element (22), which is unfoamed, extending from the second profile (18). The rigidity of the interlocking elements provides the required stability when the zipper is closed while the foamed sealant layers improve the sealing characteristics of the zipper to a packaging film.

ZIPPER PROFILES WITH FOAMED SEALANT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application No. 61/298,977, to Plourde, filed on January 28, 2010, the disclose of which is incorporated herein by reference in its entirety.

BACKGROUND OF THE DISCLOSED EMBODIMENTS

[0002] Field Of The Disclosed Embodiments

[0003] The invention is directed to a reclosable zipper with zipper profiles that comprise compressible foamed sealant layers for enhancing the connection with packaging films, and wherein the zipper has interlocking elements which are unfoamed.

[0004] Description Of The Related Art

[0005] Zippers are typically sealed to a packaging film by compressing the zipper, or a portion of the zipper, between layers of film by two heated seal bars. For this system to work, the sealing surfaces and alignment of the seal bars must be maintained to very tight tolerances, which are often not the case in many packaging operations, resulting in weak or spotty seals.

[0006] One option is to enhance the connection between the reclosable zipper and the package film with a sealant. This is because sealants provide stronger zipper to film seals at a lower temperature, pressure and/or dwell. However, typical relatively incompressible sealant layers result in either weak spots in the seal or spots where seal bars burn through the packaging film, which results in weak spots in the package.

[0007] In view of the problems with typical sealants, a compressible foamed sealant layer is an option for enhancing the connection between the reclosable zipper and the package film.

The compressibility of the foamed sealant layer provides a more consistent zipper to package film seal. For example, the durometer of the foamed sealant layer can be selected so that the foamed sealant layer collapses in areas of high spots when a seal bar presses against the zipper and packaging film, allowing the low spots in the seal bar to contact the zipper and film with adequate pressure to form a proper seal. In addition, maintenance of a packaging machine is much less critical with a foamed sealant layer. Another advantage is that foamed sealant layers act as insulating layers, reducing the likelihood that the inside surfaces of the zipper profile flanges will seal to each other when the zipper is sealed to the package. In addition, there is a reduced likelihood that the flanges will seal together where no intervening barrier is provided. Yet another advantage of utilizing foamed sealant layers is that less plastic can be used to make the zipper, so that the zipper weighs less, improving sustainability from a materials point as well as a shipping aspect.

[0008] An example of an application of foamed material for manufacturing a zipper is provided in U.S. Patent No. 5,520,463 to Tilman. Tilman discloses a zipper that is either completely foamed, or has a foamed core encapsulated within a solid skin layer or casing of polymeric resin material to which no blowing agent has been added. That is, in Tilman, the profiles, including the interlocking elements, are extruded from a synthetic polymeric resin material such as low-density polyethylene (LDPE). The resin material is mixed with a blowing agent, such as HYDROCEROL® CF 40 E, included in an amount less than or equal to 5% of the synthetic polymeric resin material by volume. The blowing agent provides the resin with a fine-celled foam structure, increasing the size (cross-sectional area) of the profiles without increasing the mass of the zipper at opposing side seals. However, the foamed interlocking elements taught in Tilman fail to provide required rigidity. The lack of rigidity of the interlocking elements of such zippers results in inadequate strength to remain closed when product is in the package.

BRIEF SUMMARY OF THE DISCLOSED EMBODIMENTS

[0009] A reclosable zipper is disclosed which includes a first profile which comprises a first compressible foamed sealant layer, and a first interlocking element, which is unfoamed, extending from the first profile. The zipper includes a second profile which comprises a second compressible foamed sealant layer, and a second interlocking element, which is unfoamed,

extending from the second profile. The rigidity of the interlocking elements provides the required stability when the zipper is closed while the foamed sealant layers improve the sealing characteristics of the zipper to a packaging film.

BRIEF DESCRIPTION OF THE FIGURES

[00010] The accompanying figures illustrate the disclosed embodiments, which are to be considered as examples only, and in which:

[00011] Figure 1 illustrates one embodiment of the disclosed zipper profiles with foamed sealant layers and interlocking elements which are unfoamed;

[00012] Figure 2 illustrates another embodiment of the disclosed zipper profiles with foamed sealant layers and interlocking elements which are unfoamed;

[00013] Figure 3 illustrates yet another embodiment of the disclosed zipper profiles with foamed sealant layers and interlocking elements which are unfoamed;

[00014] Figure 4 illustrates a further embodiment of the disclosed zipper profiles with foamed sealant layers and interlocking elements which are unfoamed;

[00015] Figure 5 illustrates a bag including yet a further embodiment of the disclosed zipper profiles with foamed sealant layers and interlocking elements which are unfoamed; and

[00016] Figure 6 illustrates an additional embodiment of the disclosed zipper profiles with foamed sealant layers and interlocking elements which are unfoamed.

DETAILED DESCRIPTION OF THE DISCLOSED EMBODIMENTS

[00017] Turning to Figures 1-4, a reclosable zipper 10 is illustrated. The zipper 10 includes a first profile 12 which comprises a first compressible foamed sealant layer 14, and a first interlocking element 16, which is unfoamed, that is, not foamed, extending from the first profile 12. The zipper 10 includes a second profile 18 which comprises a second compressible foamed sealant layer 20, and a second interlocking element 22, which is unfoamed, extending from the second profile 18. The rigidity of the interlocking elements 16, 22 provides the

required stability when the zipper 10 is closed while the foamed sealant layers 14, 20 improve the sealing characteristics of the zipper 10 to a packaging film for reasons noted above.

[00018] As illustrated in the figures, the first interlocking element 16 is a female zipper element and the second interlocking element 22 is a male zipper element, and the first profile 12 is as large in a bag height-wise direction as the second profile 18. The foamed sealant layers 14, 20 comprise the same foamed sealant. Specifically, for example, the foamed sealant layers 14, 20 comprise a foamed polyolefin sealant resin. Most polyolefin sealant resins can be foamed using commercially available foaming agents that react when heated in a barrel of an extruder. The interlocking elements 16, 22 comprise polyolefin sealant resin which is unfoamed. The resins used in the sealant layers may include, but are not limited to mLLDPE, particularly mLLDPE's with densities less than 0.910, co-polymers, and lower melting point resins. In addition, the sealant layer could be made from a similar resin as the interlocking elements, only foamed.

[00019] The first profile 12 comprises a first product side flange 24, a first consumer side flange 26, and a first connecting flange 28 from which the first interlocking element 16 extends, where the first connecting flange 28 is between, in a bag height-wise direction, the first product side flange 24 and the first consumer side flange 26. The second profile 18 comprises a second product side flange 30, a second consumer side flange 32, and a second connecting flange 34 from which the second interlocking element 22 extends, where the second connecting flange 34 is between, in a bag height-wise direction, the second product side flange 30 and the second consumer side flange 32.

[00020] In the embodiments illustrated in Figures 1 and 2, none of the flanges are foamed. The first foamed sealant layer 14 is disposed on a first film facing side 36 of the first profile 12. The second foamed sealant layer 20 is disposed on a second film facing side 38 of the second profile 18.

[00021] More specifically, in the embodiment illustrated in Figure 1, the first foamed sealant layer 14 comprises a first product side foamed sealant segment 40 on a first film facing side 42 of the first product side flange 24, and a first consumer side foamed sealant segment 44 on a first film facing side 46 of the first consumer side flange 26. The second foamed sealant

layer 20 comprises a second product side foamed sealant segment 48 on a second film facing side 50 of the second product side flange 30, and a second consumer side foamed sealant segment 52 on a second film facing side 54 of the second consumer side flange 32. Each of the foamed sealant segments extends in the bag width-wise direction on respective profiles 12, 18.

[00022] In the embodiment illustrated in Figure 2, the first foamed sealant layer 14 comprises a first set of narrow-based foamed sealant ribs, including, for example, a first rib 56, a second rib 58 and a third rib 60, which are substantially uniformly distributed in a bag height-wise direction across the first film facing side 36 of the first profile 12. The second foamed sealant layer 20 comprises a second set of narrow-based foamed sealant ribs, including for example, a fourth rib 62, a fifth rib 64 and a sixth rib 66, which are substantially uniformly distributed in a bag height-wise direction across the second film facing side 38 of the second profile 18. With such distribution, each flange includes at least one foamed sealant rib. Each of the foamed sealant ribs extends in the bag width-wise direction on respective profiles 12, 18.

[00023] In the embodiment illustrated in Figure 3, each flange is foamed. Accordingly, the first foamed sealant layer 14 comprises each of the first profile side flanges. The second foamed sealant layer 20 comprises each of the second profile side flanges.

[00024] In the embodiment illustrated in Figure 4, the first foamed sealant layer 14 comprises the first product side flange 24 and the first consumer side flange 26, and the first connecting flange 28 is unfoamed. The second foamed sealant layer 20 comprises the second product side flange 30 and second consumer side flange 32, and the second connecting flange 34 is unfoamed. The first connecting flange 28 is larger, in a bag height-wise direction, than the second connecting flange 34. This is because the female interlocking element 16 has a base which is larger, in a bag height-wise direction, than the male interlocking element 22.

[00025] A bag is within the scope of the disclosed embodiments which comprises any of the above disclosed reclosable zippers. As illustrated in Figure 5, one embodiment for a bag 70 comprises a first bag panel 72 sealed to the first profile 12. The bag 70 also comprises a second bag panel 74 sealed to the second profile 18. The first and second bag panels 72, 74 may be continuous or sealed at a bag bottom seal (not illustrated). The zipper 10 illustrated in Figure 5

is a slider type, where the first and second profiles 12, 18 including respective first and second product side flanges 24, 30, along with respective first and second product size foamed sealant layers 40, 48. Instead of consumer side flanges, the zipper 10 includes a slider 76 which slides over the consumer side end 78 of the zipper 10 to open or close the zipper 10.

[00026] As illustrated in Figure 6, it is within the scope of the disclosed embodiments for the zipper 10 to be a flangeless, string zipper type mechanism. If the zipper 10 is flangeless, a first base 80 of the first interconnecting element 16 has a first foamed sealant layer 82 on a first film facing side of the first base 80. On the other hand, a second base 84 of the second interconnecting element 22 has a second foamed sealant layer 86 on a second film facing side of the second base 84.

[00027] In sum, what has been disclosed is a zipper 10 for a reclosable package which has compressible sealant layers 14, 20 for improving the sealing characteristics between the zipper 10 and packaging film. The foamed sealant layers 14, 20 can be localized, extruded as sealing ribs and extended in a bag width-wise direction across the backside of the profiles 12, 18. Alternately the profile flanges can be entirely formed from a foamed sealant, or can be partially formed from a foamed sealant with portions 28, 34 of respective profiles 12, 18, which support respective interlocking elements 16, 22, being left solid.

[00028] The present disclosed embodiments elements may be configured in other specific forms without departing from the spirit or essential characteristics identified herein. The described embodiments are in all respects only as illustrative and not as restrictive. The scope of the embodiments is, therefore, indicated by the appended claims and their combination in whole or in part rather than by the foregoing description. All changes that come within the meaning and range of equivalency of the claims are to be embraced within their scope.

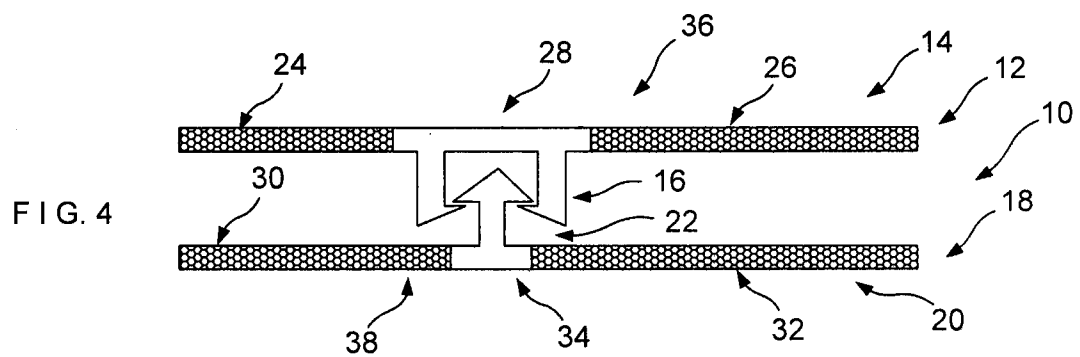
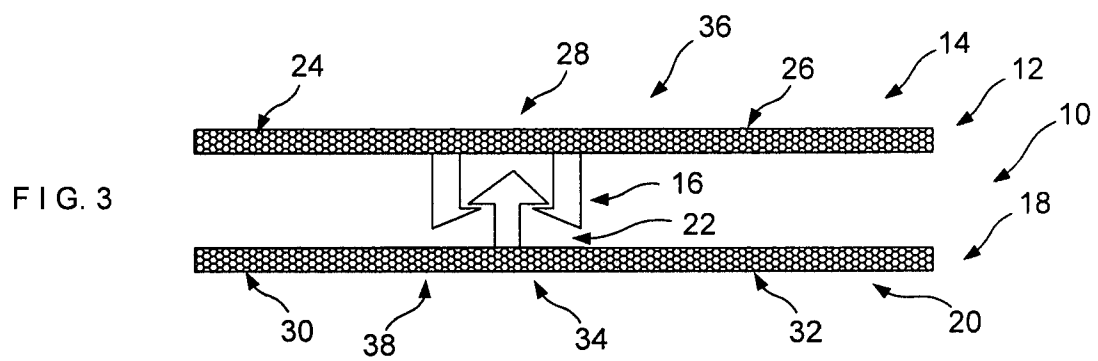
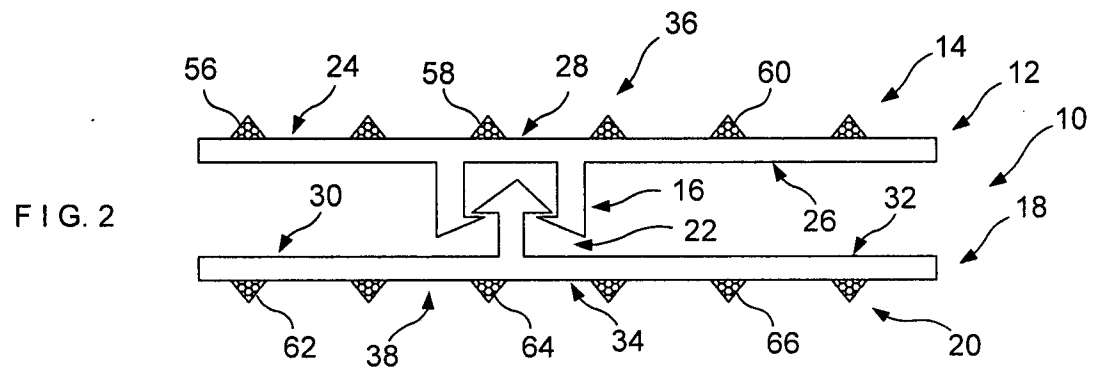
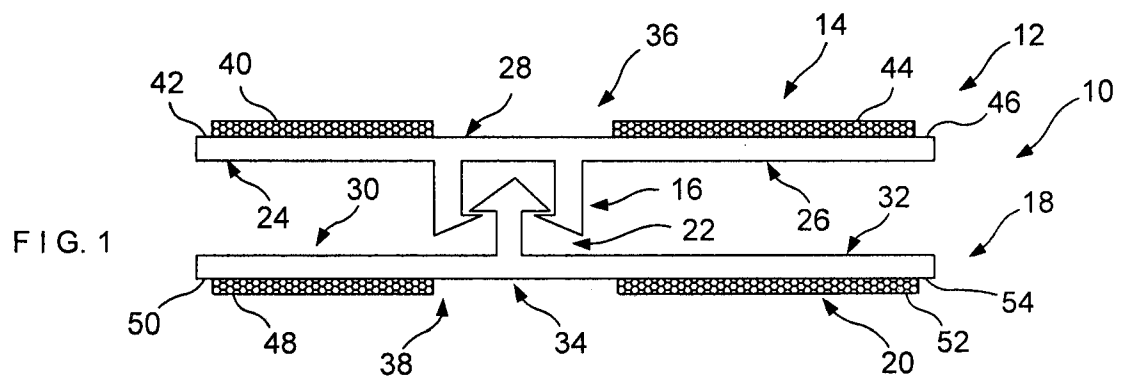
CLAIMS

We Claim:

1. A reclosable zipper comprising:
a first profile which comprises a first compressible foamed sealant layer, and a first interlocking element, which is unfoamed, extending from the first profile; and
a second profile which comprises a second compressible foamed sealant layer, and a second interlocking element, which is unfoamed, extending from the second profile.
2. The reclosable zipper of claim 1, wherein the first interlocking element is a female zipper element and the second interlocking element is a male zipper element.
3. The reclosable zipper of claim 1, wherein the foamed sealant layers comprise the same foamed sealant.
4. The reclosable zipper of claim 1, wherein the foamed sealant layers comprise a foamed polyofin sealant resin.
5. The reclosable zipper of claim 1, wherein the interlocking elements comprise polyofin sealant resin which is unfoamed.
6. The reclosable zipper of claim 3, wherein:
the first profile comprises a first product side flange, a first consumer side flange, and a first connecting flange from which the first interlocking element extends, where the first connecting flange is between, in a bag height-wise direction, the first product side flange and the first consumer side flange; and
the second profile comprises a second product side flange, a second consumer side flange, and a second connecting flange from which the second interlocking element extends, where the second connecting flange is between, in a bag height-wise direction, the second product side flange and the second consumer side flange.

7. The reclosable zipper of claim 6, wherein none of the flanges are foamed.
8. The reclosable zipper of claim 7, wherein the first foamed sealant layer is disposed on a first film facing side of the first profile and the second foamed sealant layer is disposed on a second film facing side of the second profile.
9. The reclosable zipper of claim 7, wherein:
 - the first foamed sealant layer comprises a first product side foamed sealant segment on a first film facing side of the first product side flange, and a first consumer side foamed sealant segment on a first film facing side of the first consumer side flange; and
 - the second foamed sealant layer comprises a second product side foamed sealant segment on a second film facing side of the second product side flange, and a second consumer side foamed sealant segment on a second film facing side of the second consumer side flange.
10. The reclosable zipper of claim 9, wherein each of the foamed sealant segments extends in the bag width-wise direction on respective profiles.
11. The reclosable zipper of claim 8, wherein:
 - the first foamed sealant layer comprises a first set of narrow-based foamed sealant ribs that are substantially uniformly distributed in a bag height-wise direction across the first film facing side of the first profile; and
 - the second foamed sealant layer comprises a second set of narrow-based foamed sealant ribs that are substantially uniformly distributed in a bag height-wise direction across the second film facing side of the second profile.
12. The reclosable zipper of claim 11, wherein each flange includes at least one foamed sealant rib.
13. The reclosable zipper of claim 12, wherein each of the foamed sealant ribs extends in the bag width-wise direction on respective profiles.

14. The reclosable zipper of claim 6, wherein each flange is foamed, so that the first foamed sealant layer comprises each of the first profile side flanges and the second foamed sealant layer comprises each of the second profile side flanges.
15. The reclosable zipper of claim 6, wherein the first foamed sealant layer comprises the first product side flange and the first consumer side flange, and the first connecting flange is unfoamed, and the second foamed sealant layer comprises the second product side flange and second consumer side flange, and the second connecting flange is unfoamed.
16. The reclosable zipper of claim 15, wherein the first connecting flange is larger, in a bag height-wise direction, than the second connecting flange.
17. A bag comprising the reclosable zipper of claim 1 and further comprising a first panel sealed to the first profile and a second panel sealed to the second profile.
18. The reclosable zipper of claim 1, wherein the zipper includes a slider.
19. The reclosable zipper of claim 1, wherein the zipper is flangeless.
20. The reclosable zipper of claim 19, wherein a first base of the first interconnecting element comprises said first foamed layer and a second base of the second interconnecting element comprises said second foamed layer.



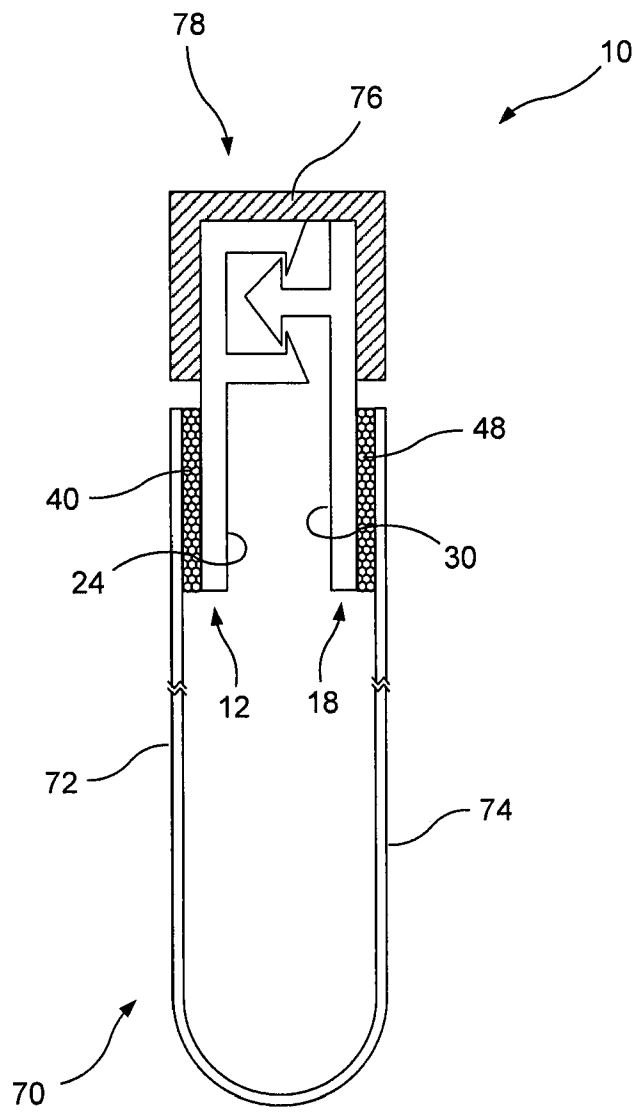


FIG. 5

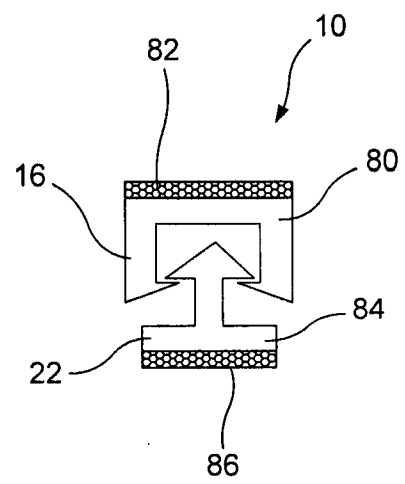


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2011/020733

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D33/25
ADD.

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 027 840 A1 (ILLINOIS TOOL WORKS [US]) 16 August 2000 (2000-08-16) paragraph [0019] - paragraph [0022]; figures 1-6	1-20
A	EP 1 579 780 A2 (REYNOLDS CONSUMER PROD [US]) 28 September 2005 (2005-09-28) paragraph [0044] - paragraph [0046]; figures 1-6	1-20
A	US 5 520 463 A (TILMAN PAUL A [US]) 28 May 1996 (1996-05-28) cited in the application the whole document	1-20
A	US 6 004 032 A (KAPPERMAN ELIZABETH J [US] ET AL) 21 December 1999 (1999-12-21) column 4, line 34 - line 64; figures 1-21	1-20



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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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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