



(11) **EP 1 742 843 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
08.08.2007 Bulletin 2007/32

(51) Int Cl.:
B65B 61/18 ^(2006.01) **B65B 9/20** ^(2006.01)
B65D 75/58 ^(2006.01)

(21) Application number: **05714375.2**

(86) International application number:
PCT/BE2005/000024

(22) Date of filing: **17.02.2005**

(87) International publication number:
WO 2005/105581 (10.11.2005 Gazette 2005/45)

(54) **VFFS/HFFS PACKAGING WITH OPENING AID ON THE LONGITUDINAL SEAM AND PROCESS OF MAKING SUCH A PACKAGING**

VERTIKALE/HORIZONTALE FORM-FÜLL-SIEGEL-VERPACKUNG MIT ÖFFNUNGSHILFE AN DER LÄNGSNAHT UND VERFAHREN ZUR HERSTELLUNG EINER SOLCHEN VERPACKUNG

EMBALLAGE OBTENU PAR UN PROCEDE VERTICAL OU HORIZONTAL DE FORMAGE-REPLISSAGE-SCELLAGE ET PROCEDE POUR FABRIQUER UN TEL EMBALLAGE

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR**

• **VERBEECK, Bart**
3540 Herk-de-Stad (BE)

(30) Priority: **05.05.2004 EP 04447113**

(74) Representative: **pronovem**
Office Van Malderen
Bld. de la Sauvenière 85/043
4000 Liège (BE)

(43) Date of publication of application:
17.01.2007 Bulletin 2007/03

(73) Proprietor: **Amtcor Flexibles Europe A/S**
8700 Horsens (DK)

(56) References cited:
EP-A- 0 400 577 **CH-A- 651 795**
US-A- 5 409 115

(72) Inventors:
• **DAELMANS, Eddy**
3650 Disen-Stokkem (BE)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 742 843 B1

Description**Field of the invention**

[0001] The present invention relates to flexible packaging and in particular to vertical and horizontal form, fill and seal packaging (VFFS/HFFS) with a continuous teeth structure on the longitudinal seam of said packaging.

State of the art

[0002] VFFS/HFFS packaging machine reels exhibit in the extrusion direction of the plastic film uncontrolled tear behaviour and the tear tends to continue in the extrusion direction. The majority of VFFS/HFFS packagings are positioned in a way that the length of the pack is parallel to the extrusion direction of the film. The consequence of this positioning is that the cross seam or transversal seam of the packaging generally comprises the opening initiations of the packaging. The mostly used opening initiations are uninterrupted teeth structures in the cross seam of the VFFS/HFFS packaging. The opening of the pack at the top of such a VFFS/HFFS packaging including a teeth structure as opening initiations, as mentioned above, often leads to uncontrolled tear in the extrusion direction of the plastic film (machine direction).

[0003] In the prior art, several documents present opening initiations such as "V-shaped" incisions or notches on the longitudinal seal.

[0004] Document US 5,409,115 discloses a tubular bag packaging for bandage-like material. This packaging exhibits at least one opening initiation on the longitudinal seam positioned between continuously recurring longitudinal spaces with tear-off tongs between notches for tearing limiting one another. In this packaging, the teeth structure is interrupted by longitudinal spaces defining tear-off tongs of possibly different widths. The opening initiation structure on the longitudinal seam is achieved during the VFFS/HFFS process, which slows down the packaging speed. Furthermore, this kind of opening initiation on the longitudinal seam generates scrap in the VFFS/HFFS process because material is removed.

[0005] Document CH 651 795 A5 discloses a VFFS/HFFS packaging with opening initiations in the longitudinal seam of said packaging. In this case, the opening initiations are cut incisions present on determined positions of said seam. No material is removed in this technique. Nevertheless, the teeth structure is not a continuous and uninterrupted structure. A continuous teeth structure allows the tear of the packaging in a transverse direction to the extrusion direction (machine direction) at any position of the seam. Furthermore, the incisions have to be achieved during the VFFS/HFFS process, again slowing down the packaging speed.

[0006] Document EP 0 400 577 A1 discloses micro-cuts in the side margin. This type of micro-cuts represents non-controllable tear initiations for oriented polymer

films.

Aim of the invention

[0007] The present invention aims to provide a VFFS/HFFS packaging with a continuous teeth structure on the longitudinal seam, said teeth structure being present from the beginning on the packaging machine reel and therefore independent of the packaging process itself, the technique of the present invention having therefore no influence on the packaging speed and generating no additional scrap.

Summary of the invention

[0008] The present invention discloses a vertical/horizontal form, fill and seal packaging comprising a plastic film, a longitudinal seam and a cross-directional seam, characterised in that the longitudinal seam comprises a continuous teeth structure of adjacent notches with no remaining horizontal cutting lines, representing tear initiations over the whole length of the longitudinal seam, said packaging being obtained by a plastic film comprising on both lateral edges said continuous teeth structure before being formed into a tube in the VFFS/HFFS packaging process.

[0009] In a particular embodiment of the present invention, said packaging further comprises tear initiations on the cross directional seam.

[0010] Preferably, said tear initiations on the cross directional seam comprises a continuous teeth structure.

[0011] Generally, the longitudinal seam is a fin seal or a lap seal.

[0012] In practice, the lap seal presents a seal-free continuous teeth structure.

[0013] The present invention further discloses a VFFS/HFFS packaging process comprising the step of unwinding a reel of a plastic film, characterised in that said reel comprises a continuous teeth structure on the lateral edges of said reel, said continuous teeth structure forming in the finished package tear initiation over the whole length of the longitudinal seal avoiding additional scrap in the VFFS/HFFS packaging process.

[0014] A key feature of the process of the present invention is that said process is a packaging material waste-free process, except for the usual side-slitting waste of said reel.

[0015] Furthermore, the VFFS/HFFS packaging process is characterised in that the continuous teeth structure on the lateral edges is performed by rotary knives having a substantially continuous teeth structure.

Short description of the drawings

[0016] Fig. 1 shows a VFFS/HFFS packaging with a continuous teeth structure of adjoining notches on the cross seam as usually produced in the prior art.

[0017] Fig. 2 shows a VFFS/HFFS packaging with a

continuous teeth structure of adjoining notches on the longitudinal seam according to the invention.

[0018] Fig. 3 shows another example of a VFFS/HFFS packaging bag with a continuous teeth structure of adjoining notches on the longitudinal seam according to the invention.

[0019] Fig. 4 shows the same packaging as that of Fig. 3 with the particular opening possibility by tearing the packaging in the cross-direction to the extrusion direction of the plastic film.

[0020] Fig. 5 shows a VFFS/HFFS packaging machine reel where the teeth structure of adjoining notches is present on the reel to be used on the VFFS/HFFS machine.

[0021] Fig. 6a shows a diagrammatic representation of the length necessary for a VFFS/HFFS packaging on the unwound reel if the teeth structure of adjoining notches is present at the top of the packaging.

[0022] Fig. 6b shows the length of the VFFS/HFFS necessary on the reel if the teeth structure of adjoining notches is present on the lateral side of the web.

[0023] Fig. 7 shows a VFFS/HFFS process where the reels used have a lateral teeth structure of adjoining notches.

[0024] Fig. 8 shows the cutting of an extrusion film in different strips where the teeth structure of adjoining notches is achieved by rotary slitting knives exhibiting a teeth structure.

[0025] Fig. 9a shows a teeth structure present in the cross direction of the extrusion direction (E.D) and a dotted line showing the privileged tear direction.

[0026] Fig. 9b shows the teeth structure of adjacent/adjoining notches laterally present on the VFFS/HFFS packaging machine reel where the privileged tear directions of the film are represented in dotted lines.

[0027] Fig. 10 shows a longitudinal seam of a VFFS/HFFS packaging where the teeth structure of adjacent notches is not perfectly superposed.

Detailed description of the invention

[0028] The present invention discloses a VFFS/HFFS packaging with a continuous teeth structure present at least on the longitudinal seam of said packaging. The expression "continuous teeth structure" should be understood as substantially non-interrupted "V-shaped" incisions also called adjacent notches or adjoining notches as shown on the different figures relating to the present invention. The expression "adjoining notches" or "adjacent notches" are indistinctly used in the text.

[0029] Such a teeth structure is created simultaneously with the cutting of the extrusion film into the right width for the packaging machine reels. The first side of the film cut in a "V-shape" representing the counterpart of the second side, in such a way that no horizontal cutting lines remain, allowing a scrap-free cutting (see Fig. 8). In US 5,409,115, the cutting leaves cutting lines that are parallel to the seam, which does not allow the tear of the film at

any place. Furthermore, the cutting of the film in US 5,409,115 generates scrap and has to be performed during the packaging operation to build proper tear-off tongues.

5 [0030] There are different possibilities for creating such a teeth structure by means well-known by those skilled in the art (laser cutting, water-jet cutting, rotary-knife cutting, etc.). The teeth structure can consist of big or small adjacent notches, depending on the application.

10 [0031] In the prior art, the teeth structure in the cross seam of the packaging is achieved by a cutting device during the cross seal and cutting operation. If the notches are big, the sealing bars in the cross seal must be much more spread than if the cross-cutting was a straight cutting, this is well known by those skilled in the art. The consequence of this spread is a globally higher length of the packaging representing loss of packaging material. By positioning the continuous teeth structure on the lateral edges of the reel, the global length of the packaging is reduced by a length X, where X represents up to 10%. This principle is shown on Fig.6a (prior art) and 6b (invention).

15 [0032] The teeth structure interrupted by recurring longitudinal spaces to build tear-off tongs, as shown in document US 5, 409,115, requires the cutting-away of material and generates waste during the process. As mentioned above, the generation of scrap in a VFFS/HFFS process is a major drawback. In the case of the present invention, the continuous teeth structure is directly available on the reel (see Fig.5) with no scrap, except for the usual side-slitting waste Y, as shown on Fig.8.

20 [0033] Therefore, the first reason for positioning the continuous teeth structure on the longitudinal seam is that the total length of the VFFS/HFFS packaging can be reduced up to 10%, which represents a considerable packaging material saving, without generating any additional scrap.

25 [0034] The second reason for positioning the continuous teeth structure on the longitudinal seam is the possibility to tear the pack in a transverse direction to the extrusion direction of the film (see figure 9a and 9b). This allows a more predictable opening and sometimes a particular opening of the packaging as shown in figure 4. The fact that the teeth structure is a continuous structure further allows a tear at any position on the longitudinal seam.

30 [0035] The manufacturing of such packaging machine reels is shown in Fig. 8. The side-slitting scrap Y is always present, even in traditional cutting, and kept as small as possible.

35 [0036] A finished reel is shown in Fig. 5 and its use on a VFFS/HFFS packaging machine is shown in Fig. 7.

40 [0037] The presence of the teeth structure on the machine reel has no influence on the running speed of the packaging machine because the cutting knife does not slow down the VFFS/HFFS process.

45 [0038] The fact that the teeth structure is present from the beginning on the machine reel has the consequence

that the teeth structure of both sides of the reel is never perfectly superposed 8 on the longitudinal seam, as it is in Document US 5,409,115. This is represented in figure 10. Nevertheless, this has no effect on the tear possibilities in the cross direction of the extrusion direction of the plastic film because the tear initiation is still present.

[0039] An additional advantage of the present invention is a positive influence on tamper evidence for peel opening. In a prior art VFFS/HFFS packaging, the cross sealed top can be peeled open by pulling on the fin seal of said packaging. If the longitudinal seams (seals) are equipped with a continuous teeth structure, the pack will start to tear at the longitudinal edge before the peeling can start. This makes it almost impossible to peel and reseal the pack without tearing it assuring in this way a certain tamper proof (tamper evidence).

[0040] The plastic materials suitable for VFFS/HFFS packaging produced via a reel equipped with a continuous teeth structure are not limited. Representative examples widely used in the market are BOPP, PET, PS, PE, PA, CPP, mono or multilayer combinations as well as laminates with paper or metallized films, etc.

Legend

[0041]

1. Continuous teeth structure of adjacent notches
2. Longitudinal seam of the VFFS/HFFS packaging
3. Torn piece on a VFFS/HFFS packaging with tearing in the cross direction to the extrusion direction
4. Plastic film cut in the right width for the packaging machine reel
5. Cross directional seam of the VFFS/HFFS packaging
6. Sealing bars on the VFFS/HFFS process
7. Rotary knives for cutting the teeth structure
8. Not perfectly superposed continuous teeth structure

Claims

1. Vertical/horizontal form, fill and seal packaging comprising a plastic film, a longitudinal seam (2) and a cross-directional seam (5), **characterised in that** the longitudinal seam (2) comprises a continuous teeth structure of adjacent notches (1) with no remaining horizontal cutting lines, representing tear initiations over the whole length of the longitudinal seam (2), said packaging being obtained by a plastic film comprising on both lateral edges said continuous teeth structure (1) before being formed into said packaging in the VFFS/HFFS packaging process.
2. VFFS/HFFS packaging as recited in claim 1, **characterised in that** said packaging further comprises tear initiations on the cross directional seam (5).

3. VFFS/HFFS packaging as recited in claim 2, **characterised in that** said tear initiations on the cross directional seam (5) comprises a continuous teeth structure (1).

4. VFFS/HFFS packaging as recited in claim 1, **characterised in that** the longitudinal seam (2) is a fin seal or a lap seal.

5. VFFS/HFFS packaging as recited in claim 4, **characterised in that** the lap seal presents a seal-free continuous teeth structure (1).

6. VFFS/HFFS packaging process comprising the step of unwinding a reel of a plastic film, **characterised in that** said reel comprises a continuous teeth structure (1) on the lateral edges of said reel, said continuous teeth structure forming in the finished package tear initiation over the whole length of the longitudinal seal avoiding additional scrap in the VFFS/HFFS packaging process.

7. VFFS/HFFS packaging process as recited in claim 6, **characterised in that** said process is a packaging material waste-free process, except for the usual side-slitting waste of said reel.

8. VFFS/HFFS packaging process as recited in claim 6, **characterised in that** the continuous teeth structure (1) on the lateral edges is performed by rotary knives having a substantially continuous teeth structure.

Patentansprüche

1. Vertikale/horizontale Form-, Füll- und Siegel Verpackung, die eine Kunststoffolie, eine Längsnaht (2) sowie Quernaht umfasst, **dadurch gekennzeichnet, dass** die Längsnaht (2) eine kontinuierliche Zahnstruktur von benachbarten Aussparungen (1) ohne verbleibende horizontale Schneidlinien umfasst, die Anreißstellen über die gesamte Länge der Längsnaht (2) darstellen; die besagte Verpackung entsteht durch eine Kunststoffolie, die an beiden Seitenkanten die besagte kontinuierliche Zahnstruktur (1) aufweist, bevor sie durch das VFFS/HFFS-Verpackungsverfahren in die Form der besagten Verpackung gebracht wird.

2. VFFS/HFFS-Verpackung nach Anspruch 1, **dadurch gekennzeichnet, dass** die besagte Verpackung weitere Anreißstellen an der Quernaht (5) umfasst.

3. VFFS/HFFS-Verpackung nach Anspruch 2, **dadurch gekennzeichnet, dass** die besagten weiteren Anreißstellen an der Quernaht (5) eine kontinu-

ierliche Zahnstruktur (1) umfassen.

4. VFFS/HFFS-Verpackung nach Anspruch 1, **dadurch gekennzeichnet, dass** es sich bei der Längsnaht (2) um eine Flossennaht oder überlappende Siegelnaht handelt.
5. VFFS/HFFS-Verpackung nach Anspruch 4, **dadurch gekennzeichnet, dass** die überlappende Siegelnaht eine Siegelfreie kontinuierliche Zahnstruktur aufweist.
6. VFFS/HFFS-Verpackungsverfahren, das einen Schritt umfasst, bei dem eine Rolle mit Kunststoffolie abgewickelt wird, **dadurch gekennzeichnet, dass** die besagte Rolle eine kontinuierliche Zahnstruktur (1) an den Seitenkanten der besagten Rolle umfasst, und **dadurch** dass die besagte kontinuierliche Zahnstruktur an der fertig gestellten Verpackung Anreißstellen über die gesamte Länge der Längsnaht bildet und hierdurch zusätzlichen Verschnitt beim VFFS/HFFS-Verpackungsverfahren vermeidet.
7. VFFS/HFFS-Verpackungsverfahren nach Anspruch 6, **dadurch gekennzeichnet, dass** es sich bei besagtem Verfahren um ein im Hinblick auf Verpackungsmaterial abfallfreies Verfahren handelt, ausgenommen dere üblichen Seitenschneidabfälle an der besagten Rolle.
8. VFFS/HFFS-Verpackungsverfahren nach Anspruch 6, **dadurch gekennzeichnet, dass** die kontinuierliche Zahnstruktur (1) an den Seitenkanten durch Rollstanzen geschaffen wird, die im Wesentlichen über eine kontinuierliche Zahnstruktur verfügen.

3. Emballage VFFS/HFFS selon la revendication 2, **caractérisé en ce que** lesdits initiations à la déchirure sur le serti transversal (5) comprennent une structure dentée continue (1).

4. Emballage VFFS/HFFS selon la revendication 1, **caractérisé en ce que** le serti longitudinal (2) est un scellage à ailettes ou un scellage à recouvrement.

5. Emballage VFFS/HFFS selon la revendication 4, **caractérisé en ce que** le scellage à recouvrement présente une structure dentée continue exempte de scellage (1).

6. Procédé d'emballage VFFS/HFFS comprenant l'étape de déroulement d'un rouleau de film plastique, **caractérisé en ce que** ledit rouleau comprend une structure dentée continue (1) sur les bords latéraux dudit rouleau, ladite structure dentée continue formant dans l'emballage final une initiation à la déchirure sur toute la longueur du serti longitudinal, évitant le déchet supplémentaire dans le procédé d'emballage VFFS/HFFS.

7. Procédé d'emballage VFFS/HFFS selon la revendication 6, **caractérisé en ce que** ledit procédé est un procédé d'emballage exempt de déchets, sauf pour les déchets habituels de découpe latérale dudit rouleau.

8. Procédé d'emballage VFFS/HFFS selon la revendication 6, **caractérisé en ce que** la structure dentée continue (1) sur les bords latéraux est obtenue par des couteaux rotatifs avec une structure dentée essentiellement continue.

Revendications

1. Emballage de formage, remplissage et serti vertical/horizontal comprenant un film plastique, un serti longitudinal (2) et un serti transversal (5), **caractérisé en ce que** le serti longitudinal (2) comprend une structure dentée continue formée d'encoches adjacentes (1) sans lignes de découpe horizontales résiduelles, représentant des initiations à la déchirure sur toute la longueur du serti longitudinal (2), ledit emballage étant obtenu par un film plastique comprenant sur les deux bords latéraux ladite structure dentée continue (1) avant de prendre la forme dudit emballage dans le procédé d'emballage VFFS/HFFS.
2. Emballage VFFS/HFFS selon la revendication 1, **caractérisé en ce que** ledit emballage comprend en outre des initiations à la déchirure sur le serti transversal (5).

40

45

50

55

Figure 1

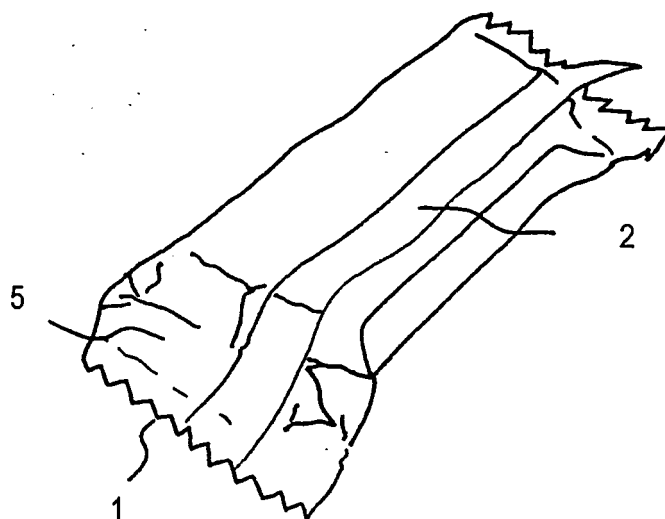


Figure 2

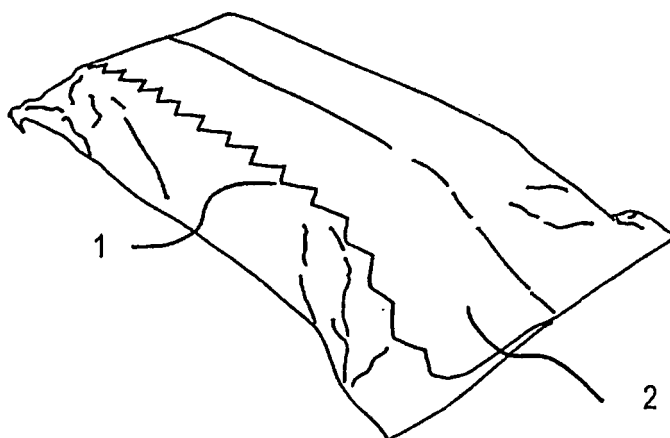


Figure 3

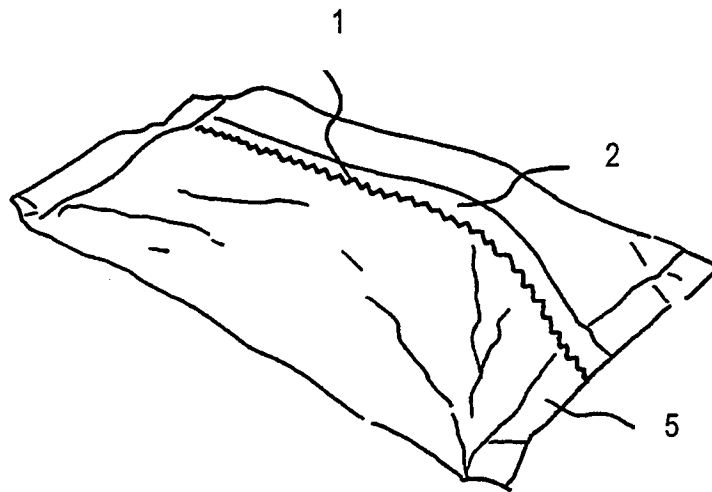


Figure 4

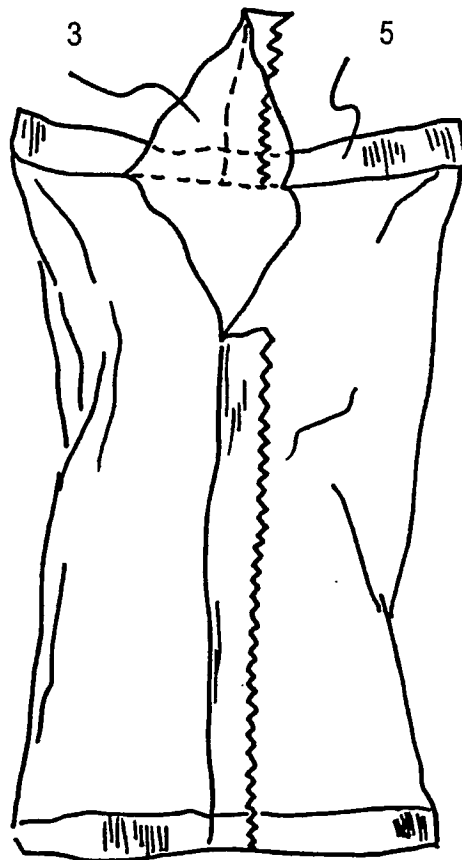


Figure 5

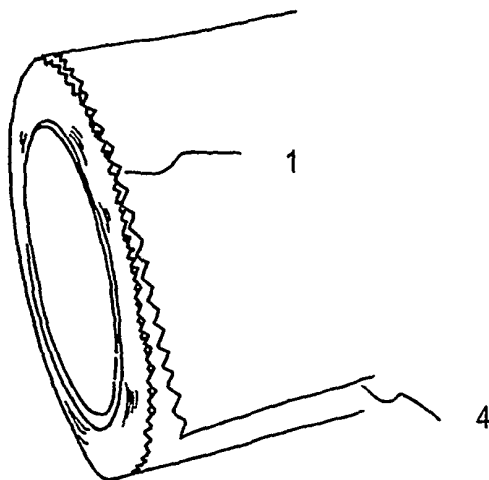
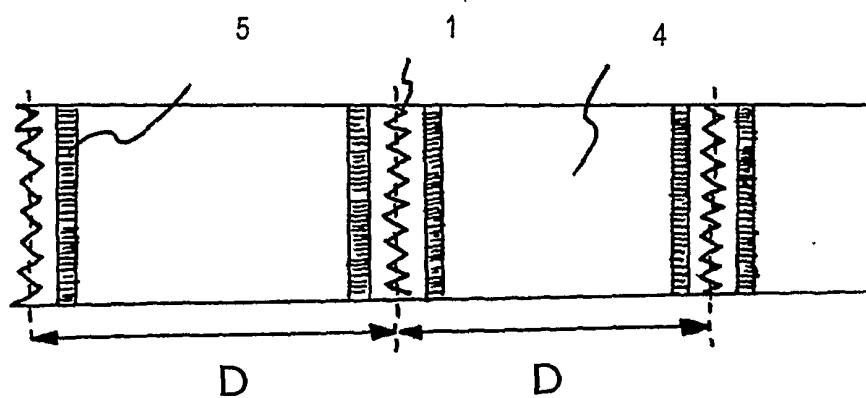


Figure 6 (a,b)

(a)



(b)

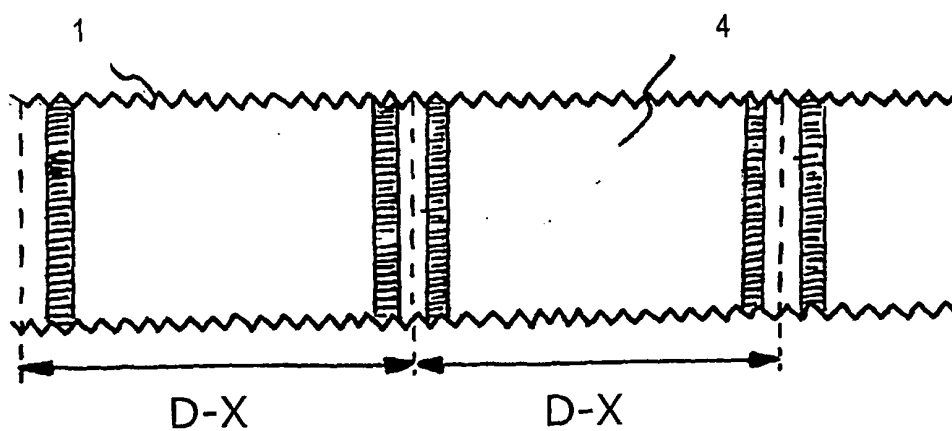


Figure 7

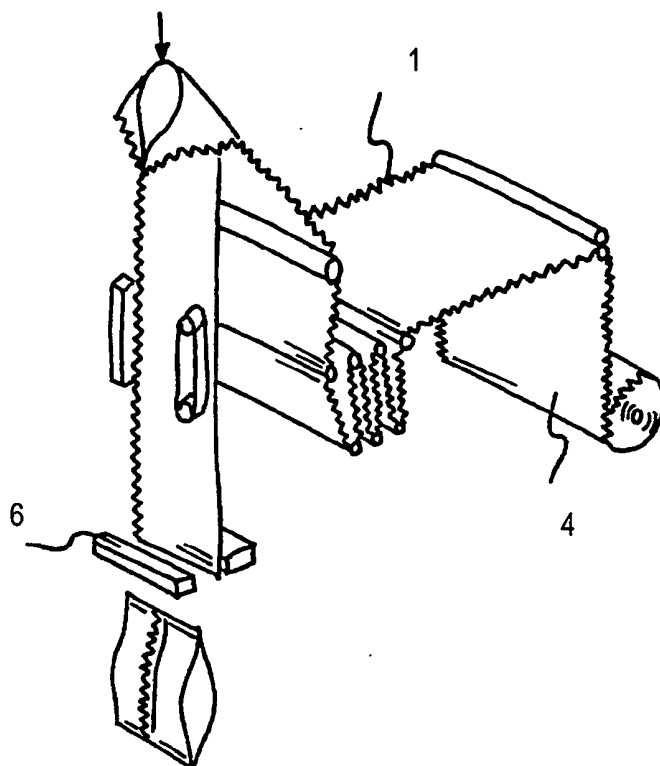


Figure 8

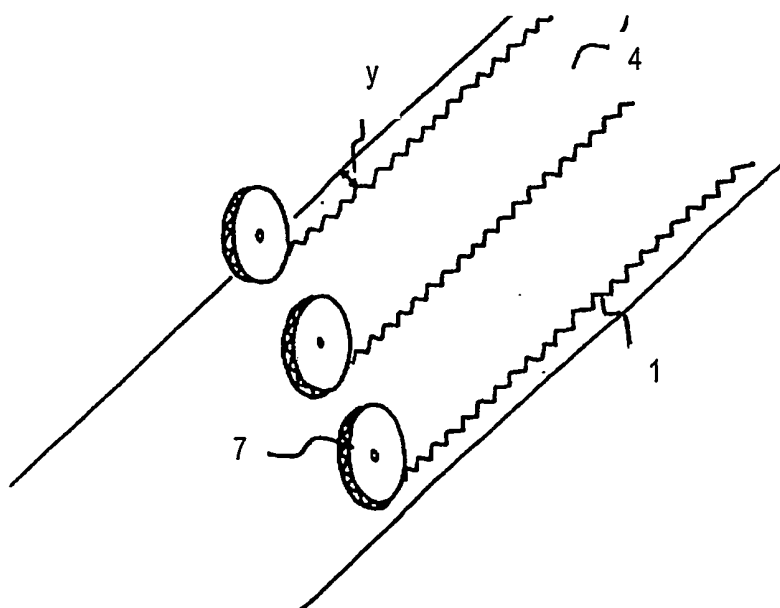


Figure 9

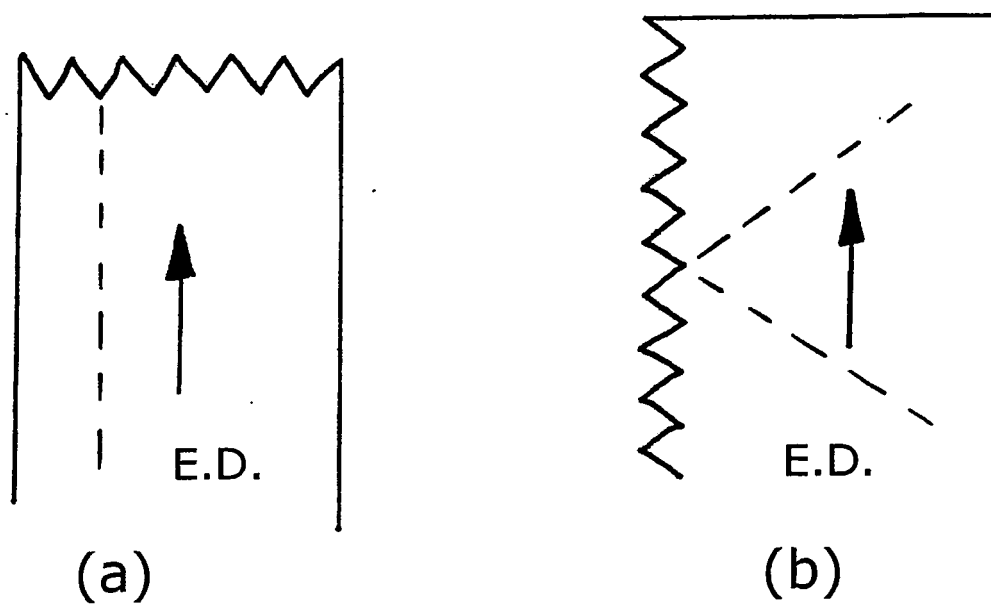
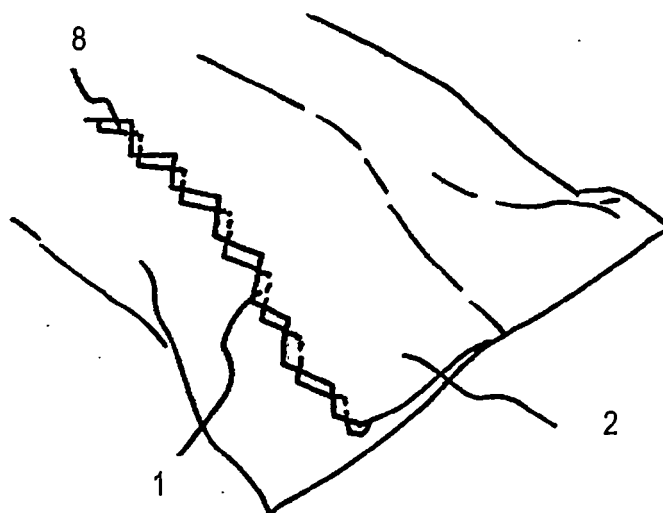


Figure 10



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 5409115 A [0004] [0029] [0029] [0032] [0038]
- CH 651795 A5 [0005]
- EP 0400577 A1 [0006]