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(54) **Apparatus and method for the manufacture of easy-to-open shrink sleeve wrap packages**

Vorrichtung und Verfahren zur Herstellung von leicht zu öffnenden Schrumpf-Verpackungen

Dispositif et procédé de fabrication d'emballages retrécissables faciles à ouvrir

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Description

Technical field

[0001] The present invention relates to an apparatus and method for producing new shrink sleeve wrap packages comprising an easy-to-open tear strip defined by a peculiar pattern of perforations created across the width of the thermoplastic packaging material.

Background of the invention

[0002] Typically in shrink sleeve wrapping, an article to be packaged or a plurality of articles that are to be formed into a unit for distribution or transportation, are conveyed by an automatic in-feed conveyor to a sleeve wrapping machine, wrapped up in a shrink film which is then transversely sealed into a tubular form and conveyed to a heat tunnel where the wrapping film will shrink to conform to the packaged article or plurality of articles, in the latter case holding them together in a tightly packed condition.

[0003] Shrink sleeve wrapping can be used to individually package a single article, such as for instance any yarn holder in textile, such as bobbins, tubes and the like, or to combine two or more different articles that however need to be sold or at least distributed together, or to collate a plurality of the same article in a single unit. Since this last one is the most interesting application of shrink sleeve wrapping, in the following the apparatus and method of the present invention will be discussed in relation therewith, but this should not be interpreted as a limitation to the scope of the appended claims.

[0004] There are essentially two main processes for shrink sleeve wrapping, i.e. a single roll shrink sleeve wrapping process, which can be considered a discontinuous process, and a two-rolls shrink sleeve wrapping process, which is a continuous process.

[0005] In the former method a single sheet of shrink wrap film of suitable size is cut from a roll of film and is wrapped around the articles to be packaged, that are grouped together, with or without a supporting tray, to form a desired external configuration, thus forming a tube that covers the top, bottom and the leading and trailing sides of the collation, with the longitudinal edges of the film projecting beyond the other two side edges thereof. The leading edge of the sheet will then be overlapped by the trailing edge, typically on the bottom of the package, i.e., underneath the collation, and be sealed thereto. This occurs before the collated package enters into the heated shrink tunnel or preferably at the same time. In the former case any sealing system and preferably any heat-sealing system can suitably be employed, while in the latter case it will be the pressure created by the weight of the products in combination with the high temperature reached in the heated shrink tunnel to give the overlapped transverse seal. In the heated shrink tunnel, the film will shrink tightly around the collated products with the projecting

longitudinal edges collapsing against the side edges of the collation thus creating, in a film thickened area, the so-called "bullseyes", i.e. openings that are typically used for gripping, sufficiently large to allow introduction of the fingers of one hand and sufficiently resistant to allow raising the collated package and moving it without any rupturing.

[0006] In the two-rolls process, the shrink film is fed from two different rolls, an upper roll and a lower roll. A first transverse seal joins the leading edges of said two films, a collation of products is then pushed against said transverse seal pulling both films to wrap up the collation and a second transverse seal is then created behind the collation at the same time as a transverse cut to sever the sealed package from the film webs and the front transverse seal between the leading edges of the next package. The loosely wrapped up package is then conveyed to a heated shrink tunnel to complete the packaging process as seen for the single roll system.

[0007] In both processes one of the main problems is to obtain a package that besides keeping the articles together in a tightly manner as a self-contained unit may also make them easily accessible and removable from the package, if and when desired, by the application of an appropriate force, in a relatively simple, effective, and non time consuming manner without requiring the use of cutting devices that may adversely affect the packaged articles and/or create a safety problem if not used correctly.

[0008] In most of the applications furthermore it would be highly preferable to have an easy-to-open package that may make the packaged products selectively accessible and removable by the application of an appropriate force, while the remainder of the package still may be treated as a self-contained unit. This would in fact allow selective removal of only some of the packaged articles, e.g., a number sufficient to fill in the shelves of a shop, while the package containing the others can still be moved as a single unit.

[0009] Collated packages containing tear strips defined by perforations that can be torn when the articles are to be removed are known in the prior art. This is typically achieved by applying perforations to the film in its running direction, i.e. parallel with the edges of the film web. However the packages known in the art suffer from certain inadequacies. In most of the cases in fact tearing of the strip produces a weakening of the whole package and usually allows only a few of the packages to be released easily from the shrink sleeve while keeping the remaining articles within the package.

[0010] When more sophisticated systems are devised that could solve this problem, then the apparatuses required and the manufacturing methods involved are quite elaborated and not easily, if at all, retrofittable, making them non-applicable on an industrial scale.

[0011] It is therefore an object of the present invention to address this problem and provide a method and apparatus for the manufacture of an improved easy-to-open

shrink package that can be easily applicable on industrial scale. It is another specific object of the present invention to provide a device that can be used to retrofit the existing shrink sleeve wrapping machines with the aim at manufacturing improved easy-to-open shrink sleeve wrapped packages.

EP-A-794125 describes a method for the manufacture of an easy-to-open shrink package by creating a tear strip defined by weakening lines wherein the length of the weakness segments as well as the distance between them is purposely set to weaken with greater intensity certain specific sections of the weakening lines, in particular those at the extreme edges of the film used in the wrapping process. This may result in the premature failing of the openings feature and definitely rules out the continued portability of the package after opening.

Summary of the Invention

[0012] The first object of the present invention is a method for the manufacture of an easy-to-open shrink sleeve wrapped package wherein the package contains a tear strip defined by a close sequence of pairs of mutually diverging weakness segments created transversally in the film web, i.e., created in a direction that is at 90 degrees to the direction of movement of the film, wherein

- a. the mutually diverging weakness segments have the same or substantially the same shape and size, and diverge in the same direction,
- b. there is distance between the terminal edge of one pair of weakness segments and the next pair, and
- c. said sequence of pairs of mutually diverging weakness segments does not reach the edges of the film.

[0013] The second object of the present invention is the device that is used for the creation of the transversal tear strip, as defined in the first object, the third object is the machine for shrink sleeve wrapping that incorporates said device, and the fourth object is said machine for shrink sleeve wrapping that further incorporates an applicator which affixes a lift tab label to the final shrink package.

Brief description of the drawings

[0014] Figure 1 is a plan view of the packaging film comprising a tear strip with a specific pattern of perforations created in accordance to the present invention;

[0015] Figure 2 is a prospective view of a shrink sleeve wrapped package with the tear strip according to the embodiment of Figure 1 obtained by the process of the invention;

[0016] Figures 3a, 3b, and 3c are plan views of different alternative slits created at the tear strip starting position;

[0017] Figure 4 is a schematic illustration of the two rolls shrink sleeve wrapping process including the step

of creating the tear strip;

[0018] Figure 5 is a cross-sectional view of one embodiment of the perforating device which is used in the process of Figure 4 to create the tear strip;

[0019] Figure 6 shows cross-sectional views of an exemplary knife used in the process and device of the invention;

Detailed description of the invention

[0020] With reference to Figure 1, 10 is the film web, the arrow indicates the longitudinal direction in which film 10 is moved, 11 indicates the easy-to open strip which is created and defined by the sequence of pairs of mutually diverging weakness segments, 12, 12', across the film web. The film as known in the art is typically made of a mono- or multi-layer thermoplastic material, and is flexible enough to be used in a wrapping process, it is heat-sealable, as in the shrink wrapping process it is normally heat-sealed either to itself, in the single roll process, or to another thermoplastic film, in the two roll process, and it is a shrink film, i.e., it shrinks at least in the longitudinal direction when heated to the temperature reached in a conventional heat shrink tunnel, so as to tightly cling to the packaged articles. Shrink films for shrink sleeve wrapping applications have a thickness generally comprised between about 12 and about 150 μm , depending on the type, weight and number of articles to be packaged. For most of the conventional shrink sleeve wrapping applications, suitable shrink films have a thickness preferably comprised between about 35 and about 120 μm . They might be cold- or solid-state oriented films, i.e., films obtained by extrusion or co-extrusion, followed by a quenching step, a reheating to a temperature below the melting temperature of the thermoplastic material employed and a bi-axial or preferably mono-axial stretching. Preferably and more conveniently

[0021] Typical thermoplastic materials employed in shrink sleeve wrapping processes are polyolefins, and in particular ethylene homo- or co-polymers and propylene homo- or co-polymers. The tear strip 11 is the area of film surface comprised between the sequence of pairs of weakness segments 12, 12'. The two weakness segments making up each pair, are symmetrically positioned with respect to a transverse axis passing between them and are diverging with respect to said axis. The various pairs, still indicated in the drawings with the numerals 12, 12', have preferably the same shape and the same size, diverge in the same direction, i.e., the direction of tearing, and are sequenced, one over the other, across the film width. Therefore said tear strip 11 will have a minimum width, given by the minimum distance between each pair (a), and a maximum width, given by the maximum distance (b) between each pair. The value of (a) will be chosen in such a way to give a tear strip that can be easily grasped by hand and is sufficiently resistant not to break during the tearing-off. A typical value for (a) would thus be in the range 1.5 to 4 cm, preferably 2 to 3

cm. As anticipated, the weakness segments of each pair will not be parallel but mutually diverging. Preferably they will be slightly diverging, wherein, as used herein, this will mean that the angle between the two lines of which the segments are part will not be higher than 30°, typically comprised between 5° and 20°. The maximum distance (b) will thus depend, for a given angle, on the length of each pair of segments. Generally the length of segments 12 and 12' is comprised between about 3 and about 7 cm, preferably between about 4 and about 6 cm, and more preferably around 5 cm. The angle between segments 12 and 12' and the length thereof will then dictate the width of the receiving slots for the perforator blades shown in figure 5 (slots 44 and 45 in the stationary backing 43).

[0022] The weakness segments are obtained by perforating the film. The perforations in said segments, after shrinking, can have the shape of circular holes but perforations with an elongated dash-like shape are preferred. They should be arranged in sufficient proximity to one another linearly to permit the shrunk wrap film to open along the perforations upon application of a reasonable manual force. By way of example, dash-shaped perforations, from about 2 to about 5 mm long, separated by a similar length, would generally provide the desired easy tearing of the strip 11.

[0023] Figure 1 illustrates how each pair of weakness segments ends before the beginning of the next pair. The distance (d) between the terminal edge of one pair of weakness segments and the next pair is small enough to allow conjunction between the two as a result of tear extending from the end of the opened pair of weakness segments to the next pair when tearing of the strip is continued. Said distance (d) however should not be too small as in such a case it would be difficult to control the force required to break the desired number of pairs of weakness segments. Typically said distance will thus be comprised between at least about 0.5 and about 3.0 cm, preferably between about 0.6 and about 2.8 cm and more preferably between about 0.7 and about 2.5 cm.

[0024] As illustrated in Figure 1 the perforations do not reach the edges of the web and preferably they are sufficiently distant therefrom that it will be possible to grip and move the end shrunk package by the bullseye openings without risking the inadvertent rupture of the package. In a most preferred embodiment, illustrated in Figure 2, the film web will be perforated in such a way that a tear strip will be present only on one surface of the end shrunk package. Preferably the tear strip will be centered on one surface of the end package, generally the top surface, leaving an area of from about 3 to about 10 % of the package width, on each edge, non perforated.

[0025] In Figure 1, 13 represents a typical slit that links the starting edges of the first pair of weakness segments 12, 12'. The aim of slit 13 is to create a starting position for the tear strip 11 or even a pull tab that facilitates opening. Once one finger has been inserted into the slit and it is thus possible to grasp the film, it would be sufficient

to apply an upwardly and outwardly directed force thereto to cause the desired pairs of weakness lines to break, thus forming a tear strip of the desired length from the starting position, and thus be able to selectively remove only some of the packaged articles while maintaining the remaining ones within the self-contained unit. The shape of the slit is such to ensure that it severs the film transversely between the two starting perforations of the first pair of weakness segments. Figures 3a, 3b, and 3c illustrate different possible shapes of the slit 13. In one embodiment, illustrated in Figure 3a, the slit has the shape of an inverted V while in the embodiment illustrated in Figure 3b the slit is slightly concave. In the preferred embodiment illustrated in Figure 3c, the slit 13 is slightly concave and its edges 13a and 13b extend beyond the transverse weakening segments. This configuration of the slit 13 will facilitate the complete opening of the package when and if this is desired. Other shapes may however be easily envisaged.

[0026] The package illustrated in Figure 2 contains an array of articles indicated by numeral 22. The tear strip is obtained by a sequence, in this example, of five pairs of weakness segments 12, 12'. A slit 13 co-joins the two segments of the first or top pair. In said Figure 2 there is also an adhesive label or tape-like member 14. Part of the surface of said label or tape-like member 14 facing the package surface comprises an adhesive, such as a pressure-sensitive adhesive and is indicated in Figure 2 as 14a. Said part is secured to the surface of the package covering and closing the slit 13 that defines the tear strip starting position, while the non adhesive part of the label or tape-like member 14, indicated in Figure 2 as 14b, covers the non perforated edge of the package beyond slit 13. The label or tape-like member 14 provides extension means for pulling the tear strip from the starting position created by slit 13 when desired and also serves the purpose of preventing the slit 13 from being accidentally pulled. It is preferably suitably colored or printed to give to the end user a clear indication of the presence of a tear strip and of the direction of tearing to be applied. In said Figure 2, 17 is the side bullseye opening formed in the end shrunk package 10.

[0027] Figure 4 schematically illustrates the method according to the present invention that provides for the creation of the tear strip with the above indicated pattern by perforating the shrink film, across the film width, before the wrapping step. In said Figure 4, 21 is an in-feed conveyor where the articles to be packaged 22 are grouped together in the desired configuration and moved to face the wrapping films. The upper shrink wrap film 25 is unwound from an upper film roll 24 and delivered through a plurality of dance bars 26 which create film tension to the perforating unit 27, that will be described in detail in connection with Figure 5. The lower shrink wrap film 29 is delivered from the lower film roll 28. A lowering heat-sealing jaw 30 and fixed position sealing jaw pad 31 create the rear transverse seal 15 of one package and the front transverse seal 16 of the next package and sever,

by means of a blade or knife positioned in-between the two sealing bars and parallel thereto, the two packages. The array of articles 22 on the edge of conveyor 21 is then pushed by pusher 23 against the sealed films as soon as the sealing jaw 30 opens up, and is transferred to adjacent conveyor 32, pulling with it the upper and the lower films. Conveyor 32 then brings the separated package 18 to a suitably heated shrink tunnel 33 where the loose tube of shrink film wrapping the array of products in package 18 shrinks and tightly clings to the products giving the end shrunk package 10, with the side bullseye openings 17. The end package is then removed through an out-feed conveyor 34 and if desired it is transported on suitable conveying 35 to a position where an applicator 36 (schematically represented) applies thereto the pull to open label 14, to complete the process. In such a case it is preferred that the applicator 36 is sufficiently distant from the shrink tunnel 33, e.g. from about 1 to about 4 m, to allow partial cooling of the package to take place before application of the label. Alternatively the applicator 36 could be closer to the shrink tunnel 33 but in such a case a cooling fan or anyway a cooling system should preferably be provided between the two.

[0028] The perforation process that occurs in the perforating unit 27 is an intermittent process (while the unwinding of film 25 from the roll 24 is a continuous process) and coincides with the closing cycle of the sealing jaw 30 to the sealing jaw pad 31 that makes the sleeve wrap around the articles to be packaged. Alternatively it would also be possible to use reciprocating sealing jaws, where both the upper and the lower jaws move one towards the other.

[0029] Figure 5 illustrates in detail perforating unit 27. In said unit the upper film 25 delivered through the dance bars 26 is intermittently clamped between two clamps 40 and 41, where the upper parts 40a and 41 a move downward in a direction perpendicular to the film web against corresponding lower stationary parts 40b and 41 b to trap the film. A perforating device 42 is positioned above the film web between the two upper clamps 40a and 41 a. Once the film has been clamped, the perforating device lowers against a stationary backing 43 and creates the specific pattern of perforations described above. Clamping occurs along the whole width of the film web or at least along that width of the film web that will be perforated. Clamping can occur simultaneously by lowering and pressing both upper clamps at the same time or the upstream clamp 40 may be actioned first and the downstream one 41 immediately after, to further tension the film between the two clamps. The distance between the two upper clamps should be sufficient to allow the easy vertical movement of the perforating device 42 between them but not much larger than that. While pneumatic clamps are typically employed and are generally preferred, any other type of clamps, e.g., hydraulic, oleodynamic, electric, or spring actuated clamps, may be suitably employed.

[0030] In correspondence with at least the perforating

device 42, the lower stationary backing 43 will contain cavities positioned in such a way to allow lowering of the knife into the backing to the desired extent thus creating the desired perforation pattern. While said cavities in the lower stationary backing may correspond precisely to the design of the knife, a better flexibility can be obtained by the use of a stationary backing 43 with two separate parallel channels, 44 and 45, positioned at a distance equal to or lower than the minimum distance (a) of each pair of weakness segments, where each of said channels has a suitable depth as well as a width suitable to receive the set of knives that create one of the two sequences of parallel weakness segments of the tear strip.

[0031] In Figure 5, 46 indicates a dancing roll that is secured to the perforating unit frame by fixing one or both of its ends in one or respectively two slots 47. The position of said dancing roll 46 can be varied, by raising or lowering it along side slots 47, whenever an adjustment of the positioning of the tear strip on the package surface is required.

[0032] Figure 6a is a cross-sectional view of the knife 50 used for the creation of the pair of weakness segments of Figure 6b, while Figure 6c is a front view of the same knife. The cutting edge of the knife 50 is serrated with narrow teeth of the same size and triangular sharpened shape. The knife will engage with the film in the perforating device and generally penetrate into the film by from about 20 to about 70 % of the teeth height (from the cutting edge to the valley). The size of the teeth is then suitably selected so as to obtain perforations in sufficient proximity to one another linearly to permit the shrunk wrap film to open along the perforations upon tearing. Typically when dash-shaped perforations are used to create the weakness segments, the perforations will preferably be from about 2 mm to about 5 mm long and separated by a similar unperforated length.

[0033] When the single roll shrink sleeve wrapping process is employed, the perforations can be made by using a perforating unit device as described above or alternatively a rotary cutter where a knife capable of providing the desired perforation pattern is slideably mounted thereon or is integral thereto.

Claims

1. A method of manufacturing an easy-to-open shrink sleeve wrapped package comprising wrapping up a plurality of products in a shrink thermoplastic film (10) and submitting the obtained sleeve to a heat shrinking step to give a tight package, wherein the package comprises a tear strip (11) defined by a close sequence of mutually diverging weakness segments (12, 12'), created by perforating across the film width before the wrapping step, to facilitate opening of the package, said method being **characterized in that**

- a. the mutually diverging weakness segments

- have the same or substantially the same shape and size, and diverge in the same direction,
 b. there is a distance between the terminal edge of one pair of weakness segments and the next pair, and
 c. said sequence of pairs of mutually diverging weakness segments does not reach the edges of the film.
2. The method of claim 1 wherein the perforation is carried out intermittently while the film web is clamped and kept tensioned. 10
 3. The method of claim 2 wherein the film is clamped on either side of the perforating device and closely thereto. 15
 4. The method of claim 2 wherein the perforation of the film web is synchronized with the sealing cycle of the sleeve wrapping process. 20
 5. The method of any of the preceding claims wherein the perforations are in sufficient proximity to one another linearly to permit the shrunk wrap film to open along said perforations upon application of a reasonable manual force. 25
 6. The method of any of the preceding claims wherein the perforations have an elongated dash-like shape. 30
 7. The method of any of the preceding claims wherein the starting edges of the first pair of mutually diverging weakness segments are joined by a slit to define the tear starting position. 35
 8. The method of claim 7 wherein a partially adhesive label or tape-like member is applied, with the adhesive part, over the slit.
 9. The method of claim 8 wherein the partially adhesive label or tape-like member is a linerless label. 40
 10. A unit 27 for perforating a film for shrink sleeve wrapping applications to create therein an easy-to-open tear strip, which unit comprises a perforating device 42, equipped with a knife 50 with teeth arranged to create a sequence of pairs of mutually diverging weakness segments, having the same or substantially the same shape and size, diverging in the same direction, and being sequenced, one over the other across the film width, with a distance between the terminal edge of one pair of weakness segments and the next pair, said knife 50 not reaching the edges of the film web, an opposite stationary backing 43, carved with two channels 44, 45, of suitable size to receive the knife, and, close to the perforating device 42, an upstream clamp 40 and a downstream clamp 41 to block and tension the film web during perfora-

tion, so that perforation is carried out intermittently across the film web.

11. The unit of claim 10 wherein the clamps 40 and 41 are pneumatic clamps. 5
12. A shrink sleeve wrapping machine comprising means for unwinding the packaging film(s), means for wrapping the unwound film(s) loosely around the articles to be packaged, means for transverse sealing and cutting off the loosely wrapped up packages and means for heating them to shrink the loose sleeve around the articles, said machine being **characterized in that** it further comprises a perforating unit 27 as in any of preceding claims 10 and 11 positioned between the film(s) unwinding means and the wrapping means.
13. The shrink sleeve wrapping machine of claim 12 which further comprises an applicator 36 of a partially adhesive label or tape-like member positioned downstream the heating means.
14. The shrink sleeve wrapping machine of claim 13 wherein the partially adhesive label or tape-like member is a linerless label.
15. The shrink wrapping machine of claim 14 which is a two rolls shrink sleeve wrapping machine.

Patentansprüche

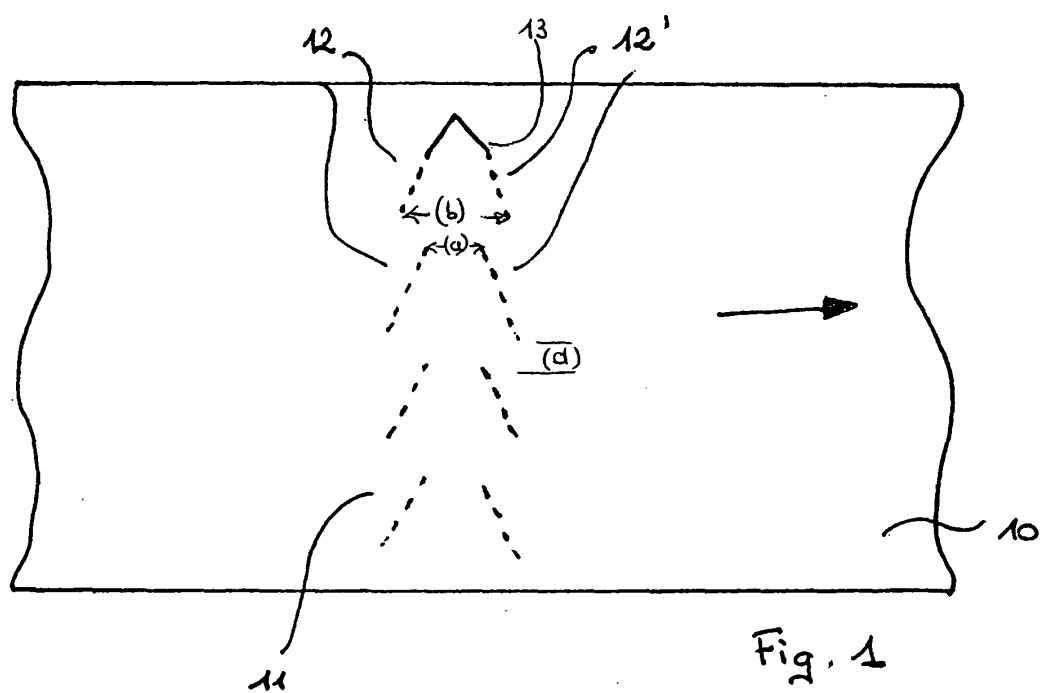
1. Verfahren zur Herstellung einer leicht zu öffnenden Schrumpfhüllen-Verpackung, umfassend Einwickeln einer Vielzahl von Erzeugnisse in einer schrumpfbaren thermoelastischen Folie (10) und Übergeben der erhaltenen Hülle an einen Heißschrumpfschritt, um eine dichte Verpackung zu vergeben, wobei die Verpackung einen Aufreißstreifen (11) umfasst, der durch eine enge Folge von wechselseitig divergierenden Schwächungssegmenten (12, 12') definiert ist, der durch Perforieren quer über die Folienbreite vor der Einwicklungsstufe geschaffen wird, um das Öffnen der Verpackung zu erleichtern, **dadurch gekennzeichnet, dass**
 - a. die wechselseitig divergierende Schwächungssegmente die gleiche oder im Wesentlichen die gleiche Form und Größe aufweisen und in der gleichen Richtung divergieren,
 - b. ein Abstand zwischen der Endkante des einen Paares von Schwächungssegmenten und dem nächsten Paar besteht,
 - c. die Folge der wechselseitig divergierenden Schwächungssegmente sich nicht bis zu den Kanten der Folie erstreckt.

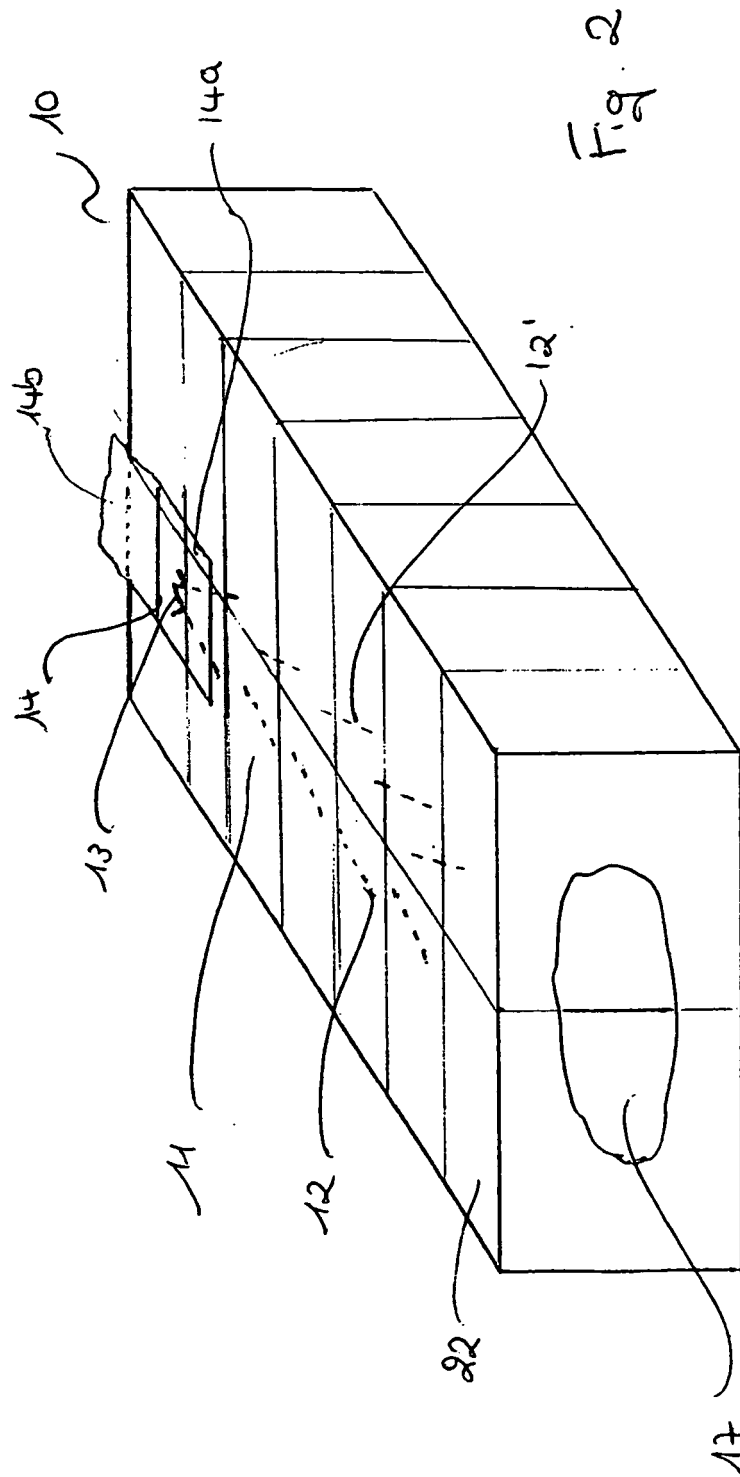
2. Verfahren nach Anspruch 1, wobei die Perforation intermittierend ausgeführt wird, während die Folienbahn festgeklemt und gespannt gehalten wird.
3. Verfahren nach Anspruch 2, wobei die Folie auf beiden Seiten der Perforationseinrichtung und in der Nähe derselben festgeklemt wird. 5
4. Verfahren nach Anspruch 2, wobei die Perforation der Folienbahn mit dem Versiegelungszyklus des Schrumpfhüllen-Einwicklungsvorgangs synchronisiert ist. 10
5. Verfahren nach einem der vorhergehenden Ansprüche, wobei sich die Perforationen linear in ausreichender Nähe voneinander befinden, um bei Anbringen einer angemessenen Handkraft ein Öffnen der geschrumpften Einwicklungsfolie entlang der Perforationen zu gestatten. 15
6. Verfahren nach einem der vorhergehenden Ansprüche, wobei die Perforationen eine längs gestreckte, Bindestrich-ähnliche Form aufweisen. 20
7. Verfahren nach einem der vorhergehenden Ansprüche, wobei die Startkanten des ersten Paares der wechselseitig divergierenden Schwächungssegmente durch einen Schlitz miteinander verbunden sind, um die Startposition für das Aufreißen zu definieren. 25
8. Verfahren nach Anspruch 7, wobei ein partiell klebendes Etikett oder ein Band-ähnliches Glied mit dem klebenden Teil über dem Schlitz angeordnet ist. 30
9. Verfahren nach Anspruch 8, wobei ein partiell klebendes Etikett oder ein Band-ähnliches Glied ein Linerless-Etikett ist. 35
10. Vorrichtung 27 zum Perforieren einer Folie für Schrumpfhüllen-Einwicklungsanwendungen, um dabei einen leicht zu öffnenden Abreißstreifen zu bilden, wobei die Vorrichtung ein Perforationsgerät 42 aufweist, das mit einem Messer 50 mit Zähnen in solcher Anordnung ausgestattet ist, dass sie eine Folge von wechselseitig divergierenden Segmenten erzeugen, welche die gleiche oder im Wesentlichen die gleiche Form und Größe aufweisen, in der gleichen Richtung divergieren und welche, eine über der anderen quer über die Folienbreite mit einem Abstand zwischen der Endkante eines Paares der Schwächungssegmente und dem nächsten Paar wiederholt werden, wobei das Messer 50 nicht die Kanten der Folienbahn erreicht, mit einer gegenüber liegenden stationären Rückseite 43, die mit zwei eingritzten Kanälen 44, 45 von geeigneter Größe zur Aufnahme des Messers versehen ist, und nahe am Perforationseinrichtung 42 mit einer stromaufwärts angeordneten Klemmvorrichtung 40 und einer stromabwärts angeordneten Klemmvorrichtung 41 zum Festhalten und Spannen der Folienbahn während des Perforierens, so dass das Perforieren intermittierend quer über die Folienbahn erfolgt. 40
11. Vorrichtung nach Anspruch 10, wobei die Klemmvorrichtungen 40 und 41 pneumatische Klemmvorrichtungen sind. 45
12. Schrumpfhüllen-Verpackungsmaschine, umfassend Mittel zum Abwickeln der Verpackungsfolie(n), Mittel zum losen Umwickeln der abgewickelten Folie (n) um die zu verpackenden Gegenstände, Mittel zur Querversiegelung und zum Abschneiden der lose umwickelten Verpackungen und Mittel zum Erhitzen dieser zum Schrumpfen der losen Hülle um die Gegenstände, wobei die Maschine **dadurch gekennzeichnet ist, dass** sie ferner eine Perforiervorrichtung 27, nach einem der vorstehenden Ansprüche 10 und 11, in einer Anordnung zwischen dem Mittel zum Abwickeln der Folie(n) und dem Mittel zum Umwickeln aufweist. 50
13. Schrumpfhüllen-Verpackungsmaschine nach Anspruch 12, ferner umfassend einen Applikator 36 für ein partiell klebendes Etikett oder Band-ähnliches Glied, das stromabwärts hinter dem Mittel zum Erhitzen angeordnet ist. 55
14. Schrumpfhüllen-Verpackungsmaschine nach Anspruch 13, wobei das partiell klebende Etikett oder ein Band-ähnliches Glied ein Linerless-Etikett ist.
15. Schrumpfhüllen-Verpackungsmaschine nach Anspruch 14, die eine Zwei-Rollen-Schrumpfhüllen-Verpackungsmaschine ist.

Revendications

1. Procédé de fabrication d'un emballage enveloppé d'un manchon rétractable facile à ouvrir comprenant l'enveloppement d'une pluralité de produits dans un film thermoplastique rétractable (10) et la soumission du manchon obtenu à une étape de thermorétraction pour donner un emballage serré, où l'emballage comprend une bande de déchirement (11) définie par une séquence proche de segments de faiblesse mutuellement divergents (12, 12'), créés par des perforations à travers la largeur du film avant l'étape d'enveloppement, pour faciliter l'ouverture de l'emballage, ledit procédé étant **caractérisé en ce que**
 - a. les segments de faiblesse mutuellement divergents ont la même ou essentiellement la même forme et taille, et divergent dans la même

- direction,
 b. il y a une distance entre le bord terminal d'une
 paire de segments de faiblesse et la paire sui-
 vante, et
 c. ladite séquence de paires de segments de
 faiblesse mutuellement divergents n'atteint pas
 les bords du film. 5
2. Procédé de la revendication 1, où la perforation est
 effectuée de façon intermittente alors que la nappe
 de film est serrée et maintenue tendue. 10
3. Procédé de la revendication 2, où le film est serré
 sur l'un ou l'autre côté du dispositif de perforation et
 étroitement sur celui-ci. 15
4. Procédé de la revendication 2, où la perforation de
 la nappe de film est synchronisée au cycle de scel-
 lement du procédé d'enveloppement sous manchon. 20
5. Procédé de l'une quelconque des revendications
 précédentes, où les perforations sont à proximité
 suffisante l'une de l'autre linéairement pour permet-
 tre au film d'enveloppement rétracté de s'ouvrir le
 long desdites perforations lors de l'application d'une
 force manuelle raisonnable. 25
6. Procédé de l'une quelconque des revendications
 précédentes, où les perforations ont une forme al-
 longée de type tiret. 30
7. Procédé de l'une quelconque des revendications
 précédentes, où les bords de départs de la première
 paire de segments de faiblesse mutuellement diver-
 gents sont joints par une fente de façon à définir la
 position de départ de déchirement. 35
8. Procédé de la revendication 7, où une étiquette ou
 un élément de type bande partiellement adhésif est
 appliqué avec la partie adhésive au-dessus de la
 fente. 40
9. Procédé de la revendication 8, où l'étiquette ou l'élé-
 ment de type bande partiellement adhésif est une
 étiquette sans garniture. 45
10. Unité 27 pour perforer un film pour des applications
 d'enveloppement sous manchon rétractable de fa-
 çon à créer dedans une bande de déchirement facile
 à ouvrir, laquelle unité comprend un dispositif de per-
 foration 42, équipé d'un couteau 50 avec des dents
 disposées de façon à créer une séquence de paires
 de segments de faiblesse mutuellement divergents,
 ayant la même ou essentiellement la même forme
 et taille divergeant dans la même direction, et étant
 rangés en séquence, l'un au-dessus de l'autre sur
 la largeur du film, avec une distance entre le bord
 terminal d'une paire de segments de faiblesse et la
 paire suivante, ledit couteau 50 n'atteignant pas les
 bords de la nappe de film, un support stationnaire
 opposé 43, taillé avec deux canaux 44, 45, de di-
 mension appropriée pour recevoir le couteau, et,
 près du dispositif de perforation 42, une pince en
 amont 40 et une pince en aval 41 pour bloquer et
 tendre la nappe de film durant la perforation, de sorte
 que la perforation est effectuée de façon intermit-
 tente à travers la nappe de film.
11. Unité de la revendication 10, où les pinces 40 et 41
 sont des pinces pneumatiques.
12. Machine d'enveloppement sous manchon rétracta-
 ble comprenant des moyens pour dérouler le(s) film
 (s) d'emballage, des moyens pour envelopper le(s)
 film(s) déroulé(s) de façon lâche autour des articles
 à emballer, des moyens pour un scellement trans-
 versal et une découpe des emballages enveloppés
 de façon lâche et des moyens pour les chauffer de
 façon à rétracter le manchon lâche autour des arti-
 cles, ladite machine étant **caractérisée en ce qu'**el-
 le comprend de plus une unité de perforation 27 se-
 lon l'une quelconque des revendications précéden-
 tes 10 et 11 positionnée entre les moyens de dérou-
 lement du (des) film(s) et les moyens d'enveloppe-
 ment.
13. Machine d'enveloppement sous manchon rétracta-
 ble de la revendication 12, qui comprend de plus un
 applicateur 36 d'une étiquette ou d'un élément de
 type bande partiellement adhésif positionné en aval
 des moyens de chauffage.
14. Machine d'enveloppement sous manchon rétracta-
 ble de la revendication 13, où l'étiquette ou l'élément
 de type bande partiellement adhésif est une étiquette
 sans garniture.
15. Machine d'enveloppement sous manchon de la re-
 vendication 14, qui est une machine d'enveloppe-
 ment sous manchon rétractable à deux rouleaux.





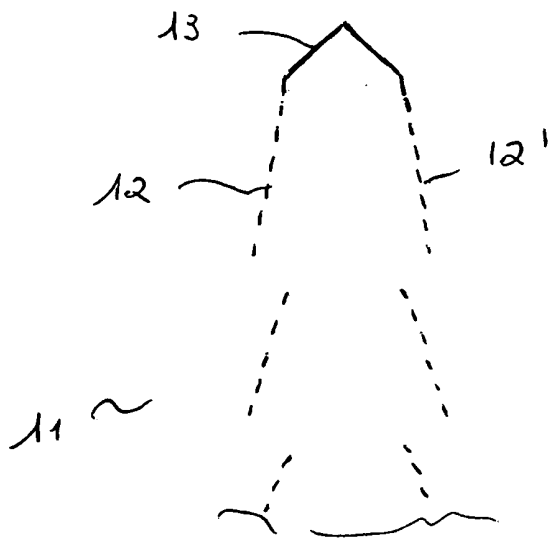


Fig. 3a

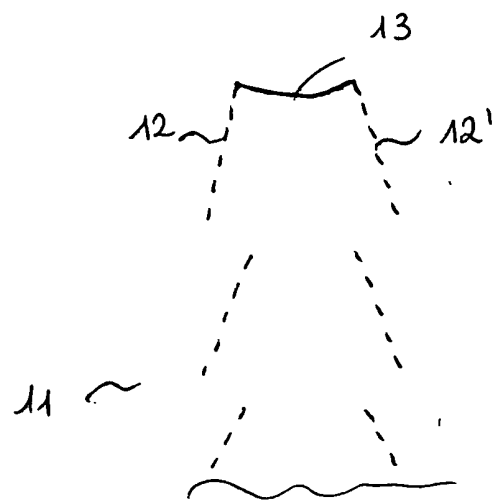


Fig. 3b

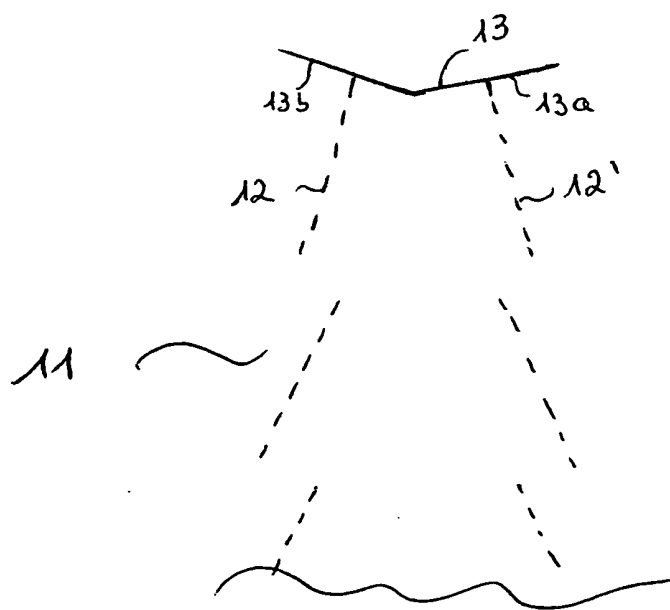


Fig. 3c

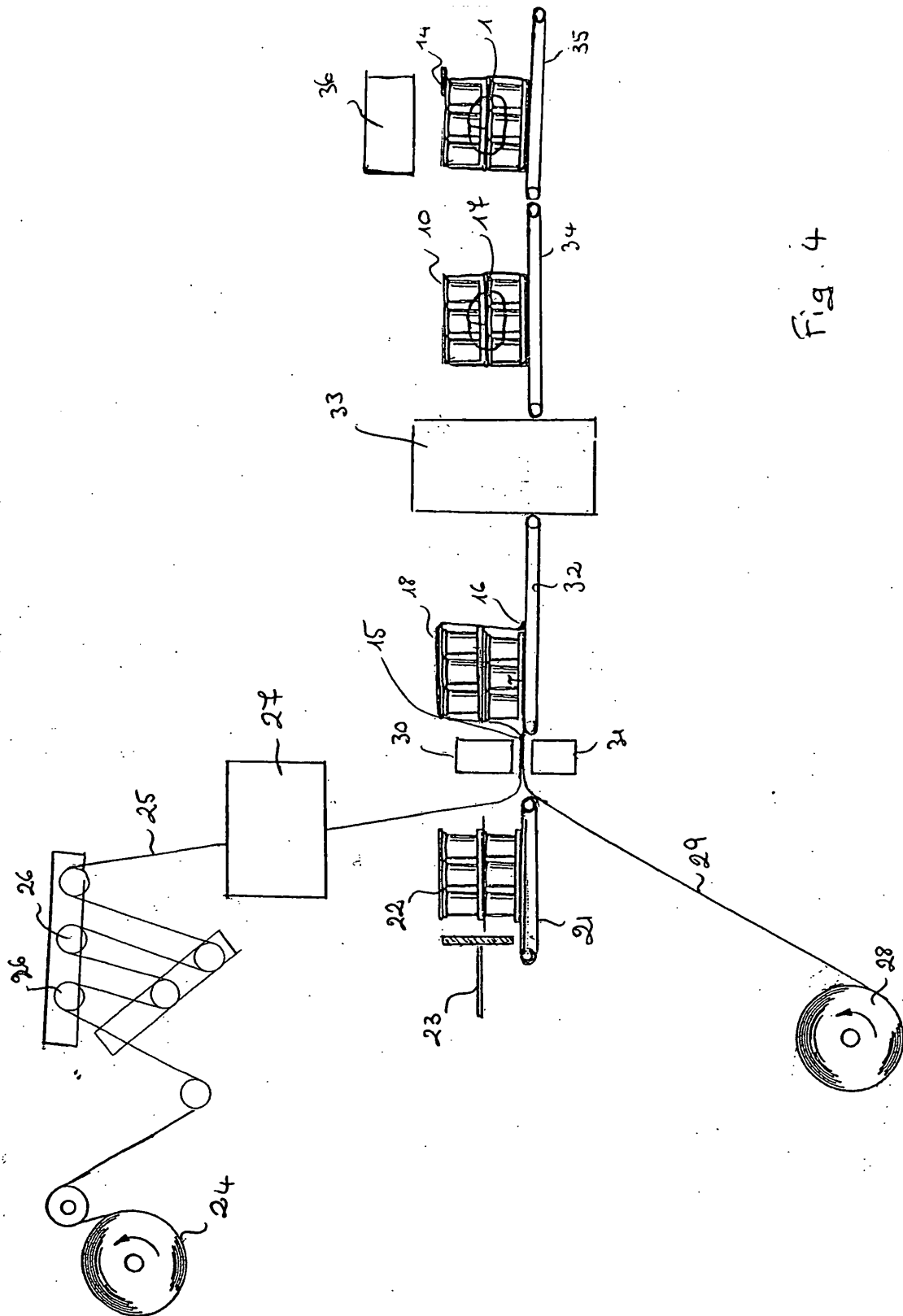
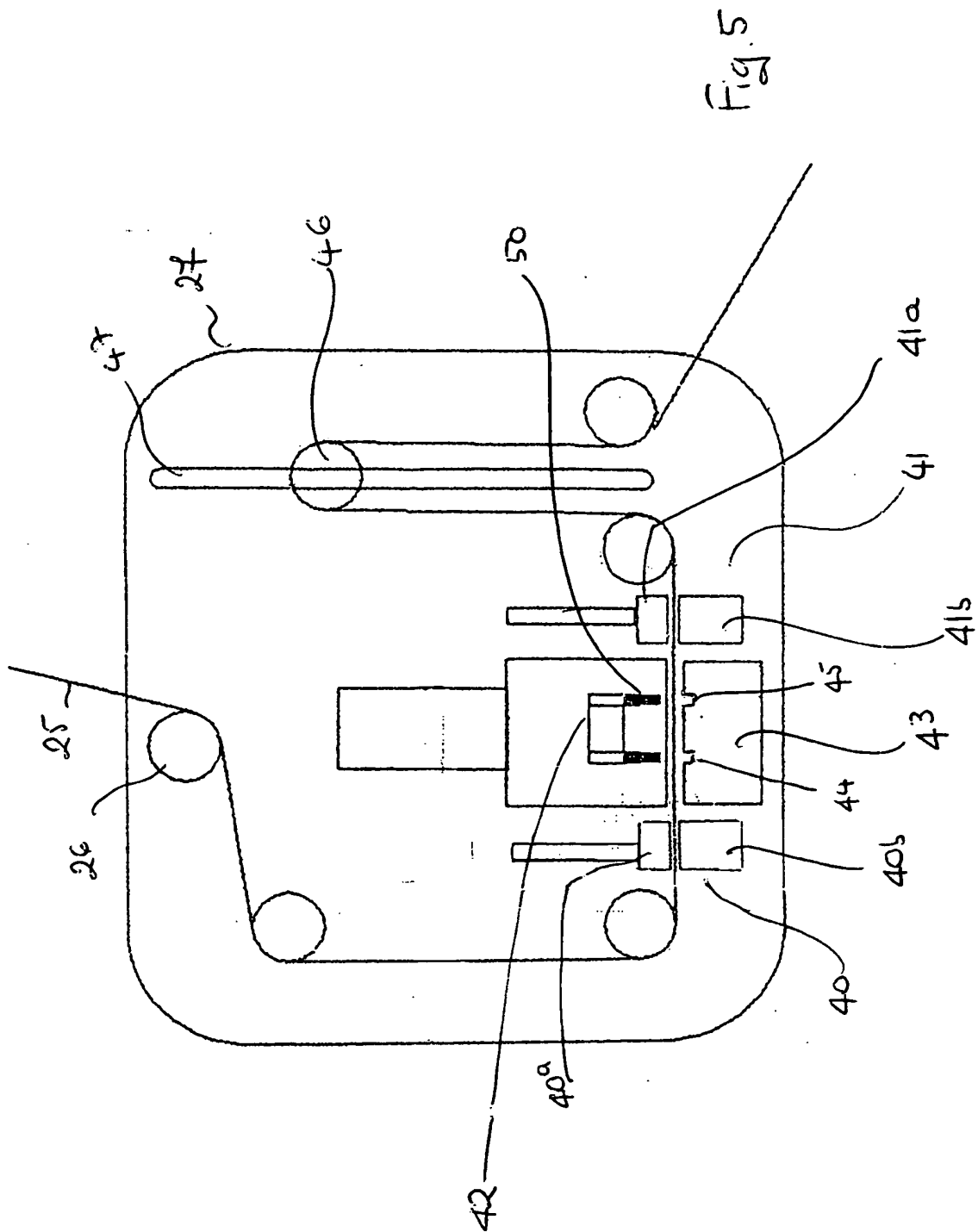


Fig. 4



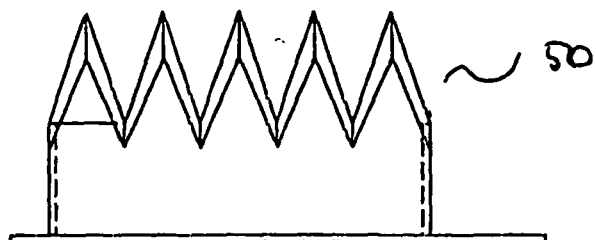


Fig. 6a

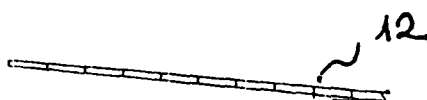


Fig. 6b

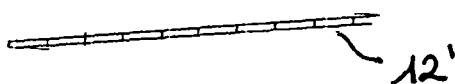
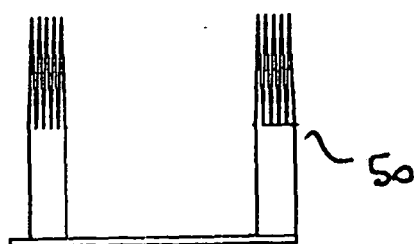


Fig. 6c



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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