EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
12.08.2009 Bulletin 2009/33

(21) Application number: 02791849.9

(22) Date of filing: 18.12.2002

(54) HEAT-SHRINKABLE FILM PACKAGING FOR BOTTLES AND PROCESS FOR MANUFACTURING SAID PACKAGING
WÄRMESCHRUMPFBARE FOLIENVERPACKUNG FÜR FLASCHEN UND VERFAHREN ZU IHRER HERSTELLUNG
FILM THERMORETRACTABLE POUR BOUTEILLES ET PROCÉDE DE FABRICATION DE CE FILM

(84) Designated Contracting States:
BG CZ EE SI SK


(43) Date of publication of application:
19.01.2005 Bulletin 2005/03

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(51) Int Cl.:
B65D 71/00 (2006.01) B26F 1/20 (2006.01)

(86) International application number:
PCT/EP2002/014509

(87) International publication number:

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• PATENT ABSTRACTS OF JAPAN vol. 014, no. 501 (M-1043), 2 November 1990 (1990-11-02) -& JP 02
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15 August 1990 (1990-08-15)

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Description

[0001] The present invention relates to heat-shrinkable film packaging for bottles and to manufacturing processes for the manufacture of heat-shrinkable film packaging. With the word "packaging" is herein indicated the well-known wrapping used to market any kind of containers - particularly plastic bottles - obtained by wrapping a group of containers with a length of heat-shrinkable polyethylene film so as to cause the overlapping of the two free strips of the film at the bottom of the containers, and then performing a heat treatment so as to obtain the heat-shrinking of the film on the group of containers, and the mutual sealing of the two free strips of the film length. The number and arrangement of the containers of the group can vary according to their shape and volume and according to the material they are made of; the arrangement by far most used, for example to market mineral waters and/or soft drinks in 1,5 or 2 litres bottles, being the one formed by a group of six bottles arranged in three parallel rows of two bottles each. In the following description and drawings, for simplicity and uniformity's sake, reference is exclusively made to containers of the "bottle" type, which in fact represent the type of container more frequently packaged in the above mentioned packaging; it is however to be understood that the invention is not limited in any way to such a particular application, but includes any kind of known container present on the market, either made of paper, carton, plastic, metal or any combination of said materials.

[0002] Particularly the invention refers to a packaging according to claim 1 which can be easily divided into several portions, each one containing a smaller number of bottles while keeping the integrity of the packaging wrapper to make it easier carrying away thereof. Characteristics and advantages of such a kind of container are widely described in the Patent EP-B-717.712.

[0003] The present invention also refers to a packaging for bottles according to the preamble of claim 5 made with a heat-shrinkable film, of the so called easy-opening type, that is to a packaging provided with means to render the film tearing easier in predetermined positions and allow, in so doing, to take out one or more bottles from the packaging, free from the packaging film.

[0004] The present invention as well includes manufacturing processes according to the preamble of claim 10 and to the preamble of claim 14.

[0005] The above mentioned Patent EP-717.712 has provided a new type of packaging for bottles by using a packaging film wherein a plurality of linear incisions, spaced by a suitable pitch, are performed along separation lines positioned between two rows of bottles. This type of packaging is easily divisible along said incision lines in submultiples of at least two bottles, every bottle of each sub-multiple being firmly held in position by the of packaging portion separated therewith. This new type of packaging - distinguished on the market by the trade mark ZIPACK® - has solved a number of problems related to transportation and marketing of bottles packaged in heat-shrinkable plastic film packagings, nowadays largely widespread in place of previous form of transportation such as wooden or plastic made cases with internal separating frames. Among the major advantages provided by the ZIPACK® system - in addition to the fundamental one, which is to allow the purchasing and carrying of a smaller number of bottles than that characterising the standard packaging, firmly held and easily transportable - it's worth mentioning the following: the quickness and easiness of separation of submultiples with the only help of the hands, the elimination of any piece or remainder of packaging film in sales points, the possibility to choose the size of the submultiple in relation with purchasing needs and carrying capability of each single consumer and, finally, discouraging consumers from purchasing only one bottle, due to the fact that the smallest submultiple, comprising two bottles, is much easier to carry away than a single bottle.

[0006] During the first period of use of the ZIPACK system some technical peculiarities and marketing requirements came to evidence, indicating the necessity to introduce some updating and improving of the system which, precisely, represent the subject matter of the present invention.

[0007] More in details, a first technical peculiarity of the ZIPACK® packaging, which in certain conditions could give rise to problems, is the effective direct directionality of the tearing line of the film, driven by each single incision, when the detachment of a submultiple is undergoing. In the known manufacturing methods, actually, the incisions - consisting of linear cuts of some mm of length - are performed by rotary cutting devices with blades which penetrate into the film, shown in the figures from 1 to 3. A cutting disk T provided with cutting teeth D on its circumference (fig. 1) is mounted, coaxial and adjacent to one or possibly two supporting wheels R, R’ (fig. 2), upon the film P to be cut. The wheels R, R’ have a diameter slightly smaller than the diameter of the disk T, so as to allow the teeth D to jut out the necessary amount to cut the film. The wheels R, R’ lean and roll on a contrast roll C placed under the film P, while the teeth D of the disk T go through the film P and get into an appropriate groove provided for in the roll C. Both the wheels R, R’ and the cutting disk T included between them, and the roll C turn preferably idle, being driven by the movement of the film P which is wound around a separate powered reel. The cutting line obtained with such a device is shown in figure 3 and includes a series of aligned incisions of a length t repeated with a constant pitch L, so as to leave an uncut length p = L.

- t, in the following simply indicated as "uncut", between two subsequent incisions. The ratio incision/uncut and the value of the pitch L can be varied modifying the dimensions and the pitch of the teeth D on the disk T.
[0008] With this cutting method, however, it is not possible to avoid that, either when the blade "enters" into and, even if with a smaller effect, when it comes out from an incision, the blade slightly tears the film producing two little opposite rips, so that the two ends of each linear incision take a Y shape, whose size mainly depends on the construction and operational characteristics of the cutting equipment, on the quality of the blades and on their maintenance level. When - for example due to either an inadequate maintenance or an excessive blades penetration - the size of said Y shaped rips becomes tangible, after the shrinking phase of the film, the incision shape, instead of the required buttonhole shape with sharp ends, will have an ovalized-rectangular shape characterised by a reduced capability of imparting a correct directionality to the tearing line when separating the submultiples of the packaging. In this cases, the tearing of the packaging film might not result quite regular so that the tearing line could deviate, in one or more zones - particularly those where the packaging shows an important curvature - from the incision line provided beforehand in the film.

A tearing of this type is not satisfactory, not only from an esthetical point of view, but also as it might require an higher tearing energy and, sometimes, could determine a not satisfactory holding of the bottles contained in the separated submultiple.

[0009] A first object of the present invention, therefore, is to provide a packaging - and a relative manufacturing method - in which the incision lines of the film show such a conformation to ensure a perfectly regular separation of the packaging into submultiples, which means an extremely easy separation, exactly performed along the incision line provided in the film, besides ensuring a perfect mechanical resistance of the packaging during the transportation thereof.

[0010] A second technical problem considered by the Applicant has been to achieve an easy and clear separation of the packaging submultiples even in the bottom portion of the packaging, i.e. where the two free strips of the length of packaging film are overlapped and sealed each other. As a matter of fact, being the alignment of the two overlapped free strips never perfect, sometimes it may happen that the incisions of one of the free strips actually overlap to an uncut zone of the other free strip, so as to be partially sealed during the shrinking phase, making less quick and effective the separation of the packaging submultiples.

[0011] An higher refinement of the wrap around techniques to wrap the length of film around the group of bottles of the packaging has allowed to improve the alignment of the two free strips and consequently the overlapping the respective incision lines, thus reducing remarkably the magnitude of such a problem, which nevertheless cannot be totally eliminated in this way.

[0012] In patent IT-1.289.944, in the name of the same Applicant, some innovative packaging processes have been proposed, allowing to solve this problem maintaining or restoring the open-state of the incisions of at least one of the two overlapped free strips of the length of film. In particular a first process provides for adjusting the temperature of the film in the bottom area of the packaging, along the incision lines, by positioning shielding frames in the heat-shrinking oven, so as to reduce or to cool down the air flow in correspondence with the above mentioned area, and consequently avoid the sealing of the incisions. In a second process the open-state of the incisions in the bottom area of the packaging is restored, after the exist from the heat-shrinking oven, using appropriate cutting means operating on the finished packaging.

In a third process, the incision lines on one of the two said free strips consist in two wide buttonholes, sufficiently large to completely overlap to the normal incision lines provided on the other free strip, so avoiding their sealing. In a fourth and latter process one band of film along each incision lines is subject to a corona treatment, so as to reduce the superficial reactivity thereof and prevent the subsequent sealing of the free strips in correspondence with said bands, thus maintaining the open-state of the incisions.

[0013] In the patent EP-868.364 it is suggested another type of solution to this problem, according to which, in correspondence with each incision line, is provided a band of film coated with a printing ink so as to impart to said band an unsealing feature. This technique allows to avoid sealing of the two overlapped free strips of film just in correspondence with the incision lines and nearby of the same, so that the open-state of the incisions is maintained even in presence of alignment errors in the overlapping of the two free strips.

[0014] Both above mentioned patents allow to definite-ly solve the above described problem, even if at the cost of introducing some process variations or an additional working phase of the film, imposing unwanted additional costs to the packaging manufacturing process.

[0015] A second object of the present invention therefore is to provide a new type of packaging - and the relative manufacturing method - where the separation of the submultiples occurs in a quick and clear way along all the perimeter of the packaging, including the bottom portion thereof, without any necessity of modifying the existent manufacturing methods of the packaging or performing any additional treatments to the film other than providing the incision lines.

[0016] In addition to the above mentioned technical improvements, the commercial experience so far carried out with the ZIPACK® system has underlined the necessity to also make available - at least for some quite conservative market segments - an easy-opening system for the packaging, to allow the easy and quick picking up of one or more loose bottles from the packaging. The easy-opening systems so far offered by the known techniques, are not enough satisfactory both from a practical and economical point of view so as to reach a real and wide diffusion on the market. The disadvantages more frequently present in such known systems are relative to the fact that the easy-opening feature is obtained either
with the use of additional materials along the opening lines provided on the packaging (such as threads, strips, etc.), either with some special additives integrating the normal components of the packaging film (such as polymer materials with an high tearing directionality, etc.), which materials generate in both cases an increase of the overall costs of the packaging. Moreover these known systems are not always practical in their opening mode, presenting sometimes the disadvantage to generate stripes or scraps of torn film which make out of order and less attractive the sales point, requiring additional time for their elimination.

[0017] A third object of the present invention is then to provide a packaging with an easy-opening feature - and the relative manufacturing method - which do not require the use of any additive or special material, in addition to the heat-shrinkable film normally used to produce a additional packaging, and which, moreover, do not give rise to film stripes or scraps when the easy-opening operation takes place.

[0018] US-A-6.105.776 discloses an easy-opening packaging for a plurality of articles, arranged in superposed layers separated by cardboards, comprising a plastic material film having a preferred direction of tearing and a continuos weakenig band formed by a linear array of perforations in the film, said band being oriented transversally to said preferred direction of tearing. These objects are all achieved, according to the present invention, through a packaging with the characteristics as defined in the independent claims 1 or 5 and through a manufacturing method with the characteristics as defined in the independent claims 10 or 14.

[0019] Other characteristics of the invention are defined in the secondary claims.

[0020] Further characteristics and advantages of the packaging, of the manufacturing method and of the cutting equipment according to the present invention, will result in much more evidence from the following detailed description of some favourite embodiments of the packaging and of the cutting device, which are illustrated in the enclosed drawings, wherein:

- fig. 1 is a front view of a penetration cutting device according to the prior art, which can be used to perform the incision lines on a ZIPACK® packaging; (PRIOR ART)
- fig. 2 is a lateral view, partially in section, of the cutting device of fig. 1; (PRIOR ART)
- fig. 3 is a plan view illustrating an incision line performed in a film length, through the cutting device shown in figs. 1 and 2; (PRIOR ART)
- fig. 4 is a front view of a score cut device according to the prior art; (PRIOR ART)
- fig. 5 is a lateral view, partially in section, of the cutting device of fig. 4; (PRIOR ART)
- fig. 6 is a plan view illustrating an incision line performed in a film, through the cutting device shown in figs. 4 and 5; (PRIOR ART)
- fig. 7 is a front view of a score cut device with supporting cams, which can be used to perform incision lines in a packaging (not part of the invention)
- fig. 8 is a lateral view, partially in section, of the cutting device of fig. 7; (not part of the invention)
- fig. 9 is a front view of a score cut device provided with resilient wheels, which can be used to perform incision lines in a packaging (not part of the invention)
- fig. 10 is a lateral view, partially in section, of the cutting device of fig. 9; (not part of the invention)
- fig. 11 is a lateral view, partially in section, of a score cut device provided with a resilient supporting wheel having a variable diameter, which can be used to perform incision lines in a packaging; (not part of the invention)
- fig. 12 is a lateral view, partially in section, of the cutting device of fig. 11 in a different working position; (not part of the invention)
- fig. 13 is a plan view illustrating an incision line performed in a film, through the cutting device shown in figures from 7 to 12; (not part of the invention)
- fig. 14 is a front view of a score cut device having a plurality of cutting discs, which can be used to perform incision lines in a packaging according to the present invention; (not part of the invention)
- fig. 15 is a lateral view, partially in section, of the cutting device of fig. 14;
- fig. 16 is a plan view illustrating an incision line performed in a film, through the cutting device shown in figs. 14 and 15;
- fig. 17 is a perspective schematic view of a packaging divisible into separable sections, (not part of the invention)
- fig. 18 is a perspective schematic view of a packaging with an easy-opening feature, according to the present invention;
- fig. 19 is a schematic front view of a cutting equipment according to the present invention; and
- fig. 20 is a lateral view of the cutting equipment of fig. 19.

[0022] Having accurately studied the formation mechanism of the film cutting as well as that of the heat-shrinkage of the packaging, the Applicant has succeeded in finding out the defects - illustrated in the preliminary section of the present description - belonging to the traditional cutting devices used to perform incision lines in films used for producing ZIPACK® packaging, i.e. penetration cutting devices.

[0023] The Applicant has therefore carried out a market search, even in market sectors far off that one of the present invention, in order to verify the availability of other curving methods which would be free from the above mentioned disadvantages. Among the various cutting methods examined during that search, that one showing the better intrinsic cutting characteristics, at least at a potential level, has proved to be the score cut method. A cutting device of such a type is schematically illustrated.
in figs. 4 to 6.

[0024] Also in this case the cutting tool consists of a disc \( T \), yet directly leaning, through its teeth \( D \), on a contrast roll \( C \), with the interposition of a film \( P \) to be cut. With the aim to provide a constant contact with the contrast roll \( C \), the teeth \( D \) have in this case an external profile perfectly circular with an edge not particularly sharpened, so as not to engrave the surface of such a contrast roll \( C \). The cutting disc \( T \) is mounted on a mobile holder \( S \), pneumatically controlled so that the disk \( T \) will exercise a predetermined constant pressure on the contrast roll \( C \).

[0025] This type of score cut device performs cuts of high quality, since there is no relative movement between the film \( P \) and the teeth \( D \) apart from the simple compression along the cutting line; in this way it is not possible that the short rips or lateral tearings typical of the penetration cutting method take place. Normally score cut devices are used for continuous cuttings, by means of a disk \( T \) provided with a single edge perfectly circular, their use has been further extended to obtain incision lines of the kind illustrated in fig. 6, in which the ratio incision/uncut is extremely high. To reach such a result short interruptions or interspaces are provided on the outline of a disk \( T \) with a continuous edge, so as to determine the formation of teeth \( D \) with a circular profile on that disk. The wideness of these interspaces must be very small; as a matter of fact it has to be considered that the cutting disk \( T \) is continuously in contact and pressed against the roll \( C \) so that if the interspace between two subsequent teeth \( D \) would be too wide, a sudden approach of disk \( T \) to roll \( C \) would take place in correspondence with the interspace between two teeth; as a consequence, as the front edge of the subsequent tooth will run into the roll \( C \), an unacceptable strike and sudden return of disk \( T \) will take place, generating in so doing an unacceptable beating of the disk \( T \). Practically, to maintain such a beating within a sufficiently low level so as to avoid a quick deterioration of the teeth \( D \), it is necessary that the interspace between two adjacent teeth, for standard disks with a diameter of 100 mm, is not higher than 1 mm. Interspaces proportionally higher can be admitted with cutting disks having an higher diameter.

[0026] Taking all this under consideration, it appears quite clear that the score cut devices of a known type are completely unsuitable for the realisation of incision lines in a film to be used for producing a ZIPACK® packaging; as a matter of fact the incision lines on such a film must present the "uncut" of the incision line wide enough to ensure the necessary stability of the packaging, during the heat-shrinking and transportation operations, thus at least equal to 4-8 mm in a normal packaging containing 6 bottles of 1.5 - 2 litres.

[0027] Quite recently a new type of holder \( S \) has been developed for the cutting disk \( T \) of a score cut device in which, in addition to the constant cutting pressure, also the longitudinal stroke of the disk is made adjustable. As a matter of fact such a stroke is not only limited, as in the previous versions, to 2-3 mm millimetres of maximum run, but it is finely adjustable through a micrometric regulation so as to allow the disk to run the only necessary stroke to go through the whole film, cutting the same, thus without allowing any further advancing of the cutting disk in the interspace between two subsequent teeth and therefore without giving rise to the above mentioned problems, i.e. the beating of the disk \( T \) in correspondence with said interspaces.

[0028] However, neither this technical device is suitable to solve the problem; as a matter of fact, since both the cutting disk \( T \) and the contrast roll \( C \) rotate idle (devices with a mechanical connection between the disk \( T \) and the roll \( C \), as well as powered versions, in fact are not generally used due to higher cost and device complication) so that their rotation is ensured only by the film \( P \) movement, it is quite clear that in case the contact between disk \( T \) and roll \( C \) should be regularly and repeatedly lost in correspondence with each interspace between subsequent teeth (where such an interspace would be sufficiently wide to generate an incision line with the desired uncut length, driving on the cutting disk could become highly irregular, determining as a consequence an unacceptable unevenness in the formation of the incision lines.

[0029] The Applicant, faced by these problems, nevertheless willing to take advantage of the positive technical performances of the score cut system, has conceived a cutting device which allows to score cut a film performing on it incision lines with a ratio incision/uncut whose value can be set at will, without giving rise to any problem concerning beating of the disk \( T \) on the contrast roll \( C \).

[0030] A first embodiment of such a cutting device which is not part of the present invention is illustrated in figs. 7 and 8. As shown in fig. 7, a cutting disk 1 - of a kind suitable for score cut, but with quite wide interspaces between its eeth 2, suitable to perform incision lines for a ZIPACK® packaging is provided with a cam disk 3 of the same diameter, coaxial and fixedly connected in rotation thereto. The cams 4 of the cam disk 3 are positioned exactly in correspondence with the interspaces between teeth 2 of the cutting disk 1 (as it appear in fig. 7 where, for sake of simplicity, only few cams are shown) and the minimum circumferential extension of each cam is equal to the extension of the corresponding interspace diminished by a maximum value of circumferential clearance equal to 2/100 of the diameter of the cam disk. The cams 4 have a thickness sufficiently wide to guarantee a good support of the cutting disk 1 between two subsequent teeth (as clearly shown in fig. 1) without, however, determining any deterioration of the film \( P \) on which they lean on; to this purpose, they preferably have their edges adequately smoothed. In this way the cutting tool, consisting of the set of disks 1 and 3, during its rotation leans on the contrast roll \( C \) alternatively with one tooth 2 of the disk 1 or with one cam 4 of the disk 3, while a soft passage from the first to the second is preferably granted by the
presence of the above mentioned circumferential clearance, equal to 1/100 of the cam disk diameter, between the end of one tooth 2 and the beginning of a cam 4 and vice versa. It has to be dearly understood that while said clearance can not have a value higher than the one indicated to avoid the rising of beatings of the cutting tool, such clearance can assume a inferior, null or negative value (i.e. the circumferential extension of the cams 4 can be higher of the one of the corresponding interspaces of the disk 1) without that the functionality of the cutting tool would be substantially compromised; however such a solution, presently, is not preferred. A second cam disk 3’ (of which only the outline is indicated in fig. 8) can be placed on the other side of the disk 1, in case one likes to obtain a perfectly symmetrical construction of the cutting tool.

[0031] Thus, with this solution it is possible to form the teeth 2 of the cutting disk 1 at any desired distance, and in particular at that specific distance which is needed to perform incision lines suitable to provide films for a ZTPACK® packaging, completely avoiding any beating of the cutting disk on the contrast roll. As a matter of fact, when none of the teeth 2 is in touch with the contrast roll C, the needed stability of the cutting tool, which means the substantial absence of any movement in the direction of arrow F of fig.8, is ensured by the presence of the cams 4 leaning on the contrast roll C.

[0032] With the above described device it is thus possible to produce films P performed with incision lines having the desired ratio incision/uncut like, for example, the film illustrated in fig 13, totally suitable to produce a ZTPACK® packaging such as schematically shown in fig. 17. These incision lines, thanks to the score cut method by which they have been obtained, are completely free from any defects found in the incision lines performed with the known penetration cutting devices, so that they present an high tearing directionality A version of this first embodiment which is not part of the invention and, which also allows an additional technical function, is illustrated in the figs. 9 and 10. In this case the cutting disk 1, is coaxial to and fixedly connected in rotation with a supporting wheel 5. The supporting wheel 5 consists of a metallic hard core 6 whose peripheral rim is provided with an adequately resilient covering 7 made from an elastomeric material. In an unstressed state, the external diameter of the supporting wheels 5 is equal to or slightly higher than the cutting disk 1 diameter, in relation to the resiliency degree of the elastomeric covering 7, in such a way that, when the holder of the disk 1(not illustrated) is pushed at his working pressure against the contrast roll C, the covering 7 of the supporting wheels 5 yields sufficiently so as to allow the cutting disk 1 and in particular its teeth 2 to go completely through the film P which has to be cut.

[0033] This very simple solution makes it possible to completely avoid the beating phenomenon, thus allowing to form the teeth 2 of disk 1 at a distance suitable to perform the incision lines needed to prepare the film for a ZTPACK® packaging. In fact, when the direct support of teeth 2 on the contrast roll C is missed, the desired stability of the system, i.e. the absence of perceptible movements in the direction indicated by arrow G of fig. 10, is ensured by the elastomeric covering 7 of wheels 5 which will react elastically to the higher load determined by the absence of a tooth and - thanks to a correct choice of the relative coefficient of elasticity - can succeed in avoiding any sensible lowering of the cutting disk 1, at the interspace between two subsequent teeth 2, avoiding, as a consequence, any beating phenomenon. In the drawings only one supporting wheel 5 has been shown, yet it is clear that, with the obvious modifications of the cutting tool, it will be possible to provide a second supporting wheel 5’ (illustrated in fig. 10 with dotted lines) symmetrically positioned on the other side of the cutting disk 1, where this would be useful or effective to ensure a better working of the same device.

[0034] In addition to the above mentioned fundamental function of supporting the cutting disk within the interspace between two subsequent teeth, the above described supporting wheel 5 achieves also a second very important function, which is to ensure a correct and continuous driving of the cutting device, and therefore of the cutting disk 1, thanks to the motion of the film P, with which the supporting wheel 5 keeps a continuous contact. Such an additional function keeps its importance even in case the stroke end of the cutting disk 1 is controlled - by the way with a more costly solution - through a micrometric stop regulation, such as to mechanically prevent the longitudinal movement of the cutting disk 1 from extending beyond the value needed to cut the film P. As a matter of fact, even in this case, the supporting wheel 5 is essential to keep the continuity of contact with the film P between two subsequent teeth of the cutting disk 1 so as to avoid a possible reciprocal sliding between the film P and the cutting tool which would negatively affect the position and the quality of the incisions.

[0035] A second version of this first embodiment which is not part of the invention is shown in the figs. 11 and 12 and provides, in addition to the above mentioned advantages of the first version, a second additional function. According to this version, the supporting wheel 5 consists of a metallic core 6 provided with a circumferential cavity in which it is lodged an elastomeric gasket 17, ring shaped and hallowed inside, ensuring to the cutting tool the same continuous supporting function ensured, in the first version, by the elastomeric covering 7. The cutting device of this second version allows - as already anticipated - a second additional function, thanks to the fact that the metallic core 6 of the wheel 5, and as a consequence the elastomeric gasket 17, can assume the two different positions shown in figs. 11 and 12 under the action of the electromagnet 9 placed around the mobile nucleus 8, apt to longitudinally slide with respect to the supporting shaft (not illustrated) of the cutting device. When the electromagnet 9 is activated, the nucleus 8 moves from positions d (fig. 11) to position d’ (fig. 12)
shifting towards the left side of the drawing and, through a bell-shaped flange 10 fixedly connected thereto, determines a corresponding movement of an external flank of the core 6 so as to reduce the inner volume of the lodging cavity holding the gasket 17. Therefore, said gasket is correspondingly squeezed and a reduction of the volume of its inner cavity as well as an increase of its diameter will take place, so as to determine a lifting \( z \) of the cutting device, sufficient to allow a similar lifting of the cutting disk 1 from the film P and thus the interruption of the incision line. The above mentioned electromagnetic control is characterised by both an high speed performance and a low inertia, and therefore it is perfectly suitable to perform the cyclical interruption of the incision lines even at an high working speed.

[0036] Obviously, the supporting wheels according to the two versions above described, having the peripheral rim made from an elastomeric material, can also be profitably used in conjunction with the cam disk of the first embodiment of the present invention. As a matter of fact, such a coupling will allow to achieve a very good driving effect of the film and to exploit the interesting opportunities of spaced cutting offered by the supporting wheel with variable diameter, yet maintaining the mechanical positioning precision typical of the cam disk.

[0037] A second embodiment of the cutting device which does not form part of the present invention is illustrated in figs. 14 and 15, and has been studied by the Applicant with the aim of providing incision lines characterised by an high directionality as well as by a low tearing energy. In this second embodiment, the cutting tool consists of two cutting disks 1 and 1', coupled on a same axis and fixedly connected each other, laterally to which one or two supporting wheels 5, like those illustrated for the two versions of the first embodiment, may or may not be used. In the figures, for simplicity sake, it has been illustrated only the version without the supporting wheels.

The distance \( i \) (fig. 16) between the two disks 1 and 1' is in the order of some millimetre, and more precisely is comprised between a minimum value of about 1 mm and a maximum value approximately equal to the length of the uncut \( p \) existing between two subsequent incisions of the same incision line; preferably such a distance is included into the range of 2-3 mm.

[0038] The disks 1 and 1' have the same number of teeth 2 and 2' set out with an identical pitch, and are reciprocally mounted in such a way so that the teeth of one of the two disks take a configuration perfectly alternate with respect to those of the adjacent disk, as shown in fig. 14. The particular incision line obtained with the above described cutting device of the second embodiment is illustrated in fig. 16. In the above illustrated embodiment and with reference to disks of a standard type having a diameter of about 100 mm, the maximum value of the pitch \( L \) of the teeth 2, 2' is 2 mm longer than the double cutting length \( t \) of a tooth so that, during the rotation of the cutting tool between one tooth and the subsequent one of the adjacent disk, there will not be an interval longer than about 1/100 of the diameter of the cutting disk, i.e. about 1 mm in the case of standard cutting disks with a diameter of 100 mm. In this condition the teeth 2, 2' can have, for example, a length of 4 mm and a pitch length up to 10 mm. In this case no beating of the cutting tool on the contrast roll C will take place, since its correct support on the contrast roll C is ensured alternatively by one tooth 2 of disk 1 and by one tooth 2' of disk 1'; such a cutting tool therefore can be used as it is, with a clear advantage for the simplicity of the system.

[0039] On the contrary, in case the interspace between two subsequent teeth 2 and 2' (of the two adjacent disks 1 and 1') has a length higher than the above mentioned one, it is necessary to couple the cutting tool with at least one cam disk 3 and/or at least one supporting wheel 5 of the type above illustrated, suitable for giving an adequate support to the cutting tool also in correspondence with the interspace between two subsequent teeth, whatever the interspace length is.

[0040] As above said such a cutting tool has been thought with the aim to obtain incision lines for a ZIPACK® packaging, provided with better characteristics such as an high directionality and a reduced tearing energy. As a matter of fact, in applying such a cutting line on a film P used to produce a ZIPACK® packaging, the Applicant has obtained the factual confirmation that said cutting line actually provides absolutely superior performances both from the point of view of the high directionality of the film tearing and from the point of view of the reduced energy necessary to tear the film, so that this operation is performed in a much easier way by the user. In addition to this, the packaging formed using this type of incision lines proves to be much more stable during the heat-shrinking as well as during the transportation, as all the tensions on the film P are subdivided among a double number of incisions and, consequently, the stress on each single incision is substantially reduced. Finally, surprisingly enough, the packaging produced with the above mentioned incision line demonstrate to ensure a complete detachment of the packaging submultiples, even in the bottom area of the packaging - where, in relation with what has been said in the introductory section, the most critical conditions take place - without the necessity to apply any special treatment to the film P or to modify in any way the packaging manufacturing method.

[0041] An explanation for such a particularly positive performances is probably to be seen in the fact that in the traditional incision line, to proceed from one incision to the subsequent one during the tearing operation, it is necessary to tear a portion of film rather long (4-8 mm) in a well established direction, i.e. the incision line direction. Using, on the contrary, the particular double incision line of the second embodiment, the tearing of the film can take place either along the above mentioned direction of the incision line, or even along an oblique direction, i.e. proceeding from one incision on a first incision line to the one laterally positioned on the adjacent incision line, increasing in this way the overall probability that the
double incision line open along the established direction; as a matter of fact is quite unlikely that, starting from a predetermined incision, the tearing line will go on in a transversal direction opposite to that where the lateral subsequent adjacent incision is positioned as, at the moment in which the tearing action reaches a determined incision, the film already shows a remarkable weakening toward the lateral subsequent incision which has already started to become deformed. Since this phenomenon will happen alternatively on the two adjacent incision lines, the more probable tearing pattern - actually that one requiring the minimum opening energy - will assume a typical "slalom" pattern configuration. Besides, considering that the energy required by a "lateral tearing" - i.e. the one taking place between a given incision and the subsequent lateral one - is on average lower than the energy required by a "longitudinal tearing" - i.e. the one taking place between a given incision and the subsequent one on the same line - due to the fact that the length of film to be teared is shorter (about 2-3 mm compared with 4-8 mm), with this new type of incision line it is also achieved an overall reduction of the energy required to separate two submultiples of the packaging.

Finally, even in regard to the positive characteristic of allowing a complete and easy division of the packaging into submultiples of a very good quality - independently from any possible sealing of the incisions which could have taken place between the two free strips of the packaging - one can assume that it could depend on the fact that the possible zigzag proceeding of the tearing line is such as to allow a previous reopening of the incisions possibly sealed during the heat-shrinking of the packaging, as long as the tearing goes on.

To leave apart, however, the actual mechanism of action taking place during the tearing of the film - being the above mentioned explanations to be considered only mere explanatory hypothesis, not having any limiting value on the scope of the invention - a large number of trials and production tests carried out in the most different heat-shrinking conditions of the packaging have proved that the particular double incision line, obtained with the cutting device of the second embodiment, allows to obtain: a better stress distribution among the different incisions during the heat-shrinking phase and consequently a lower ovaling of the same, all this allowing to avoid in a very safe way any accidental opening of the packaging either during the manufacturing or transportation; a very good directionality of the tearing line and a lower quantity of energy needed to achieve the tearing operation, so as to ensure the first object of the invention with even better performances as compared to the first embodiment above illustrated; a perfect and easy division of the packaging into submultiples, also in the bottom zone of the packaging, without the necessity to apply any preventive treatment to the film and without any modification of the manufacturing method, so reaching also the second object of the present invention.

In the above illustrated embodiment, only two cutting disks 1 and 1' are provided. However, cutting experiments as well as packaging manufacturing tests with an higher number of cutting disks, for example 3 or more adjacent disks, each one positioned with the teeth staggered with respect to the adjacent disk, have been carried out by the Applicant. By this type of cutting tool particular incision lines are obtained which, after the heat-shrinking phase has been completed, assume a typical honeycomb configuration, showing a very high mechanical resistance and, contemporaneously, a very important tearing easiness so as to be quite useful for specific applications. A convenient application for this type of incision lines is, for example, that of using them for packages with an easy-opening feature; as a matter of fact, due to the higher wideness of the tearing area, the access to the packaging, in order to take the bottles out, results much easier.

Moreover, a packaging with an easy-opening feature, can also be obtained according to the third embodiment which is not part of the present invention, which provides a cutting device consisting in just two cutting disks associated but reciprocally positioned at a distance much higher than the one discussed at in the second embodiment, for example of 2-3 cm, so as to generate two incision lines distant enough to be independent and not cooperating each other. Also this cutting tool, as the one described in relation with the second embodiment, may or may not be associated with one or two supporting wheels provided with a peripheral rim made from an elastomeric material to ensure a correct and continuous support to the cutting tool when the support provided by the cutting disks should not be sufficient because of the specific ratio incision/uncut of the same disks. Preferably in this case the supporting wheel will be just one, positioned between the two cutting disks, so as to usefully become also their spacer element. Besides, the two incision lines could also be of the type obtained with both the cutting devices above described, so as to be either single or double lines, obtaining in the last case - even in this type of application - the same additional advantages already seen and above described.

In the final packaging produced with a film performed with the cutting device according to this third embodiment, the incision lines are no more positioned in the middle zone between two adjacent bottle rows, but on the contrary closer to the necks of the same bottles as shown in fig. 18. In such a way, it is therefore possible, after one has opened the packaging in correspondence with the said lines, to take away with much more easiness the loose bottles from the packaging itself.

In this type of application for a packaging with an easy-opening feature it is often advisable to limit the incision lines to the upper zone of the packaging, so as to avoid either the accidental division of the packaging into submultiples, that in this case it is not welcome, or the detachment of stripes of film from the packaging, so as to achieve also the third object of the invention. The arrangement of these partial incision lines is illustrated
to avoid that the separation of the film proceeds all along the incision lines, determining the complete detachment of submultiples of the packaging. Alternatively, it is possible to provide the two series of incisions in a adequately staggered way - using two cutting disks with teeth distributed only in given sectors of their circumference and positioning said disks one another in such a way that their sectors with teeth will result reciprocally staggered - so that in the bottom area of the packaging the two free strips will be sealed due to the lack of overlapping between the series of incisions performed on the same free strips, while the easy-opening feature will be exploited in a satisfactory way using alternatively one or the other of the two series of incisions.

[0052] The different types of cutting devices above described with reference to the different embodiments do not from part of the present invention and are preferably incorporated in a self-standing cutting equipment as illustrated in figs. 19 and 20. Such a unit is completely autonomous, and allows to prepare pre-cut reels of film P to be used with packers of any known kind, so as to allow a very high flexibility in the application of the present invention even in case of already existing plants. Obviously, there’s noting preventing such a device, with the necessary modification, from being installed on-line on a specially designed packer, so as to perform the incision lines during the unwinding of the film still uncut, before the film itself is transversally cut to generate the lengths of film for manufacturing the packaging.

[0053] In the unit illustrated in figs. 19 and 20, the film P is of a double width so as to allow the feeding of a double path packer, where the film P is divided longitudinally in correspondence with its middle line. In the case of standard packaging with 6 bottles each, the number of incision lines to be performed on the film is two for each packaging, so that for a double size film P is in all four. Thus, the unit is provided with four cutting devices D, adjustably positioned on a common transversal bar, as shown in fig. 19. The supporting bar of the devices D is fixed, while the single cutting devices are movable in a direction perpendicular to the supporting bar itself and to the contrast roll C positioned below the same, under the action of the respective pneumatic pressure devices (not illustrated).

[0054] The film P is unwound from a supplying reel A and is rewound on a receiving reel B, after having passed on a series of rolls M including, where necessary, two dancer rolls N and finally on the contrast roll C. The contrast roll C, as already mentioned in detail, is in contact with the cutting devices D and in particular with the cutting disks 1 thereof. To perform the incisions, the reel B is put into rotation as its drive shaft is properly powered; normally the motorization do not provide, for simplicity sake, a speed control system, so that the rewinding of the film takes place at a constant angular speed and, consequently, at a linear speed increasing as the diameter of the reel B grows up. Thanks to the different type of cutting devices illustrated, insuring a continuous contact be-
tween the film P in movement and the cutting tool - should this last include either a cam disk 3 or a supporting wheel 5 - it is possible to avoid any reciprocal sliding between the film P and the cutting tools, thus obtaining a cutting with characteristics of a very high regularity. It is possible, where required, to design a cutting equipment provided with constant speed, which equipment however will obviously be more sophisticated and expensive. Such a result can be achieved, for example using to rewind reel B, a motorization equipped with a speed control system controlled by a film speed measurement system associated with roll C. Alternatively, it is possible to insert along the film path - preferably just after the contrast roll C - a couple of rolls powered with a motor at constant speed and to provide the motor of reel B with an inverter adjusting electronically its revolving speed to insure a controlled rewinding of the pre-cut film.

[0055] The present invention has been described with reference to some preferred embodiments of the packaging, as well as of the relevant manufacturing method. It is clear, however, that the scope of the invention is not limited to those embodiments, but includes all other possible variants at the reach of an expert in the field, as long as falling in the definitions given in the attached claims.

Claims

1. Heat-shrinkable film packaging, divisible into submultiples, of the type in which a length of said film (P) is wrapped and heat-shrunk around a group of bottles arranged alongside one another in parallel rows, so as to present the overlapping zone of its free strips in correspondence with the bottom zone of the group of bottles, characterized in that two series of incisions are provided on the film (P) on opposite sides with respect to each of the planes separating said rows of bottles, said incisions being parallel and spaced out from each said planes and extending themselves only on the upper region of the packaging.

6. Heat-shrinkable film packaging as in Claim 5, wherein said series of incisions have a reciprocal distance included between 1 and 3 cm.

7. Heat-shrinkable film packaging as in Claim 5, wherein said series of incisions are interrupted by zones without incisions.

8. Heat-shrinkable film packaging as in Claim 5, wherein each one of said series of incisions consists of one or more parallel lines of aligned incisions, the incisions of one of said incision lines being alternated in position with respect to the incisions of another of said incision lines immediately adjacent thereto.

9. Heat-shrinkable film packaging as in Claim 8, wherein the distance (d) between said incision lines is included between a minimum value of 1 mm and a maximum value equal to the uncut length (p) of one of the incision lines, and preferably between 2 and 3 mm.

10. Manufacturing process specially adapted for the manufacture of a heat-shrinkable film packaging, divisible into submultiples, of a group of bottles arranged alongside one another in parallel rows, according to claim 1), of the type comprising the following steps:

   a) perform in said film (P) a series of incisions in correspondence with the planes separating adjacent rows of bottles;
   b) arrange an even number of bottles in a group composed by two or more adjacent and parallel rows,
   c) wrap around said group of bottles a length of said film (P) so as to position the overlapping zone of the free strips of the film in correspondence with the bottom zone of the group of bottles;
   d) heat said length of film wrapped around the group of bottles to determine its heat-shrinking; characterized in that
   e) each one of the series of incisions provided in step a) is performed in the film (P) along two or more parallel lines of aligned incisions.
11. Manufacturing process of a heat-shrinkable film packaging as in Claim 10, wherein the incisions of a first of said lines are alternated in position with respect to the incisions of a second one of said lines immediately adjacent to said first line.

12. Manufacturing process of a heat-shrinkable film packaging as in Claim 11, wherein the distance (d) between said lines of incisions is included between a minimum value of 1 mm and a maximum value equal to the uncut length (p) of one of the incision lines, and preferably between 2 and 3 mm.

13. Manufacturing process of a heat-shrinkable film packaging as in Claim 12, wherein said lines are in number of two.

14. Manufacturing process specially adapted for the manufacture of a heat-shrinkable film packaging, provided with an easy-opening feature, of a group of bottles, arranged alongside one another in parallel rows, according to claim 1, of the type comprising the following steps:

   a) arrange an even number of bottles in a group formed by two or more adjacent and parallel rows;
   b) wrap around to said group of bottles a length of said film (P) so as to position the overlapping zone of the free strips of the film in correspondence with the bottom zone of the group of bottles;
   c) heat said length of film (P) wrapped around the group of bottles to determine its heat-shrinkage;
   d) perform in said film (P) two series of incisions on opposite sides with respect to the planes separating rows of bottles, said incisions being parallel and spaced out from said planes; and
   e) extend said series of incisions to a zone of each length of film corresponding only to the upper region of the packaging.

15. Manufacturing process of a heat-shrinkable film packaging as in Claim 14, wherein each one of said series of incisions consists of two or more parallel lines of aligned incisions, the incisions of one of said incision lines being alternated in their position with respect to the incisions of another of said incision lines immediately adjacent thereto.

16. Manufacturing process of a heat-shrinkable film packaging as in claim 15, wherein the distance (d) between said lines of incisions is included between a minimum value of 1 mm and a maximum value equal to the uncut length (p) of one of the incision lines, and preferably between 2 and 3 mm.

Patentansprüche


2. Wärmeschrumpfbare Folienverpackung nach Anspruch 1, wobei die Schnitte einer der besagten Linien von Schnitten in der Position alternierend in Bezug auf die Schnitte einer anderen der besagten Linien, die unmittelbar daran angrenzt, sind.

3. Wärmeschrumpfbare Folienverpackung nach Anspruch 2, wobei der Abstand (d) zwischen den Schnittlinien zum Minimalwert von 1 mm und einem Maximalwert, der gleich zu der nicht geschnittenen Länge (p) einer der Schnittlinien, eingeschlossen ist, und bevorzugt zwischen 2 und 3 mm.


5. Wärmeschrumpfbare Folienverpackung, bereitgestellt mit einem Merkmal zum leichten Öffnen, und des Typs, bei dem eine Länge des Films (P) um eine Gruppe von Flaschen, die nebeneinander in parallelen Reihen angeordnet sind, gewickelt und wärmegeschrumpft ist, um so die Überlappungszone ihrer freien Streifen in Übereinstimmung mit der Bodenzone der Gruppe von Flaschen darzubieten, dadurch gekennzeichnet, dass zwei Reihen von Schnitten an dem Film (P) auf gegenüberliegenden Seiten in Bezug auf jede der Ebenen, die besagte Reihen von Flaschen trennen, bereitgestellt sind, wobei die Schnitte parallel und gesperrt von jeder der Ebenen und sich selbst erstreckend lediglich auf den oberen Bereich der Verpackung sind.

6. Wärmeschrumpfbare Folienverpackung nach Anspruch 5, wobei die Reihen von Schnitten einen wechselseitigen Abstand aufweisen, der zwischen 1 und 3 cm eingeschlossen ist.

7. Wärmeschrumpfbare Folienverpackung nach Anspruch 5, wobei die Reihen von Schnitten durch Zonen ohne Schnitte unterbrochen sind.
8. Wärmeschrumpfbare Folienverpackung nach Anspruch 5, wobei jede der Reihen von Schnitten aus einer oder mehreren parallelen Linien von ausgezeichneten Schnitten besteht, wobei die Schnitte einer der Schnittlinien in der Position in Bezug auf die Schnitte einer anderen der Schnittlinien, die unmittelbar daran angrenzen, alternierend sind.

9. Wärmeschrumpfbare Folienverpackung nach Anspruch 8, wobei der Abstand (d) zwischen den Schnittlinien zwischen einem Minimalwert von 1 mm und einem Maximalwert, der gleich ist zu der nicht geschnittenen Länge (p) einer der Schnittlinien, eingeschlossen ist, und bevorzugt zwischen 2 und 3 mm.

10. Herstellungsverfahren, das speziell angepasst ist für die Herstellung einer wärmeschrumpfbaren, in Teile einer Einheit trennbaren Folienverpackung für eine Gruppe von Flaschen, die nebeneinander in parallelen Reihen angeordnet sind, gemäß Anspruch 1, und des Typs, der die folgenden Schritte umfasst:

a) Ausführen einer Reihe von Schnitten in der Folie (P) in Übereinstimmung mit den Ebenen, die benachbarte Reihen von Flaschen trennen; b) Anordnen einer geraden Anzahl von Flaschen in einer Gruppe, die aus zwei oder mehreren benachbarten und parallelen Reihen aufgebaut ist; c) Umwickeln einer Länge der Folie (P) um die Gruppe von Flaschen, um die Überlappungszone der freien Streifen der Folie in Übereinstimmung mit der Bodenzone der Gruppe der Flaschen zu positionieren; d) Erwärmen der Länge der Folie (P), die um die Gruppe von Flaschen gewickelt ist, um ihre Wärmeschrumpfung zu bestimmen; e) jede der Reihen von Schnitten, die in Schritt a) bereitgestellt wurden, in dem Film (P) entlang zweier oder mehrerer paralleler Linien von ausgerichteten Schnitten ausgeführt wird.

11. Herstellungsverfahren einer wärmeschrumpfbaren Folienverpackung nach Anspruch 10, wobei die Schnitte einer ersten der Linien in der Position in Bezug auf die Schnitte einer zweiten der Linien, die unmittelbar an die erste Linie angrenzen, alternierend sind.

12. Herstellungsverfahren einer wärmeschrumpfbaren Folienverpackung nach Anspruch 11, wobei der Abstand (d) zwischen den Linien von Schnitten zwischen einem Minimalwert von 1 mm und einem Maximalwert, der gleich ist zu der ungeschnittenen Länge (p) einer der Schnittlinien, eingeschlossen ist, und bevorzugt zwischen 2 und 3 mm.

13. Herstellungsverfahren einer wärmeschrumpfbaren Folienverpackung nach Anspruch 12, wobei die Linien der Anzahl nach zwei sind.

14. Herstellungsverfahren, das speziell für die Herstellung einer wärmeschrumpfbaren Folienverpackung angepasst ist, bereitgestellt mit einem Merkmal zum leichten Öffnen, für eine Gruppe von Flaschen, die nebeneinander in parallelen Reihen angeordnet sind, gemäß Anspruch 1, und des Typs, welcher die folgenden Schritte umfasst:

a) Anordnen einer geraden Anzahl von Flaschen in einer Gruppe, die aus zwei oder mehreren benachbarten und parallelen Reihen aufgebaut ist; b) Umwickeln einer Länge der Folie (P) um die Gruppe von Flaschen, um die Überlappungszone der freien Streifen der Folie in Übereinstimmung mit der Bodenzone der Gruppe der Flaschen zu positionieren; c) Erwärmen der Länge der Folie (P), die um die Gruppe von Flaschen gewickelt ist, um ihre Wärmeschrumpfung zu bestimmen; dadurch gekennzeichnet, dass, vor Schritt a), es die folgenden Schritte einschließt: d) Ausführen von zwei Reihen von Schnitten in der Folie (P) auf gegenüberliegenden Seiten in Bezug auf die Ebenen, die die Reihen der Flaschen trennen, wobei die Schnitte parallel und gesperrt von den Ebenen sind; und e) Erstrecken der Reihen von Schnitten auf eine Zone jeder Länge der Folie, die lediglich mit dem oberen Bereich der Verpackung korrespondiert.

15. Herstellungsverfahren einer wärmeschrumpfbaren Folienverpackung nach Anspruch 14, wobei jede der Reihen von Schnitten aus zwei oder mehreren parallelen Linien von ausgerichteten Schnitten besteht, wobei die Schnitte einer der Schnittlinien in der Position in Bezug auf die Schnitte einer anderen der Schnittlinien, die daran unmittelbar angrenzen, alternierend sind.

16. Herstellungsverfahren einer wärmeschrumpfbaren Folienverpackung nach Anspruch 15, wobei der Abstand (d) zwischen den Linien von Schnitten zwischen einem Minimalwert von 1 mm und einem Maximalwert, der gleich der ungeschnittenen Länge (p) einer der Schnittlinien, eingeschlossen ist, und bevorzugt zwischen 2 und 3 mm.

Revendications

1. Emballage à film thermorétractable, divisible en sous-multiples, du type dans lequel une longueur dudit film (P) est enroulée et thermorétractée autour
d’un groupe de bouteilles agencées le long les unes des autres en rangées parallèles, afin de présenter la zone de chevauchement de ses bandes libres en correspondance avec la zone de dessous du groupe de bouteilles et dans lequel une série d’incisions est prévue sur le film (P) en correspondance avec chaque plan séparant des rangées adjacentes de bouteilles, ladite chaque série d’incisions consistant en deux ou plus de deux lignes parallèles d’incisions alignées.

2. Emballage à film thermorétractable selon la revendication 1, dans lequel les incisions de l’une desdites lignes d’incisions alternent en position avec les incisions d’une autre desdites lignes qui lui est immédiatement adjacente.

3. Emballage à film thermorétractable selon la revendication 2, dans lequel la distance (d) entre lesdites lignes d’incisions est comprise entre une valeur minimale de 1 mm et une valeur maximale égale à la longueur non coupée (p) de l’une des lignes d’incisions, et avantageusement entre 2 et 3 mm.

4. Emballage à film thermorétractable selon la revendication 3, dans lequel lesdites lignes sont au nombre de deux.

5. Emballage à film thermorétractable, pourvu d’un moyen d’ouverture facile, du type dans lequel une longueur dudit film (P) est enroulée et thermorétractée autour d’un groupe de bouteilles agencées le long les unes des autres en rangées parallèles, afin de présenter la zone de chevauchement de ses bandes libres en correspondance avec la zone de dessous du groupe de bouteilles. caractérisé en ce que deux séries d’incisions sont prouvées sur le film (P) sur des côtés opposés par rapport à chacun des plans séparant lesdites rangées de bouteilles, lesdites incisions étant parallèles et espacées de chacun desdits plans et s’étendant elles-mêmes uniquement sur la région supérieure de l’emballage.

6. Emballage à film thermorétractable selon la revendication 5, dans lequel lesdites séries d’incisions ont une distance réciproque comprise entre 1 et 3 cm.

7. Emballage à film thermorétractable selon la revendication 5, dans lequel lesdites séries d’incisions sont interrompues par des zones sans incisions.

8. Emballage à film thermorétractable selon la revendication 5, dans lequel chacune desdites séries d’incisions est constituée d’une ou plusieurs lignes parallèles d’incisions alignées, les incisions d’une desdites lignes d’incisions étant dans des positions qui alternent par rapport aux incisions d’une autre desdites lignes d’incisions qui lui est immédiatement adjacente.

9. Emballage à film thermorétractable selon la revendication 8, dans lequel la distance (d) entre lesdites lignes d’incisions est comprise entre une valeur minimale de 1 mm et une valeur maximale égale à la longueur non coupée (p) de l’une des lignes d’incisions, et avantageusement entre 2 et 3 mm.

10. Procédé de fabrication conçu en particulier pour la fabrication d’un emballage à film thermorétractable, divisible en sous-multiples, d’un groupe de bouteilles agencées le long les unes des autres en rangées parallèles, selon la revendication 1, du type comprenant les étapes suivantes qui consistent :

a) à réaliser dans l’édit film (P) une série d’incisions en correspondance avec les plans séparant les rangées adjacentes de bouteilles ;
b) à disposer un nombre pair de bouteilles dans un groupe composé de deux ou plus de deux rangées adjacentes et parallèles ;
c) à enrouler autour dudit groupe de bouteilles une longueur dudit film (P) afin de positionner la zone de chevauchement des bandes libres du film en correspondance avec la zone de dessous du groupe de bouteilles ;
d) à chauffer ladite longueur de film enroulée autour du groupe de bouteilles pour déterminer son thermoretrait ;

caractérisé en ce que
e) chacune de la série d’incisions produites dans l’étape a) est réalisée dans le film (P) le long de deux ou plus de deux lignes parallèles d’incisions alignées.

11. Procédé de fabrication d’un emballage à film thermorétractable selon la revendication 10, dans lequel les incisions d’une première desdites lignes ont des positions qui alternent par rapport aux incisions d’une deuxième desdites lignes immédiatement adjacentes à ladite première ligne.

12. Procédé de fabrication d’un emballage à film thermorétractable selon la revendication 11, dans lequel la distance (d) entre lesdites lignes d’incisions est comprise entre une valeur minimale de 1 mm et une valeur maximale égale à la longueur non coupée (p) de l’une des lignes d’incisions, et avantageusement entre 2 et 3 mm.

13. Procédé de fabrication d’un emballage à film thermorétractable selon la revendication 12, dans lequel lesdites lignes sont au nombre de 2.

14. Procédé de fabrication particulièrement conçu pour la fabrication d’un emballage à film thermorétractable, pourvu d’un moyen d’ouverture facile, d’un group-
pe de bouteilles agencées le long les unes des autres en rangées parallèles, selon la revendication 1, du type comprenant les étapes suivantes qui consistent :

a) à disposer un nombre pair de bouteilles en un groupe formé de deux ou plus de deux rangées adjacentes et parallèles ;
b) à enrouler autour dudit groupe de bouteilles une longueur dudit film (P) afin de positionner la zone de chevauchement des bandes libres du film en correspondance avec la zone de dessous du groupe de bouteilles ;
c) à chauffer ladite longueur de film (P) enroulée autour du groupe de bouteilles pour déterminer son thermoretrait ;
caractérisé en ce que, avant l’étape a), il comprend les étapes suivantes qui consistent :
d) à réaliser dans ledit film (P) deux séries d’incisions sur des côtés opposés par rapport aux plans séparant des rangées de bouteilles, lesdites incisions étant parallèles et espacées vers l’extérieur desdits plans ; et
e) à étendre lesdites séries d’incisions jusqu’à une zone de chaque longueur de film correspondant uniquement à la région supérieure de l’emballage.

15. Procédé de fabrication d’un emballage à film thermorétractable selon la revendication 14, dans lequel chacune desdites séries d’incisions est constituée de deux ou plus de deux lignes parallèles d’incisions allignées, les incisions de l’une desdites lignes d’incisions ayant des positions qui alternent avec celles des incisions d’une autre desdites lignes d’incisions qui lui est immédiatement adjacente.

16. Procédé de fabrication d’un emballage à film thermorétractable selon la revendication 15, dans lequel la distance (d) entre lesdites lignes d’incisions est comprise entre une valeur minimale de 1 mm et une valeur maximale égale à la longueur non coupée (p) de l’une des lignes d’incisions, et avantageusement entre 2 et 3 mm.
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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