Title: PERFECTED BLISTEr PACK

Abstract: A perfected blister pack (10) comprises at least one blister (11). The blister (11) has part of its surface defined by polygonal surfaces (14).
"PERFECTED BLISTER PACK"

FIELD OF THE INVENTION

The present invention concerns blister packs, that is, those sealed containers which, in the blisters present in them, contain various products such as, for example, tablets, pills, capsules and suchlike.

More particularly, the present invention concerns a perfected form of the blisters, the method used to obtain them in the perfected form, and also the device that allows to obtain them and the machine that obtains the blisters and packages the blisters.

The blisters can be circular, oval, pseudo-square or pseudo-rectangular, or other particular shape.

BACKGROUND OF THE INVENTION

Any rolled product, only if it is subjected to numerous rolling passes, has minimum discontinuities in its consistency. These discontinuities, which derive from discontinuities present in the original cast product, are disposed longitudinally and affect longer or shorter segments of the rolled product.

Strips too have these discontinuities, whether they are obtained as such or are obtained from the longitudinal shearing of metal sheet.

The discontinuities are not normally perceived, since the wrinkles or deformations usually obtained during working are not very important, because they are so small.

In the case of particular drawing operations, such as for obtaining blisters, such as blisters for blister packs made from aluminum strips, these discontinuities are obvious only when breakages, cracks or discontinuous thicknesses occur.

These problems can cause a communication between the outside environment and the inside of the blister, into which air and humidity enter, and other factors which influence the product contained in the blister. This leads to problems of discarding and selecting blister packs containing defective blisters: all this slows down the process and increases costs, and can also be dangerous for the health.

To reduce these dangers, the blisters are therefore made with sizes that are bigger than necessary, in order to graduate the deformation, and the speed of deformation is kept limited.
Furthermore, in the state of the art it is not possible to exceed a certain height of the blisters in relation to the sizes of the upper compartment. Great care must be taken with regard to the matrix or deformer punch and the deformation cycle, so as to obtain as constant a thickness as possible.

More generally, in current conditions, according to the Applicant the width of the blisters is too large in relation to the product that is contained therein. Moreover, the depth of the blisters is contained depending on the sizes of the aperture.

Another disadvantage lies in the speed of production of the blisters, which cannot be too high otherwise the blisters would break or crack.

The Applicant believes that the frequency at which surface cracks and breakages of the blisters occur, in concomitance with a limited thickness of the blister, is in any case too high.

One purpose of the present invention is to obtain a blister which, compared to known blisters, is less likely to crack and break, is smaller in size but with the same depth, stronger given the same sizes. It is also intended to obtain a blister with a more constant average thickness.

Another purpose is to obtain a blister in a shorter time.

The advantages deriving from the present invention are various, including an improvement in the insulation of the material contained in the blister from the outside environment.

The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

The present invention is set forth and characterized in the independent claims, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

The above purposes and advantages are obtained inasmuch as the inventive idea, contrary to the state of the art which provides blisters obtained with continuous and progressive toroid deformation elements, provides to fraction the surface of the blister, made on a strip, into small geometric figures such as rectangles, triangles, polygons etc. By small we mean that each geometric figure
defined has reduced sizes, which are a minimum fraction with respect to the overall surface of the blister, so as to obtain a plurality of said geometric figures on the surface of the blister.

According to a main feature of the present invention, the total deformation of the strip to obtain the blister is fractioned into a considerable number of small deformation surfaces. The individual blister therefore has a dome-shaped part with a total concave surface that is faceted and divided into a considerable number of small surfaces, which have the shape of polygons.

According to a variant, at least some of the deformation surfaces, in the case where the blisters have a pseudo-rectangular or ovoid shape, have elongated shapes in cooperation with the long sides.

According to another variant, the surface of the blister is fractioned as far as a certain distance from the plane that makes up the base of the blister, said distance being characterized by a smooth toroid ring, said ring being comprised between 20% and 50% of the total height of the blister. The toroid zone is therefore deformed continuously and in a known manner.

According to another main characteristic, the deformation does not occur for surfaces which create lines of deformation parallel to the axis of the strip, but with surfaces that generate lines that are disposed angled with respect to the axis of the strip. The angles can be of a few degrees or even orthogonal. In this way, the lines of deformation operate in a direction transverse to the longitudinal lines of the strip. In other words, the lines of deformation are not consistent with the longitudinal lines of the strip, since they do not operate on longitudinal lines and therefore they distribute the tension on lateral spaces having different characteristics.

The longitudinal lines are therefore not affected, as far as possible, by forces parallel to them, except where the lines are disposed in the bottom of the blister.

Furthermore, according to the present invention, the small deformation surfaces put less stress on the material and contribute, with a gradual and gentle action, to obtaining the desired total deformation.

Furthermore, it should be noted that as a consequence the blisters are given an attractive external esthetic appearance, which contributes to the user accepting what is present in the blister more easily.
The shape of the blister can be of various types.

A blister of this type is obtained using a punch, which performs the drawing operation on the material to be sealed. The punch is shaped so as to reproduce the desired concave shape.

The blister machine, in the zone where the blisters are formed in the strip of aluminum, will have as many punches as there are blisters to be obtained on each occasion.

**DESCRIPTION OF THE DRAWINGS**

These and other characteristics of the present invention will become apparent from the following description of a form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is the view from above of a portion of a blister pack in which there is a blister according to the present invention;
- fig. 2 is the front view of the portion of the blister pack in fig. 1;
- fig. 3 is the view from above of the portion of the blister pack in fig. 1;
- fig. 4 is the view from above of a blister according to the present invention;
- fig. 5 is the front view of a punch for making a blister of the blister pack in fig. 1;
- fig. 6 is the three-dimensional view of fig. 5;
- fig. 7 is the front view of the portion of the blister pack in fig. 2 according to a variant;
- figs. 8a, 8b show a blister with a substantially circular base;
- figs. 9, 10, 11 show only a plan view of other blister shapes.

**DESCRIPTION OF ONE EMBODIMENT**

Functional parts that perform the same functions have the same reference numbers.

With reference to figs. 1, 2, 3, 4, in a portion of a blister pack 10 there is a blister 11, suitable to contain an element to be sealed, such as for example a pill, a capsule or other, not shown in the drawings. The blister 11 is made by deforming a strip 12, for example aluminum, and is sealed by a sealing tape 13.

The blister 11 comprises a punched surface 17 which includes a dome-shaped part 19, obtained by drawing or punching the strip 12.

Most of the surface of the dome-shaped part 19 of the blister 11 is faceted, as
it is divided into polygonal surfaces 14, small with respect to the overall surface of the blister 11, such as for example triangles, squares and rectangles or polygons; care must be taken to prevent, as far as possible, edges of the polygons from connecting along longitudinal lines of the strip 12.

In some example embodiments, the dome-shaped part 19 protrudes from the punched or drawn strip 12. The envelope of the surfaces tangent to the dome-shaped part 19 comprises a flat base wall 23, opposite the strip 12, in this case parallel to it, and convex lateral walls 25, with a determinate curvilinear development, which connect the base wall 23 with the strip 12 in a rounded manner.

A connector 16 is present between the strip 12 and the punched surface 17 of the blister 11. The connector 16 is a consequence of the drawing action that makes the blister 11.

With reference to figs. 5 and 6, a punch 20 is used to make a blister 11 as described above. The punch 20 comprises a deforming end 21. It should be noted that, in its deforming end 21, in the lower part, the punch 20 has a dome-shaped part 119 which includes polygonal surfaces 114 which reproduce in negative the shape of the dome-shaped part 19 and the polygonal surfaces 14 of the blister 11 that are to be obtained by deforming the strip 12. The polygonal surfaces 114 affect part of or all the deforming end 21, so that the blister 11 has the mating polygonal surfaces 14 on part of or all its height or depth.

With reference to fig. 7, a variant provides that the upper part of the blister 11, that is, the part near the sealing tape 13, consists of a curved surface 22, without being fractioned into polygonal surfaces.

It is clear that modifications and/or additions of parts may be made to the perfected blister and blister pack as described heretofore, without departing from the field and scope of the present invention.

It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of perfected blister and blister pack, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.
CLAIMS

1. Perfected blister, characterized in that it has a dome-shaped part (19) having a surface, most of which is faceted and defined by polygonal surfaces (14) of small dimensions.

2. Blister as in claim 1, characterized in that said polygonal surfaces (14) have, in a plurality of cases, sides or perimeter lines transverse to the longitudinal lines of a strip (12) on which the blister (11) is made.

3. Blister as in claim 2, characterized in that the sides of the polygonal surfaces (14) are inclined with respect to the longitudinal lines of the strip (12) at least by a few degrees.

4. Blister as in any claim hereinbefore, characterized in that it has a part conformed as polygonal surfaces (14) covering from 80% to 50% of the height of the blister (11).

5. Blister as in any claim from 1 to 3, characterized in that its whole surface is defined by said polygonal surfaces (14).

6. Blister as in any claim hereinbefore, characterized in that said dome-shaped part (19) protrudes from a punched or drawn strip (12), the envelope of the surfaces tangent to said dome-shaped part (19) comprising a flat base wall (23) opposite to said strip (12) and convex lateral walls (25) that connect in a rounded manner the base wall (23) with the strip (12).

7. Blister pack comprising at least one blister as in any claim hereinbefore.

8. Punch (20) to obtain blisters (11) of a blister pack as in any claim hereinbefore, comprising a deforming end (21) to form the blister (11) with a desired height, characterized in that at least a part of the deforming end (21) has at least a dome-shaped part (119) having a faceted deformation zone defined by polygonal surfaces (114) of small dimensions.

9. Punch (20) as in claim 8, characterized in that the deformation zone with polygonal surfaces (114) affects at least 50% of the deforming end (21).

10. Punch (20) as in claim 8, characterized in that the deformation zone with polygonal surfaces (114) affects the whole of the deforming end (21).

11. Blister machine, characterized in that it comprises one or more punches (20) as in any claim from 8 to 10.

12. Blister machine as in claim 11, characterized in that it is configured to
obtain blister packs having at least one blister (11) which comprises a dome-shaped part (19) of which most of the surface is defined by polygonal surfaces (14) of small dimensions.
INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2012/01972

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61J1/Q3
ADD.

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

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
A61J B65D

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Date of the actual completion of the international search
17 January 2013

Date of mailing of the international search report
24/01/2013

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