An element (1) punched out in a cover shape, for sealing of containers (7), includes a first ply (2) and a second inner ply (3) which is provided with a heat-sealable layer (5) on its side facing the container. The plies (2, 3) are connected to one another over their surface sides (2', 3') facing one another by a cold-sealing layer (4), the adhesion between the plies (2, 3) being lower than that between the inner ply (3) and the container edge (8). On the inner ply (3) there can be scoring (10) which is exposed by peeling off the outer ply (2). If for example packaged material which is suited for heating in a microwave oven is stored in the container (7), the steam which forms during heating can escape through the scoring (10).
TWO-PLY BLANK (COLD SEALABLE)

[0001] This invention relates to an element which is punched out in a cover shape for sealing of containers, consisting of a first outer ply and a second inner ply which is provided with a heat-sealable layer on its side facing the container.

[0002] The use of two-ply covers for sealing of containers in order for example to enable the flavor protection which is required for foods is known.

[0003] Furthermore, it has been shown that especially in the case of perishable foods, for the consumer there is an increased demand for information relating to origin, contents, and storability. In order to provide enough space for this information, there has been a transition to printing it on the outer ply of the sealing cover, conversely the inner ply remains unprinted as much as possible. This is the case since possible contact of printing inks with foods is to be avoided.

[0004] To open these packages the upper ply of the cover is pulled off and only after separating the inner, second ply is access to the package contents possible.

[0005] But known approaches have the disadvantage that this partial opening process is often difficult, since sometimes the entire cover, therefore the two plies, are pulled off the container. But this is undesirable when flavor protection for the packaged contents is to continue to be maintained by the second inner ply. This is necessary for example for larger package contents which can only be consumed in portions, but also in packages for microwave dishes.

[0006] Therefore the object of this invention is to devise an element of the initially mentioned type which is punched out in the shape of a cover, which preserves the package contents in a satisfactory manner, especially with respect to flavor protection, and which can be easily handled in a for the consumer when opening [sic].

[0007] As claimed in the invention, this object is achieved with an element which is punched out in a cover shape and which is characterized in that its plies are connected to one another over their surface sides facing one another by a cold-sealing layer, and that the adhesion between the plies is lower than that between the inner ply and the container edge.

[0008] This varied adhesion makes it possible for the consumer to easily partially open the container such that in the first opening step the outer ply is pulled, i.e. peeled, off the inner ply facing the container. In a second step the inner ply is pulled off the container edge, an increased force being necessary since the heat-sealable coating adheres more strongly to the container edge than the cold-sealing layer between the individual compound plies.

[0009] Other embodiments of the element which is punched out in a cover shape as claimed in the invention are disclosed according to the dependent claims.

[0010] The invention is detailed below using possible embodiments of the invention. FIG. 1 shows one possible embodiment in which the ply of the element which is punched out in a cover shape, which ply faces the container, has an inherently closed surface. According to FIG. 2 this surface is provided with scoring, as shown in FIG. 3 with perforations for forming a pour opening. As shown in FIG. 4, the inner ply of the element which is punched out in a cover shape is made in the form of a lattice.

[0011] In the production of the element 1 which is punched out in a cover shape as claimed in the invention, for the present the outer ply 2 or the inner ply 3 is produced.

[0012] For producing the outer ply 2, for example aluminum foil with a thickness in the range from 10 to 100 microns is used. It is however also possible to use plastic films in the thickness range from 10 to 100 microns. The plastics can be selected from the group polypropylene, polyethylene, polyester, polyacrylate, polyamide, or polystyrene.

[0013] The outer ply 2 can furthermore be provided with typography on its surface 1'side facing the viewer. It can be both smooth and also rough in its surface configuration. The surface roughness yields the desired typography by the irregular, but also regular arrangement of the print motifs. Furthermore the surface roughness of the typography facilitates the unstacking of the elements which are punched out in a cover shape and which are conventionally stored on top of one another in magazines.

[0014] The aforementioned typography can however also reproduce the information from which the consumer takes the origin, composition and storage life of the packaged material.

[0015] After printing the outer ply 2, it is provided with a cold-sealing layer 4 on its surface side 2'. Cold-sealing substances are characterized in that by using pressure, but without additional temperature use, adhesion between two plies can be produced. The cold-sealing layer can be prepared for example by applying a polymer-containing emulsion or dispersion. Polymer emulsions in aqueous form can be for example those with the commercial name “Crodaseal 22-055” since they meet legal requirements relating to food. Furthermore it is conceivable to use a likewise food-compatible, softer-free polymer dispersion based on acrylic acid ester copolymers in water with the commercial name “Flexbond®”.

[0016] Regardless of the aforementioned production or lamination process of the outer ply 2, the ply 3 facing the container is produced or prepared in a further process step. It consists for example of plastics in a monolayer or compound structure, the thickness range from 10 to 100 microns being chosen. The plastics can be chosen from the group polypropylene, polyethylene, polyester, polyacrylate, polyamide, or polystyrene.

[0017] Then the inner ply 3 facing the container is provided on its surface side 3' facing the container with a heat-sealable layer 5. It can be made for example from a hot sealing wax or a peelable plastic film. It is furthermore conceivable for the heat-sealable layer 5 to be applied by coextrusion coating. It is important that by choosing the heat-sealable compounds, their chemical composition and the degree of their crosslinking in the heat-sealing process, adhesion between the inner ply 3 and the container edge 8 is produced such that it is greater than that adhesion which is produced by the cold-sealing layer 4 between the plies 2 and 3 of the cover element.

[0018] It is furthermore advantageous that the heat-sealable layer 5 is made with a rough surface, since this greatly
facilitates the unstacking of the cover elements which are conventionally stored on top of one another in magazines. The execution of the surface-rough heat-sealable layer 5 in the form of geometrically arranged spacers 6 is especially advantageous. These spacers, due to their geometrical arrangement, enclose air in the likewise regularly arranged intermediate spaces so that the aforementioned unstacking process is additionally facilitated. A rapid unstacking process is especially of great advantage when, as in the case of perishable foods, they must be sealed especially carefully and airtight when being packaged.

[0019] The inner ply 3 of the cover element 1, which ply is produced for example in this way, can now have an inherently closed surface, as is shown in FIG. 1.

[0020] According to the embodiments as shown in FIGS. 2 and 3, the inner ply 3 however can also have scoring 10 or perforations 11.

[0021] The scoring 10 is produced for example by slight punching and is used to enable escape of the steam which may be formed when microwave dishes are heated, without fouling the microwave oven.

[0022] The inner ply can furthermore be provided with perforations 11 which constitute for example the form of a pour opening 12. It is formed in a partial opening process and for large package contents also enables partial removal of the packaged material.

[0023] Another possible embodiment of the element which is punched out in a cover shape is shown in FIG. 4. Here the inner ply 3 facing the container has the shape of a broken lattice 14. This lattice 14 consists of lengthwise filaments 15 and crosswise filaments 16 which are formed from heat-sealable plastics, for example from polypropylene, polyethylene, polyester, polycrylate, polycarbonate, or polystyrene. The lattice breaches 17 which are formed between the lengthwise and crosswise filaments 15 and 16 after partial opening enable proportioned delivery of sprinkled packaged material such as spices, salt or pepper in which the necessary flavor protection is to be ensured during storage and even after opening of the container.

[0024] After producing or preparing the outer ply 2 and the inner ply 3, they are joined to one another over their surfaces sides 2' and 3' which face one another by the cold-sealing layer 4 in a cold lamination process. This takes place for example in a lamination station consisting essentially of a laminating roller pair, the plies 2 and 3 each being brought near one another on a roller surface such that the cold-sealing layer 4 which is attached for example to the ply 3 is facing the surface side 3' of the ply 3 which is guided over the second laminating roller. Due to the contact pressure which is formed in the roll gap, at room temperature via the cold-sealing layer 4 an adhesive connection takes place over the surface sides 2' and 3' of the plies 2 and 3. Since the lamination process takes place at room temperature, the heat-sealable layer 5 remains in the deactivated state, i.e. no crosslinking reactions of any kind which cause adhesion which is undesirable in this stage take place.

[0025] The plies 2 and 3 are now connected over their surfaces 2' and 3' by the cold-sealing layer 4. This combination is stored as rolled goods from which the elements for sealing can be punched out in the corresponding cover shape. In doing so there can also be formation of an opening aid, for example a pull tab 9, 9', at locations free of cement. These cover elements 1 which are ordinarily stored in magazines can now be used for other applications, i.e. for sealing of containers 7. The containers 7 which can be filled with yoghurt, but also free-flowing packaged materials such as spices, salt or pepper, are continuously sealed with the elements 1 which are punched out in a cover shape as claimed in the invention in a heat sealing process. By using pressure at an elevated temperature the chemical compounds in the heat-sealable layer 5 are activated such that adhesion is produced in the range of greater than or equal (≥) 5 N/15 mm (measured according to DIN EN 28510-1 “Peel test for flexibly/rigidly cemented samples”) between the cover element 1 and the container edge 8. This adhesion even after partial opening of the container 7 results in that it is sealed at least partially airtight. To open it, as is shown in FIGS. 1 to 4, the pull tab 9 which is located in the outer ply 2 is gripped and pulled in the direction of the arrow F1. The adhesion between the plies 2 and 3 is overcome by the tearing force which is produced so that the outer ply 2 can be pulled entirely or partially off the underlying ply 3. So that in this opening process the cover element 1 can in fact be partially peeled off, the adhesion between the outer ply 2 and the inner ply 3 is in the range from 0.2 to 4.5 N/15 mm (measured according to DIN EN 28510-1 “Peel test for flexibly/rigidly cemented samples”).

[0026] In order to be able to measure the average peeling force which is a characteristic quantity for the adhesion on the one hand between the container edge 8 and the inner ply 3 and on the other hand between the outer ply 2 and the inner ply 3, to perform the peel test, samples of the compound partners, specifically the container material and the inner ply 3 on the one hand and the inner ply 3 and the outer ply 2 on the other, are produced in the form of partial combination. Thus, as claimed in the invention there is a partial combination of the container material 7, the heat-sealable layer 5 and the inner ply 3 and a second partial combination of the inner ply 3, the cold-sealable layer 4 and the outer ply 2. For the peeling test, 15 mm wide and roughly 300 mm long strips are cut out of these partial combinations in the running direction. Then the compound partners are separated from one another on the ends of the samples by hand so that the free ends can be clamped in the clamping means of a tensile testing apparatus, for example from the Zwick company. The test proceeds at a pulling rate of 100 mm/min, a clamped length of a maximum 50 mm and a pulling angle of 90°. The measurement result or the variation of the peeling strength (adhesion) is either read on the tensile testing apparatus or is recorded with a diagram recorder. The average values in N/15 mm are computed from the results of each test series.

[0027] As is shown in FIG. 2c, it will be necessary to pull off the entire ply 2 from the ply 3 since this embodiment of the cover element 1 as claimed in the invention is suited for sealing of microwave containers. Here the ply 2 which consists for example of foil or aluminum will be pulled before use in the microwave so that aluminum does not disrupt or prevent the passage of microwaves. The steam which forms during heating can escape through the scoring 10 so that fouling of the microwave oven is prevented.

[0028] When the container 7 is partially opened, as is shown in FIG. 3c, however by applying the tearing force F1 at the same time a pour opening 12 is formed. This takes place by making a tear along the perforations 11 so that on
the outer ply 2 which has been pulled off the ply 3 the corresponding shape of the pour opening 12 remains adhering. In this embodiment it is sufficient for the outer ply 2 to be pulled off only partially at least in the area of the pour opening 12 in order to enable partial removal of the packaged material via this pour opening 12 for the consumer. For further storage it is possible, by pressing the outer ply 2 against the ply 3, to ensure a type of resealability of the package. This takes place by the corresponding selection of the cold-sealing layer 4 which can be present for example in the form of a pressure-sensitive cement.

[0029] Even in the application as is shown in FIG. 4b, by pulling on the pull tab 9 in the direction of the arrow F1 at least in part the lattice-shaped structure 14 is exposed. By means of the lattice breaches 17 a free-flowing packaged material, for example spices, salt or pepper, can be removed. In this form of packaging it will also be sufficient for the outer ply 2 to be only partially pulled off the underlying ply 3.

[0030] In summary, it can therefore be stated that by differently setting the adhesion between the plies 2 and 3 of the element which is punched out in a cover shape as claimed in the invention on the one hand and the adhesion between the container edge 8 and the cover element surface 3, an opening mechanism can be initiated in a purposeful manner such that the plies 2, 3 of the cover element 1 can be pulled off from one another in whole or in part. If the outer ply 2 is pulled completely off the inner ply 3, for example the scoring 10 on the inner ply 3 is exposed. If at this point packaged material which is suited for heating in microwave ovens is stored in the container 7, the steam which is conventional during heating can escape through the exposed scoring 10 so that unwanted fouling of the microwave oven is prevented.

1. Element (1) which is punched out in a cover shape for sealing of containers (19), consisting of a first outer ply (2) and a second inner ply (3) which is provided with a heat-sealable layer (5) on its side facing the container, characterized in that the plies (2, 3) are connected to one another over their surface sides (2, 3) facing one another by a cold-sealing layer (4), and that the adhesion between the plies is lower than that between the inner ply (3) and the container edge (8).

2. Element which is punched out in a cover shape as claimed in claim 1, wherein the adhesion between the plies (2) and (3) is 0.2 to 4.5 N/15 mm measured according to DIN EN 28510-1.

3. Element which is punched out in a cover shape as claimed in claim 1, wherein the adhesion between the inner ply (2) and the container edge (8) is greater than or equal (≧) 5 N/15 mm measured according to DIN EN 28510-1.

4. Element which is punched out in a cover shape as claimed in claim 1, wherein the plies (2) and (3) are present as monomaterials and/or compound materials.

5. Element which is punched out in a cover shape as claimed in claim 1, wherein the outer ply (2) is a metal foil, preferably an aluminum foil.

6. Element which is punched out in a cover shape as claimed in claim 5, wherein the outer ply (2) is provided with an imprint.

7. Element which is punched out in a cover shape as claimed in claim 6, wherein the imprint has a rough surface.

8. Element which is punched out in a cover shape as claimed in claim 7, wherein the surface-rough imprint is present in the form of geometrically arranged spacers.

9. Element which is punched out in a cover shape as claimed in claim 1, wherein the inner ply (3) consists of plastics.

10. Element which is punched out in a cover shape as claimed in claim 9, wherein the plastics are selected from the group polypropylene, polyethylene, polyester, polyacrylate, polyamide, or polystyrene.

11. Element which is punched out in a cover shape as claimed in claim 1, wherein the inner ply (3) comprises at least one layer of paper.

12. Element which is punched out in a cover shape as claimed in claim 1, wherein the inner ply (3) has scoring (10).

13. Element which is punched out in a cover shape as claimed in claim 1, wherein the inner ply (3) has perforations (11).

14. Element which is punched out in a cover shape as claimed in claim 13, wherein the perforations (11) have the shape of a pour opening (12).

15. Element which is punched out in a cover shape as claimed in claim 13, wherein the heat-sealable layer (5) has a rough surface.

16. Element which is punched out in a cover shape as claimed in claim 15, wherein the surface roughness is formed by geometrically arranged spacers (6).

17. Element which is punched out in a cover shape as claimed in claim 15, wherein the inner ply (3) is formed from a broken lattice (14) consisting of heat-sealable plastics.

18. Element which is punched out in a cover shape as claimed in claim 15, wherein in at least one ply (2, 3) there is a combination-free area in the form of an opening aid, preferably a pull tab (9, 9').

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