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(54) Bag with one-off sealing and method for manufacturing such bag

(57) A bag and a method for making a bag in which is provided an opening side, where the opening is provided by the bag being made of plastic film (1,2), of which at least one zone (8) around the opening having properties (13) allowing peeling without destroying the plastic film (1,2).

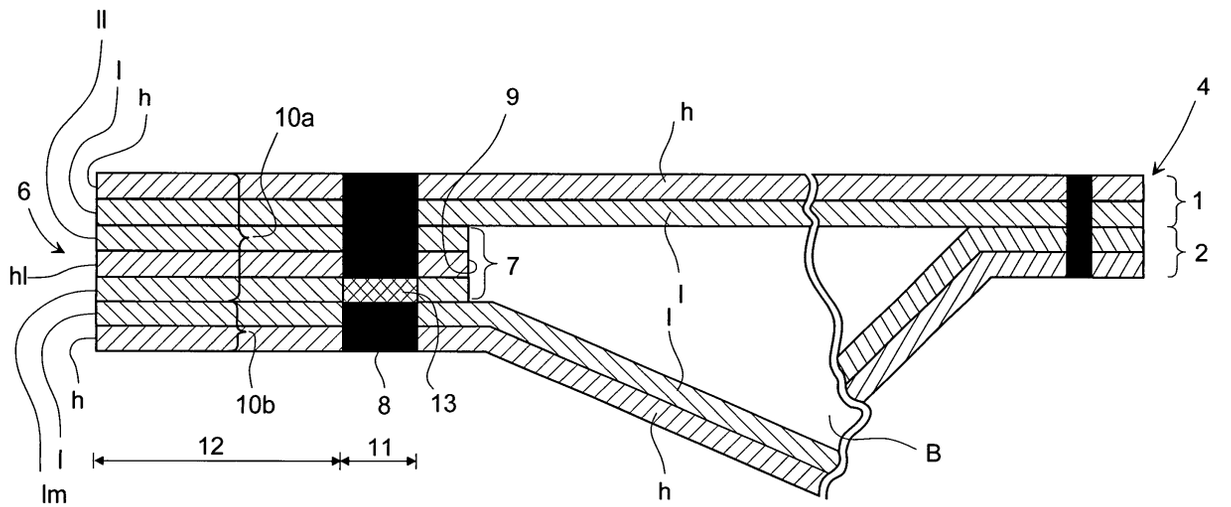

Fig.1

EP 1 359 096 A2

Description

[0001] The present invention concerns a bag with an opening closure provided along at least one edge and which is made of two layers of plastic film, e.g. made up as laminates, of which one laminate facing the other plastic layer includes a weldable plastic, and which bag, at a closing zone near the mouth at the end to be opened, includes a plastic that provides peelability by welding. The bag is produced by welding plastic film. A film sheet may be folded and welded at three sides, whereby a closed bag appears. Two film sheets may correspondingly be welded at four sides whereby a closed bag appears. Such bags may be opened by cutting a weld. The invention further concerns a method for manufacturing a bag including the following steps:

- parallel overlaid conveying of two plastic films with a width corresponding to the finished depth of the bag, of which the two plastic films are arranged so that one film presents plastic welding properties at the side facing the other plastic film, and that tearing properties are provided at a closure zone near the mouth, in that a plastic providing peelability by welding is arranged.

[0002] For use with disposable equipment for e.g. medical or surgical application, sealed bags are often used as packing. These packings are to be opened rapidly without use of sharp instruments such as scissors. It is desired that a predetermined edge of the bag is to be opened, and this is achieved by the welding being substituted by a gluing with a peeling wax. Such a wax is applied as a run on one of two mutually facing sides of a film sheet, and at the passage of the welding rollers there is performed a tight joining resembling a weld but which may be separated again by tearing the outer ends of the film pieces situated outside the glue joint. After tearing there is no cohesive force between the two film sheets, and therefore the bag cannot be closed again.

[0003] Correspondingly, for many goods in the retail business bag that may be closed again are wanted, and they are therefore provided with a "zipper" as joint between the two film sheets that may be opened by pulling the two film sections located outside the zipper. Such a zipper is not quite tight, and therefore often there is provided for an outermost welding that establishes tightness. Thereby, the outer welding has to be cut off before access to the zipper is achieved. It is desirous that this outer, tight joint may be torn up without use of tools (typically scissors). A peelable joint may here find use also.

[0004] For one of the two opposing film layers, it is possible to use a film which over its entire surface has the desired peelable sealing. This has the production advantage that a roll of plastic film is uniformly cylindric as well as a roll of material with the other of the opposing material layers. However, in use it easily happens that not only the desired edge is torn up but also the lateral edges, whereby the bag is rendered unserviceable despite the provision of a zipper. In order to avoid this risk it is desirable only to apply the wax as a run during the making of the bag since a prior web-like application provides film rolls which are difficult to work with. Such application in connection with a bag welding machine means mounting an extra unit which cannot run stepwise in the same way as a bag welding machine as risk of irregularities in the layer occur when the film is not moving with even speed.

[0005] Therefore, it is desired to achieve a peelable joining of a bag that only appear at one side and is provided in a way so that waste in the production due to irregularity is avoided.

[0006] According to the invention, this is achieved with a bag which is peculiar in that in the closing zone there is welded laminate in the shape of strips in parallel with the mouth, and that the laminate in the welded strip consists of three layers, as one outer layer is a low pressure polyethylene, the centre is a high pressure polyethylene with greater stiffness, and the other outer layer is a low pressure polyethylene which is modified with the intention of peelability after passage of a welding station.

[0007] By this bag construction there is achieved a closure where one film side is weldable and the other film side is peelable, whereby is ensured an efficient closing of the bag by a traditional welding process which due to the peelable material properties of the other film does not cause an actual welding of the two plastic materials.

[0008] In this connection, peelability is to be understood that the two types of plastic film, e.g. built up as laminates, i.e. a plurality of different material layers, are assembled so that when the two plastic films are pulled from each other, the closure is broken in a pre-defined zone without tearing of the two films.

[0009] When the bag comprises a strip consisting of three layers, as one outer layer is a low pressure polyethylene, the centre is a high pressure polyethylene with greater stiffness, and the other outer layer is a low pressure polyethylene which is modified with the intention of peelability after passage of a welding station, greater stiffness is attained implying that the bag is easier to get hold of. However, it is to be noted that there is only need for two layers in a bag side: a peelable and a weldable layer.

[0010] The plastic film materials are e.g. built up as laminates where the film may have different properties at each side. Furthermore, these films are made e.g. by co-extrusion.

[0011] A method for making a bag according to the invention is peculiar in including the following further steps:

- parallel advancing and interposing of a more narrow plastic film strip between the two plastic films,
- that the plastic film strip consists welding properties

at one side and tearing properties in at least a part of the width on the other side, correlating the three plastic film layers to a welding station with welding rollers, welding together of three layers of plastic film at one side in a pattern corresponding to the desired peelability, and two layers of plastic film at the other sides,

- correlating the two layers of plastic film and the plastic film strip to a plastic welding station with welding rollers,
- welding together of the plastic film layers at one side in a pattern corresponding to the desired peelability, and welding together of the three other sides.

[0012] The invention will be described in more detail below with reference to the drawing, where:

Fig. 1 shows a bag with peeling ability according to the invention,
Fig. 2 shows an example of a prior art bag with peeling ability, and
Fig. 3 shows a bag according to the invention.

[0013] Fig. 2 illustrates a prior art bag. The bag is made up of two layers of plastic film 1, 2, e.g. made of laminates, i.e. two or more layers of different plastics. In the shown example, the plastic film is built up of two layers, e.g. a HDPE and a LDPE layer. The films are turned so that the layers 1 consisting of LDPE are facing each other and are welded together along the three edges 3, 4, 5, see Fig. 3. In the zone 8 of the bag where the bag opening is provided, one plastic film, in this example the film layer 2, has been modified so that the LDPE layer is modified with e.g. a polybutylene in the opening zone 8. The modified area is illustrated by 13. The area 12 in front of the opening zone 8 thus consists of two free film ends 1, 2. The length of the film ends is thus adapted so that it is easy for a user, who is to open the bag, to grip the two free film ends in order to pull the bag up by breaking the zone 8 where the LDPE lay is modified with polybutylene 13 so that there is provided peeling properties in the opening. At the opposite end of the bag, at the edge 4, the bag is welded in a traditional way.

[0014] On Fig. 1 is seen a bag B according to the invention for use in e.g. sterile storage of medical disposable accessories. The bag is shown in section, the centre part is removed from the drawing, and all thicknesses are strongly exaggerated. The bag consists of two layers of plastic film 1, 2, e.g. a laminate h and 1 of HDPE and LDPE, where the two layers 1 with LDPE are facing each other and are welded together along three edges 3, 4, 5. At a fourth edge 6, between the two layers 1, 2, there is embedded a plastic strip 7 consisting of three layers, as the laminate is constituted by a centre layer of HDPE hl which on one side has a layer of LDPE 11 and on the other side a layer of LDPE lm, which e.g. has been modified with polybutylene. By passing a patterned welding roller, a stripe 8 appears where the two layers of plastic film have been welded together with the plastic strip at the edge 9 of the plastic strip being farthest in the bag, where the desired tightness is attained. However, a pure welding (melting of only one material) only appears by welding of the two layers 1, 11 of pure LDPE on each other, whereas the joint 1, lm of modified LDPE and the pure LDPE becomes peelable. The seam 8 is strong, but by pulling in one plastic film 1 relative to the joint 2, 7 of plastic strip with the second plastic film, the joint 8 yields without tearing the film material, as the adhering to the modified LDPE is less than by pure welding. Thereby, the bag is opened without tools. A minimum width 11 of 5 mm on the peelable joint 8 and a minimum width 12 of 10 mm on the two plastic film pieces 10a, 10b outside the peelable joint are used. In practice, the width 11 will be 8 mm and the width 12 be 15 mm, respectively, in order to provide sufficient material to be gripped by the fingers.

[0015] In Fig. 3 is illustrated a bag consisting of two film layers welded together as described above, where the circumference of the bag is defined by the edges 3, 4, 5 and 6, of which the edge 6 is consisting of two projecting, free film ends that a user may get hold of when opening the bag. The ends of the film 12 is adapted so that it is easy for a user to get hold of the free film ends and thereby break the sealing of the bag in the zone 8.

Claims

1. Bag with an opening closure provided along at least one edge and which is made of two layers of plastic film, e.g. made up as laminates, of which one laminate facing the other plastic layer includes a weldable plastic, and which bag, at a closing zone near the mouth at the end to be opened includes a plastic that provides peelability by welding, **characterised in that** in the closing zone there is welded strip-shaped laminate in parallel with the mouth, and that the laminate in the welded strip consists of three layers, as one outer layer is a low pressure polyethylene, the centre is a high pressure polyethylene with greater stiffness, and the other outer layer is a low pressure polyethylene which is modified with the intention of peelability after passage of a welding station.

2. Bag according to claim 1, **characterised in that** the films consist of co-extruded laminate polymer materials.

3. Method for manufacturing a bag including the following steps:

   - parallel overlaid conveying of two plastic films with a width corresponding to the finished depth of the bag, of which the two plastic films are arranged so that one film presents plastic welding

properties at the side facing the other plastic film, and that tearing properties are provided at a closure zone near the mouth, in that a plastic providing peelability by welding is arranged,

characterised in including the following further steps:

- parallel advancing and interposing of a more narrow plastic film strip between the two plastic films,
- that the plastic film strip consists welding properties at one side and tearing properties in at least a part of the width on the other side, correlating the three plastic film layer to a welding station with welding rollers, welding together of three layers of plastic film at one side in a pattern corresponding to the desired peelability, and two layers of plastic film at the other sides,
- correlating the two layers of plastic film and the plastic film strip to a plastic welding station with welding rollers,
- welding together of the plastic film layers at one side in a pattern corresponding to the desired peelability, and welding together of the three other sides.

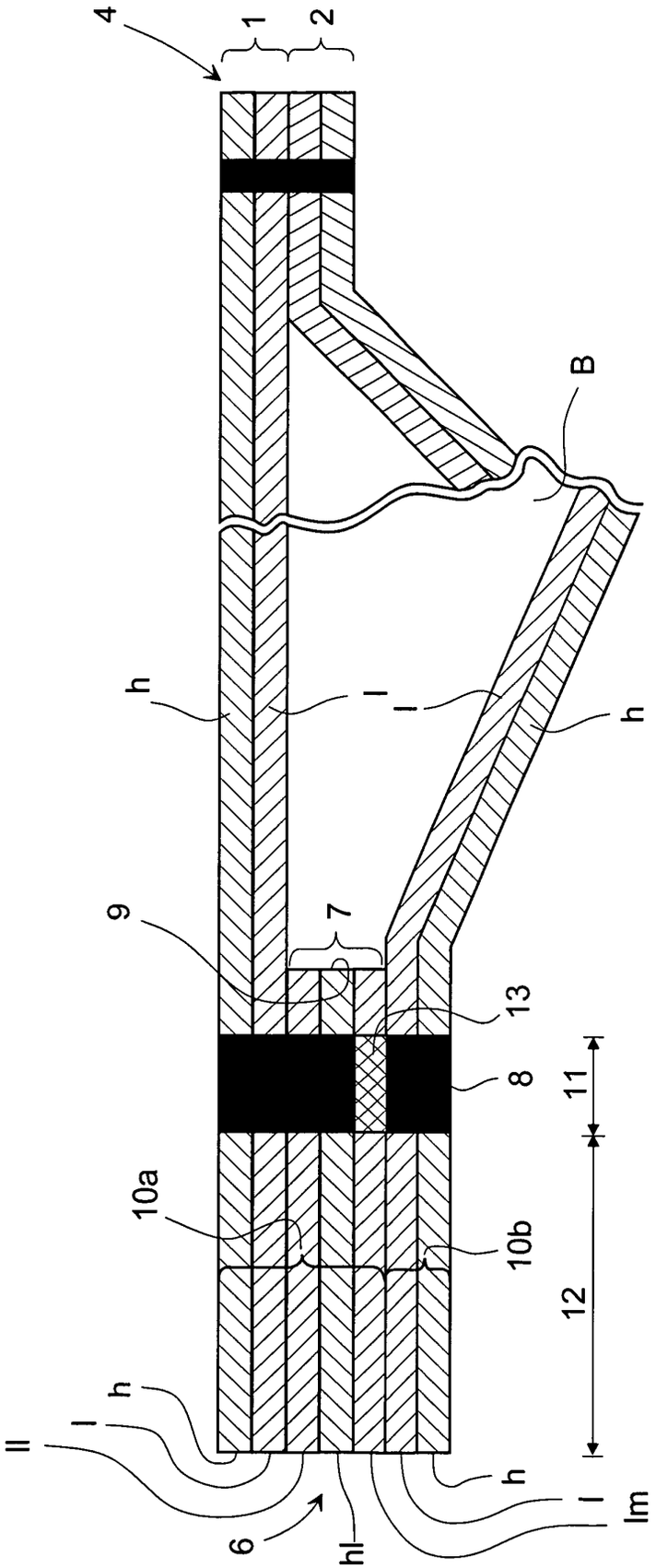

Fig.1

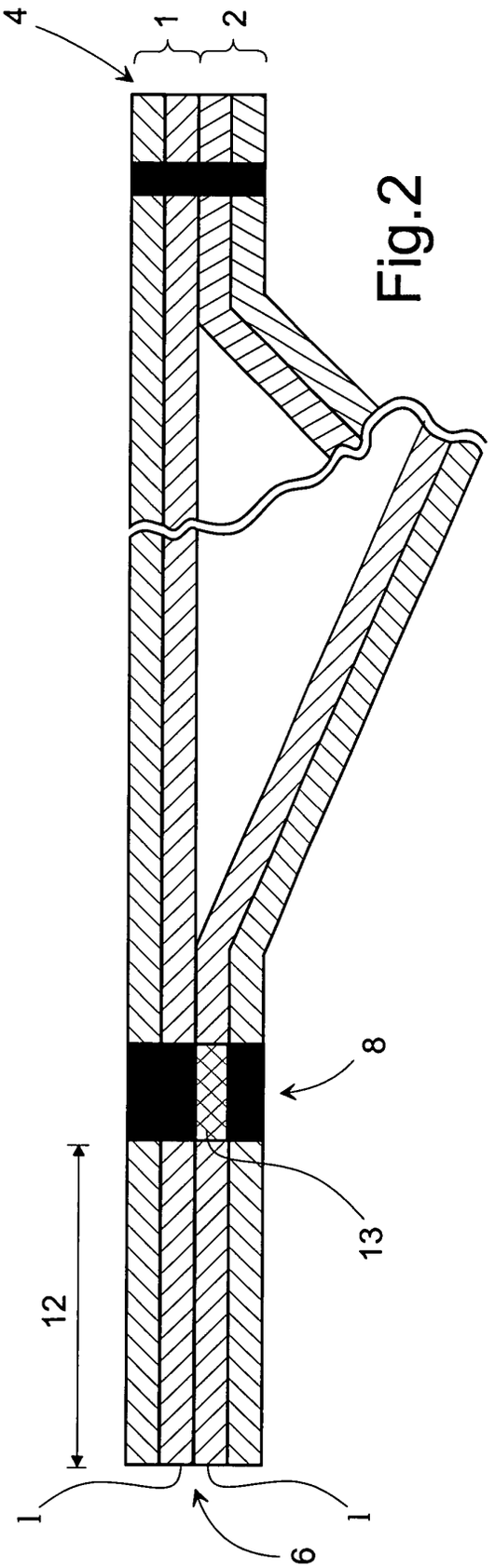

Fig.2

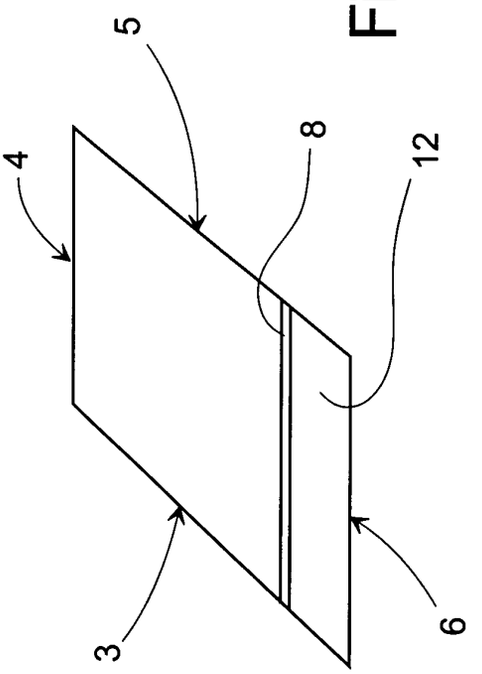

Fig.3