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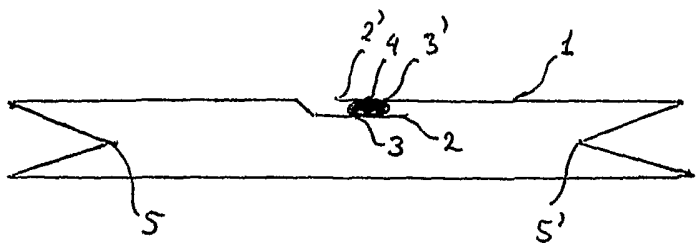
(54) Title: A STRETCH HOOD PACKAGING



(57) Abstract: A stretch hood formed from a biaxially oriented tubular film having a seam provides flexibility in sizing of stretch hoods customised to the users' needs, and also flexibility with respect to customized printing, without compromising the elastic properties of the hood necessary for the use as a stretch hood and enables the manufacture of small size stretch hoods using equipment having high output.

TITLE

A Stretch Hood Packaging

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a stretch hood packaging, a method of preparing a stretch hood, and a method for packaging objects, in particular a stack of goods, on a pallet, using a hose-shaped stretch film.

Stretch hood packaging is produced from a thermoplastic film material which is stretched in the machine direction (MD) and the transverse direction (TD) (with respect to the manufacture of the film). After stretching, the film relaxes, i.e. returns essentially to its original thickness and shape and presses up to the goods being covered, when the stretching force is released. Thus, a stretch hood reacts in an analogous manner to a rubber band.

When the film is stretched, the tensile strength is increased, both in the transverse direction and the machine direction, most in the transverse direction. This means that in connection with the use of the stretch hood for securing palletized goods that an increased stability is obtained in connection with increased tension. Thus, an equal securing of palletized goods is obtained by reducing the thickness of a given film and at the same time increasing the stretch of the film of reduced thickness.

Stretch hood packaging may be used on manual and automated packaging plants for securing palletized goods.

Such film hoods are used in particular for packaging stacks of goods arranged on pallets in order to protect the stack of goods during transport

against humidity and other environmental influences. Moreover, the wrapping of such a stack of goods with a film hood allots increased stability to the packaging unit, since the film hood is stretched in horizontal and vertical direction when pulled over the stack of goods and after having been pulled over bears on said stack of goods and said pallet with tension.

2. Description of the Related Art

Present-day stretch hoods are typically manufactured on an extrusion plant for producing blown film in the form of a tubular film.

Such hoods are for example disclosed in German Patent No. DE 3921190 C2 disclosing an apparatus for packaging objects in a hose-shaped plastic foil and in published US Patent Application No. US 2002/0033005 A1 disclosing a method for packaging objects, a stack of goods on a pallet in particular, with a hose-shaped stretch foil guided in run-like manner as a hose of lateral folds and an apparatus including:
a lifting frame movable in essentially vertical direction, for pulling a foil hood over said stack of goods;
several gripper means provided for on said lifting frame, for seizing and expanding said foil hood or band stock, respectively, in essentially horizontal direction;
folding or reefing means provided for on said gripper means, for reefing and pulling-off of said foil hood from said gripper means.

A stretch hood consists of a tubular film which is most frequently welded and cut forming a top of a hood of a desired length and for providing a tight packaging.

Today stretch hoods are often manufactured as one-layer films and as a three-layer film by co-extrusion for providing a strong centre of the film and

weldable outer surfaces. Thus, ExxonMobil Chemical states in the presentation "Novel Coextrusion Solution Stretch Hood Packaging" that stretch hoods outperforms shrink hoods and could also be a competitive alternative versus stretch wrap, especially when outdoor storage is required. The presentation also discloses a Stretch hood development program providing new three-layer blown coextruded films for stretch hoods allowing a reduction of the film thickness by 20% from about 160µm to about 140µm. The use of a skin layer based on Exceed™ polymers provides outstanding optical properties and improves the resistance to formation of holes and tear propagation.

During automatic application using a stretch hood apparatus the film is stretched in the MD and especially in the TD. During the stretch, the film is especially strained in areas in contact with the gripper means and there is a risk of thinning of the film or even overstretching of the film causing permanent deformation being deleterious for the purpose of use as a stretch hood.

The size of a stretch hood of the state of the art depends on the size of the tube from which it is made. Thus, when stretch hoods of smaller dimensions are desired, they will have to be made from blown tubes of a corresponding smaller diameter.

The output of extruded and blown tubes, on the other side, depends on i.a. on the materials used and the blow up ratio, normally in the range from 2 to 5, suitably in the range from 2.2 to 3.5, and the die used. Thus, in a conventional equipment provided with a die of a Ø of 315 millimetres and a blow up ration of 3, an output of 300 kilograms material produced per hour may be obtained, whereas in a conventional equipment provided with a die of a Ø of 160 millimetres an output of only 140 kilograms material

produced per hour is obtained. A higher output of up to 600 kilograms material produced per hour may obtained when using a die having of Ø 610 millimetres, which however provides tubes of a larger diameter. If a broad range of sizes of stretch hoods are desired, a range of tools must be available, a time consuming exchange of tools will have to be made when changing the desired dimensions of the stretch hoods, and a considerably reduced output must be accepted if stretch hoods of small dimensions are desired. Until now stretch hoods are normally only used for packing larger objects of a size corresponding to a standard EURO pallet or larger and not for objects smaller than the size of a quarter or half-size standard EURO pallet. Stretch hoods are typically used for packing goods such as white goods or bricks.

Furthermore, printing on conventional stretch hoods is subject to a number of limitations. Thus, it is problematic to print directly on the tube, and after flattening the tube, it is normally necessary to leave an edge free of printing, especially if the flattened tube is provided with a longitudinal gusset.

In order to enable an extended use of stretch hoods having smaller dimensions, there is need for stretch hoods of small dimensions which may be produced in a high output (typically of about 300 kilograms material produced per hour or more), and furthermore there is a need more flexible method of preparing stretch hoods in order to minimize the downtime due to exchange of tools and to enable a flexibility in sizing of stretch hoods customised to the users' needs without having to produce, store and maintain a large number of tools.

Still further a reduction of the size of stretch hoods will meet increasing problems in relation to providing stretch hoods with a printing, especially flexibility with respect to customized printing being more important for

small-sized packets being apt for packing of retail goods such as bottles containing beverages or cans or cartons containing bulk products such as flour, sugar or rolled oats or for packing bulk products directly by filling the packaging during the manufacture thereof in a manner known per se.

The present invention offers a simple and flexible solution to the above problems.

SUMMARY OF THE INVENTION

The present invention relates in a first aspect to a stretch hood formed from a tubular film having a seam.

In a second aspect the invention relates to a method of preparing a stretch hood comprising:

extruding or co-extruding a flat film web from one or more thermoplastic material(s),

stretching the film web in the transverse direction and the machine direction

forming a tube from the web,

providing a longitudinal seam closing the tube,

forming the stretch hood by providing a length of the tube harmonized to the length of said good to be packed and

welding the top of the hose and cutting the desired length of the tube forming a hood.

In a third aspect the invention relates to a method of preparing a stretch hood comprising:

extruding or coextruding and blowing a tube from one or more thermoplastic material(s),

flattening and laminating the tube forming a laminated flat film web,

forming a tube from the web,

providing a longitudinal seam closing the tube,
forming the stretch hood by providing a length of the tube harmonized to the length of said good to be packed and
welding the top of the hose and cutting the desired length of the tube forming a hood.

In a fourth aspect the invention relates to a method for packaging objects, a stack of goods on a pallet in particular, with a hose-shaped stretch film guided in run-like manner as hose of lateral folds in particular, including the steps of
forming a film hood harmonized to the length of said good to be packed;
reefing said film hood on several gripper means movable in essentially horizontal direction, of a lifting frame movable in essentially vertical direction;
tentering said reefed film hood in essentially horizontal direction by movement of said gripper means such that said tentered opening of said film hood is larger than the contour of said objected to be packed and wherein said film hood is expanded in essentially horizontal direction;
pulling-over of said film hood over said object by the essentially vertical movement of said lifting frame, wherein said film hood is pulled-off from said gripper means and is expanded in essentially vertical direction;
wherein said stretch hood is formed from a tubular film having a longitudinal seam.

Brief Description of the Drawings

The invention is disclosed more in detail with reference to the drawing in which
figure 1 shows a partially exploded cross-sectional view of a stretch hood according to the invention with one embodiment of a seam,

figure 2 shows a partially exploded cross-sectional view of a stretch hood according to the invention with another embodiment of a seam,
figure 3 shows partially exploded a cross-sectional view of a stretch hood according to the invention with a third embodiment of a seam,
figure 4 shows a partially exploded cross-sectional view of a stretch hood according to the invention with a fourth embodiment of a seam, and
figure 5 shows the embodiment of a seam shown in figure 4 in an enlarged scale.

Detailed Description of the Present Invention

In its broadest aspect the invention relates to the formation of a stretch hood from a tube formed from a flat film web of a thermoplastic material providing a seam.

The present invention relates to a stretch hood formed from a biaxially oriented tubular film having at least one seam.

It is envisaged that the seam may be longitudinal or transverse or helical compared to the direction of applying the stretch hood to the goods to be packed.

It has surprisingly been found that it is possible to provide a stretch hood packaging from a tubular film having a longitudinal seam without compromising the elastic properties of the hood required for the use as a stretch hood. This finding enables the manufacture of small size stretch hoods using equipment having high output and provides a simple and flexible solution to the above problems.

In a preferred embodiment the stretch hood has a longitudinal seam in the machine direction and in the direction of applying the stretch hood to the

goods to be packed as it is very simple to manufacture by folding a film web and sealing the edges of the folded film web forming a tube which is then formed into a stretch hood in a manner known per se. At the same time, the influence of the physical properties of the seam of the stretch hood is of less importance, as would be a heavy transverse seam which might hamper the tentering of the stretch hood during application.

A longitudinal seam of a stretch hood of the invention may e.g. be in the form of a seal wherein the edges of the film overlap or alternatively in the form of an abutting joint wherein the abutting edges of the folded film web is covered by a tape or strip sealing against the edge parts of the tube-formed film web.

In a further embodiment of the invention the seal may be in the form of a so-called fin seal in which the inner sides of the edge parts of the tube are sealed against each other. After sealing the fin seal will suitably be folded so as to flush with the surface of the tube for forming a stretch hood.

In a still further embodiment of the invention the seal may be in the form of a notched sealing in which overlapping and notched edge parts of the film web are sealed, e.g. by welding or heat sealing.

In a preferred embodiment the edges of the folded film web overlap as the overlap facilitates the formation of a tight seam closing the tube.

In a yet further embodiment of the invention a stretch hood has a helical seam compared to the direction of applying the stretch hood. Such a stretch hood may be manufactures by winding and sealing a tube from a length of biaxially oriented thermoplastic material. This embodiment enables a nearly continuous variation of the size of stretch hoods over a

broad range of sizes without being limited to a number of fixed sizes of film webs or widths of film.

A stretch hood of the invention may be produced from a flat film web by forming a tube and forming a longitudinal seam closing the tube. The formation of the tube and the provision of the seam may take place in a manner known per se.

In one embodiment of the invention a tube for forming a stretch hood is formed by extruding or co-extruding a flat film web from one or more thermoplastic materials, stretching the film web in the transverse direction and the machine direction, forming a tube from the web and providing a longitudinal seam closing the tube.

In a preferred embodiment of the invention a tube for forming a stretch hood is formed by extruding or coextruding and blowing a tube from one or more thermoplastic materials and flattening and laminating the tube forming a flat film web. The lamination is preferably carried out using a suitable pressure at a suitable temperature ensuring that the film web does not delaminate during the further processing. Then, the flat film web is made into a tube and provided with a longitudinal seam closing the tube. The size of the overlap should be sufficiently large to cover an adhesive material forming the seam in order to avoid sticking together of the surfaces of the film. An overlap of from 15 to 45 millimetres has been found suitable.

When producing stretch hoods according to the invention it is possible to optimize the properties and size of a stretch hood and at the same time to improve the efficiency of the production using equipment having a high output, even for manufacturing smaller sizes of stretch hoods.

Before forming a tube from a laminated film web it is possible to cut the web into a number of more narrow film webs of a desired width enabling a simple method of providing more narrow film webs suitable for the manufacture of stretch hoods of smaller dimensions without the limitations else connected with manufacture of film webs of smaller dimensions by regulating the gauge of the extrusion and blowing equipment. Thus, it is possible according to the invention to produce film webs for producing stretch hoods having a width of typically two to four times the desired width, or even more, allowing a production using equipment having a high output and efficiency and lower cost per unit produced and then simply cutting the film web into a number of more narrow film webs before forming a tube for forming stretch hoods. This is also considered a part of the present invention.

It is also considered an aspect of the invention to cut a blown tube into one or more web(s) of a desired width without laminating the film by simply cutting the film and opening the tube and optionally cutting the opened tube into a number of more narrow film webs for forming tubes for forming stretch hoods according to the invention.

Thus, the invention enables the manufacture of stretch hoods in a very broad range of sizes using extruders having a high output. Furthermore, the invention enables the manufacture stretch hoods from a broad range of one-layer or multi-layer films by utilizing various extrusion and/or co-extrusion and/or blowing processes optionally combined with lamination of blown films enabling a tailoring of stretch hoods for special purposes.

It has surprisingly been found that when producing stretch hoods according to the invention it is possible to omit the addition of an anti-blocking

agent in order to avoid sticking together of a flattened tube for production of stretch hoods.

In another embodiment of the invention a stretch hood is formed from a tube which is formed by first extruding or co-extruding one or more thermoplastic materials using a flat die forming a flat film web. Then, the flat film web is made into a tube and provided with a longitudinal seam closing the tube. If desired, a flat film web may be cut into a number of more narrow webs of film before forming a tube for forming a stretch hood.

In one embodiment of the invention the edges of the folded flat film web forming a tube overlaps and the overlapping parts of the web are joined by welding forming a welding seam.

In a further embodiment of the invention the edges of the folded flat film web forming a tube overlaps and the overlapping parts of the web are joined by an adhesive such as a pressure sensitive adhesive or a hot melt adhesive.

In a preferred embodiment of the invention the edges of the folded flat film web forming a tube overlaps and the overlapping parts of the web joined by a hot melt adhesive. A hot melt adhesive is preferably made from a material being compatible with the material or the surface material of the film enabling a simple provision of a seam showing for practical purposes the same properties as the areas outside the seam area. A low density polyethylene or an acrylate copolymer including ethylacrylate such as Elvaloy® 2715 ac form Dupont has been found to be very suitable as hot melt adhesive for making seams in accordance with the present invention as it will not provide any shrinking effect in the tube formed and no weakening of the web is observed. It has been found that the use of polyethyl-

ene in an amount of from 1 to 2 grams per metre of seam provides a suitable seam not compromising the properties needed for stretch hoods.

It is preferred to provide the tubular film with two longitudinal gussets preferably located diametrically opposite each other for facilitating the manufacture of a four-sided stretch hood. For stretch hoods of conventional sizes the gussets will normally have a width of from 100 to 600 millimetres and may be provided in a manner known per se.

When it is desired to print on a stretch hood, the stretch hood of the invention offers an advantage as it is possible to carry out the printing in a manner known per se while the film is a flat film web which may easily be provided with a printing before the formation of the tube. Thus, it is possible to provide a stretch hood of the invention with a customized printing essentially without limitations, and it is e.g. also possible to provide the film with a printing which, after forming the tube and the longitudinal seam, encircles the packaging and forms a continuous printing such as a picture or an ornament.

In a second aspect the invention relates to a method of preparing a stretch hood comprising:
extruding or co-extruding a flat film web from one or more thermoplastic material(s),
stretching the film web in the transverse direction and the machine direction
forming a tube from the web,
providing a longitudinal seam closing the tube,
forming the stretch hood by providing a length of the tube harmonized to the length of said good to be packed and

welding the top of the tube and cutting the desired length of the tube forming a hood.

In a third aspect the invention relates to a method of preparing a stretch hood, said method comprising:
extruding or coextruding and blowing a tube from one or more thermoplastic material(s),
flattening and laminating the tube forming a laminated flat film web,
forming a tube from the web,
providing a longitudinal seam closing the tube,
forming the stretch hood by providing a length of the tube harmonized to the length of said good to be packed and
welding the top of the tube and cutting the desired length of the tube forming a hood.

In a preferred embodiment of the method two or more thermoplastic materials are coextruded and blown to form a coextruded laminate comprising two or more layers. In one preferred embodiment a three layer tube is coextruded and blown. After flattening and laminating the tube, a flat film web comprising six layers of which the two layers in the middle are identical giving for most practical purposes a five-layer film is obtained. In another preferred embodiment a five layer tube is coextruded and blown. After flattening and laminating the tube, a flat film web comprising ten layers of which the two layers in the middle are identical giving for most practical purposes a nine-layer film web.

The lamination may be carried out by increasing the pressure of the squeezing rollers at the top of the extruder flattening and drawing the extruded and blown film and controlling the temperature to an interval in which the adjacent inner layers of the flattened film are laminated. Typi-

cally a temperature in the interval from about 50 to about 80°C will be suitable and an increase of the pressure from the normal about 2 atmospheres pressure above that of the atmosphere to from 3 to 5 atmospheres pressure above that of the atmosphere, depending of the material and properties of the layers to be laminated.

In one embodiment of the invention, the longitudinal seam is provided by welding overlapping parts of the film web using heat and pressing the overlapping parts together.

In a further aspect the invention relates to a method for preparing a stretch hood comprising providing an essentially continuous length of biaxially oriented film web, winding the web forming a tube providing overlapping edges of the lengths and sealing the overlapping edges closing the tube, forming the stretch hood by providing a length of the tube harmonized to the length of said good to be packed and welding the top of the tube and cutting the desired length of the tube forming a hood.

The manufacture and sealing of a tube may be carried out in a manner known per se for preparation of tubing by winding and closing the tube by welding or gluing in a manner known per se for providing seams joining thermoplastic materials.

During welding the edge parts to be united are heated making the materials flow and join the parts. Such heating is easily made in industrial scale by providing a tube-forming equipment known per se with a source for local heating of edge parts of the film to be joined, e.g. a heat blower or a source of radiation such as infra red radiation, and pressing the edge parts together, e.g. using pressure rollers. During welding care must be taken not to provide a seam in which the elastic properties needed for providing

a stretch hood are compromised. Furthermore, care must be taken not to provide a weak zone in the welding area which may break during the stretching of the stretch hood.

In a preferred embodiment of the invention the longitudinal seam is provided by applying an adhesive to overlapping parts of the film web and pressing the overlapping parts together.

It is especially preferred to use a hot melt adhesive such as Elvaloy® 2715 ac from Dupont.

The manufacture of a tube from a film web in which the overlapping parts of the film web are joined by an adhesive may be carried out in industrial scale by providing a tube-forming equipment known per se with means such as a dispenser or an extruder having a die for delivering the adhesive to the parts of the film to be joined. Then, the seam is suitable made using pressure in a manner known per se, e.g. pressing between rollers. A pressure sensitive adhesive may be provided in the form of an essentially continuous supply, e.g. a roll, which is laminated with the parts of the film to be joined using pressure in a manner known per se, e.g. pressing between rollers.

In another embodiment of the invention, the adhesive is a pressure sensitive adhesive.

The methods discussed above for providing sealing of joints of webs may also be used for producing stretch hoods of the invention having other embodiments of sealing than sealing of overlapping edges.

A stretch hood of the invention printing may be provided with printing before made into a tube and thus, no folded edges or longitudinal gussets have to be taken into account during printing.

Still further, when producing stretch hood in accordance with the invention new options for optimizing and tailoring the properties of a film for forming the stretch hood are made available together with an improved flexibility and increased output and efficiency in the production.

Thus, it has been found that when producing stretch hoods according to the invention it is possible to improve the transparency, the gloss, the stretchability by up to 100%, and the holding force of stretch hoods. Furthermore, a better printability is obtained and it is rendered easier to provide a film having a higher resistance against puncture resistance and a higher tearing resistance and to obtain a more stable and flexible production having a high output.

In a fourth aspect the invention relates to a method for packaging objects, a stack of goods on a pallet in particular, with a hose-shaped stretch film guided in run-like manner as hose of lateral folds in particular, including the steps of

forming a film hood harmonized to the length of said good to be packed;

reefing said film hood on several gripper means movable in essentially horizontal direction, of a lifting frame movable in essentially vertical direction;

tentering said reefed film hood in essentially horizontal direction by movement of said gripper means such that said tentered opening of said film hood is larger than the contour of said objected to be packed and wherein said film hood is expanded in essentially horizontal direction;

pulling-over of said film hood over said object by the essentially vertical

movement of said lifting frame, wherein said film hood is pulled-off from said gripper means and is expanded in essentially vertical direction; wherein said stretch hood is formed from a tubular film having a longitudinal seam.

The stretching is preferably performed providing a minimum permanent elongation.

Description of the Preferred Embodiments

The invention is now explained more in detail with reference to the drawings showing preferred embodiments of the invention.

Reference is made to figure 1 showing a cross-sectional view of a stretch hood according to the invention. The stretch hood is made from a film web 1 which has been formed as a tube in a manner known per se, wherein the edges 2,2' of the folded web 1 forming a tube comprise overlapping parts 3,3'. Between the two overlapping edge areas is placed a seam of adhesive material 4 sealing the tube. The tube is provided with gussets 5,5' located diametrically opposite each other for facilitating the manufacture of a four-sided stretch hood.

Figure 2 shows a partially exploded cross-sectional view of a stretch hood according to the invention with another embodiment of a seam. In this embodiment the stretch hood is made from a film web 1 which has been formed as a tube in a manner known per se, wherein the edges 2,2' of the folded web 1 forming a tube comprising overlapping parts 3,3'. Between the two overlapping edge areas is placed a seam of adhesive material 4 sealing the tube. The tube is provided with gussets 5,5' located diametrically opposite each other. In this embodiment the seal is in the form of a

so-called fin seal in which the inner sides of the edge parts 3,3' of the tube are sealed against each other by a seal 4. After sealing the fin seal will suitably be folded so as to flush with the surface of the tube 1 for forming a stretch hood.

Figure 3 shows partially exploded a cross-sectional view of a stretch hood according to the invention with a third embodiment of a seam. In this embodiment the stretch hood is made from a film web 1 which has been formed as a tube in a manner known per se, wherein the edges 2,2' of the folded web 1 forming a tube form an abutting joint wherein the abutting edges 2,2' of the folded film web 1 is covered by a tape or strip 6 sealing against the edge parts 3,3' of the tube-formed film web by an adhesive material 4,4'.

Figure 4 and 5 show partially exploded cross-sectional views of a stretch hood according to the invention with a fourth embodiment of a seam. In this embodiment the stretch hood is made from a film web 1 which has been formed as a tube in a manner known per se, wherein the edges 2,2' of the folded web 1 and overlapping parts 3,3',3'',3''' forming a tube form a notched sealing. Between the overlapping edge areas 3,3',3'',3''' are placed seams of adhesive material 4,4',4'' sealing the tube. The tube is provided with gussets 5,5' located diametrically opposite each other.

MATERIALS AND METHODS

EVA: suitably corresponding to Greenflex™ FF55 from Polimeri

EVA: suitably corresponding to Nexxstar 00111 from ExxonMobil Chemical

Linear low density PE: polyethylene polymers suitably corresponding to Metallocene Exceed™ mLLDPE Exceed 1018 form ExxonMobil Chemical
An extruder from W&H for coextrusion and blowing of a three layer film.

A High Speed Tube Former

Example A

Preparation of a Film for a Stretch Hood According to the State of the Art.

A coextruded three-layer film consisting of a central layer of EVA Greenflex® FC45 from Polimeri constituting 60% by weight of the total film covered by two outer layers of PE Exxon Exceed® 1018 from ExxonMobil each constituting 20% by weight of the total film was coextruded at a temperature of about 200-220°C and blown using a W&H extruder for coextrusion having a screw a diameter of 90 mm and a length to diameter ratio of 30, a die of a diameter of 315 mm provided with internal cooling, a 1.0 mm die gap and a blow up ration of 3:1 forming a film having a gauge of 100µm and the resulting film was wound and collected on a 1400 millimetres Afex winder.

An anti-blocking agent in the form of a master batch comprising silica and polyethylene was added to both PE films in an amount of 2 to 3% in accordance with the state of the art.

The film may be used directly for preparation of stretch hoods for use in accordance with the state of the art.

Example 1

Preparation of a Film for a Stretch Hood According to the Invention.

Using the method, extruder, and winder used in Example A, apart from use of an anti-blocking agent, a three-layer film having a gauge of 100µm and consisting of one outer layer of Exxon Exceed® 1018 from ExxonMobil constituting 20% by weight of the total film, followed by a central layer of Nexxstar 00111 constituting 60% by weight of the total film, which was again followed by another outer layer EVA Greenflex® FF55 form Polimeri constituting 20% by weight of the total film, was coextruded and blown. The pressure between the squeezing rollers for flattening the film before winding was increased from 2 to 4 atmospheres pressure above that of the atmosphere and temperature was controlled by adjusting the process parameters to be about 60°C. The resulting film was forwarded to an in-line tube-forming station.

Formation of a Tube from a Film

The coextruded and laminated film web was formed into a tube a high speed tube former in a manner known per se in which the edges of the web overlapped with 30 millimetres. A melted Elvaloy® 2715 ac from Dupont was extruded in an amount of 2 grams per meter onto the overlapping edge at a temperature of about 200°C and the overlapping edges pressed together using squeezing rollers at a temperature of about 10°C and a pressure of 3 atmospheres pressure above that of the atmosphere. Gussets were formed in a manner known per se using a standard gusset former, and the resulting film was wound and collected on a standard winder corresponding to the width of the film web and the desired length.

The resulting film may be used for preparation of stretch hoods in a manner known per se.

No delaminating was observed in the laminated film during stretching thereof.

Example 2

Comparison of Properties of a Stretch Hood According to the Invention with the Properties of a Stretch Hood of the State of the Art.

A stretch hood of the invention prepared in Example 1 was compared with the stretch hood of state of the art Trioplast Super Stretch with respect to Transparency, Gloss, Stretching properties, and Printability.

The comparison showed that as compared to Trioplast Super Stretch the stretch hood of the invention provided:
Considerably improved transparency
Considerably improved gloss
Better stretchability > 100%
The same holding force
Better printability.

The improvement of the transparency and gloss is believed to be ascribable to fact that no blocking agent is needed using a stretch hood of the invention. The improvement of stretchability seems to be ascribable to the fact that a stretch hood of the invention may be made with a higher proportion of elastic constituents (80% as compared to 60%).

Furthermore, a stretch hood of the invention printing may be provided with printing before made into a tube and thus, no folded edges or longitudinal gussets have to be taken into account during printing.

Still further, when producing stretch hood in accordance with the invention new options for optimizing and tailoring the properties of a film for forming the stretch hood are made available together with an improved flexibility and improved output and efficiency in the production.

Claims

1. A stretch hood formed from a biaxially oriented tubular film having at least one seam.

2. A stretch hood according to claim 1 wherein the seam is a longitudinal seam.

3. A stretch hood according to claim 1 or 2 wherein the seam is in the form of a lap seal comprising overlapping parts of the film.

4. A stretch hood according to claim 1 or 2 wherein the seam is in the form of a fin seal.

5. A stretch hood according to claim 3 or 4 wherein the seam is a welding seam.

6. A stretch hood according to claim 3 or 4 wherein the seam is an adhesive seam.

7. A stretch hood according to claim 6 wherein the adhesive is a hot melt adhesive.

8. A stretch hood according to any of claims 1-7 wherein the tubular film is provided with two longitudinal gussets located diametrically opposite each other.

9. A method of preparing a stretch hood comprising:
extruding or co-extruding a flat film web from one or more thermoplastic material(s),

stretching the film web in the transverse direction and the machine direction

forming a tube from the web,

providing a longitudinal seam closing the tube,

forming the stretch hood by providing a length of the tube harmonized to the length of said good to be packed and

welding the top of the tube and cutting the desired length of the tube forming a hood.

10. A method of preparing a stretch hood comprising:

extruding or coextruding and blowing a tube from one or more thermoplastic material(s),

flattening and laminating the tube forming a laminated flat film web,

forming a tube from the web,

providing a longitudinal seam closing the tube,

forming the stretch hood by providing a length of the tube harmonized to the length of said good to be packed and

welding the top of the tube and cutting the desired length of the tube forming a hood.

11. A method according to claim 9 or 10, wherein two or more thermoplastic materials are used to form a co-extruded laminate comprising two or more layers.

12. A method according to any of claims 9-11, wherein the longitudinal seam is provided by welding facing parts of the film web using heat and pressing the facing parts together.

13. A method according to any of claims 9-12, wherein the longitudinal seam is provided by applying an adhesive and pressing the facing parts together.

14. A method according to claim 13 wherein the adhesive is a hot melt adhesive.

15. A method according to claim 13 wherein the adhesive is a pressure sensitive adhesive.

16. A method for packaging objects, a stack of goods on a pallet in particular, with a hose-shaped stretch film guided in run-like manner as hose of lateral folds in particular, including the steps of
forming a film hood harmonized to the length of said good to be packed;
reefing said film hood on several gripper means movable in essentially horizontal direction, of a lifting frame movable in essentially vertical direction;
tentering said reefed film hood in essentially horizontal direction by movement of said gripper means such that said tentered opening of said film hood is larger than the contour of said objected to be packed and wherein said film hood is expanded in essentially horizontal direction;
pulling-over of said film hood over said object by the essentially vertical movement of said lifting frame, wherein said film hood is pulled-off from said gripper means and is expanded in essentially vertical direction;
wherein said stretch hood is formed from a tubular film having at least one seam.

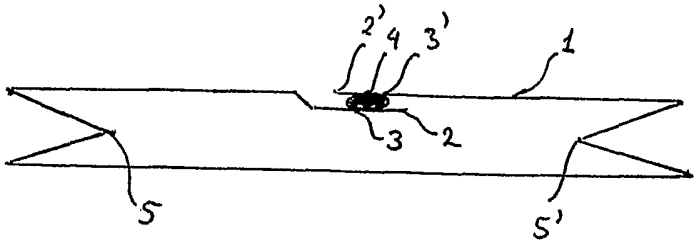


Fig. 1

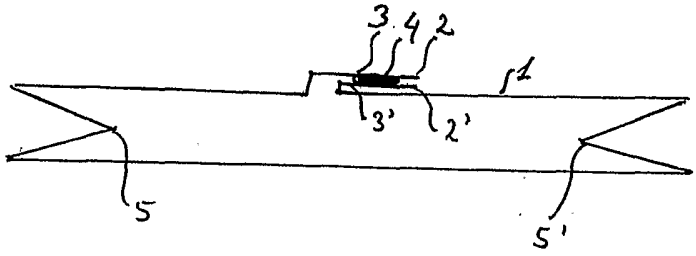


Fig. 2

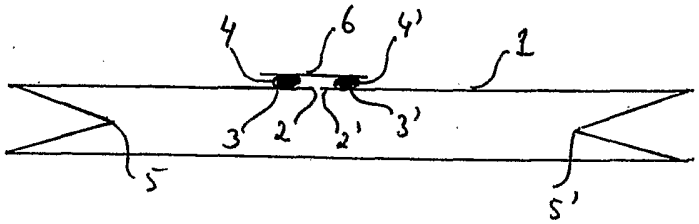


Fig. 3

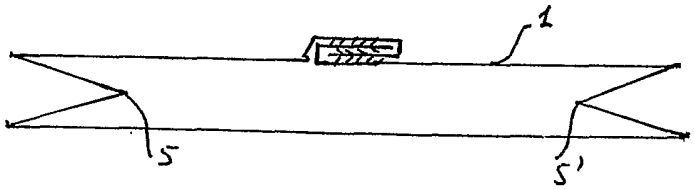


Fig. 4

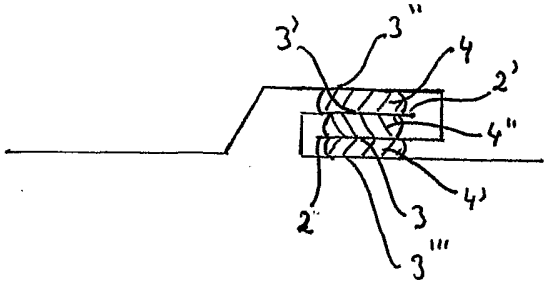


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/DK2006/000026

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65B9/13

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)
B65B B31B

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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 493 641 A (KURT LACHENMEIER A/S) 8 July 1992 (1992-07-08) abstract column 6, line 34 - column 8, line 19 column 9, line 1 - line 14 figures 1-5	1-16
Y	US 2 953 976 A (HAHN WILLARD E) 27 September 1960 (1960-09-27) figures 4,5 abstract	1-16
A	WO 03/062062 A (LACHENMEIER A/S; LACHENMEIER, PER; RASZTAR, KARL, MAGNUS; THOMSEN, FLE) 31 July 2003 (2003-07-31) abstract	1-16

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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Date of the actual completion of the international search	Date of mailing of the international search report
20 April 2006	03/05/2006

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

International application No
PCT/DK2006/000026

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 789 981 A (PAPER SACKS LIMITED) 29 January 1958 (1958-01-29) the whole document -----	1-16

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/DK2006/000026

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