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(54) Packaging machine for wrapping products or batches of products, and packaging process

(57) Packaging machine for wrapping products or batches of products, comprising transport means (2) for transporting the products (3) or the batches of products to be wrapped in a determined direction (X), at least one reel (4) comprising a rolled film (5) that is released for wrapping each product (3) or batch of products according to said determined direction (X), printing means (8), and cutting and sealing means for generating a wrapper for each product (3) or batch of products. The film (5) has a width that is smaller than the width of the products (3) or batches of products, the wrappers thereby forming a sleeve around the corresponding product (3) or batch of products, and said wrappers comprise printed information. The machine (1) comprises heating means (7) for shrinking the film (5) once the wrapper has been generated for each product (3) or batch of products, and said film (5) is shrinkable only in the longitudinal direction, the wrappers being shrunk in such a way that the printed information is of a high quality and legible.

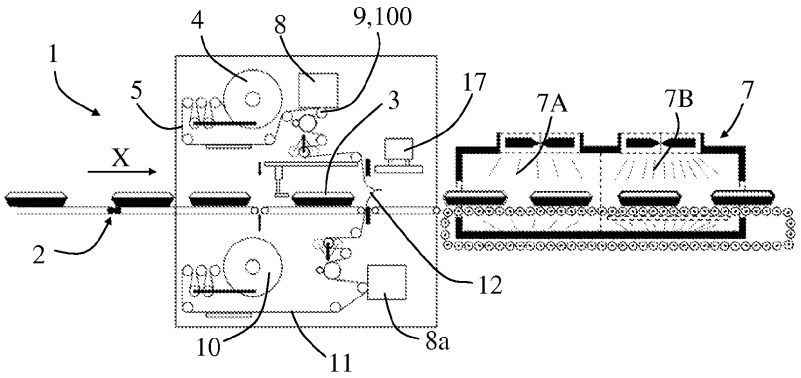


Fig. 1

EP 2 311 734 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to packaging machines, and more specifically to packaging machines for wrapping products or batches of products. Said invention also relates to process for carrying out said packaging.

PRIOR ART

[0002] A large number of products that are put on sale are packaged with plastic films. The films may be used to package a single product or they may be used to group together a certain number of products to form a batch of products.

[0003] In some cases, the packaging of the products is disposed manually by an operator, resulting in a slow and costly process. Packaging machines that resolve this drawback and that package products automatically are already known on the market. Some of these machines dispose the packaging vertically, from a reel with a film that is folded in the shape of a tube, with the longitudinal edges then being sealed and said tube being cut transversally to the required length or height so that it may then be introduced in a vertical direction on the product to be wrapped. These machines are designed for packaging products of a determined shape.

[0004] Document JP9048406A discloses a packaging machine that may solve this drawback, it being capable of packaging products or batches of different shapes without any need to adapt the machine for such a purpose. Said machine comprises transport means for transporting the products or batches of products to be wrapped in a determined direction, at least one reel comprising a rolled film that is released from the reel for wrapping each product or batch of products according to said determined direction, and cutting and sealing means for generating a wrapper for each product or batch of products, each product or batch of products being wrapped by a wrapper as a result of its treatment in the machine.

DISCLOSURE OF THE INVENTION

[0005] It is the object of the invention to provide a packaging machine and a packaging process for a packaging machine, as defined in the claims.

[0006] The packaging machine of the invention is used for wrapping products or batches of products. Said machine comprises transport means for transporting the products or batches of products to be wrapped in a determined direction, at least one reel comprising a rolled film that is released from the reel for wrapping each product or batch of products according to said determined direction, and cutting and sealing means for generating a wrapper for each product or batch of products, which act on the film once the product or batch of products are wrapped, with the result that the wrapper wraps said product or batch of products.

[0007] It is envisaged that the film used in the machine of the invention has a width that is smaller than the width of the products or batches of products, the wrappers thereby forming a sleeve around the corresponding product or batch of products, and it is also envisaged that said wrappers comprise printed information.

[0008] The machine of the invention comprises heating means for shrinking the film once the wrapper has been generated for each product or batch of products, each product or batch of products being pressed by the corresponding wrapper, thereby ensuring the products or batches of products are optimally held in place and preventing consumers from damaging the wrapper, for example, when handling the products and batches of products that are put on display in a supermarket. In the machine of the invention a film is also used that is shrinkable only in the longitudinal direction, thereby ensuring that the printed information on the wrapper is legible following shrinking.

[0009] These and other advantages and characteristics of the invention will be made evident in the light of the drawings and the detailed description thereof.

DESCRIPTION OF THE DRAWINGS

[0010]

Figure 1 is a schematic view of a preferred embodiment of the packaging machine of the invention.

Figure 2 is a schematic view of the machine of Figure 1, and shows a film wrapping a product.

Figure 3 is a schematic view of the machine of Figure 1, and shows cutting and sealing means generating a wrapper that wraps a product.

Figure 4 is a perspective view of a product packaged by the machine of Figure 1.

DETAILED DISCLOSURE OF THE INVENTION

[0011] Figures 1 to 3 show a preferred embodiment of the packaging machine 1 of the invention, which is designed to wrap products or batches of products. The machine 1 is preferably used to wrap food products, but may also be used to wrap any other type of non-food products that require packaging. In addition, said machine 1 enables products 3 to be packaged separately from each other, one by one, or a batch of products to be packaged, a batch that may comprise a specific number of units of a single product or even a specific number of different products, said products 3 being capable of being, for example, uniform, irregular, hard, soft or of any other characteristic or combination of characteristics. Hereinafter and for the purposes of simplification, reference shall be made to products 3 throughout the description and not

to batches of products, although it is evident that batches of products may be used instead of products 3.

[0012] The machine 1 comprises transport means 2 on which are disposed the products 3 to be wrapped and which transport said products 3 in a determined direction X, at least one reel 4 comprising a rolled film 5 that is released from the reel 4 for wrapping each product 3 according to said determined direction X, and cutting and sealing means 14 for generating a wrapper 6 for each product 3, each product 3 being wrapped by a wrapper 6. The transport means 2 preferably comprise at least one conveyor belt, and the product 3 to be wrapped is disposed on said conveyor belt and is moved in the determined direction X in order to be packaged. The machine 1 also comprises a plurality of rollers 100 in order to give the film 5 the required tension when it is released from the roller 4 and to guide said film 5, so that the product 3 may be wrapped according to the determined direction X.

[0013] The film 5 that is rolled on the reel 4 has a width that is smaller than the width of the products 3, the wrappers 6 thereby forming a sleeve around the corresponding product 3, in the form of a band, as shown in Figure 4. Although said Figure 4 shows a product 3 in the format of a tray, it is clear that the wrapper 6 may also be used, as well as for batches of products, for wrapping products 3 of a cylindrical type or other types of products 3, be they uniform, irregular, hard, soft, etc.

[0014] The wrapper 6 may have printed information 16 that may be decorative and/or variable printed information. The decorative information is generally printed before the film 5 is disposed in the reel 4, in other words it is pre-printed before the reel 4 is disposed in the machine 1. In contrast, the variable information may, for example, be customised for each product 3 during the packaging process and may therefore be printed on the machine 1 of the invention. Said machine 1 also comprises heating means 7 for shrinking the film 5 once the wrapper 6 has been generated for each product 3, said film 5 being shrinkable only in the longitudinal direction of the film 5, with the result that the wrapper 6 shrinks to make the printed information 16 legible and the product 3 is enclosed or pressed by the wrapper 6, thereby preventing it from being mishandled. The heating means 7 preferably comprise an enclosed area that corresponds with an oven, which comprises an inlet 71 through which the products 3 with the wrapper 6 are introduced in its interior in order to cause the wrapper 6 to shrink, and an outlet 72 through which said products 3 are removed from its interior once said wrapper has been shrunk.

[0015] In the event that the printed information 16 on the wrapper 6 comprises customised information, the machine 1 of the invention comprises printing means to place said customised information on the film 5 once said film 5 is released from the reel 4 and before wrapping a product 3 so that the information to be printed on each time can be customised. The customised information may comprise ingredients, expiry dates, a batch number, barcode, packaging date, date of manufacture or other variable information for each product 3. This thus prevents the need for an additional machine such as a labelling machine, for example, to place a label or a sticker with said information on the wrapper 6 of the product 3, thereby allowing savings to be made in the machinery used and in the time required to obtain a packaged product. Furthermore, as it does not require labels, the wrapper 6 can be recycled more easily as it does not have labels stuck on it or adhesive from another material different to that of the wrapper 6. The printing means comprise at least one printer 8 and support means 9 on which the film 5 is supported, the printer 8 printing on the surface of the film 5 supported on said support means 9. As a result, thanks to the printing of the film 5 on said support means 9, high quality printing may be obtained on said film 5, thereby improving the aesthetic appearance of the product for the user. Preferably, the support means 9 correspond with one of the rollers 100 that the machine 1 comprises to tighten and guide the film 5 once it is released from the reel 4, but it may have a support or similar member designed for such a purpose.

[0016] The printing means may also comprise a second printer (not shown in the figures) with respective support means continuous to said printer 8. As a result, the first printer 8 may, for example, print a white box on the film 5, while the second printer may print a plurality of lines and numbers on said box to create a barcode. The printing of barcodes has been described by way of example, but it is evident that other types of printing may also be printed both in black and white and colour for the presentation of the product 3. A single reel 4 may thus be used to package different products 3 or a single product requiring different printed variable information 16, for example, without the need to replace the reel 4 every time the product 3 is changed or every time the information associated with the product 3 being packaged at that time is changed. This results in financial savings due to the reduction in the number of pre-printed reels 4 required for the different products 3 to be packaged, and savings in storage space, which therefore represents a logistical advantage as there is no need to store different reels 4 with different information. Preferably, the film 5 is also transparent, with the result, on the one hand, that it is very easy to identify the printing and, on the other, that the user is able to see the product through the wrapper 6. The film 5 used is preferably a plastic PET-G film.

[0017] The heating means 7 of the machine 1 comprise a first chamber 7A where heat is emitted by infrared on each product 3, already wrapped with the wrapper 6, and a second chamber 7B, disposed after the first chamber 7A, where heat is emitted by convection on said wrapped product 3. As a result, once a product 3 is wrapped with a wrapper 6, by means of second transport means 2A said product 3 is introduced in the first chamber 7A of the heating means 7 (which preferably correspond with an oven), from where they reach the second chamber 7B by means of third transport means 2B. The transport

means 2A and 2B preferably correspond with conveyor belts and are synchronised with each other, and with transport means 2. Consequently, the products 3 move in a synchronised manner from one place to another where they are disposed on the transport means 2 until their removal from the second chamber 7B of the heating means 7. In order to emit heat by convection in said first chamber 7A infrareds are preferably used and which are distributed in such a way that the product 3 is heated homogenously, or which may be disposed in such a way that more heat is irradiated against the lower part of the product 3, the part of the wrapper 6 that is disposed in said lower part shrinking to a greater extent. With this last arrangement the wrapper 6 of the upper part of the product 3, which is the part that is usually shown, is altered to a lesser extent, thereby improving the presentation of said product 3.

[0018] The machine 1 of the invention comprises control means (not shown in the Figures) that are designed, among other functions, to keep the transport means 2, 2A and 2B synchronised. Said control means may also be used to control the printing means, with the result that the printing means may print information entered beforehand by the user or variable information such as an expiry date calculated at the exact moment of packaging depending on the product 3 to be packaged. Said control means also allow the extent to which the film 5 shrinks when it passes through the heating means 7 to be anticipated, and to enter a correction of said subsequent deformation in the printing so that the information printed may be of a high quality and legible after said shrinking.

[0019] In the preferred embodiment, the machine 1 comprises a second reel 10 with a second rolled film 11 that is released from the second reel 10 for wrapping each product 3 according to the determined direction X, with the result that the wrappers 6 are generated joining one segment of the first film 5 with a respective segment of the second film 11 to form a "curtain" 12. This also enables products 3 of different shapes to be packaged without technical modifications having to be made to the machine 1, said machine 1 being very versatile. In said preferred embodiment, in a first arrangement of the machine 1, one of the reels is placed over the transport means 2, 2A while the other reel is placed under the transport means 2, 2A. In the embodiment of the figures it is the reel 4 that is placed over the transport means 2, 2A, while it is the reel 10 that is placed under said transport means 2, 2A. In said preferred embodiment the machine 1 also comprises pressing means 17 that act on the film 5 in order to push it towards the product 3, and thereby prevent the movement of the wrapper 6 during the operations in which the film 5 is cut and sealed. As a result, the pressing means 17 allow, for example, the film 5 to be stretched by the product 3 as it advances, with its shape not being recovered until the cutting and sealing means 14 act. In addition, by keeping the film 5 against the product 3 the pressing means 17 prevent said film 5 from moving while said cutting and sealing means 14 cut and seal it.

[0020] With this first arrangement, the machine 1 may be used to package products 3 of the type presented in a tray for example, joining the films 5 and 11 to form a curtain 12 that is vertical or oblique to the vertical plane (Figure 1), it being the product 3 that comes into contact with said curtain 12 wrapped, in the form of a band, in the longitudinal direction of the product 3 (on top of and beneath said product 3). Said first arrangement also allows products 3 of the container or bottle type, for example, to be packaged, with the difference that said machine 1 comprises guide means (not shown in the Figures) to guide the films 5 and 11 in such a way that they join together to form a curtain 12 that is horizontal or oblique to the horizontal plane (not shown in the Figures), said products 3 being wrapped transversally, in the form of a band.

[0021] In other arrangements not shown in the figures, the reels 4 and 10 may be placed on either side of the transport means 2 or both on the same side of said transport means 2 (over, under or to one side of said transport means 2), thereby causing films 5 and 11 to join to form a curtain 12 that is vertical or oblique to the vertical plane, or a curtain 12 that is horizontal or oblique to the horizontal plane, depending on what is required.

[0022] In both arrangements of the preferred embodiment, the two films 5 and 11 are preferably made of a single material to enable them to be sealed together. However, it is not necessary that both films 5 and 11 are shrinkable in the longitudinal direction, with only one or both of them being shrinkable. As a result, the film 5 may be shrinkable in the longitudinal direction, and the film 11 may be non-shrinkable, for example. In both arrangements there may also be a printer 8 (or more printers) for the film 4, and another printer 8A (or more printers) for the film 11.

[0023] Elements of the machine 1 such as the rollers 100 and the reels 4 and 10 are fixed with freedom of rotation to preferably at least one vertical plate 13. This provides the machine 1 with a clean arrangement, which may be especially advantageous when wrapping food products 3.

[0024] The process of the invention is explained below, which is used for wrapping products 3 or batches of products. During said procedure a product 3 is transported in a determined direction X, and a film 5 is released from a reel 4 of a machine 1 for wrapping said product 3 according to said determined direction X, said film 5 comprising a width that is smaller than the width of said product 3 and printed information 16, and being shrinkable only in the longitudinal direction. Once the film 5 wraps the product 3, said film 5 is cut and sealed to generate a wrapper 6 for said product 3 by means of cutting and sealing means 14 of the machine 1, and said product 3 continues to be transported in the determined direction X towards heating means 7 of said machine 1. During its movement the product 3, with the wrapper 6, is introduced into a first chamber 7A of the heating means 7, with heat being

applied to it by infrared. Said product 3 continues to advance in the determined direction X and moves to a second chamber 7B of said heating means 7, where heat is applied to it by convection. As a result of its passage through the heating means and the ability of the film 5 to shrink in the longitudinal direction, said film 5 shrinks and adapts itself to the shape of the product 3 once the wrapper 6 has been generated, said product 3 being pressed by said wrapper 6 and the printed information 16 being disposed on it in a legible manner.

[0025] Preferably, the film 5 is released from the reel 4 in synchronisation with the advance of the product 3. Thus, when said product 3 reaches a specific position (next to the film 5 in said determined direction X, or when it comes into contact with said film 5), control means of the machine 1 cause the release of said film 5 at a speed substantially equal to the speed of advance of said product 3 in the determined direction X, thereby helping the film 5 to wrap the product 3. The control means act on at least one of the rollers 100 of the machine 1, used for giving the film 5 the required tension when it is released from the roller 4 and for guiding said film 5, causing the rotation of said roller 100 at a speed substantially equal to the speed of advance of said product 3 in the determined direction X. The machine 1 may also comprise pushing means 15, which are controlled by the control means and push the product 3 when said product 3 reaches a specific position (next to the film 5 in said determined direction X, or when it comes into contact with said film 5), thereby helping said product 3 to be wrapped by the film 5. Preferably, the pushing means 15 push said product 3 at a speed substantially equal to the speed of advance of said product 3, thereby ensuring synchronisation with the advance of the product 3 and with the release of the film 5 from the reel 4.

[0026] The process of the invention may also comprise a stage in which printed information 16 is disposed on the film 5, once said film 5 is released from the reel 4 and before wrapping the product 3. Said printed information 16 may be customised by the printing means and the control means.

[0027] With the process of the invention being used in a machine 1 according to the embodiment of Figure 1, during said process a product 3 is transported in the determined direction X towards the curtain 12 formed by the joining of the films 5 and 11, as shown in Figure 1. When it reaches the height of said curtain 12, said product 3 comes into contact with said curtain 12 and pushes it, said curtain 12 being wrapped around said product 3 in the form of a band as shown in Figure 2. Subsequently, once said film 5 wraps said product 3, the pressing means 17 prevent the films 5 and 11 from moving in relation to the product 3, while the cutting and sealing means 14 cut said films 5 and 11, thereby generating a wrapper 6 formed by the curtain 12, and seal together both the two ends of the wrapper 6, with said wrapper 6 closing around the product 3, and the two segments of the films 5 and 11, which generate a new curtain 12 for the next product 3 to be wrapped, as shown in Figure 3. The product 3 wrapped by the wrapper 6 enters the heating means, where said wrapper 6 is shrunk following its passage through both chambers 7A and 7B of the heating means 7.

Claims

1. Packaging machine for wrapping products or batches of products, comprising
transport means (2) for transporting the products (3) or the batches of products to be wrapped in a determined direction (X),
at least one reel (4) comprising a rolled film (5) that is released from the reel (4) for wrapping each product (3) or batch of products according to said determined direction (X), and
cutting and sealing means (14) for generating a wrapper (6) for each product (3) or batch of products,
characterised in that
the film (5) has a width that is smaller than the width of the products (3) or the batches of products, the wrappers (6) thereby forming a sleeve around the corresponding product (3) or batch of products,
said wrappers (6) comprise printed information (16),
the machine (1) comprises heating means (7) for shrinking the film (5) once the wrapper (6) has been generated for each product (3) or batch of products,
and said film (5) is shrinkable only in the longitudinal direction, the wrappers (6) being shrunk in such a way that they adapt themselves to the shape of the product (3) or the batch and the printed information (16) remains legible.

2. Machine according to claim 1, comprising printing means for placing the printed information (16) on the film (5) once said film (5) is released from the reel (4) and before wrapping the corresponding product (3) or the batch of products with said film (5), so that the information to be printed each time can be customised.

3. Machine according to claim 2, wherein said printing means comprise a printer (8) and support means (9), the film (5) being supported on said support means (9) and the printer (8) printing on the surface of the film (5) supported on the support means (9).

4. Machine according to claim 3, wherein said printing means comprise a second printer with respective support means after the printer (8).

5. Machine according to any of the preceding claims, wherein the heating means (7) comprise a first chamber (7A) where each wrapped product (3) or batch of products is heated by infrared, and a second chamber (7B) after said first chamber (7A) where

said wrapped product (3) or batch of products is heated by convection.

6. Machine according to any of the preceding claims, wherein the film (5) is substantially transparent.

7. Machine according to any of the preceding claims, wherein the film (5) is PET-G.

8. Machine according to any of the preceding claims, comprising a second reel (10) with a second rolled film (11) that is released from the second reel (10) for wrapping each product (3) or batch of products according to the determined direction (X), one of said reels (4,10) being placed over the transport means (2) and the other of said reels (4,10) being placed under the transport means (2), so that the wrappers (6) are generated joining one segment of the first film (5) with one segment of the second film (11).

9. Machine according to claim 8, wherein the second film (11) is also shrinkable only in the longitudinal direction.

10. Machine according to claim 19, wherein the first film (5) and the second film (11) are identical.

11. Machine according to claim 8, wherein the second film (11) is not shrinkable.

12. Packaging process for a packaging machine, wherein
a product (3) or a batch of products is transported in a determined direction (X),
a film (5) is released from a reel (4) of the machine (1) for wrapping each product (3) or batch of products according to said determined direction (X), and
said film (5) is cut and sealed for generating a wrapper (6) for each product (3) or batch of products,
characterised in that
the film (5) is shrunk once the wrapper (6) has been generated for each product (3) or batch of products, by means of heating means (7) of the machine (1),
the product (3) or batch of products are wrapped with a film (5) having a width that is smaller than the width of the products (3) or the batches of products and being shrinkable only in the longitudinal direction, and
the wrapper (6) has printed information (16),
said wrapper (6) being shrunk in such a way that it adapts itself to the shape of the product (3) or the batch of products and the printed information (16) remains legible.

13. Process according to claim 12, wherein the printed information (16) is disposed on the film (5) once it is released from the reel (4) and before wrapping the corresponding product (3) or batch of products, so that the information to be printed each time can be customised.

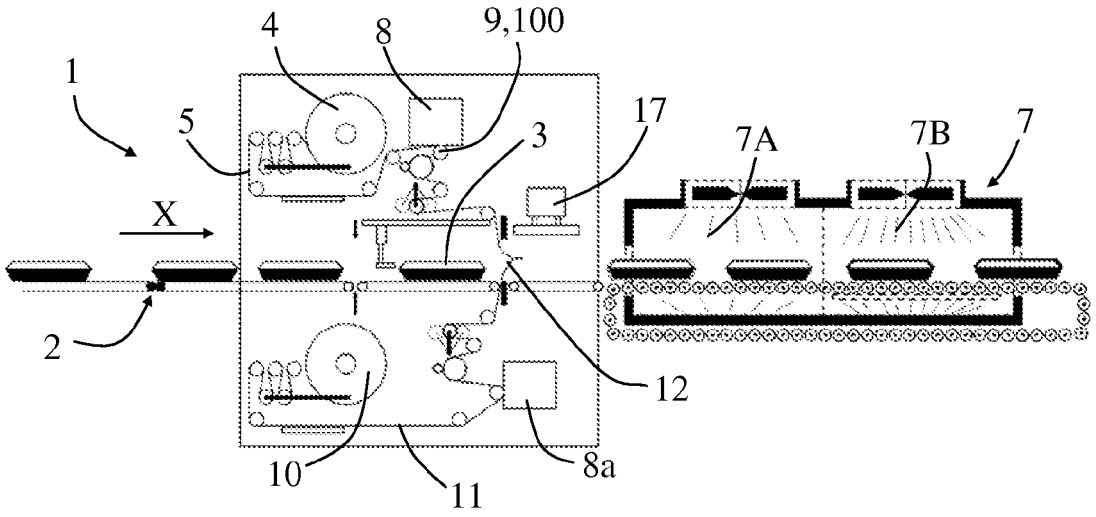


Fig. 1

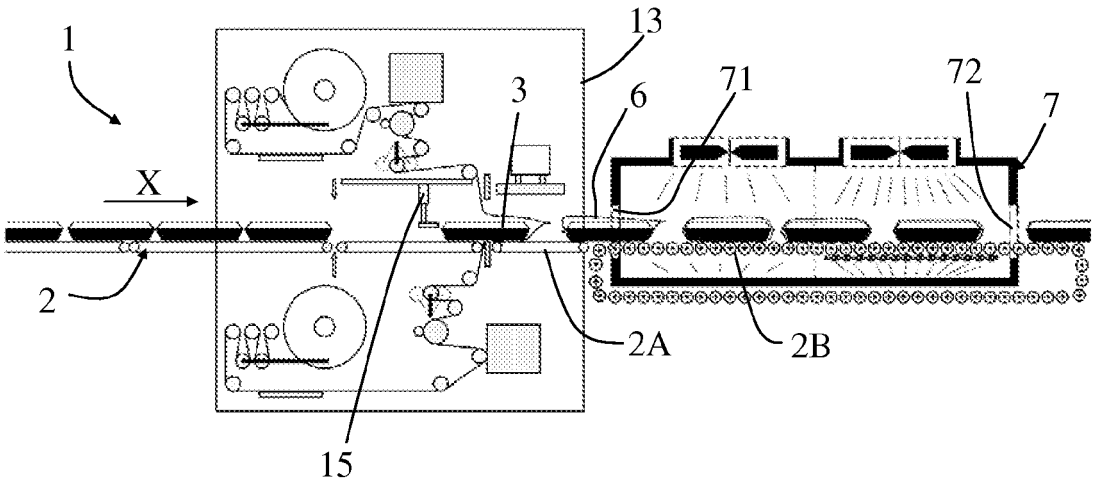
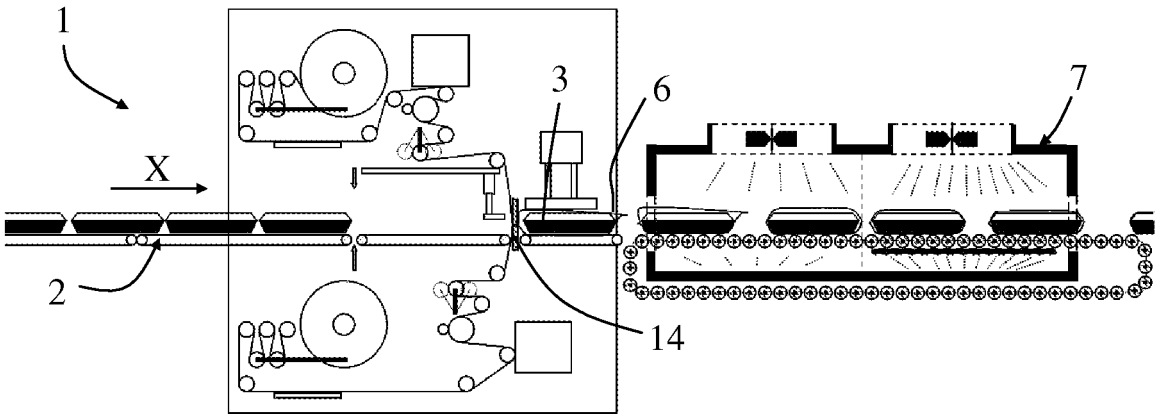


Fig. 2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X
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14

Fig. 3

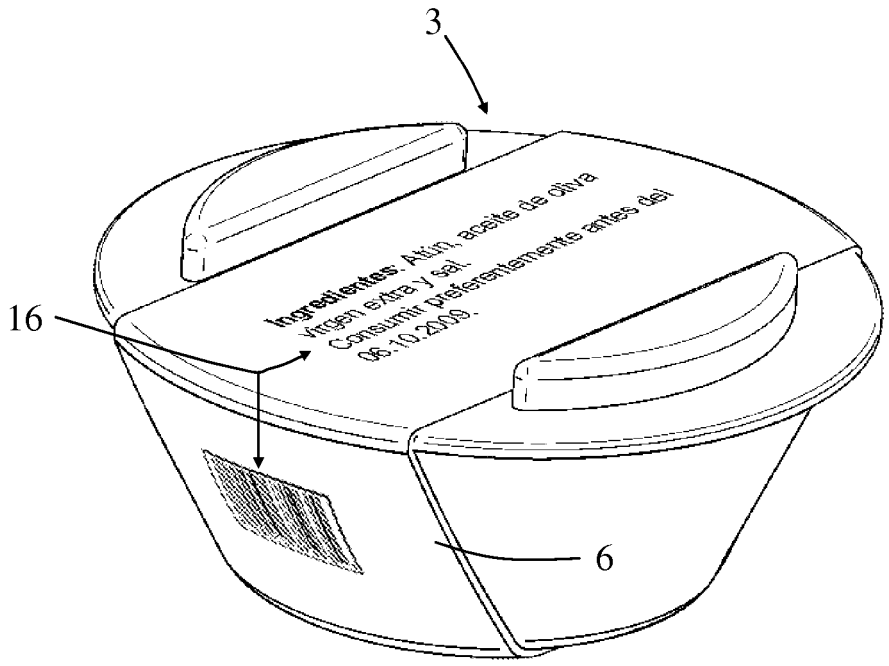
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Fig. 4

Europäisches Patentamt
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EUROPEAN SEARCH REPORT

Application Number
EP 09 38 2214

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 3 295 290 A (SELBY BILLINGSLEY JOHN GEORGE ET AL) 3 January 1967 (1967-01-03) * the whole document *	1-4,6-13	INV. B65B7/28 B65B9/02 B65B53/02 B65B53/06 B65B61/02
Y	US 2007/215506 A1 (HARTNESS THOMAS P [US] ET AL) 20 September 2007 (2007-09-20) * paragraphs [0039], [0057]; figure 4E *	1-4,6-13	
Y	US 2006/096244 A1 (CERE MAURO [IT]) 11 May 2006 (2006-05-11) * paragraph [0049]; figure 5 *	2-4,13	
A	GB 1 595 530 A (UNION CARBIDE AUSTRALIA) 12 August 1981 (1981-08-12) * the whole document *	1,12	
A	US 2002/112448 A1 (FISHER JEFF [US]) 22 August 2002 (2002-08-22) * the whole document *	1,12	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	16 March 2010	Schelle, Joseph

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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European Patent Office
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Application Number
EP 09 38 2214

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-4, 6-13

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 09 38 2214

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-4, 6-13

   Packaging machines and methods with specific films or wrappers

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2. claim: 5

   Packaging machine with a specific heating means

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 38 2214

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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16-03-2010

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