Systems and processes for packaging a product. In one implementation a process involves transporting the product in a first direction, printing information on a film by use of a first printer prior to the film being applied to the product, the film having a width that is less than a width of the product and shrinkable only in a longitudinal direction. In one implementation the film is then applied to the product to produce at least a partial film sleeve around at least a first portion of the product as the product is advanced in the first direction. In one implementation heat is then conveyed to at least a section of the film applied to the product to cause the film to shrink in the longitudinal direction.
PACKAGING APPARATUS AND PROCESSES

CROSS-REFERENCE TO RELATED APPLICATIONS


TECHNICAL FIELD

[0002] The present invention relates to packaging apparatus, and more specifically to packaging apparatus for wrapping products or batches of products. The invention also relates to processes for carrying out the packaging.

BACKGROUND

[0003] 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.

[0004] In some cases, the packaging of the products is performed 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 the 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.

[0005] Document JP0484064A discloses a packaging machine capable of packaging products or batches of different shapes without any need to adapt the machine for such a purpose. The machine includes transport means for transporting the products or batches of products to be wrapped in a determined direction, at least one reel having a rolled film that is released from the reel for wrapping each product or batch of products according to the 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.

[0006] U.S. Pat. No. 3,295,290 discloses a packaging machine for wrapping products or batches of products. The machine includes transport means for transporting the products or the batches of products to be wrapped in a determined direction, at least one reel having a rolled film that is released from the reel for wrapping each product or batch of products according to the determined direction, cutting and sealing means for generating a wrapper for each product or batch of products, from the film that wraps the product or the batch of products, and heating means for shrinking the film once the wrapper has been generated for each product or batch of products.

SUMMARY OF THE DISCLOSURE

[0007] According to one implementation a system for packaging a product is provided comprising: a conveyor that transports the product in a first direction, a first reel comprising a first film, the first film having a width that is less than a width of the product and shrinkable only in a longitudinal direction, a first printer adapted to print information on the first film prior to the first film being applied to the product, a first apparatus adapted to apply the first film onto the product to produce at least a partial film sleeve around at least a first portion of the product as the product is advanced in the first direction, and a first heater adapted to convey heat to at least a section of the first film applied to the product to cause the first film to shrink in the longitudinal direction.

[0008] According to one implementation a process for packaging a product is provided that comprises: transporting the product in a first direction, printing first information on a first film by use of a first printer prior to the first film being applied to the product, applying the first film onto the product to produce at least a partial film sleeve around at least a first portion of the product as the product is advanced in the first direction, the first film having a width that is less than a width of the product and shrinkable only in a longitudinal direction; and conveying heat by use of a first heater to at least a section of the first film applied to the product to cause the first film to shrink in the longitudinal direction.

[0009] In one implementation a packaging machine is provided for use in wrapping products or batches of products. In one implementation the 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 the determined direction, cutting and sealing means for generating a wrapper for each product or batch of products, each product or batch of products being wrapped by the corresponding wrapper, whereby 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.

[0010] In one implementation the film used 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.

[0011] In one implementation a packaging machine is provided that is adapted for working with a film shrinkable only in the longitudinal direction. Using a film shrinkable only in the longitudinal direction the production of edges in the wrapper after being heated is prevented when the products or batches of products are, for example, circular shaped. The reduction or elimination of edges prevents or makes it difficult for a person to manipulate the wrapper.

[0012] In one implementation a packaging machine is provided that comprises printing means for placing printed information on the film once the film is released from the reel and before wrapping the corresponding product or the batch of products with the film. This enables the information of each print, or a set of prints, to be customised. Thus, it is assured that the printed information on the wrapper is legible following shrinking.

[0013] These and other advantages and characteristics will be made evident in the light of the drawings and the detailed description thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a schematic view of a packaging apparatus according to one implementation.
FIG. 2 is a schematic view of the packaging apparatus of FIG. 1 showing a film wrapping of a product.

FIG. 3 is a schematic view of the packaging apparatus of FIG. 1 showing cutting and sealing means generating a wrapper that wraps a product.

FIG. 4 is a perspective view of an exemplary product packaged by the packaging apparatus of FIG. 1.

DETAILED DESCRIPTION

FIGS. 1 to 3 show an exemplary embodiment of a packaging machine 1 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, the 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, the 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.

In one implementation the machine 1 comprises transport means 2 on which are disposed the products 3 to be wrapped and which transport the 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 the 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. In one implementation the transport means 2 comprises at least one conveyor belt, and the product 3 to be wrapped is disposed on the conveyor belt and is moved in the determined direction X in order to be packaged. In one implementation 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 reel 4 and to guide the film 5, so that the product 3 may be wrapped according to the determined direction X.

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 FIG. 4. Although FIG. 4 shows a product 3 in the form of a tray, it is clear that the wrapper 6 may also be used 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.

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 as a part of the packaging process. In one implementation the machine 1 also comprises heating means 7 for shrinking the film 5 once the wrapper 6 has been generated for each product 3, the film 5 being shrinkable only in the longitudinal direction of the film 5, with the result that the wrapper 6 shrinks in a manner 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. In one implementation the heating means 7 comprises 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 the products 3 are removed from its interior once the wrapper has been shrunk.

In one implementation the printing means comprises 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 the support means 9. As a result, thanks to the printing of the film 5 on the support means 9, high quality printing may be obtained on the film 5, thereby improving the aesthetic appearance of the product. In one implementation the support means 9 corresponds with one of the rollers 100 used to tighten and guide the film 5 once it is released from the reel 4, but it may have a separate support or similar member designed for such a purpose.

The printing means may also comprise a second printer (not shown in the figures) with respective support means continuous to the 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 the 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. In one implementation the film 5 is also transparent, with the result that it is easy to identify the printing and for the user to see the product through the wrapper 6. In one implementation the film 5 is a plastic PET-G film.

In one implementation the heating means 7 comprises a first chamber 7A where heat is emitted by infrared on 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 the wrapped product 3. As a result, once a product 3 is wrapped with a wrapper 6, by means of second transport means 2A the product 3 is intro-
duced in the first chamber 7A of the heating means 7 (which may be an oven), from where they reach the second chamber 7B by means of third transport means 2B. In one implementation the transport means 2A and 2B comprise conveyor belts and are synchronised with each other and also 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 one implementation, in order to emit heat in the first chamber 7A infrareds are used and which are distributed in such a way that the product 3 is heated homogeneously, 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 the 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 the product 3.

[0025] In one implementation the machine 1 comprises control means (not shown in the Figures) that is adapted, among other functions, to keep the transport means 2, 2A and 2B synchronised. The 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. The 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 the subsequent deformation in the printing so that the information printed may be of a high quality and legible after the shrinking.

[0026] In one implementation 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, the machine 1 being very versatile. In one implementation according to 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 an implementation of a machine according to FIGS. 1-3 it is the reel 4 that is placed over the transport means 2, 2A, while it is the reel 10 that is placed under the transport means 2, 2A. In one implementation the machine 1 also comprises pressing means 17 that acts 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 allows, 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 have acted. In addition, by keeping the film 5 against the product 3 the pressing means 17 prevents the film 5 from moving while the cutting and sealing means 14 cut and seal it.

[0027] 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 (FIG. 1), it being the product 3 that comes into contact with the curtain 12 wrapped, in the form of a band, in the longitudinal direction of the product 3 (on top of and beneath the product 3). The first arrangement also allows products 3 of the container or bottle type, for example, to be packaged, with the difference that the 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), the products 3 being wrapped transversally, in the form of a band.

[0028] 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 the transport means 2 (over, under or to one side of the transport means 2), thereby causing films 5 and 11 to joint 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.

[0029] In one implementation the two films 5 and 11 are 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.

[0030] In one implementation elements of the machine 1, such as the rollers 100 and the reels 4 and 10, are fixed with freedom and housed within an enclosure plate 13. This provides the machine 1 with a clean arrangement, which may be especially advantageous when wrapping food products 3.

[0031] Implementations of packaging processes used for wrapping products 3 or batches of products will now be explained. In one implementation 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 the product 3 according to the determined direction X, the film 5 comprising a width that is smaller than the width of the product 3 and printed information 16, and being shrinkable only in the longitudinal direction. Once the film 5 wraps the product 3, the film 5 is cut and sealed to generate a wrapper 6 for the product 3 by means of cutting and sealing means 14 of the machine 1, and the product 3 continues to be transported in the determined direction X towards heating means 7 of the 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. In one implementation product 3 continues to advance in the determined direction X and moves to a second chamber 7B of the 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, the film 5 shrinks and adapts itself to the shape of the product 3 once the wrapper 6 has been generated, the product 3 being pressed by the wrapper 6 and the printed information 16 being disposed on it in a legible manner.

[0032] In one implementation the film 5 is released from the reel 4 in synchronisation with the advance of the product 3. Thus, when the product 3 reaches a specific position (e.g., next to the film 5 in the determined direction X, or when it comes into contact with the film 5), control means of the machine 1 cause the release of the film 5 at a speed substantially equal to the speed of advance of the product 3 in the determined direction X, thereby helping the film 5 to wrap the product 3. In one implementation the control means acts 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 the film 5, causing the rotation speed of the roller 100 to be substantially equal to the speed of advance of the product 3 in the determined direction X. The machine 1 may also comprise pushing means 15 which may be controlled by the control means to push the product 3 when the product 3 reaches a specific position (e.g., next to the film 5 in the determined direction X, or when it comes into contact with the film 5), thereby helping the product 3 to be wrapped by the film 5. In one implementation the pushing means 15 pushes the product 3 at a speed substantially equal to the speed of advance of the product 3, thereby ensuring synchronisation with the advance of the product 3 and with the release of the film 5 from the reel 4.

In one implementation the process also comprises a stage in which printed information 16 is disposed on the film 5, once the film 5 is released from the reel 4 and before wrapping the product 3. The printed information 16 may be customised by the printing means and the control means.

In one implementation 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 FIG. 1. When it reaches the height of the curtain 12, the product 3 comes into contact with the curtain 12 and pushes it, the curtain 12 being wrapped around the product 3 in the form of a band as shown in FIG. 2. Subsequently, once the film 5 wraps the 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 the 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 the 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 FIG. 3. The product 3 wrapped by the wrapper 6 enters the heating means, where the wrapper 6 is shrink following its passage through both chambers 7A and 7B of the heating means 7.

What is claimed is:

1. A system for packaging a product comprising:
   a conveyor that transports the product in a first direction, a first reel comprising a first film, the first film having a width that is less than a width of the product and shrinkable only in a longitudinal direction,
   a first printer adapted to print information on the first film prior to the first film being applied to the product,
   a first apparatus adapted to apply the first film onto the product to produce at least a partial film sleeve around at least a first portion of the product as the product is advanced in the first direction; and
   a first heater adapted to convey heat to at least a section of the first film applied to the product to cause the first film to shrink in the longitudinal direction.

2. A system according to claim 1, further comprising a structure adapted to support the first film in a relationship to the printer.

3. A system according to claim 1, further comprising a second printer adapted to print information on the first film prior to the film being applied to the product.

4. A system according to claim 1, further comprising a second heater adapted to convey heat to at least the first section and/or a second section of the first film applied to the product, the first heater comprising an infrared heater and the second heater comprising a convection heater.

5. A system according to claim 4, wherein the first heater is disposed in a first chamber and the second heater is disposed in a second chamber subsequent the first chamber.

6. A system according to claim 1, wherein the first film is substantially transparent.

7. A system according to claim 1, wherein the first film is a plastic PET-G film.

8. A system according to claim 1, further comprising a second reel with a second film.

9. A system according to claim 8, wherein the second film has a width that is less than a width of the product.

10. A system according to claim 9, wherein the second film is shrinkable only in a longitudinal direction.

11. A system according to claim 9, further comprising a second apparatus adapted to apply the second film onto the product to produce at least a partial second film sleeve around at least a second portion of the product as the product is advanced in the first direction.

12. A system according to claim 11, wherein the first reel is located on a first side of the conveyor and the second reel is located on a second side of the conveyor opposite the first side, the first apparatus and second apparatus adapted to apply the first and second films, respectively, so that a segment of the first film is joined with a segment of the second film.

13. A system according to claim 11, wherein the first film and the second film are identical.

14. A system according to claim 8, wherein the second film is not shrinkable.

15. A process for packaging a product comprising:
   transporting the product in a first direction, printing first information on a first film by use of a first printer prior to the first film being applied to the product, applying the first film onto the product to produce at least a partial film sleeve around at least a first portion of the product as the product is advanced in the first direction, the first film having a width that is less than a width of the product and shrinkable only in a longitudinal direction; and
   conveying heat by use of a first heater to at least a section of the first film applied to the product to cause the first film to shrink in the longitudinal direction.

16. A process according to claim 15, further comprising conveying heat to at least a section of the first film applied to the product using a second heater.

17. A process according to claim 16, wherein the first heater is an infrared heater and the second heater is a convection heater.

18. A process according to claim 15, further comprising applying a second film onto the product to produce at least a partial film sleeve around at least a second portion of the product as the product is advanced in the first direction.

19. A process according to claim 18, wherein the second film has a width that is less than a width of the product.

20. A process according to claim 19, wherein the second film shrinkable.

21. A process according to claim 19, wherein the second film is shrinkable only in a longitudinal direction.

22. A process according to claim 18, wherein at least a segment of the first film is joined with at least a segment of the second film.

23. A process according to claim 20, further comprising conveying heat to the second film to cause it to shrink.

24. A process according to claim 21, further comprising conveying heat to the second film to cause it to shrink in the longitudinal direction.